

Appendix for Traffic Impact Study Residential Development

North Road
Sudbury, Massachusetts

Prepared by
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Prepared for
Town of Sudbury

October 2018

APPENDIX A

Traffic Count Data



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Sudbury Road
 E/W: Fitchburg Turnpike (Route 117)
 Sudbury, MA
 Weekday AM

File Name : AM_Fitchburg Tpk at Sudbury Rd
 Site Code : 09201801
 Start Date : 9/20/2018
 Page No : 1

Groups Printed- Cars & Peds - Heavy Vehicles

Start Time	Sudbury Road From North					Fitchburg Turnpike (Route 117) From East					Sudbury Road From South					Fitchburg Turnpike (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	7	16	42	0	65	11	22	3	0	36	31	54	0	0	85	1	143	19	0	163	349
07:15 AM	17	22	35	0	74	17	17	5	0	39	33	52	0	0	85	0	145	18	0	163	361
07:30 AM	14	20	53	0	87	19	28	4	0	51	20	38	7	0	65	0	126	19	0	145	348
07:45 AM	15	17	37	0	69	10	47	8	0	65	17	58	23	0	98	6	126	15	0	147	379
Total	53	75	167	0	295	57	114	20	0	191	101	202	30	0	333	7	540	71	0	618	1437
08:00 AM	22	14	33	0	69	18	32	4	0	54	12	37	3	0	52	7	128	19	0	154	329
08:15 AM	14	25	37	0	76	18	38	3	0	59	15	53	0	0	68	2	160	18	0	180	383
08:30 AM	20	26	39	1	86	28	36	4	0	68	34	56	0	0	90	0	130	23	0	153	397
08:45 AM	22	25	38	0	85	23	34	7	0	64	26	27	1	0	54	3	126	46	0	175	378
Total	78	90	147	1	316	87	140	18	0	245	87	173	4	0	264	12	544	106	0	662	1487
Grand Total	131	165	314	1	611	144	254	38	0	436	188	375	34	0	597	19	1084	177	0	1280	2924
Apprch %	21.4	27	51.4	0.2		33	58.3	8.7	0		31.5	62.8	5.7	0		1.5	84.7	13.8	0		
Total %	4.5	5.6	10.7	0	20.9	4.9	8.7	1.3	0	14.9	6.4	12.8	1.2	0	20.4	0.6	37.1	6.1	0	43.8	
Cars & Peds	120	150	301	0	571	138	244	34	0	416	182	357	31	0	570	16	1053	172	0	1241	2798
% Cars & Peds	91.6	90.9	95.9	0	93.5	95.8	96.1	89.5	0	95.4	96.8	95.2	91.2	0	95.5	84.2	97.1	97.2	0	97	95.7
Heavy Vehicles	11	15	13	1	40	6	10	4	0	20	6	18	3	0	27	3	31	5	0	39	126
% Heavy Vehicles	8.4	9.1	4.1	100	6.5	4.2	3.9	10.5	0	4.6	3.2	4.8	8.8	0	4.5	15.8	2.9	2.8	0	3	4.3

Start Time	Sudbury Road From North					Fitchburg Turnpike (Route 117) From East					Sudbury Road From South					Fitchburg Turnpike (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	15	17	37	0	69	10	47	8	0	65	17	58	23	0	98	6	126	15	0	147	379
08:00 AM	22	14	33	0	69	18	32	4	0	54	12	37	3	0	52	7	128	19	0	154	329
08:15 AM	14	25	37	0	76	18	38	3	0	59	15	53	0	0	68	2	160	18	0	180	383
08:30 AM	20	26	39	1	86	28	36	4	0	68	34	56	0	0	90	0	130	23	0	153	397
Total Volume	71	82	146	1	300	74	153	19	0	246	78	204	26	0	308	15	544	75	0	634	1488
% App. Total	23.7	27.3	48.7	0.3		30.1	62.2	7.7	0		25.3	66.2	8.4	0		2.4	85.8	11.8	0		
PHF	.807	.788	.936	.250	.872	.661	.814	.594	.000	.904	.574	.879	.283	.000	.786	.536	.850	.815	.000	.881	.937



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Sudbury Road
 E/W: Fitchburg Turnpike (Route 117)
 Sudbury, MA
 Weekday AM

File Name : AM_Fitchburg Tpk at Sudbury Rd
 Site Code : 09201801
 Start Date : 9/20/2018
 Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Sudbury Road From North					Fitchburg Turnpike (Route 117) From East					Sudbury Road From South					Fitchburg Turnpike (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	2	1	3	0	6	0	2	2	0	4	1	1	0	0	2	0	3	0	0	3	15
07:15 AM	0	0	2	0	2	1	0	0	0	1	2	4	0	0	6	0	6	1	0	7	16
07:30 AM	2	2	1	0	5	0	1	0	0	1	0	3	0	0	3	0	2	0	0	2	11
07:45 AM	0	2	1	0	3	2	1	0	0	3	0	4	3	0	7	0	3	1	0	4	17
Total	4	5	7	0	16	3	4	2	0	9	3	12	3	0	18	0	14	2	0	16	59
08:00 AM	3	2	2	0	7	1	1	1	0	3	1	1	0	0	2	1	6	1	0	8	20
08:15 AM	1	2	1	0	4	0	1	0	0	1	1	3	0	0	4	1	4	0	0	5	14
08:30 AM	1	1	2	1	5	1	1	1	0	3	1	2	0	0	3	0	4	1	0	5	16
08:45 AM	2	5	1	0	8	1	3	0	0	4	0	0	0	0	0	1	3	1	0	5	17
Total	7	10	6	1	24	3	6	2	0	11	3	6	0	0	9	3	17	3	0	23	67
Grand Total	11	15	13	1	40	6	10	4	0	20	6	18	3	0	27	3	31	5	0	39	126
Apprch %	27.5	37.5	32.5	2.5		30	50	20	0		22.2	66.7	11.1	0		7.7	79.5	12.8	0		
Total %	8.7	11.9	10.3	0.8	31.7	4.8	7.9	3.2	0	15.9	4.8	14.3	2.4	0	21.4	2.4	24.6	4	0	31	

Start Time	Sudbury Road From North					Fitchburg Turnpike (Route 117) From East					Sudbury Road From South					Fitchburg Turnpike (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:45 AM	0	2	1	0	3	2	1	0	0	3	0	4	3	0	7	0	3	1	0	4	17
08:00 AM	3	2	2	0	7	1	1	1	0	3	1	1	0	0	2	1	6	1	0	8	20
08:15 AM	1	2	1	0	4	0	1	0	0	1	1	3	0	0	4	1	4	0	0	5	14
08:30 AM	1	1	2	1	5	1	1	1	0	3	1	2	0	0	3	0	4	1	0	5	16
Total Volume	5	7	6	1	19	4	4	2	0	10	3	10	3	0	16	2	17	3	0	22	67
% App. Total	26.3	36.8	31.6	5.3		40	40	20	0		18.8	62.5	18.8	0		9.1	77.3	13.6	0		
PHF	.417	.875	.750	.250	.679	.500	1.000														

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 07:45 AM



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 Start Date : 9/20/2018
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Sudbury Road From North					Fitchburg Turnpike (Route 117) From East					Sudbury Road From South					Fitchburg Turnpike (Route 117) From West					Int. Total	
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total		
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
Total	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:15 AM	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	2
08:30 AM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	0	2	0	1	0	0	1	1	0	0	0	1	0	1	0	0	0	1	5
Grand Total	0	3	0	0	3	0	1	0	0	1	1	2	0	0	3	0	1	0	0	0	1	8
Apprch %	0	100	0	0		0	100	0	0		33.3	66.7	0	0		0	100	0	0			
Total %	0	37.5	0	0	37.5	0	12.5	0	0	12.5	12.5	25	0	0	37.5	0	12.5	0	0	12.5		

Start Time	Sudbury Road From North					Fitchburg Turnpike (Route 117) From East					Sudbury Road From South					Fitchburg Turnpike (Route 117) From West					Int. Total	
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total		
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:15 AM	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	2
08:30 AM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	2	0	0	2	0	1	0	0	1	1	1	0	0	2	0	1	0	0	0	1	6
% App. Total	0	100	0	0		0	100	0	0		50	50	0	0		0	100	0	0			
PHF	.000	.250	.000	.000	.250	.000	.250	.000	.000	.250	.250	.250	.000	.000	.500	.000	.250	.000	.000	.250	.750	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 07:45 AM



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Sudbury Road
 E/W: Fitchburg Turnpike (Route 117)
 Sudbury, MA
 Weekday PM

File Name : PM_Fitchburg Tpk at Sudbury Rd
 Site Code : 09281803
 Start Date : 9/27/2018
 Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Sudbury Road From North					Fitchburg Turnpike (Route 117) From East					Sudbury Road From South					Fitchburg Turnpike (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	1	1	0	0	2	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	6
04:15 PM	1	1	0	0	2	0	4	0	0	4	0	1	0	0	1	0	1	0	0	1	8
04:30 PM	0	1	1	0	2	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	4
04:45 PM	1	2	0	0	3	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	5
Total	3	5	1	0	9	0	9	1	0	10	0	1	0	0	1	0	2	1	0	3	23
05:00 PM	0	0	0	0	0	3	3	0	0	6	0	0	0	0	0	0	1	1	0	2	8
05:15 PM	1	0	0	0	1	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	3
05:30 PM	1	1	0	0	2	0	1	1	0	2	0	1	0	0	1	0	0	0	0	0	5
05:45 PM	0	2	0	0	2	0	2	0	0	2	1	1	0	0	2	0	0	0	0	0	6
Total	2	3	0	0	5	4	7	1	0	12	1	2	0	0	3	0	1	1	0	2	22
Grand Total	5	8	1	0	14	4	16	2	0	22	1	3	0	0	4	0	3	2	0	5	45
Apprch %	35.7	57.1	7.1	0		18.2	72.7	9.1	0		25	75	0	0		0	60	40	0		
Total %	11.1	17.8	2.2	0	31.1	8.9	35.6	4.4	0	48.9	2.2	6.7	0	0	8.9	0	6.7	4.4	0	11.1	

Start Time	Sudbury Road From North					Fitchburg Turnpike (Route 117) From East					Sudbury Road From South					Fitchburg Turnpike (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	1	1	0	0	2	0	4	0	0	4	0	1	0	0	1	0	1	0	0	1	8
04:30 PM	0	1	1	0	2	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	4
04:45 PM	1	2	0	0	3	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	5
05:00 PM	0	0	0	0	0	3	3	0	0	6	0	0	0	0	0	0	1	1	0	2	8
Total Volume	2	4	1	0	7	3	9	1	0	13	0	1	0	0	1	0	2	2	0	4	25
% App. Total	28.6	57.1	14.3	0		23.1	69.2	7.7	0		0	100	0	0		0	50	50	0		
PHF	.500	.500	.250	.000	.583	.250	.563	.250	.000	.542	.000	.250	.000	.000	.250	.000	.500	.500	.000	.500	.781



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Pantry Road/Dakin Road
 E/W: North Road (Route 117)
 Sudbury, MA
 Weekday AM

File Name : AM_North Rd at Dakin Rd
 Site Code : 00000000
 Start Date : 9/20/2018
 Page No : 1

Groups Printed- Cars & Peds - Heavy Vehicles

Start Time	Dakin Road From North					North Road (Route 117) From East					Pantry Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	1	22	12	1	36	2	23	4	0	29	8	17	6	0	31	11	226	3	0	240	336
07:15 AM	4	25	5	0	34	2	34	4	0	40	9	24	14	0	47	14	206	10	0	230	351
07:30 AM	3	13	7	1	24	8	34	7	0	49	22	16	6	0	44	26	200	11	0	237	354
07:45 AM	4	15	4	0	23	9	72	2	0	83	48	17	9	0	74	40	205	15	0	260	440
Total	12	75	28	2	117	21	163	17	0	201	87	74	35	0	196	91	837	39	0	967	1481
08:00 AM	4	19	3	0	26	6	57	10	0	73	22	20	9	1	52	60	178	20	0	258	409
08:15 AM	4	16	4	0	24	4	50	14	0	68	24	46	15	0	85	57	150	6	0	213	390
08:30 AM	11	30	4	0	45	2	50	14	0	66	7	27	8	0	42	40	146	11	0	197	350
08:45 AM	4	26	7	0	37	0	58	4	0	62	10	27	10	0	47	47	187	18	0	252	398
Total	23	91	18	0	132	12	215	42	0	269	63	120	42	1	226	204	661	55	0	920	1547
Grand Total	35	166	46	2	249	33	378	59	0	470	150	194	77	1	422	295	1498	94	0	1887	3028
Apprch %	14.1	66.7	18.5	0.8		7	80.4	12.6	0		35.5	46	18.2	0.2		15.6	79.4	5	0		
Total %	1.2	5.5	1.5	0.1	8.2	1.1	12.5	1.9	0	15.5	5	6.4	2.5	0	13.9	9.7	49.5	3.1	0	62.3	
Cars & Peds	32	165	45	2	244	31	361	57	0	449	144	187	70	1	402	288	1468	89	0	1845	2940
% Cars & Peds	91.4	99.4	97.8	100	98	93.9	95.5	96.6	0	95.5	96	96.4	90.9	100	95.3	97.6	98	94.7	0	97.8	97.1
Heavy Vehicles	3	1	1	0	5	2	17	2	0	21	6	7	7	0	20	7	30	5	0	42	88
% Heavy Vehicles	8.6	0.6	2.2	0	2	6.1	4.5	3.4	0	4.5	4	3.6	9.1	0	4.7	2.4	2	5.3	0	2.2	2.9

Start Time	Dakin Road From North					North Road (Route 117) From East					Pantry Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	3	13	7	1	24	8	34	7	0	49	22	16	6	0	44	26	200	11	0	237	354
07:45 AM	4	15	4	0	23	9	72	2	0	83	48	17	9	0	74	40	205	15	0	260	440
08:00 AM	4	19	3	0	26	6	57	10	0	73	22	20	9	1	52	60	178	20	0	258	409
08:15 AM	4	16	4	0	24	4	50	14	0	68	24	46	15	0	85	57	150	6	0	213	390
Total Volume	15	63	18	1	97	27	213	33	0	273	116	99	39	1	255	183	733	52	0	968	1593
% App. Total	15.5	64.9	18.6	1		9.9	78	12.1	0		45.5	38.8	15.3	0.4		18.9	75.7	5.4	0		
PHF	.938	.829	.643	.250	.933	.750	.740	.589	.000	.822	.604	.538	.650	.250	.750	.763	.894	.650	.000	.931	.905



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 Weekday AM

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 Site Code : 00000000
 Start Date : 9/20/2018
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Groups Printed- Heavy Vehicles

Start Time	Dakin Road From North					North Road (Route 117) From East					Pantry Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	6	0	0	6	6
07:15 AM	0	0	0	0	0	0	1	1	0	2	1	1	1	0	3	2	3	1	0	6	11
07:30 AM	0	0	0	0	0	1	2	1	0	4	0	1	1	0	2	0	1	1	0	2	8
07:45 AM	0	0	0	0	0	1	3	0	0	4	3	0	1	0	4	2	4	0	0	6	14
Total	1	0	0	0	1	2	6	2	0	10	4	3	3	0	10	4	14	2	0	20	41
08:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	1	0	3	0	5	2	0	7	10
08:15 AM	0	0	0	0	0	0	5	0	0	5	0	3	2	0	5	1	1	1	0	3	13
08:30 AM	2	0	1	0	3	0	3	0	0	3	0	0	0	0	0	1	2	0	0	3	9
08:45 AM	0	1	0	0	1	0	3	0	0	3	1	0	1	0	2	1	8	0	0	9	15
Total	2	1	1	0	4	0	11	0	0	11	2	4	4	0	10	3	16	3	0	22	47
Grand Total	3	1	1	0	5	2	17	2	0	21	6	7	7	0	20	7	30	5	0	42	88
Apprch %	60	20	20	0		9.5	81	9.5	0		30	35	35	0		16.7	71.4	11.9	0		
Total %	3.4	1.1	1.1	0	5.7	2.3	19.3	2.3	0	23.9	6.8	8	8	0	22.7	8	34.1	5.7	0	47.7	

Start Time	Dakin Road From North					North Road (Route 117) From East					Pantry Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
08:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	1	0	3	0	5	2	0	7	10
08:15 AM	0	0	0	0	0	0	5	0	0	5	0	3	2	0	5	1	1	1	0	3	13
08:30 AM	2	0	1	0	3	0	3	0	0	3	0	0	0	0	0	1	2	0	0	3	9
08:45 AM	0	1	0	0	1	0	3	0	0	3	1	0	1	0	2	1	8	0	0	9	15
Total Volume	2	1	1	0	4	0	11	0	0	11	2	4	4	0	10	3	16	3	0	22	47
% App. Total	50	25	25	0		0	100	0	0		20	40	40	0		13.6	72.7	13.6	0		
PHF	.250	.250	.250	.000	.333	.000	.550	.000	.000	.550	.500	.333	.500	.000	.500	.750	.500	.375	.000	.611	.783

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 08:00 AM



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Pantry Road/Dakin Road
 E/W: North Road (Route 117)
 Sudbury, MA
 Weekday AM

File Name : AM_North Rd at Dakin Rd
 Site Code : 00000000
 Start Date : 9/20/2018
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Dakin Road From North					North Road (Route 117) From East					Pantry Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1
08:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1
Grand Total	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	2	0	0	3	5
Apprch %	0	100	0	0		0	100	0	0		0	0	0	0		33.3	66.7	0	0		
Total %	0	20	0	0	20	0	20	0	0	20	0	0	0	0	0	20	40	0	0	60	

Start Time	Dakin Road From North					North Road (Route 117) From East					Pantry Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2
08:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	4
% App. Total	0	100	0	0		0	100	0	0		0	0	0	0		0	100	0	0		
PHF	.000	.250	.000	.000	.250	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.500

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 07:45 AM



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Pantry Road/Dakin Road
 E/W: North Road (Route 117)
 Sudbury, MA
 Weekday PM

File Name : PM_North Rd at Dakin Rd
 Site Code : 09272018
 Start Date : 9/27/2018
 Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Dakin Road From North					North Road (Route 117) From East					Pantry Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	0	0	0	1	1	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	10
04:15 PM	0	0	0	0	0	0	6	1	0	7	0	1	1	0	2	1	3	0	0	4	13
04:30 PM	1	0	0	0	1	0	1	1	0	2	1	0	0	0	1	0	2	0	0	2	6
04:45 PM	1	0	0	0	1	1	2	0	0	3	0	0	0	0	0	0	1	0	0	1	5
Total	2	0	0	1	3	1	14	2	0	17	1	1	1	0	3	1	10	0	0	11	34
05:00 PM	0	1	1	0	2	0	4	1	0	5	0	0	4	0	4	0	2	1	0	3	14
05:15 PM	0	0	1	0	1	0	4	0	0	4	0	0	3	0	3	0	0	0	0	0	8
05:30 PM	1	1	0	0	2	0	3	0	0	3	0	0	4	0	4	0	0	0	0	0	9
05:45 PM	0	0	1	0	1	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	7
Total	1	2	3	0	6	0	17	1	0	18	0	0	11	0	11	0	2	1	0	3	38
Grand Total	3	2	3	1	9	1	31	3	0	35	1	1	12	0	14	1	12	1	0	14	72
Apprch %	33.3	22.2	33.3	11.1		2.9	88.6	8.6	0		7.1	7.1	85.7	0		7.1	85.7	7.1	0		
Total %	4.2	2.8	4.2	1.4	12.5	1.4	43.1	4.2	0	48.6	1.4	1.4	16.7	0	19.4	1.4	16.7	1.4	0	19.4	

Start Time	Dakin Road From North					North Road (Route 117) From East					Pantry Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	0	0	0	0	0	6	1	0	7	0	1	1	0	2	1	3	0	0	4	13
04:30 PM	1	0	0	0	1	0	1	1	0	2	1	0	0	0	1	0	2	0	0	2	6
04:45 PM	1	0	0	0	1	1	2	0	0	3	0	0	0	0	0	0	1	0	0	1	5
05:00 PM	0	1	1	0	2	0	4	1	0	5	0	0	4	0	4	0	2	1	0	3	14
Total Volume	2	1	1	0	4	1	13	3	0	17	1	1	5	0	7	1	8	1	0	10	38
% App. Total	50	25	25	0		5.9	76.5	17.6	0		14.3	14.3	71.4	0		10	80	10	0		
PHF	.500	.250	.250	.000	.500	.250	.542	.750	.000	.607	.250	.250	.313	.000	.438	.250	.667	.250	.000	.625	.679



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Pantry Road/Dakin Road
 E/W: North Road (Route 117)
 Sudbury, MA
 Weekday PM

File Name : PM_North Rd at Dakin Rd
 Site Code : 09272018
 Start Date : 9/27/2018
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Dakin Road From North					North Road (Route 117) From East					Pantry Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2
05:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Total	0	2	0	0	2	0	1	0	0	1	0	3	0	0	3	0	0	0	0	0	6
Grand Total	0	2	0	0	2	0	2	0	0	2	0	3	0	0	3	0	1	0	0	1	8
Apprch %	0	100	0	0		0	100	0	0		0	100	0	0		0	100	0	0		
Total %	0	25	0	0	25	0	25	0	0	25	0	37.5	0	0	37.5	0	12.5	0	0	12.5	

Start Time	Dakin Road From North					North Road (Route 117) From East					Pantry Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
Total Volume	0	2	0	0	2	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	6
% App. Total	0	100	0	0		0	100	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.500	.000	.000	.500	.000	.500	.000	.000	.500	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.500

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 04:45 PM



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Mossman Road/Powder Hill Road
 E/W: North Road (Route 117)
 Sudbury, MA
 Weekday AM

File Name : AM_North Road at Powder Mill Rd
 Site Code : 20180920
 Start Date : 9/20/2018
 Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Powder Hill Road From North					North Road (Route 117) From East					Mossman Road From South					North Road (Route 117) From West					Int. Total	
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total		
07:00 AM	0	1	5	0	6	3	1	0	0	4	0	0	0	0	0	0	7	0	0	0	7	17
07:15 AM	0	1	4	0	5	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	8
07:30 AM	0	2	3	0	5	0	3	0	0	3	0	0	0	0	0	0	1	1	0	0	2	10
07:45 AM	0	1	2	0	3	0	1	0	0	1	0	1	0	0	1	0	4	2	0	0	6	11
Total	0	5	14	0	19	3	5	0	0	8	0	1	0	0	1	0	14	4	0	0	18	46
08:00 AM	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	4	1	0	0	5	7
08:15 AM	0	0	1	0	1	1	2	1	0	4	0	0	0	0	0	0	3	0	0	0	3	8
08:30 AM	0	0	2	0	2	2	3	0	0	5	1	0	0	0	1	0	5	1	0	0	6	14
08:45 AM	0	0	1	0	1	1	1	0	0	2	3	0	0	0	3	0	4	1	0	0	5	11
Total	0	0	5	0	5	5	6	1	0	12	4	0	0	0	4	0	16	3	0	0	19	40
Grand Total	0	5	19	0	24	8	11	1	0	20	4	1	0	0	5	0	30	7	0	0	37	86
Apprch %	0	20.8	79.2	0		40	55	5	0		80	20	0	0		0	81.1	18.9	0	0		
Total %	0	5.8	22.1	0	27.9	9.3	12.8	1.2	0	23.3	4.7	1.2	0	0	5.8	0	34.9	8.1	0	0	43	

Start Time	Powder Hill Road From North					North Road (Route 117) From East					Mossman Road From South					North Road (Route 117) From West					Int. Total	
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total		
07:00 AM	0	1	5	0	6	3	1	0	0	4	0	0	0	0	0	0	7	0	0	0	7	17
07:15 AM	0	1	4	0	5	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	8
07:30 AM	0	2	3	0	5	0	3	0	0	3	0	0	0	0	0	0	1	1	0	0	2	10
07:45 AM	0	1	2	0	3	0	1	0	0	1	0	1	0	0	1	0	4	2	0	0	6	11
Total Volume	0	5	14	0	19	3	5	0	0	8	0	1	0	0	1	0	14	4	0	0	18	46
% App. Total	0	26.3	73.7	0		37.5	62.5	0	0		0	100	0	0		0	77.8	22.2	0	0		
PHF	.000	.625	.700	.000	.792	.250	.417	.000	.000	.500	.000	.250	.000	.000	.250	.000	.500	.500	.000	.000	.643	.676

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 07:00 AM



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Mossman Road/Powder Hill Road
 E/W: North Road (Route 117)
 Sudbury, MA
 Weekday AM

File Name : AM_North Road at Powder Mill Rd
 Site Code : 20180920
 Start Date : 9/20/2018
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Powder Hill Road From North					North Road (Route 117) From East					Mossman Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0
07:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	1	0	0	1	0	0	0	1	1	0	1	0	0	1	0	2	0	0	2	5
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
08:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	0	1	0	0	1	4
Grand Total	0	1	0	0	1	0	1	0	1	2	0	3	0	0	3	0	3	0	0	3	9
Apprch %	0	100	0	0		0	50	0	50		0	100	0	0		0	100	0	0		
Total %	0	11.1	0	0	11.1	0	11.1	0	11.1	22.2	0	33.3	0	0	33.3	0	33.3	0	0	33.3	

Start Time	Powder Hill Road From North					North Road (Route 117) From East					Mossman Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:15 AM	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	2
07:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
Total Volume	0	1	0	0	1	0	0	0	1	1	0	3	0	0	3	0	2	0	0	2	7
% App. Total	0	100	0	0		0	0	0	100		0	100	0	0		0	100	0	0		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.250	.250	.000	.375	.000	.000	.375	.000	.500	.000	.000	.500	.875

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 07:15 AM



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Mossman Road/Powder Hill Road
 E/W: North Road (Route 117)
 Sudbury, MA
 Weekday PM

File Name : PM_North Road at Powder Mill Rd
 Site Code : 20180927
 Start Date : 9/27/2018
 Page No : 1

Groups Printed- Cars & Peds - Heavy Vehicles

Start Time	Powder Hill Road From North					North Road (Route 117) From East					Mossman Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	2	6	16	0	24	57	179	6	0	242	3	5	3	2	13	1	52	9	0	62	341
04:15 PM	1	6	15	0	22	40	174	9	0	223	2	5	1	1	9	4	47	10	0	61	315
04:30 PM	3	5	9	0	17	53	182	6	1	242	5	5	2	1	13	0	52	7	0	59	331
04:45 PM	4	4	9	0	17	63	192	5	0	260	3	4	2	0	9	2	55	9	0	66	352
Total	10	21	49	0	80	213	727	26	1	967	13	19	8	4	44	7	206	35	0	248	1339
05:00 PM	1	9	20	0	30	60	190	2	0	252	9	10	0	0	19	2	50	14	0	66	367
05:15 PM	1	11	17	0	29	72	220	5	0	297	3	6	0	1	10	4	48	10	0	62	398
05:30 PM	2	10	15	0	27	67	188	5	0	260	1	11	3	0	15	2	60	10	0	72	374
05:45 PM	0	9	26	0	35	76	189	8	0	273	6	8	1	0	15	5	49	19	0	73	396
Total	4	39	78	0	121	275	787	20	0	1082	19	35	4	1	59	13	207	53	0	273	1535
Grand Total	14	60	127	0	201	488	1514	46	1	2049	32	54	12	5	103	20	413	88	0	521	2874
Apprch %	7	29.9	63.2	0		23.8	73.9	2.2	0		31.1	52.4	11.7	4.9		3.8	79.3	16.9	0		
Total %	0.5	2.1	4.4	0	7	17	52.7	1.6	0	71.3	1.1	1.9	0.4	0.2	3.6	0.7	14.4	3.1	0	18.1	
Cars & Peds	14	59	126	0	199	477	1488	46	1	2012	31	52	11	5	99	19	402	83	0	504	2814
% Cars & Peds	100	98.3	99.2	0	99	97.7	98.3	100	100	98.2	96.9	96.3	91.7	100	96.1	95	97.3	94.3	0	96.7	97.9
Heavy Vehicles	0	1	1	0	2	11	26	0	0	37	1	2	1	0	4	1	11	5	0	17	60
% Heavy Vehicles	0	1.7	0.8	0	1	2.3	1.7	0	0	1.8	3.1	3.7	8.3	0	3.9	5	2.7	5.7	0	3.3	2.1

Start Time	Powder Hill Road From North					North Road (Route 117) From East					Mossman Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	9	20	0	30	60	190	2	0	252	9	10	0	0	19	2	50	14	0	66	367
05:15 PM	1	11	17	0	29	72	220	5	0	297	3	6	0	1	10	4	48	10	0	62	398
05:30 PM	2	10	15	0	27	67	188	5	0	260	1	11	3	0	15	2	60	10	0	72	374
05:45 PM	0	9	26	0	35	76	189	8	0	273	6	8	1	0	15	5	49	19	0	73	396
Total Volume	4	39	78	0	121	275	787	20	0	1082	19	35	4	1	59	13	207	53	0	273	1535
% App. Total	3.3	32.2	64.5	0		25.4	72.7	1.8	0		32.2	59.3	6.8	1.7		4.8	75.8	19.4	0		
PHF	.500	.886	.750	.000	.864	.905	.894	.625	.000	.911	.528	.795	.333	.250	.776	.650	.863	.697	.000	.935	.964
Cars & Peds	100	97.4	100	0	99.2	97.5	98.3	100	0	98.2	94.7	100	75.0	100	96.6	100	99.0	94.3	0	98.2	98.2
% Cars & Peds	0	1	0	0	1	7	13	0	0	20	1	0	1	0	2	0	2	3	0	5	28
Heavy Vehicles	0	2.6	0	0	0.8	2.5	1.7	0	0	1.8	5.3	0	25.0	0	3.4	0	1.0	5.7	0	1.8	1.8



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Mossman Road/Powder Hill Road
 E/W: North Road (Route 117)
 Sudbury, MA
 Weekday PM

File Name : PM_North Road at Powder Mill Rd
 Site Code : 20180927
 Start Date : 9/27/2018
 Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Powder Hill Road From North					North Road (Route 117) From East					Mossman Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	0	0	1	0	1	1	3	0	0	4	0	1	0	0	1	1	3	1	0	5	11
04:15 PM	0	0	0	0	0	2	4	0	0	6	0	1	0	0	1	0	4	1	0	5	12
04:30 PM	0	0	0	0	0	1	4	0	0	5	0	0	0	0	0	0	0	0	0	0	5
04:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	4
Total	0	0	1	0	1	4	13	0	0	17	0	2	0	0	2	1	9	2	0	12	32
05:00 PM	0	1	0	0	1	3	4	0	0	7	0	0	0	0	0	0	2	0	0	2	10
05:15 PM	0	0	0	0	0	2	2	0	0	4	0	0	0	0	0	0	0	0	0	0	4
05:30 PM	0	0	0	0	0	2	4	0	0	6	1	0	1	0	2	0	0	2	0	2	10
05:45 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	1	0	1	4
Total	0	1	0	0	1	7	13	0	0	20	1	0	1	0	2	0	2	3	0	5	28
Grand Total	0	1	1	0	2	11	26	0	0	37	1	2	1	0	4	1	11	5	0	17	60
Apprch %	0	50	50	0		29.7	70.3	0	0		25	50	25	0		5.9	64.7	29.4	0		
Total %	0	1.7	1.7	0	3.3	18.3	43.3	0	0	61.7	1.7	3.3	1.7	0	6.7	1.7	18.3	8.3	0	28.3	

Start Time	Powder Hill Road From North					North Road (Route 117) From East					Mossman Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	1	0	1	1	3	0	0	4	0	1	0	0	1	1	3	1	0	5	11
04:15 PM	0	0	0	0	0	2	4	0	0	6	0	1	0	0	1	0	4	1	0	5	12
04:30 PM	0	0	0	0	0	1	4	0	0	5	0	0	0	0	0	0	0	0	0	0	5
04:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	4
Total Volume	0	0	1	0	1	4	13	0	0	17	0	2	0	0	2	1	9	2	0	12	32
% App. Total	0	0	100	0		23.5	76.5	0	0		0	100	0	0		8.3	75	16.7	0		
PHF	.000	.000	.250	.000	.250	.500	.813	.000	.000	.708	.000	.500	.000	.000	.500	.250	.563	.500	.000	.600	.667



120 Water Street, 4th Floor
 Boston, MA 02109
 617-556-0020

N/S: Mossman Road/Powder Hill Road
 E/W: North Road (Route 117)
 Sudbury, MA
 Weekday PM

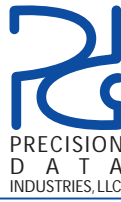
File Name : PM_North Road at Powder Mill Rd
 Site Code : 20180927
 Start Date : 9/27/2018
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Powder Hill Road From North					North Road (Route 117) From East					Mossman Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
04:15 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	1	0	0	1	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	1	1	0	0	2	3	0	0	0	3	0	1	0	0	1	7
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	0	1
05:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	4
Grand Total	0	1	0	0	1	1	4	0	0	5	3	0	0	0	3	0	2	0	0	2	11
Apprch %	0	100	0	0		20	80	0	0		100	0	0	0		0	100	0	0		
Total %	0	9.1	0	0	9.1	9.1	36.4	0	0	45.5	27.3	0	0	0	27.3	0	18.2	0	0	18.2	

Start Time	Powder Hill Road From North					North Road (Route 117) From East					Mossman Road From South					North Road (Route 117) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	1	0	0	1	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	3
Total Volume	0	1	0	0	1	0	3	0	0	3	3	0	0	0	3	0	1	0	0	1	8
% App. Total	0	100	0	0		0	100	0	0		100	0	0	0		0	100	0	0		
PHF	.000	.250	.000	.000	.250	.000	.375	.000	.000	.375	.250	.000	.000	.000	.250	.000	.250	.000	.000	.250	.500

North Road (Route 117)
 west of Melone Gravel Pit Access
 City, State: Sudbury, MA
 Client: McMahon Associates/ C. Medeiros



46 Morton Street, Framingham, MA 01702
 Office: 508-875-0100 Fax: 508-875-0118
 Email: datarequests@pdillc.com

186494 A Volume
 Site Code: Y18699.11

Start Time	EB		WB		Combin ed		09/27/18 Thu							
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.								
12:00	0	69	3	61	3	130								
12:15	0	62	4	72	4	134								
12:30	0	48	6	71	6	119								
12:45	0	76	255	6	19	68	272	19	144	527				
01:00	1	50	3	66	4	116								
01:15	0	65	4	69	4	134								
01:30	1	58	2	75	3	133								
01:45	0	57	230	2	11	71	281	2	13	128	511			
02:00	2	42	1	67	3	109								
02:15	0	50	2	82	2	132								
02:30	2	79	1	100	3	179								
02:45	2	38	209	0	4	135	384	2	10	173	593			
03:00	1	96	0	144	1	240								
03:15	1	73	0	174	1	247								
03:30	2	57	3	181	5	238								
03:45	0	79	305	0	3	240	739	0	7	319	1044			
04:00	4	61	1	235	5	296								
04:15	12	73	0	209	12	282								
04:30	12	58	0	236	12	294								
04:45	18	46	60	252	3	4	213	893	21	50	273	1145		
05:00	17	66	3	205	20	271								
05:15	54	69	1	230	55	299								
05:30	79	75	7	212	86	287								
05:45	102	252	70	280	7	18	213	860	109	270	283	1140		
06:00	154	58	21	225	175	283								
06:15	295	63	19	226	314	289								
06:30	316	43	16	185	332	228								
06:45	249	1014	35	199	29	85	173	809	278	1099	208	1008		
07:00	255	37	29	128	284	165								
07:15	227	38	35	88	262	126								
07:30	200	20	48	76	248	96								
07:45	160	842	21	116	51	163	55	347	211	1005	76	463		
08:00	165	40	56	55	221	95								
08:15	159	28	57	59	216	87								
08:30	188	22	53	54	241	76								
08:45	181	693	22	112	62	228	48	216	243	921	70	328		
09:00	208	22	42	43	250	65								
09:15	167	26	57	50	224	76								
09:30	141	28	42	34	183	62								
09:45	114	630	11	87	54	195	38	165	168	825	49	252		
10:00	101	12	59	16	160	28								
10:15	86	9	46	28	132	37								
10:30	64	4	40	21	104	25								
10:45	65	316	6	31	56	201	18	83	121	517	24	114		
11:00	56	4	44	15	100	19								
11:15	59	2	55	16	114	18								
11:30	56	2	56	19	112	21								
11:45	78	249	3	11	55	210	11	61	133	459	14	72		
Total	4054	2087	1141	5110	5195	7197								
Percent	78.0%	29.0%	22.0%	71.0%										
Day Total		6141		6251		12392								
Peak	06:15	-	03:00	-	08:00	-	03:45	-	06:15	-	03:45	-	-	-
Vol.	1115	-	305	-	228	-	920	-	1208	-	1191	-	-	-
P.H.F.	0.882		0.794		0.919		0.958		0.910		0.933			

North Road (Route 117)
west of Melone Gravel Pit Access
City, State: Sudbury, MA
Client: McMahon Associates/ C. Medeiros



46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

186494 A Class
Site Code: Y18699.11

EB

Start Time	Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/27/1														
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
02:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
03:00	1	2	1	0	0	0	0	0	0	0	0	0	0	4
04:00	0	36	8	0	0	1	0	1	0	0	0	0	0	46
05:00	2	191	53	1	4	1	0	0	0	0	0	0	0	252
06:00	4	831	138	3	27	3	5	2	1	0	0	0	0	1014
07:00	7	701	104	5	14	2	3	6	0	0	0	0	0	842
08:00	2	587	91	1	8	0	2	2	0	0	0	0	0	693
09:00	4	532	67	1	20	2	4	0	0	0	0	0	0	630
10:00	1	246	54	1	9	0	4	1	0	0	0	0	0	316
11:00	3	200	34	1	8	2	1	0	0	0	0	0	0	249
12 PM	2	194	39	0	11	5	2	1	0	1	0	0	0	255
13:00	2	189	24	1	8	1	5	0	0	0	0	0	0	230
14:00	4	165	32	1	6	1	0	0	0	0	0	0	0	209
15:00	8	236	44	1	14	1	1	0	0	0	0	0	0	305
16:00	6	213	23	4	4	1	0	0	1	0	0	0	0	252
17:00	1	259	14	0	6	0	0	0	0	0	0	0	0	280
18:00	1	178	17	0	3	0	0	0	0	0	0	0	0	199
19:00	0	99	16	0	0	1	0	0	0	0	0	0	0	116
20:00	1	92	16	0	2	1	0	0	0	0	0	0	0	112
21:00	1	76	6	0	4	0	0	0	0	0	0	0	0	87
22:00	1	25	5	0	0	0	0	0	0	0	0	0	0	31
23:00	0	10	1	0	0	0	0	0	0	0	0	0	0	11
Total	51	5068	789	20	148	22	27	13	2	1	0	0	0	6141
Percent	0.8%	82.5%	12.8%	0.3%	2.4%	0.4%	0.4%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	06:00	06:00	07:00	06:00	06:00	06:00	07:00	06:00					06:00
Vol.	7	831	138	5	27	3	5	6	1					1014
PM Peak	15:00	17:00	15:00	16:00	15:00	12:00	13:00	12:00	16:00	12:00				15:00
Vol.	8	259	44	4	14	5	5	1	1	1				305

North Road (Route 117)
 west of Melone Gravel Pit Access
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 Email: datarequests@pdillc.com

186494 A Class
 Site Code: Y18699.11

WB

Start Time	Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/27/1														
8	0	16	3	0	0	0	0	0	0	0	0	0	0	19
01:00	0	11	0	0	0	0	0	0	0	0	0	0	0	11
02:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
03:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
04:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
05:00	0	11	2	0	5	0	0	0	0	0	0	0	0	18
06:00	0	68	11	1	5	0	0	0	0	0	0	0	0	85
07:00	2	129	22	1	8	0	0	1	0	0	0	0	0	163
08:00	0	177	32	2	13	3	0	1	0	0	0	0	0	228
09:00	0	147	32	2	11	2	0	1	0	0	0	0	0	195
10:00	0	136	43	0	19	2	1	0	0	0	0	0	0	201
11:00	1	147	35	0	23	3	0	1	0	0	0	0	0	210
12 PM	2	195	46	0	21	6	1	1	0	0	0	0	0	272
13:00	2	193	54	0	28	2	0	2	0	0	0	0	0	281
14:00	3	255	89	0	24	5	0	5	2	1	0	0	0	384
15:00	8	493	164	3	67	3	0	1	0	0	0	0	0	739
16:00	4	634	177	1	67	3	2	5	0	0	0	0	0	893
17:00	3	680	128	0	42	2	0	5	0	0	0	0	0	860
18:00	3	627	147	1	29	1	0	0	1	0	0	0	0	809
19:00	1	263	66	0	17	0	0	0	0	0	0	0	0	347
20:00	0	157	49	0	9	1	0	0	0	0	0	0	0	216
21:00	1	124	35	0	4	0	0	1	0	0	0	0	0	165
22:00	1	67	12	0	3	0	0	0	0	0	0	0	0	83
23:00	0	53	6	0	2	0	0	0	0	0	0	0	0	61
Total	31	4593	1154	11	397	33	4	24	3	1	0	0	0	6251
Percent	0.5%	73.5%	18.5%	0.2%	6.4%	0.5%	0.1%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	10:00	08:00	11:00	08:00	10:00	07:00						08:00
Vol.	2	177	43	2	23	3	1	1						228
PM Peak	15:00	17:00	16:00	15:00	15:00	12:00	16:00	14:00	14:00	14:00				16:00
Vol.	8	680	177	3	67	6	2	5	2	1				893



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

North Road (Route 117)
west of Melone Gravel Pit Access
City, State: Sudbury, MA
Client: McMahon Associates/ C. Medeiros

186494 A Speed
Site Code: Y18699.11

EB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
09/27/																
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	1	0	1	0	0	0	0	2	52	47
02:00	0	0	0	0	0	4	2	0	0	0	0	0	0	6	41	39
03:00	0	0	0	0	0	1	2	1	0	0	0	0	0	4	46	42
04:00	0	0	0	0	2	11	23	8	2	0	0	0	0	46	45	42
05:00	0	0	0	6	24	108	97	15	2	0	0	0	0	252	42	39
06:00	43	48	66	51	269	434	101	2	0	0	0	0	0	1014	38	33
07:00	87	18	77	64	182	312	96	6	0	0	0	0	0	842	38	31
08:00	11	23	34	26	82	339	164	12	1	0	0	1	0	693	41	36
09:00	1	0	0	9	106	339	161	14	0	0	0	0	0	630	41	37
10:00	0	0	0	0	31	161	102	21	1	0	0	0	0	316	42	39
11:00	0	0	1	1	24	109	97	16	1	0	0	0	0	249	42	39
12 PM	0	0	0	2	38	119	86	9	1	0	0	0	0	255	42	38
13:00	0	1	2	15	23	108	76	4	1	0	0	0	0	230	42	38
14:00	0	0	1	1	31	115	54	5	1	0	1	0	0	209	41	38
15:00	0	1	9	4	47	152	84	6	2	0	0	0	0	305	41	37
16:00	0	1	1	3	37	98	96	14	2	0	0	0	0	252	42	39
17:00	0	0	0	0	24	131	100	24	1	0	0	0	0	280	43	39
18:00	0	0	0	2	24	105	55	12	1	0	0	0	0	199	42	38
19:00	0	1	2	4	13	56	35	4	1	0	0	0	0	116	42	38
20:00	0	0	1	7	27	48	26	3	0	0	0	0	0	112	41	36
21:00	0	0	0	0	11	41	27	8	0	0	0	0	0	87	43	39
22:00	0	0	0	0	3	14	10	3	1	0	0	0	0	31	43	40
23:00	0	0	0	0	3	4	4	0	0	0	0	0	0	11	41	37
Total	142	93	194	195	1001	2809	1499	187	19	0	1	1	0	6141		
%	2.3%	1.5%	3.2%	3.2%	16.3%	45.7%	24.4%	3.0%	0.3%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	06:00	07:00	07:00	06:00	06:00	08:00	10:00	04:00			08:00		06:00		
Vol.	87	48	77	64	269	434	164	21	2			1		1014		
PM Peak		13:00	15:00	13:00	15:00	15:00	17:00	17:00	15:00		14:00			15:00		
Vol.		1	9	15	47	152	100	24	2		1			305		

Stats

15th Percentile : 30 MPH
50th Percentile : 36 MPH
85th Percentile : 41 MPH
95th Percentile : 43 MPH

Mean Speed(Average) : 36 MPH
10 MPH Pace Speed : 35-44 MPH
Number in Pace : 4308
Percent in Pace : 70.2%
Number of Vehicles > 35 MPH : 3954
Percent of Vehicles > 35 MPH : 64.4%



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdilc.com

North Road (Route 117)
west of Melone Gravel Pit Access
City, State: Sudbury, MA
Client: McMahon Associates/ C. Medeiros

186494 A Speed
Site Code: Y18699.11

WB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
	14	19	24	29	34	39	44	49	54	59	64	69	9999			
09/27/																
18	0	0	0	0	0	5	7	6	1	0	0	0	0	19	47	43
01:00	0	0	0	0	1	4	4	1	1	0	0	0	0	11	45	41
02:00	0	0	0	1	1	0	2	0	0	0	0	0	0	4	42	36
03:00	0	0	0	0	1	0	1	1	0	0	0	0	0	3	46	40
04:00	0	0	0	1	0	1	2	0	0	0	0	0	0	4	42	37
05:00	0	0	0	0	1	4	10	2	1	0	0	0	0	18	44	41
06:00	0	0	8	2	4	25	28	16	2	0	0	0	0	85	45	39
07:00	0	0	15	3	10	39	66	25	4	0	0	0	1	163	44	39
08:00	0	0	5	3	3	58	100	50	6	2	1	0	0	228	46	42
09:00	0	0	0	0	12	49	85	45	4	0	0	0	0	195	46	41
10:00	0	0	0	0	8	48	100	38	7	0	0	0	0	201	45	42
11:00	0	0	0	0	6	55	99	44	3	1	1	0	1	210	46	42
12 PM	0	0	7	1	11	67	135	47	4	0	0	0	0	272	45	41
13:00	0	1	6	10	25	93	100	39	7	0	0	0	0	281	44	39
14:00	1	1	0	1	5	95	195	67	19	0	0	0	0	384	46	42
15:00	0	0	0	0	21	244	355	111	6	0	1	1	0	739	44	41
16:00	0	0	0	2	44	204	493	141	9	0	0	0	0	893	44	41
17:00	0	0	0	0	11	187	497	154	11	0	0	0	0	860	45	42
18:00	0	0	0	4	34	315	361	90	5	0	0	0	0	809	43	40
19:00	0	0	0	0	7	103	169	56	8	4	0	0	0	347	45	42
20:00	0	0	0	0	7	50	110	41	6	2	0	0	0	216	46	42
21:00	0	0	0	0	2	47	67	44	3	1	0	0	1	165	46	42
22:00	0	0	0	0	0	11	34	26	10	2	0	0	0	83	48	44
23:00	0	0	0	0	0	11	16	25	8	1	0	0	0	61	48	45
Total	1	2	41	28	214	1715	3036	1069	125	13	3	1	3	6251		
%	0.0%	0.0%	0.7%	0.4%	3.4%	27.4%	48.6%	17.1%	2.0%	0.2%	0.0%	0.0%	0.0%			
AM Peak			07:00	07:00	09:00	08:00	08:00	08:00	10:00	08:00	08:00		07:00	08:00		
Vol.			15	3	12	58	100	50	7	2	1		1	228		
PM Peak	14:00	13:00	12:00	13:00	16:00	18:00	17:00	17:00	14:00	19:00	15:00	15:00	21:00	16:00		
Vol.	1	1	7	10	44	315	497	154	19	4	1	1	1	893		

Stats

15th Percentile : 35 MPH
 50th Percentile : 40 MPH
 85th Percentile : 45 MPH
 95th Percentile : 48 MPH

Mean Speed(Average) : 41 MPH
 10 MPH Pace Speed : 35-44 MPH
 Number in Pace : 4751
 Percent in Pace : 76.0%
 Number of Vehicles > 35 MPH : 5622
 Percent of Vehicles > 35 MPH : 89.9%

APPENDIX B

Crash Summary

Crash Summary
Melone Residential Development
Sudbury, MA

	Fitchburg Turnpike (Route 117) at Sudbury Road	North Road (Route 117) at Pantry Road/ Dakin Road	North Road (Route 117) at Mossman Road/ Powder Mill Road	North Road (Route 117) in the vicinity of the proposed site driveway
Year				
2012	4	3	1	0
2013	1	4	3	1
2014	8	4	2	1
2015	8	3	1	1
2016	5	2	0	1
Total	26	16	7	4
Type				
Angle	13	5	4	0
Rear-end	6	9	0	0
Sideswipe	3	0	1	1
Head-on	2	0	1	0
Single Vehicle	2	2	1	3
Total	26	16	7	4
Severity				
Property Damage	22	14	7	3
Personal Injury	4	2	0	1
Fatality	0	0	0	0
Total	26	16	7	4
Weather				
Clear	20	11	5	3
Cloudy	3	2	1	0
Rain	2	2	0	1
Snow	1	1	1	0
Fog	0	0	0	0
Total	26	16	7	4
Time				
7:00 AM to 9:00 AM	4	5	2	1
9:00 AM to 4:00 PM	6	5	1	1
4:00 PM to 6:00 PM	8	3	1	1
6:00 PM to 7:00 AM	8	3	3	1
Total	26	16	7	4
Crash Rate	0.74	0.55	0.25	-
State Average	0.78	0.78	0.57	-
District 3 Average	0.89	0.89	0.61	-

Source: MassDOT

APPENDIX C

Traffic Projection Model

**Weekday Morning Peak Hour
Melone Residential Development
Sudbury, MA**

TRAFFIC PROJECTION MODEL

Intersection	Dir.	Turn	2018 Existing Volumes	Background Growth 7 yrs (at 1.0 % per year)	129 Parker Development	2025 No-Build Volumes	New Project PERCENT ENTER	New Project Trips ENTER	New Project PERCENT EXIT	New Project Trips EXIT	New Project Trips TOTAL	2025 Build Volumes
Fitchburg Turnpike (Route 117) at Sudbury Road	EB	L	75	5	2	82		0	25%	21	21	103
		T	544	39	12	595		0	30%	25	25	620
		R	15	1	0	16		0		0	0	16
	WB	L	19	1		20		0		0	0	20
		T	153	11	12	176	30%	8		0	8	184
		R	74	5		79		0		0	0	79
	NB	L	26	2	2	30		0		0	0	30
		T	204	15		219		0		0	0	219
		R	78	6		84		0		0	0	84
SB	L	146	11		157		0		0	0	157	
	T	82	6		88		0		0	0	88	
	R	71	5	6	82	25%	7		0	7	89	
North Road (Route 117) at Site Driveway	EB	L	0	0	0	0	45%	12		0	12	12
		T	672	48	14	734		0		0	0	734
	WB	T	217	16	20	253		0		0	0	253
		R	0	0		0	55%	15		0	15	15
	SB	L	0	0		0		0	55%	46	46	46
R	0	0	0	0	0		0	45%	37	37	37	
North Road (Route 117) at Dakin Road/Pantry Road	EB	L	52	4	1	57		0		0	0	57
		T	679	49	14	742	15%	4		0	4	746
		R	197	14	4	215		0		0	0	215
	WB	L	40	3		43		0	30%	25	25	68
		T	229	17	20	266		0	15%	12	12	278
		R	21	2		23		0		0	0	23
	NB	L	41	3	4	48		0		0	0	48
		T	110	8		118		0		0	0	118
		R	101	7		108	30%	8		0	8	116
SB	L	15	1		16		0		0	0	16	
	T	80	6		86		0		0	0	86	
	R	23	2	2	27		0		0	0	27	
North Road (Route 117) at Powder Mill Road/Mossman Road	EB	L	87	6	2	95		0		0	0	95
		T	760	55	19	834	10%	3		0	3	837
		R	16	1	1	18		0		0	0	18
	WB	L	16	1		17		0		0	0	17
		T	170	12	26	208		0	10%	8	8	216
		R	54	4		58		0		0	0	58
	NB	L	4	0	1	5		0		0	0	5
		T	27	2		29		0		0	0	29
		R	32	2		34		0		0	0	34
SB	L	189	14		203		0		0	0	203	
	T	54	4		58		0		0	0	58	
	R	2	0	0	2		0		0	0	2	

Peak Hour: 7:45 AM - 8:45 AM

**Weekday Afternoon Peak Hour
Melone Residential Development
Sudbury, MA**

TRAFFIC PROJECTION MODEL

Intersection	Dir.	Turn	2018 Existing Volumes	Background Growth 7 yrs (at 1.0 % per year)	129 Parker Development	2025 No-Build Volumes	New Project PERCENT ENTER	New Project Trips ENTER	New Project PERCENT EXIT	New Project Trips EXIT	New Project Trips TOTAL	2025 Build Volumes
Fitchburg Turnpike (Route 117) at Sudbury Road	EB	L	73	5	11	89		0	25%	13	13	102
		T	167	12	25	204		0	30%	15	15	219
		R	6	0	1	7		0		0	0	7
	WB	L	113	8		121		0		0	0	121
		T	692	50	36	778	30%	26		0	26	804
		R	266	19		285		0		0	0	285
	NB	L	12	1	1	14		0		0	0	14
		T	126	9		135		0		0	0	135
		R	23	2		25		0		0	0	25
SB	L	149	11		160		0		0	0	160	
	T	199	14		213		0		0	0	213	
	R	99	7	5	111	25%	21		0	21	132	
North Road (Route 117) at Site Driveway	EB	L	0	0	0	0	45%	38		0	38	38
		T	280	20	37	337		0		0	0	337
	WB	T	860	62	42	964		0		0	0	964
		R	0	0		0	55%	47		0	47	47
	SB	L	0	0		0		0	55%	28	28	28
R	0	0	0	0	0		0	45%	23	23	23	
North Road (Route 117) at Dakin Road/Pantry Road	EB	L	23	2	3	28		0		0	0	28
		T	247	18	37	302	15%	13		0	13	315
		R	41	3	6	50		0		0	0	50
	WB	L	43	3		46		0	30%	15	15	61
		T	839	61	42	942		0	15%	8	8	950
		R	14	1		15		0		0	0	15
	NB	L	143	10	7	160		0		0	0	160
		T	75	5		80		0		0	0	80
		R	13	1		14	30%	25		0	25	39
SB	L	9	1		10		0		0	0	10	
	T	116	8		124		0		0	0	124	
	R	39	3	2	44		0		0	0	44	
North Road (Route 117) at Powder Mill Road/Mossman Road	EB	L	53	4	12	69		0		0	0	69
		T	207	15	46	268	10%	9		0	9	277
		R	13	1	3	17		0		0	0	17
	WB	L	20	1		21		0		0	0	21
		T	787	57	51	895		0	10%	5	5	900
		R	275	20		295		0		0	0	295
	NB	L	4	0	0	4		0		0	0	4
		T	35	3		38		0		0	0	38
		R	19	1		20		0		0	0	20
SB	L	78	6		84		0		0	0	84	
	T	39	3		42		0		0	0	42	
	R	4	0	0	4		0		0	0	4	

Peak Hour: 5:00 PM - 6:00 PM

APPENDIX D

Journey-to-Work Data

**Melone Residential Development
Residential Journey-to-Work Data
Sudbury, MA**

	Town/City of Residence	County of Work	City/Town of Work	Number of Vehicles	Percent	Assigned Route(s)	
1	Sudbury	Middlesex	Sudbury	1620	25%	Pantry Road	Route 117 West of Dakin/Pantry
2	Sudbury	Suffolk	Boston	959	15%	Sudbury Road (North)	Route 117 (East)
3	Sudbury	Middlesex	Framingham	459	7%	Pantry Road	Route 117 (East)
4	Sudbury	Middlesex	Waltham	365	6%	Route 117 (East)	Sudbury Road (North)
5	Sudbury	Middlesex	Cambridge	361	6%	Sudbury Road (North)	Route 117 (East)
6	Sudbury	Middlesex	Marlborough	315	5%	Pantry Road	Route 117 (West)
7	Sudbury	Middlesex	Lexington	290	4%	Sudbury Road (North)	
8	Sudbury	Middlesex	Natick	206	3%	Route 117 (East)	Pantry Road
9	Sudbury	Middlesex	Newton	194	3%	Route 117 (East)	
10	Sudbury	Middlesex	Burlington	184	3%	Sudbury Road (North)	Route 117 (East)
11	Sudbury	Middlesex	Concord	168	3%	Sudbury Road (North)	Dakin Road
12	Sudbury	Middlesex	Maynard	146	2%	Route 117 (West)	Powder Mill Road
13	Sudbury	Middlesex	Woburn	138	2%	Sudbury Road (North)	Route 117 (East)
14	Sudbury	Middlesex	Weston	129	2%	Route 117 (East)	
15	Sudbury	Middlesex	Wayland	120	2%	Pantry Road	Route 117 (East)
16	Sudbury	Middlesex	Hudson	119	2%	Route 117 (West)	Pantry Road
17	Sudbury	Norfolk	Wellesley	107	2%	Route 117 (East)	
18	Sudbury	Norfolk	Brookline	104	2%	Sudbury Road (North)	Route 117 (East)
19	Sudbury	Worcester	Westborough	99	2%	Route 117 (West)	Pantry Road
20	Sudbury	Middlesex	Bedford	93	1%	Sudbury Road (North)	Dakin Road
21	Sudbury	Worcester	Worcester	93	1%	Route 117 (West)	Pantry Road
22	Sudbury	Middlesex	Acton	83	1%	Route 117 (West)	Powder Mill Road Sudbury Road (North)
23	Sudbury	Middlesex	Lowell	63	1%	Sudbury Road (North)	
24	Sudbury	Norfolk	Needham	61	1%	Route 117 (East)	
25	Sudbury	Norfolk	Canton	60	1%	Sudbury Road (North)	Route 117 (East)
Total				6536	100%		
Trip Distribution - Residential Trips							
	Route	% Estimated	% Assigned				
	Route 117 (East)	29.5%	30%				
	Pantry Road	29.7%	30%				
	Sudbury Road (North)	25.1%	25%				
	Route 117 (West)	7.0%	10%				
	Route 117 West of Dakin/Pantry	6.2%	5%				
	Dakin Road	1.3%	0%				
	Powder Mill Road	1.2%	0%				
			70%				

APPENDIX E

Highway Capacity Manual Methodologies

CAPACITY/LEVEL-OF-SERVICE ANALYSES METHODOLOGY

The detailed capacity/level-of-service analysis contained in this traffic impact study was performed in accordance with the standard techniques contained in the *Highway Capacity Manual*.⁽¹⁾ By definition, capacity represents “the maximum rate of flow that can reasonably be expected to pass a point on a uniform section of a lane or roadway under prevailing roadway, traffic, and control conditions.” The level of functioning of an intersection or a uniform section of a lane or roadway can be expressed in terms of levels of service. Level of service (LOS) is defined as “a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers”. Such measures include “speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.”

At unsignalized intersections, a methodology for evaluating the relative functioning of intersections controlled by stop or yield signs has been developed, and is based on several assumptions, including:

- Major street flows are not affected by the minor (stop-sign controlled) street movements.
- Left turns from the major street to the minor street are influenced only by opposing major street through flow.
- Minor street left turns are impeded by all major street traffic plus opposing minor street traffic.
- Minor street through traffic is impeded by all major street traffic.
- Minor street right turns are impeded only by the major street traffic coming from the left.

The concept of stop-controlled or yield-controlled intersection analysis is based on the estimate of average total delay on minor streets. The methodology of analysis relies on three elements: the size and distribution of gaps in the major traffic stream, the usefulness of these gaps to the minor stream drivers, and the relative priority of the various traffic streams at the intersection. The results of the analysis provide an estimate of average total delay for the various critical movements at the unsignalized intersections. Correlation between average total delay and the respective levels of service are provided for unsignalized intersections as follows:

(1) *Transportation Research Board, Highway Capacity Manual 2010, published by the Transportation Research Board, Washington, DC, 2010.*

Unsignalized Intersections

Level of Service	Control Delay Per Vehicle (seconds)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F	> 50

At signalized intersections, an additional element must be considered: time allocation. Level of service is based on the average control delay per vehicle for various movements within the intersection. Volume/capacity relationships also affect the operations of signalized intersections. Thus, both volume/capacity and delay must be considered to evaluate the overall operation of a signalized intersection. Correlation between average delay per vehicle and the respective levels of service are provided for signalized intersections as follows:

Signalized Intersections

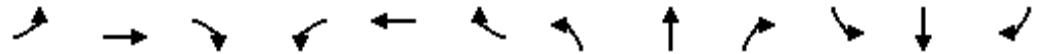
Level of Service	Control Delay Per Vehicle (seconds)
A	≤ 10
B	>10 – 20
C	>20 – 35
D	>35 – 55
E	>55 – 80
F	> 80

APPENDIX F

2018 Existing Capacity/Level-of-Service Analysis

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Morning Peak Hour
 2018 Existing



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	52	679	197	40	229	21	41	110	101	15	80	23
Future Volume (vph)	52	679	197	40	229	21	41	110	101	15	80	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1791	0	0	1788	0	0	1699	0	0	1784	0
Flt Permitted		0.965			0.813			0.918			0.896	
Satd. Flow (perm)	0	1733	0	0	1464	0	0	1572	0	0	1608	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			11			48			18	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1144			1234			866			622	
Travel Time (s)		26.0			28.0			19.7			14.1	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			2			1						1
Peak Hour Factor	0.89	0.89	0.89	0.87	0.87	0.87	0.74	0.74	0.74	0.66	0.66	0.66
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	2%	2%	0%	5%	5%	10%	4%	4%	7%	0%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1042	0	0	333	0	0	340	0	0	179	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		11.0	11.0		11.0	11.0	
Total Split (s)	45.0	45.0		45.0	45.0		20.0	20.0		20.0	20.0	
Total Split (%)	69.2%	69.2%		69.2%	69.2%		30.8%	30.8%		30.8%	30.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effect Green (s)		38.4			38.4			14.0			14.0	
Actuated g/C Ratio		0.61			0.61			0.22			0.22	
v/c Ratio		0.96			0.37			0.87			0.48	
Control Delay		34.1			7.4			46.1			24.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		34.1			7.4			46.1			24.3	

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Morning Peak Hour
 2018 Existing

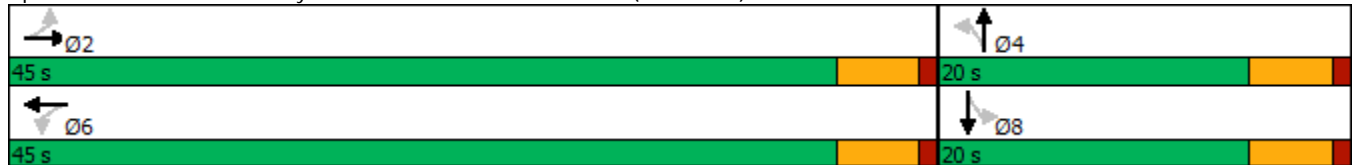


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			A			D			C	
Approach Delay		34.1			7.4			46.1			24.3	
Approach LOS		C			A			D			C	
Queue Length 50th (ft)		329			55			111			55	
Queue Length 95th (ft)		#625			93			#170			73	
Internal Link Dist (ft)		1064			1154			786			542	
Turn Bay Length (ft)												
Base Capacity (vph)		1132			948			416			402	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.92			0.35			0.82			0.45	

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 62.5
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 30.6
 Intersection LOS: C
 Intersection Capacity Utilization 85.6%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: Pantry Road/Dakin Road & North Road (Route 117)



Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Morning Peak Hour
 2018 Existing



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	544	15	19	153	74	26	204	78	146	82	71
Future Volume (vph)	75	544	15	19	153	74	26	204	78	146	82	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	175		50	120		50	0		0	160		0
Storage Lanes	0		1	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1736	1845	1429	1626	1845	1538	0	1726	0	1736	1618	0
Flt Permitted	0.650			0.281				0.967		0.413		
Satd. Flow (perm)	1187	1845	1400	481	1845	1505	0	1676	0	755	1618	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			16			82		24			63	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			1374			720			969	
Travel Time (s)		23.0			31.2			16.4			22.0	
Confl. Peds. (#/hr)	1						1					
Confl. Bikes (#/hr)			1			1			1			2
Peak Hour Factor	0.88	0.88	0.88	0.90	0.90	0.90	0.79	0.79	0.79	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	3%	13%	11%	3%	5%	12%	5%	4%	4%	9%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	618	17	21	170	82	0	390	0	166	174	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	11.0	11.0		11.0	11.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0		24.0	24.0	
Total Split (%)	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	34.3%	34.3%		34.3%	34.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min	Min	Min	Min	None	None		None	None	
Act Effect Green (s)	28.2	28.2	28.2	28.2	28.2	28.2		20.3		20.3	20.3	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48		0.35		0.35	0.35	
v/c Ratio	0.15	0.70	0.02	0.09	0.19	0.11		0.66		0.64	0.29	
Control Delay	8.4	16.1	3.7	8.3	8.6	2.3		24.8		34.5	12.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	8.4	16.1	3.7	8.3	8.6	2.3		24.8		34.5	12.9	

Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Morning Peak Hour
 2018 Existing

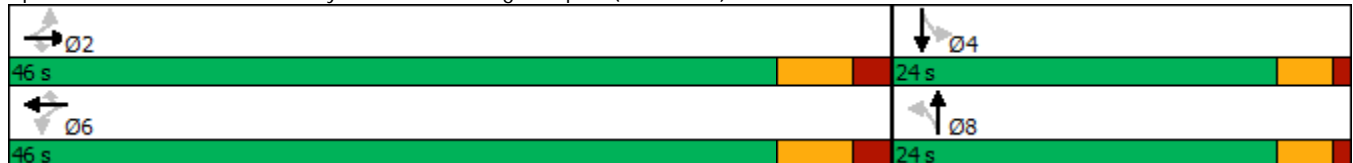


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	B	A	A	A	A		C		C	B	
Approach Delay		14.9			6.7			24.8			23.5	
Approach LOS		B			A			C			C	
Queue Length 50th (ft)	15	155	0	4	31	0		107		49	27	
Queue Length 95th (ft)	33	237	7	13	58	16		201		#158	81	
Internal Link Dist (ft)		930			1294			640			889	
Turn Bay Length (ft)	175		50	120		50				160		
Base Capacity (vph)	826	1284	979	334	1284	1072		599		262	604	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.10	0.48	0.02	0.06	0.13	0.08		0.65		0.63	0.29	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 58.7
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 17.5
 Intersection LOS: B
 Intersection Capacity Utilization 80.9%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 14: Sudbury Road & Fitchburg Turnpike (Route 117)



Melone 40B Development
 4: Mossman Road/Powder Mill Road & North Road (Route 117)

Weekday Morning Peak Hour
 2018 Existing

Intersection												
Int Delay, s/veh	180.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	87	760	16	16	170	54	4	27	32	189	54	2
Future Vol, veh/h	87	760	16	16	170	54	4	27	32	189	54	2
Conflicting Peds, #/hr	0	0	8	8	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	91	91	91	83	83	83	88	88	88
Heavy Vehicles, %	5	2	0	6	4	7	0	4	3	3	2	0
Mvmt Flow	95	826	17	18	187	59	5	33	39	215	61	2

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	246	0	0	851	0	0	1317	1315	843	1314	1294	217
Stage 1	-	-	-	-	-	-	1033	1033	-	253	253	-
Stage 2	-	-	-	-	-	-	284	282	-	1061	1041	-
Critical Hdwy	4.15	-	-	4.16	-	-	7.1	6.54	6.23	7.13	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.54	-	6.13	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.54	-	6.13	5.52	-
Follow-up Hdwy	2.245	-	-	2.254	-	-	3.5	4.036	3.327	3.527	4.018	3.3
Pot Cap-1 Maneuver	1303	-	-	771	-	-	136	156	362	~ 134	163	828
Stage 1	-	-	-	-	-	-	283	307	-	749	698	-
Stage 2	-	-	-	-	-	-	727	674	-	270	307	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	1303	-	-	765	-	-	77	130	359	~ 85	136	828
Mov Cap-2 Maneuver	-	-	-	-	-	-	77	130	-	~ 85	136	-
Stage 1	-	-	-	-	-	-	242	262	-	646	679	-
Stage 2	-	-	-	-	-	-	642	656	-	~ 182	262	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.8		0.7		38.5		\$ 995.6	
HCM LOS					E		F	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	181	1303	-	-	765	-	-	93
HCM Lane V/C Ratio	0.419	0.073	-	-	0.023	-	-	2.994
HCM Control Delay (s)	38.5	8	0	-	9.8	0	-	\$ 995.6
HCM Lane LOS	E	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	1.9	0.2	-	-	0.1	-	-	27

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

Melone 40B Development
8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Afternoon Peak Hour
2018 Existing



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	23	247	41	43	839	14	143	75	13	9	116	39
Future Volume (vph)	23	247	41	43	839	14	143	75	13	9	116	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1833	0	0	1853	0	0	1740	0	0	1756	0
Flt Permitted		0.913			0.970			0.670			0.976	
Satd. Flow (perm)	0	1680	0	0	1801	0	0	1201	0	0	1719	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			2			4			19	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1144			1234			866			622	
Travel Time (s)		26.0			28.0			19.7			14.1	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)						1			3			2
Peak Hour Factor	0.88	0.88	0.88	0.95	0.95	0.95	0.81	0.81	0.81	0.84	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	1%	0%	2%	2%	7%	8%	0%	0%	22%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	354	0	0	943	0	0	286	0	0	195	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		11.0	11.0		11.0	11.0	
Total Split (s)	55.0	55.0		55.0	55.0		25.0	25.0		25.0	25.0	
Total Split (%)	68.8%	68.8%		68.8%	68.8%		31.3%	31.3%		31.3%	31.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effect Green (s)		40.8			40.8			20.3			20.3	
Actuated g/C Ratio		0.57			0.57			0.28			0.28	
v/c Ratio		0.37			0.91			0.83			0.39	
Control Delay		8.5			27.9			49.5			23.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.5			27.9			49.5			23.6	

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Afternoon Peak Hour
 2018 Existing

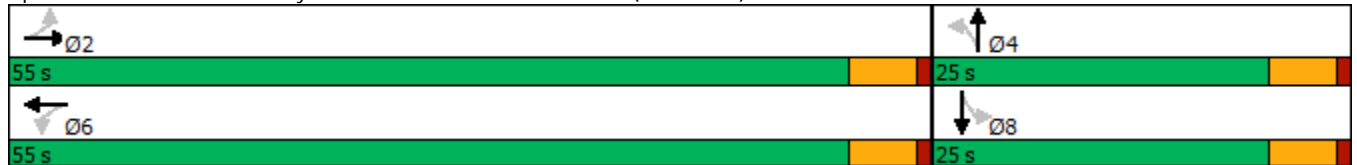


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		A			C			D			C	
Approach Delay		8.5			27.9			49.5			23.6	
Approach LOS		A			C			D			C	
Queue Length 50th (ft)		70			329			123			65	
Queue Length 95th (ft)		112			#578			#245			123	
Internal Link Dist (ft)		1064			1154			786			542	
Turn Bay Length (ft)												
Base Capacity (vph)		1203			1285			345			504	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.29			0.73			0.83			0.39	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 71.3
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 27.1
 Intersection LOS: C
 Intersection Capacity Utilization 90.5%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: Pantry Road/Dakin Road & North Road (Route 117)



Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Afternoon Peak Hour
 2018 Existing



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	167	6	113	692	266	12	126	23	149	199	99
Future Volume (vph)	73	167	6	113	692	266	12	126	23	149	199	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	175		50	120		50	0		0	160		0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1787	1881	1615	1770	1881	1583	0	1837	0	1805	1751	0
Flt Permitted	0.252			0.638				0.963		0.623		
Satd. Flow (perm)	474	1881	1581	1188	1881	1549	0	1776	0	1184	1751	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			16			138		12			36	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			1374			720			969	
Travel Time (s)		23.0			31.2			16.4			22.0	
Confl. Peds. (#/hr)	1		1	1		1						
Confl. Bikes (#/hr)						1			1			1
Peak Hour Factor	0.88	0.88	0.88	0.94	0.94	0.94	0.94	0.94	0.94	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	1%	0%	2%	1%	2%	0%	1%	0%	0%	2%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	190	7	120	736	283	0	171	0	175	350	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	11.0	11.0		11.0	11.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0		24.0	24.0	
Total Split (%)	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	34.3%	34.3%		34.3%	34.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min	Min	Min	Min	None	None		None	None	
Act Effect Green (s)	33.2	33.2	33.2	33.2	33.2	33.2		15.3		15.3	15.3	
Actuated g/C Ratio	0.56	0.56	0.56	0.56	0.56	0.56		0.26		0.26	0.26	
v/c Ratio	0.31	0.18	0.01	0.18	0.70	0.30		0.37		0.57	0.73	
Control Delay	11.5	7.3	1.8	7.7	14.0	4.8		20.7		29.3	29.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	11.5	7.3	1.8	7.7	14.0	4.8		20.7		29.3	29.1	

Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Afternoon Peak Hour
 2018 Existing



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	A	A	A	B	A		C		C	C	
Approach Delay		8.4			11.1			20.7			29.2	
Approach LOS		A			B			C			C	
Queue Length 50th (ft)	15	32	0	20	183	24		53		63	118	
Queue Length 95th (ft)	43	62	3	46	320	61		102		113	188	
Internal Link Dist (ft)		930			1294			640			889	
Turn Bay Length (ft)	175		50	120		50				160		
Base Capacity (vph)	331	1316	1111	831	1316	1125		647		426	654	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.25	0.14	0.01	0.14	0.56	0.25		0.26		0.41	0.54	

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	59.2
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	16.0
Intersection LOS:	B
Intersection Capacity Utilization:	88.3%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 14: Sudbury Road & Fitchburg Turnpike (Route 117)



Melone 40B Development
 4: Mossman Road/Powder Mill Road & North Road (Route 117)

Weekday Afternoon Peak Hour
 2018 Existing

Intersection												
Int Delay, s/veh	47.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	53	207	13	20	787	275	4	35	19	78	39	4
Future Vol, veh/h	53	207	13	20	787	275	4	35	19	78	39	4
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	91	91	91	80	80	80	86	86	86
Heavy Vehicles, %	4	2	0	0	2	3	25	0	5	0	3	0
Mvmt Flow	57	223	14	22	865	302	5	44	24	91	45	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1167	0	0	238	0	0	1430	1556	231	1438	1412	1016
Stage 1	-	-	-	-	-	-	345	345	-	1060	1060	-
Stage 2	-	-	-	-	-	-	1085	1211	-	378	352	-
Critical Hdwy	4.14	-	-	4.1	-	-	7.35	6.5	6.25	7.1	6.53	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.1	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.1	5.53	-
Follow-up Hdwy	2.236	-	-	2.2	-	-	3.725	4	3.345	3.5	4.027	3.3
Pot Cap-1 Maneuver	591	-	-	1341	-	-	100	114	801	112	137	291
Stage 1	-	-	-	-	-	-	625	640	-	273	300	-
Stage 2	-	-	-	-	-	-	237	257	-	648	630	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	591	-	-	1340	-	-	61	96	800	~ 62	115	291
Mov Cap-2 Maneuver	-	-	-	-	-	-	61	96	-	~ 62	115	-
Stage 1	-	-	-	-	-	-	555	568	-	243	284	-
Stage 2	-	-	-	-	-	-	186	244	-	516	559	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.3			0.1			64.7			\$ 531.8		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	128	591	-	-	1340	-	-	75
HCM Lane V/C Ratio	0.566	0.096	-	-	0.016	-	-	1.876
HCM Control Delay (s)	64.7	11.7	0	-	7.7	0	-	\$ 531.8
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	2.8	0.3	-	-	0.1	-	-	12.4

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

APPENDIX G

2025 No Build Capacity/Level-of-Service Analysis

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Morning Peak Hour
 2025 No Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	57	742	215	43	266	23	48	118	108	16	86	27
Future Volume (vph)	57	742	215	43	266	23	48	118	108	16	86	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1791	0	0	1791	0	0	1697	0	0	1778	0
Flt Permitted		0.959			0.801			0.891			0.888	
Satd. Flow (perm)	0	1723	0	0	1443	0	0	1526	0	0	1589	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			11			47			19	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1144			1234			866			622	
Travel Time (s)		26.0			28.0			19.7			14.1	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			2			1						1
Peak Hour Factor	0.89	0.89	0.89	0.87	0.87	0.87	0.74	0.74	0.74	0.66	0.66	0.66
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	2%	2%	0%	5%	5%	10%	4%	4%	7%	0%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1140	0	0	381	0	0	370	0	0	195	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		11.0	11.0		11.0	11.0	
Total Split (s)	45.0	45.0		45.0	45.0		20.0	20.0		20.0	20.0	
Total Split (%)	69.2%	69.2%		69.2%	69.2%		30.8%	30.8%		30.8%	30.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effect Green (s)		40.0			40.0			15.0			15.0	
Actuated g/C Ratio		0.62			0.62			0.23			0.23	
v/c Ratio		1.06			0.43			0.95			0.51	
Control Delay		60.8			8.1			60.8			25.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		60.8			8.1			60.8			25.1	

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Morning Peak Hour
 2025 No Build

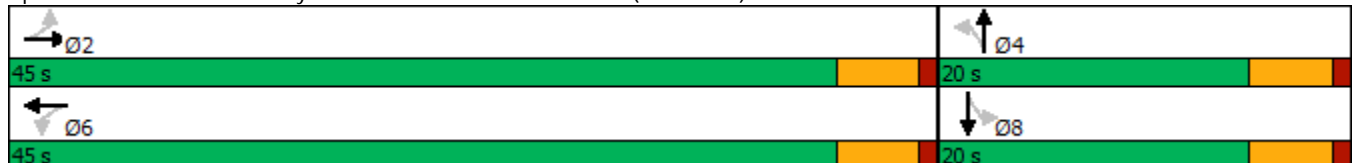


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E			A			E			C	
Approach Delay		60.8			8.1			60.8			25.1	
Approach LOS		E			A			E			C	
Queue Length 50th (ft)		-506			66			128			61	
Queue Length 95th (ft)		#718			111			#201			79	
Internal Link Dist (ft)		1064			1154			786			542	
Turn Bay Length (ft)												
Base Capacity (vph)		1075			892			388			381	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.06			0.43			0.95			0.51	

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 47.8
 Intersection LOS: D
 Intersection Capacity Utilization 92.9%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.

Splits and Phases: 8: Pantry Road/Dakin Road & North Road (Route 117)



Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Morning Peak Hour
 2025 No Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	595	16	20	176	79	30	219	84	157	88	82
Future Volume (vph)	82	595	16	20	176	79	30	219	84	157	88	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	175		50	120		50	0		0	160		0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1736	1845	1429	1626	1845	1538	0	1725	0	1736	1614	0
Flt Permitted	0.634			0.245				0.961		0.372		
Satd. Flow (perm)	1157	1845	1400	419	1845	1505	0	1665	0	680	1614	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			16			88		24			67	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			1374			720			969	
Travel Time (s)		23.0			31.2			16.4			22.0	
Confl. Peds. (#/hr)	1						1					
Confl. Bikes (#/hr)			1			1			1			2
Peak Hour Factor	0.88	0.88	0.88	0.90	0.90	0.90	0.79	0.79	0.79	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	3%	13%	11%	3%	5%	12%	5%	4%	4%	9%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	676	18	22	196	88	0	421	0	178	193	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	11.0	11.0		11.0	11.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0		24.0	24.0	
Total Split (%)	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	34.3%	34.3%		34.3%	34.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min	Min	Min	Min	None	None		None	None	
Act Effect Green (s)	30.8	30.8	30.8	30.8	30.8	30.8		20.4		20.4	20.4	
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50		0.33		0.33	0.33	
v/c Ratio	0.16	0.73	0.03	0.10	0.21	0.11		0.74		0.79	0.33	
Control Delay	8.2	16.8	3.8	8.4	8.5	2.2		30.0		51.4	14.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	8.2	16.8	3.8	8.4	8.5	2.2		30.0		51.4	14.2	

Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Morning Peak Hour
 2025 No Build

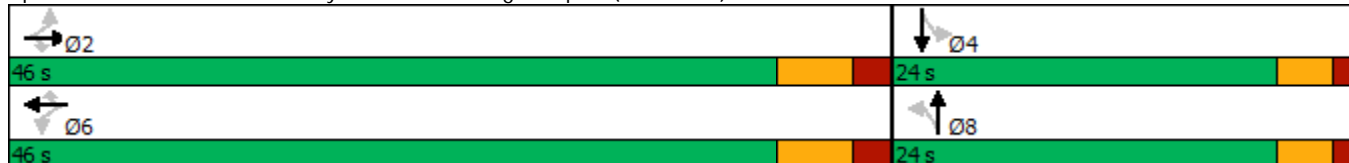


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	B	A	A	A	A		C		D	B	
Approach Delay		15.5			6.7			30.0			32.0	
Approach LOS		B			A			C			C	
Queue Length 50th (ft)	17	178	0	4	37	0		132		61	34	
Queue Length 95th (ft)	36	272	8	14	66	16		#247		#182	91	
Internal Link Dist (ft)		930			1294			640			889	
Turn Bay Length (ft)	175		50	120		50				160		
Base Capacity (vph)	769	1225	935	278	1225	1029		568		225	580	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.12	0.55	0.02	0.08	0.16	0.09		0.74		0.79	0.33	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 61.4
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 20.6
 Intersection LOS: C
 Intersection Capacity Utilization 85.9%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 14: Sudbury Road & Fitchburg Turnpike (Route 117)



Melone 40B Development
 4: Mossman Road/Powder Mill Road & North Road (Route 117)

Weekday Morning Peak Hour
 2025 No Build

Intersection												
Int Delay, s/veh	307.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	95	834	18	17	208	58	5	29	34	203	58	2
Future Vol, veh/h	95	834	18	17	208	58	5	29	34	203	58	2
Conflicting Peds, #/hr	0	0	8	8	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	91	91	91	83	83	83	88	88	88
Heavy Vehicles, %	5	2	0	6	4	7	0	4	3	3	2	0
Mvmt Flow	103	907	20	19	229	64	6	35	41	231	66	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	293	0	0	935	0	0	1464	1462	925	1460	1440	261
Stage 1	-	-	-	-	-	-	1131	1131	-	299	299	-
Stage 2	-	-	-	-	-	-	333	331	-	1161	1141	-
Critical Hdwy	4.15	-	-	4.16	-	-	7.1	6.54	6.23	7.13	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.54	-	6.13	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.54	-	6.13	5.52	-
Follow-up Hdwy	2.245	-	-	2.254	-	-	3.5	4.036	3.327	3.527	4.018	3.3
Pot Cap-1 Maneuver	1252	-	-	716	-	-	107	127	325	~ 106	133	783
Stage 1	-	-	-	-	-	-	249	276	-	708	666	-
Stage 2	-	-	-	-	-	-	685	642	-	237	275	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1252	-	-	711	-	-	46	101	323	~ 58	106	783
Mov Cap-2 Maneuver	-	-	-	-	-	-	46	101	-	~ 58	106	-
Stage 1	-	-	-	-	-	-	205	227	-	588	645	-
Stage 2	-	-	-	-	-	-	594	621	-	~ 145	226	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.8		0.6		65.2		\$ 1747.4	
HCM LOS					F		F	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	136	1252	-	-	711	-	-	65
HCM Lane V/C Ratio	0.602	0.082	-	-	0.026	-	-	4.598
HCM Control Delay (s)	65.2	8.1	0	-	10.2	0	-	\$ 1747.4
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	3.1	0.3	-	-	0.1	-	-	32.7

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

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Afternoon Peak Hour
 2025 No Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	28	302	50	46	942	15	160	80	14	10	124	44
Future Volume (vph)	28	302	50	46	942	15	160	80	14	10	124	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1833	0	0	1853	0	0	1738	0	0	1753	0
Flt Permitted		0.893			0.966			0.608			0.977	
Satd. Flow (perm)	0	1644	0	0	1794	0	0	1090	0	0	1718	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			2			3			20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1144			1234			866			622	
Travel Time (s)		26.0			28.0			19.7			14.1	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)						1			3			2
Peak Hour Factor	0.88	0.88	0.88	0.95	0.95	0.95	0.81	0.81	0.81	0.84	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	1%	0%	2%	2%	7%	8%	0%	0%	22%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	432	0	0	1056	0	0	314	0	0	212	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		11.0	11.0		11.0	11.0	
Total Split (s)	55.0	55.0		55.0	55.0		25.0	25.0		25.0	25.0	
Total Split (%)	68.8%	68.8%		68.8%	68.8%		31.3%	31.3%		31.3%	31.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effect Green (s)		47.5			47.5			20.1			20.1	
Actuated g/C Ratio		0.61			0.61			0.26			0.26	
v/c Ratio		0.43			0.96			1.11			0.46	
Control Delay		9.0			35.2			116.7			26.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.0			35.2			116.7			26.6	

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Afternoon Peak Hour
 2025 No Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		A			D			F			C	
Approach Delay		9.0			35.2			116.7			26.6	
Approach LOS		A			D			F			C	
Queue Length 50th (ft)		93			428			~186			81	
Queue Length 95th (ft)		144			#757			#294			134	
Internal Link Dist (ft)		1064			1154			786			542	
Turn Bay Length (ft)												
Base Capacity (vph)		1070			1162			284			459	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.40			0.91			1.11			0.46	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	77.6
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.11
Intersection Signal Delay:	41.4
Intersection LOS:	D
Intersection Capacity Utilization:	98.8%
ICU Level of Service:	F
Analysis Period (min):	15
~ 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.	

Splits and Phases: 8: Pantry Road/Dakin Road & North Road (Route 117)



Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Afternoon Peak Hour
 2025 No Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	204	7	121	778	285	14	135	25	160	213	111
Future Volume (vph)	89	204	7	121	778	285	14	135	25	160	213	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	175		50	120		50	0		0	160		0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1787	1881	1615	1770	1881	1583	0	1835	0	1805	1749	0
Flt Permitted	0.188			0.614				0.913		0.588		
Satd. Flow (perm)	354	1881	1581	1143	1881	1549	0	1682	0	1117	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			16			132		12			38	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			1374			720			969	
Travel Time (s)		23.0			31.2			16.4			22.0	
Confl. Peds. (#/hr)	1		1	1		1						
Confl. Bikes (#/hr)						1			1			1
Peak Hour Factor	0.88	0.88	0.88	0.94	0.94	0.94	0.94	0.94	0.94	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	1%	0%	2%	1%	2%	0%	1%	0%	0%	2%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	232	8	129	828	303	0	186	0	188	382	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	11.0	11.0		11.0	11.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0		24.0	24.0	
Total Split (%)	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	34.3%	34.3%		34.3%	34.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min	Min	Min	Min	None	None		None	None	
Act Effect Green (s)	35.6	35.6	35.6	35.6	35.6	35.6		16.6		16.6	16.6	
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.57	0.57		0.27		0.27	0.27	
v/c Ratio	0.50	0.22	0.01	0.20	0.77	0.32		0.41		0.64	0.78	
Control Delay	19.8	7.7	2.3	8.1	17.1	5.3		21.8		32.5	32.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	19.8	7.7	2.3	8.1	17.1	5.3		21.8		32.5	32.5	

Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Afternoon Peak Hour
 2025 No Build

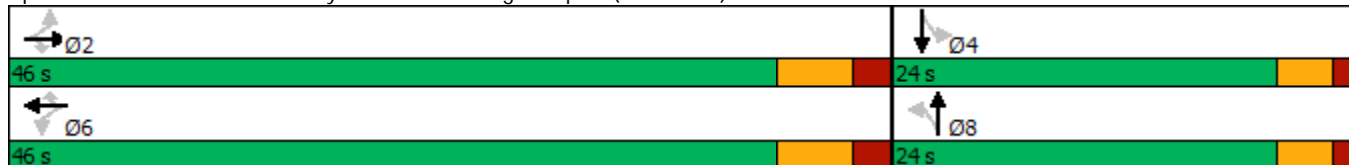


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	A	A	A	B	A		C		C	C	
Approach Delay		11.1			13.4			21.8			32.5	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	23	43	0	24	242	32		59		69	133	
Queue Length 95th (ft)	72	75	3	50	397	69		112		124	208	
Internal Link Dist (ft)		930			1294			640			889	
Turn Bay Length (ft)	175		50	120		50				160		
Base Capacity (vph)	235	1249	1055	759	1249	1073		566		371	606	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.43	0.19	0.01	0.17	0.66	0.28		0.33		0.51	0.63	

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	62.5
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	18.3
Intersection LOS:	B
Intersection Capacity Utilization:	95.0%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 14: Sudbury Road & Fitchburg Turnpike (Route 117)



Melone 40B Development
 4: Mossman Road/Powder Mill Road & North Road (Route 117)

Weekday Afternoon Peak Hour
 2025 No Build

Intersection												
Int Delay, s/veh	164											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	69	268	17	21	895	295	4	38	20	84	42	4
Future Vol, veh/h	69	268	17	21	895	295	4	38	20	84	42	4
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	91	91	91	80	80	80	86	86	86
Heavy Vehicles, %	4	2	0	0	2	3	25	0	5	0	3	0
Mvmt Flow	74	288	18	23	984	324	5	48	25	98	49	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1308	0	0	307	0	0	1665	1800	298	1674	1647	1146
Stage 1	-	-	-	-	-	-	446	446	-	1192	1192	-
Stage 2	-	-	-	-	-	-	1219	1354	-	482	455	-
Critical Hdwy	4.14	-	-	4.1	-	-	7.35	6.5	6.25	7.1	6.53	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.1	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.1	5.53	-
Follow-up Hdwy	2.236	-	-	2.2	-	-	3.725	4	3.345	3.5	4.027	3.3
Pot Cap-1 Maneuver	523	-	-	1265	-	-	68	81	734	~ 77	99	245
Stage 1	-	-	-	-	-	-	549	577	-	230	259	-
Stage 2	-	-	-	-	-	-	198	220	-	569	567	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	523	-	-	1264	-	-	27	62	733	~ 23	76	245
Mov Cap-2 Maneuver	-	-	-	-	-	-	27	62	-	~ 23	76	-
Stage 1	-	-	-	-	-	-	455	478	-	191	239	-
Stage 2	-	-	-	-	-	-	143	203	-	410	469	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.5			0.1			188.2			\$ 2001		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	79	523	-	-	1264	-	-	31
HCM Lane V/C Ratio	0.981	0.142	-	-	0.018	-	-	4.876
HCM Control Delay (s)	188.2	13	0	-	7.9	0	-	\$ 2001
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	5.3	0.5	-	-	0.1	-	-	18.1

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

APPENDIX H

2025 Build Capacity/Level-of-Service Analysis

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Morning Peak Hour
 2025 Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	57	746	215	68	278	23	48	118	116	16	86	27
Future Volume (vph)	57	746	215	68	278	23	48	118	116	16	86	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1791	0	0	1792	0	0	1694	0	0	1778	0
Flt Permitted		0.956			0.729			0.894			0.881	
Satd. Flow (perm)	0	1717	0	0	1318	0	0	1527	0	0	1576	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			9			50			19	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1144			1234			866			622	
Travel Time (s)		26.0			28.0			19.7			14.1	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			2			1						1
Peak Hour Factor	0.89	0.89	0.89	0.87	0.87	0.87	0.74	0.74	0.74	0.66	0.66	0.66
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	2%	2%	0%	5%	5%	10%	4%	4%	7%	0%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1144	0	0	424	0	0	381	0	0	195	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		11.0	11.0		11.0	11.0	
Total Split (s)	45.0	45.0		45.0	45.0		20.0	20.0		20.0	20.0	
Total Split (%)	69.2%	69.2%		69.2%	69.2%		30.8%	30.8%		30.8%	30.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effect Green (s)		40.0			40.0			15.0			15.0	
Actuated g/C Ratio		0.62			0.62			0.23			0.23	
v/c Ratio		1.07			0.52			0.98			0.52	
Control Delay		63.5			9.8			65.8			25.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		63.5			9.8			65.8			25.3	

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Morning Peak Hour
 2025 Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E			A			E			C	
Approach Delay		63.5			9.8			65.8			25.3	
Approach LOS		E			A			E			C	
Queue Length 50th (ft)		-511			81			132			61	
Queue Length 95th (ft)		#724			137			#208			80	
Internal Link Dist (ft)		1064			1154			786			542	
Turn Bay Length (ft)												
Base Capacity (vph)		1071			814			390			378	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.07			0.52			0.98			0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Natural Cycle: 100
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 49.8
 Intersection LOS: D
 Intersection Capacity Utilization 91.1%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.

Splits and Phases: 8: Pantry Road/Dakin Road & North Road (Route 117)



Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Morning Peak Hour
 2025 Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	620	16	20	184	79	30	219	84	157	88	89
Future Volume (vph)	103	620	16	20	184	79	30	219	84	157	88	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	175		50	120		50	0		0	160		0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1736	1845	1429	1626	1845	1538	0	1725	0	1736	1609	0
Flt Permitted	0.630			0.229				0.960		0.363		
Satd. Flow (perm)	1150	1845	1400	392	1845	1505	0	1663	0	663	1609	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			16			88		24			73	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			1374			720			969	
Travel Time (s)		23.0			31.2			16.4			22.0	
Confl. Peds. (#/hr)	1						1					
Confl. Bikes (#/hr)			1			1			1			2
Peak Hour Factor	0.88	0.88	0.88	0.90	0.90	0.90	0.79	0.79	0.79	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	3%	13%	11%	3%	5%	12%	5%	4%	4%	9%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	705	18	22	204	88	0	421	0	178	201	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	11.0	11.0		11.0	11.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0		24.0	24.0	
Total Split (%)	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	34.3%	34.3%		34.3%	34.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min	Min	Min	Min	None	None		None	None	
Act Effect Green (s)	31.9	31.9	31.9	31.9	31.9	31.9		20.3		20.3	20.3	
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51		0.33		0.33	0.33	
v/c Ratio	0.20	0.75	0.02	0.11	0.22	0.11		0.76		0.83	0.35	
Control Delay	8.6	17.3	3.8	8.6	8.4	2.2		31.2		57.3	14.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	8.6	17.3	3.8	8.6	8.4	2.2		31.2		57.3	14.2	

Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Morning Peak Hour
 2025 Build

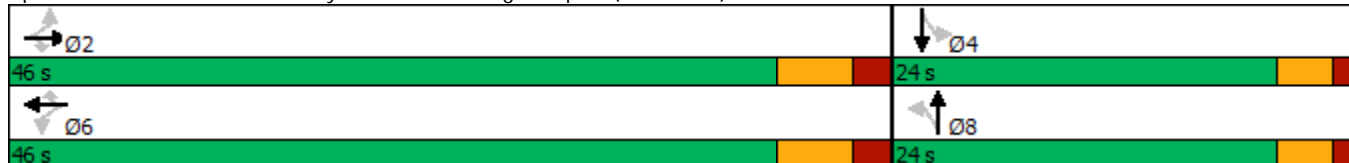


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	B	A	A	A	A		C		E	B	
Approach Delay		15.8			6.7			31.2			34.4	
Approach LOS		B			A			C			C	
Queue Length 50th (ft)	22	190	0	4	38	0		141		65	37	
Queue Length 95th (ft)	44	291	8	14	68	16		#247		#184	92	
Internal Link Dist (ft)		930			1294			640			889	
Turn Bay Length (ft)	175		50	120		50				160		
Base Capacity (vph)	749	1201	917	255	1201	1010		557		215	573	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.16	0.59	0.02	0.09	0.17	0.09		0.76		0.83	0.35	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 62.4
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 21.3
 Intersection LOS: C
 Intersection Capacity Utilization 87.7%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 14: Sudbury Road & Fitchburg Turnpike (Route 117)



Melone 40B Development
 4: Mossman Road/Powder Mill Road & North Road (Route 117)

Weekday Morning Peak Hour
 2025 Build

Intersection												
Int Delay, s/veh	311											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	95	837	18	17	216	58	5	29	34	203	58	2
Future Vol, veh/h	95	837	18	17	216	58	5	29	34	203	58	2
Conflicting Peds, #/hr	0	0	8	8	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	91	91	91	83	83	83	88	88	88
Heavy Vehicles, %	5	2	0	6	4	7	0	4	3	3	2	0
Mvmt Flow	103	910	20	19	237	64	6	35	41	231	66	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	301	0	0	938	0	0	1475	1473	928	1471	1451	269
Stage 1	-	-	-	-	-	-	1134	1134	-	307	307	-
Stage 2	-	-	-	-	-	-	341	339	-	1164	1144	-
Critical Hdwy	4.15	-	-	4.16	-	-	7.1	6.54	6.23	7.13	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.54	-	6.13	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.54	-	6.13	5.52	-
Follow-up Hdwy	2.245	-	-	2.254	-	-	3.5	4.036	3.327	3.527	4.018	3.3
Pot Cap-1 Maneuver	1243	-	-	714	-	-	106	125	323	~ 105	131	775
Stage 1	-	-	-	-	-	-	249	275	-	701	661	-
Stage 2	-	-	-	-	-	-	678	636	-	236	275	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1243	-	-	709	-	-	45	99	321	~ 57	104	775
Mov Cap-2 Maneuver	-	-	-	-	-	-	45	99	-	~ 57	104	-
Stage 1	-	-	-	-	-	-	205	226	-	580	640	-
Stage 2	-	-	-	-	-	-	587	616	-	~ 144	226	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.8		0.6		68		\$ 1781.4	
HCM LOS					F		F	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	133	1243	-	-	709	-	-	64
HCM Lane V/C Ratio	0.616	0.083	-	-	0.026	-	-	4.67
HCM Control Delay (s)	68	8.2	0	-	10.2	0	-	\$ 1781.4
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	3.2	0.3	-	-	0.1	-	-	32.8

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

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	12	734	253	15	46	37
Future Vol, veh/h	12	734	253	15	46	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	150
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	77	77	74	74	92	92
Heavy Vehicles, %	2	3	4	2	2	2
Mvmt Flow	16	953	342	20	50	40

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	362	0	-	0	1337 352
Stage 1	-	-	-	-	352 -
Stage 2	-	-	-	-	985 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1197	-	-	-	169 692
Stage 1	-	-	-	-	712 -
Stage 2	-	-	-	-	362 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1197	-	-	-	164 692
Mov Cap-2 Maneuver	-	-	-	-	164 -
Stage 1	-	-	-	-	692 -
Stage 2	-	-	-	-	362 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	24.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1197	-	-	-	164	692
HCM Lane V/C Ratio	0.013	-	-	-	0.305	0.058
HCM Control Delay (s)	8	0	-	-	36.3	10.5
HCM Lane LOS	A	A	-	-	E	B
HCM 95th %tile Q(veh)	0	-	-	-	1.2	0.2

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Afternoon Peak Hour
 2025 Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	28	315	50	61	950	15	160	80	39	10	124	44
Future Volume (vph)	28	315	50	61	950	15	160	80	39	10	124	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1835	0	0	1852	0	0	1732	0	0	1753	0
Flt Permitted		0.893			0.950			0.617			0.976	
Satd. Flow (perm)	0	1645	0	0	1764	0	0	1099	0	0	1717	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			2			10			20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1144			1234			866			622	
Travel Time (s)		26.0			28.0			19.7			14.1	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)			2			1						1
Peak Hour Factor	0.88	0.88	0.88	0.95	0.95	0.95	0.81	0.81	0.81	0.84	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	1%	0%	2%	2%	7%	8%	0%	0%	22%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	447	0	0	1080	0	0	345	0	0	212	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		11.0	11.0		11.0	11.0	
Total Split (s)	55.0	55.0		55.0	55.0		25.0	25.0		25.0	25.0	
Total Split (%)	68.8%	68.8%		68.8%	68.8%		31.3%	31.3%		31.3%	31.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effect Green (s)		49.8			49.8			20.0			20.0	
Actuated g/C Ratio		0.62			0.62			0.25			0.25	
v/c Ratio		0.43			0.98			1.22			0.48	
Control Delay		9.0			39.5			156.4			27.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.0			39.5			156.4			27.2	

Melone 40B Development
 8: Pantry Road/Dakin Road & North Road (Route 117)

Weekday Afternoon Peak Hour
 2025 Build

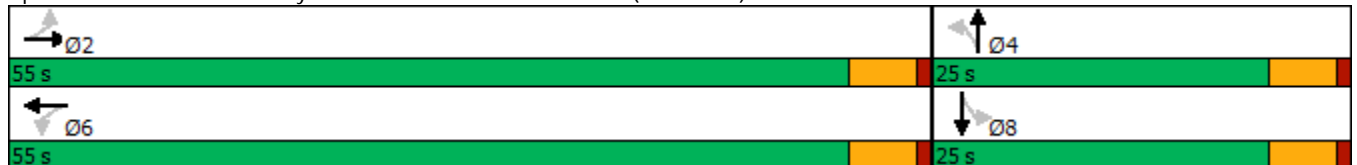


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		A			D			F			C	
Approach Delay		9.0			39.5			156.4			27.2	
Approach LOS		A			D			F			C	
Queue Length 50th (ft)		97			464			~213			81	
Queue Length 95th (ft)		151			#794			#322			134	
Internal Link Dist (ft)		1064			1154			786			542	
Turn Bay Length (ft)												
Base Capacity (vph)		1037			1106			283			445	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.43			0.98			1.22			0.48	

Intersection Summary






















Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 79.8
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.22
 Intersection Signal Delay: 51.1
 Intersection LOS: D
 Intersection Capacity Utilization 105.3%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.

Splits and Phases: 8: Pantry Road/Dakin Road & North Road (Route 117)



Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Afternoon Peak Hour
 2025 Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	219	7	121	804	285	14	135	25	160	213	132
Future Volume (vph)	102	219	7	121	804	285	14	135	25	160	213	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	175		50	120		50	0		0	160		0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1787	1881	1615	1770	1881	1583	0	1835	0	1805	1735	0
Flt Permitted	0.169			0.605				0.865		0.586		
Satd. Flow (perm)	318	1881	1580	1126	1881	1549	0	1593	0	1113	1735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			16			128		12			44	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			1374			720			969	
Travel Time (s)		23.0			31.2			16.4			22.0	
Confl. Peds. (#/hr)	1		1	1		1						
Confl. Bikes (#/hr)			1			1			1			2
Peak Hour Factor	0.88	0.88	0.88	0.94	0.94	0.94	0.94	0.94	0.94	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	1%	0%	2%	1%	2%	0%	1%	0%	0%	2%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	116	249	8	129	855	303	0	186	0	188	406	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	11.0	11.0		11.0	11.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0		24.0	24.0	
Total Split (%)	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	34.3%	34.3%		34.3%	34.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min	Min	Min	Min	None	None		None	None	
Act Effect Green (s)	36.5	36.5	36.5	36.5	36.5	36.5		17.2		17.2	17.2	
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.57	0.57		0.27		0.27	0.27	
v/c Ratio	0.64	0.23	0.01	0.20	0.80	0.32		0.43		0.63	0.82	
Control Delay	31.1	7.8	2.3	8.2	18.5	5.4		22.4		32.3	35.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	31.1	7.8	2.3	8.2	18.5	5.4		22.4		32.3	35.4	

Melone 40B Development
 14: Sudbury Road & Fitchburg Turnpike (Route 117)

Weekday Afternoon Peak Hour
 2025 Build

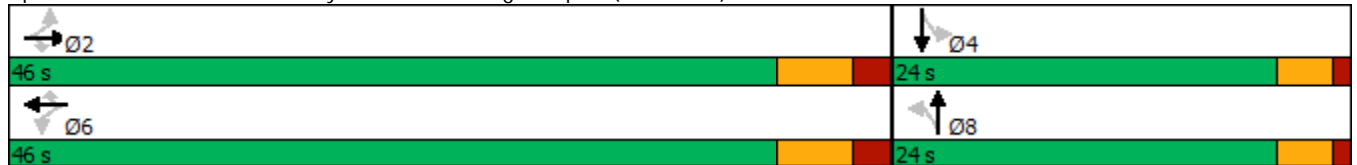


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	A	A	A	B	A		C		C	D	
Approach Delay		15.0			14.4			22.4			34.4	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	31	48	0	24	262	33		60		69	142	
Queue Length 95th (ft)	#113	80	3	50	#428	70		114		125	#245	
Internal Link Dist (ft)		930			1294			640			889	
Turn Bay Length (ft)	175		50	120		50				160		
Base Capacity (vph)	204	1212	1023	725	1212	1044		521		359	589	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.57	0.21	0.01	0.18	0.71	0.29		0.36		0.52	0.69	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 64
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 20.0
 Intersection LOS: B
 Intersection Capacity Utilization 97.6%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 14: Sudbury Road & Fitchburg Turnpike (Route 117)



Melone 40B Development
 4: Mossman Road/Powder Mill Road & North Road (Route 117)

Weekday Afternoon Peak Hour
 2025 Build

Intersection												
Int Delay, s/veh	183.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	69	277	17	21	900	295	4	38	20	84	42	4
Future Vol, veh/h	69	277	17	21	900	295	4	38	20	84	42	4
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	91	91	91	80	80	80	86	86	86
Heavy Vehicles, %	4	2	0	0	2	3	25	0	5	0	3	0
Mvmt Flow	74	298	18	23	989	324	5	48	25	98	49	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1313	0	0	317	0	0	1680	1815	308	1689	1662	1151
Stage 1	-	-	-	-	-	-	456	456	-	1197	1197	-
Stage 2	-	-	-	-	-	-	1224	1359	-	492	465	-
Critical Hdwy	4.14	-	-	4.1	-	-	7.35	6.5	6.25	7.1	6.53	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.1	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.1	5.53	-
Follow-up Hdwy	2.236	-	-	2.2	-	-	3.725	4	3.345	3.5	4.027	3.3
Pot Cap-1 Maneuver	520	-	-	1255	-	-	66	79	725	~ 75	97	243
Stage 1	-	-	-	-	-	-	542	572	-	229	258	-
Stage 2	-	-	-	-	-	-	197	219	-	562	561	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	520	-	-	1254	-	-	26	60	724	~ 21	74	243
Mov Cap-2 Maneuver	-	-	-	-	-	-	26	60	-	~ 21	74	-
Stage 1	-	-	-	-	-	-	448	472	-	189	238	-
Stage 2	-	-	-	-	-	-	142	202	-	404	463	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.5			0.1			204.3			\$ 2259.9		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	76	520	-	-	1254	-	-	28
HCM Lane V/C Ratio	1.02	0.143	-	-	0.018	-	-	5.399
HCM Control Delay (s)	204.3	13.1	0	-	7.9	0	-	\$ 2259.9
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	5.5	0.5	-	-	0.1	-	-	18.5

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

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	38	337	964	47	28	23
Future Vol, veh/h	38	337	964	47	28	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	150
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	95	95	92	92
Heavy Vehicles, %	2	1	1	2	2	2
Mvmt Flow	44	387	1015	49	30	25

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1064	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	655	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	655	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	33
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	655	-	-	-	121	280
HCM Lane V/C Ratio	0.067	-	-	-	0.252	0.089
HCM Control Delay (s)	10.9	0	-	-	44.5	19.1
HCM Lane LOS	B	A	-	-	E	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9	0.3

APPENDIX I

Capacity/Level-of-Service Analysis

Capacity Analysis Summary
Melone Residential Development
Sudbury, Massachusetts

Weekday Morning Peak Hour											
Intersection	Movement		2018 Existing			2025 No Build			2025 Build		
			LOS ¹	Delay ²	V/C ³	LOS	Delay	V/C	LOS	Delay	V/C
Fitchburg Turnpike (Route 117) at Sudbury Road	EB	L	A	8.4	0.15	A	8.2	0.16	A	8.6	0.20
		T	B	16.1	0.70	B	16.8	0.73	B	17.3	0.75
		R	A	3.7	0.02	A	3.8	0.03	A	3.8	0.02
	WB	L	A	8.3	0.09	A	8.4	0.10	A	8.6	0.11
		T	A	8.6	0.19	A	8.5	0.21	A	8.4	0.22
		R	A	2.3	0.11	A	2.2	0.11	A	2.2	0.11
	NB	LTR	C	24.8	0.66	C	30.0	0.74	C	31.2	0.76
	SB	L	C	34.5	0.64	D	51.4	0.79	E	57.3	0.83
		TR	B	12.9	0.29	B	14.2	0.33	B	14.2	0.35
<i>Overall</i>			B	17.5	0.70	C	20.6	0.79	C	21.3	0.83
North Road (Route 117) at Site Driveway	EB	LT	-	-	-	-	-	-	A	0.1	0.01
		TR	-	-	-	-	-	-	A	0.0	0.00
	SB	L	-	-	-	-	-	-	E	36.3	0.31
		R	-	-	-	-	-	-	B	10.5	0.06
North Road (Route 117) at Dakin Road/Pantry Road	EB	LTR	C	34.1	0.96	E	60.8	1.06	E	63.5	1.07
		LTR	A	7.4	0.37	A	8.1	0.43	A	9.8	0.52
	NB	LTR	D	46.1	0.87	E	60.8	0.95	E	65.8	0.98
	SB	LTR	C	24.3	0.48	C	25.1	0.51	C	25.3	0.52
	<i>Overall</i>			C	30.6	0.96	D	47.8	1.06	D	49.8
North Road (Route 117) at Powder Mill Road/Mossman Road	EB	LTR	A	0.8	0.07	A	0.8	0.08	A	0.8	0.08
		LTR	A	0.7	0.02	A	0.6	0.03	A	0.6	0.03
	NB	LTR	E	38.5	0.42	F	65.2	0.60	F	68.0	0.62
	SB	LTR	F	>100	2.99	F	>100	4.60	F	>100	4.67
	<i>Overall</i>			-	-	-	-	-	-	-	-

1 Level-of-Service

2 Average vehicle delay in seconds

3 Volume to capacity ratio

Queue Summary
Melone Residential Development
Sudbury, Massachusetts

Weekday Morning Peak Hour								
Intersection	Movement	2018 Existing		2025 No Build		2025 Build		
		50th Queue ¹	95th Queue ²	50th Queue	95th Queue	50th Queue	95th Queue	
Fitchburg Turnpike (Route 117) at Sudbury Road	EB	L	15	33	17	36	22	44
		T	155	237	178	272	190	291
		R	0	7	0	8	0	8
	WB	L	4	13	4	14	4	14
		T	31	58	37	66	38	68
		R	0	16	0	16	0	16
	NB	LTR	107	201	132	247	141	247
	SB	L	49	158	61	182	65	184
	TR	27	81	34	91	37	92	
North Road (Route 117) at Site Driveway	EB	LT	-	-	-	-	-	0
	WB	TR	-	-	-	-	-	0
	SB	L	-	-	-	-	-	30
		R	-	-	-	-	-	5
North Road (Route 117) at Dakin Road/Pantry Road	EB	LTR	329	625	506	718	511	724
	WB	LTR	55	93	66	111	81	137
	NB	LTR	111	170	128	201	132	208
	SB	LTR	55	73	61	79	61	80
North Road (Route 117) at Powder Mill Road/ Mossman Road	EB	LTR	-	5	-	8	-	8
	WB	LTR	-	3	-	3	-	3
	NB	LTR	-	48	-	78	-	80
	SB	LTR	-	675	-	818	-	820

1 50th percentile queue length in feet

2 95th percentile queue length in feet

Capacity Analysis Summary
Melone Residential Development
Sudbury, Massachusetts

Weekday Afternoon Peak Hour											
Intersection	Movement	2018 Existing			2025 No Build			2025 Build			
		LOS ¹	Delay ²	V/C ³	LOS	Delay	V/C	LOS	Delay	V/C	
Fitchburg Turnpike (Route 117) at Sudbury Road	EB L	B	11.5	0.31	B	19.8	0.50	C	31.1	0.64	
	T	A	7.3	0.18	A	7.7	0.22	A	7.8	0.23	
	R	A	1.8	0.01	A	2.3	0.01	A	2.3	0.01	
	WB L	A	7.7	0.18	A	8.1	0.20	A	8.2	0.20	
	T	B	14.0	0.70	B	17.1	0.77	B	18.5	0.80	
	R	A	4.8	0.30	A	5.3	0.32	A	5.4	0.32	
	NB LTR	C	20.7	0.37	C	21.8	0.41	C	22.4	0.43	
	SB L	C	29.3	0.57	C	32.5	0.64	C	32.3	0.63	
	TR	C	29.1	0.73	C	32.5	0.78	D	35.4	0.82	
	<i>Overall</i>		<i>B</i>	<i>16.0</i>	<i>0.73</i>	<i>B</i>	<i>18.3</i>	<i>0.78</i>	<i>B</i>	<i>20.0</i>	<i>0.82</i>
North Road (Route 117) at Site Driveway	EB LT	-	-	-	-	-	-	A	1.1	0.07	
	WB TR	-	-	-	-	-	-	A	0.0	0.00	
	SB L	-	-	-	-	-	-	E	44.5	0.25	
	R	-	-	-	-	-	-	C	19.1	0.09	
North Road (Route 117) at Dakin Road/Pantry Road	EB LTR	A	8.5	0.37	A	9.0	0.43	A	9.0	0.43	
	WB LTR	C	27.9	0.91	D	35.2	0.96	D	39.5	0.98	
	NB LTR	D	49.5	0.83	F	>100	1.11	F	>100	1.22	
	SB LTR	C	23.6	0.39	C	26.6	0.46	C	27.2	0.48	
	<i>Overall</i>	<i>C</i>	<i>27.1</i>	<i>0.91</i>	<i>D</i>	<i>41.4</i>	<i>1.11</i>	<i>D</i>	<i>51.1</i>	<i>0.22</i>	
North Road (Route 117) at Powder Mill Road/Mossman Road	EB LTR	A	2.3	0.10	A	2.5	0.14	A	2.5	0.14	
	WB LTR	A	0.1	0.02	A	0.1	0.02	A	0.1	0.02	
	NB LTR	F	64.7	0.57	F	>100	0.98	F	>100	1.02	
	SB LTR	F	>100	1.88	F	>100	4.88	F	>100	5.40	
	<i>Overall</i>	-	-	-	-	-	-	-	-	-	

1 Level-of-Service

2 Average vehicle delay in seconds

3 Volume to capacity ratio

Queue Summary
Melone Residential Development
Sudbury, Massachusetts

Weekday Afternoon Peak Hour								
Intersection	Movement	2018 Existing		2025 No Build		2025 Build		
		50th Queue ¹	95th Queue ²	50th Queue	95th Queue	50th Queue	95th Queue	
Fitchburg Turnpike (Route 117) at Sudbury Road	EB	L	15	43	23	72	31	113
		T	32	62	43	75	48	80
		R	0	3	0	3	0	3
	WB	L	20	46	24	50	24	50
		T	183	320	242	397	262	428
		R	24	61	32	69	33	70
	NB	LTR	53	102	59	112	60	114
	SB	L	63	113	69	124	69	125
	TR	118	188	133	208	142	245	
North Road (Route 117) at Site Driveway	EB	LT	-	-	-	-	-	5
	WB	TR	-	-	-	-	-	0
	SB	L	-	-	-	-	-	23
		R	-	-	-	-	-	8
North Road (Route 117) at Dakin Road/Pantry Road	EB	LTR	70	112	93	144	97	151
	WB	LTR	329	578	428	757	464	794
	NB	LTR	123	245	186	294	213	322
	SB	LTR	65	123	81	134	81	134
North Road (Route 117) at Powder Mill Road/ Mossman Road	EB	LTR	-	8	-	13	-	13
	WB	LTR	-	3	-	3	-	3
	NB	LTR	-	70	-	133	-	138
	SB	LTR	-	310	-	453	-	463

1 50th percentile queue length in feet

2 95th percentile queue length in feet