

Traffic Impact, Access and Parking Study

Appendix Table of Contents

Title

- A. Turning Movement Count (TMC) Data Sheets
- B. Automatic Traffic Recorder (ATR) Data Sheets
- C. Regional Seasonal Adjustment Data
- D. MBTA Public Transportation Data
- E. Compiled MassDOT Crash Data (2007-2010)
- F. MassDOT Permanent Count Station Data – Background Growth
- G. Re-Occupancy of Vacant Space
- H. Site Trip Generation and Distribution
- I. Redistributed Trips Calculations
- J. Intersection Capacity Analyses
 - 2010 Existing (AM, PM & SAT Peak Hours)
 - 2017 No-Build (AM, PM & SAT Peak Hours)
 - 2017 Build (AM, PM & SAT Peak Hours)
- K. Parking Demand Count Data Sheets
- L. Parking Demand Estimate Calculations
- M. Trapelo Road / Belmont Street Roadway Improvement Project Plans

Appendix A

Turning Movement Count (TMC)

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

S: Williston Road
E/W: Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019A
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Cars - Trucks

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			Exclu. Total	Inclu. Total	Int. Total
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds			
07:00 AM	70	1	1	4	5	6	4	126	1	8	210	218
07:15 AM	63	1	2	3	3	4	5	137	1	7	212	219
07:30 AM	111	3	2	7	2	12	5	187	1	15	315	330
07:45 AM	123	9	2	6	4	14	7	181	1	17	330	347
Total	367	14	7	20	14	36	21	631	4	47	1067	1114
08:00 AM	93	7	2	7	3	6	4	192	1	9	306	315
08:15 AM	126	5	2	4	2	5	7	199	0	7	343	350
08:30 AM	111	8	2	1	4	9	5	204	3	14	333	347
08:45 AM	110	5	1	6	4	7	9	213	4	12	347	359
Total	440	25	7	18	13	27	25	808	8	42	1329	1371
Grand Total	807	39	14	38	27	63	46	1439	12	89	2396	2485
Apprch %	95.4	4.6		58.5	41.5		3.1	96.9				
Total %	33.7	1.6		1.6	1.1		1.9	60.1		3.6	96.4	
Cars	785	39		37	27		46	1412		0	0	2435
% Cars	97.3	100	100	97.4	100	100	100	98.1	100	0	0	98
Trucks	22	0		1	0		0	27		0	0	50
% Trucks	2.7	0	0	2.6	0	0	0	1.9	0	0	0	2

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			Int. Total
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
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										
08:00 AM	93	7	100	7	3	10	4	192	196	306
08:15 AM	126	5	131	4	2	6	7	199	206	343
08:30 AM	111	8	119	1	4	5	5	204	209	333
08:45 AM	110	5	115	6	4	10	9	213	222	347
Total Volume	440	25	465	18	13	31	25	808	833	1329
% App. Total	94.6	5.4		58.1	41.9		3	97		
PHF	.873	.781	.887	.643	.813	.775	.694	.948	.938	.957
Cars	434	25	459	17	13	30	25	794	819	1308
% Cars	98.6	100	98.7	94.4	100	96.8	100	98.3	98.3	98.4
Trucks	6	0	6	1	0	1	0	14	14	21
% Trucks	1.4	0	1.3	5.6	0	3.2	0	1.7	1.7	1.6

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

S: Williston Road
E/W: Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019A
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Trucks

	Trapelo Road From East		Williston Road From South		Trapelo Road From West		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
07:00 AM	2	0	0	0	0	2	4
07:15 AM	2	0	0	0	0	1	3
07:30 AM	4	0	0	0	0	6	10
07:45 AM	8	0	0	0	0	4	12
Total	16	0	0	0	0	13	29
08:00 AM	0	0	0	0	0	3	3
08:15 AM	4	0	0	0	0	4	8
08:30 AM	0	0	0	0	0	2	2
08:45 AM	2	0	1	0	0	5	8
Total	6	0	1	0	0	14	21
Grand Total	22	0	1	0	0	27	50
Apprch %	100	0	100	0	0	100	
Total %	44	0	2	0	0	54	

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. 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	4	0	4	0	0	0	0	6	6	10
07:45 AM	8	0	8	0	0	0	0	4	4	12
08:00 AM	0	0	0	0	0	0	0	3	3	3
08:15 AM	4	0	4	0	0	0	0	4	4	8
Total Volume	16	0	16	0	0	0	0	17	17	33
% App. Total	100	0		0	0		0	100		
PHF	.500	.000	.500	.000	.000	.000	.000	.708	.708	.688

Transportation Data Corporation

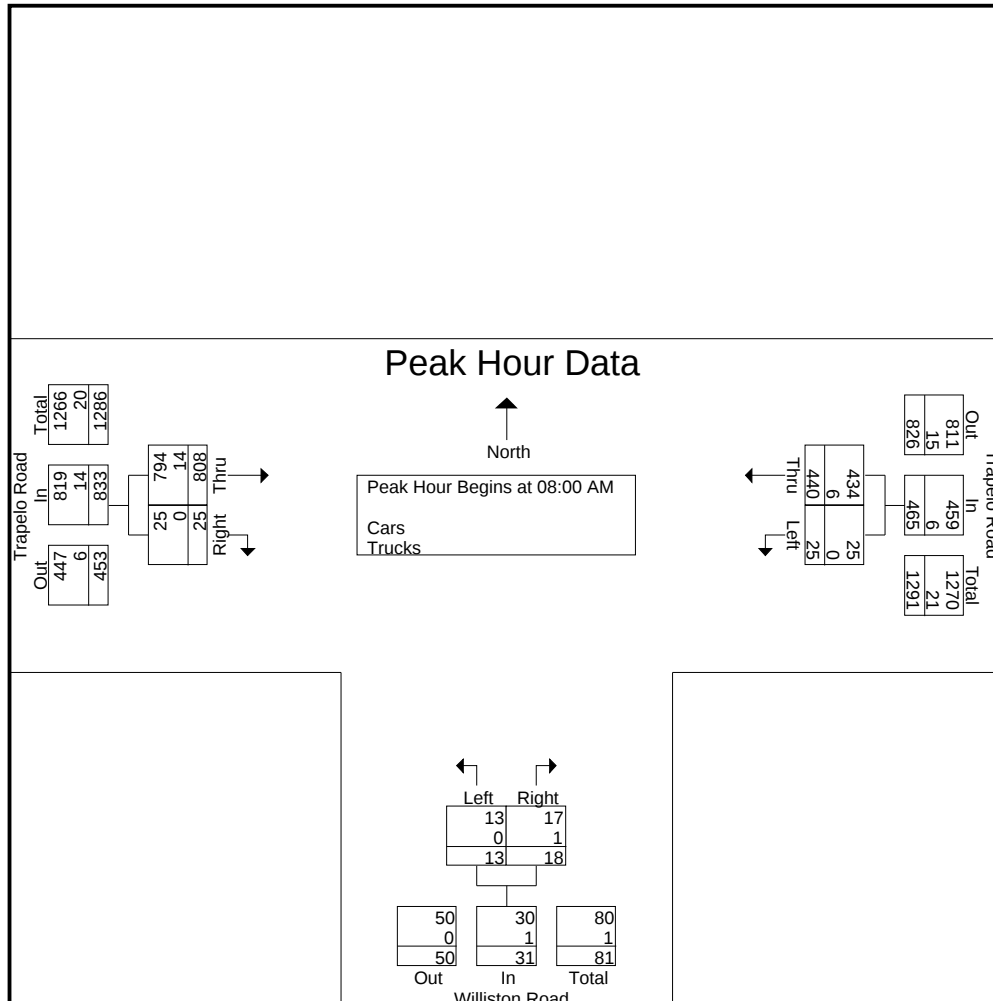
Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

S: Williston Road
E/W: Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019A
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
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										
08:00 AM	93	7	100	7	3	10	4	192	196	306
08:15 AM	126	5	131	4	2	6	7	199	206	343
08:30 AM	111	8	119	1	4	5	5	204	209	333
08:45 AM	110	5	115	6	4	10	9	213	222	347
Total Volume	440	25	465	18	13	31	25	808	833	1329
% App. Total	94.6	5.4		58.1	41.9		3	97		
PHF	.873	.781	.887	.643	.813	.775	.694	.948	.938	.957
Cars	434	25	459	17	13	30	25	794	819	1308
% Cars	98.6	100	98.7	94.4	100	96.8	100	98.3	98.3	98.4
Trucks	6	0	6	1	0	1	0	14	14	21
% Trucks	1.4	0	1.3	5.6	0	3.2	0	1.7	1.7	1.6



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

NE/N,S: Cushing Ave./Common St.

E/W: Trapelo Road

City, State: Belmont, MA

Client: TEC/S. Mallory

File Name : 04019B

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

Groups Printed- Cars - Trucks

	Common Street From North					Cushing Avenue From Northeast				Trapelo Road From East					Common Street From South					Trapelo Road From West								
Start Time	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Hard Right	Right	Thru	Left	Peds	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Exclu. Total	Inclu. Total	Int. Total	
07:00 AM	5	48	36	0	7	0	0	0	0	2	14	60	2	0	5	0	41	3	2	7	116	0	6	5	14	345	359	
07:15 AM	13	40	38	2	18	0	0	0	0	1	13	50	9	1	3	1	35	10	4	8	127	0	7	7	30	357	387	
07:30 AM	28	29	48	2	5	0	0	0	0	2	13	62	7	1	9	3	47	8	3	12	154	1	19	12	21	444	465	
07:45 AM	32	50	52	2	11	0	0	0	0	1	20	92	5	1	5	1	39	6	5	11	164	0	20	9	26	500	526	
Total	78	167	174	6	41	0	0	0	0	6	60	264	23	3	22	5	162	27	14	38	561	1	52	33	91	1646	1737	
08:00 AM	24	55	54	0	10	0	0	0	0	1	20	73	4	4	7	0	32	4	3	10	166	2	11	6	23	463	486	
08:15 AM	19	53	52	0	11	0	0	0	0	0	33	112	2	4	1	2	22	6	10	7	179	7	21	11	36	516	552	
08:30 AM	21	53	64	3	10	0	0	0	0	0	18	87	3	3	4	1	30	0	6	10	169	1	19	10	29	483	512	
08:45 AM	20	65	44	4	12	0	0	0	0	1	26	93	7	5	6	1	40	5	7	11	174	6	24	7	31	527	558	
Total	84	226	214	7	43	0	0	0	0	2	97	365	16	16	18	4	124	15	26	38	688	16	75	34	119	1989	2108	
Grand Total	162	393	388	13	84	0	0	0	0	8	157	629	39	19	40	9	286	42	40	76	1249	17	127	67	210	3635	3845	
Apprch %	16.9	41.1	40.6	1.4		0	0	0	0	1	18.8	75.5	4.7		10.6	2.4	75.9	11.1		5.2	85	1.2	8.6					
Total %	4.5	10.8	10.7	0.4		0	0	0	0	0.2	4.3	17.3	1.1		1.1	0.2	7.9	1.2		2.1	34.4	0.5	3.5		5.5	94.5		
Cars	161	389	387	13		0	0	0	0	8	155	609	39		39	9	283	42		73	1228	17	125		0	0	3787	
% Cars	99.4	99	99.7	100	100	0	0	0	0	100	98.7	96.8	100	100	97.5	100	99	100	100	96.1	98.3	100	98.4	100	0	0	98.5	
Trucks	1	4	1	0		0	0	0	0	0	2	20	0		1	0	3	0		3	21	0	2		0	0	58	
% Trucks	0.6	1	0.3	0	0	0	0	0	0	0	1.3	3.2	0	0	2.5	0	1	0	0	3.9	1.7	0	1.6	0	0	0	1.5	

	Common Street From North					Cushing Avenue From Northeast					Trapelo Road From East					Common Street From South					Trapelo Road From West						
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Int. Total	
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																											
08:00 AM	24	55	54	0	133	0	0	0	0	0	1	20	73	4	98	7	0	32	4	43	10	166	2	11	189	463	
08:15 AM	19	53	52	0	124	0	0	0	0	0	0	33	112	2	147	1	2	22	6	31	7	179	7	21	214	516	
08:30 AM	21	53	64	3	141	0	0	0	0	0	0	18	87	3	108	4	1	30	0	35	10	169	1	19	199	483	
08:45 AM	20	65	44	4	133	0	0	0	0	0	1	26	93	7	127	6	1	40	5	52	11	174	6	24	215	527	
Total Volume	84	226	214	7	531	0	0	0	0	0	2	97	365	16	480	18	4	124	15	161	38	688	16	75	817	1989	
% App. Total	15.8	42.6	40.3									20.2				11.2					84.2						
PHF	.875	.869	.836	.438	.941	.000	.000	.000	.000	.000	.500	.735	.815	.571	.816	.643	.500	.775	.625	.774	.864	.961	.571	.781	.950	.944	
Cars	84	225	214	7	530	0	0	0	0	0	2	96	359	16	473	18	4	122	15	159	36	678	16	74	804	1966	
% Cars	100	99.6	100	100	99.8	0	0	0	0	0	100	99.0	98.4	100	98.5	100	100	98.4	100	98.8	94.7	98.5	100	98.7	98.4	98.8	
Trucks	0	1	0	0	1	0	0	0	0	0	0	1	6	0	7	0	0	2	0	2	2	10	0	1	13	23	
% Trucks	0	0.4	0	0	0.2	0	0	0	0	0	0	1.0	1.6	0	1.5	0	0	1.6	0	1.2	5.3	1.5	0	1.3	1.6	1.2	

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

NE/N,S: Cushing Ave./Common St.

E/W: Trapelo Road

City, State: Belmont, MA

Client: TEC/S. Mallory

File Name : 04019B

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

Groups Printed- Trucks

	Common Street From North				Cushing Avenue From Northeast				Trapelo Road From East				Common Street From South				Trapelo Road From West				Int. Total
Start Time	Right	Thru	Left	Hard Left	Hard Right	Bear Right	Bear Left	Hard Left	Hard Right	Right	Thru	Left	Right	Bear Right	Thru	Left	Right	Thru	Bear Left	Left	
07:00 AM	0	1	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	6
07:15 AM	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	4
07:30 AM	0	1	0	0	0	0	0	0	0	0	3	0	1	0	1	0	0	5	0	0	11
07:45 AM	0	1	0	0	0	0	0	0	0	0	8	0	0	0	0	0	1	3	0	1	14
Total	1	3	1	0	0	0	0	0	0	1	14	0	1	0	1	0	1	11	0	1	35
08:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3
08:15 AM	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	1	3	0	0	9
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	1	2	0	0	0	1	0	0	4	0	1	9
Total	0	1	0	0	0	0	0	0	0	1	6	0	0	0	2	0	2	10	0	1	23
Grand Total	1	4	1	0	0	0	0	0	0	2	20	0	1	0	3	0	3	21	0	2	58
Apprch %	16.7	66.7	16.7	0	0	0	0	0	0	9.1	90.9	0	25	0	75	0	11.5	80.8	0	7.7	
Total %	1.7	6.9	1.7	0	0	0	0	0	0	3.4	34.5	0	1.7	0	5.2	0	5.2	36.2	0	3.4	

	Common Street From North					Cushing Avenue From Northeast					Trapelo Road From East					Common Street From South					Trapelo Road From West					
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Int. 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	0	1	0	0	1	0	0	0	0	0	0	0	3	0	3	1	0	1	0	2	0	5	0	0	5	11
07:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	8	0	8	0	0	0	0	0	1	3	0	1	5	14
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	3
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	1	0	1	1	3	0	0	4	9
Total Volume	0	3	0	0	3	0	0	0	0	0	0	0	15	0	15	1	0	2	0	3	2	13	0	1	16	37
% App. Total																33.3		66.7			12.5	81.2				
PHF	.000	.750	.000	.000	.750	.000	.000	.000	.000	.000	.000	.000	.469	.000	.469	.250	.000	.500	.000	.375	.500	.650	.000	.250	.800	.661

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

NE/N,S: Cushing Ave./Common St.

E/W: Trapelo Road

City, State: Belmont, MA

Client: TEC/S. Mallory

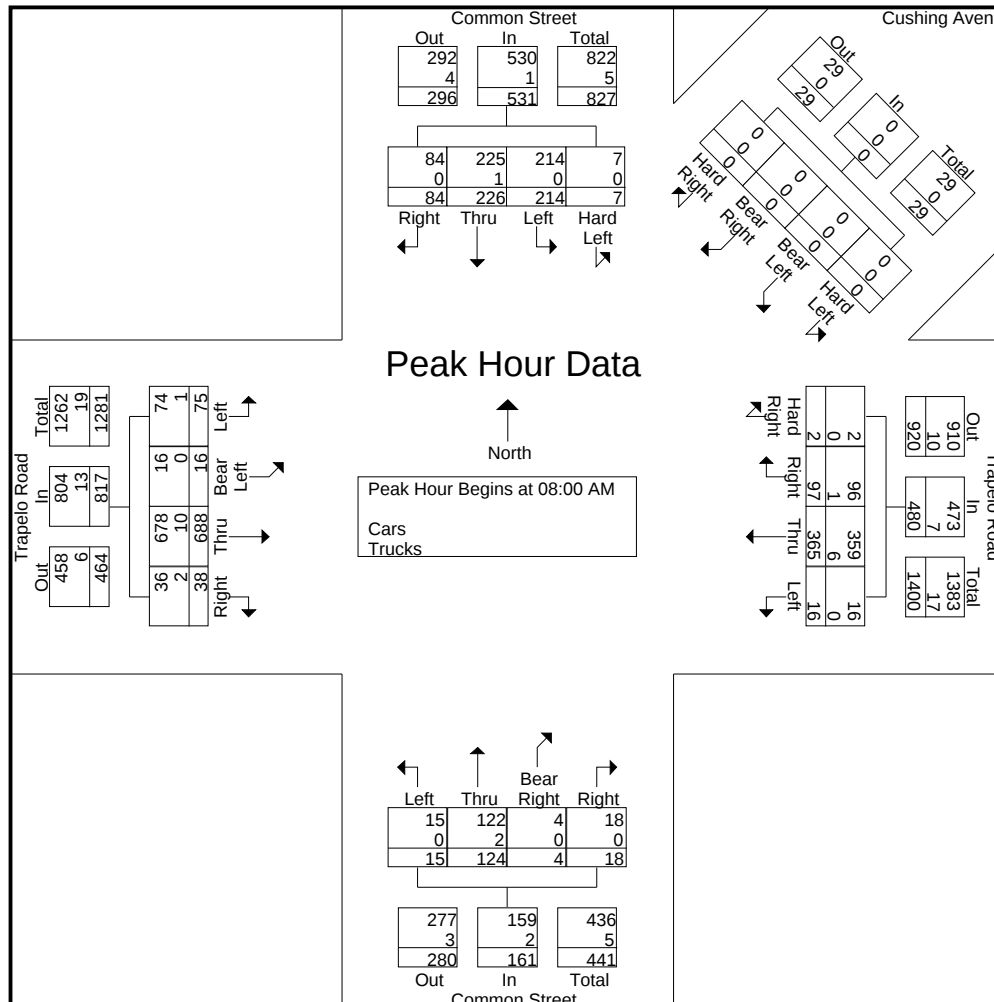
File Name : 04019B

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

	Common Street From North					Cushing Avenue From Northeast					Trapelo Road From East					Common Street From South					Trapelo Road From West						
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Int. Total	
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																											
08:00 AM	24	55	54	0	133	0	0	0	0	0	1	20	73	4	98	7	0	32	4	43	10	166	2	11	189	463	
08:15 AM	19	53	52	0	124	0	0	0	0	0	0	33	112	2	147	1	2	22	6	31	7	179	7	21	214	516	
08:30 AM	21	53	64	3	141	0	0	0	0	0	0	18	87	3	108	4	1	30	0	35	10	169	1	19	199	483	
08:45 AM	20	65	44	4	133	0	0	0	0	0	1	26	93	7	127	6	1	40	5	52	11	174	6	24	215	527	
Total Volume	84	226	214	7	531	0	0	0	0	0	2	97	365	16	480	18	4	124	15	161	38	688	16	75	817	1989	
% App. Total	15.8	42.6	40.3								20.2					11.2					84.2						
PHF	.875	.869	.836	.438	.941	.000	.000	.000	.000	.000	.500	.735	.815	.571	.816	.643	.500	.775	.625	.774	.864	.961	.571	.781	.950	.944	
Cars	84	225	214	7	530	0	0	0	0	0	2	96	359	16	473	18	4	122	15	159	36	678	16	74	804	1966	
% Cars	100	99.6	100	100	99.8	0	0	0	0	0	100	99.0	98.4	100	98.5	100	100	98.4	100	98.8	94.7	98.5	100	98.7	98.4	98.8	
Trucks	0	1	0	0	1	0	0	0	0	0	0	1	6	0	7	0	0	2	0	2	2	10	0	1	13	23	
% Trucks	0	0.4	0	0	0.2	0	0	0	0	0	0	1.0	1.6	0	1.5	0	0	1.6	0	1.2	5.3	1.5	0	1.3	1.6	1.2	



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Poplar Street
E: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019C
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Cars - Trucks

	Poplar Street From North			Horne Road From East			Poplar Street From South			Exclu. Total	Inclu. Total	Int. Total
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds			
07:00 AM	2	1	0	0	1	0	5	5	0	0	14	14
07:15 AM	2	0	0	1	4	0	5	4	0	0	16	16
07:30 AM	13	0	0	1	5	1	2	7	0	1	28	29
07:45 AM	2	3	0	4	1	3	2	8	0	3	20	23
Total	19	4	0	6	11	4	14	24	0	4	78	82
08:00 AM	4	0	0	2	1	2	4	15	2	4	26	30
08:15 AM	4	0	0	1	5	2	5	16	1	3	31	34
08:30 AM	5	2	0	2	3	3	7	19	1	4	38	42
08:45 AM	2	2	0	0	4	1	2	30	0	1	40	41
Total	15	4	0	5	13	8	18	80	4	12	135	147
Grand Total	34	8	0	11	24	12	32	104	4	16	213	229
Apprch %	81	19		31.4	68.6		23.5	76.5				
Total %	16	3.8		5.2	11.3		15	48.8		7	93	
Cars	34	8		10	24		31	104		0	0	227
% Cars	100	100	0	90.9	100	100	96.9	100	100	0	0	99.1
Trucks	0	0		1	0		1	0		0	0	2
% Trucks	0	0	0	9.1	0	0	3.1	0	0	0	0	0.9

	Poplar Street From North			Horne Road From East			Poplar Street From South			Int. Total
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
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										
08:00 AM	4	0	4	2	1	3	4	15	19	26
08:15 AM	4	0	4	1	5	6	5	16	21	31
08:30 AM	5	2	7	2	3	5	7	19	26	38
08:45 AM	2	2	4	0	4	4	2	30	32	40
Total Volume	15	4	19	5	13	18	18	80	98	135
% App. Total	78.9	21.1		27.8	72.2		18.4	81.6		
PHF	.750	.500	.679	.625	.650	.750	.643	.667	.766	.844
Cars	15	4	19	5	13	18	17	80	97	134
% Cars	100	100	100	100	100	100	94.4	100	99.0	99.3
Trucks	0	0	0	0	0	0	1	0	1	1
% Trucks	0	0	0	0	0	0	5.6	0	1.0	0.7

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Poplar Street
E: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019C
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Trucks

	Poplar Street From North		Horne Road From East		Poplar Street From South		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
07:00 AM	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0
07:45 AM	0	0	1	0	0	0	1
Total	0	0	1	0	0	0	1
08:00 AM	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	1	0	1
Total	0	0	0	0	1	0	1
Grand Total	0	0	1	0	1	0	2
Apprch %	0	0	100	0	100	0	
Total %	0	0	50	0	50	0	

	Poplar Street From North			Horne Road From East			Poplar Street From South			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
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										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	1	0	1	0	0	0	1
Total Volume	0	0	0	1	0	1	0	0	0	1
% App. Total	0	0		100	0		0	0		
PHF	.000	.000	.000	.250	.000	.250	.000	.000	.000	.250

Transportation Data Corporation

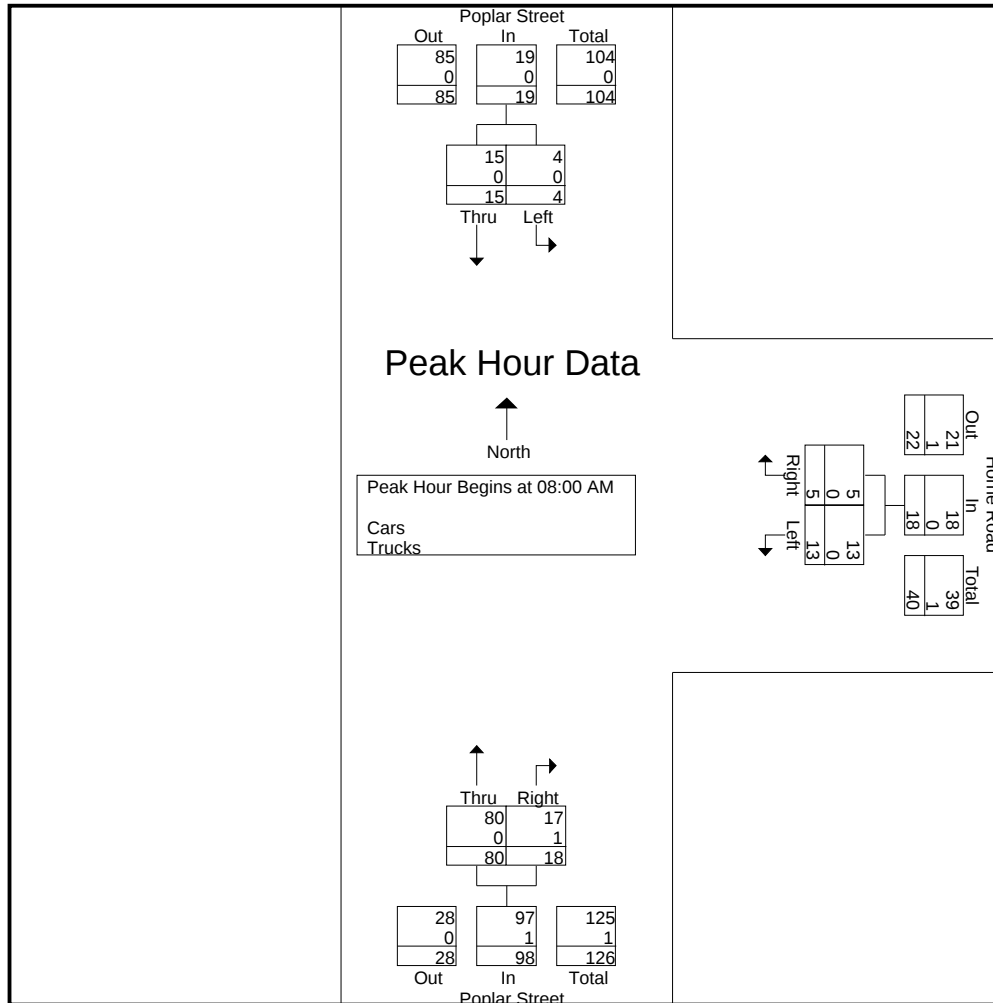
Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Poplar Street
E: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019C
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

	Poplar Street From North			Horne Road From East			Poplar Street From South			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
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										
08:00 AM	4	0	4	2	1	3	4	15	19	26
08:15 AM	4	0	4	1	5	6	5	16	21	31
08:30 AM	5	2	7	2	3	5	7	19	26	38
08:45 AM	2	2	4	0	4	4	2	30	32	40
Total Volume	15	4	19	5	13	18	18	80	98	135
% App. Total	78.9	21.1		27.8	72.2		18.4	81.6		
PHF	.750	.500	.679	.625	.650	.750	.643	.667	.766	.844
Cars	15	4	19	5	13	18	17	80	97	134
% Cars	100	100	100	100	100	100	94.4	100	99.0	99.3
Trucks	0	0	0	0	0	0	1	0	1	1
% Trucks	0	0	0	0	0	0	5.6	0	1.0	0.7



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N: Williston Road
E/W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019D
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Cars - Trucks

	Williston Road From North			Horne Road From East			Horne Road From West			Exclu. Total	Inclu. Total	Int. Total
Start Time	Right	Left	Peds	Right	Thru	Peds	Thru	Left	Peds			
07:00 AM	1	1	0	3	0	0	1	5	0	0	11	11
07:15 AM	3	4	0	1	1	0	0	3	0	0	12	12
07:30 AM	3	4	0	4	2	0	1	4	0	0	18	18
07:45 AM	3	7	0	3	3	0	0	3	0	0	19	19
Total	10	16	0	11	6	0	2	15	0	0	60	60
08:00 AM	2	7	0	1	1	0	3	3	0	0	17	17
08:15 AM	2	5	0	1	2	0	1	4	0	0	15	15
08:30 AM	2	7	0	1	2	0	4	2	0	0	18	18
08:45 AM	3	9	0	3	2	0	2	1	0	0	20	20
Total	9	28	0	6	7	0	10	10	0	0	70	70
Grand Total	19	44	0	17	13	0	12	25	0	0	130	130
Apprch %	30.2	69.8		56.7	43.3		32.4	67.6				
Total %	14.6	33.8		13.1	10		9.2	19.2		0	100	
Cars	19	44		17	12		12	24		0	0	128
% Cars	100	100	0	100	92.3	0	100	96	0	0	0	98.5
Trucks	0	0		0	1		0	1		0	0	2
% Trucks	0	0	0	0	7.7	0	0	4	0	0	0	1.5

	Williston Road From North			Horne Road From East			Horne Road From West			Int. Total
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	
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										
08:00 AM	2	7	9	1	1	2	3	3	6	17
08:15 AM	2	5	7	1	2	3	1	4	5	15
08:30 AM	2	7	9	1	2	3	4	2	6	18
08:45 AM	3	9	12	3	2	5	2	1	3	20
Total Volume	9	28	37	6	7	13	10	10	20	70
% App. Total	24.3	75.7		46.2	53.8		50	50		
PHF	.750	.778	.771	.500	.875	.650	.625	.625	.833	.875
Cars	9	28	37	6	7	13	10	9	19	69
% Cars	100	100	100	100	100	100	100	90.0	95.0	98.6
Trucks	0	0	0	0	0	0	0	1	1	1
% Trucks	0	0	0	0	0	0	0	10.0	5.0	1.4

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N: Williston Road
E/W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019D
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Trucks

	Williston Road From North		Horne Road From East		Horne Road From West		
Start Time	Right	Left	Right	Thru	Thru	Left	Int. Total
07:00 AM	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0
07:45 AM	0	0	0	1	0	0	1
Total	0	0	0	1	0	0	1
08:00 AM	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	1	1
Total	0	0	0	0	0	1	1
Grand Total	0	0	0	1	0	1	2
Apprch %	0		0	100	0	100	
Total %	0		0	50	0	50	

	Williston Road From North			Horne Road From East			Horne Road From West			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
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										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	1	1	0	0	0	1
Total Volume	0	0	0	0	1	1	0	0	0	1
% App. Total	0	0		0	100		0	0		
PHF	.000	.000	.000	.000	.250	.250	.000	.000	.000	.250

Transportation Data Corporation

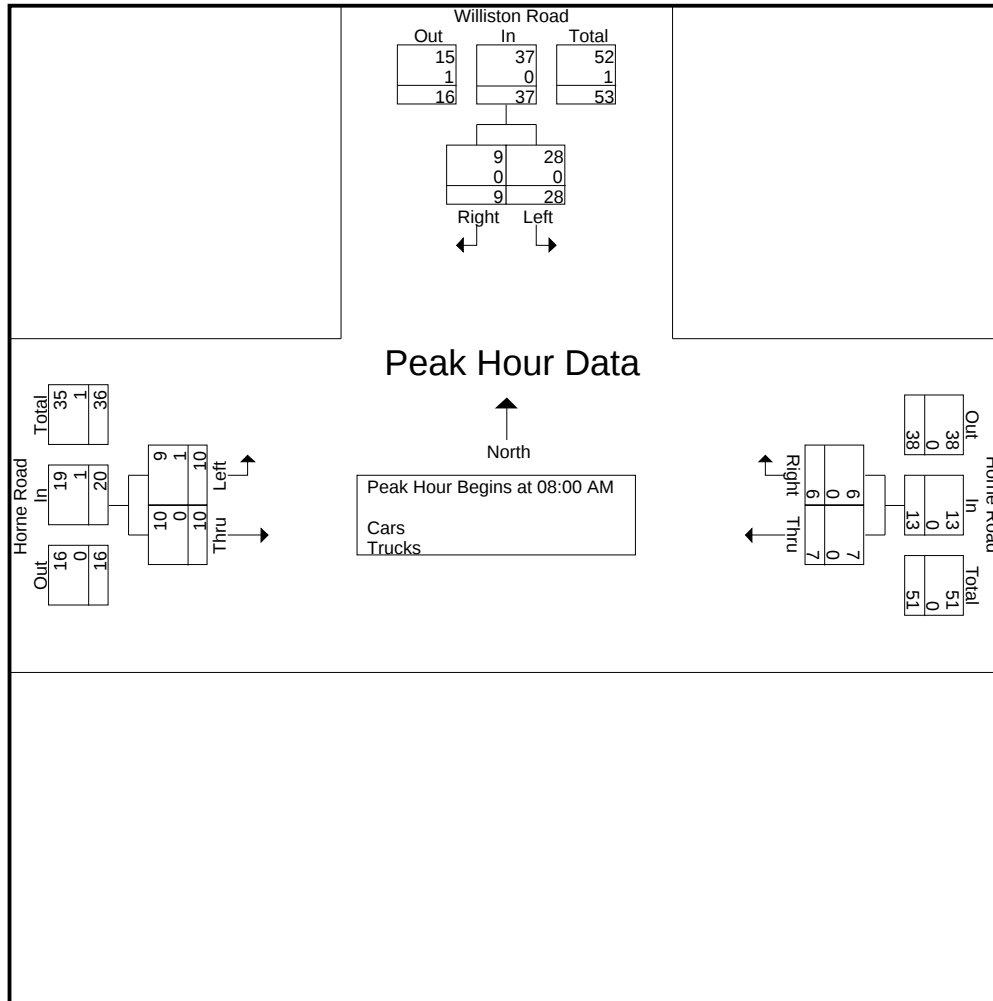
Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N: Williston Road
E/W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019D
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

	Williston Road From North			Horne Road From East			Horne Road From West			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
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										
08:00 AM	2	7	9	1	1	2	3	3	6	17
08:15 AM	2	5	7	1	2	3	1	4	5	15
08:30 AM	2	7	9	1	2	3	4	2	6	18
08:45 AM	3	9	12	3	2	5	2	1	3	20
Total Volume	9	28	37	6	7	13	10	10	20	70
% App. Total	24.3	75.7		46.2	53.8		50	50		
PHF	.750	.778	.771	.500	.875	.650	.625	.625	.833	.875
Cars	9	28	37	6	7	13	10	9	19	69
% Cars	100	100	100	100	100	100	100	90.0	95.0	98.6
Trucks	0	0	0	0	0	0	0	1	1	1
% Trucks	0	0	0	0	0	0	0	10.0	5.0	1.4



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street
W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019E
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Cars - Trucks

	Common Street From North			Common Street From South			Horne Road From West			Exclu. Total	Inclu. Total	Int. Total
Start Time	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds			
07:00 AM	1	54	1	50	1	0	1	1	0	1	108	109
07:15 AM	2	55	1	49	0	0	4	0	3	4	110	114
07:30 AM	1	48	3	57	3	1	2	4	0	4	115	119
07:45 AM	1	61	0	53	6	0	5	1	0	0	127	127
Total	5	218	5	209	10	1	12	6	3	9	460	469
08:00 AM	1	73	0	41	1	0	7	3	0	0	126	126
08:15 AM	4	60	1	24	0	0	4	2	4	5	94	99
08:30 AM	1	60	0	35	2	2	6	4	5	7	108	115
08:45 AM	2	73	1	47	2	0	6	5	6	7	135	142
Total	8	266	2	147	5	2	23	14	15	19	463	482
Grand Total	13	484	7	356	15	3	35	20	18	28	923	951
Apprch %	2.6	97.4		96	4		63.6	36.4				
Total %	1.4	52.4		38.6	1.6		3.8	2.2		2.9	97.1	
Cars	13	477		351	14		35	20		0	0	938
% Cars	100	98.6	100	98.6	93.3	100	100	100	100	0	0	98.6
Trucks	0	7		5	1		0	0		0	0	13
% Trucks	0	1.4	0	1.4	6.7	0	0	0	0	0	0	1.4

	Common Street From North			Common Street From South			Horne Road From West			Int. Total
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	2	55	57	49	0	49	4	0	4	110
07:30 AM	1	48	49	57	3	60	2	4	6	115
07:45 AM	1	61	62	53	6	59	5	1	6	127
08:00 AM	1	73	74	41	1	42	7	3	10	126
Total Volume	5	237	242	200	10	210	18	8	26	478
% App. Total	2.1	97.9		95.2	4.8		69.2	30.8		
PHF	.625	.812	.818	.877	.417	.875	.643	.500	.650	.941
Cars	5	233	238	198	9	207	18	8	26	471
% Cars	100	98.3	98.3	99.0	90.0	98.6	100	100	100	98.5
Trucks	0	4	4	2	1	3	0	0	0	7
% Trucks	0	1.7	1.7	1.0	10.0	1.4	0	0	0	1.5

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street
W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019E
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Trucks

	Common Street From North		Common Street From South		Horne Road From West		
Start Time	Right	Thru	Thru	Left	Right	Left	Int. Total
07:00 AM	0	1	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0
07:30 AM	0	1	2	0	0	0	3
07:45 AM	0	2	0	1	0	0	3
Total	0	4	2	1	0	0	7
08:00 AM	0	1	0	0	0	0	1
08:15 AM	0	1	1	0	0	0	2
08:30 AM	0	1	0	0	0	0	1
08:45 AM	0	0	2	0	0	0	2
Total	0	3	3	0	0	0	6
Grand Total	0	7	5	1	0	0	13
Apprch %	0	100	83.3	16.7	0	0	
Total %	0	53.8	38.5	7.7	0	0	

	Common Street From North			Common Street From South			Horne Road From West			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. 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	0	1	1	2	0	2	0	0	0	3
07:45 AM	0	2	2	0	1	1	0	0	0	3
08:00 AM	0	1	1	0	0	0	0	0	0	1
08:15 AM	0	1	1	1	0	1	0	0	0	2
Total Volume	0	5	5	3	1	4	0	0	0	9
% App. Total	0	100		75	25		0	0		
PHF	.000	.625	.625	.375	.250	.500	.000	.000	.000	.750

Transportation Data Corporation

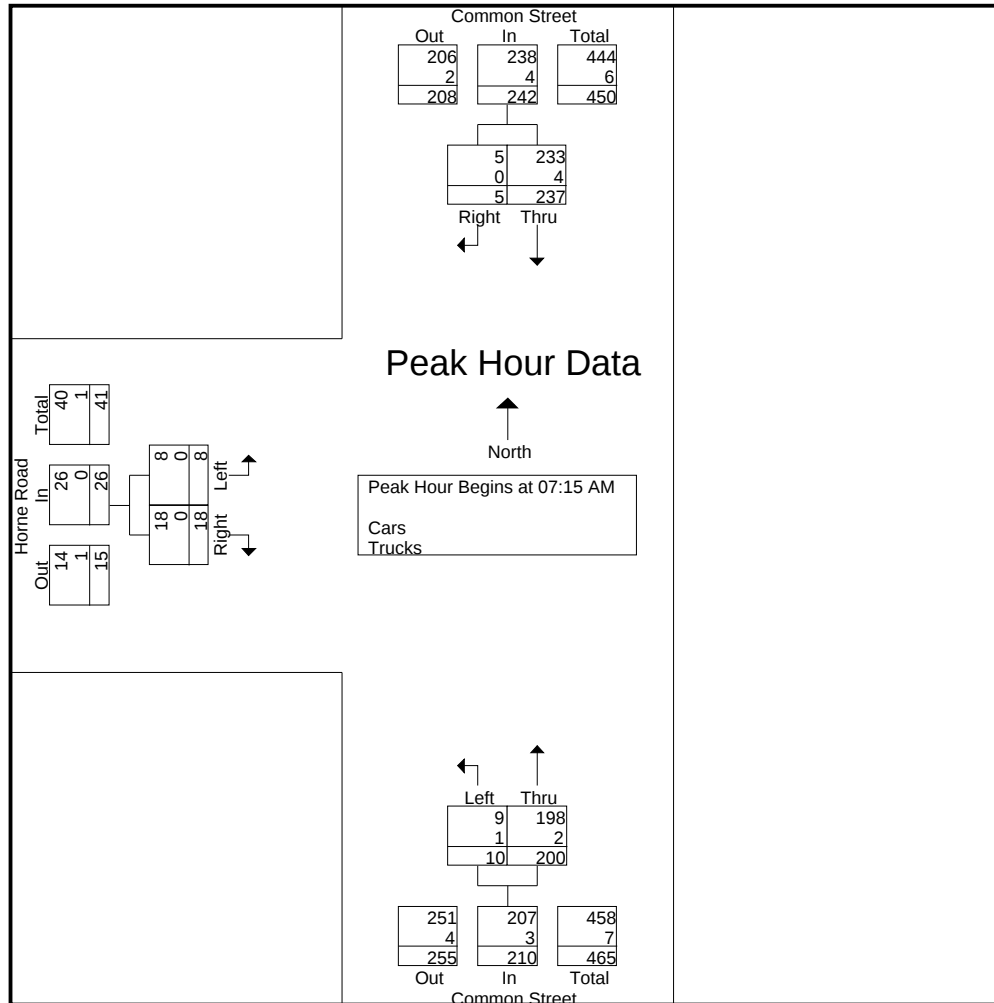
Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street
W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019E
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

	Common Street From North			Common Street From South			Horne Road From West			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
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										
07:15 AM	2	55	57	49	0	49	4	0	4	110
07:30 AM	1	48	49	57	3	60	2	4	6	115
07:45 AM	1	61	62	53	6	59	5	1	6	127
08:00 AM	1	73	74	41	1	42	7	3	10	126
Total Volume	5	237	242	200	10	210	18	8	26	478
% App. Total	2.1	97.9		95.2	4.8		69.2	30.8		
PHF	.625	.812	.818	.877	.417	.875	.643	.500	.650	.941
Cars	5	233	238	198	9	207	18	8	26	471
% Cars	100	98.3	98.3	99.0	90.0	98.6	100	100	100	98.5
Trucks	0	4	4	2	1	3	0	0	0	7
% Trucks	0	1.7	1.7	1.0	10.0	1.4	0	0	0	1.5



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street (Under Constr.)

E/W: Belmont Street

City, State: Belmont, MA

Client: TEC/S. Mallory

File Name : 04019F

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

Groups Printed- Cars - Trucks

Start Time	Common Street From North				Belmont Street From East				Common Street From South				Belmont Street From West				Exclu. Total	Inclu. Total	Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds			
07:00 AM	13	41	0	0	5	49	6	0	4	28	0	1	2	76	20	2	3	244	247
07:15 AM	19	39	1	0	9	63	5	0	6	26	3	1	10	92	17	1	2	290	292
07:30 AM	13	35	3	2	5	61	9	0	5	31	4	2	3	136	22	1	5	327	332
07:45 AM	50	12	7	1	7	98	2	0	3	14	4	1	2	139	40	0	2	378	380
Total	95	127	11	3	26	271	22	0	18	99	11	5	17	443	99	4	12	1239	1251
08:00 AM	70	0	6	0	1	104	0	3	0	2	0	2	0	129	31	0	5	343	348
08:15 AM	56	1	7	1	2	91	0	1	0	0	0	1	0	155	23	0	3	335	338
08:30 AM	60	0	5	2	3	110	0	0	0	1	0	1	0	115	31	2	5	325	330
08:45 AM	63	0	15	4	5	105	1	0	0	1	0	0	0	119	49	3	7	358	365
Total	249	1	33	7	11	410	1	4	0	4	0	4	0	518	134	5	20	1361	1381
Grand Total	344	128	44	10	37	681	23	4	18	103	11	9	17	961	233	9	32	2600	2632
Apprch %	66.7	24.8	8.5		5	91.9	3.1		13.6	78	8.3		1.4	79.4	19.2		1.2	98.8	
Total %	13.2	4.9	1.7		1.4	26.2	0.9		0.7	4	0.4		0.7	37	9				
Cars	341	126	42		37	680	23		16	101	11		17	953	229		0	0	2608
% Cars	99.1	98.4	95.5	100	100	99.9	100	100	88.9	98.1	100	100	100	99.2	98.3	100	0	0	99.1
Trucks	3	2	2		0	1	0		2	2	0		0	8	4		0	0	24
% Trucks	0.9	1.6	4.5	0	0	0.1	0	0	11.1	1.9	0	0	0	0.8	1.7	0	0	0	0.9

	Common Street From North				Belmont Street From East				Common Street From South				Belmont Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	13	35	3	51	5	61	9	75	5	31	4	40	3	136	22	161	327
07:45 AM	50	12	7	69	7	98	2	107	3	14	4	21	2	139	40	181	378
08:00 AM	70	0	6	76	1	104	0	105	0	2	0	2	0	129	31	160	343
08:15 AM	56	1	7	64	2	91	0	93	0	0	0	0	0	155	23	178	335
Total Volume	189	48	23	260	15	354	11	380	8	47	8	63	5	559	116	680	1383
% App. Total	72.7	18.5	8.8		3.9	93.2	2.9		12.7	74.6	12.7		0.7	82.2	17.1		
PHF	.675	.343	.821	.855	.536	.851	.306	.888	.400	.379	.500	.394	.417	.902	.725	.939	.915
Cars	186	47	22	255	15	353	11	379	7	45	8	60	5	554	114	673	1367
% Cars	98.4	97.9	95.7	98.1	100	99.7	100	99.7	87.5	95.7	100	95.2	100	99.1	98.3	99.0	98.8
Trucks	3	1	1	5	0	1	0	1	1	2	0	3	0	5	2	7	16
% Trucks	1.6	2.1	4.3	1.9	0	0.3	0	0.3	12.5	4.3	0	4.8	0	0.9	1.7	1.0	1.2

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street (Under Constr.)

E/W: Belmont Street

City, State: Belmont, MA

Client: TEC/S. Mallory

File Name : 04019F

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

Groups Printed- Trucks

	Common Street From North			Belmont Street From East			Common Street From South			Belmont Street From West			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	0	1	0	0	0	0	0	0	0	0	2	0	3
07:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	1
07:30 AM	1	0	0	0	0	0	1	2	0	0	2	0	6
07:45 AM	1	0	1	0	1	0	0	0	0	0	0	1	4
Total	2	1	1	0	1	0	2	2	0	0	4	1	14
08:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	1	0	0	0	0	0	0	0	0	3	1	5
08:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	1	2	3
Total	1	1	1	0	0	0	0	0	0	0	4	3	10
Grand Total	3	2	2	0	1	0	2	2	0	0	8	4	24
Apprch %	42.9	28.6	28.6	0	100	0	50	50	0	0	66.7	33.3	
Total %	12.5	8.3	8.3	0	4.2	0	8.3	8.3	0	0	33.3	16.7	

	Common Street From North				Belmont Street From East				Common Street From South				Belmont Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	1	0	0	1	0	0	0	0	1	2	0	3	0	2	0	2	6
07:45 AM	1	0	1	2	0	1	0	1	0	0	0	0	0	0	1	1	4
08:00 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	3	1	4	5
Total Volume	3	1	1	5	0	1	0	1	1	2	0	3	0	5	2	7	16
% App. Total	60	20	20		0	100	0		33.3	66.7	0		0	71.4	28.6		
PHF	.750	.250	.250	.625	.000	.250	.000	.250	.250	.250	.000	.250	.000	.417	.500	.438	.667

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street (Under Constr.)

E/W: Belmont Street

City, State: Belmont, MA

Client: TEC/S. Mallory

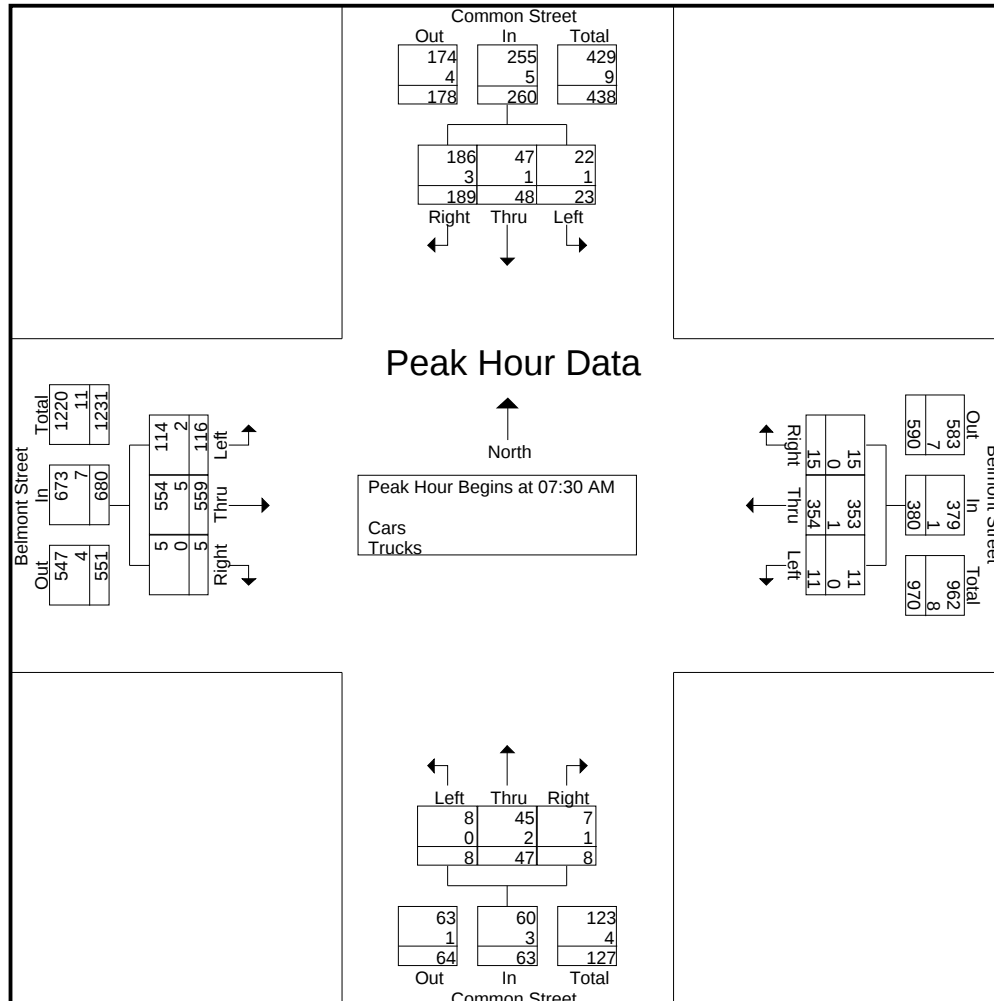
File Name : 04019F

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

	Common Street From North				Belmont Street From East				Common Street From South				Belmont Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	13	35	3	51	5	61	9	75	5	31	4	40	3	136	22	161	327
07:45 AM	50	12	7	69	7	98	2	107	3	14	4	21	2	139	40	181	378
08:00 AM	70	0	6	76	1	104	0	105	0	2	0	2	0	129	31	160	343
08:15 AM	56	1	7	64	2	91	0	93	0	0	0	0	0	155	23	178	335
Total Volume	189	48	23	260	15	354	11	380	8	47	8	63	5	559	116	680	1383
% App. Total	72.7	18.5	8.8		3.9	93.2	2.9		12.7	74.6	12.7		0.7	82.2	17.1		
PHF	.675	.343	.821	.855	.536	.851	.306	.888	.400	.379	.500	.394	.417	.902	.725	.939	.915
Cars	186	47	22	255	15	353	11	379	7	45	8	60	5	554	114	673	1367
% Cars	98.4	97.9	95.7	98.1	100	99.7	100	99.7	87.5	95.7	100	95.2	100	99.1	98.3	99.0	98.8
Trucks	3	1	1	5	0	1	0	1	1	2	0	3	0	5	2	7	16
% Trucks	1.6	2.1	4.3	1.9	0	0.3	0	0.3	12.5	4.3	0	4.8	0	0.9	1.7	1.0	1.2



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

S: Williston Road
E/W: Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019AA
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Cars - Trucks

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			Exclu. Total	Inclu. Total	Int. Total
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds			
04:00 PM	165	7	2	1	2	11	7	137	5	18	319	337
04:15 PM	181	4	1	7	2	10	6	125	4	15	325	340
04:30 PM	173	5	6	5	1	8	3	132	2	16	319	335
04:45 PM	189	1	0	2	3	7	2	126	2	9	323	332
Total	708	17	9	15	8	36	18	520	13	58	1286	1344
05:00 PM	173	5	3	4	3	8	2	132	3	14	319	333
05:15 PM	186	5	2	8	1	5	3	165	1	8	368	376
05:30 PM	187	3	6	3	3	8	3	154	3	17	353	370
05:45 PM	197	3	2	2	0	8	9	144	3	13	355	368
Total	743	16	13	17	7	29	17	595	10	52	1395	1447
Grand Total	1451	33	22	32	15	65	35	1115	23	110	2681	2791
Apprch %	97.8	2.2		68.1	31.9		3	97				
Total %	54.1	1.2		1.2	0.6		1.3	41.6		3.9	96.1	
Cars	1437	33		32	15		35	1107		0	0	2769
% Cars	99	100	100	100	100	100	100	99.3	100	0	0	99.2
Trucks	14	0		0	0		0	8		0	0	22
% Trucks	1	0	0	0	0	0	0	0.7	0	0	0	0.8

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			Int. Total
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	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	173	5	178	4	3	7	2	132	134	319
05:15 PM	186	5	191	8	1	9	3	165	168	368
05:30 PM	187	3	190	3	3	6	3	154	157	353
05:45 PM	197	3	200	2	0	2	9	144	153	355
Total Volume	743	16	759	17	7	24	17	595	612	1395
% App. Total	97.9	2.1		70.8	29.2		2.8	97.2		
PHF	.943	.800	.949	.531	.583	.667	.472	.902	.911	.948
Cars	737	16	753	17	7	24	17	592	609	1386
% Cars	99.2	100	99.2	100	100	100	100	99.5	99.5	99.4
Trucks	6	0	6	0	0	0	0	3	3	9
% Trucks	0.8	0	0.8	0	0	0	0	0.5	0.5	0.6

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

S: Williston Road
E/W: Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019AA
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Trucks

	Trapelo Road From East		Williston Road From South		Trapelo Road From West		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
04:00 PM	3	0	0	0	0	1	4
04:15 PM	3	0	0	0	0	1	4
04:30 PM	2	0	0	0	0	1	3
04:45 PM	0	0	0	0	0	2	2
Total	8	0	0	0	0	5	13
05:00 PM	3	0	0	0	0	1	4
05:15 PM	2	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	2	2
05:45 PM	1	0	0	0	0	0	1
Total	6	0	0	0	0	3	9
Grand Total	14	0	0	0	0	8	22
Apprch %	100		0		0	100	
Total %	63.6	0	0	0	0	36.4	

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. 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	3	0	3	0	0	0	0	1	1	4
04:15 PM	3	0	3	0	0	0	0	1	1	4
04:30 PM	2	0	2	0	0	0	0	1	1	3
04:45 PM	0	0	0	0	0	0	0	2	2	2
Total Volume	8	0	8	0	0	0	0	5	5	13
% App. Total	100	0		0	0		0	100		
PHF	.667	.000	.667	.000	.000	.000	.000	.625	.625	.813

Transportation Data Corporation

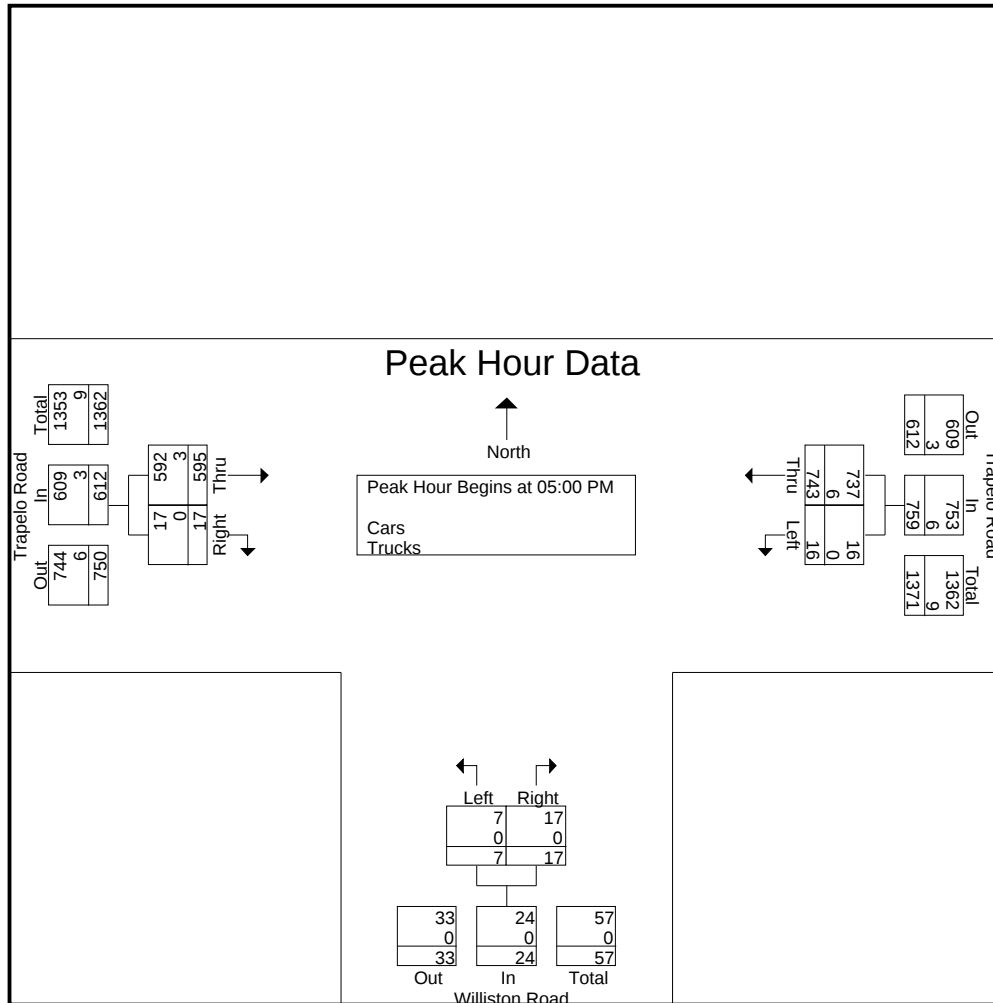
Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

S: Williston Road
E/W: Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019AA
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. 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	173	5	178	4	3	7	2	132	134	319
05:15 PM	186	5	191	8	1	9	3	165	168	368
05:30 PM	187	3	190	3	3	6	3	154	157	353
05:45 PM	197	3	200	2	0	2	9	144	153	355
Total Volume	743	16	759	17	7	24	17	595	612	1395
% App. Total	97.9	2.1		70.8	29.2		2.8	97.2		
PHF	.943	.800	.949	.531	.583	.667	.472	.902	.911	.948
Cars	737	16	753	17	7	24	17	592	609	1386
% Cars	99.2	100	99.2	100	100	100	100	99.5	99.5	99.4
Trucks	6	0	6	0	0	0	0	3	3	9
% Trucks	0.8	0	0.8	0	0	0	0	0.5	0.5	0.6



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

NE/N,S: Cushing Ave./Common St.

E/W: Trapelo Road

City, State: Belmont, MA

Client: TEC/S. Mallory

File Name : 04019BB

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

Groups Printed- Cars - Trucks																											
Start Time	Common Street From North					Cushing Avenue From Northeast				Trapelo Road From East					Common Street From South					Trapelo Road From West					Exclu. Total	Inclu. Total	Int. Total
	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Hard Right	Right	Thru	Left	Peds	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds			
04:00 PM	26	58	22	4	31	0	0	0	0	2	29	121	7	1	9	0	40	20	8	11	103	3	23	10	50	478	528
04:15 PM	26	44	22	1	24	0	0	0	0	1	34	147	2	6	11	2	50	12	6	10	97	1	21	9	45	481	526
04:30 PM	20	55	20	1	35	0	0	0	0	3	32	141	3	6	1	3	54	13	5	21	95	2	22	7	53	486	539
04:45 PM	26	43	34	0	48	0	0	0	0	1	31	148	5	13	7	4	52	16	8	15	95	3	14	13	82	494	576
Total	98	200	98	6	138	0	0	0	0	7	126	557	17	26	28	9	196	61	27	57	390	9	80	39	230	1939	2169
05:00 PM	21	44	17	1	31	0	0	0	0	3	32	143	4	2	4	6	63	14	8	15	95	4	19	8	49	485	534
05:15 PM	31	66	29	2	17	0	0	0	0	2	29	138	6	3	7	2	60	15	7	16	119	6	26	9	36	554	590
05:30 PM	22	68	29	1	25	0	0	0	0	2	38	148	3	8	11	4	59	22	2	18	111	4	19	13	48	559	607
05:45 PM	18	59	40	4	29	0	0	0	0	3	35	165	6	2	7	2	45	14	5	13	122	6	12	5	41	551	592
Total	92	237	115	8	102	0	0	0	0	10	134	594	19	15	29	14	227	65	22	62	447	20	76	35	174	2149	2323
Grand Total	190	437	213	14	240	0	0	0	0	17	260	1151	36	41	57	23	423	126	49	119	837	29	156	74	404	4088	4492
Apprch %	22.2	51.2	24.9	1.6		0	0	0	0	1.2	17.8	78.6	2.5		9.1	3.7	67.2	20		10.4	73.4	2.5	13.7				
Total %	4.6	10.7	5.2	0.3		0	0	0	0	0.4	6.4	28.2	0.9		1.4	0.6	10.3	3.1		2.9	20.5	0.7	3.8		9	91	
Cars	187	434	213	14		0	0	0	0	17	260	1141	35		57	23	421	126		119	832	29	154		0	0	4466
% Cars	98.4	99.3	100	100	100	0	0	0	0	100	100	99.1	97.2	100	100	100	99.5	100	100	100	99.4	100	98.7	100	0	0	99.4
Trucks	3	3	0	0		0	0	0	0	0	0	10	1		0	0	2	0		0	5	0	2		0	0	26
% Trucks	1.6	0.7	0	0	0	0	0	0	0	0	0	0.9	2.8	0	0	0	0.5	0	0	0	0.6	0	1.3	0	0	0	0.6

	Common Street From North					Cushing Avenue From Northeast					Trapelo Road From East					Common Street From South					Trapelo Road From West					
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Int. 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	21	44	17	1	83	0	0	0	0	0	3	32	143	4	182	4	6	63	14	87	15	95	4	19	133	485
05:15 PM	31	66	29	2	128	0	0	0	0	0	2	29	138	6	175	7	2	60	15	84	16	119	6	26	167	554
05:30 PM	22	68	29	1	120	0	0	0	0	0	2	38	148	3	191	11	4	59	22	96	18	111	4	19	152	559
05:45 PM	18	59	40	4	121	0	0	0	0	0	3	35	165	6	209	7	2	45	14	68	13	122	6	12	153	551
Total Volume	92	237	115	8	452	0	0	0	0	0	10	134	594	19	757	29	14	227	65	335	62	447	20	76	605	2149
% App. Total	20.4	52.4	25.4									17.7	78.5					67.8	19.4		10.2	73.9		12.6		
PHF	.742	.871	.719	.500	.883	.000	.000	.000	.000	.000	.833	.882	.900	.792	.906	.659	.583	.901	.739	.872	.861	.916	.833	.731	.906	.961
Cars	91	236	115	8	450	0	0	0	0	0	10	134	590	19	753	29	14	225	65	333	62	445	20	75	602	2138
% Cars	98.9	99.6	100	100	99.6	0	0	0	0	0	100	100	99.3	100	99.5	100	100	99.1	100	99.4	100	99.6	100	98.7	99.5	99.5
Trucks	1	1	0	0	2	0	0	0	0	0	0	0	4	0	4	0	0	2	0	2	0	2	0	1	3	11
% Trucks	1.1	0.4	0	0	0.4	0	0	0	0	0	0	0	0.7	0	0.5	0	0	0.9	0	0.6	0	0.4	0	1.3	0.5	0.5

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

NE/N,S: Cushing Ave./Common St.

E/W: Trapelo Road

City, State: Belmont, MA

Client: TEC/S. Mallory

File Name : 04019BB

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

Groups Printed- Trucks

	Common Street From North				Cushing Avenue From Northeast				Trapelo Road From East				Common Street From South				Trapelo Road From West				
Start Time	Right	Thru	Left	Hard Left	Hard Right	Bear Right	Bear Left	Hard Left	Hard Right	Right	Thru	Left	Right	Bear Right	Thru	Left	Right	Thru	Bear Left	Left	Int. Total
04:00 PM	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	4
04:15 PM	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	5
04:30 PM	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Total	2	2	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	3	0	1	15
05:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	1	5
05:15 PM	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
Total	1	1	0	0	0	0	0	0	0	0	4	0	0	0	2	0	0	2	0	1	11
Grand Total	3	3	0	0	0	0	0	0	0	0	10	1	0	0	2	0	0	5	0	2	26
Apprch %	50	50	0	0	0	0	0	0	0	0	90.9	9.1	0	0	100	0	0	71.4	0	28.6	
Total %	11.5	11.5	0	0	0	0	0	0	0	0	38.5	3.8	0	0	7.7	0	0	19.2	0	7.7	

	Common Street From North					Cushing Avenue From Northeast					Trapelo Road From East					Common Street From South					Trapelo Road From West					
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Int. 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	1	0	0	1	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	1	1	5
04:30 PM	1	1	0	0	2	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	1	0	1	0	0	0	1	1	5
Total Volume	1	2	0	0	3	0	0	0	0	0	0	0	7	1	8	0	0	1	0	1	0	2	0	2	4	16
% App. Total	33.3	66.7											87.5	12.5												
PHF	.250	.500	.000	.000	.375	.000	.000	.000	.000	.000	.000	.000	.583	.250	.667	.000	.000	.250	.000	.250	.000	.250	.000	.500	.500	.800

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

NE/N,S: Cushing Ave./Common St.

E/W: Trapelo Road

City, State: Belmont, MA

Client: TEC/S. Mallory

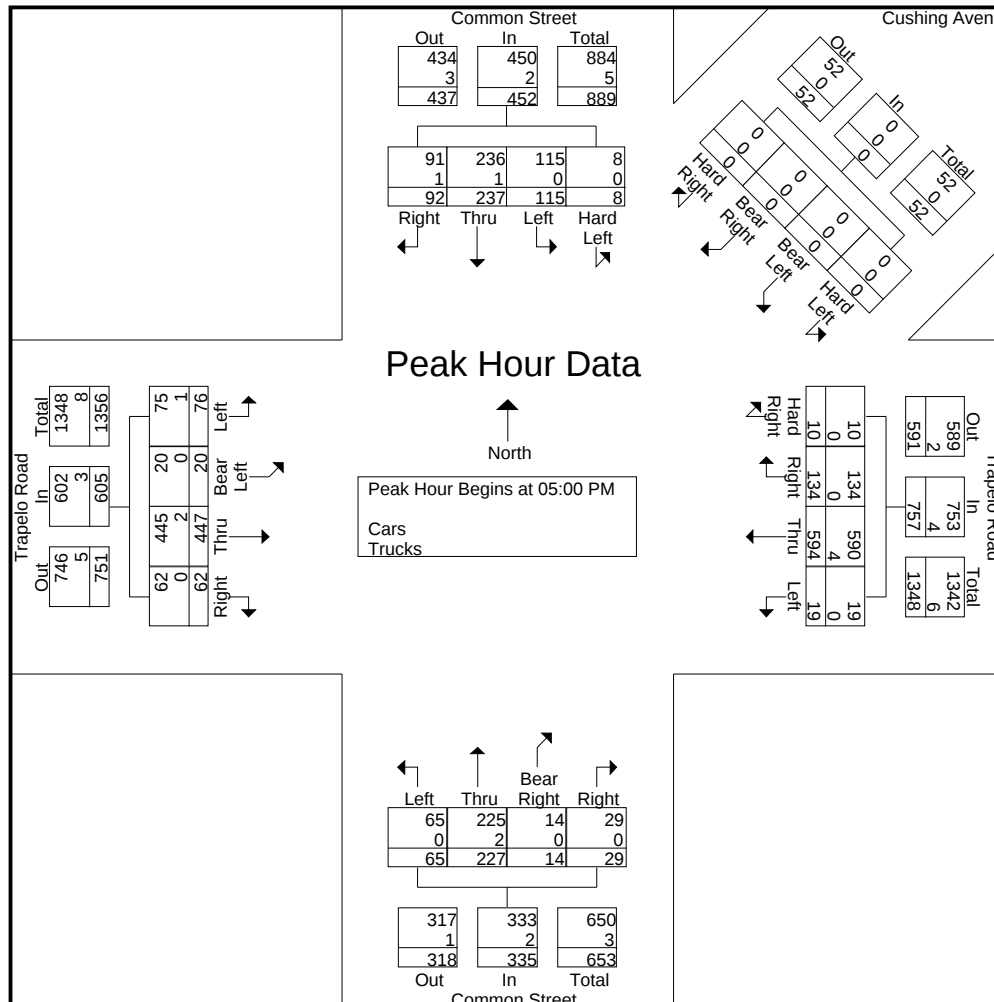
File Name : 04019BB

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

	Common Street From North					Cushing Avenue From Northeast					Trapelo Road From East					Common Street From South					Trapelo Road From West						
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Int. 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	21	44	17	1	83	0	0	0	0	0	3	32	143	4	182	4	6	63	14	87	15	95	4	19	133	485	
05:15 PM	31	66	29	2	128	0	0	0	0	0	2	29	138	6	175	7	2	60	15	84	16	119	6	26	167	554	
05:30 PM	22	68	29	1	120	0	0	0	0	0	2	38	148	3	191	11	4	59	22	96	18	111	4	19	152	559	
05:45 PM	18	59	40	4	121	0	0	0	0	0	3	35	165	6	209	7	2	45	14	68	13	122	6	12	153	551	
Total Volume	92	237	115	8	452	0	0	0	0	0	10	134	594	19	757	29	14	227	65	335	62	447	20	76	605	2149	
% App. Total	20.4	52.4	25.4									17.7	78.5					67.8	19.4		10.2	73.9		12.6			
PHF	.742	.871	.719	.500	.883	.000	.000	.000	.000	.000	.833	.882	.900	.792	.906	.659	.583	.901	.739	.872	.861	.916	.833	.731	.906	.961	
Cars	91	236	115	8	450	0	0	0	0	0	10	134	590	19	753	29	14	225	65	333	62	445	20	75	602	2138	
% Cars	98.9	99.6	100	100	99.6	0	0	0	0	0	100	100	99.3	100	99.5	100	100	99.1	100	99.4	100	99.6	100	98.7	99.5	99.5	
Trucks	1	1	0	0	2	0	0	0	0	0	0	0	4	0	4	0	0	2	0	2	0	2	0	1	3	11	
% Trucks	1.1	0.4	0	0	0.4	0	0	0	0	0	0	0	0.7	0	0.5	0	0	0.9	0	0.6	0	0.4	0	1.3	0.5	0.5	



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Poplar Street
E: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019CC
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Cars - Trucks

	Poplar Street From North			Horne Road From East			Poplar Street From South			Exclu. Total	Inclu. Total	Int. Total
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds			
04:00 PM	6	1	0	2	3	2	0	4	1	3	16	19
04:15 PM	4	0	0	6	4	0	4	7	1	1	25	26
04:30 PM	3	1	0	1	3	2	1	9	2	4	18	22
04:45 PM	5	2	0	2	1	2	1	4	0	2	15	17
Total	18	4	0	11	11	6	6	24	4	10	74	84
05:00 PM	10	0	0	2	8	1	0	8	2	3	28	31
05:15 PM	7	0	0	1	3	0	2	8	1	1	21	22
05:30 PM	3	2	0	0	1	0	3	8	0	0	17	17
05:45 PM	7	3	0	2	0	1	3	4	0	1	19	20
Total	27	5	0	5	12	2	8	28	3	5	85	90
Grand Total	45	9	0	16	23	8	14	52	7	15	159	174
Apprch %	83.3	16.7		41	59		21.2	78.8				
Total %	28.3	5.7		10.1	14.5		8.8	32.7		8.6	91.4	
Cars	45	9		16	23		14	51		0	0	173
% Cars	100	100	0	100	100	100	100	98.1	100	0	0	99.4
Trucks	0	0		0	0		0	1		0	0	1
% Trucks	0	0	0	0	0	0	0	1.9	0	0	0	0.6

	Poplar Street From North			Horne Road From East			Poplar Street From South			Int. Total
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	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	4	0	4	6	4	10	4	7	11	25
04:30 PM	3	1	4	1	3	4	1	9	10	18
04:45 PM	5	2	7	2	1	3	1	4	5	15
05:00 PM	10	0	10	2	8	10	0	8	8	28
Total Volume	22	3	25	11	16	27	6	28	34	86
% App. Total	88	12		40.7	59.3		17.6	82.4		
PHF	.550	.375	.625	.458	.500	.675	.375	.778	.773	.768
Cars	22	3	25	11	16	27	6	27	33	85
% Cars	100	100	100	100	100	100	100	96.4	97.1	98.8
Trucks	0	0	0	0	0	0	0	1	1	1
% Trucks	0	0	0	0	0	0	0	3.6	2.9	1.2

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Poplar Street
E: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019CC
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Trucks

	Poplar Street From North		Horne Road From East		Poplar Street From South		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
04:00 PM	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	1	1
04:30 PM	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	1	1
Apprch %	0	0	0	0	0	100	
Total %	0	0	0	0	0	100	

	Poplar Street From North			Horne Road From East			Poplar Street From South			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. 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	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	1	1	1
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	1	1	1
% App. Total	0	0		0	0		0	100		
PHF	.000	.000	.000	.000	.000	.000	.000	.250	.250	.250

Transportation Data Corporation

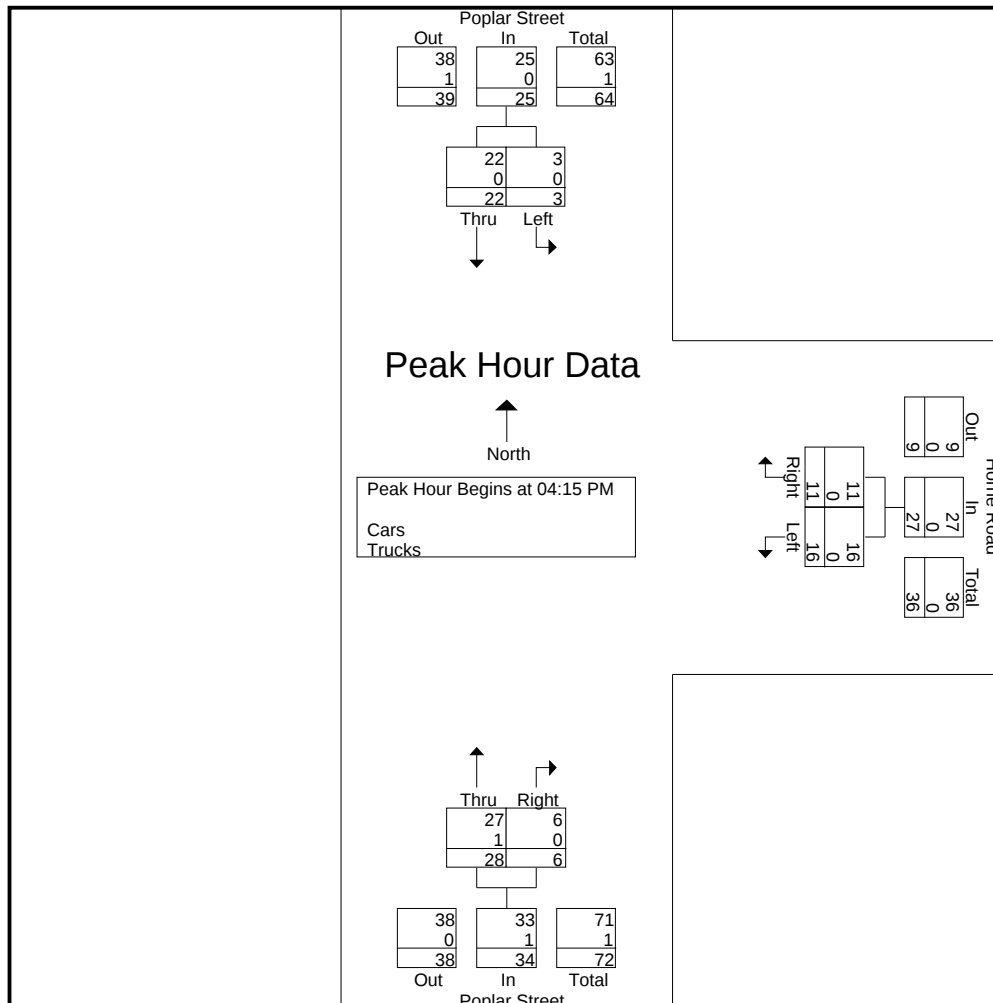
Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Poplar Street
E: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019CC
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

	Poplar Street From North			Horne Road From East			Poplar Street From South			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. 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	4	0	4	6	4	10	4	7	11	25
04:30 PM	3	1	4	1	3	4	1	9	10	18
04:45 PM	5	2	7	2	1	3	1	4	5	15
05:00 PM	10	0	10	2	8	10	0	8	8	28
Total Volume	22	3	25	11	16	27	6	28	34	86
% App. Total	88	12		40.7	59.3		17.6	82.4		
PHF	.550	.375	.625	.458	.500	.675	.375	.778	.773	.768
Cars	22	3	25	11	16	27	6	27	33	85
% Cars	100	100	100	100	100	100	100	96.4	97.1	98.8
Trucks	0	0	0	0	0	0	0	1	1	1
% Trucks	0	0	0	0	0	0	0	3.6	2.9	1.2



t (781) 587-0086 *f* (781) 587-0089

N: Williston Road
E/W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019DD
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

[illegible][illegible]

t (781) 587-0086 *f* (781) 587-0089

File Name : 04019DD
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Trucks							
	Williston Road From North		Horne Road From East		Horne Road From West		
Start Time	Right	Left	Right	Thru	Thru	Left	Int. Total
04:00 PM	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	
Total %							

[illegible]

Transportation Data Corporation

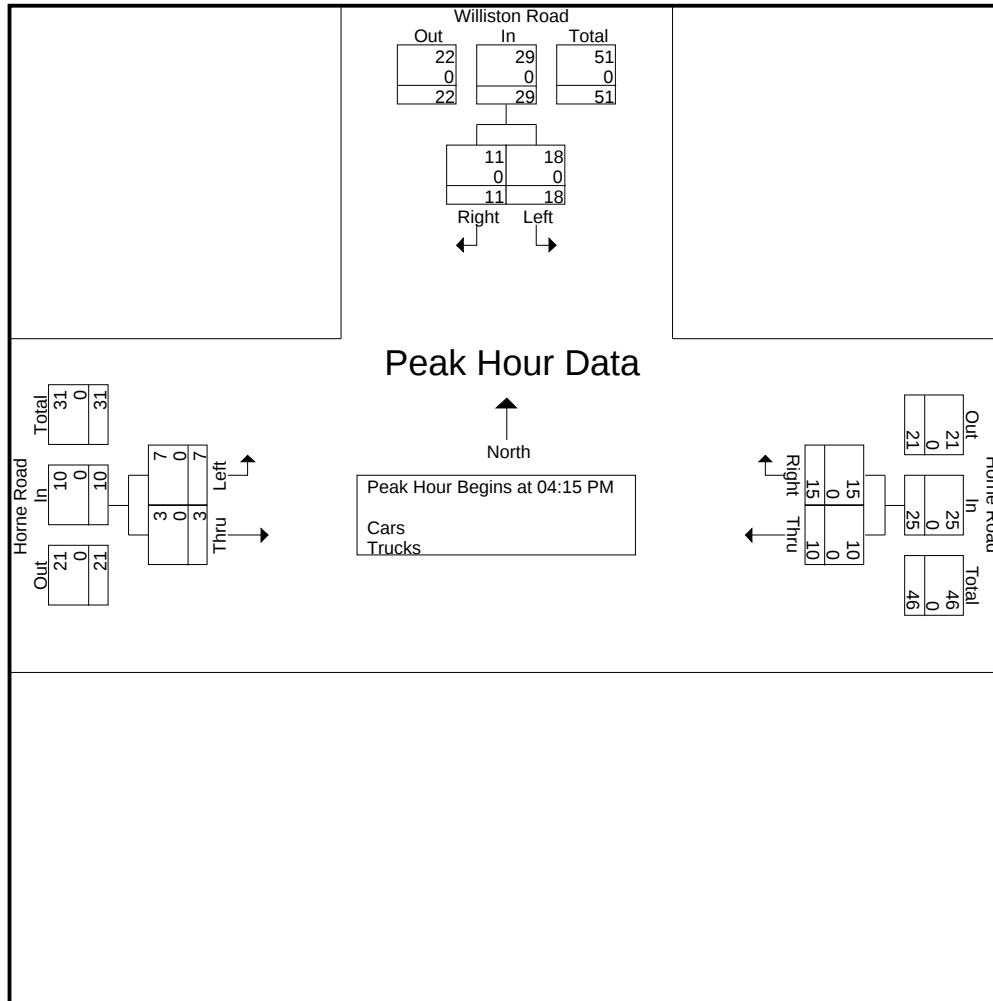
Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N: Williston Road
E/W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019DD
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

	Williston Road From North			Horne Road From East			Horne Road From West			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. 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	3	4	7	4	4	8	2	2	4	19
04:30 PM	2	5	7	1	1	2	0	2	2	11
04:45 PM	1	4	5	2	3	5	0	3	3	13
05:00 PM	5	5	10	8	2	10	1	0	1	21
Total Volume	11	18	29	15	10	25	3	7	10	64
% App. Total	37.9	62.1		60	40		30	70		
PHF	.550	.900	.725	.469	.625	.625	.375	.583	.625	.762
Cars	11	18	29	15	10	25	3	7	10	64
% Cars	100	100	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street
W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019EE
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Cars - Trucks

	Common Street From North			Common Street From South			Horne Road From West			Exclu. Total	Inclu. Total	Int. Total
Start Time	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds			
04:00 PM	3	68	2	66	2	0	7	3	0	2	149	151
04:15 PM	1	54	1	75	5	0	1	2	2	3	138	141
04:30 PM	1	81	0	68	1	0	3	3	0	0	157	157
04:45 PM	3	58	0	79	5	0	5	2	2	2	152	154
Total	8	261	3	288	13	0	16	10	4	7	596	603
05:00 PM	5	61	0	83	3	0	6	1	0	0	159	159
05:15 PM	3	80	0	85	3	0	1	0	5	5	172	177
05:30 PM	2	85	2	96	1	0	2	2	2	4	188	192
05:45 PM	1	80	1	66	2	0	4	0	0	1	153	154
Total	11	306	3	330	9	0	13	3	7	10	672	682
Grand Total	19	567	6	618	22	0	29	13	11	17	1268	1285
Apprch %	3.2	96.8		96.6	3.4		69	31				
Total %	1.5	44.7		48.7	1.7		2.3	1		1.3	98.7	
Cars	19	563		616	22		29	13		0	0	1279
% Cars	100	99.3	100	99.7	100	0	100	100	100	0	0	99.5
Trucks	0	4		2	0		0	0		0	0	6
% Trucks	0	0.7	0	0.3	0	0	0	0	0	0	0	0.5

	Common Street From North			Common Street From South			Horne Road From West			Int. Total
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	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	5	61	66	83	3	86	6	1	7	159
05:15 PM	3	80	83	85	3	88	1	0	1	172
05:30 PM	2	85	87	96	1	97	2	2	4	188
05:45 PM	1	80	81	66	2	68	4	0	4	153
Total Volume	11	306	317	330	9	339	13	3	16	672
% App. Total	3.5	96.5		97.3	2.7		81.2	18.8		
PHF	.550	.900	.911	.859	.750	.874	.542	.375	.571	.894
Cars	11	305	316	328	9	337	13	3	16	669
% Cars	100	99.7	99.7	99.4	100	99.4	100	100	100	99.6
Trucks	0	1	1	2	0	2	0	0	0	3
% Trucks	0	0.3	0.3	0.6	0	0.6	0	0	0	0.4

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street
W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019EE
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

Groups Printed- Trucks

	Common Street From North		Common Street From South		Horne Road From West		
Start Time	Right	Thru	Thru	Left	Right	Left	Int. Total
04:00 PM	0	0	0	0	0	0	0
04:15 PM	0	1	0	0	0	0	1
04:30 PM	0	2	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0
Total	0	3	0	0	0	0	3
05:00 PM	0	0	1	0	0	0	1
05:15 PM	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0
05:45 PM	0	0	1	0	0	0	1
Total	0	1	2	0	0	0	3
Grand Total	0	4	2	0	0	0	6
Apprch %	0	100	100	0	0	0	
Total %	0	66.7	33.3	0	0	0	

	Common Street From North			Common Street From South			Horne Road From West			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. 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	1	1	0	0	0	0	0	0	1
04:30 PM	0	2	2	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	1	0	1	0	0	0	1
Total Volume	0	3	3	1	0	1	0	0	0	4
% App. Total	0	100		100	0		0	0		
PHF	.000	.375	.375	.250	.000	.250	.000	.000	.000	.500

Transportation Data Corporation

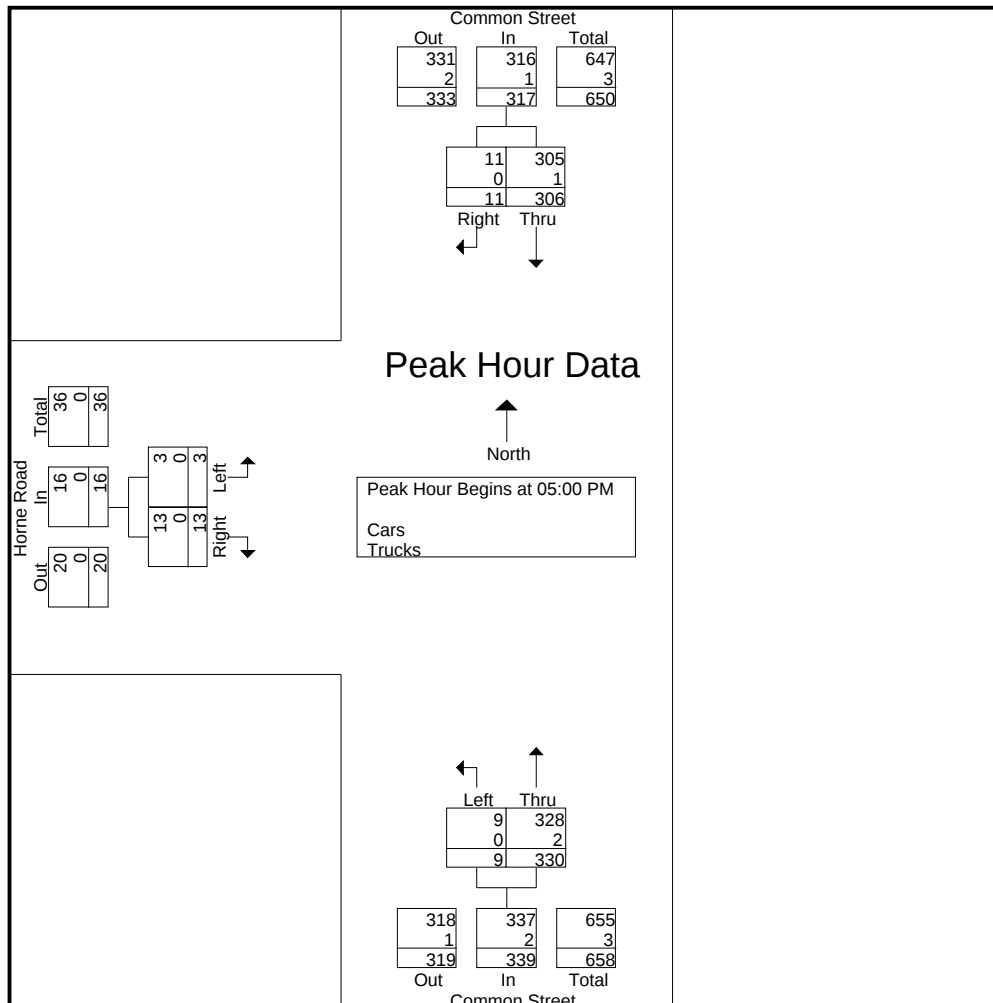
Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street
W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019EE
Site Code : T-0376
Start Date : 6/15/2010
Page No : 1

	Common Street From North			Common Street From South			Horne Road From West			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. 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	5	61	66	83	3	86	6	1	7	159
05:15 PM	3	80	83	85	3	88	1	0	1	172
05:30 PM	2	85	87	96	1	97	2	2	4	188
05:45 PM	1	80	81	66	2	68	4	0	4	153
Total Volume	11	306	317	330	9	339	13	3	16	672
% App. Total	3.5	96.5		97.3	2.7		81.2	18.8		
PHF	.550	.900	.911	.859	.750	.874	.542	.375	.571	.894
Cars	11	305	316	328	9	337	13	3	16	669
% Cars	100	99.7	99.7	99.4	100	99.4	100	100	100	99.6
Trucks	0	1	1	2	0	2	0	0	0	3
% Trucks	0	0.3	0.3	0.6	0	0.6	0	0	0	0.4



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street (Under Constr.)

E/W: Belmont Street

City, State: Belmont, MA

Client: TEC/S. Mallory

File Name : 04019FF

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

Groups Printed- Cars - Trucks

	Common Street From North				Belmont Street From East				Common Street From South				Belmont Street From West				Exclu. Total	Inclu. Total	Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds			
04:00 PM	39	32	6	1	6	92	8	0	6	39	5	3	8	68	23	0	4	332	336
04:15 PM	18	36	2	4	6	94	12	0	3	39	5	0	3	73	29	0	4	320	324
04:30 PM	40	39	4	1	5	116	15	0	5	40	4	2	8	62	26	0	3	364	367
04:45 PM	27	34	3	4	7	101	11	11	11	43	4	0	5	71	30	0	15	347	362
Total	124	141	15	10	24	403	46	11	25	161	18	5	24	274	108	0	26	1363	1389
05:00 PM	26	36	5	5	5	105	13	1	11	66	12	3	9	87	23	0	9	398	407
05:15 PM	28	48	3	3	4	118	17	3	11	57	3	0	17	96	28	2	8	430	438
05:30 PM	32	52	5	2	6	116	19	1	10	63	4	0	6	84	27	0	3	424	427
05:45 PM	31	47	4	0	2	118	8	0	12	45	5	1	5	95	22	0	1	394	395
Total	117	183	17	10	17	457	57	5	44	231	24	4	37	362	100	2	21	1646	1667
Grand Total	241	324	32	20	41	860	103	16	69	392	42	9	61	636	208	2	47	3009	3056
Apprch %	40.4	54.3	5.4		4.1	85.7	10.3		13.7	77.9	8.3		6.7	70.3	23				
Total %	8	10.8	1.1		1.4	28.6	3.4		2.3	13	1.4		2	21.1	6.9		1.5	98.5	
Cars	239	322	32		41	858	103		69	390	42		60	635	208		0	0	3046
% Cars	99.2	99.4	100	100	100	99.8	100	100	100	99.5	100	100	98.4	99.8	100	100	0	0	99.7
Trucks	2	2	0		0	2	0		0	2	0		1	1	0		0	0	10
% Trucks	0.8	0.6	0	0	0	0.2	0	0	0	0.5	0	0	1.6	0.2	0	0	0	0	0.3

	Common Street From North				Belmont Street From East				Common Street From South				Belmont Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	26	36	5	67	5	105	13	123	11	66	12	89	9	87	23	119	398
05:15 PM	28	48	3	79	4	118	17	139	11	57	3	71	17	96	28	141	430
05:30 PM	32	52	5	89	6	116	19	141	10	63	4	77	6	84	27	117	424
05:45 PM	31	47	4	82	2	118	8	128	12	45	5	62	5	95	22	122	394
Total Volume	117	183	17	317	17	457	57	531	44	231	24	299	37	362	100	499	1646
% App. Total	36.9	57.7	5.4		3.2	86.1	10.7		14.7	77.3	8		7.4	72.5	20		
PHF	.914	.880	.850	.890	.708	.968	.750	.941	.917	.875	.500	.840	.544	.943	.893	.885	.957
Cars	116	183	17	316	17	455	57	529	44	229	24	297	37	362	100	499	1641
% Cars	99.1	100	100	99.7	100	99.6	100	99.6	100	99.1	100	99.3	100	100	100	100	99.7
Trucks	1	0	0	1	0	2	0	2	0	2	0	2	0	0	0	0	5
% Trucks	0.9	0	0	0.3	0	0.4	0	0.4	0	0.9	0	0.7	0	0	0	0	0.3

t (781) 587-0086 *f* (781) 587-0089

Client: TEC/S. Mallory

Page No : 1

Groups Printed- Trucks	Groups Printed- Trucks
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	29
30	30
31	31
32	32
33	33
34	34
35	35
36	36
37	37
38	38
39	39
40	40
41	41
42	42
43	43
44	44
45	45
46	46
47	47
48	48
49	49
50	50
51	51
52	52
53	53
54	54
55	55
56	56
57	57
58	58
59	59
60	60
61	61
62	62
63	63
64	64
65	65
66	66
67	67
68	68
69	69
70	70
71	71
72	72
73	73
74	74
75	75
76	76
77	77
78	78
79	79
80	80
81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

	Common Street From North			Belmont Street From East			Common Street From South			Belmont Street From West			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	1
04:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	1	1	0	0	0	0	0	0	0	0	1	0	3
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	2	0	0	0	0	0	0	0	1	1	0	5
05:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	2
05:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	2
Total	1	0	0	0	2	0	0	2	0	0	0	0	5
Grand Total	2	2	0	0	2	0	0	2	0	1	1	0	10
Apprch %	50	50	0	0	100	0	0	100	0	50	50	0	
Total %	20	20	0	0	20	0	0	20	0	10	10	0	

[illegible]

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street (Under Constr.)

E/W: Belmont Street

City, State: Belmont, MA

Client: TEC/S. Mallory

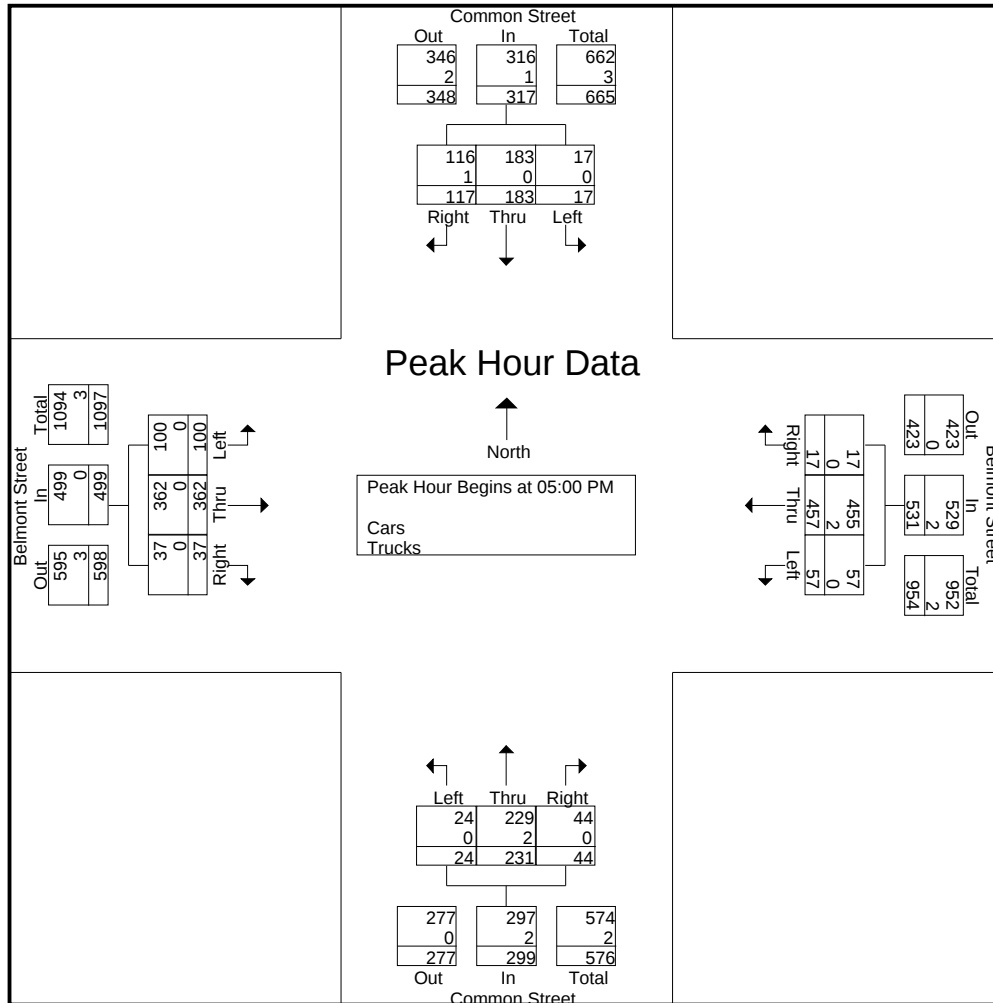
File Name : 04019FF

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

	Common Street From North				Belmont Street From East				Common Street From South				Belmont Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	26	36	5	67	5	105	13	123	11	66	12	89	9	87	23	119	398
05:15 PM	28	48	3	79	4	118	17	139	11	57	3	71	17	96	28	141	430
05:30 PM	32	52	5	89	6	116	19	141	10	63	4	77	6	84	27	117	424
05:45 PM	31	47	4	82	2	118	8	128	12	45	5	62	5	95	22	122	394
Total Volume	117	183	17	317	17	457	57	531	44	231	24	299	37	362	100	499	1646
% App. Total	36.9	57.7	5.4		3.2	86.1	10.7		14.7	77.3	8		7.4	72.5	20		
PHF	.914	.880	.850	.890	.708	.968	.750	.941	.917	.875	.500	.840	.544	.943	.893	.885	.957
Cars	116	183	17	316	17	455	57	529	44	229	24	297	37	362	100	499	1641
% Cars	99.1	100	100	99.7	100	99.6	100	99.6	100	99.1	100	99.3	100	100	100	100	99.7
Trucks	1	0	0	1	0	2	0	2	0	2	0	2	0	0	0	0	5
% Trucks	0.9	0	0	0.3	0	0.4	0	0.4	0	0.9	0	0.7	0	0	0	0	0.3



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

S: Williston Road
E/W: Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019AAA

Site Code : T-0376

Start Date : 6/12/2010

Page No : 1

Groups Printed- Cars - Trucks												
	Trapelo Road From East			Williston Road From South			Trapelo Road From West			Exclu. Total	Inclu. Total	Int. Total
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds			
11:00 AM	123	10	4	8	4	11	6	131	3	18	282	300
11:15 AM	124	4	9	5	4	8	7	123	4	21	267	288
11:30 AM	118	7	1	6	2	9	13	127	4	14	273	287
11:45 AM	137	11	3	4	6	11	8	127	2	16	293	309
Total	502	32	17	23	16	39	34	508	13	69	1115	1184
12:00 PM	138	9	2	10	2	2	4	111	4	8	274	282
12:15 PM	128	6	3	4	6	9	4	141	5	17	289	306
12:30 PM	122	12	0	10	3	9	12	134	3	12	293	305
12:45 PM	115	7	3	6	3	8	7	122	2	13	260	273
Total	503	34	8	30	14	28	27	508	14	50	1116	1166
01:00 PM	117	8	1	4	2	9	9	142	3	13	282	295
01:15 PM	120	6	6	8	3	7	2	126	4	17	265	282
01:30 PM	98	4	0	3	6	1	2	120	3	4	233	237
01:45 PM	110	7	4	2	1	2	4	127	6	12	251	263
Total	445	25	11	17	12	19	17	515	16	46	1031	1077
Grand Total	1450	91	36	70	42	86	78	1531	43	165	3262	3427
Apprch %	94.1	5.9		62.5	37.5		4.8	95.2				
Total %	44.5	2.8		2.1	1.3		2.4	46.9		4.8	95.2	
Cars	1442	91		70	42		78	1524		0	0	3412
% Cars	99.4	100	100	100	100	100	100	99.5	100	0	0	99.6
Trucks	8	0		0	0		0	7		0	0	15
% Trucks	0.6	0	0	0	0	0	0	0.5	0	0	0	0.4

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:45 AM										
11:45 AM	137	11	148	4	6	10	8	127	135	293
12:00 PM	138	9	147	10	2	12	4	111	115	274
12:15 PM	128	6	134	4	6	10	4	141	145	289
12:30 PM	122	12	134	10	3	13	12	134	146	293
Total Volume	525	38	563	28	17	45	28	513	541	1149
% App. Total	93.3	6.7		62.2	37.8		5.2	94.8		
PHF	.951	.792	.951	.700	.708	.865	.583	.910	.926	.980
Cars	524	38	562	28	17	45	28	511	539	1146
% Cars	99.8	100	99.8	100	100	100	100	99.6	99.6	99.7
Trucks	1	0	1	0	0	0	0	2	2	3
% Trucks	0.2	0	0.2	0	0	0	0	0.4	0.4	0.3

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

S: Williston Road
E/W: Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019AAA

Site Code : T-0376

Start Date : 6/12/2010

Page No : 1

Groups Printed- Trucks

	Trapelo Road From East		Williston Road From South		Trapelo Road From West		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
11:00 AM	0	0	0	0	0	0	0
11:15 AM	1	0	0	0	0	0	1
11:30 AM	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	1	1
Total	1	0	0	0	0	1	2
12:00 PM	0	0	0	0	0	0	0
12:15 PM	1	0	0	0	0	1	2
12:30 PM	0	0	0	0	0	0	0
12:45 PM	1	0	0	0	0	2	3
Total	2	0	0	0	0	3	5
01:00 PM	1	0	0	0	0	1	2
01:15 PM	1	0	0	0	0	1	2
01:30 PM	1	0	0	0	0	1	2
01:45 PM	2	0	0	0	0	0	2
Total	5	0	0	0	0	3	8
Grand Total	8	0	0	0	0	7	15
Apprch %	100	0	0	0	0	100	
Total %	53.3	0	0	0	0	46.7	

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 12:45 PM										
12:45 PM	1	0	1	0	0	0	0	2	2	3
01:00 PM	1	0	1	0	0	0	0	1	1	2
01:15 PM	1	0	1	0	0	0	0	1	1	2
01:30 PM	1	0	1	0	0	0	0	1	1	2
Total Volume	4	0	4	0	0	0	0	5	5	9
% App. Total	100	0		0	0		0	100		
PHF	1.000	.000	1.000	.000	.000	.000	.000	.625	.625	.750

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

S: Williston Road
E/W: Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

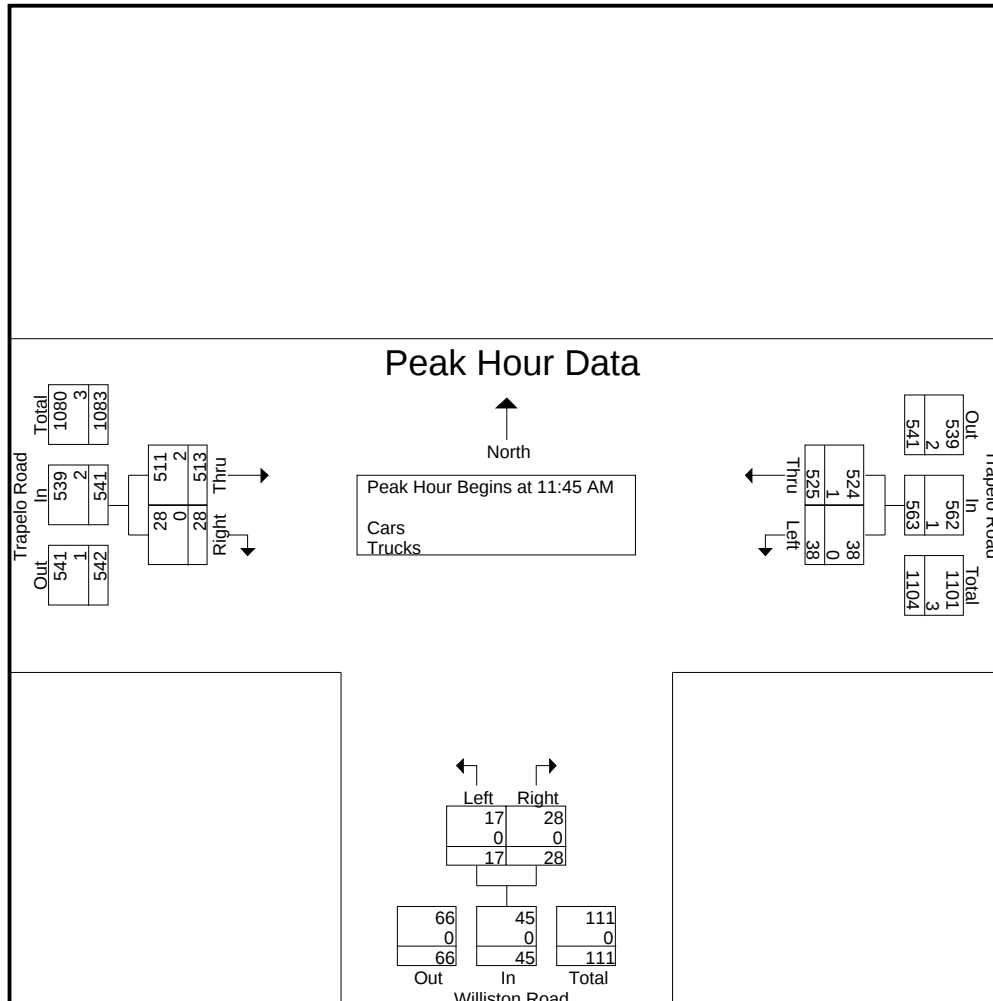
File Name : 04019AAA

Site Code : T-0376

Start Date : 6/12/2010

Page No : 1

	Trapelo Road From East			Williston Road From South			Trapelo Road From West			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:45 AM										
11:45 AM	137	11	148	4	6	10	8	127	135	293
12:00 PM	138	9	147	10	2	12	4	111	115	274
12:15 PM	128	6	134	4	6	10	4	141	145	289
12:30 PM	122	12	134	10	3	13	12	134	146	293
Total Volume	525	38	563	28	17	45	28	513	541	1149
% App. Total	93.3	6.7		62.2	37.8		5.2	94.8		
PHF	.951	.792	.951	.700	.708	.865	.583	.910	.926	.980
Cars	524	38	562	28	17	45	28	511	539	1146
% Cars	99.8	100	99.8	100	100	100	100	99.6	99.6	99.7
Trucks	1	0	1	0	0	0	0	2	2	3
% Trucks	0.2	0	0.2	0	0	0	0	0.4	0.4	0.3



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

NE/N,S: Cushing Ave./Common St.

E/W: Trapelo Road

City, State: Belmont, MA

Client: TEC/S. Mallory

File Name : 04019BBB

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

Groups Printed- Cars - Trucks																												
	Common Street From North					Cushing Avenue From Northeast				Trapelo Road From East					Common Street From South					Trapelo Road From West								
Start Time	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Hard Right	Right	Thru	Left	Peds	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Exclu. Total	Inclu. Total	Int. Total	
11:00 AM	23	37	20	1	33	0	0	0	0	2	18	85	8	9	11	1	31	15	4	11	85	1	19	15	61	368	429	
11:15 AM	21	38	22	0	42	0	0	0	0	1	26	85	9	11	16	2	35	18	12	12	88	3	21	10	75	397	472	
11:30 AM	28	38	23	2	39	0	0	0	0	4	16	80	10	1	16	2	42	13	2	12	103	2	13	13	55	404	459	
11:45 AM	34	41	20	0	33	0	0	0	0	3	18	100	7	1	24	5	36	15	6	15	95	7	21	18	58	441	499	
Total	106	154	85	3	147	0	0	0	0	10	78	350	34	22	67	10	144	61	24	50	371	13	74	56	249	1610	1859	
12:00 PM	28	50	32	4	27	0	0	0	0	4	31	95	6	3	10	6	35	24	7	13	72	5	25	9	46	440	486	
12:15 PM	17	37	19	0	35	0	0	0	0	3	21	106	7	3	10	3	44	9	11	16	110	5	19	7	56	426	482	
12:30 PM	27	36	26	2	27	0	0	0	0	2	25	82	6	1	11	5	36	17	4	13	108	5	18	10	42	419	461	
12:45 PM	29	48	32	3	26	0	0	0	0	6	16	82	2	2	8	1	42	8	6	16	80	4	23	9	43	400	443	
Total	101	171	109	9	115	0	0	0	0	15	93	365	21	9	39	15	157	58	28	58	370	19	85	35	187	1685	1872	
01:00 PM	27	46	28	0	21	0	0	0	0	0	23	88	4	2	5	8	42	14	7	16	99	10	23	5	35	433	468	
01:15 PM	19	50	18	3	18	0	0	0	0	5	26	76	5	3	14	1	45	19	4	16	89	4	24	0	25	414	439	
01:30 PM	19	44	28	4	22	0	0	0	0	2	32	80	7	0	11	3	43	6	3	14	91	6	16	4	29	406	435	
01:45 PM	26	34	27	1	22	0	0	0	0	2	26	81	2	5	9	5	45	17	1	18	103	2	22	5	33	420	453	
Total	91	174	101	8	83	0	0	0	0	9	107	325	18	10	39	17	175	56	15	64	382	22	85	14	122	1673	1795	
Grand Total	298	499	295	20	345	0	0	0	0	34	278	1040	73	41	145	42	476	175	67	172	1123	54	244	105	558	4968	5526	
Apprch % Total %	26.8 6	44.9 10	26.5 5.9	1.8 0.4		0 0	0 0	0 0	0 0	2.4 0.7	19.5 5.6	73 20.9	5.1 1.5		17.3 2.9	5 0.8	56.8 9.6	20.9 3.5		10.8 3.5	70.5 22.6	3.4 1.1	15.3 4.9		10.1	89.9		
Cars	297	498	295	20		0	0	0	0	34	277	1034	73		145	42	476	174		172	1117	54	244		0	0	5510	
% Cars	99.7	99.8	100	100	100	0	0	0	0	100	99.6	99.4	100	100	100	100	100	99.4	100	100	99.5	100	100	100		0	0	99.7
Trucks	1	1	0	0		0	0	0	0	0	1	6	0		0	0	0	1		0	6	0	0		0	0	16	
% Trucks	0.3	0.2	0	0	0	0	0	0	0	0	0.4	0.6	0	0	0	0	0	0.6	0	0	0.5	0	0	0		0	0	0.3

	Common Street From North					Cushing Avenue From Northeast					Trapelo Road From East					Common Street From South					Trapelo Road From West						
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Int. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																											
Peak Hour for Entire Intersection Begins at 11:45 AM																											
11:45 AM	34	41	20	0	95	0	0	0	0	0	3	18	100	7	128	24	5	36	15	80	15	95	7	21	138	441	
12:00 PM	28	50	32	4	114	0	0	0	0	0	4	31	95	6	136	10	6	35	24	75	13	72	5	25	115	440	
12:15 PM	17	37	19	0	73	0	0	0	0	0	3	21	106	7	137	10	3	44	9	66	16	110	5	19	150	426	
12:30 PM	27	36	26	2	91	0	0	0	0	0	2	25	82	6	115	11	5	36	17	69	13	108	5	18	144	419	
Total Volume	106	164	97	6	373	0	0	0	0	0	12	95	383	26	516	55	19	151	65	290	57	385	22	83	547	1726	
% App. Total	28.4										18.4	74.2						52.1	22.4		10.4	70.4		15.2			
PHF	.779	.820	.758	.375	.818	.000	.000	.000	.000	.000	.750	.766	.903	.929	.942	.573	.792	.858	.677	.906	.891	.875	.786	.830	.912	.978	
Cars	106	164	97	6	373	0	0	0	0	0	12	94	383	26	515	55	19	151	64	289	57	383	22	83	545	1722	
% Cars	100	100	100	100	100	0	0	0	0	0	100	98.9	100	100	99.8	100	100	100	98.5	99.7	100	99.5	100	100	99.6	99.8	
Trucks	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	2	0	0	2	4	
% Trucks	0	0	0	0	0	0	0	0	0	0	0	1.1	0	0	0.2	0	0	0	1.5	0.3	0	0.5	0	0	0.4	0.2	

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

NE/N,S: Cushing Ave./Common St.

E/W: Trapelo Road

City, State: Belmont, MA

Client: TEC/S. Mallory

File Name : 04019BBB

Site Code : T-0376

Start Date : 6/15/2010

Page No : 1

Groups Printed- Trucks

	Common Street From North				Cushing Avenue From Northeast				Trapelo Road From East				Common Street From South				Trapelo Road From West				
Start Time	Right	Thru	Left	Hard Left	Hard Right	Bear Right	Bear Left	Hard Left	Hard Right	Right	Thru	Left	Right	Bear Right	Thru	Left	Right	Thru	Bear Left	Left	Int. Total
11:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
Total	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	4
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	3
Total	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3	0	0	5
01:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	2
01:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
01:45 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Total	1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	2	0	0	7
Grand Total	1	1	0	0	0	0	0	0	0	1	6	0	0	0	0	1	0	6	0	0	16
Apprch %	50	50	0	0	0	0	0	0	0	14.3	85.7	0	0	0	0	100	0	100	0	0	
Total %	6.2	6.2	0	0	0	0	0	0	0	6.2	37.5	0	0	0	0	6.2	0	37.5	0	0	

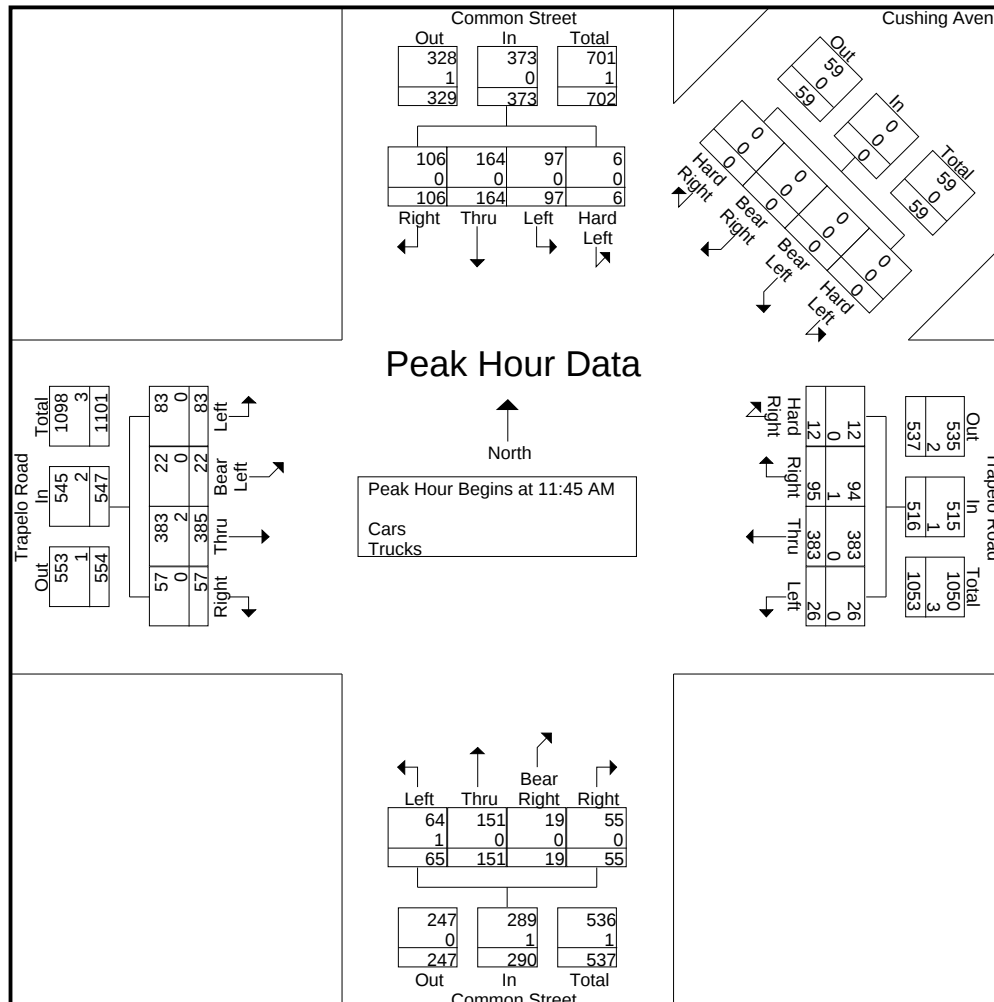
	Common Street From North					Cushing Avenue From Northeast					Trapelo Road From East					Common Street From South					Trapelo Road From West						
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Int. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																											
Peak Hour for Entire Intersection Begins at 12:45 PM																											
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	0	0	2	3
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	1	2
01:30 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	
Total Volume	1	0	0	0	1	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	4	0	0	4	8
% App. Total																											
PHF	.250	.000	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.750	.000	.750	.000	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.667

t (781) 587-0086 *f* (781) 587-0089

Client: TEC/S. Mallory

Page No : 1

	Common Street From North					Cushing Avenue From Northeast					Trapelo Road From East					Common Street From South					Trapelo Road From West					
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 11:45 AM																										
11:45 AM	34	41	20	0	95	0	0	0	0	0	3	18	100	7	128	24	5	36	15	80	15	95	7	21	138	441
12:00 PM	28	50	32	4	114	0	0	0	0	0	4	31	95	6	136	10	6	35	24	75	13	72	5	25	115	440
12:15 PM	17	37	19	0	73	0	0	0	0	0	3	21	106	7	137	10	3	44	9	66	16	110	5	19	150	426
12:30 PM	27	36	26	2	91	0	0	0	0	0	2	25	82	6	115	11	5	36	17	69	13	108	5	18	144	419
Total Volume	106	164	97	6	373	0	0	0	0	0	12	95	383	26	516	55	19	151	65	290	57	385	22	83	547	1726
% App. Total	28.4										18.4	74.2						52.1	22.4		10.4	70.4		15.2		
PHF	.779	.820	.758	.375	.818	.000	.000	.000	.000	.000	.750	.766	.903	.929	.942	.573	.792	.858	.677	.906	.891	.875	.786	.830	.912	.978
Cars	106	164	97	6	373	0	0	0	0	0	12	94	383	26	515	55	19	151	64	289	57	383	22	83	545	1722
% Cars	100	100	100	100	100	0	0	0	0	0	100	98.9	100	100	99.8	100	100	100	98.5	99.7	100	99.5	100	100	99.6	99.8
Trucks	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	2	0	0	2	4
% Trucks	0	0	0	0	0	0	0	0	0	0	0	1.1	0	0	0.2	0	0	0	1.5	0.3	0	0.5	0	0	0.4	0.2



t (781) 587-0086 *f* (781) 587-0089

N/S: Poplar Street
E: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019CCC
Site Code : T-0376
Start Date : 6/12/2010
Page No : 1

[illegible][illegible]

t (781) 587-0086 *f* (781) 587-0089

File Name : 04019CCC
Site Code : T-0376
Start Date : 6/12/2010
Page No : 1

[illegible]

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Poplar Street
E: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

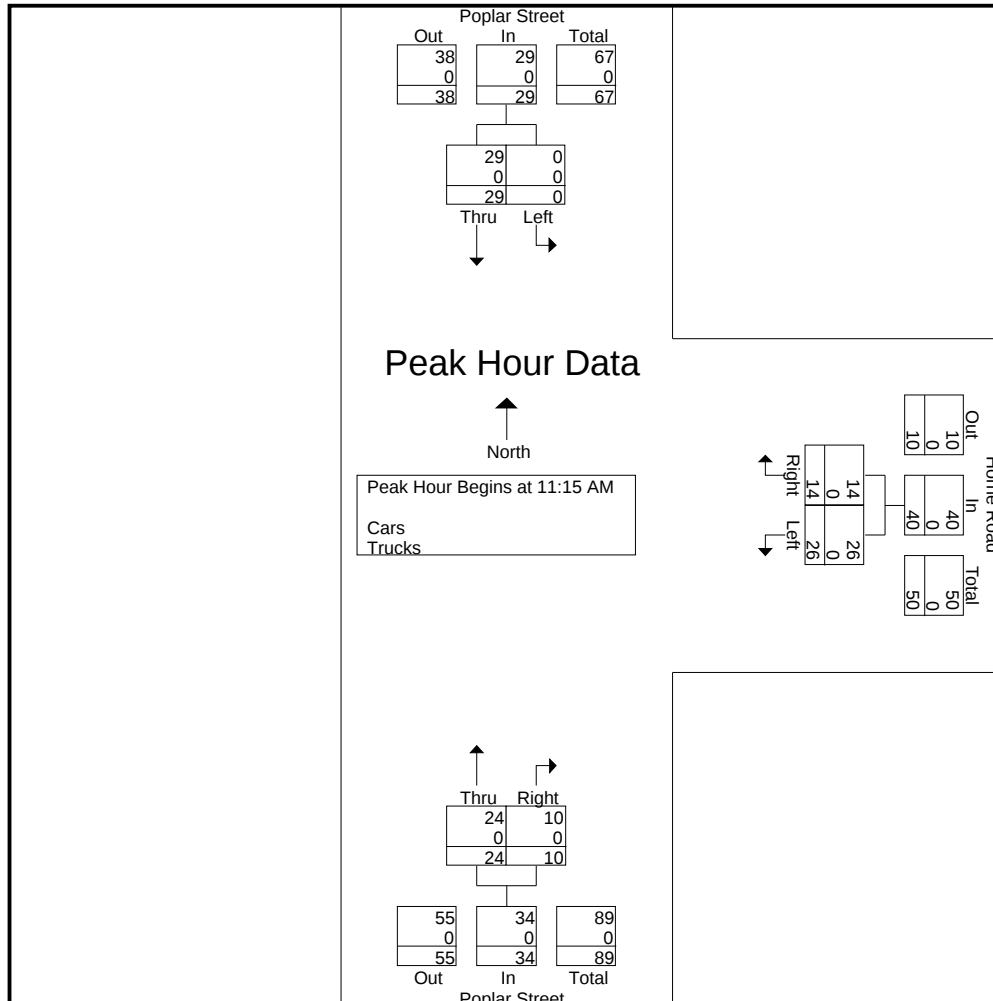
File Name : 04019CCC

Site Code : T-0376

Start Date : 6/12/2010

Page No : 1

	Poplar Street From North			Horne Road From East			Poplar Street From South			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:15 AM										
11:15 AM	6	0	6	4	5	9	0	7	7	22
11:30 AM	5	0	5	4	6	10	2	4	6	21
11:45 AM	7	0	7	4	10	14	4	6	10	31
12:00 PM	11	0	11	2	5	7	4	7	11	29
Total Volume	29	0	29	14	26	40	10	24	34	103
% App. Total	100	0		35	65		29.4	70.6		
PHF	.659	.000	.659	.875	.650	.714	.625	.857	.773	.831
Cars	29	0	29	14	26	40	10	24	34	103
% Cars	100	0	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0



t (781) 587-0086 *f* (781) 587-0089

File Name : 04019DDD
Site Code : T-0376
Start Date : 6/12/2010
Page No : 1

[illegible][illegible]

t (781) 587-0086 *f* (781) 587-0089

Page No : 1

[illegible]

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N: Williston Road
E/W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

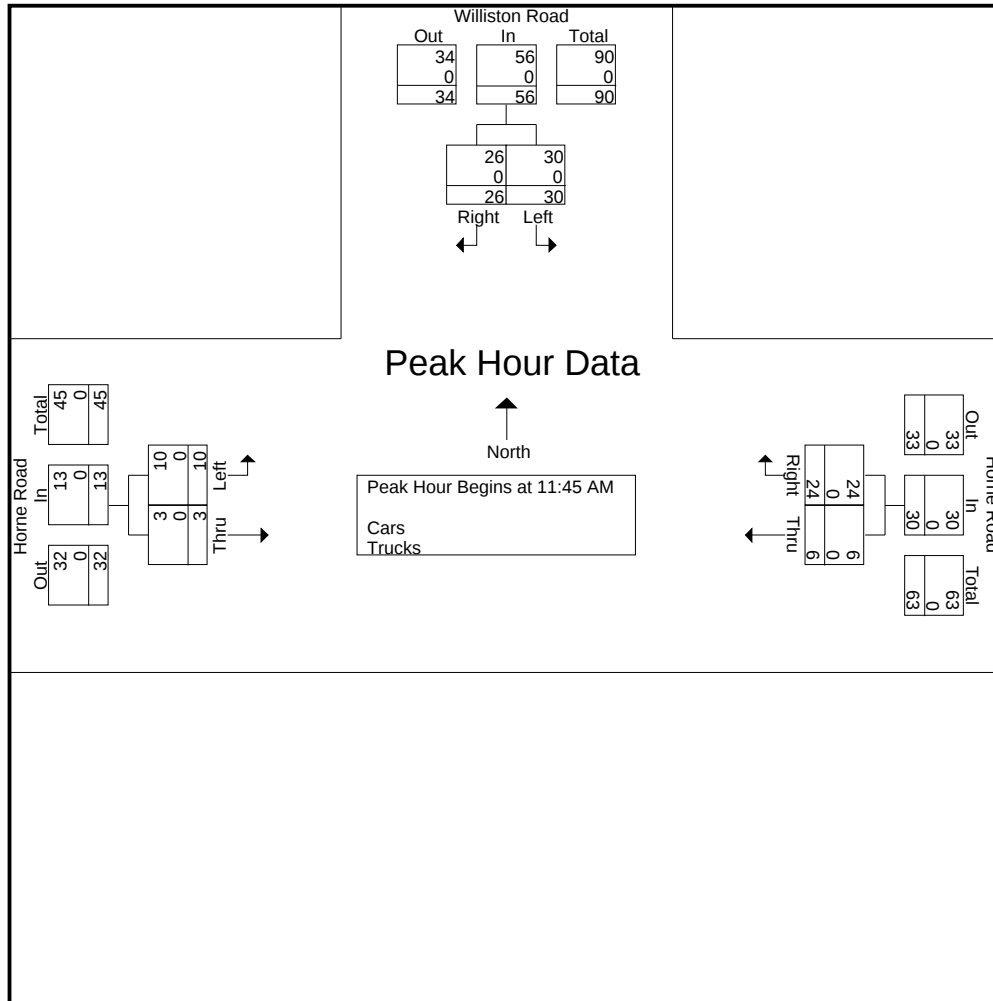
File Name : 04019DDD

Site Code : T-0376

Start Date : 6/12/2010

Page No : 1

	Williston Road From North			Horne Road From East			Horne Road From West			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:45 AM										
11:45 AM	11	8	19	9	3	12	0	2	2	33
12:00 PM	6	9	15	5	1	6	1	4	5	26
12:15 PM	4	6	10	3	0	3	1	2	3	16
12:30 PM	5	7	12	7	2	9	1	2	3	24
Total Volume	26	30	56	24	6	30	3	10	13	99
% App. Total	46.4	53.6		80	20		23.1	76.9		
PHF	.591	.833	.737	.667	.500	.625	.750	.625	.650	.750
Cars	26	30	56	24	6	30	3	10	13	99
% Cars	100	100	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street
W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

File Name : 04019EEE
Site Code : T-0376
Start Date : 6/12/2010
Page No : 1

Groups Printed- Cars - Trucks

	Common Street From North			Common Street From South			Horne Road From West					
Start Time	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	2	57	0	57	2	0	1	0	0	0	119	119
11:15 AM	9	48	3	69	1	0	4	2	1	4	133	137
11:30 AM	5	54	2	69	2	0	6	1	4	6	137	143
11:45 AM	2	63	0	74	7	0	6	3	4	4	155	159
Total	18	222	5	269	12	0	17	6	9	14	544	558
12:00 PM	0	72	2	71	5	0	10	2	4	6	160	166
12:15 PM	1	59	0	67	5	3	4	1	4	7	137	144
12:30 PM	4	52	2	67	3	2	6	1	3	7	133	140
12:45 PM	2	66	4	62	0	0	4	4	6	10	138	148
Total	7	249	8	267	13	5	24	8	17	30	568	598
01:00 PM	6	61	0	66	3	0	4	1	1	1	141	142
01:15 PM	4	65	4	75	1	0	2	3	6	10	150	160
01:30 PM	3	60	0	63	0	1	0	3	0	1	129	130
01:45 PM	1	53	0	74	1	0	2	4	0	0	135	135
Total	14	239	4	278	5	1	8	11	7	12	555	567
Grand Total	39	710	17	814	30	6	49	25	33	56	1667	1723
Apprch %	5.2	94.8		96.4	3.6		66.2	33.8				
Total %	2.3	42.6		48.8	1.8		2.9	1.5		3.3	96.7	
Cars	39	709		813	30		49	25		0	0	1721
% Cars	100	99.9	100	99.9	100	100	100	100	100	0	0	99.9
Trucks	0	1		1	0		0	0		0	0	2
% Trucks	0	0.1	0	0.1	0	0	0	0	0	0	0	0.1

	Common Street From North			Common Street From South			Horne Road From West			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:30 AM										
11:30 AM	5	54	59	69	2	71	6	1	7	137
11:45 AM	2	63	65	74	7	81	6	3	9	155
12:00 PM	0	72	72	71	5	76	10	2	12	160
12:15 PM	1	59	60	67	5	72	4	1	5	137
Total Volume	8	248	256	281	19	300	26	7	33	589
% App. Total	3.1	96.9		93.7	6.3		78.8	21.2		
PHF	.400	.861	.889	.949	.679	.926	.650	.583	.688	.920
Cars	8	248	256	280	19	299	26	7	33	588
% Cars	100	100	100	99.6	100	99.7	100	100	100	99.8
Trucks	0	0	0	1	0	1	0	0	0	1
% Trucks	0	0	0	0.4	0	0.3	0	0	0	0.2

t (781) 587-0086 *f* (781) 587-0089

File Name : 04019EEE
Site Code : T-0376
Start Date : 6/12/2010
Page No : 1

[illegible]

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street
W: Horne Road
City, State: Belmont, MA
Client: TEC/S. Mallory

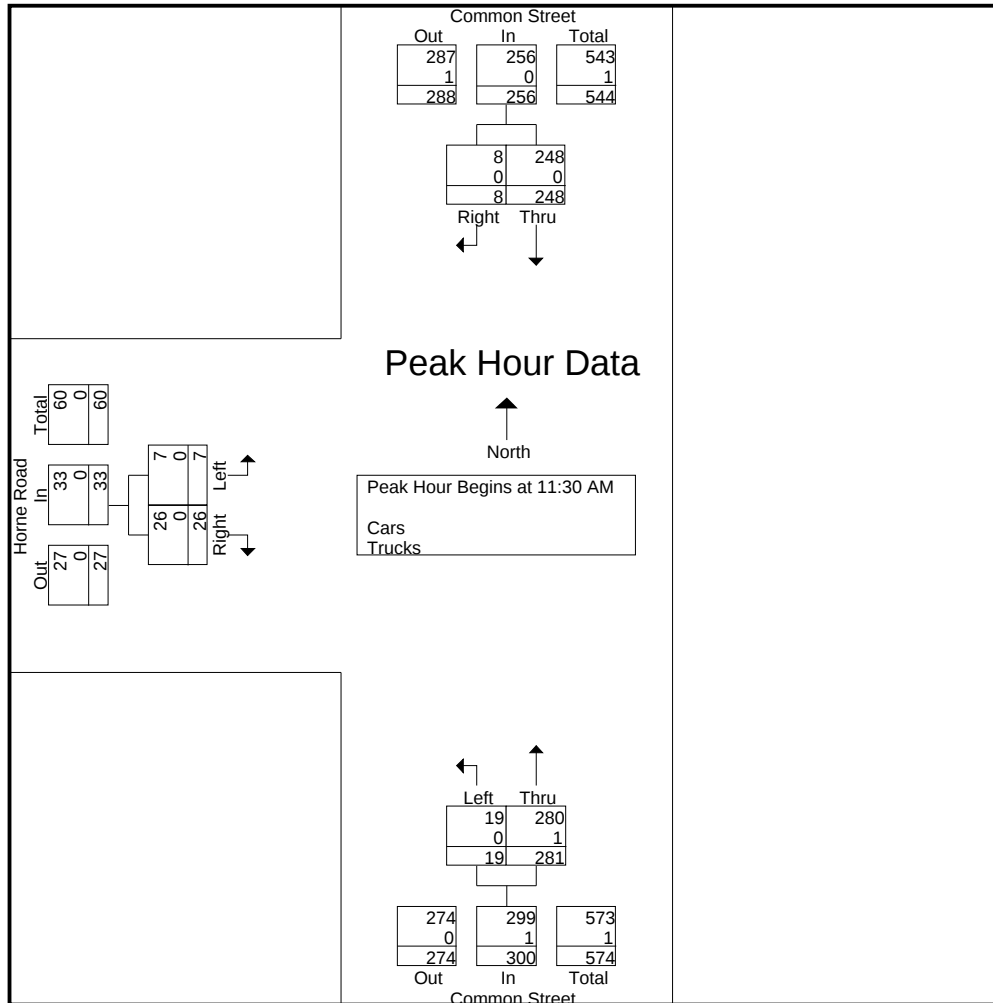
File Name : 04019EEE

Site Code : T-0376

Start Date : 6/12/2010

Page No : 1

	Common Street From North			Common Street From South			Horne Road From West			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:30 AM										
11:30 AM	5	54	59	69	2	71	6	1	7	137
11:45 AM	2	63	65	74	7	81	6	3	9	155
12:00 PM	0	72	72	71	5	76	10	2	12	160
12:15 PM	1	59	60	67	5	72	4	1	5	137
Total Volume	8	248	256	281	19	300	26	7	33	589
% App. Total	3.1	96.9		93.7	6.3		78.8	21.2		
PHF	.400	.861	.889	.949	.679	.926	.650	.583	.688	.920
Cars	8	248	256	280	19	299	26	7	33	588
% Cars	100	100	100	99.6	100	99.7	100	100	100	99.8
Trucks	0	0	0	1	0	1	0	0	0	1
% Trucks	0	0	0	0.4	0	0.3	0	0	0	0.2



Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street (Under Constr.)

E/W: Belmont Street

City, State: Belmont, MA

Client: TEC/S. Mallory

File Name : 04019FFF

Site Code : T-0376

Start Date : 6/12/2010

Page No : 1

Groups Printed- Cars - Trucks

Start Time	Common Street From North				Belmont Street From East				Common Street From South				Belmont Street From West				Exclu. Total	Inclu. Total	Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds			
11:00 AM	22	31	4	2	4	49	6	2	10	36	1	0	2	50	22	1	5	237	242
11:15 AM	17	34	2	1	3	43	8	5	6	41	1	0	3	54	27	1	7	239	246
11:30 AM	20	36	2	3	6	43	9	0	6	40	4	0	2	49	28	1	4	245	249
11:45 AM	18	40	6	0	4	50	7	1	8	47	5	3	5	66	26	1	5	282	287
Total	77	141	14	6	17	185	30	8	30	164	11	3	12	219	103	4	21	1003	1024
12:00 PM	21	48	11	0	5	57	8	1	7	43	3	1	5	56	24	1	3	288	291
12:15 PM	23	38	3	0	4	57	10	0	5	43	3	0	6	70	23	1	1	285	286
12:30 PM	18	39	4	1	3	63	5	1	11	39	1	0	6	61	26	0	2	276	278
12:45 PM	19	48	4	0	9	47	11	0	8	33	2	2	5	59	24	0	2	269	271
Total	81	173	22	1	21	224	34	2	31	158	9	3	22	246	97	2	8	1118	1126
01:00 PM	15	45	6	1	5	59	16	0	12	45	4	2	7	63	20	0	3	297	300
01:15 PM	19	39	8	0	12	42	9	0	14	44	1	0	5	54	21	0	0	268	268
01:30 PM	16	41	3	0	4	46	11	0	17	37	3	2	5	57	15	0	2	255	257
01:45 PM	18	34	2	1	3	45	11	1	11	49	7	0	6	57	18	0	2	261	263
Total	68	159	19	2	24	192	47	1	54	175	15	4	23	231	74	0	7	1081	1088
Grand Total	226	473	55	9	62	601	111	11	115	497	35	10	57	696	274	6	36	3202	3238
Apprch %	30	62.7	7.3		8	77.6	14.3		17.8	76.8	5.4		5.6	67.8	26.7		1.1	98.9	
Total %	7.1	14.8	1.7		1.9	18.8	3.5		3.6	15.5	1.1		1.8	21.7	8.6				
Cars	225	473	55		62	599	111		115	496	35		57	695	274		0	0	3233
% Cars	99.6	100	100	100	100	99.7	100	100	100	99.8	100	100	100	99.9	100	100	0	0	99.8
Trucks	1	0	0		0	2	0		0	1	0		0	1	0		0	0	5
% Trucks	0.4	0	0	0	0	0.3	0	0	0	0.2	0	0	0	0.1	0	0	0	0	0.2

Start Time	Common Street From North				Belmont Street From East				Common Street From South				Belmont Street From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	18	40	6	64	4	50	7	61	8	47	5	60	5	66	26	97	282
12:00 PM	21	48	11	80	5	57	8	70	7	43	3	53	5	56	24	85	288
12:15 PM	23	38	3	64	4	57	10	71	5	43	3	51	6	70	23	99	285
12:30 PM	18	39	4	61	3	63	5	71	11	39	1	51	6	61	26	93	276
Total Volume	80	165	24	269	16	227	30	273	31	172	12	215	22	253	99	374	1131
% App. Total	29.7	61.3	8.9		5.9	83.2	11		14.4	80	5.6		5.9	67.6	26.5		
PHF	.870	.859	.545	.841	.800	.901	.750	.961	.705	.915	.600	.896	.917	.904	.952	.944	.982
Cars	80	165	24	269	16	225	30	271	31	171	12	214	22	253	99	374	1128
% Cars	100	100	100	100	100	99.1	100	99.3	100	99.4	100	99.5	100	100	100	100	99.7
Trucks	0	0	0	0	0	2	0	2	0	1	0	1	0	0	0	0	3
% Trucks	0	0	0	0	0	0.9	0	0.7	0	0.6	0	0.5	0	0	0	0	0.3

t (781) 587-0086 *f* (781) 587-0089

Client: TEC/S. Mallory

Page No : 1

	Common Street From North			Belmont Street From East			Common Street From South			Belmont Street From West			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
11:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
12:30 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	2	0	0	1	0	0	0	0	3
01:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	1	0	1
Grand Total	1	0	0	0	2	0	0	1	0	0	1	0	5
Apprch %	100	0	0	0	100	0	0	100	0	0	100	0	
Total %	20	0	0	0	40	0	0	20	0	0	20	0	

[illegible]

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t (781) 587-0086 f (781) 587-0089

N/S: Common Street (Under Constr.)

E/W: Belmont Street

City, State: Belmont, MA

Client: TEC/S. Mallory

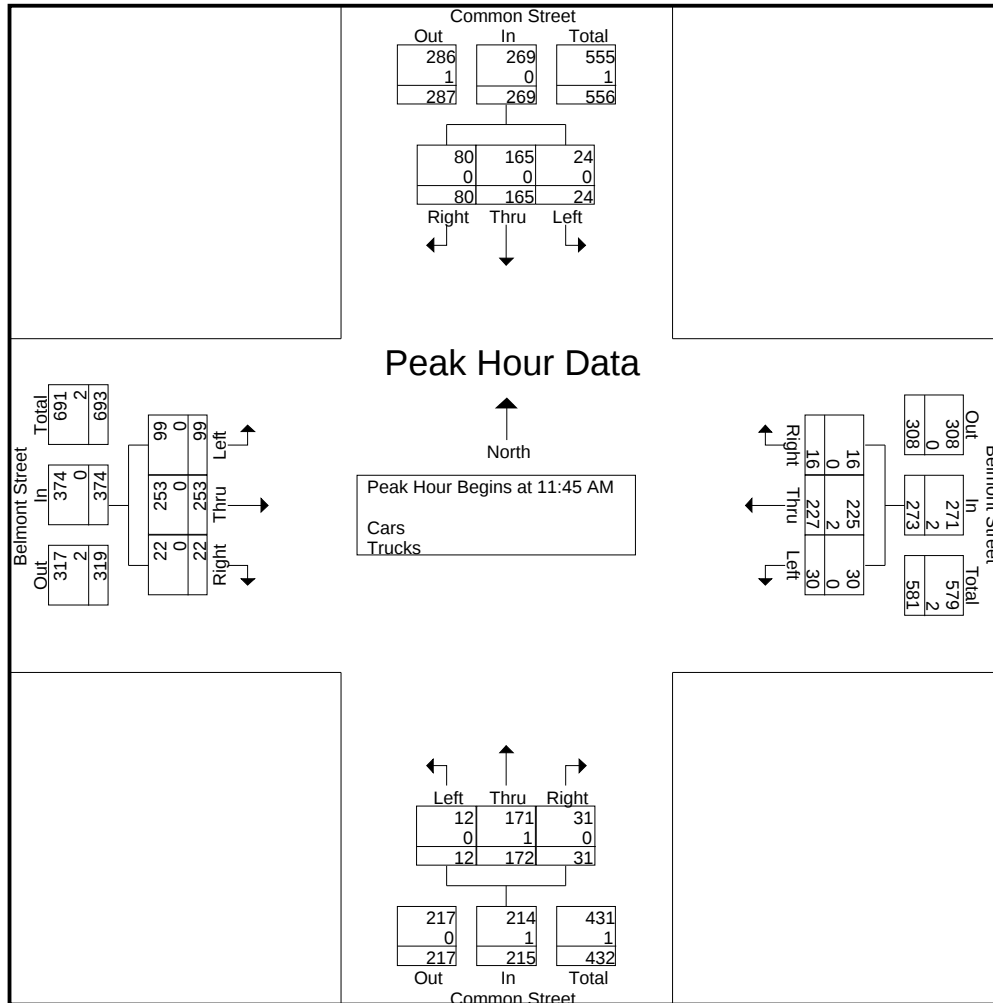
File Name : 04019FFF

Site Code : T-0376

Start Date : 6/12/2010

Page No : 1

	Common Street From North				Belmont Street From East				Common Street From South				Belmont Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	18	40	6	64	4	50	7	61	8	47	5	60	5	66	26	97	282
12:00 PM	21	48	11	80	5	57	8	70	7	43	3	53	5	56	24	85	288
12:15 PM	23	38	3	64	4	57	10	71	5	43	3	51	6	70	23	99	285
12:30 PM	18	39	4	61	3	63	5	71	11	39	1	51	6	61	26	93	276
Total Volume	80	165	24	269	16	227	30	273	31	172	12	215	22	253	99	374	1131
% App. Total	29.7	61.3	8.9		5.9	83.2	11		14.4	80	5.6		5.9	67.6	26.5		
PHF	.870	.859	.545	.841	.800	.901	.750	.961	.705	.915	.600	.896	.917	.904	.952	.944	.982
Cars	80	165	24	269	16	225	30	271	31	171	12	214	22	253	99	374	1128
% Cars	100	100	100	100	100	99.1	100	99.3	100	99.4	100	99.5	100	100	100	100	99.7
Trucks	0	0	0	0	0	2	0	2	0	1	0	1	0	0	0	0	3
% Trucks	0	0	0	0	0	0.9	0	0.7	0	0.6	0	0.5	0	0	0	0	0.3





TEC, Inc.

65 Glenn Street

Lawrence, MA 01843

www.tecmass.com or 978-794-1792

N/S: Williston Road

W: Municipal Lot

City, State: Belmont, Massachusetts

Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T. / Daniel Artergis

Alternative: Weekday Morning Peak

Project #: T0376 - TIAS

State Date: Friday July 30, 2010

Page No: 1

Group - Cars and Trucks

	Williston Road Northbound				Williston Road Southbound				Municipal Lot Westbound				Eastbound				
Start Time	Left	Thru	Right	Tot	Left	Thru	Right	Tot	Left	Thru	Right	Tot	Left	Thru	Right	Tot	Int. Total
7:00 - 7:15	0	1	3	-	5	6	0	-	5	0	8	-	0	0	0	-	28
7:15 - 7:30	0	2	4	-	7	5	0	-	3	0	4	-	0	0	0	-	25
7:30 - 7:45	0	1	2	-	7	7	0	-	4	0	3	-	0	0	0	-	24
7:45 - 8:00	0	1	2	-	6	2	0	-	5	0	7	-	0	0	0	-	23
Total	0	5	11	-	25	20	0	-	17	0	22	-	0	0	0	-	100
Grand Total	0	5	11	-	25	20	0	-	17	0	22	-	0	0	0	-	100
Apprch %	0.0	31.3	68.8	-	55.6	44.4	0.0	-	43.6	0.0	56.4	-	0.0	0.0	0.0	-	
Total %	0.0	5.0	11.0	-	25.0	20.0	0.0	-	17.0	0.0	22.0	-	0.0	0.0	0.0	-	

	Trapelo Road Out To				Trapelo Road In From												
Start Time	EB	WB			WB	EB											Int. Total
7:00 - 7:15	6	2			4	1											13
7:15 - 7:30	2	2			1	6											11
7:30 - 7:45	0	3			3	4											10
7:45 - 8:00	5	2			4	2											13
Total	13	9			12	13											47

Appendix B

Automatic Traffic Recorder (ATR) Data Sheets

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Page 1

Trapelo Road
west of Common Street
City, State: Belmont, MA
Client: TEC/S. Mallory

04019Avolume
Site Code: T-0376

Start Time	12-Jun-10 Sat	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		15	128			26	152				
12:15		9	143			16	126				
12:30		17	142			24	125				
12:45		16	119	57	532	17	118	83	521	140	1053
01:00		9	135			10	117				
01:15		9	136			13	125				
01:30		10	122			11	106				
01:45		6	129	34	522	15	110	49	458	83	980
02:00		7	127			9	121				
02:15		5	109			9	119				
02:30		4	116			8	129				
02:45		3	103	19	455	9	127	35	496	54	951
03:00		6	118			9	112				
03:15		5	128			6	131				
03:30		2	106			4	112				
03:45		3	115	16	467	7	95	26	450	42	917
04:00		1	124			0	105				
04:15		2	122			2	113				
04:30		5	137			5	100				
04:45		3	106	11	489	3	93	10	411	21	900
05:00		5	108			3	93				
05:15		11	111			3	121				
05:30		13	103			5	111				
05:45		17	91	46	413	15	87	26	412	72	825
06:00		14	93			7	100				
06:15		25	102			18	74				
06:30		30	86			25	69				
06:45		34	86	103	367	45	108	95	351	198	718
07:00		48	75			29	65				
07:15		54	73			42	67				
07:30		54	73			39	74				
07:45		57	64	213	285	47	66	157	272	370	557
08:00		80	61			58	65				
08:15		60	54			48	57				
08:30		98	69			82	43				
08:45		99	41	337	225	83	51	271	216	608	441
09:00		83	49			94	50				
09:15		114	56			96	40				
09:30		120	37			102	66				
09:45		131	48	448	190	120	57	412	213	860	403
10:00		124	42			110	54				
10:15		125	25			126	43				
10:30		139	35			101	53				
10:45		122	40	510	142	121	42	458	192	968	334
11:00		143	38			128	28				
11:15		128	30			124	32				
11:30		137	30			128	29				
11:45		133	22	541	120	137	26	517	115	1058	235
Total		2335	4207			2139	4107			4474	8314
Percent		35.7%	64.3%			34.2%	65.8%			35.0%	65.0%

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Page 2

Trapelo Road
west of Common Street
City, State: Belmont, MA
Client: TEC/S. Mallory

04019Avolume
Site Code: T-0376

Start Time	13-Jun-10 Sun	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		24	113			24	108				
12:15		11	112			14	112				
12:30		10	115			16	111				
12:45		6	116	51	456	15	105	69	436	120	892
01:00		14	99			18	117				
01:15		12	113			14	111				
01:30		9	117			15	115				
01:45		4	99	39	428	16	104	63	447	102	875
02:00		6	114			11	110				
02:15		6	101			8	96				
02:30		6	117			9	86				
02:45		3	124	21	456	12	87	40	379	61	835
03:00		3	118			4	97				
03:15		3	107			3	104				
03:30		1	100			4	87				
03:45		2	104	9	429	1	86	12	374	21	803
04:00		2	91			0	99				
04:15		2	105			4	93				
04:30		2	106			4	99				
04:45		3	101	9	403	3	90	11	381	20	784
05:00		7	106			1	94				
05:15		7	90			3	94				
05:30		9	86			4	92				
05:45		11	94	34	376	3	93	11	373	45	749
06:00		15	98			6	90				
06:15		14	104			13	73				
06:30		15	84			10	63				
06:45		23	72	67	358	22	88	51	314	118	672
07:00		28	82			25	67				
07:15		33	77			22	78				
07:30		31	69			25	55				
07:45		48	61	140	289	31	65	103	265	243	554
08:00		55	53			37	74				
08:15		40	56			41	68				
08:30		65	42			40	46				
08:45		47	42	207	193	42	39	160	227	367	420
09:00		34	30			69	40				
09:15		79	39			52	50				
09:30		74	21			68	37				
09:45		109	33	296	123	60	25	249	152	545	275
10:00		93	22			76	29				
10:15		109	18			76	17				
10:30		96	18			75	16				
10:45		90	26	388	84	84	24	311	86	699	170
11:00		89	27			72	40				
11:15		71	28			80	26				
11:30		100	29			75	24				
11:45		114	12	374	96	85	27	312	117	686	213
Total		1635	3691			1392	3551			3027	7242
Percent		30.7%	69.3%			28.2%	71.8%			29.5%	70.5%

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Trapelo Road
west of Common Street
City, State: Belmont, MA
Client: TEC/S. Mallory

04019Avolume
Site Code: T-0376

Start Time	14-Jun-10 Mon	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		12	132			8	120				
12:15		7	114			15	92				
12:30		6	124			13	123				
12:45		8	125	33	495	7	137	43	472	76	967
01:00		6	125			11	99				
01:15		4	122			5	87				
01:30		4	134			4	99				
01:45		1	125	15	506	4	105	24	390	39	896
02:00		2	117			1	101				
02:15		2	109			3	125				
02:30		2	122			4	119				
02:45		2	141	8	489	5	145	13	490	21	979
03:00		6	123			2	120				
03:15		0	125			6	142				
03:30		2	137			2	125				
03:45		4	110	12	495	4	149	14	536	26	1031
04:00		2	128			1	148				
04:15		5	124			1	150				
04:30		8	124			1	168				
04:45		11	130	26	506	5	156	8	622	34	1128
05:00		10	131			5	191				
05:15		16	150			11	136				
05:30		36	147			14	204				
05:45		41	142	103	570	12	201	42	732	145	1302
06:00		43	154			19	169				
06:15		64	141			36	177				
06:30		83	140			50	150				
06:45		125	135	315	570	65	134	170	630	485	1200
07:00		131	125			72	161				
07:15		157	149			76	129				
07:30		180	114			99	113				
07:45		213	82	681	470	131	103	378	506	1059	976
08:00		202	75			108	95				
08:15		208	67			118	82				
08:30		185	59			122	71				
08:45		215	52	810	253	95	75	443	323	1253	576
09:00		167	65			105	70				
09:15		150	52			99	77				
09:30		138	36			81	69				
09:45		141	47	596	200	90	65	375	281	971	481
10:00		117	36			91	58				
10:15		111	23			94	46				
10:30		114	35			103	38				
10:45		108	24	450	118	117	34	405	176	855	294
11:00		96	30			82	24				
11:15		99	18			87	19				
11:30		114	20			92	19				
11:45		109	9	418	77	100	14	361	76	779	153
Total		3467	4749			2276	5234			5743	9983
Percent		42.2%	57.8%			30.3%	69.7%			36.5%	63.5%

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Trapelo Road
west of Common Street
City, State: Belmont, MA
Client: TEC/S. Mallory

04019Avolume
Site Code: T-0376

Start Time	15-Jun-10 Tue	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		8	139			14	96				
12:15		7	121			10	111				
12:30		4	112			8	111				
12:45		6	95	25	467	8	124	40	442	65	909
01:00		6	134			4	102				
01:15		0	122			6	99				
01:30		2	128			4	96				
01:45		5	108	13	492	6	118	20	415	33	907
02:00		4	119			4	104				
02:15		3	103			3	148				
02:30		4	121			1	121				
02:45		1	132	12	475	1	140	9	513	21	988
03:00		4	117			3	133				
03:15		3	134			2	162				
03:30		1	125			0	147				
03:45		2	124	10	500	4	150	9	592	19	1092
04:00		5	130			2	162				
04:15		5	139			0	178				
04:30		4	145			0	172				
04:45		10	126	24	540	6	175	8	687	32	1227
05:00		8	140			8	182				
05:15		25	173			8	185				
05:30		33	150			13	191				
05:45		33	145	99	608	15	194	44	752	143	1360
06:00		45	119			18	193				
06:15		65	153			39	173				
06:30		110	143			53	174				
06:45		101	121	321	536	67	175	177	715	498	1251
07:00		135	117			69	160				
07:15		138	90			59	128				
07:30		191	105			109	126				
07:45		188	105	652	417	121	112	358	526	1010	943
08:00		195	86			101	102				
08:15		201	104			126	95				
08:30		199	77			116	93				
08:45		214	85	809	352	111	98	454	388	1263	740
09:00		168	63			98	71				
09:15		149	61			86	60				
09:30		133	34			94	68				
09:45		118	42	568	200	86	60	364	259	932	459
10:00		131	48			107	50				
10:15		117	26			84	42				
10:30		123	24			106	39				
10:45		96	28	467	126	107	44	404	175	871	301
11:00		120	31			89	28				
11:15		122	33			83	30				
11:30		119	20			93	30				
11:45		121	24	482	108	118	43	383	131	865	239
Total		3482	4821			2270	5595			5752	10416
Percent		41.9%	58.1%			28.9%	71.1%			35.6%	64.4%
Grand Total		10919	17468			8077	18487			18996	35955
Percent		38.5%	61.5%			30.4%	69.6%			34.6%	65.4%

ADT

ADT 13,738

AADT 13,738

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Common Street
south of Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

04019BBvolume
Site Code: T-0376

Start Time	29-Jun-10 Tue	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		5	50			3	50				
12:15		3	48			4	63				
12:30		7	45			4	52				
12:45		1	38	16	181	3	48	14	213	30	394
01:00		0	41			0	49				
01:15		1	34			2	40				
01:30		3	33			0	46				
01:45		1	49	5	157	2	60	4	195	9	352
02:00		0	45			2	53				
02:15		2	43			1	49				
02:30		0	47			0	58				
02:45		0	43	2	178	2	57	5	217	7	395
03:00		1	68			1	58				
03:15		0	58			0	60				
03:30		0	56			1	67				
03:45		0	51	1	233	1	62	3	247	4	480
04:00		0	65			1	61				
04:15		2	82			1	64				
04:30		1	72			1	63				
04:45		3	59	6	278	0	66	3	254	9	532
05:00		2	60			0	73				
05:15		5	66			9	60				
05:30		7	77			7	67				
05:45		15	74	29	277	7	59	23	259	52	536
06:00		13	59			10	64				
06:15		24	67			13	69				
06:30		24	60			25	49				
06:45		25	47	86	233	26	59	74	241	160	474
07:00		32	37			50	54				
07:15		26	57			46	46				
07:30		42	46			60	61				
07:45		48	35	148	175	64	35	220	196	368	371
08:00		44	33			70	44				
08:15		40	25			78	26				
08:30		49	34			70	43				
08:45		54	25	187	117	70	29	288	142	475	259
09:00		52	24			70	20				
09:15		57	43			87	31				
09:30		49	36			54	20				
09:45		47	25	205	128	55	23	266	94	471	222
10:00		60	34			54	15				
10:15		41	22			54	18				
10:30		51	11			54	10				
10:45		40	19	192	86	47	7	209	50	401	136
11:00		26	11			51	6				
11:15		44	9			51	13				
11:30		64	6			42	8				
11:45		54	4	188	30	62	2	206	29	394	59
Total		1065	2073			1315	2137			2380	4210
Percent		33.9%	66.1%			38.1%	61.9%			36.1%	63.9%

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Page 2

Common Street
south of Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

04019BBvolume
Site Code: T-0376

Start Time	30-Jun-10 Wed	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		7	36			3	41				
12:15		4	38			1	55				
12:30		2	32			2	53				
12:45		6	40	19	146	2	54	8	203	27	349
01:00		4	40			2	58				
01:15		2	48			1	43				
01:30		2	39			1	51				
01:45		1	41	9	168	0	57	4	209	13	377
02:00		2	48			0	48				
02:15		1	45			1	70				
02:30		1	33			1	57				
02:45		1	38	5	164	3	63	5	238	10	402
03:00		2	45			0	64				
03:15		0	53			1	70				
03:30		0	67			1	74				
03:45		1	55	3	220	2	56	4	264	7	484
04:00		0	62			3	56				
04:15		0	59			1	63				
04:30		1	66			2	67				
04:45		3	55	4	242	2	71	8	257	12	499
05:00		3	55			5	58				
05:15		3	76			4	79				
05:30		10	71			9	60				
05:45		10	67	26	269	9	66	27	263	53	532
06:00		17	60			15	52				
06:15		20	67			19	66				
06:30		21	52			27	55				
06:45		29	47	87	226	37	57	98	230	185	456
07:00		23	44			46	53				
07:15		32	42			37	41				
07:30		37	44			63	44				
07:45		38	44	130	174	62	38	208	176	338	350
08:00		42	35			57	42				
08:15		39	51			73	33				
08:30		39	27			100	37				
08:45		44	32	164	145	79	32	309	144	473	289
09:00		50	38			67	36				
09:15		39	34			80	38				
09:30		42	38			60	26				
09:45		48	28	179	138	71	35	278	135	457	273
10:00		35	21			41	16				
10:15		47	19			47	17				
10:30		34	27			59	20				
10:45		38	14	154	81	46	13	193	66	347	147
11:00		38	13			51	11				
11:15		36	7			61	10				
11:30		43	9			35	10				
11:45		45	5	162	34	47	4	194	35	356	69
Total		942	2007			1336	2220			2278	4227
Percent		31.9%	68.1%			37.6%	62.4%			35.0%	65.0%

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Common Street
south of Trapelo Road
City, State: Belmont, MA
Client: TEC/S. Mallory

04019BBvolume
Site Code: T-0376

Start Time	01-Jul-10 Thu	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		6	41			4	56				
12:15		3	42			0	53				
12:30		3	34			1	46				
12:45		4	51	16	168	2	57	7	212	23	380
01:00		2	45			1	44				
01:15		2	53			1	43				
01:30		0	47			2	57				
01:45		0	53	4	198	1	57	5	201	9	399
02:00		1	44			1	70				
02:15		2	42			2	51				
02:30		0	44			1	56				
02:45		1	50	4	180	2	64	6	241	10	421
03:00		1	61			0	62				
03:15		1	62			0	54				
03:30		0	71			0	67				
03:45		0	79	2	273	0	56	0	239	2	512
04:00		1	57			2	71				
04:15		2	60			0	77				
04:30		0	67			2	62				
04:45		0	79	3	263	2	62	6	272	9	535
05:00		4	79			2	61				
05:15		2	72			6	68				
05:30		5	84			10	76				
05:45		11	73	22	308	9	74	27	279	49	587
06:00		10	72			11	91				
06:15		17	64			11	54				
06:30		19	69			32	54				
06:45		27	61	73	266	33	61	87	260	160	526
07:00		19	68			55	58				
07:15		25	55			59	55				
07:30		34	41			47	35				
07:45		36	38	114	202	66	47	227	195	341	397
08:00		31	44			69	39				
08:15		44	48			55	38				
08:30		45	49			67	26				
08:45		47	23	167	164	78	23	269	126	436	290
09:00		52	41			71	32				
09:15		37	27			68	24				
09:30		38	32			60	22				
09:45		57	18	184	118	75	29	274	107	458	225
10:00		45	15			55	19				
10:15		39	28			43	19				
10:30		40	24			44	11				
10:45		40	12	164	79	47	20	189	69	353	148
11:00		48	12			59	9				
11:15		46	11			45	11				
11:30		48	11			49	1				
11:45		40	3	182	37	60	7	213	28	395	65
Total		935	2256			1310	2229			2245	4485
Percent		29.3%	70.7%			37.0%	63.0%			33.4%	66.6%
Grand Total		2942	6336			3961	6586			6903	12922
Percent		31.7%	68.3%			37.6%	62.4%			34.8%	65.2%

ADT

ADT 6,608

AADT 6,608

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Page 1

Common Street
south of Trapelo Road
City, State: Belmont, MA
Client: TEC/ S. Mallory

04019Bvolume
Site Code: T-0376

Start Time	11-Jun-10 Fri	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		*	*			*	*				
12:15		*	37			*	49				
12:30		*	42			*	44				
12:45		*	50	0	129	*	46	0	139	0	268
01:00		*	43			*	56				
01:15		*	45			*	60				
01:30		*	39			*	64				
01:45		*	44	0	171	*	53	0	233	0	404
02:00		*	52			*	71				
02:15		*	55			*	56				
02:30		*	61			*	62				
02:45		*	52	0	220	*	71	0	260	0	480
03:00		*	77			*	76				
03:15		*	65			*	68				
03:30		*	52			*	68				
03:45		*	73	0	267	*	63	0	275	0	542
04:00		*	77			*	66				
04:15		*	60			*	64				
04:30		*	74			*	61				
04:45		*	68	0	279	*	63	0	254	0	533
05:00		*	66			*	68				
05:15		*	82			*	78				
05:30		*	79			*	66				
05:45		*	78	0	305	*	57	0	269	0	574
06:00		*	64			*	74				
06:15		*	72			*	53				
06:30		*	66			*	60				
06:45		*	64	0	266	*	57	0	244	0	510
07:00		*	53			*	43				
07:15		*	43			*	39				
07:30		*	55			*	42				
07:45		*	34	0	185	*	41	0	165	0	350
08:00		*	54			*	26				
08:15		*	53			*	33				
08:30		*	31			*	37				
08:45		*	46	0	184	*	34	0	130	0	314
09:00		*	21			*	34				
09:15		*	33			*	24				
09:30		*	24			*	35				
09:45		*	37	0	115	*	34	0	127	0	242
10:00		*	31			*	23				
10:15		*	34			*	23				
10:30		*	26			*	17				
10:45		*	26	0	117	*	19	0	82	0	199
11:00		*	17			*	14				
11:15		*	23			*	16				
11:30		*	13			*	12				
11:45		*	6	0	59	*	10	0	52	0	111
Total		0	2297			0	2230			0	4527
Percent		0.0%	100.0%			0.0%	100.0%			0.0%	100.0%

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Page 2

Common Street
south of Trapelo Road
City, State: Belmont, MA
Client: TEC/ S. Mallory

04019Bvolume
Site Code: T-0376

Start Time	12-Jun-10 Sat	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		10	69			9	69				
12:15		7	66			7	60				
12:30		5	68			5	65				
12:45		4	66	26	269	5	67	26	261	52	530
01:00		3	67			6	69				
01:15		6	78			4	70				
01:30		4	69			1	62				
01:45		2	78	15	292	4	57	15	258	30	550
02:00		7	75			2	61				
02:15		1	54			4	58				
02:30		1	73			3	60				
02:45		0	54	9	256	4	65	13	244	22	500
03:00		0	47			0	57				
03:15		4	53			3	55				
03:30		1	50			1	48				
03:45		0	53	5	203	0	52	4	212	9	415
04:00		2	40			0	51				
04:15		1	57			0	46				
04:30		1	54			1	48				
04:45		3	58	7	209	1	55	2	200	9	409
05:00		0	52			3	63				
05:15		0	59			5	57				
05:30		5	54			4	56				
05:45		8	51	13	216	9	50	21	226	34	442
06:00		7	46			7	54				
06:15		9	44			4	55				
06:30		11	48			9	47				
06:45		12	59	39	197	9	51	29	207	68	404
07:00		21	47			13	44				
07:15		21	49			21	48				
07:30		30	38			17	43				
07:45		27	33	99	167	36	41	87	176	186	343
08:00		33	40			33	36				
08:15		25	32			34	40				
08:30		36	37			51	38				
08:45		41	31	135	140	43	33	161	147	296	287
09:00		48	28			38	31				
09:15		43	26			50	30				
09:30		61	30			51	24				
09:45		68	22	220	106	57	28	196	113	416	219
10:00		64	21			56	26				
10:15		56	19			52	25				
10:30		62	14			63	18				
10:45		58	18	240	72	60	20	231	89	471	161
11:00		64	15			63	15				
11:15		78	12			58	16				
11:30		81	12			56	13				
11:45		74	14	297	53	68	11	245	55	542	108
Total		1105	2180			1030	2188			2135	4368
Percent		33.6%	66.4%			32.0%	68.0%			32.8%	67.2%
Grand Total		1105	4477			1030	4418			2135	8895
Percent		19.8%	80.2%			18.9%	81.1%			19.4%	80.6%

ADT

ADT 6,503

AADT 6,503

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Page 1

Horne Road
west of Common Street
City, State: Belmont, MA
Client: TEC/S. Mallory

04019Cvolume
Site Code: T-0376

Start Time	12-Jun-10 Sat	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	14			0	7				
12:15		0	7			0	6				
12:30		0	8			1	10				
12:45		0	9	0	38	1	3	2	26	2	64
01:00		0	9			0	4				
01:15		0	5			0	4				
01:30		0	4			0	2				
01:45		1	4	1	22	0	1	0	11	1	33
02:00		0	0			0	6				
02:15		0	7			0	4				
02:30		0	7			0	5				
02:45		0	6	0	20	0	2	0	17	0	37
03:00		0	4			0	7				
03:15		1	7			0	4				
03:30		0	6			0	5				
03:45		1	2	2	19	0	4	0	20	2	39
04:00		0	2			0	4				
04:15		0	2			0	1				
04:30		0	1			0	1				
04:45		0	5	0	10	0	2	0	8	0	18
05:00		0	3			0	3				
05:15		0	3			0	1				
05:30		0	0			0	4				
05:45		0	4	0	10	0	6	0	14	0	24
06:00		0	1			0	2				
06:15		1	0			1	2				
06:30		4	2			4	2				
06:45		1	6	6	9	1	6	6	12	12	21
07:00		2	6			2	3				
07:15		1	2			3	1				
07:30		2	3			1	2				
07:45		6	3	11	14	4	4	10	10	21	24
08:00		1	1			2	4				
08:15		2	2			1	2				
08:30		2	1			5	2				
08:45		4	2	9	6	0	2	8	10	17	16
09:00		3	2			3	0				
09:15		8	1			6	5				
09:30		6	1			12	3				
09:45		8	2	25	6	4	2	25	10	50	16
10:00		3	0			9	0				
10:15		8	0			8	1				
10:30		5	1			8	0				
10:45		15	2	31	3	8	2	33	3	64	6
11:00		0	3			4	1				
11:15		6	0			10	1				
11:30		10	2			6	1				
11:45		6	2	22	7	13	1	33	4	55	11
Total		107	164			117	145			224	309
Percent		39.5%	60.5%			44.7%	55.3%			42.0%	58.0%

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Page 2

Horne Road
west of Common Street
City, State: Belmont, MA
Client: TEC/S. Mallory

04019Cvolume
Site Code: T-0376

Start Time	13-Jun-10 Sun	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	5			0	3				
12:15		2	10			0	6				
12:30		0	2			1	3				
12:45		2	7	4	24	0	6	1	18	5	42
01:00		0	4			0	7				
01:15		0	3			0	1				
01:30		2	8			0	6				
01:45		0	5	2	20	1	6	1	20	3	40
02:00		1	4			0	1				
02:15		0	9			0	5				
02:30		0	10			0	5				
02:45		0	2	1	25	0	5	0	16	1	41
03:00		0	7			0	6				
03:15		0	8			0	2				
03:30		1	8			0	6				
03:45		0	6	1	29	0	10	0	24	1	53
04:00		0	1			0	2				
04:15		0	3			0	4				
04:30		0	6			0	2				
04:45		0	1	0	11	0	10	0	18	0	29
05:00		0	7			0	5				
05:15		0	8			0	17				
05:30		0	3			1	2				
05:45		0	2	0	20	0	8	1	32	1	52
06:00		0	4			2	6				
06:15		1	2			0	2				
06:30		1	1			0	3				
06:45		0	1	2	8	0	4	2	15	4	23
07:00		0	1			2	2				
07:15		1	0			1	8				
07:30		1	2			0	3				
07:45		1	6	3	9	3	0	6	13	9	22
08:00		0	0			0	7				
08:15		1	5			1	8				
08:30		0	3			1	3				
08:45		4	0	5	8	4	4	6	22	11	30
09:00		1	2			0	0				
09:15		1	2			0	4				
09:30		2	4			4	1				
09:45		6	3	10	11	6	0	10	5	20	16
10:00		4	1			5	0				
10:15		2	1			1	1				
10:30		7	0			4	0				
10:45		5	4	18	6	4	4	14	5	32	11
11:00		3	0			5	3				
11:15		2	0			4	2				
11:30		4	1			11	4				
11:45		4	1	13	2	5	0	25	9	38	11
Total		59	173			66	197			125	370
Percent		25.4%	74.6%			25.1%	74.9%			25.3%	74.7%

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Page 3

Horne Road
west of Common Street
City, State: Belmont, MA
Client: TEC/S. Mallory

04019Cvolume
Site Code: T-0376

Start Time	14-Jun-10 Mon	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	6			2	3				
12:15		0	3			0	4				
12:30		0	6			1	6				
12:45		0	4	0	19	0	4	3	17	3	36
01:00		0	3			0	6				
01:15		0	7			0	5				
01:30		0	0			0	4				
01:45		0	5	0	15	0	4	0	19	0	34
02:00		0	1			0	1				
02:15		0	0			1	6				
02:30		0	4			0	5				
02:45		0	6	0	11	0	5	1	17	1	28
03:00		0	6			0	2				
03:15		0	4			0	8				
03:30		0	1			0	2				
03:45		0	3	0	14	0	4	0	16	0	30
04:00		0	4			0	6				
04:15		0	6			0	5				
04:30		0	8			0	10				
04:45		0	3	0	21	0	6	0	27	0	48
05:00		0	2			0	5				
05:15		1	6			0	6				
05:30		2	5			0	4				
05:45		0	1	3	14	0	5	0	20	3	34
06:00		1	6			0	6				
06:15		1	3			2	6				
06:30		4	4			1	2				
06:45		4	6	10	19	2	2	5	16	15	35
07:00		2	4			1	2				
07:15		5	5			2	4				
07:30		8	5			4	1				
07:45		2	1	17	15	2	1	9	8	26	23
08:00		6	4			6	5				
08:15		10	2			4	1				
08:30		14	1			13	3				
08:45		9	1	39	8	8	2	31	11	70	19
09:00		10	0			8	5				
09:15		8	1			4	4				
09:30		6	2			6	1				
09:45		6	2	30	5	7	3	25	13	55	18
10:00		8	0			4	1				
10:15		0	1			6	3				
10:30		6	0			9	1				
10:45		7	0	21	1	5	1	24	6	45	7
11:00		2	1			3	2				
11:15		8	0			7	1				
11:30		2	1			3	1				
11:45		8	0	20	2	8	3	21	7	41	9
Total		140	144			119	177			259	321
Percent		49.3%	50.7%			40.2%	59.8%			44.7%	55.3%

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

t. (781) 587-0086 f. (781) 587-0189

Page 4

Horne Road
west of Common Street
City, State: Belmont, MA
Client: TEC/S. Mallory

04019Cvolume
Site Code: T-0376

Start Time	15-Jun-10 Tue	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	3			0	3				
12:15		0	6			0	2				
12:30		0	4			0	8				
12:45		0	2	0	15	0	3	0	16	0	31
01:00		0	6			0	2				
01:15		1	2			0	5				
01:30		0	8			0	8				
01:45		0	3	1	19	1	4	1	19	2	38
02:00		0	3			0	4				
02:15		0	2			0	9				
02:30		0	6			0	2				
02:45		0	6	0	17	0	5	0	20	0	37
03:00		0	4			0	6				
03:15		1	4			0	3				
03:30		0	4			0	4				
03:45		0	4	1	16	1	2	1	15	2	31
04:00		0	10			0	4				
04:15		0	6			0	11				
04:30		0	9			0	4				
04:45		1	6	1	31	0	8	0	27	1	58
05:00		0	9			0	11				
05:15		0	1			0	6				
05:30		1	2			0	4				
05:45		0	6	1	18	2	4	2	25	3	43
06:00		2	5			1	3				
06:15		3	5			3	6				
06:30		6	8			3	4				
06:45		4	5	15	23	2	3	9	16	24	39
07:00		3	2			3	3				
07:15		5	1			2	5				
07:30		6	8			7	4				
07:45		10	4	24	15	6	4	18	16	42	31
08:00		10	0			2	6				
08:15		6	4			2	2				
08:30		14	5			3	7				
08:45		12	1	42	10	4	1	11	16	53	26
09:00		6	3			10	2				
09:15		14	4			7	2				
09:30		10	0			7	1				
09:45		2	2	32	9	8	2	32	7	64	16
10:00		6	4			5	0				
10:15		3	2			5	3				
10:30		8	0			8	1				
10:45		5	1	22	7	1	0	19	4	41	11
11:00		6	1			3	0				
11:15		8	0			0	0				
11:30		4	1			8	0				
11:45		6	0	24	2	10	1	21	1	45	3
Total		163	182			114	182			277	364
Percent		47.2%	52.8%			38.5%	61.5%			43.2%	56.8%
Grand Total		469	663			416	701			885	1364
Percent		41.4%	58.6%			37.2%	62.8%			39.4%	60.6%

ADT

ADT 562

AADT 562

Appendix C

Regional Seasonal Adjustment Data

Seasonal Adjustment Factor Summary Table

Project: T0376.01 - Cushing Village Redevelopment - Belmont, Massachusetts
 Date: October 1, 2012
 Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
 Source: MassDOT Permanent Count Stations 8011,8096,4118,415,4165

STATION 8011 - MEDFORD - RTE.I-93 - SOUTH OF RTE.60 ROTARY													June	
YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	Seasonal Adjustment
02	164,243	163,488	167,345	165,332	167,299	169,679	158,062	168,477	163,546	169,482	159,763	159,000	164,643	-3.1%
03	165,000	164,000	166,000	165,000	167,046	154,806	153,332	171,344	170,575	171,255	161,099	152,609	163,506	5.3%
04	158,239	164,783	166,777	172,245	173,440	160,130	159,678	172,261	172,000	171,000	162,525	160,000	166,090	3.6%
05	162,000	162,551	167,171	169,535	170,629	175,742	179,680	179,000	162,138	165,888	168,032	164,539	168,909	-4.0%
06	165,031	167,769	176,861	173,376	172,542	177,409	168,404	176,868	172,923	173,259	169,804	167,711	171,830	-3.2%

STATION 8096 - MEDFORD - RTE.I-93 - SOUTH OF ROOSEVELT CIRCLE													June Seasonal Adjustment	
YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
02	167,389	172,728	176,198	181,836	180,668	179,678	177,860	181,260	173,522	174,603	166,610	161,938	174,524	-3.0%
03	154,385	161,180	165,000	175,031	175,831	176,000	176,125	178,546	176,575	171,710	155,392	156,245	168,502	-4.5%
04	163,135	167,877	174,090	172,903	171,236	175,882	165,862	179,550	175,643	171,000	156,000	155,000	169,015	-4.1%
06	178,971	174,967	194,569	181,604	180,703	181,955	177,027	184,113	179,274	171,000	156,000	155,000	176,265	-3.2%

STATION 4118 - LEXINGTON - RTE.I-95 - NORTH OF RTE. 2A													<u>June</u>	
YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	<u>Seasonal</u> <u>Adjustment</u>
06	156,000	158,000	158,611	157,414	160,279	161,390	159,906	164,944	165,971	164,465	158,286	151,556	159,735	-1.0%

STATION 415 - NEWTON - RTE.I-95 (128) - SOUTH OF RTE.I-90													<u>June</u>	
YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	<u>Seasonal</u> <u>Adjustment</u>
02	135,484	138,523	138,077	146,761	150,834	151,321	147,085	149,436	149,028	151,095	148,920	136,396	145,247	-4.2%
06	126,000	126,906	136,149	136,322	140,602	142,863	135,563	142,863	140,973	141,211	138,206	133,710	136,781	-4.4%

STATION 4165 - NEWTON - RTE.I-95 (128) - NORTH OF RTE.16													<u>June</u> <u>Seasonal</u> <u>Adjustment</u>	
YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
02	130.921	130.600	139.873	148.909	151.439	152.620	149.953	155.246	152.030	153.522	148.263	142.276	146.304	-4.3%

Average Adj. = **-2.32%**

Whereas the average traffic volumes for June is higher than the yealry average, no seasonal adjustment will be taken for a more conservative analysis.

Appendix D

MBTA Public Transportation Data



schedule change

73

FALL September 1, 2012 - December 28, 2012

Waverley Square - Harvard Station via Trapelo Road

Serving: Mt. Auburn Hospital, Cushing Square,
Harvard University, and connections to
the Red Line & Fitchburg Commuter Rail



Arrive times are approximate, subject to traffic.

Customer Service/Travel Info..617-222-3200
Toll Free.....1-800-392-6100
Hearing Impaired (TTY).....617-222-5146

For more schedule or travel information, visit:
www.mbta.com

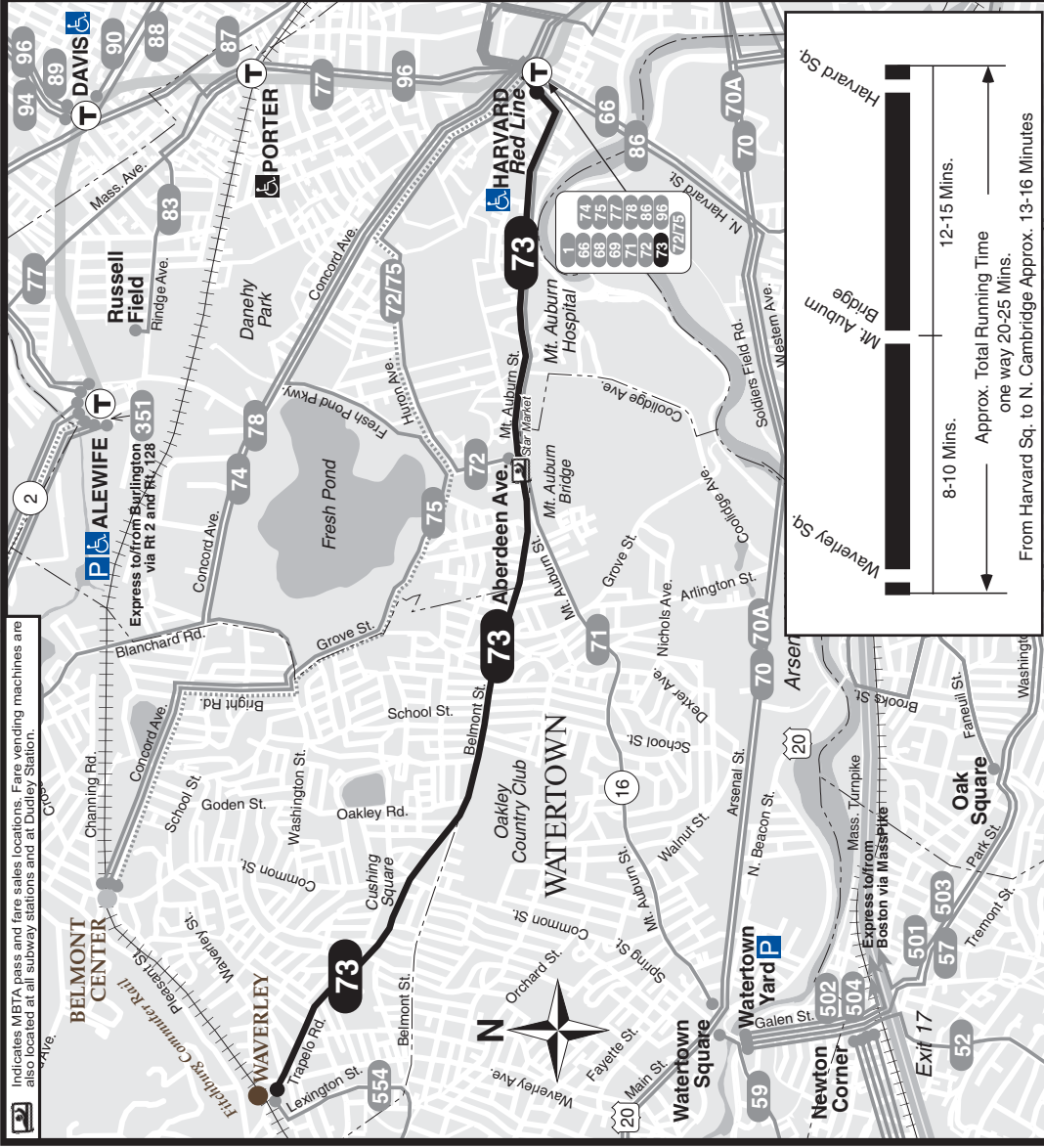


Massachusetts Bay
Transportation Authority

massDOT
Massachusetts Department of Transportation

T Route 73 Waverley Square - Harvard Station via Trapelo Road

Indicates MBTA pass and fare sales locations. Fare vending machines are also located at all subway stations and at Dudley Station.



73

WEEKDAY

INBOUND				OUTBOUND			
Leave Waverley Square	Arrive Mt. Auburn Bridge	Arrive Harvard Station	Leave Harvard Station	Arrive Mt. Auburn Bridge	Arrive Waverley Square	Arrive Harvard Station	Leave Harvard Station
5:02A	5:09A	5:16A	4:49A	4:54A	5:02A	5:16A	4:49A
5:23	5:30A	5:20A	5:07	5:12	5:23	5:36	5:06
5:43	5:50	5:38	5:25	5:30	5:43	5:56	5:26
6:00	6:07	5:57	5:49	5:50	6:03	6:16	5:46
6:11	6:18	6:25	6:14	6:30	6:23	6:36	6:06
6:18	6:25	6:33	6:02	6:37	6:42	6:55	6:26
6:25	6:33	6:41	6:07	6:42	6:57	7:10	6:41
6:35	6:44	6:53	Every	6:57	7:04	7:10	6:41
6:45	6:54	7:03	Every	7:04	7:10	7:10	6:41
Every	9 Mins.	or Less	9:04	15 Mins	Every	Until	6:46
9:30	9:40	9:54	9:16	9:06	8:57	9:13	7:06
9:45	9:54	10:05	9:26	9:11	9:25	9:27	7:23
9:54	10:03	10:14	9:36	9:34	9:25	9:41	Every
10:00	10:09	10:20	9:51	9:44	9:39	9:55	9:45
Every	15 Mins.	Until	10:01	9:59	9:54	10:10	9:51
11:45	11:54	12:05P	11:46	10:09	10:09	10:25	10:00
12:00N	12:09P	12:20P	12:01P	10:18	Every	Until	10:09
Every	15 Mins.	2:09	Every	11:54	12:07P	12:07P	10:17
2:00	2:09	2:19	2:01	12:09P	12:22P	12:22P	15 Mins.
2:15	2:24	2:34	2:11	15 Mins.	Until	Until	12:17P
2:25	2:34	2:44	2:22	2:09	2:23	2:33	12:17P
2:35	2:44	2:54	2:37	2:30	2:33	2:44	12:17P
2:50	2:59	3:09	2:47	2:45	2:59	3:09	12:17P
3:04	3:13	3:23	2:57	2:55	3:09	3:19	12:17P
3:11	3:20	3:30	3:07	3:05	3:19	3:29	12:17P
3:20	3:29	3:39	3:16	3:24	3:38	3:48	12:17P
3:29	3:38	3:48	3:25	3:33	3:47	3:57	12:17P
3:38	3:47	3:57	3:33	3:41	3:55	4:05	12:17P
3:47	3:56	4:07	3:38	3:46	4:00	4:10	12:17P
3:56	4:05	4:16	3:42	3:50	4:04	4:14	12:17P
4:00	4:09	4:20	3:46	3:54	4:08	4:18	12:17P
Every	5 Mins.	Until	3:51	3:59	4:13	4:23	12:17P
6:50	6:57	7:06	3:55	4:03	4:17	4:27	12:17P
6:53	7:00	7:09	3:55	4:08	4:22	4:32	12:17P
6:57	7:04	7:13	Every	6 Mins.	or Less	or Less	12:17P
6:58	7:05	7:14	6:28	6:36	6:50	7:00	12:17P
7:04	7:11	7:20	6:32	6:40	6:54	7:04	12:17P
7:10	7:17	7:26	6:38	6:46	7:00	7:10	12:17P
7:16	7:23	7:32	6:45	6:53	7:07	7:17	12:17P
7:22	7:29	7:38	6:52	7:00	7:14	7:24	12:17P
7:29	7:36	7:45	6:59	7:07	7:21	7:31	12:17P
7:36	7:43	7:52	7:06	7:14	7:27	7:37	12:17P
7:45	7:52	8:01	7:13	7:21	7:34	7:44	12:17P
7:54	8:01	8:10	7:20	7:27	7:40	7:50	12:17P
8:06	8:13	8:21	7:30	7:37	7:50	8:00	12:17P
8:15	8:22	8:30	7:42	7:49	8:02	8:12	12:17P
8:35	8:42	8:50	7:55	8:02	8:15	8:25	12:17P
8:50	8:57	9:05	8:11	8:18	8:31	8:41	12:17P
9:00	9:07	9:15	8:27	8:34	8:47	8:57	12:17P
9:15	9:22	9:30	8:39	8:46	8:59	9:09	12:17P
9:30	9:37	9:45	8:52	8:59	9:12	9:22	12:17P
Every	20 Mins.	Until	9:06	9:13	9:26	9:36	12:17P
10:30	10:37	10:45	Every	20 Mins.	Until	Until	12:17P
10:50	10:57	11:05	10:26	10:33	10:45	10:55	12:17P
11:10	11:17	11:25	10:46	10:52	11:04	11:14	12:17P
11:27	11:33	11:41	11:06	11:12	11:24	11:34	12:17P
11:50	11:56	12:04A	11:26	11:32	11:44	11:54	12:17P
12:05A	12:11A	12:19A	11:46	11:52	12:04A	12:14A	12:17P
12:40	12:46	12:54	12:16A	12:22A	12:34	12:44	12:17P
1:20	1:25	1:32	w 1:02	1:08	1:20	1:30	1:20

73

SATURDAY

INBOUND				OUTBOUND			
Leave Waverley Square	Arrive Mt. Auburn Bridge	Arrive Harvard Station	Leave Harvard Station	Arrive Mt. Auburn Bridge	Arrive Waverley Square	Arrive Harvard Station	Leave Harvard Station
5:03A	5:10A	5:16A	4:49A	4:56A	5:02A	5:16A	4:49A
5:23	5:30	5:36	5:06	5:13	5:23	5:36	5:06
5:43	5:50	5:56	5:26	5:33	5:39	5:56	5:26
6:03	6:10	6:16	5:46	5:53	6:03	6:16	5:46
6:23	6:30	6:36	6:06	6:13	6:19	6:36	6:06
6:42	6:49	6:55	6:26	6:33	6:42	6:55	6:26
6:57	7:04	7:10	6:41	6:48	6:54	7:10	6:41
Every	15 Mins	Until	6:46	6:53	6:59	7:10	6:46
8:57	9:06	9:13	7:06	7:13	7:22	7:32	7:06
9:11	9:20	9:27	7:23	7:30	7:39	7:49	7:23
9:25	9:34	9:41	Every	15 Mins	Until	Until	7:39
9:39	9:48	9:55	9:38	9:45	9:54	10:04	9:38
9:54	10:03	10:10	9:51	9:58	10:09	10:19	9:51
10:09	10:18	10:25	10:00	10:08	10:19	10:29	10:00
Every	15 Mins	Until	10:09	10:17	10:28	10:38	10:09
11:09	11:18	11:25	Every	15 Mins.	Until	Until	10:17
11:24	11:33	11:40	11:09	11:17	11:28	11:38	11:09
11:39	11:48	11:55	11:24	11:32	11:43	11:53	11:24
11:54	12:03P	12:10P	11:39	11:47	11:58	12:08	11:39
12:09P	12:18P	12:25P	11:54	12:02P	12:13P	12:23P	11:54
Every	15 Mins	Until	12:09P	12:17P	12:28P	12:38P	12:09P
6:09	6:18	6:25	Every	15 Mins.	Until	Until	12:28P
6:24	6:33	6:40	6:09	6:17	6:28	6:38	6:09
6:39	6:48	6:55	6:24	6:32	6:43	6:53	6:24
6:54	7:03	7:10	6:24	6:32	6:43	6:53	6:24
7:10	7:19	7:26	6:39	6:47	6:58	7:08	6:39
7:20	7:29	7:36	6:54	7:02	7:13	7:23	6:54
7:30	7:39	7:46	7:18	7:25	7:36	7:46	7:18
7:50	7:59	8:05	7:26	7:34	7:45	7:55	7:26
8:10	8:17	8:23	7:46	7:54	8:04	8:14	7:46
8:30	8:37	8:43	8:06	8:14	8:24	8:34	8:06
8:50	8:57	9:03	8:26	8:34	8:44	8:54	8:26
9:10	9:17	9:23	8:46	8:54	9:04	9:14	8:46
9:30	9:37	9:43	9:06	9:14	9:24	9:34	9:06
9:50	9:57	10:03	9:26	9:34	9:44	9:54	9:26
10:10	10:17	10:23	9:46	9:54	10:04	10:14	9:46
10:30	10:37	10:43	10:06	10:14	10:24	10:34	10:06
10:50	10:57	11:03	10:26	10:34	10:44	10:54	10:26
11:10	11:17	11:23	10:46	10:54	11:04	11:14	10:46
11:30	11:37	11:43	11:06	11:14	11:24	11:34	11:06
11:50	11:57	12:03A	11:26	11:34	11:44	11:54	11:26
12:00M	12:07A	12:13	11:41	11:49	11:59	12:09A	11:41
12:35A	12:42	12:48	12:16A	12:24A	12:34A	12:44A	12:16A
1:19	1:26	1:32	w 1:01	1:09	1:19	1:29	1:09

w - Waits for last train to arrive at Harvard Sta.



ALL BUSES ARE ACCESSIBLE TO PERSONS WITH DISABILITIES

Route 73

Waverley Sq. - Harvard Station
via Trapelo Road

73

SUNDAY

INBOUND				OUTBOUND			
Leave Waverley Square	Arrive Mt. Auburn Bridge	Arrive Harvard Station	Leave Harvard Station	Arrive Mt. Auburn Bridge	Arrive Waverley Square	Arrive Harvard Station	Leave Harvard Station
6:50A	6:56A	7:10A	6:26A	6:38A	6:45A	7:10A	6:26A
7:15	7:24	7:35	6:51	7:03	7:10	7:35	6:51
7:40	7:49	8:00	7:14	7:26	7:33	8:00	7:14
8:00	8:09	8:20	7:34	7:46	7:53	8:20	7:34
8:20	8:29	8:40	7:54	8:06	8:13	8:40	7:54
8:40	8:49	9:00	8:14	8:26	8:33	9:00	8:14
Every	20 Mins.	Until	Every	20 Mins.	Until	Until	Every
11:40	11:49	12:00N	11:54	12:08P	12:16P	12:00N	11:54
12:00N	12:09P	12:20P	12:14P	12:28P	12:36P	12:20P	12:14P
12:20P	12:29	12:40	12:34	12:48	12:56	12:40	12:34
12:40	12:49	1:00	12:54	1:08	1:16	1:00	12:54
1:00	1:09	1:20	1:14	1:28	1:36	1:20	1:14
1:20	1:29	1:40	1:34	1:49	1:57	1:40	1:34
1:40	1:49	2:00	1:54	2:09	2:17	2:00	1:54
2:00	2:09	2:20	2:14	2:29	2:37	2:20	2:14
2:20	2:29	2:40	2:34	2:49	2:57	2:40	2:34
2:40	2:49	3:00	2:54	3:09	3:17	3:00	2:54
3:00	3:09	3:20	3:14	3:29	3:37	3:20	3:14
3:20	3:29	3:40	3:34	3:49	3:57	3:40	3:34
3:40	3:49	4:00	3:54	4:09	4:17	4:00	3:54
4:00	4:09	4:20	4:14	4:29	4:37	4:20	4:14
4:20	4:29	4:40	4:34	4:49	4:57	4:40	4:34
4:40	4:49	5:00	4:54	5:09	5:17	5:00	4:54
5:00	5:09	5:20	5:14	5:29	5:37	5:20	5:14
5:20	5:29	5:40	5:34	5:49	5:57	5:40	5:34
5:40	5:49	6:00	5:54	6:08	6:17	6:00	5:54
Every	20 Mins.	Until	Every	20 Mins.	Until	Until	Every
10:40	10:48	10:58	10:54	11:06	11:13	10:58	10:54
11:00	11:08	11:18	11:14	11:26	11:33	11:18	11:14
11:20	11:28	11:38	11:34	11:46	11:53	11:38	11:34
11:40	11:48	11:58	11:54	12:06A	12:13A	11:58	11:54
12:05A	12:13A	12:23A	12:24A	12:36A	12:43A	12:23A	12:24A
12:45	12:53	1:03	w 1:04	1:16	1:23	1:03	w 1:04

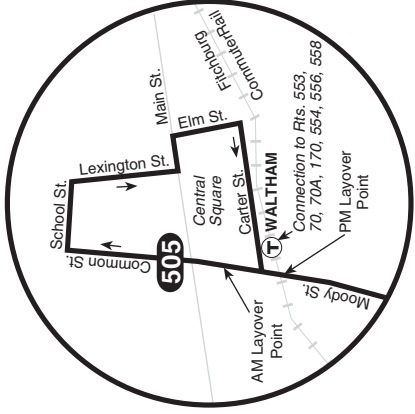
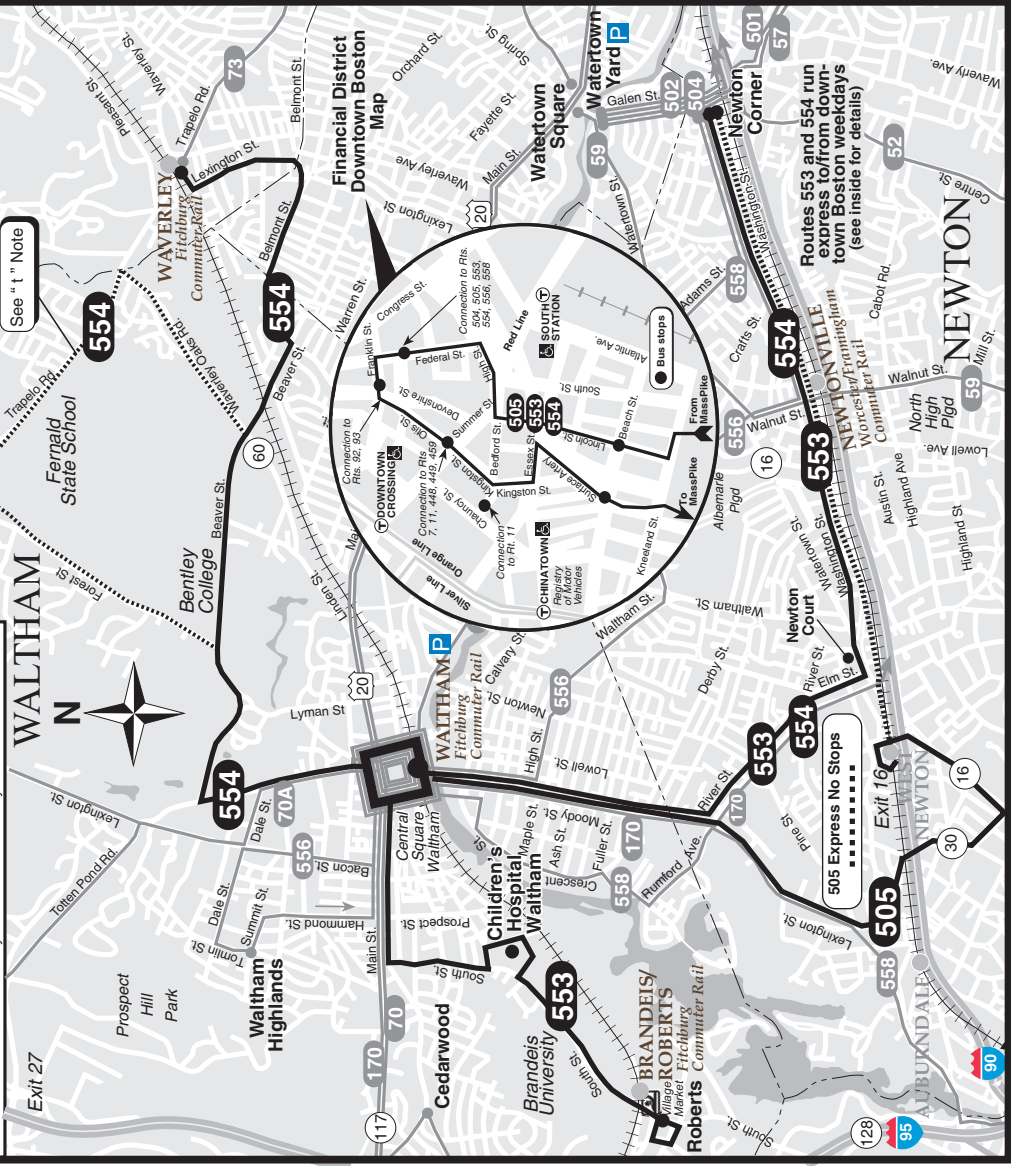
Harvard Station : Buses depart from the Lower Busway on weekdays and Saturdays. Buses depart from the Upper Busway on Sundays.

FARES

PAYING WITH...	1-BUS TRIP	2-BUS TRIP	BUS + SUBWAY TRIP
CharlieCard	\$1.50	\$1.50	\$2.00
CharlieTicket	\$2.00	\$2.00	\$4.50
Cash onboard	\$2.00	\$4.00	\$4.50
Student CharlieCard*	\$0.75	\$0.75	\$1.00
Senior/TAP CharlieCard**	\$0.75	\$0.75	\$1.00

- T** **Route 505** Express Bus Central Square, Waltham - Downtown Boston via Moody St.
- T** **Route 553** Roberts - Downtown Boston via Newton Corner & Central Sq. Waltham
- T** **Route 554** Waverley Sq. - Downtown Boston via Newton Corner & Bentley College

 Indicates MBTA pass and fare sales locations. Fare vending machines are also located at all subway stations and at Dudley Station.



Express Bus

**Central Sq., Waltham -
Downtown Boston**
via Mass Pike

505

**Roberts - Downtown
Boston**
via Newton Corner &
Mass Pike

553

**Waverly Sq. -
Downtown Boston**
via Newton Corner &
Mass Pike

554

FALL September 1, 2012 - December 28, 2012



Serving: Central Square Waltham, Newtonville,
Newton Court, Brandeis University,
and Bentley College



Arrive times are approximate, subject to traffic.

Customer Service/Travel Info 617-222-3200
Toll Free.....1-800-392-6100
Hearing Impaired (TTY).....617-222-5146

For more schedule or travel information, visit:
www.mbta.com



**Massachusetts Bay
Transportation Authority**

massDOT
Massachusetts Department of Transportation

505

WEEKDAY

INBOUND			OUTBOUND		
Leave Central Sq. Waltham	Arrive West Newton	Arrive Federal & Franklin Sts.	Leave Federal & Franklin Sts.	Arrive Newton	Arrive Central Sq. Waltham
5:55A	6:09A	6:28A	6:05A	6:21A	6:30A
6:10	6:24	6:43	6:35	6:51	7:00
6:25	6:39	6:58	6:55	7:15	7:27
6:40	6:54	7:13	7:03	7:24	7:36
6:53	7:09	7:28	7:14	7:35	7:47
7:05	7:22	7:44	7:29	7:50	8:02
7:14	7:31	7:58	7:45	8:06	8:18
7:22	7:41	8:08	8:00	8:21	8:33
7:30	7:51	8:17	8:15	8:36	8:48
7:38	7:59	8:25	8:40	9:01	9:11
7:45	8:06	8:30	9:12	9:30	9:40
7:53	8:14	8:36	9:40	9:58	10:08
8:02	8:22	8:44			
8:10	8:28	8:50			
8:18	8:36	8:58			
8:34	8:52	9:11			
8:50	9:06	9:22	3:10P	3:25P	3:46P
9:06	9:19	9:35	3:40	3:55	4:17
9:22	9:35	9:51	4:00	4:22	4:48
9:45	9:58	10:14	4:30	4:37	5:03
10:15	10:28	10:44	4:45	4:52	5:18
3:55P	4:07P	4:25P	4:45	5:07	5:33
4:25	4:37	4:55	5:00	5:22	5:48
4:50	5:02	5:20	5:10	5:32	5:58
5:05	5:17	5:35	5:20	5:42	6:08
5:20	5:32	5:50	5:35	5:57	6:23
5:35	5:47	6:05	5:50	6:12	6:38
5:50	6:02	6:20	6:05	6:27	6:53
6:05	6:17	6:35	6:20	6:42	7:08
6:23	6:35	6:53	6:35	6:57	7:23
6:38	6:50	7:08	6:55	7:17	7:43
6:53	7:05	7:23	7:20	7:42	8:08

NO ROUTE 505 SERVICE
ON WEEKENDS OR HOLIDAYS



ALL BUSES ARE ACCESSIBLE TO PERSONS WITH DISABILITIES.

Route 505

OuterExpressBus

Central Sq., Waltham - Downtown Boston
via Moody St. & Mass. Turnpike

553 & 554

WEEKDAY

INBOUND			OUTBOUND		
Leave Roberts Square	Leave Waverley Square	Lv/Arrive Central Sq. Waltham	Arrive Newton Corner	Arrive Downtown Boston	Leave Downtown Boston
6:25A		6:31A	6:55A	7:17A	t 5:51A
6:50		6:57	7:21	.....	5:58
7:20	7:00A	7:14	7:40	8:03	t 6:15
7:45		7:27	7:51	8:12	6:20
7:45	7:30	7:44	8:10	8:33	6:43
8:45		8:10	8:24	8:50	t 6:50
8:45		8:52	9:14	9:35	7:40
9:45		9:10	9:22	9:40	8:10
10:45		10:10	10:22	10:40	8:40
11:45		11:10	11:22	11:40	9:16
.....		11:52	12:14P	12:38	9:40
.....		12:10P	12:22P	12:40P	10:10
12:45P		12:53	1:16	1:40	10:40
1:45		1:22	1:40	2:03	11:10
2:45		2:10	2:22	2:40	11:40
3:45		3:10	3:22	3:40	12:10P
4:45		4:15	4:29	4:54	12:40P
5:45		5:20	5:42	6:04	12:57
6:45		6:15	6:35	6:52	1:10
.....		6:51	7:11	7:32	1:24
.....		7:15	7:35	7:52	1:57
.....		7:50	8:10	8:28	2:24
.....		8:20	8:40	8:58	2:57
.....		8:50	9:25	9:43	3:18
.....		9:25	9:45	10:07	3:41
.....		10:07	10:29	.....	3:59
.....		12:05P	12:15P	.....	4:20
.....		12:30P	12:50P	.....	4:52
.....		1:15	1:35	.....	5:21
.....		2:00	2:20	.....	5:04
.....		2:45	3:05	.....	5:35
.....		3:30	3:50	.....	6:10
.....		4:15	4:35	.....	6:25
.....		5:00	5:20	.....	6:58
.....		6:30	6:50	.....	7:18
.....		7:15	7:35	.....	7:46
.....		8:00	8:20	.....	8:16
.....		8:45	9:05	.....	8:35
.....		9:30	9:50	.....	9:04
.....		10:15	10:35	.....	.....
.....		11:00	11:20	.....	.....
.....		11:45	12:05P	.....	.....

c - To/from Central Sq., Waltham via Copley Sq.
t - Via Trapelo Rd.

Route 554 indicated by shaded areas

Route 553

Roberts or Central Sq., Waltham -
Downtown Boston via Newton Corner &
Central Sq., Waltham

Route 554

Waverley Sq. - Downtown Boston
via Newton Corner, Central Sq.,
Waltham & Bentley College

553 SATURDAY
INBOUND

Leave Roberts Square	Arrive Central Sq. Waltham	Arrive Newton Corner
6:30A	6:41A	7:03A
7:15	7:26	7:48
8:00	8:11	8:33
8:45	8:56	9:18
9:30	9:41	10:03
10:15	10:26	10:48
11:00	11:11	11:33
11:45	11:56	12:18P
12:30P	12:41P	1:03P
1:15	1:26	1:48
2:00	2:11	2:33
2:45	2:56	3:18
3:30	3:41	4:03
4:15	4:26	4:48
5:00	5:11	5:33
5:45	5:56	6:18
6:30	6:41	7:03
7:15	7:26	7:48

553 SATURDAY
OUTBOUND

Leave Newton Corner	Arrive Central Sq. Waltham	Arrive Roberts Square
6:30A	6:50A	7:00A
7:15	7:35	7:45
8:00	8:20	8:30
8:45	9:05	9:15
9:30	9:50	10:00
10:15	10:35	10:45
11:00	11:20	11:30
11:45	12:05P	12:15P
12:30P	12:50P	1:00P
1:15	1:35	1:45
2:00	2:20	2:30
2:45	3:05	3:15
3:30	3:50	4:00
4:15	4:35	4:45
5:00	5:20	5:30
6:30	6:50	7:00
7:15	7:35	7:45

NO ROUTE 554 SERVICE
ON WEEKENDS OR HOLIDAYS

NO ROUTE 553 SERVICE
SUNDAY OR HOLIDAYS

OUTER EXPRESS

ROUTE 505 FARES		
PAYING WITH...	OUTER X-BUS + LOCAL BUS TRIP	OUTER X-BUS + SUBWAY TRIP
CharlieCard	\$5.00	\$5.00
CharlieTicket	\$6.50	\$8.50
Cash onboard	\$6.50	\$8.50
Student CharlieCard*	\$3.25	\$3.25
Senior/TAP CharlieCard**	\$3.25	\$3.25

Children under 12 ride free when accompanied by an adult.
Blind Access CharlieCard holders ride free, if using a guide, the guide rides free.

VALID PASSES: Outer Express Bus Pass (\$160/mo.), Commuter Boat Pass (\$262/mo), and Commuter Rail Zone 1-10 passes.

* Available to students through participating middle schools and high schools.
** Available to Medicare cardholders, seniors 65+, and persons with disabilities.

NO local fare applies for any portion of Route 505

ROUTE 553/554

FARES		
PAYING WITH...	LOCAL X-BUS TRIP	INNER X-BUS + LOCAL BUS TRIP
CharlieCard	\$1.50	\$3.50
CharlieTicket	\$2.00	\$4.50
Cash onboard	\$2.00	\$4.50
Student CharlieCard*	\$0.75	\$2.25
Senior/TAP CharlieCard**	\$0.75	\$2.25

Children under 12 ride free when accompanied by an adult.
Blind Access CharlieCard holders ride free, if using a guide, the guide rides free.

VALID PASSES: Inner Express Bus Pass (\$110/mo.), Outer Express Bus Pass (\$160/mo.), Commuter Boat Pass (\$262/mo), and Commuter Rail Zone 1-10 passes.

* Available to students through participating middle schools and high schools.
** Available to Medicare cardholders, seniors 65+, and persons with disabilities.

Local bus fare applies if your trip does not include the Mass. Turnpike.

Fall 2012 Holidays

Oct. 8 : See Saturday Sept. 3, Nov. 22, Dec. 25: See Sunday Nov. 12: See Weekday

Appendix E

Compiled MassDOT Crash Data (2007 – 2010)

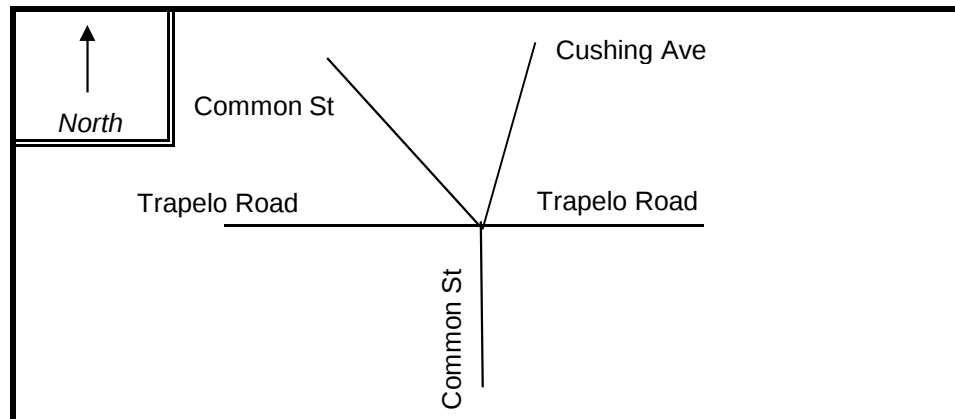
INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : BELMONT, MASSACHUSETTS COUNT DATE : JUNE 2010
 DISTRICT : 4 UNSIGNALIZED : ☐ NO ☒ SIGNALIZED : ☐ YES ☒

~ INTERSECTION DATA ~

MAJOR STREET : TRAPELO ROAD
 MINOR STREET(S) : COMMON STREET
CUSHING AVENUE

INTERSECTION
DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	→	←	↑	↘		
VOLUMES (PM) :	605	757	335	452		2,149

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES (A) :

CRASH RATE CALCULATION :

$$\text{RATE} = \frac{(A * 1,000,000)}{(ADT * 365)}$$

COMMENTS: K DETERMINED FROM ATR ON TRAPELO ROAD WEST OF INTERSECTION
(IN AND OUT VOLUME FROM TMC APPROACH / ADT FROM ATR)
 PROJECT: PROPOSED MIXED USE DEVELOPMENT - CUSHING VILLAGE - BELMONT, MA

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : BELMONT, MASSACHUSETTS COUNT DATE : JUNE 2010

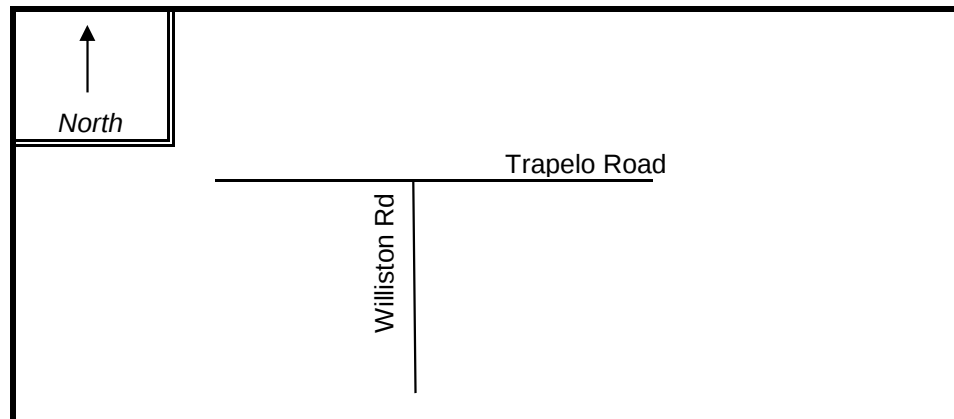
DISTRICT : 4 UNSIGNALIZED : ☒ **YES** SIGNALIZED : ☐ **NO**

~ INTERSECTION DATA ~

MAJOR STREET : TRAPELO ROAD

MINOR STREET(S) : WILLISTON ROAD

**INTERSECTION
DIAGRAM**
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	↑	→	←			
VOLUMES (PM) :	24	612	759			1,395

" K " FACTOR : **0.084** APPROACH ADT : **16,607** ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : **6** # OF YEARS : **4** AVERAGE # OF CRASHES (A) : **1.50**

CRASH RATE CALCULATION :

0.25

$$\text{RATE} = \frac{(A * 1,000,000)}{(ADT * 365)}$$

COMMENTS: K DETERMINED FROM ATR ON TRAPELO ROAD WEST OF INTERSECTION
(IN AND OUT VOLUME FROM TMC APPROACH / ADT FROM ATR)

PROJECT: PROPOSED MIXED USE DEVELOPMENT - CUSHING VILLAGE - BELMONT, MA

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : BELMONT, MASSACHUSETTS COUNT DATE : JUNE 2010

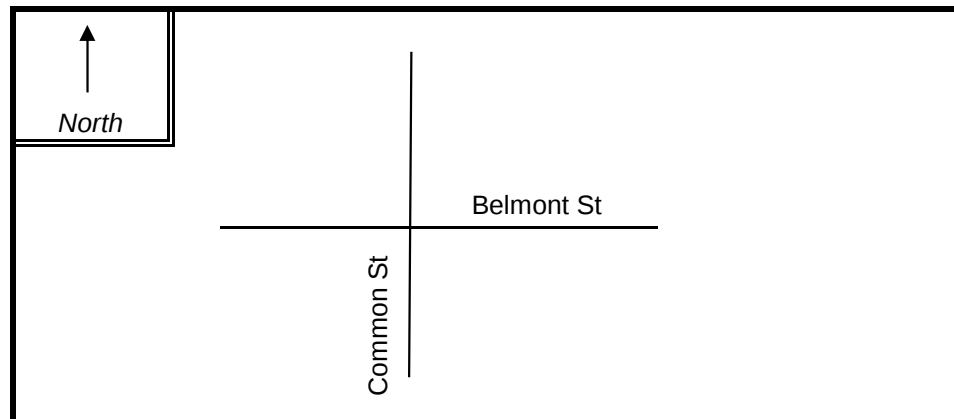
DISTRICT : 4 UNSIGNALIZED : ☐ NO SIGNALIZED : ☒ YES

~ INTERSECTION DATA ~

MAJOR STREET : COMMON STREET

MINOR STREET(S) : BELMONT STREET

INTERSECTION
DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	↑	↓	→	←		
VOLUMES (PM) :	299	317	499	531		1,646

" K " FACTOR : 0.088 APPROACH ADT : 18,705 ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 7 # OF YEARS : 4 AVERAGE # OF CRASHES (A) : 1.75

CRASH RATE CALCULATION :

0.26

$$\text{RATE} = \frac{(A * 1,000,000)}{(ADT * 365)}$$

COMMENTS: K DETERMINED FROM ATR ON TRAPELO ROAD WEST OF INTERSECTION
(IN AND OUT VOLUME FROM TMC APPROACH / ADT FROM ATR)

PROJECT: PROPOSED MIXED USE DEVELOPMENT - CUSHING VILLAGE - BELMONT, MA

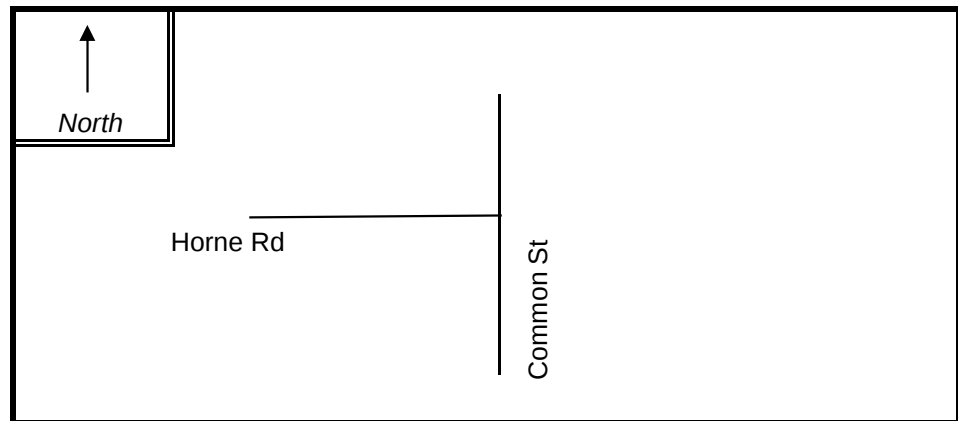
INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : BELMONT, MASSACHUSETTS COUNT DATE : JUNE 2010
 DISTRICT : 4 UNSIGNALIZED : ☒ YES SIGNALIZED : ☐ NO

~ INTERSECTION DATA ~

MAJOR STREET : COMMON STREET
 MINOR STREET(S) : HORNE ROAD

INTERSECTION
DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	→	↑	↓			
VOLUMES (PM) :	16	339	317			672

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES (A) :

CRASH RATE CALCULATION :



$$\text{RATE} = \frac{(A * 1,000,000)}{(ADT * 365)}$$

COMMENTS: K DETERMINED FROM ATR ON TRAPELO ROAD WEST OF INTERSECTION
(IN AND OUT VOLUME FROM TMC APPROACH / ADT FROM ATR)
 PROJECT: PROPOSED MIXED USE DEVELOPMENT - CUSHING VILLAGE - BELMONT, MA

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : BELMONT, MASSACHUSETTS COUNT DATE : JUNE 2010

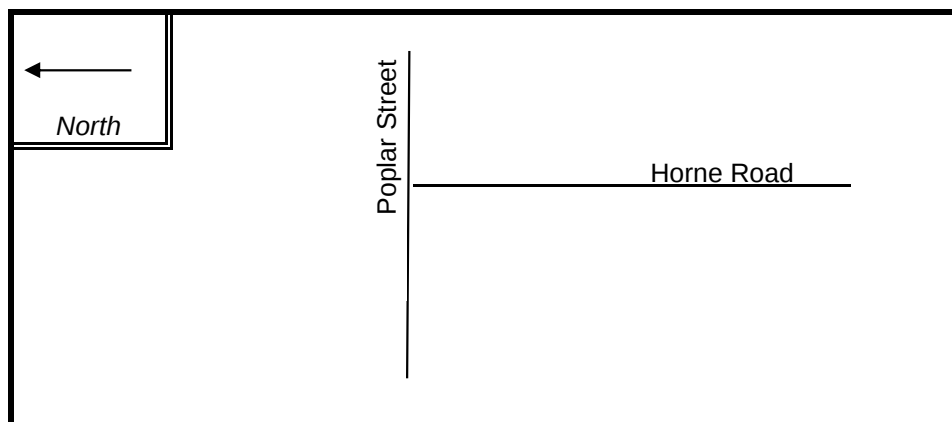
DISTRICT : 4 UNSIGNALIZED : ☒ YES SIGNALIZED : ☐ NO

~ INTERSECTION DATA ~

MAJOR STREET : POPLAR STREET

MINOR STREET(S) : HORNE ROAD

INTERSECTION
DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	↑	↓	←			
VOLUMES (AM) :	34	25	27			86

" K " FACTOR : 0.102 APPROACH ADT : 843 ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 0 # OF YEARS : 4 AVERAGE # OF CRASHES (A) : 0.00

CRASH RATE CALCULATION :

0

$$\text{RATE} = \frac{(A * 1,000,000)}{(ADT * 365)}$$

COMMENTS: K DETERMINED FROM ATR ON TRAPELO ROAD WEST OF INTERSECTION
(IN AND OUT VOLUME FROM TMC APPROACH / ADT FROM ATR)

PROJECT: PROPOSED MIXED USE DEVELOPMENT - CUSHING VILLAGE - BELMONT, MA

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : BELMONT, MASSACHUSETTS COUNT DATE : JUNE 2010

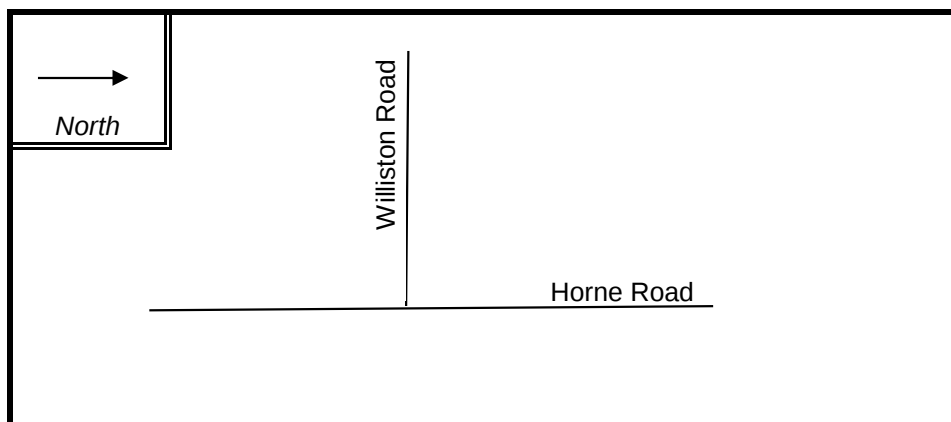
DISTRICT : 4 UNSIGNALIZED : ☒ YES SIGNALIZED : ☐ NO

~ INTERSECTION DATA ~

MAJOR STREET : WILLISTON ROAD

MINOR STREET(S) : HORNE ROAD

INTERSECTION
DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	↓	→	←			
VOLUMES (AM) :	29	10	25			64

" K " FACTOR : 0.102 APPROACH ADT : 627 ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 0 # OF YEARS : 4 AVERAGE # OF CRASHES (A) : 0.00

CRASH RATE CALCULATION :

0

$$\text{RATE} = \frac{(A * 1,000,000)}{(ADT * 365)}$$

COMMENTS: K DETERMINED FROM ATR ON TRAPELO ROAD WEST OF INTERSECTION
(IN AND OUT VOLUME FROM TMC APPROACH / ADT FROM ATR)

PROJECT: PROPOSED MIXED USE DEVELOPMENT - CUSHING VILLAGE - BELMONT, MA

Massachusetts Department of Transportation Crash Report for Belmont in 2007

Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Non-Motorist Type
2259848	BELMONT	30-Oct-2007	4:25 PM	Not Reported	2	0	0	Angle	V1: Travelling straight ahead / V2: Entering traffic lane	V1: Eastbound / V2: Northbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2: Passenger car	Dry	Daylight	Clear		TRAPELO ROAD	
2260056	BELMONT	20-Nov-2007	2:14 PM	Not Reported	2	0	0	Sideswipe, same direction	V1: Parked / V2: Backing	V1: Not reported / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with parked motor vehicle	V1: Light truck/van, mini-van, panel, pickup, sport utility with only four tires / V2: Passenger car	Wet	Daylight	Sleet, hail (freezing rain or drizzle)/Cloudy		75 feet W from Intersection TRAPELO ROAD / COMMON STREET	
2155756	BELMONT	01-Mar-2007	12:21 PM	Non-fatal injury	2	1	0	Angle	V1: Travelling straight ahead / V2: Making U-turn	V1: Northbound / V2: Northbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2: Passenger car	Dry	Daylight	Clear	COMMON STREET / TRAPELO ROAD		
2259863	BELMONT	02-Nov-2007	6:52 PM	Property damage only (none injured)	2	0	0	Sideswipe, opposite direction	V1: Turning left / V2: Travelling straight ahead	V1: Northbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2: Passenger car	Dry	Dusk	Clear/Clear	COMMON STREET / TRAPELO ROAD		
2179433	BELMONT	20-Apr-2007	4:14 PM	Property damage only (none injured)	2	0	0	Sideswipe, same direction	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: Westbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Light truck/van, mini-van, panel, pickup, sport utility with only four tires / V2: Light truck/van, mini-van, panel, pickup, sport utility with only four tires	Dry	Daylight	Clear		100 feet E from Intersection TRAPELO ROAD / COMMON STREET	
2253807	BELMONT	01-Sep-2007	3:57 PM	Property damage only (none injured)	1	0	0	Unknown	V1: Unknown	V1: Westbound	V1: Collision with highway traffic sign post	V1: Light truck/van, mini-van, panel, pickup, sport utility with only four tires	Dry	Daylight	Clear	BELMONT STREET / COMMON STREET		

Massachusetts Department of Transportation Crash Report for Belmont in 2008																		
Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Fatal Injuries	Total Nonfatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Non-Motorist Type
2353580	BELMONT	20-May-2008	1:41 PM	Property damage only (none injured)	2	0	0	Angle	V1: Turning left / V2: Travelling straight ahead	V1:Westbound / V2:Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2:Light truck/Van, mini-van, panel pickup, sport utility with only four tires	Dry	Daylight		TRAPELO ROAD / WILLISTON ROAD		
2370992	BELMONT	20-Aug-2008	12:08 PM	Property damage only (none injured)	2	0	0	Rear-end	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:Not reported / V2:Eastbound	V1: Not reported / V2: Not reported	V1: Passenger car / V2:Light truck/Van, mini-van, panel pickup, sport utility with only four tires	Dry	Daylight	Clear		TRAPELO ROAD / WILLISTON ROAD	
2411460	BELMONT	20-Nov-2008	12:21 PM	Property damage only (none injured)	2	0	0	Angle	V1: Turning left / V2: Travelling straight ahead	V1:Northbound / V2:Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2:Passenger car	Dry	Daylight	Clear	TRAPELO ROAD / WILLISTON ROAD		
2301904	BELMONT	26-Mar-2008	5:54 PM	Property damage only (none injured)	2	0	0	Sideswipe, same direction	V1: Parked / V2: Travelling straight ahead	V1:Southbound / V2:Southbound	V1: Collision with motor vehicle in traffic / V2: Collision with parked motor vehicle	V1: Passenger car / V2:Light truck/Van, mini-van, panel pickup, sport utility with only four tires	Dry	Daylight	Clear	COMMON STREET / TRAPELO ROAD		
2411871	BELMONT	29-Dec-2008	12:13 PM	Not Reported	2	0	0	Sideswipe, same direction	V1: Parked / V2: Unknown	V1:Not reported / V2:Westbound	V1: Not reported / V2: Not reported	V1: Passenger car / V2:Not reported	Dry	Daylight	Clear		BELMONT STREET	

Massachusetts Department of Transportation Crash Report for Belmont in 2009

Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Fatal Injuries	Total Nonfatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Non-Motorist Type
2487527	BELMONT	08-Jul-2009	1:54 PM	Property damage only (none injured)	2	0	0	Angle	V1: Turning left / V2: Travelling straight ahead	V1: Eastbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2: Passenger car	Wet	Daylight	Cloudy	TRAPELO ROAD / WILLISTON ROAD		
2434468	BELMONT	26-Jan-2009	9:56 AM	Property damage only (none injured)	2	0	0	Sideswipe, same direction	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: Southbound / V2: Southbound	V1: Not reported / V2: Not reported	V1: Unknown heavy truck, cannot classify / V2: Passenger car	Dry	Daylight	Clear	COMMON STREET / TRAPELO ROAD		
2576793	BELMONT	16-Apr-2009	5:31 PM	Property damage only (none injured)	0	0	0	Sideswipe, same direction					Dry	Daylight	Clear	TRAPELO ROAD / COMMON STREET		P1: Pedalcyclist (bicycle, tricycle, skateboard, sled car)
2502728	BELMONT	12-Aug-2009	7:34 PM	Property damage only (none injured)	1	0	0	Rear-end	V1: Travelling straight ahead	V1: Northbound	V1: Collision with motor vehicle in traffic	V1: Passenger car	Dry	Dusk	Cloudy	COMMON STREET / TRAPELO ROAD		
2514284	BELMONT	09-Sep-2009	3:49 PM	Non-fatal injury	1	1	0	Single vehicle crash	V1: Travelling straight ahead	V1: Southbound	V1: Collision with pedestrian	V1: Light truck/van, minivan, panel, pickup, sport utility) with only four tires	Dry	Daylight	Clear	COMMON STREET / TRAPELO ROAD	COMMON STREET / TRAPELO ROAD	P1: Pedestrian
2514279	BELMONT	12-Sep-2009	3:08 PM	Not Reported	2	0	0	Angle	V1: Turning left / V2: Backing	V1: Eastbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2: Passenger car	Wet	Daylight	Cloudy		COMMON STREET / TRAPELO ROAD	
2455783	BELMONT	20-Feb-2009	8:24 AM	Property damage only (none injured)	3	0	0	Rear-end	V1: Travelling straight ahead / V2: Travelling straight ahead / V3: Travelling straight ahead	V1: Eastbound / V2: Eastbound / V3: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic / V3: Collision with motor vehicle in traffic	V1: Passenger car / V2: Passenger car / V3: Passenger car	Dry	Daylight	Clear	BELMONT STREET / COMMON STREET		
2454803	BELMONT	04-Apr-2009	2:46 PM	Not Reported	2	0	0	Angle	V1: Turning left / V2: Travelling straight ahead	V1: Northbound / V2: Southbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Light truck/van, minivan, panel, pickup, sport utility) with only four tires / V2: Passenger car	Dry	Daylight	Clear	BELMONT STREET / COMMON STREET		
2476759	BELMONT	06-Jun-2009	11:20 AM	Non-fatal injury	1	1	0	Single vehicle crash	V1: Travelling straight ahead	V1: Northbound	V1: Collision with utility pole	V1: Passenger car	Dry	Daylight	Clear/Clear	COMMON STREET		
2526432	BELMONT	09-Oct-2009	1:47 PM	Property damage only (none injured)	1	0	0	Single vehicle crash	V1: Travelling straight ahead	V1: Eastbound	V1: Collision with highway traffic sign post	V1: Light truck/van, minivan, panel, pickup, sport utility) with only four tires / V2: Light truck/van, minivan, panel, pickup, sport utility) with only four tires	Wet	Daylight	Rain/Rain	BELMONT STREET / COMMON STREET		
2495609	BELMONT	21-Jul-2009	2:46 PM	Property damage only (none injured)	2	0	0	Angle	V1: Turning left / V2: Travelling straight ahead	V1: Eastbound / V2: Southbound	V1: Not reported / V2: Not reported	V1: Passenger car / V2: Light truck/van, minivan, panel, pickup, sport utility) with only four tires	Wet	Daylight	Rain	BELMONT STREET / COMMON STREET	BELMONT STREET / COMMON STREET	

MassDOT Massachusetts Department of Transportation Crash Report for Belmont in 2010																	
Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Number of Nonfatal Injuries	Number of Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Non Motorist Type
2570544	BELMONT	20-Jan-2010	10:28 AM	Non-fatal injury	2	1	0	Sideways, same	V1: Traveling straight ahead / V2: Traveling straight ahead /	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Light truck/van, minivan, passenger car / V2: Passenger car /	Dry	Daylight	Clear		TRAPELO ROAD / WILLISTON	
2601927	BELMONT	03-Nov-2010	10:40 AM	Non-fatal injury	2	1	0	Rear-end	V1: Traveling straight ahead / V2: Slowing or stopped in traffic	V1: Not reported / V2: Eastbound	V1: Light truck/van, minivan, passenger car / V2: Bus (loads for more than 15 people, including driver)	Dry	Daylight	Clear/Cloud		100 feet W from Intersection 112 TRAPELO ROAD / COMMON STREET	

Appendix F

MassDOT Permanent Count Station Data –
Background Growth

Average Daily Traffic Summary Table

Project: T0376.01 - Cushing Village Redevelopment - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: MassDOT Temporary Count Stations

STA.	TOWN	ROUTE/STREET	LOCATION	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
4130	ARLINGTON	RTE. 2	LEXINGTON T.L.	75,900								75,300	68,000	-1.17%
8420	CAMBRIDGE	LAND BLVD.	WEST OF CAMBRIDGE PKWY.			39,000	34,600	32,400	30,300	32,000	31,100	32,900		-2.59%
8111	CAMBRIDGE	O'BRIEN HWY.	NORTH OF LAND BLVD.			34,300	32,000	30,900	32,200	32,100	30,400	30,300		-1.98%
4134	WATERTOWN	ARLINGTON ST.	NORTH OF ARSENAL ST.		15,300			10,900			10,000			-6.76%
4133	WATERTOWN	SCHOOL ST.	NORTH OF MOUNT AUBURN ST.		9,000			7,800			7,200			-3.65%
4911	WALTHAM	RTE. 60	WEST OF TRAPELO RD.				14,500			12,800			13,000	-1.78%
4119 L	WALTHAM	RTE.128 & I- 95	SOUTH OF WINTER ST.	170,766	176,956	178,343	172,230							0.33%
4873	WALTHAM	TOTTEN POND RD.	WEST OF LEXINGTON ST.				21,300			19,600			17,900	-2.86%

Average Annual Ambient Growth = -2.6%

Assume 1% Ambient Growth Rate



Traffic Volume Growth

Project: T0376.01 - Cushing Village Redevelopment - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T. / Rebecca L. Brown, P.E.
Source: 2005 Trapelo Road FDR

Trapelo Road at Common Street

TIME PERIOD	2005 - FDR Counts	2010 - TEC Counts	Ambient Growth
Weekday AM Peak	2,155	1,989	-1.59%
Weekday PM Peak	2,252	2,149	-0.93%

Average Annual Ambient Growth = -1.26%

Assume 1% Ambient Growth Rate

Appendix G

Re-Occupancy of Vacant Space



Not to Scale

Cushing Village Redevelopment - Belmont, Massachusetts

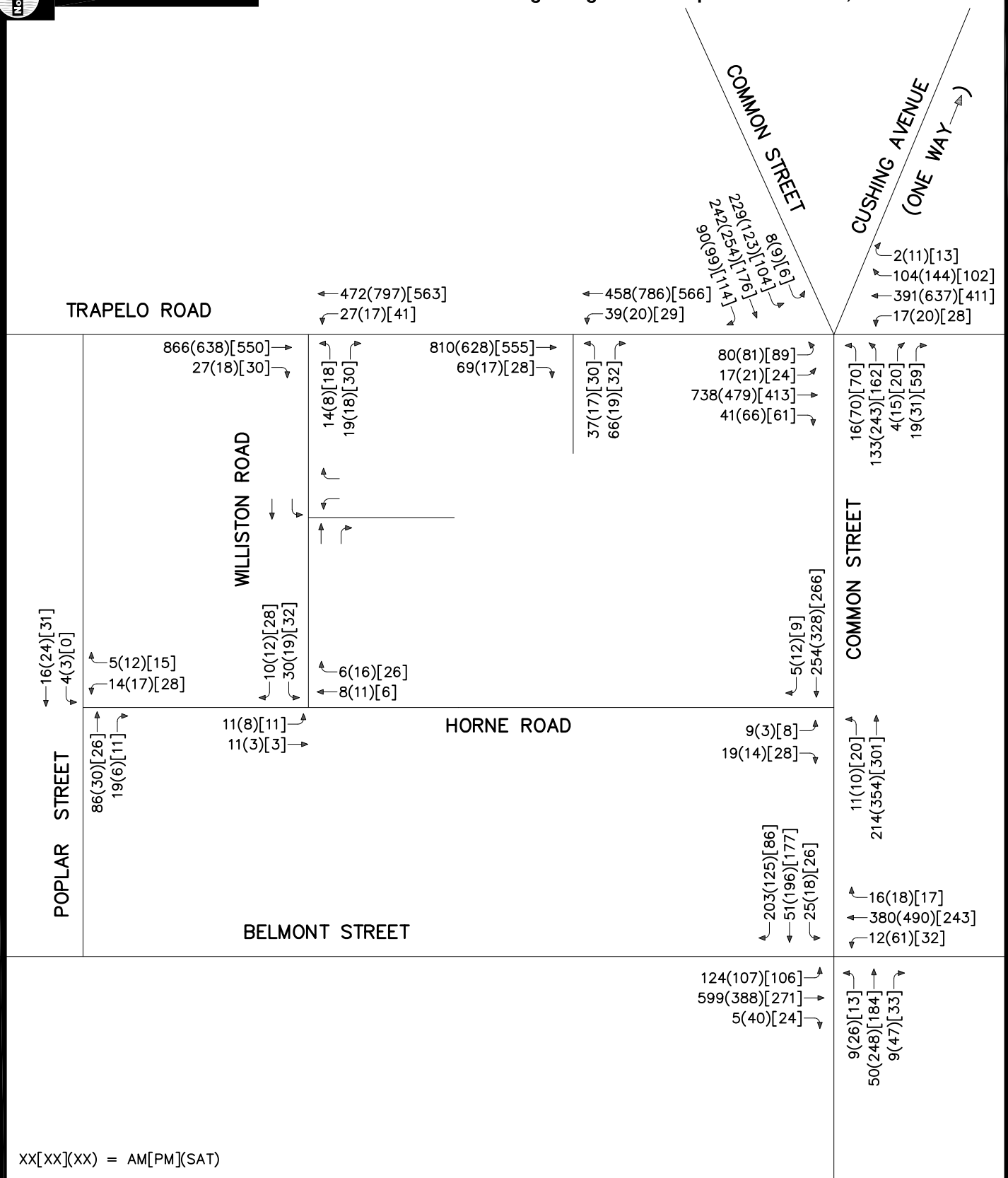


Figure G-1

2017 Base
Weekday Morning,
Weekday Evening, and
Saturday Midday
Peak Hour Traffic Volumes



T: \\T0376.01\\CAD\\Civil\\Graphics\\Updated TIAS - October 2012\\T0376.01_TrafficNetworks.dwg 10/1/2012 10:58:50 AM EDT



Not to Scale

Cushing Village Redevelopment - Belmont, Massachusetts

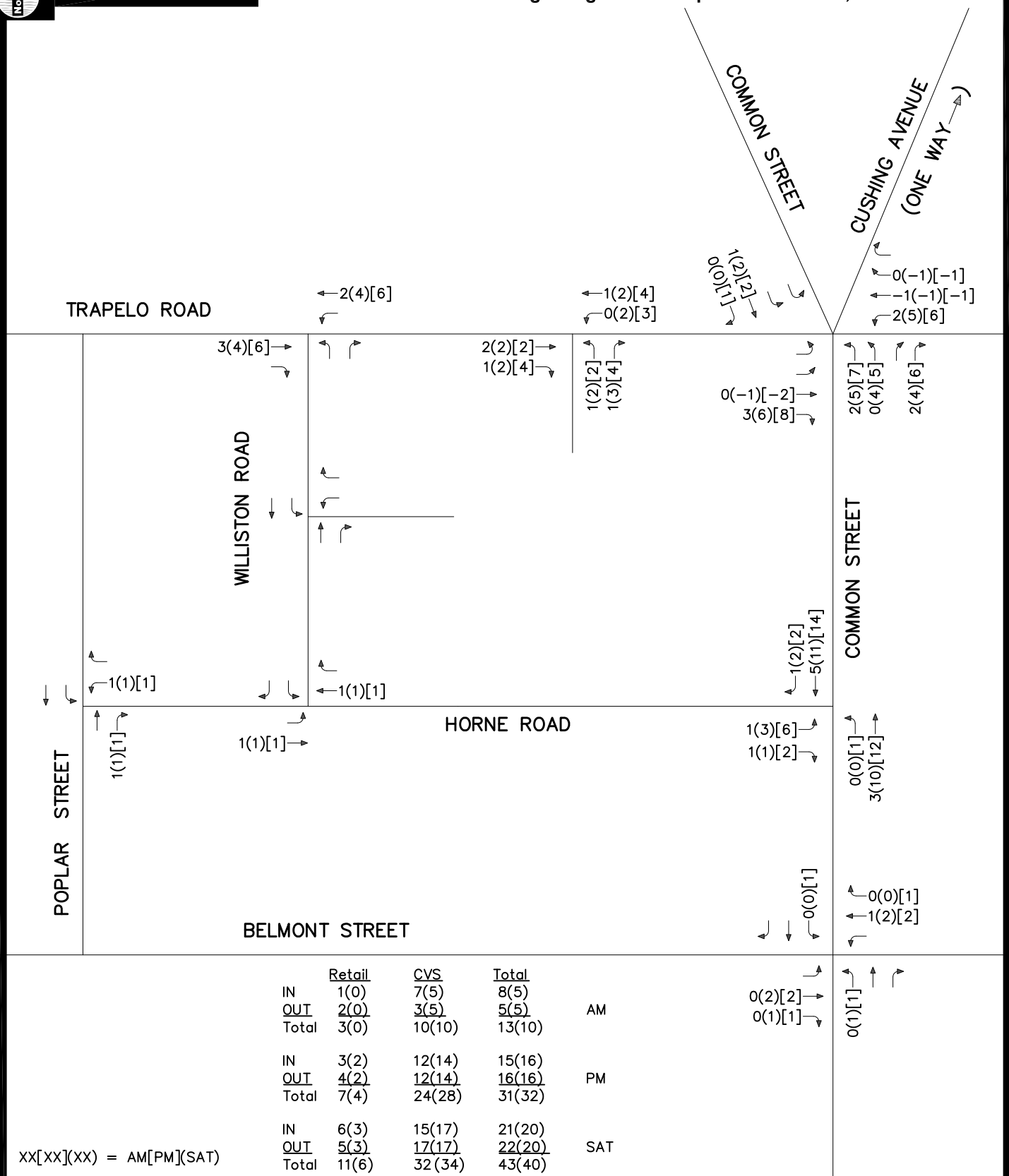


Figure G-2

Re-Occupancy of Vacant Space
Weekday Morning,
Weekday Evening, and
Saturday Midday
Peak Hour Traffic Volumes



TEC, Inc.

Trip Generation Assessment - Existing vs. Re-Occupied Uses

Project: Proposed Mixed Use Development - Belmont, Massachusetts
 Date: October 1, 2012
 Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
 Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Re-Occupancy Uses

6,200 SF Pharmacy/Drugstore without Drive-Thru Window (ITE LUC 880)

Size:	6.2 KSF		Total Trips		% Distribution		Multi-Use Trips		Total New Pass-by Trips		Total New Primary Trips		# Passby Trips		# Primary Trips	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Weekday Daily	277	277	277	277	50%	50%	0	0	294	294	260	260	147	147	130	130
Weekday AM PH	12	8	20	8	59%	41%	0	0	10	10	10	10	5	5	7	3
Weekday PM PH	26	26	52	26	50%	50%	0	0	28	28	24	24	14	14	12	12
Saturday Daily	354	354	708	354	49%	51%	0	0	376	376	332	332	188	188	166	166
Sat Midday PH	32	34	66	34	49%	51%	0	0	34	34	32	32	17	17	15	17

Interpolated Saturday Daily from Weekday PM PH

Assumed 53% passby rate (Trip Generation Handbook, 2nd Edition).

12,065 SF Specialty Retail (ITE LUC 814)

Size:	12.065 KSF		Total Trips		% Distribution		Multi-Use Trips		Total New Pass-by Trips		Total New Primary Trips		# Passby Trips		# Primary Trips	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Weekday Daily	268	267	535	267	50%	50%	0	0	140	140	395	395	70	70	198	197
Weekday AM PH	5	4	9	4	61%	39%	0	0	2	2	7	7	1	1	4	3
Weekday PM PH	15	18	33	18	44%	56%	0	0	12	12	21	21	6	6	9	12
Saturday Daily	254	253	507	253	50%	50%	0	0	132	132	375	375	66	66	188	187
Sat Midday PH	26	24	50	24	52%	48%	0	0	14	14	36	36	7	7	19	17

Interpolated Weekday AM PH from Weekday AM PH LUC 820 - Shopping Center

Assumed 34% pass-by rate for weekday PM and 26% pass-by rate for all others (LUC 820 - Shopping Center - Trip Generation Handbook, 2nd Edition).

1,800 SF Starbucks (ITE LUC 936)

Size:	1.8 KSF		Total Trips		% Distribution		Multi-Use Trips		Total New Pass-by Trips		Total New Primary Trips		# Passby Trips		# Primary Trips	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Weekday Daily	780	780	1560	780	50%	50%	0	0	780	780	780	780	390	390	390	390
Weekday AM PH	108	103	211	103	51%	49%	0	0	104	104	107	107	52	52	56	51
Weekday PM PH	37	36	73	36	50%	50%	0	0	36	36	37	37	18	18	19	18
Saturday Daily	758	757	1515	757	50%	50%	0	0	758	758	757	757	379	379	379	378
Sat Midday PH	57	62	119	62	48%	52%	0	0	60	60	59	59	30	30	27	32

Assumed 49% pass-by rate for weekday AM and 50% pass-by rate for all others (LUC 934 - Fast-Food Restaurant with Drive Thru - Trip Generation Handbook, 2nd Edition).

Trip Generation Assessment - Existing vs. Re-Occupied Uses

Project: Proposed Mixed Use Development - Belmont, Massachusetts
 Date: October 1, 2012
 Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
 Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Existing Uses

0 SF Pharmacy/Drugstore without Drive-Thru Window (ITE LUC 880)

Size:	0 KSF		Total Trips		% Distribution		Multi-Use Trips		Total New		Total New		# Passby Trips		# Primary Trips	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	Pass-by Trips	Primary Trips	IN	OUT	IN	OUT	IN	OUT
Weekday Daily	0	0	0	0	50%	50%	0	0	0	0	0	0	0	0	0	0
Weekday AM PH	0	0	0	0	59%	41%	0	0	0	0	0	0	0	0	0	0
Weekday PM PH	0	0	0	0	50%	50%	0	0	0	0	0	0	0	0	0	0
Saturday Daily	0	0	0	0	49%	51%	0	0	0	0	0	0	0	0	0	0
Sat Midday PH	0	0	0	0	49%	51%	0	0	0	0	0	0	0	0	0	0

Interpolated Saturday Daily from Weekday PM PH
 Assumed 53% passby rate (Trip Generation Handbook, 2nd Edition).

8,135 SF Specialty Retail (ITE LUC 814)

Size:	8,135 KSF		Total Trips		% Distribution		Multi-Use Trips		Total New		Total New		# Passby Trips		# Primary Trips	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	Pass-by Trips	Primary Trips	IN	OUT	IN	OUT	IN	OUT
Weekday Daily	181	180	361	0	50%	50%	0	0	94	267	47	47	134	133	3	1
Weekday AM PH	4	2	6	0	61%	39%	0	0	2	4	1	1	3	1	0	0
Weekday PM PH	10	12	22	0	44%	56%	0	0	8	14	4	4	6	8	0	0
Saturday Daily	171	171	342	0	50%	50%	0	0	88	254	44	44	127	127	13	12
Sat Midday PH	17	16	33	0	52%	48%	0	0	8	25	4	4	13	12	0	0

Interpolated Weekday AM PH from Weekday AM PH LUC 820 - Shopping Center
 Assumed 34% pass-by rate for weekday PM and 26% pass-by rate for all others (LUC 820 - Shopping Center - Trip Generation Handbook, 2nd Edition).

1,800 SF Starbucks (ITE LUC 936)

Size:	1.8 KSF		Total Trips		% Distribution		Multi-Use Trips		Total New		Total New		# Passby Trips		# Primary Trips	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	Pass-by Trips	Primary Trips	IN	OUT	IN	OUT	IN	OUT
Weekday Daily	780	780	1560	0	50%	50%	0	0	780	780	390	390	390	390	56	51
Weekday AM PH	108	103	211	0	51%	49%	0	0	104	107	52	52	18	18	19	18
Weekday PM PH	37	36	73	0	50%	50%	0	0	36	37	18	18	379	379	27	32
Saturday Daily	758	757	1515	0	48%	52%	0	0	758	757	30	30	27	27	0	0
Sat Midday PH	57	62	119	0	48%	52%	0	0	60	59	30	30	27	27	0	0

Assumed 49% pass-by rate for weekday AM and 50% pass-by rate for all others (LUC 934 - Fast-Food Restaurant with Drive Thru - Trip Generation Handbook, 2nd Edition).

Net Increase	Total Trips		Total Multi-Use Trips		Total New		Total Pass-by Trips		Total Primary Trips	
	In	Out	In	Out	Pass-by Trips	Primary Trips	In	Out	In	Out
Weekday Daily	728	728	0	0	340	388	170	170	194	194
Weekday AM Peak Hour	23	23	0	0	10	13	5	5	8	5
Weekday PM Peak Hour	63	63	0	0	32	31	16	16	15	16
Saturday Daily	873	873	0	0	420	453	210	210	227	226
Sat Midday Peak Hour	83	83	0	0	40	43	20	20	21	22

Site Generated Trip Assessment - EXISTING

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE)

Land Use Code (LUC) 880 - Pharmacy/Drugstore without Drive-Through Window

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 0.000

AVERAGE WEEKDAY DAILY

$$\ln(T) = 0.99 \ln(X) + 4.51$$

$$\ln(T) = 0.99 * \ln(0.00) + 4.51$$

$$\ln(T) = 0.00$$

$$T = \boxed{0} \text{ vehicle trips}$$

with 50% (0) entering trips & (0 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 3.20 * (X)$$

$$T = 3.20 * 0.00$$

$$T = \boxed{0} \text{ vehicle trips}$$

with 59% (0) entering trips & (0 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 8.42 * (X)$$

$$T = 8.42 * 0.00$$

$$T = \boxed{0} \text{ vehicle trips}$$

with 50% (0) entering trips & (0 vph) exiting.

SATURDAY DAILY

$$\frac{\text{ITE LUC 880 Weekday Daily Trip Rate}}{\text{ITE LUC 880 Weekday Evening Trip Rate}} = \frac{\text{ITE LUC 880 Saturday Daily Trip Rate}}{\text{ITE LUC 880 Saturday Midday Trip Rate}}$$

$$\frac{90.06}{8.42} = \frac{(Y)}{10.68} \quad Y = 114.2329$$

$$T = Y * 0.000$$

$$T = \boxed{0} \text{ vehicle trips}$$

with 50% (0 vph) entering and 50% (0 vph) exiting.

(same distribution split as ITE LUC 880 during the weekday daily)

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 10.68 * (X)$$

$$T = 10.68 * 0.00$$

$$T = \boxed{0} \text{ vehicle trips}$$

with 49% (0) entering trips & (0 vph) exiting.

Site Generated Trip Assessment - RE-OCCUPANCY

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE)

Land Use Code (LUC) 880 - Pharmacy/Drugstore without Drive-Through Window

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 6.200

AVERAGE WEEKDAY DAILY

$$\ln(T) = 0.99 \ln(X) + 4.51$$

$$\ln(T) = 0.99 * \ln(6.20) + 4.51$$

$$\ln(T) = 6.32$$

$$T = \boxed{554} \text{ vehicle trips}$$

with 50% (277) entering trips & (277 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 3.20 * (X)$$

$$T = 3.20 * 6.20$$

$$T = \boxed{20} \text{ vehicle trips}$$

with 59% (12) entering trips & (8 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 8.42 * (X)$$

$$T = 8.42 * 6.20$$

$$T = \boxed{52} \text{ vehicle trips}$$

with 50% (26) entering trips & (26 vph) exiting.

SATURDAY DAILY

$$\frac{\text{ITE LUC 880 Weekday Daily Trip Rate}}{\text{ITE LUC 880 Weekday Evening Trip Rate}} = \frac{\text{ITE LUC 880 Saturday Daily Trip Rate}}{\text{ITE LUC 880 Saturday Midday Trip Rate}}$$

$$\frac{90.06}{8.42} = \frac{(Y)}{10.68} \quad Y = 114.2329$$

$$T = Y * 6.200$$

$$T = \boxed{708} \text{ vehicle trips}$$

with 50% (354 vph) entering and 50% (354 vph) exiting.

(same distribution split as ITE LUC 880 during the weekday daily)

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 10.68 * (X)$$

$$T = 10.68 * 6.20$$

$$T = \boxed{66} \text{ vehicle trips}$$

with 49% (32) entering trips & (34 vph) exiting.

Site Generated Trip Assessment - EXISTING

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE) Land Use Code (LUC) 814 - Specialty Retail

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Leasable Area
Independent Variable (X): 8.135

AVERAGE WEEKDAY DAILY

$T = 44.32 * (X)$
 $T = 44.32 * 8.135$
 $T = \boxed{361}$ vehicle trips
with 50% (181 vpd) entering and 50% (180 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$\frac{\text{ITE LUC 820 Weekday Morning Trip Rate}}{\text{ITE LUC 820 Weekday Evening Trip Rate}} = \frac{\text{ITE LUC 814 Weekday Morning Trip Rate}}{\text{ITE LUC 814 Weekday Evening Trip Rate}}$

$$\frac{1.00}{3.73} = \frac{(Y)}{2.71} \quad Y = 0.7265416$$

$T = Y * 8.135$
 $T = \boxed{6}$ vehicle trips
with 61% (4 vph) entering and 39% (2 vph) exiting.
(same distribution split as ITE LUC 820 during the weekday morning peak hour of adjacent street traffic)

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 2.71 * (X)$
 $T = 2.71 * 8.135$
 $T = \boxed{22}$ vehicle trips
with 44% (10 vph) entering and 56% (12 vph) exiting.

SATURDAY DAILY

$T = 42.04 * (X)$
 $T = 42.04 * 8.135$
 $T = \boxed{342}$ vehicle trips
with 50% (171 vpd) entering and 50% (171 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR

$\frac{\text{ITE LUC 820 Saturday Midday Trip Rate}}{\text{ITE LUC 820 Saturday Daily Trip Rate}} = \frac{\text{ITE LUC 814 Saturday Midday Trip Rate}}{\text{ITE LUC 814 Saturday Daily Trip Rate}}$

$$\frac{4.89}{49.97} = \frac{(Y)}{42.04} \quad Y = 4.1139804$$

$T = Y * 8.135$
 $T = \boxed{33}$ vehicle trips
with 52% (17 vph) entering and 48% (16 vph) exiting.
(same distribution split as ITE LUC 820 during the Saturday midday peak hour of generator)

Site Generated Trip Assessment - RE-OCCUPANCY

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE) Land Use Code (LUC) 814 - Specialty Retail

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Leasable Area
Independent Variable (X): 12.065

AVERAGE WEEKDAY DAILY

$T = 44.32 * (X)$
 $T = 44.32 * 12.065$
 $T = 535$ vehicle trips
with 50% (268 vpd) entering and 50% (267 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$\frac{\text{ITE LUC 820 Weekday Morning Trip Rate}}{\text{ITE LUC 820 Weekday Evening Trip Rate}} = \frac{\text{ITE LUC 814 Weekday Morning Trip Rate}}{\text{ITE LUC 814 Weekday Evening Trip Rate}}$

$$\frac{1.00}{3.73} = \frac{(Y)}{2.71} \quad Y = 0.7265416$$

$T = Y * 12.065$
 $T = 9$ vehicle trips
with 61% (5 vph) entering and 39% (4 vph) exiting.
(same distribution split as ITE LUC 820 during the weekday morning peak hour of adjacent street traffic)

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 2.71 * (X)$
 $T = 2.71 * 12.065$
 $T = 33$ vehicle trips
with 44% (15 vph) entering and 56% (18 vph) exiting.

SATURDAY DAILY

$T = 42.04 * (X)$
 $T = 42.04 * 12.065$
 $T = 507$ vehicle trips
with 50% (254 vpd) entering and 50% (253 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR

$\frac{\text{ITE LUC 820 Saturday Midday Trip Rate}}{\text{ITE LUC 820 Saturday Daily Trip Rate}} = \frac{\text{ITE LUC 814 Saturday Midday Trip Rate}}{\text{ITE LUC 814 Saturday Daily Trip Rate}}$

$$\frac{4.89}{49.97} = \frac{(Y)}{42.04} \quad Y = 4.1139804$$

$T = Y * 12.065$
 $T = 50$ vehicle trips
with 52% (26 vph) entering and 48% (24 vph) exiting.
(same distribution split as ITE LUC 820 during the Saturday midday peak hour of generator)

Site Generated Trip Assessment - Existing

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE)

Land Use Code (LUC) 936 - Coffee/Donut Shop without Drive-Through Window

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 1.800

WEEKDAY DAILY

$$\frac{\text{ITE LUC 937 Weekday Daily Trip Rate}}{\text{ITE LUC 937 Weekday Morning Trip Rate}} = \frac{\text{ITE LUC 936 Weekday Daily Trip Rate}}{\text{ITE LUC 936 Weekday Morning Trip Rate}}$$

$$\frac{818.58}{110.75} = \frac{(Y)}{117.23} \quad Y = 866.47525$$

$$T = Y * 1.800$$
$$T = \boxed{1560} \text{ vehicle trips}$$

with 50% (780 vph) entering and 50% (780 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 117.23 * (X)$$
$$T = 117.23 * 1.800$$
$$T = \boxed{211} \text{ vehicle trips}$$

with 51% (108 vph) entering and 49% (103 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 40.75 * (X)$$
$$T = 40.75 * 1.80$$
$$T = \boxed{73} \text{ vehicle trips}$$

with 50% (37 vph) entering and 50% (36 vph) exiting.

SATURDAY DAILY

$$\frac{\text{ITE LUC 933 Saturday Daily Trip Rate}}{\text{ITE LUC 933 Saturday Midday Trip Rate}} = \frac{\text{ITE LUC 936 Saturday Daily Trip Rate}}{\text{ITE LUC 933 Saturday Midday Trip Rate}}$$

$$\frac{696.00}{54.55} = \frac{(Y)}{65.96} \quad Y = 841.57947$$

$$T = Y * 1.800$$
$$T = \boxed{1515} \text{ vehicle trips}$$

with 50% (758 vph) entering and 50% (757 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 65.96 * (X)$$
$$T = 65.96 * 1.800$$
$$T = \boxed{119} \text{ vehicle trips}$$

with 48% (57 vph) entering and 52% (62 vph) exiting.

Site Generated Trip Assessment - RE-OCCUPANCY

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE)

Land Use Code (LUC) 936 - Coffee/Donut Shop without Drive-Through Window

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 1.800

WEEKDAY DAILY

$$\frac{\text{ITE LUC 937 Weekday Daily Trip Rate}}{\text{ITE LUC 937 Weekday Morning Trip Rate}} = \frac{\text{ITE LUC 936 Weekday Daily Trip Rate}}{\text{ITE LUC 936 Weekday Morning Trip Rate}}$$

$$\frac{818.58}{110.75} = \frac{(Y)}{117.23} \quad Y = 866.47525$$

$$T = Y * 1.800$$
$$T = \boxed{1560} \text{ vehicle trips}$$

with 50% (780 vph) entering and 50% (780 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 117.23 * (X)$$
$$T = 117.23 * 1.800$$
$$T = \boxed{211} \text{ vehicle trips}$$

with 51% (108 vph) entering and 49% (103 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 40.75 * (X)$$
$$T = 40.75 * 1.80$$
$$T = \boxed{73} \text{ vehicle trips}$$

with 50% (37 vph) entering and 50% (36 vph) exiting.

SATURDAY DAILY

$$\frac{\text{ITE LUC 933 Saturday Daily Trip Rate}}{\text{ITE LUC 933 Saturday Midday Trip Rate}} = \frac{\text{ITE LUC 936 Saturday Daily Trip Rate}}{\text{ITE LUC 933 Saturday Midday Trip Rate}}$$

$$\frac{696.00}{54.55} = \frac{(Y)}{65.96} \quad Y = 841.57947$$

$$T = Y * 1.800$$
$$T = \boxed{1515} \text{ vehicle trips}$$

with 50% (758 vph) entering and 50% (757 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

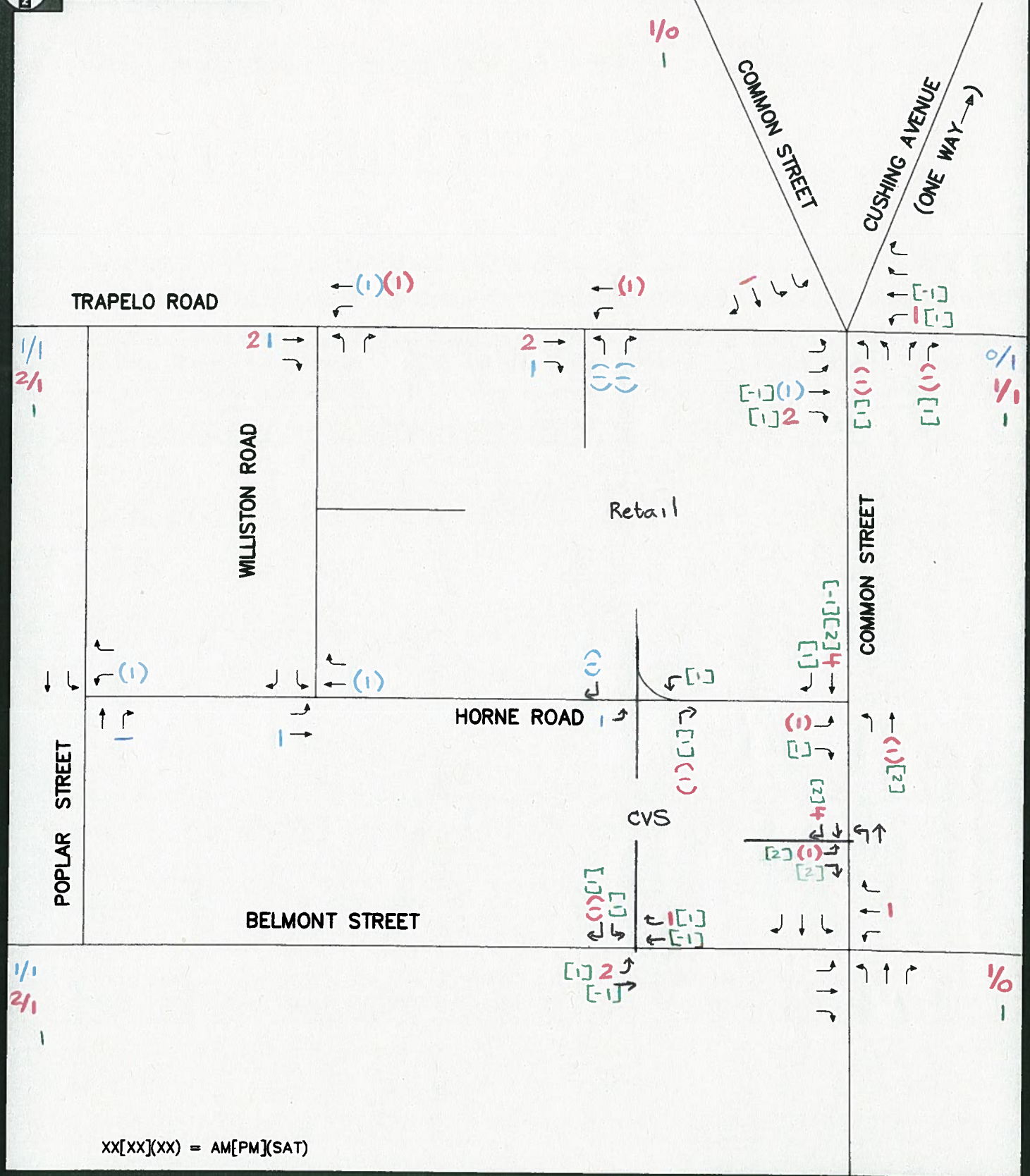
$$T = 65.96 * (X)$$
$$T = 65.96 * 1.800$$
$$T = \boxed{119} \text{ vehicle trips}$$

with 48% (57 vph) entering and 52% (62 vph) exiting.



Not to Scale

Cushing Village - Belmont, MA

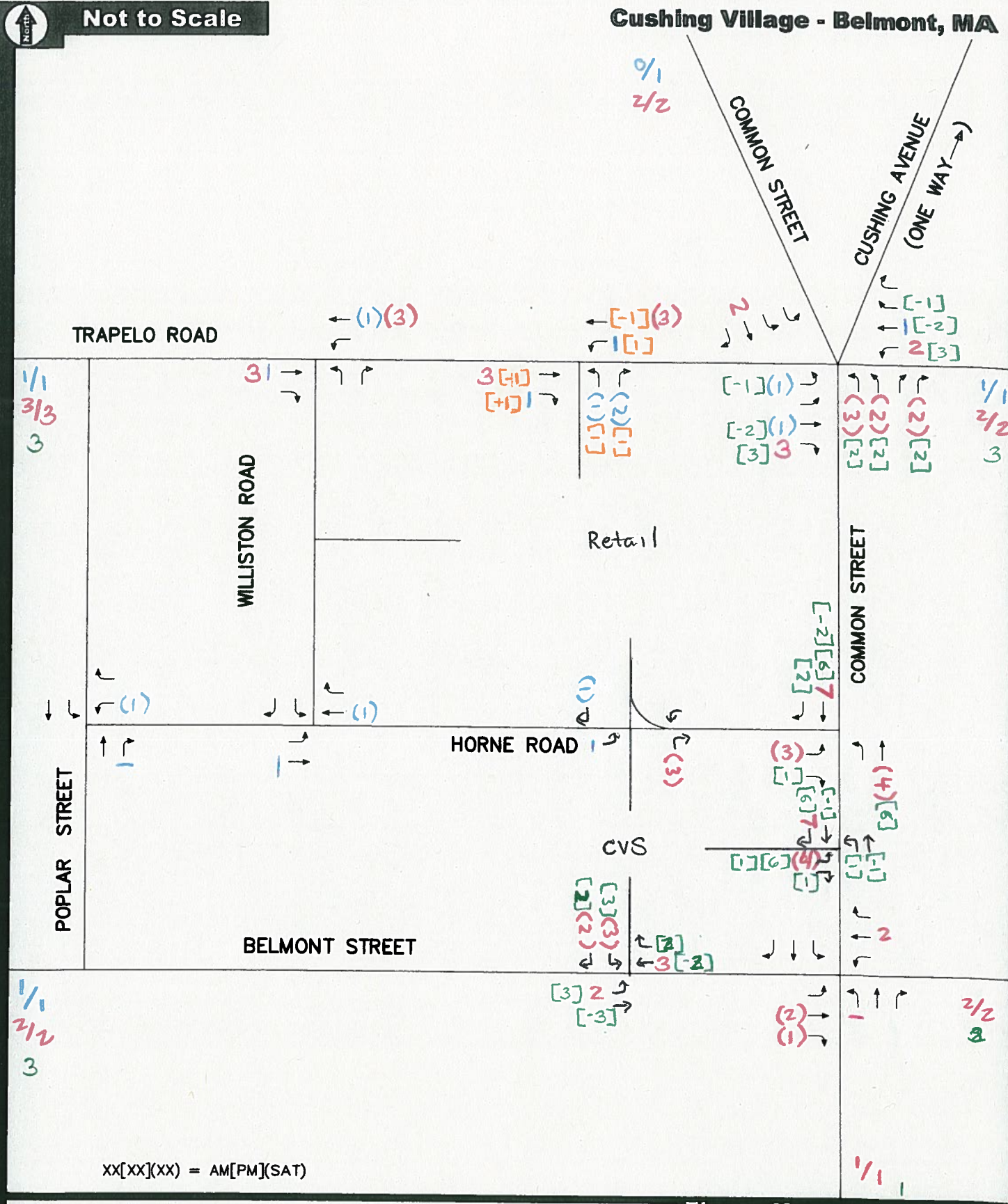


IN
OUT

	Retail		CVS	
	Primary	PB	Primary	Pass-by
IN	1	0	7	5
OUT	2	0	3	5
	3	0	10	10

Figure X

Re-Occupy Vacant Space
Weekday Morning,
Weekday Evening and
Saturday Midday
Peak Hour Traffic Volumes



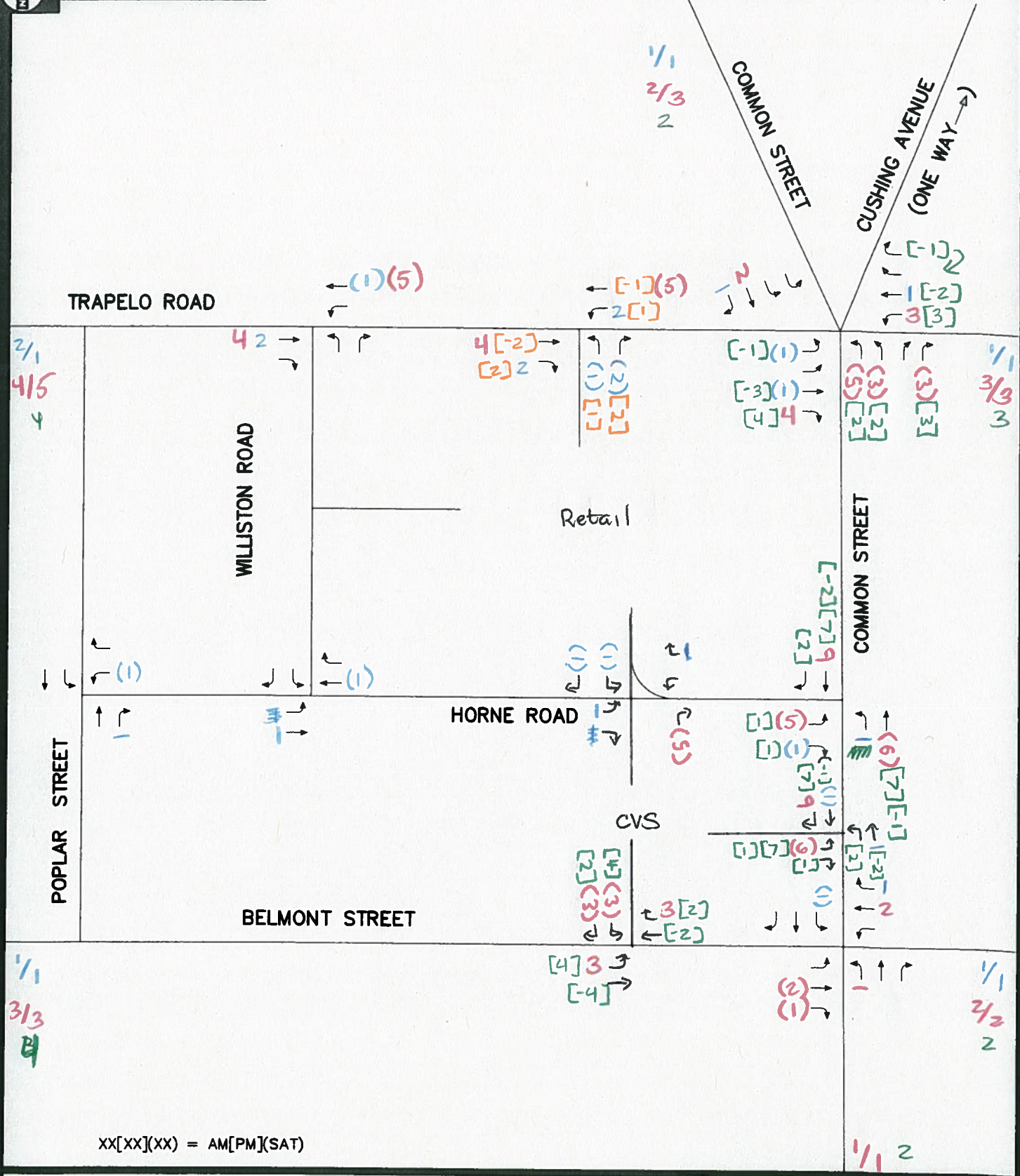
TEC, Inc.

	Retail		CVS	
	PR	PB	PR	PB
IN	3	2	12	14
OUT	4	2	12	14
	7	4	24	28



Not to Scale

Cushing Village - Belmont, MA



	Retail		CVS	
IN	PR	PB	PR	PB
	6	3	15	17
OUT	5	3	17	17
	11	6	32	34

Figure X

Re-Occupy Vacant Space
 Weekday Morning,
 Weekday Evening, and
 Saturday Midday
 Peak Hour Traffic Volumes

Appendix H

Site Trip Generation and Distribution

Trip Generation Assessment - Proposed Uses vs. Existing / Re-Occupied Uses

Project: Proposed Mixed Use Development - Belmont, Massachusetts
 Date: October 1, 2012
 Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
 Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Proposed Development

118 Unit Apartment (ITE LUC 220)

Units:		118 Units																			
				Total Trips		Total Trips		Total Trips		% Distribution		Multi-Use Trips		Total New Pass-by Trips		Total New Primary Trips		# Passby Trips		# Primary Trips	
				IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Weekday Daily				393	392	785		130	149	50%	50%	0	0	506		0	0	263	243		
Weekday AM PH				12	48	60		4	12	20%	80%	0	0	44		0	0	8	36		
Weekday PM PH				47	26	73		15	14	65%	35%	0	0	44		0	0	32	12		
Saturday Daily				377	377	754		124	143	50%	50%	0	0	487		0	0	253	234		
Sat Midday PH				31	30	61		11	10	50%	50%	0	0	40		0	0	20	20		

27,200 SF Shopping Center (ITE LUC 820)

Size:	27.2 KSF															
	Total Trips		Total Trips		Multi-Use Trips		% Distribution		Pass-by Trips		Total New Primary Trips		# Passby Trips		# Primary Trips	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Weekday Daily	1302	1302	2604		388	357	50%	50%	242	242	1375		6	6	672	703
Weekday AM PH	38	24	62		11	6	61%	39%	6	6	33		33	33	21	12
Weekday PM PH	118	121	239		18	24	49%	51%	33	33	131		372	372	67	64
Saturday Daily	1807	1806	3613		391	362	50%	50%	34	34	2116		1044	1044	105	1072
Sat Midday PH	171	158	329		32	36	52%	48%	34	34	193		34	34	105	88

Assumed 34% pass-by rate for weekday PM and 26% pass-by rate for all others (LUC 820 - Shopping Center - Trip Generation Handbook, 2nd Edition).

3,300 SF Health/Fitness Club (ITE LUC 492)

Size:	3.3 KSF															
	Total Trips		Total Trips		Multi-Use Trips		% Distribution		Pass-by Trips		Total New Primary Trips		# Passby Trips		# Primary Trips	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Weekday Daily	55	54	109		18	19	50%	50%	0	0	72		0	0	37	35
Weekday AM PH	2	3	5		0	0	45%	55%	0	0	5		0	0	2	3
Weekday PM PH	7	5	12		2	1	57%	43%	0	0	9		0	0	5	4
Saturday Daily	35	34	69		12	11	50%	50%	0	0	46		0	0	23	23
Sat Midday PH	4	5	9		1	1	45%	55%	0	0	7		0	0	3	4

Trip Generation Assessment - Proposed Uses vs. Existing / Re-Occupied Uses

Project: Proposed Mixed Use Development - Belmont, Massachusetts
 Date: October 1, 2012
 Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
 Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

5,000 SF Quality Restaurant (ITE LUC 931)

Size:	5 KSF	Total Trips		% Distribution		Multi-Use Trips		Total New Primary Trips	# Passby Trips		# Primary Trips	
		IN	OUT	IN	OUT	IN	OUT		IN	OUT	IN	OUT
Weekday Daily		225	225	50%	50%	77	80	165	64	64	84	81
Weekday AM PH		2	2	50%	50%	0	0	2	1	1	1	1
Weekday PM PH		25	12	67%	33%	7	3	15	6	6	12	3
Saturday Daily		220	219	50%	50%	72	74	165	64	64	84	81
Sat Midday PH		32	22	59%	41%	11	7	20	8	8	13	7

Assumed 44% passby rate (Trip Generation Handbook, 2nd Edition).

2,000 SF Starbucks (ITE LUC 936)

Size:	2 KSF	Total Trips		% Distribution		Multi-Use Trips		Total New Primary Trips	# Passby Trips		# Primary Trips	
		IN	OUT	IN	OUT	IN	OUT		IN	OUT	IN	OUT
Weekday Daily		867	866	50%	50%	266	274	597	298	298	303	294
Weekday AM PH		119	115	51%	49%	14	11	105	52	52	53	52
Weekday PM PH		41	41	50%	50%	10	10	30	16	16	15	15
Saturday Daily		842	841	50%	50%	247	256	590	295	295	300	290
Sat Midday PH		63	69	48%	52%	20	21	45	23	23	20	25

Assumed 49% pass-by rate for weekday AM and 50% pass-by rate for all others (LUC 934 - Fast-Food Restaurant with Drive Thru - Trip Generation Handbook, 2nd Edition).

Full Re-Occupied Uses

6,200 SF Pharmacy/Drugstore without Drive-Thru Window (ITE LUC 880)

Size:	6.2 KSF	Total Trips		% Distribution		Multi-Use Trips		Total New Primary Trips	# Passby Trips		# Primary Trips	
		IN	OUT	IN	OUT	IN	OUT		IN	OUT	IN	OUT
Weekday Daily		277	277	50%	50%	0	0	260	147	147	130	130
Weekday AM PH		12	8	59%	41%	0	0	10	5	5	7	3
Weekday PM PH		26	26	50%	50%	0	0	24	14	14	12	12
Saturday Daily		354	354	49%	51%	0	0	332	188	188	166	166
Sat Midday PH		32	34	49%	51%	0	0	32	17	17	15	17

Interpolated Saturday Daily from Weekday PM PH

Assumed 53% passby rate (Trip Generation Handbook, 2nd Edition).

Trip Generation Assessment - Proposed Uses vs. Existing / Re-Occupied Uses

Project: Proposed Mixed Use Development - Belmont, Massachusetts
 Date: October 1, 2012
 Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
 Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

12,065 SF Specialty Retail (ITE LUC 814)

Size:	12,065 KSF	Total Trips		% Distribution		Multi-Use Trips		Total New Pass-by Trips		Total New Primary Trips		# Passby Trips		# Primary Trips	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Weekday Daily		268	267	50%	50%	0	0	140	140	395	395	70	70	198	197
Weekday AM PH		5	4	61%	39%	0	0	2	2	7	7	1	1	4	3
Weekday PM PH		15	18	44%	56%	0	0	12	12	21	21	6	6	9	12
Saturday Daily		254	253	50%	50%	0	0	132	132	375	375	66	66	188	187
Sat Midday PH		26	24	52%	48%	0	0	14	14	36	36	7	7	19	17

Interpolated Weekday AM PH from Weekday AM PH LUC 820 - Shopping Center
 Assumed 34% pass-by rate for weekday PM and 26% pass-by rate for all others (LUC 820 - Shopping Center - Trip Generation Handbook, 2nd Edition).

1,800 SF Starbucks (ITE LUC 936)

Size:	1.8 KSF	Total Trips		% Distribution		Multi-Use Trips		Total New Pass-by Trips		Total New Primary Trips		# Passby Trips		# Primary Trips	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Weekday Daily		780	780	50%	50%	0	0	780	780	780	780	390	390	390	390
Weekday AM PH		108	103	51%	49%	0	0	104	104	107	107	52	52	56	51
Weekday PM PH		37	36	50%	50%	0	0	36	36	37	37	18	18	19	18
Saturday Daily		758	757	50%	50%	0	0	758	758	757	757	379	379	379	378
Sat Midday PH		57	62	48%	52%	0	0	60	60	59	59	30	30	27	32

Assumed 49% pass-by rate for weekday AM and 50% pass-by rate for all others (LUC 934 - Fast-Food Restaurant with Drive Through - Trip Generation Handbook, 2nd Edition).

Net Increase	Total Trips	Total Multi-Use Trips		Total New Pass-by Trips	Total New Primary Trips	Total Pass-by Trips		Total Primary Trips	
		In	Out			In	Out		
Weekday Daily	3032	879	879	-6	1280	-3	-3	641	639
Weekday AM Peak Hour	125	29	29	2	65	1	1	18	47
Weekday PM Peak Hour	285	52	52	34	147	17	17	91	56
Saturday Daily	3828	846	846	196	1940	98	98	971	969
Sat Midday Peak Hour	350	75	75	22	178	11	11	100	78

Trip Generation Assessment - Cushing Square Development

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Edition

Proposed Development

Size:	27,200 SF Shopping Center (ITE LUC 820)	27,200 SF		Potential Multi-Use Trips				Retail/Retail Trips		Remaining Trips	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
		1,302	1,302	365	391	304	282	998	1,020		
	Weekday Daily										
	Weekday AM PH	38	24	8	5	8	5	30	19		
	Weekday PM PH	38	24	8	5	8	5	30	19		
	Weekday PM PH	118	121	24	24	10	13	108	108		
	Saturday Daily	1,807	1,806	506	542	295	276	1512	1530		
	Sat Midday PH	171	158	53	46	25	29	146	129		
	Interpolated Saturday Daily from Weekday PM PH										
	Assumed 53% passby rate (Trip Generation Handbook, 2nd Edition).										

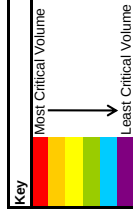
Size:		3,300 SF Health/Fitness Club (ITE LUC 492)									
3,300 SF		Total Trips		Potential Multi-Use Trips			Retail/Retail Trips		Remaining Trips		
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Weekday Daily		55	54	15	16	15	16	15	16	40	38
Weekday AM PH		2	3	0	1	0	0	0	0	2	3
Weekday PM PH		7	5	1	1	1	1	1	1	6	4
Saturday Daily		35	34	10	10	10	10	10	10	25	24
Sat Midday PH		4	5	1	1	1	1	1	1	3	4

Size:		5 (KSF)		5 (KSF)									
		Total Trips		Potential Multi-Use Trips		Retail-Retail Trips				Remaining Trips			
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT		
Weekday Daily		225	225	63	68	63	68	0	0	162	157		
Weekday AM PH		2	0	0	0	0	0	0	0	2	2		
Weekday PM PH		25	12	5	2	5	2	5	2	10	10		
Saturday Daily		220	219	62	66	62	66	66	66	158	153		
Sat Midday PH		32	22	10	6	10	6	6	6	22	16		

Assumed 44% passby rate (Trip Generation Handbook, 2nd Edition).

Size:		2 KSF									
2,000 SF Starbucks (ITE LUC 936)											
		Total Trips		Potential Multi-Use Trips				Retail-Retail Trips		Remaining Trips	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
	Weekday Daily	780	780	218		234		218		562	546
	Weekday AM PH	108	103	22	21	5		8	103	95	95
	Weekday PM PH	37	36	7	7	7		7	30	29	29
	Saturday Daily	758	757	212	227	212		227	546	530	530
	Sat. Sunday PH	57	62	18	18	18		18	39	44	44
Assumed 34% pass-by rate for weekday PM and 26% pass-by rate for all others (LUC 820 - Shopping Center - Trip Generation Handbook)											

Total 'Retail Uses'	Total Trips				Retail-Retail Trips		Remaining Trips	
	IN		OUT		IN		OUT	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Weekday Daily	2362	2361	600				1762	1761
Weekday AM PH	150	132	13	13			137	119
Weekday PM PH	187	174	23	23			164	151
Saturday Daily	2820	2816	579				2241	2237
Sat Midday PH	264	247	54	54			210	193



Maximum Shared Retail to Retail					931936
Development Type		820	492		
Weekday Daily	IN	365	15	281	
	OUT	391	16	302	
	Total	756	31	583	
Weekday Morning	IN	8	0	22	
	OUT	5	1	21	
	Total	13	1	43	
Weekday Evening	IN	24	1	12	
	OUT	24	1	9	
	Total	48	2	21	
Saturday Daily	IN	506	10	274	
	OUT	542	18	283	
	Total	1,048	20	567	
Saturday Midday	IN	53	1	28	
	OUT	46	1	24	
	Total	99	2	52	

From		To			
From	820	492	931/936	Total	
	820	0	8	274	282
	492	9	0	7	16
	931/936	295	7	0	302
Total	304	15	281	600	

Weekday Morning					
	To				
	From	820	492	931/936	Total
	820	0	0	5	5
	492	0	0	0	0
	931/936	8	0	0	8
	Total	8	0	5	13

Weekday Evening		To			
From	820	492	931/936	Total	
820	0	1	12	13	
492	1	0	0	1	
931/936	9	0	0	9	
Total	10	1	12	23	

Saturday Daily		To			
From	820	492	931936	Total	
820	0	6	270	276	
492	6	0	4	10	
931936	289	4	0	293	
Total	295	10	274	579	

Saturday: Midday		To		
From	820	492	931/936	Total
820	0	1	28	29
492	1	0	0	1
931/936	24	0	0	24
Total	25	1	28	54

Site Generated Trip Assessment - PROPOSED

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE) Land Use Code (LUC) 220 - Apartment

Average Vehicle Trips vs: Dwelling Units
Independent Variable (X): 118

AVERAGE WEEKDAY DAILY

$T = 6.65 * (X)$
 $T = 6.65 * 118$
 $T = \boxed{785}$ vehicle trips
with 50% (393 vpd) entering and 50% (392 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 0.51 * (X)$
 $T = 0.51 * 118$
 $T = \boxed{60}$ vehicle trips
with 20% (12 vph) entering and 80% (48 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 0.62 * (X)$
 $T = 0.62 * 118$
 $T = \boxed{73}$ vehicle trips
with 65% (47 vph) entering and 35% (26 vph) exiting.

SATURDAY DAILY

$T = 6.39 * (X)$
 $T = 6.39 * 118$
 $T = \boxed{754}$ vehicle trips
with 50% (377 vpd) entering and 50% (377 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$T = 0.52 * (X)$
 $T = 0.52 * 118$
 $T = \boxed{61}$ vehicle trips
with 50% (31 vph) entering and 50% (30 vph) exiting.

Site Generated Trip Assessment - RE-OCCUPIED

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE)

Land Use Code (LUC) 880 - Pharmacy/Drugstore without Drive-Through Window

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 6.200

AVERAGE WEEKDAY DAILY

$$\ln(T) = 0.99 \ln(X) + 4.51$$

$$\ln(T) = 0.99 * \ln(6.20) + 4.51$$

$$\ln(T) = 6.32$$

$$T = \boxed{554} \text{ vehicle trips}$$

with 50% (277) entering trips & (277 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 3.20 * (X)$$

$$T = 3.20 * 6.20$$

$$T = \boxed{20} \text{ vehicle trips}$$

with 59% (12) entering trips & (8 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 8.42 * (X)$$

$$T = 8.42 * 6.20$$

$$T = \boxed{52} \text{ vehicle trips}$$

with 50% (26) entering trips & (26 vph) exiting.

SATURDAY DAILY

$$\frac{\text{ITE LUC 880 Weekday Daily Trip Rate}}{\text{ITE LUC 880 Weekday Evening Trip Rate}} = \frac{\text{ITE LUC 880 Saturday Daily Trip Rate}}{\text{ITE LUC 880 Saturday Midday Trip Rate}}$$

$$\frac{90.06}{8.42} = \frac{(Y)}{10.68} \quad Y = 114.2329$$

$$T = Y * 6.200$$

$$T = \boxed{708} \text{ vehicle trips}$$

with 50% (354 vph) entering and 50% (354 vph) exiting.

(same distribution split as ITE LUC 880 during the weekday daily)

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 10.68 * (X)$$

$$T = 10.68 * 6.20$$

$$T = \boxed{66} \text{ vehicle trips}$$

with 49% (32) entering trips & (34 vph) exiting.

Site Generated Trip Assessment - PROPOSED

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE) Land Use Code (LUC) 492 - Health/Fitness Club

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 3.300

AVERAGE WEEKDAY DAILY

$$T = 32.93 * (X)$$
$$T = 32.93 * 3.300$$
$$T = \boxed{109} \text{ vehicle trips}$$

with 50% (55 vpd) entering and 50% 54 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 1.38 * (X)$$
$$T = 1.38 * 3.300$$
$$T = \boxed{5} \text{ vehicle trips}$$

with 45% (2 vph) entering and 55% 3 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 3.53 * (X)$$
$$T = 3.53 * 3.30$$
$$T = \boxed{12} \text{ vehicle trips}$$

with 57% (7 vph) entering and 43% 5 vph) exiting.

SATURDAY DAILY

$$T = 20.87 * (X)$$
$$T = 20.87 * 3.30$$
$$T = \boxed{69} \text{ vehicle trips}$$

with 50% (35 vpd) entering and 50% 34 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 2.87 * (X)$$
$$T = 2.87 * 3.300$$
$$T = \boxed{9} \text{ vehicle trips}$$

with 45% (4 vph) entering and 55% 5 vph) exiting.

Site Generated Trip Assessment - PROPOSED

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE) Land Use Code (LUC) 931 - Quality Restaurant

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 5.000

AVERAGE WEEKDAY DAILY

$$T = 89.95 * (X)$$
$$T = 89.95 * 5.000$$
$$T = \boxed{450} \text{ vehicle trips}$$

with 50% (225 vpd) entering and 50% 225 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.81 * (X)$$
$$T = 0.81 * 5.000$$
$$T = \boxed{4} \text{ vehicle trips}$$

with 50% (2 vph) entering and 50% 2 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 7.49 * (X)$$
$$T = 7.49 * 5.00$$
$$T = \boxed{37} \text{ vehicle trips}$$

with 67% (25 vph) entering and 33% 12 vph) exiting.

SATURDAY DAILY

$$\ln(T) = 1.04 \ln(X) + 4.41$$
$$\ln(T) = 1.04 * \ln(5.00) + 4.41$$
$$\ln(T) = 6.08$$
$$T = \boxed{439} \text{ vehicle trips}$$

with 50% (220 vpd) entering and 50% 219 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 10.82 * (X)$$
$$T = 10.82 * 5.000$$
$$T = \boxed{54} \text{ vehicle trips}$$

with 59% (32 vph) entering and 41% 22 vph) exiting.

Site Generated Trip Assessment - RE-OCCUPIED

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE) Land Use Code (LUC) 814 - Specialty Retail

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Leasable Area
Independent Variable (X): 12.065

AVERAGE WEEKDAY DAILY

$T = 44.32 * (X)$
 $T = 44.32 * 12.065$
 $T = \boxed{535}$ vehicle trips
with 50% (268 vpd) entering and 50% (267 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$\frac{\text{ITE LUC 820 Weekday Morning Trip Rate}}{\text{ITE LUC 820 Weekday Evening Trip Rate}} = \frac{\text{ITE LUC 814 Weekday Morning Trip Rate}}{\text{ITE LUC 814 Weekday Evening Trip Rate}}$

$$\frac{1.00}{3.73} = \frac{(Y)}{2.71} \quad Y = 0.7265416$$

$T = Y * 12.065$
 $T = \boxed{9}$ vehicle trips
with 61% (5 vph) entering and 39% (4 vph) exiting.
(same distribution split as ITE LUC 820 during the weekday morning peak hour of adjacent street traffic)

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 2.71 * (X)$
 $T = 2.71 * 12.065$
 $T = \boxed{33}$ vehicle trips
with 44% (15 vph) entering and 56% (18 vph) exiting.

SATURDAY DAILY

$T = 42.04 * (X)$
 $T = 42.04 * 12.065$
 $T = \boxed{507}$ vehicle trips
with 50% (254 vpd) entering and 50% (253 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR

$\frac{\text{ITE LUC 820 Saturday Midday Trip Rate}}{\text{ITE LUC 820 Saturday Daily Trip Rate}} = \frac{\text{ITE LUC 814 Saturday Midday Trip Rate}}{\text{ITE LUC 814 Saturday Daily Trip Rate}}$

$$\frac{4.89}{49.97} = \frac{(Y)}{42.04} \quad Y = 4.1139804$$

$T = Y * 12.065$
 $T = \boxed{50}$ vehicle trips
with 52% (26 vph) entering and 48% (24 vph) exiting.
(same distribution split as ITE LUC 820 during the Saturday midday peak hour of generator)

Site Generated Trip Assessment - PROPOSED

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE) ITE Land Use Code (LUC) 820 - Shopping Center

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): **37.5** **27.2**

AVERAGE WEEKDAY DAILY

$$\ln T = 0.65 * \ln(X) + 5.83$$

$$\ln T = 0.65 * \ln(37.500) + 5.83$$

$$\ln T = 8.19$$

T = **3,590** vehicle trips **2604**
with 50% (1,795 vpd) entering and 50% (1,795 vpd) exiting.
1,302 **1,302**

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.59 * \ln(X) + 2.32$$

$$\ln T = 0.59 * \ln(37.500) + 2.32$$

$$\ln T = 4.46$$

T = **86** vehicle trips **62**
with 61% (52 vph) entering and 39% (34 vph) exiting.
38 **24**

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.67 * \ln(X) + 3.37$$

$$\ln T = 0.67 * \ln(37.50) + 3.37$$

$$\ln T = 5.80$$

T = **330** vehicle trips **239**
with 49% (162 vph) entering and 51% (168 vph) exiting.
118 **121**

SATURDAY DAILY

$$\ln T = 0.63 * \ln(X) + 6.23$$

$$\ln T = 0.63 * \ln(37.50) + 6.23$$

$$\ln T = 8.51$$

T = **4,981** vehicle trips **3613**
with 50% (2,491 vpd) entering and 50% (2,490 vpd) exiting.
1,807 **1,806**

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$\ln T = 0.65 * \ln(X) + 3.76$$

$$\ln T = 0.65 * \ln(37.500) + 3.76$$

$$\ln T = 6.12$$

T = **453** vehicle trips **329**
with 52% (236 vph) entering and 48% (217 vph) exiting.
171 **158**

Site Generated Trip Assessment - RE-OCCUPIED

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE)

Land Use Code (LUC) 936 - Coffee/Donut Shop without Drive-Through Window

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 1.800

WEEKDAY DAILY

$$\frac{\text{ITE LUC 937 Weekday Daily Trip Rate}}{\text{ITE LUC 937 Weekday Morning Trip Rate}} = \frac{\text{ITE LUC 936 Weekday Daily Trip Rate}}{\text{ITE LUC 936 Weekday Morning Trip Rate}}$$

$$\frac{818.58}{110.75} = \frac{(Y)}{117.23} \quad Y = 866.47525$$

$$T = Y * 1.800$$
$$T = \boxed{1560} \text{ vehicle trips}$$

with 50% (780 vph) entering and 50% (780 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 117.23 * (X)$$
$$T = 117.23 * 1.800$$
$$T = \boxed{211} \text{ vehicle trips}$$

with 51% (108 vph) entering and 49% (103 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 40.75 * (X)$$
$$T = 40.75 * 1.80$$
$$T = \boxed{73} \text{ vehicle trips}$$

with 50% (37 vph) entering and 50% (36 vph) exiting.

SATURDAY DAILY

$$\frac{\text{ITE LUC 933 Saturday Daily Trip Rate}}{\text{ITE LUC 933 Saturday Midday Trip Rate}} = \frac{\text{ITE LUC 936 Saturday Daily Trip Rate}}{\text{ITE LUC 933 Saturday Midday Trip Rate}}$$

$$\frac{696.00}{54.55} = \frac{(Y)}{65.96} \quad Y = 841.57947$$

$$T = Y * 1.800$$
$$T = \boxed{1515} \text{ vehicle trips}$$

with 50% (758 vph) entering and 50% (757 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 65.96 * (X)$$
$$T = 65.96 * 1.800$$
$$T = \boxed{119} \text{ vehicle trips}$$

with 48% (57 vph) entering and 52% (62 vph) exiting.

Site Generated Trip Assessment - PROPOSED

Project: Proposed Mixed Use Development - Belmont, Massachusetts
Date: October 1, 2012
Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
Source: Institute of Transportation Engineers - Trip Generation - 8th Ed.

Institute of Transportation Engineers (ITE)

Land Use Code (LUC) 936 - Coffee/Donut Shop without Drive-Through Window

Average Vehicle Trips vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 2.000

WEEKDAY DAILY

$$\frac{\text{ITE LUC 937 Weekday Daily Trip Rate}}{\text{ITE LUC 937 Weekday Morning Trip Rate}} = \frac{\text{ITE LUC 936 Weekday Daily Trip Rate}}{\text{ITE LUC 936 Weekday Morning Trip Rate}}$$

$$\frac{818.58}{110.75} = \frac{(Y)}{117.23} \quad Y = 866.47525$$

$$T = Y * 2.000$$
$$T = \boxed{1733} \text{ vehicle trips}$$

with 50% (867 vph) entering and 50% (866 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 117.23 * (X)$$
$$T = 117.23 * 2.000$$
$$T = \boxed{234} \text{ vehicle trips}$$

with 51% (119 vph) entering and 49% (115 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 40.75 * (X)$$
$$T = 40.75 * 2.00$$
$$T = \boxed{82} \text{ vehicle trips}$$

with 50% (41 vph) entering and 50% (41 vph) exiting.

SATURDAY DAILY

$$\frac{\text{ITE LUC 933 Saturday Daily Trip Rate}}{\text{ITE LUC 933 Saturday Midday Trip Rate}} = \frac{\text{ITE LUC 936 Saturday Daily Trip Rate}}{\text{ITE LUC 933 Saturday Midday Trip Rate}}$$

$$\frac{696.00}{54.55} = \frac{(Y)}{65.96} \quad Y = 841.57947$$

$$T = Y * 2.000$$
$$T = \boxed{1683} \text{ vehicle trips}$$

with 50% (842 vph) entering and 50% (841 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

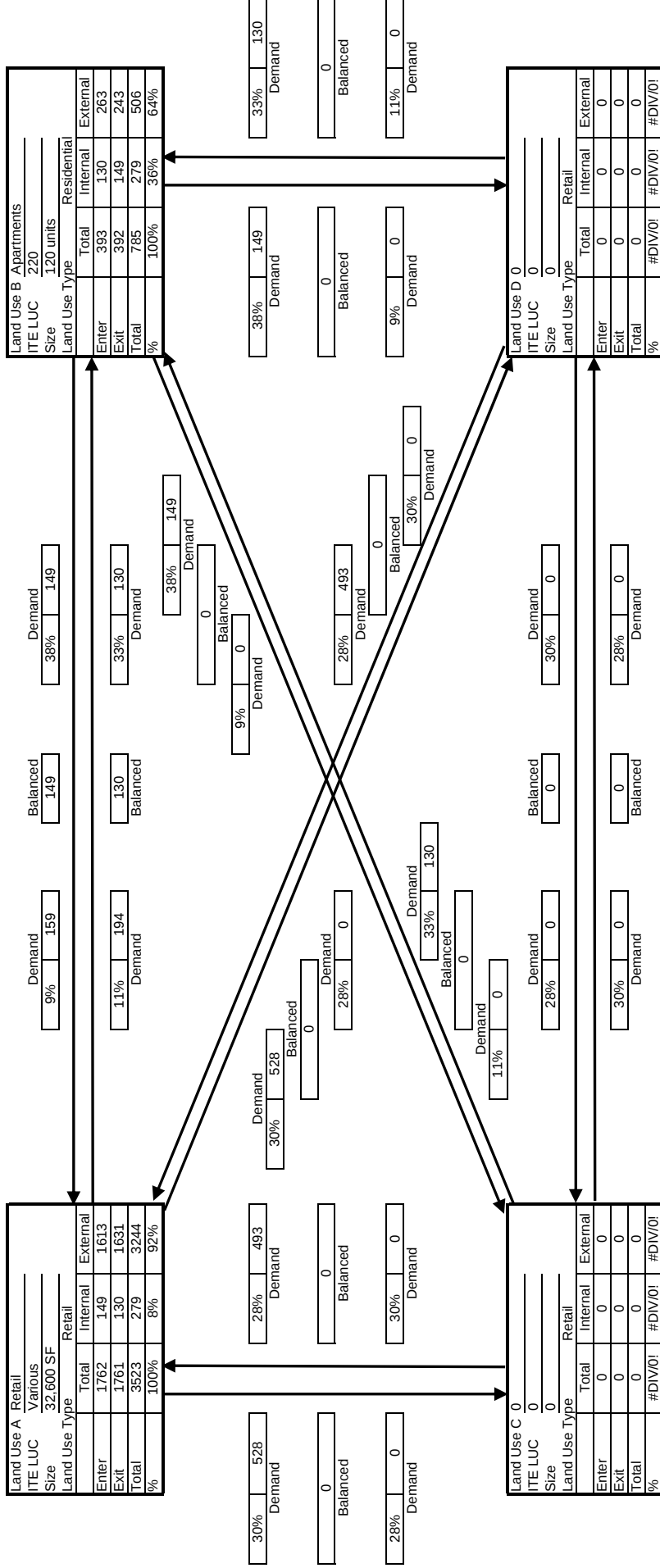
$$T = 65.96 * (X)$$
$$T = 65.96 * 2.000$$
$$T = \boxed{132} \text{ vehicle trips}$$

with 48% (63 vph) entering and 52% (69 vph) exiting.

Multi-Use Trip Generation Calculation

Analyst: TEC, Inc. / Samuel W. G
Date: 10/1/2012

Project Name: Cushing Village
Time Period: Weekday Daily

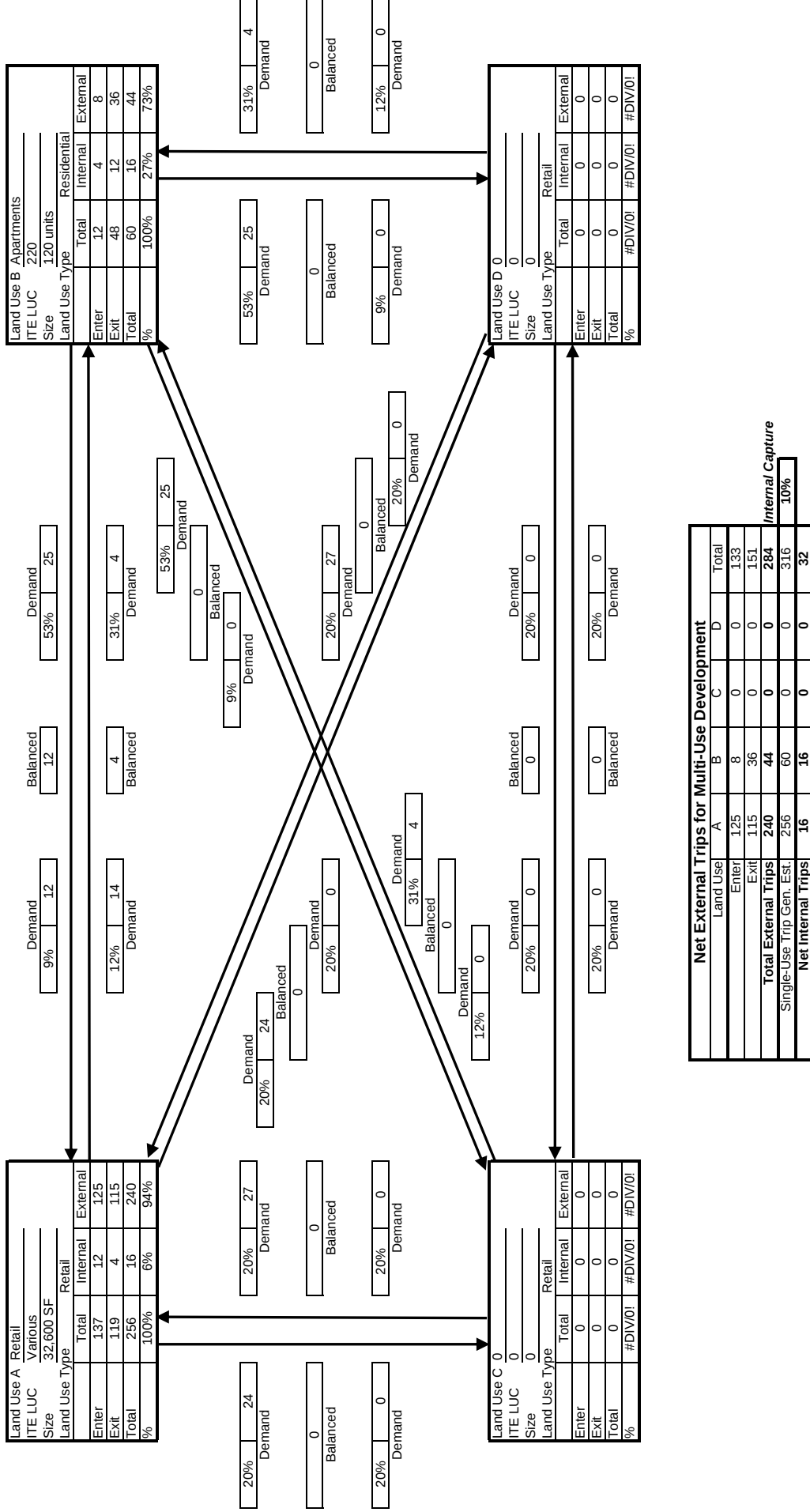


Net External Trips for Multi-Use Development					
Land Use	A	B	C	D	Total
Enter	1613	263	0	0	1876
Exit	1631	243	0	0	1874
Total External Trips	3244	506	0	0	3750
Single-Use Trip Gen. Est.	3523	785	0	0	4308
Net Internal Trips	279	279	0	0	558

Multi-Use Trip Generation Calculation

Analyst: TEC, Inc. / Samuel W. G
Date: 10/1/2012

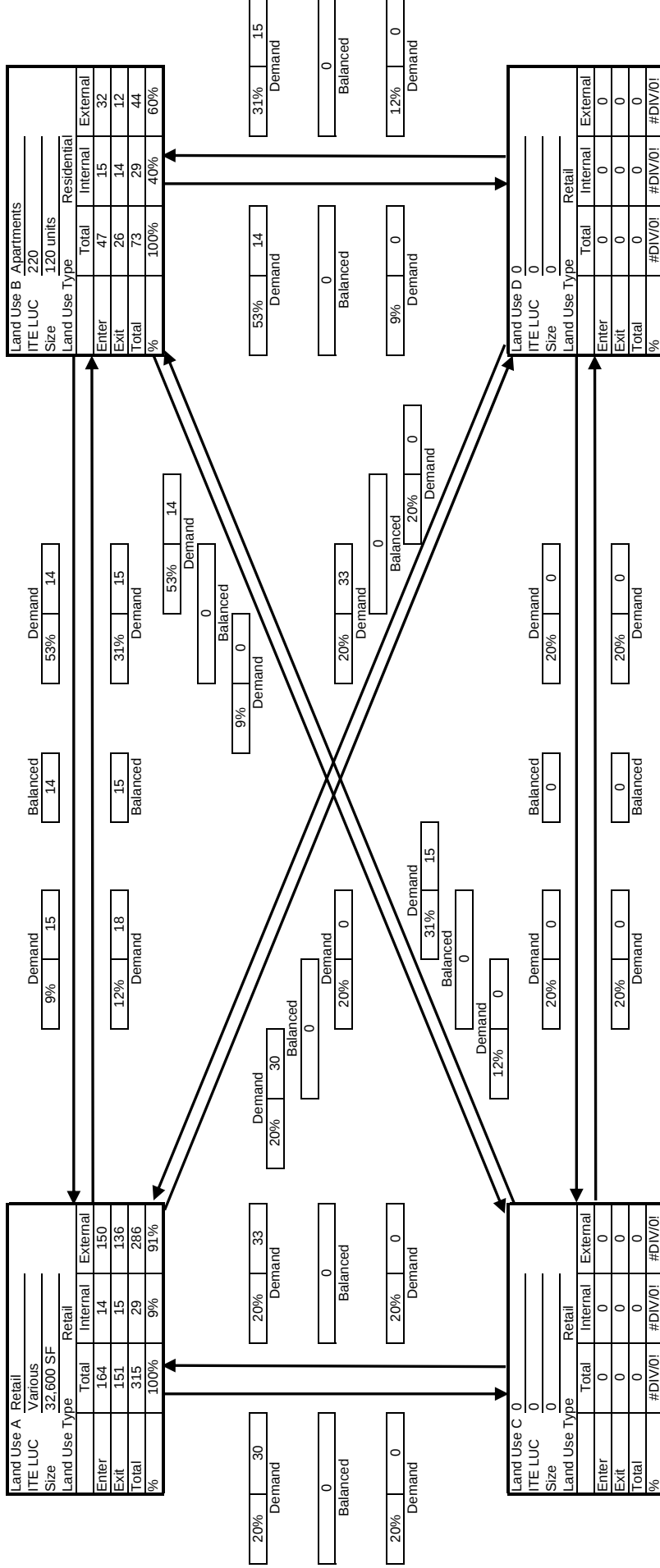
Project Name: Cushing Village
Time Period: Weekday AM Peak Hour



Multi-Use Trip Generation Calculation

Analyst: TEC, Inc. / Samuel W. G
Date: 10/1/2012

Project Name: Cushing Village
Time Period: Weekday PM Peak Hour

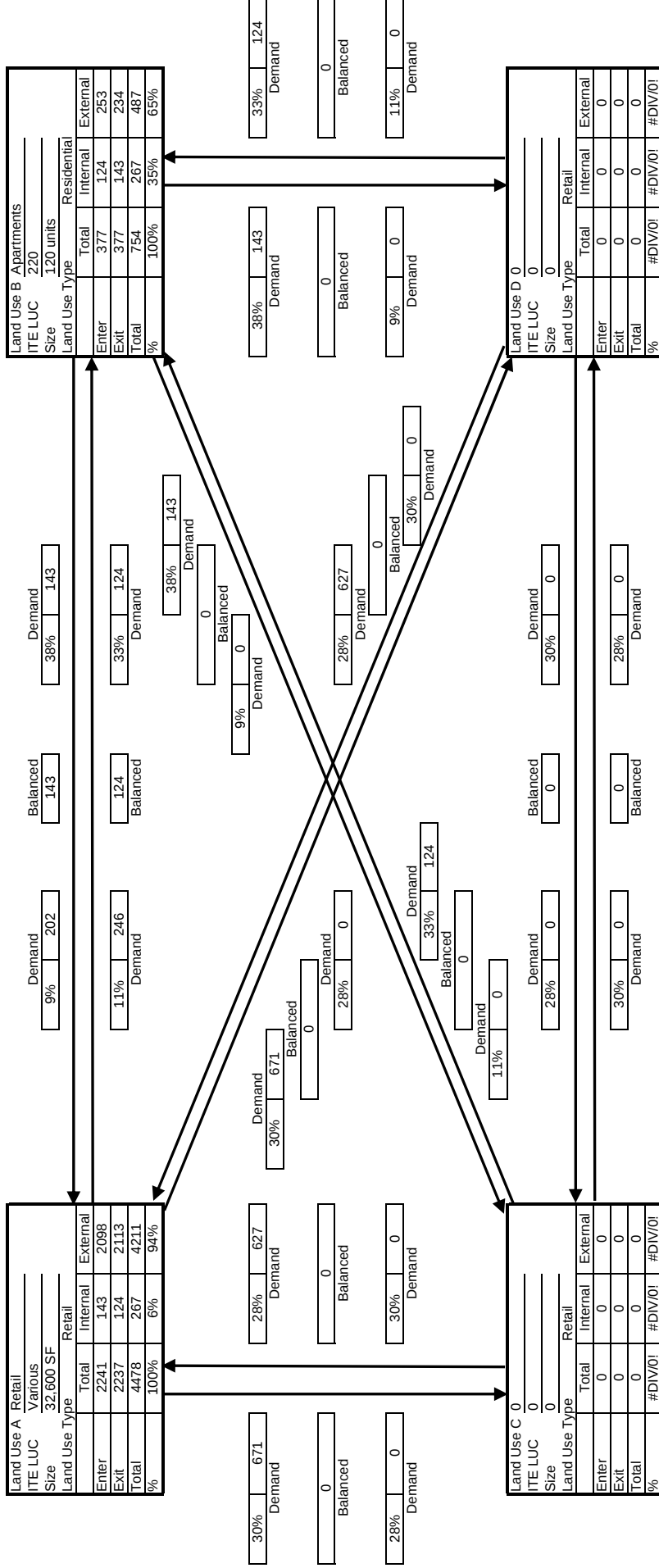


Net External Trips for Multi-Use Development					
Land Use	A	B	C	D	Total
Enter	150	32	0	0	182
Exit	136	12	0	0	148
Total External Trips	286	44	0	0	330
Single-Use Trip Gen. Est.	315	73	0	0	388
Net Internal Trips	29	29	0	0	58

Multi-Use Trip Generation Calculation

Analyst: TEC, Inc. / Samuel W. G
Date: 10/1/2012

Project Name: Cushing Village
Time Period: Saturday Daily

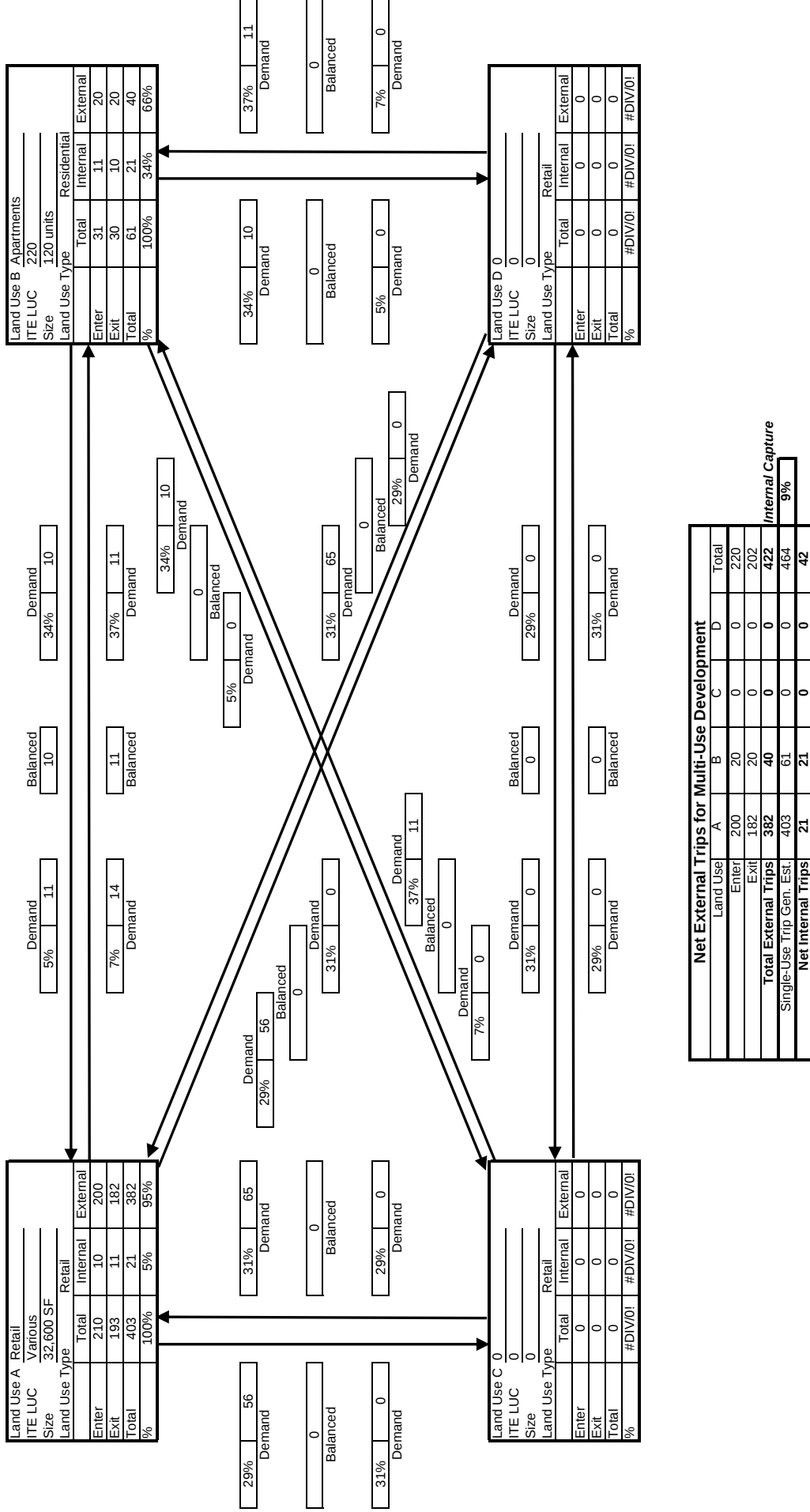


Net External Trips for Multi-Use Development					
Land Use	A	B	C	D	Total
Enter	2098	253	0	0	2351
Exit	2113	234	0	0	2347
Total External Trips	4211	487	0	0	4698
Single-Use Trip Gen. Est.	4478	754	0	0	5232
Net Internal Trips	267	267	0	0	534

Multi-Use Trip Generation Calculation

Analyst: TEC, Inc. / Samuel W. G
Date: 10/1/2012

Project Name: Cushing Village
Time Period: Saturday Midday



Appendix I

Redistributed Trips Calculations

T: \\T0376.01\\CAD\\Civil\\Graphics\\Updated TIAS - October 2012\\T0376.01_TrafficNetworks.dwg 10/1/2012 10:58:50 AM EDT



Not to Scale

Cushing Village Redevelopment - Belmont, Massachusetts

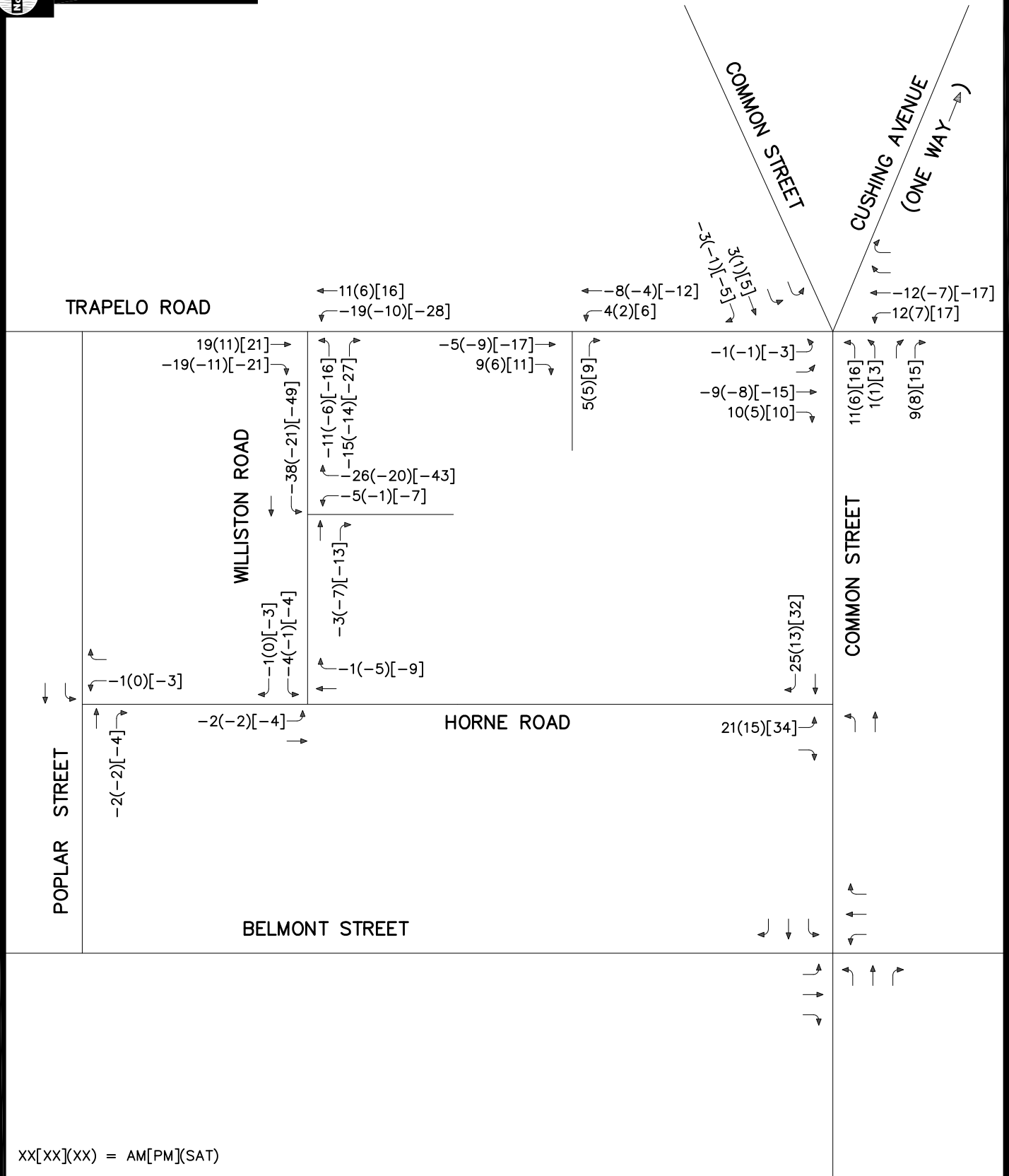


Figure I-1



TEC, Inc.

Municipal Lot Closure Redistribution
Weekday Morning,
Weekday Evening, and
Saturday Midday
Peak Hour Traffic Volumes



Not to Scale

Cushing Village Redevelopment - Belmont, Massachusetts

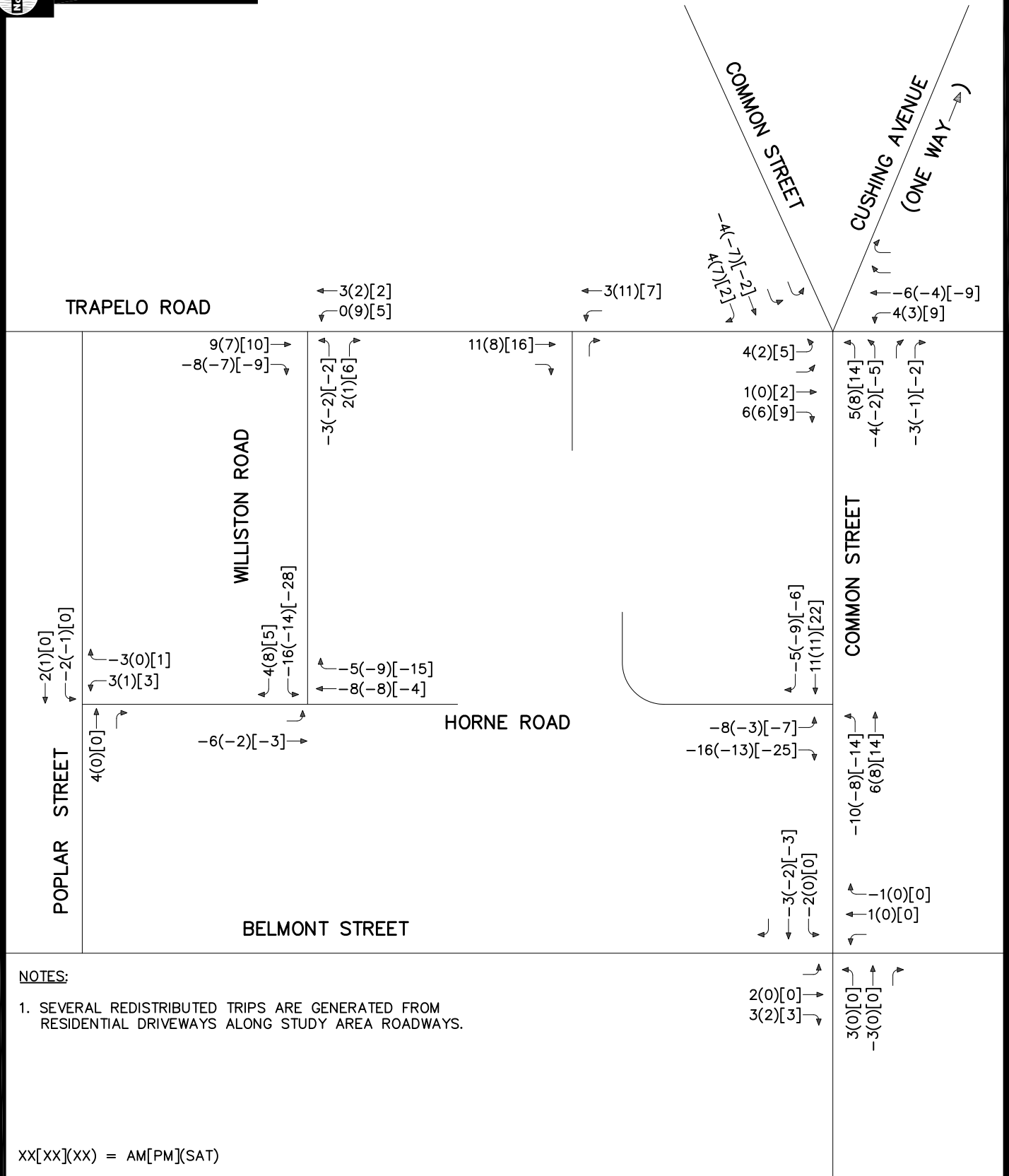


Figure I-2

Horne Road Closure Redistribution
Weekday Morning,
Weekday Evening, and
Saturday Midday
Peak Hour Traffic Volumes



T: \\T0376.01\\CAD\\Civil\\Graphics\\Updated TIAS - October 2012\\T0376.01_TrafficNetworks.dwg 10/1/2012 10:58:50 AM EDT



Not to Scale

Cushing Village Redevelopment - Belmont, Massachusetts

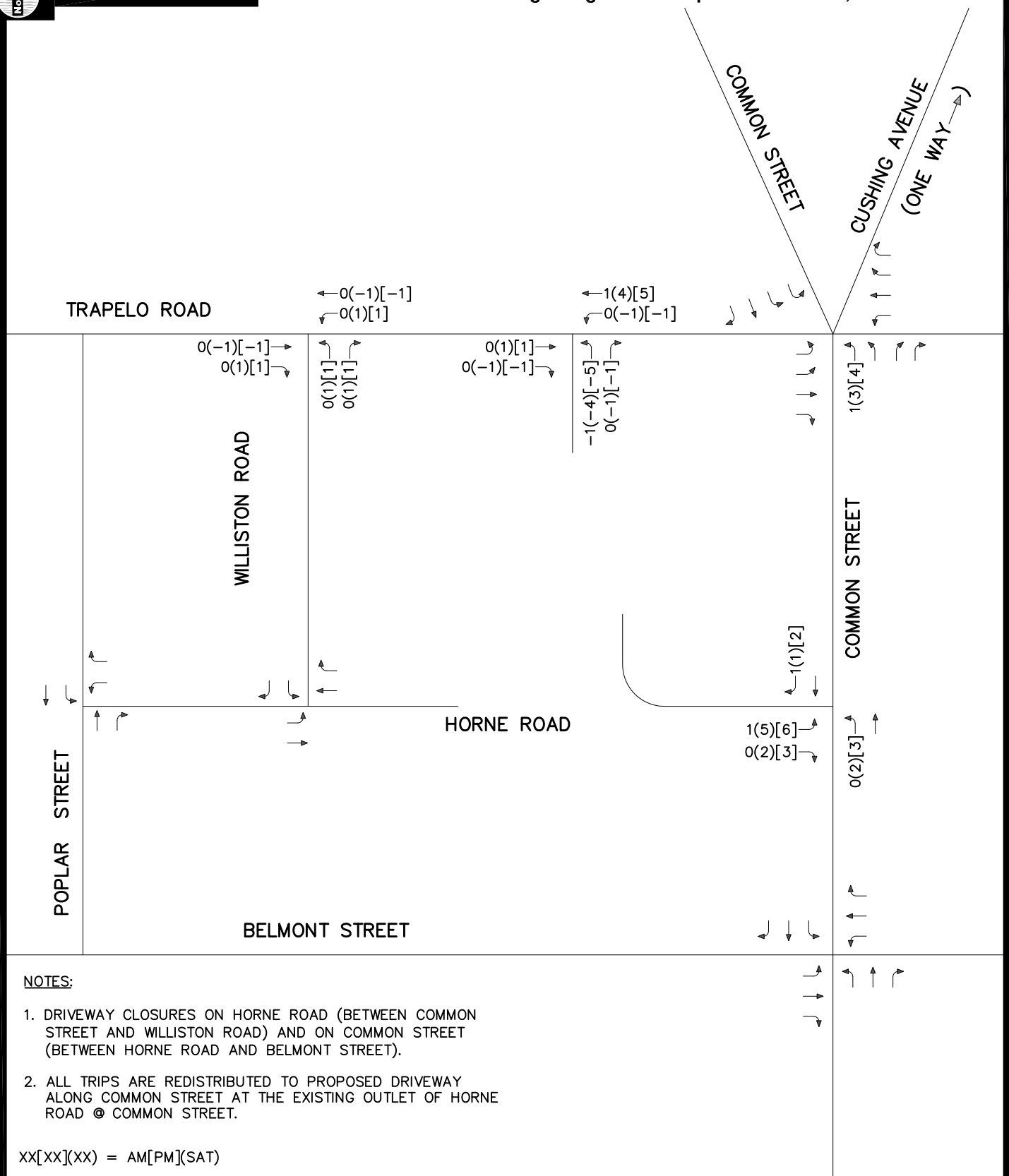


Figure I-3

Existing Retail Trip Redistribution
Weekday Morning,
Weekday Evening, and
Saturday Midday
Peak Hour Traffic Volumes

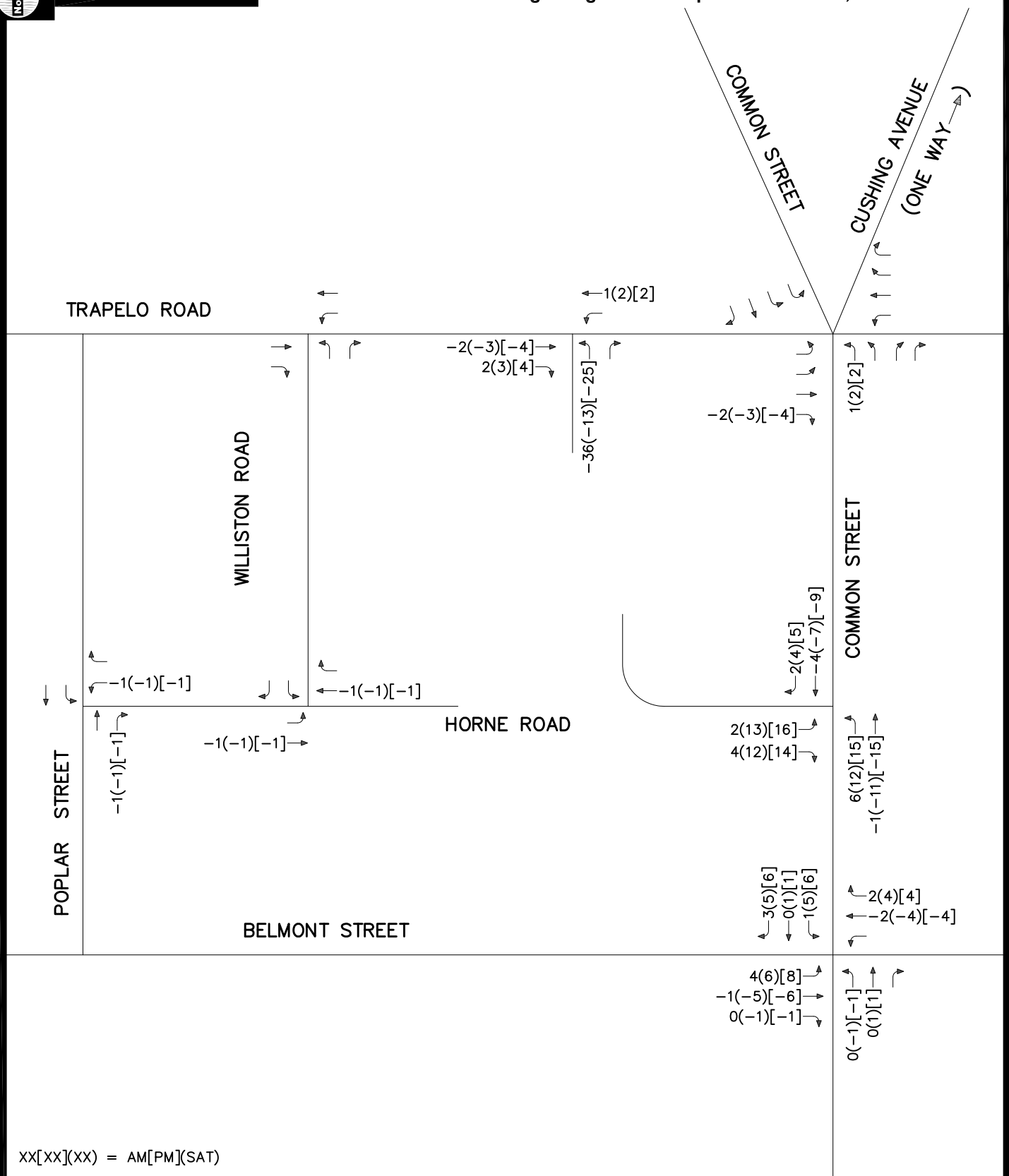


TEC, Inc.



Not to Scale

Cushing Village Redevelopment - Belmont, Massachusetts



XXXX = AM[PM](SAT)



TEC, Inc.

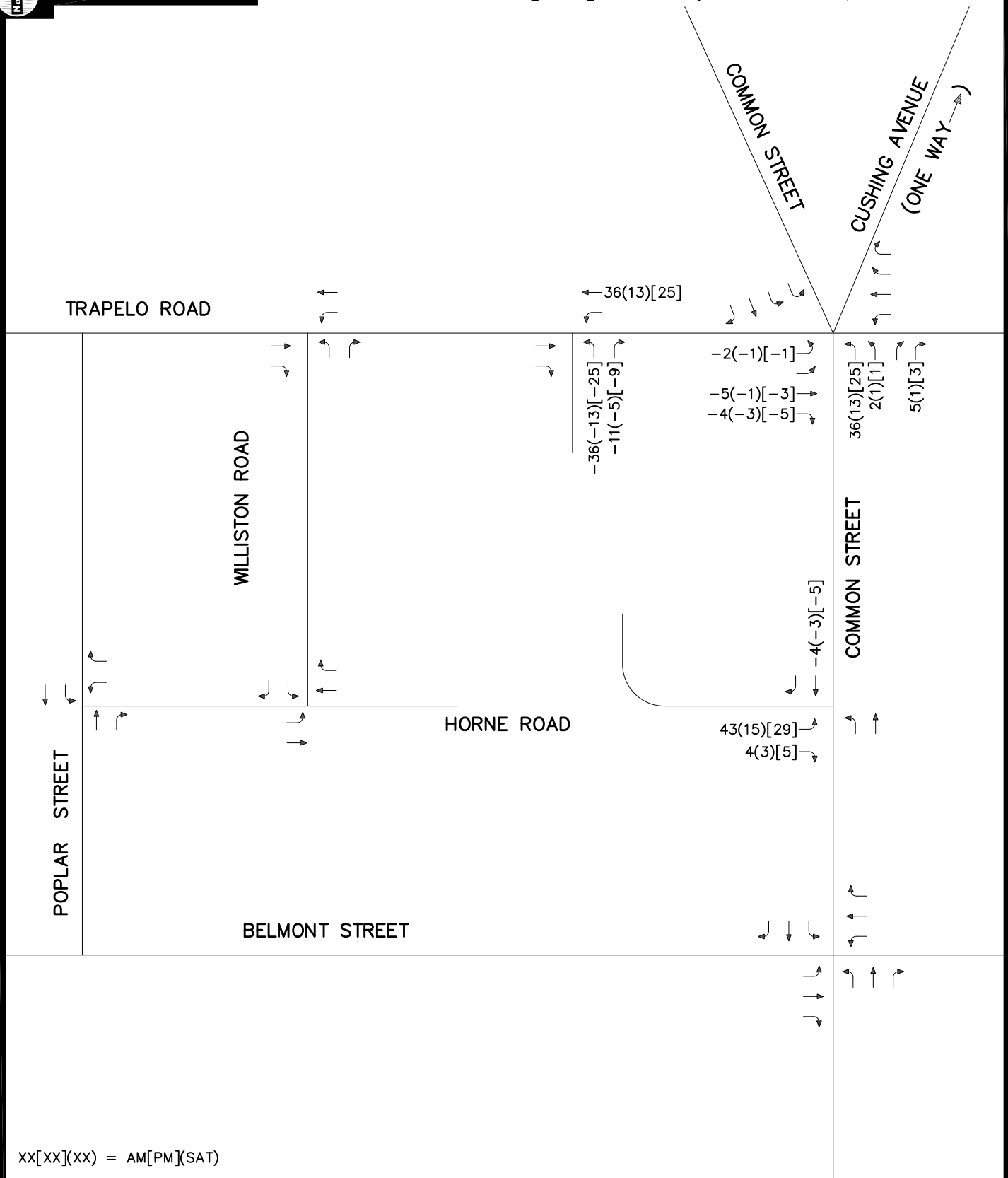
Figure I-4

Re-Occupancy Trip Redistribution
Weekday Morning,
Weekday Evening, and
Saturday Midday
Peak Hour Traffic Volumes



Not to Scale

Cushing Village Redevelopment - Belmont, Massachusetts



TEC, Inc.

Figure I-5

Trapelo Road Driveway Redistribution
Weekday Morning,
Weekday Evening, and
Saturday Midday
Peak Hour Traffic Volumes

Williston Road at Municipal Lot	Trips		
	AM	PM	Saturday
WBL	4	1	4
WBR	47	33	65
NBT	12	10	7
NBR	2	4	4
SBL	63	39	64
SBT	25	25	29

Percentage		
AM	PM	Saturday
14%	4%	12%
80%	77%	90%
14%	29%	36%
72%	61%	69%

2017 No-Build Trips

Williston Road at Trapelo Road	Trips		
	AM	PM	Saturday
EBR	27	18	30
WBL	27	17	41
NBL	14	8	18
NBR	19	18	30

Trips Destined to/from Municipal Lot

AM	PM	Saturday
19	11	21
19	10	28
11	6	16
15	14	27

Williston Road at Horne Road

SBL	30	19	32
SBR	10	12	28
EBL	11	8	11
WBR	6	16	26

4	1	4
1	0	3
2	2	4
1	5	9



[illegible]

Retail Trips

Total Trips				Weekday AM					Weekday PM					Saturday Midday				
Enter	AM	PM	Saturday	Base Trips (No-Build minus Redistributed)	Existing Retail Trips	Proposed Retail Trips	Redistributed Retail Trips	Base Trips (No-Build minus Redistributed)	Existing Retail Trips	Proposed Retail Trips	Redistributed Retail Trips	Base Trips (No-Build minus Redistributed)	Existing Retail Trips	Proposed Retail Trips	Redistributed Retail Trips	Base Trips (No-Build minus Redistributed)	Existing Retail Trips	Proposed Retail Trips
Exit	2	10	17															
Total	6	22	33															
Cushing Ave./Common St./Trapelo Rd., Belmont, MA																		
Common Street (From North)	Right	91					0	105			0	111				0		
	Thru	241					0	246			0	179				0		
	Left	229					0	123			0	104				0		
	Hard Left Ped	8					0	9			0	6				0		
Trapelo Road (From East)	Hard Right	2					0	11			0	13				0		
	Right	104					0	144			0	102				0		
	Thru	373					0	626			0	365				0		
	Left Ped	33					0	30			0	54				0		
Common Street (From South)	Right	25					0	36			0	72				0		
	Seal Right	4					0	15			0	20				0		
	Thru	130					0	242			0	160				0		
	Left Ped	32			1	1	1	84		3	3	100		4	4			
Trapelo Road (From West)	Right	57					0	77			0	80				0		
	Thru	730					0	471			0	400				0		
	Left	17					0	21			0	24				0		
	Seal Left Ped	83					0	82			0	91				0		
Poplar Street/Horse Road, Belmont, MA																		
Poplar Street (From North)	Thru Left Ped	18					0	25			0	31				0		
	Left Ped	2					0	2			0	0				0		
Horse Road (From East)	Right	2					0	12			0	16				0		
	Left Ped	16					0	18			0	28				0		
Poplar Street (From South)	Right	17					0	4			0	7				0		
	Thru Ped	90					0	30			0	26				0		
Common Street/Belmont Street, Belmont, MA																		
Common Street (From North)	Right	203					0	125			0	86				0		
	Thru	48					0	194			0	174				0		
	Left Ped	23					0	18			0	26				0		
Belmont Street (From East)	Right	15					0	18			0	17				0		
	Thru	361					0	490			0	243				0		
	Left Ped	12					0	61			0	32				0		
Common Street (From South)	Right	9					0	47			0	33				0		
	Thru	47					0	248			0	184				0		
	Left Ped	12					0	26			0	13				0		
Belmont Street (From West)	Right	8					0	42			0	27				0		
	Thru	601					0	388			0	271				0		
	Left Ped	124					0	107			0	106				0		
Common Street/Horse Road, Belmont, MA																		
Common Street (From North)	Right	25			1	1	0	16		1	1	35			2	2		
	Thru	265					0	339			0	288				0		
Common Street (From South)	Thru	220				0	0	362			0	315				0		
	Left Ped	1			0	0	0	2		2	2	6			3	3		
Horse Road (From West)	Right	3			0	0	0	1		2	2	3			3	3		
	Left Ped	22			1	1	1	15		5	5	35			35	6	6	
Williston Road/Trapelo Road, Belmont, MA																		
Trapelo Road (From East)	Thru	486	1	1	0	0	0	805	4	3	-1	561	5	4	-1			
	Left Ped	9			0	0	0	16		1	1	19			1	1		
Williston Road (From South)	Right	6			0	0	0	5		1	1	9			1	1		
	Left Ped	0			0	0	0	0		1	1	0			1	1		
Trapelo Road (From West)	Thru	0			0	0	0	0		1	1	0						
	Left Ped	894	2	-2	0	0	0	656	3	2	-1	581	7	6	-1			
Williston Road/Horse Road, Belmont, MA																		
Williston Road (From North)	Right	13					0	20			0	30				0		
	Left Ped	10					0	4			0	0				0		
Horse Road (From East)	Right	0					0	2			0	2				0		
	Thru Ped	0					0	3			0	2				0		
Horse Road (From West)	Thru	5					0	1			0	0				0		
	Left Ped	9					0	6			0	7				0		
Proposed Trapelo Road Driveway																		
Driveway (From South)	Right				1	1				3	3				5	5		
	Left Ped				0	0				0	0				0	0		
Trapelo Road (From East)	Left				1	1				3	3				4	4		
	Thru Ped				1	1				4	4				5	5		
Trapelo Road (From West)	Thru				0	0				1	1				1	1		
	Right Ped				2	2				2	2				6	6		
Existing Trapelo Road Driveway																		
Driveway (From South)	Right	1					-1	4			-4	6				-6		
	Left Ped	1					-1	4			-4	5				-5		
Trapelo Road (From East)	Left						0				0					0		
	Thru Ped						-2	3			-3	7				-7		
Existing Common Street Driveway																		
Driveway (From West)	Right	0					0	2			-2	3				-3		
	Left Ped	0					0	2			-2	2				-2		
Common Street (From North)	Right	1					-1	1			-1	2				-2		
	Thru Ped						0				0					0		
Common Street (From South)	Thru						0				0					0		
	Left Ped	0					0	2			-2	3				-3		

I:\03\0.0\CAD\Civil\Graphics\T0376.01_TrafficNetworks.dwg 11/28/2011 10:58:50 AM EDT

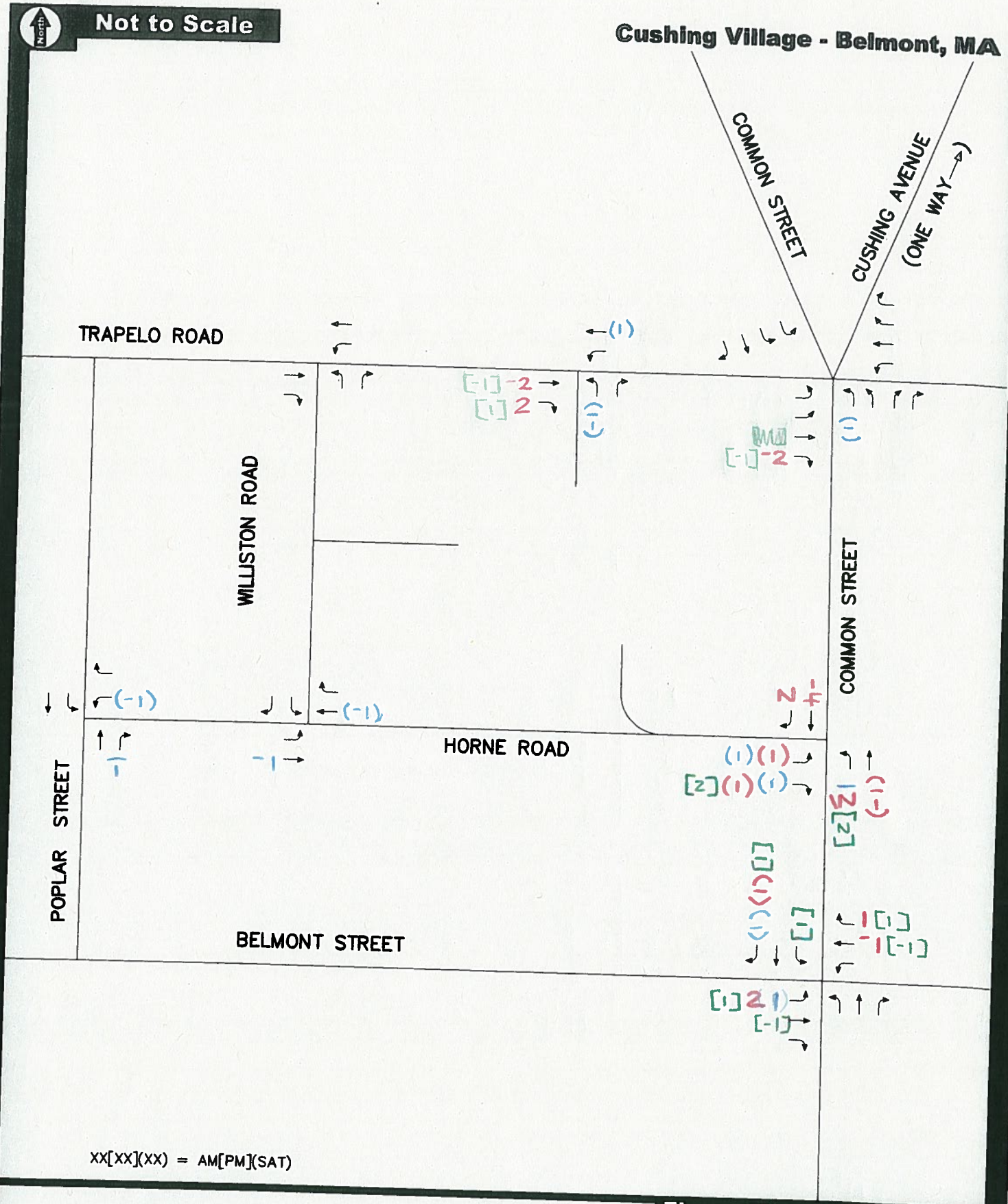


Figure X

Re-Occ Redistribution
Weekday Morning,
Weekday Evening, and
Saturday Midday
Peak Hour Traffic Volumes



Not to Scale

Cushing Village - Belmont, MA

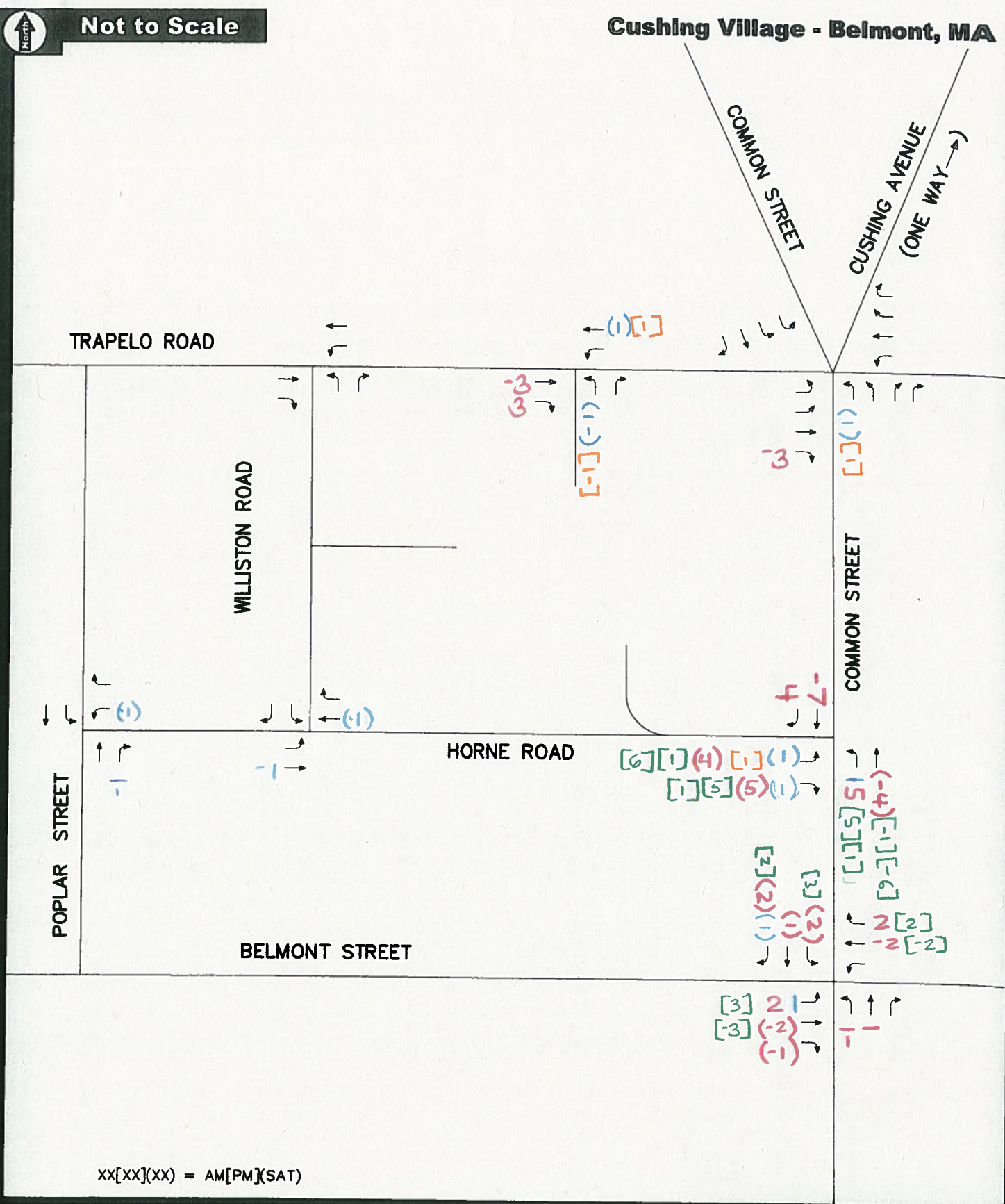


Figure X

Re-Occ Redistribution
~~Weekday Morning,~~
~~Weekday Evening,~~
~~Saturday Midday~~
 Peak Hour Traffic Volumes



TEC, Inc.



Not to Scale

Cushing Village - Belmont, MA

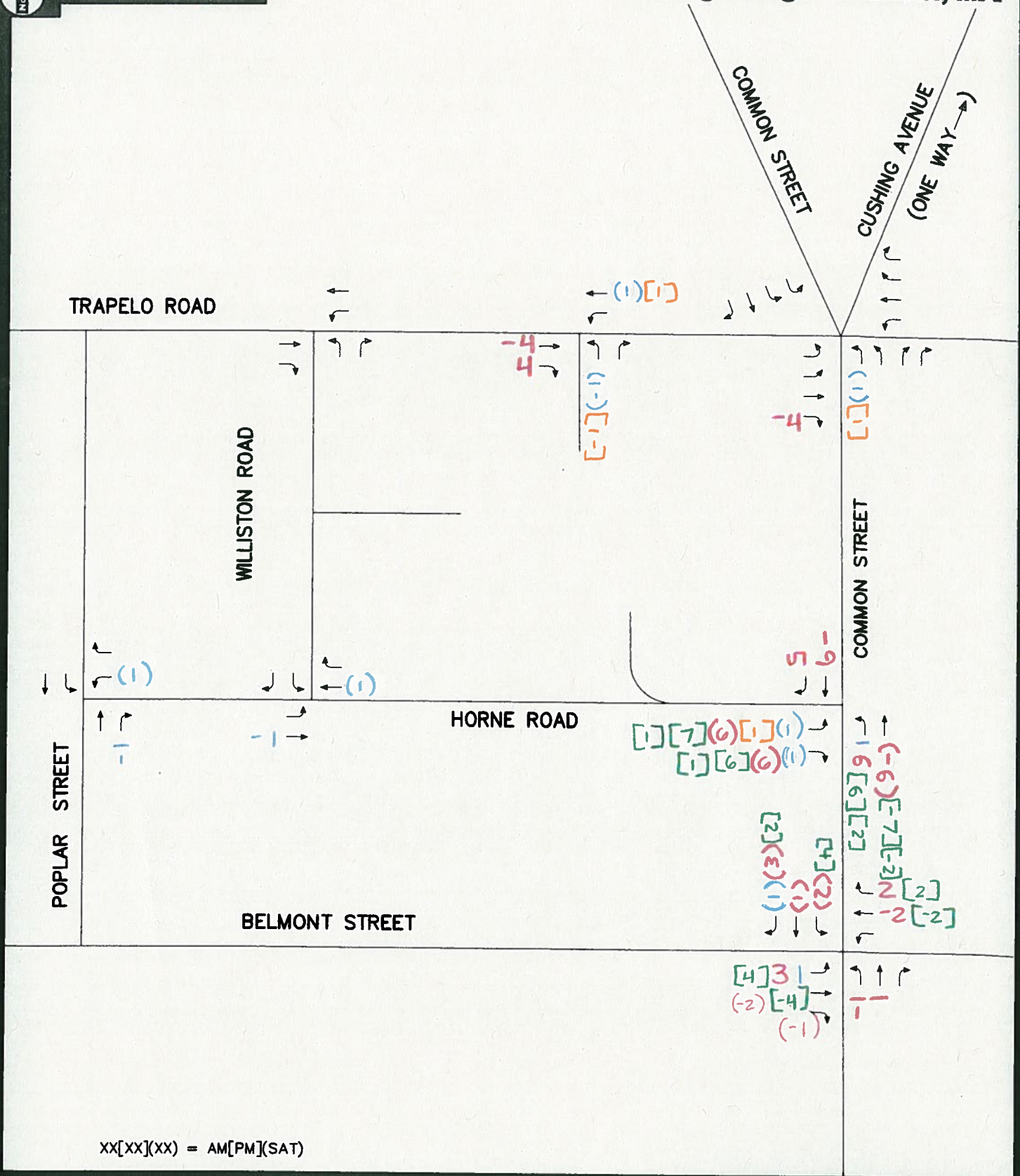


Figure X

Re-Occ Redistribution
Weekday Morning,
Weekday Evening, and
Saturday Midday
Peak Hour Traffic Volumes



Appendix J

Intersection Capacity Analyses

Unsignalized Intersections

2010 Existing

Lanes, Volumes, Timings
3: Trapelo Road & Williston Road

2010 Existing Conditions
Weekday Morning

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	 			 	 	
Volume (vph)	808	25	25	440	13	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt	0.995				0.922	
Flt Protected				0.997	0.979	
Satd. Flow (prot)	3108	0	0	3145	1547	0
Flt Permitted				0.997	0.979	
Satd. Flow (perm)	3108	0	0	3145	1547	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	121			300	276	
Travel Time (s)	2.8			6.8	6.3	
Peak Hour Factor	0.94	0.94	0.89	0.89	0.78	0.78
Heavy Vehicles (%)	2%	0%	0%	1%	0%	6%
Parking (#/hr)	2	2	2	2		
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

3: Trapelo Road & Williston Road

2010 Existing Conditions
Weekday Morning

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	808	25	25	440	13	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.89	0.89	0.78	0.78
Hourly flow rate (vph)	860	27	28	494	17	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				300		
pX, platoon unblocked					0.93	
vC, conflicting volume			886		1176	443
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			886		1048	443
tC, single (s)			4.1		6.8	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			96		92	96
cM capacity (veh/h)			772		204	551
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	573	313	193	330	40	
Volume Left	0	0	28	0	17	
Volume Right	0	27	0	0	23	
cSH	1700	1700	772	1700	322	
Volume to Capacity	0.34	0.18	0.04	0.19	0.12	
Queue Length 95th (ft)	0	0	3	0	10	
Control Delay (s)	0.0	0.0	1.8	0.0	17.8	
Lane LOS			A		C	
Approach Delay (s)	0.0		0.7		17.8	
Approach LOS					C	
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			40.8%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Horne Road & Common Street

2010 Existing Conditions
Weekday Morning

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	8	18	10	200	237	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	14	14	14	14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.906				0.997	
Flt Protected	0.985			0.998		
Satd. Flow (prot)	1583	0	0	1775	1764	0
Flt Permitted	0.985			0.998		
Satd. Flow (perm)	1583	0	0	1775	1764	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	310			211	274	
Travel Time (s)	7.0			4.8	6.2	
Peak Hour Factor	0.65	0.65	0.88	0.88	0.82	0.82
Heavy Vehicles (%)	0%	0%	10%	1%	2%	0%
Parking (#/hr)			2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

4: Horne Road & Common Street

2010 Existing Conditions

Weekday Morning

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	8	18	10	200	237	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.88	0.88	0.82	0.82
Hourly flow rate (vph)	12	28	11	227	289	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				211	274	
pX, platoon unblocked	0.88	0.86	0.86			
vC, conflicting volume	542	292	295			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	302	90	93			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	98	97	99			
cM capacity (veh/h)	603	834	1244			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	40	239	295			
Volume Left	12	11	0			
Volume Right	28	0	6			
cSH	746	1244	1700			
Volume to Capacity	0.05	0.01	0.17			
Queue Length 95th (ft)	4	1	0			
Control Delay (s)	10.1	0.5	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.1	0.5	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			28.7%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Horne Road & Williston Road

2010 Existing Conditions
Weekday Morning

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	10	10	7	6	28	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.939		0.966	
Flt Protected		0.976			0.964	
Satd. Flow (prot)	0	1467	1482	0	1470	0
Flt Permitted		0.976			0.964	
Satd. Flow (perm)	0	1467	1482	0	1470	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		596	310		276	
Travel Time (s)		13.5	7.0		6.3	
Peak Hour Factor	0.83	0.83	0.65	0.65	0.77	0.77
Heavy Vehicles (%)	10%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

5: Horne Road & Williston Road

2010 Existing Conditions

Weekday Morning

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	10	7	6	28	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.83	0.83	0.65	0.65	0.77	0.77
Hourly flow rate (vph)	12	12	11	9	36	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	20				52	15
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	20				52	15
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	99				96	99
cM capacity (veh/h)	1546				955	1070
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	24	20	48			
Volume Left	12	0	36			
Volume Right	0	9	12			
cSH	1546	1700	980			
Volume to Capacity	0.01	0.01	0.05			
Queue Length 95th (ft)	1	0	4			
Control Delay (s)	3.7	0.0	8.9			
Lane LOS	A		A			
Approach Delay (s)	3.7	0.0	8.9			
Approach LOS			A			
Intersection Summary						
Average Delay			5.6			
Intersection Capacity Utilization			17.7%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Horne Road & Poplar Street

2010 Existing Conditions
Weekday Morning

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	13	5	80	18	4	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.961		0.976			
Flt Protected	0.966					0.989
Satd. Flow (prot)	1465	0	1633	0	0	1672
Flt Permitted	0.966					0.989
Satd. Flow (perm)	1465	0	1633	0	0	1672
Link Speed (mph)	30		30			30
Link Distance (ft)	596		290			271
Travel Time (s)	13.5		6.6			6.2
Peak Hour Factor	0.75	0.75	0.77	0.77	0.68	0.68
Heavy Vehicles (%)	0%	0%	0%	6%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Horne Road & Poplar Street

2010 Existing Conditions
Weekday Morning

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	13	5	80	18	4	15
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.77	0.77	0.68	0.68
Hourly flow rate (vph)	17	7	104	23	6	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	149	116			127	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	149	116			127	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	844	942			1471	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	24	127	28			
Volume Left	17	0	6			
Volume Right	7	23	0			
cSH	869	1700	1471			
Volume to Capacity	0.03	0.07	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	9.3	0.0	1.6			
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	1.6			
Approach LOS	A					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			15.3%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Trapelo Road & Williston Road

2010 Existing Conditions
Weekday Evening

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	595	17	16	743	7	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt	0.996				0.904	
Flt Protected				0.999	0.986	
Satd. Flow (prot)	3141	0	0	3150	1581	0
Flt Permitted				0.999	0.986	
Satd. Flow (perm)	3141	0	0	3150	1581	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	121			300	276	
Travel Time (s)	2.8			6.8	6.3	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.67	0.67
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Parking (#/hr)	2	2	2	2		
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

3: Trapelo Road & Williston Road

2010 Existing Conditions
Weekday Evening

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	595	17	16	743	7	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.67	0.67
Hourly flow rate (vph)	654	19	17	782	10	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				300		
pX, platoon unblocked					0.79	
vC, conflicting volume			673		1088	336
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			673		585	336
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		97	96
cM capacity (veh/h)			928		347	665
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	436	237	278	521	36	
Volume Left	0	0	17	0	10	
Volume Right	0	19	0	0	25	
cSH	1700	1700	928	1700	525	
Volume to Capacity	0.26	0.14	0.02	0.31	0.07	
Queue Length 95th (ft)	0	0	1	0	5	
Control Delay (s)	0.0	0.0	0.7	0.0	12.4	
Lane LOS			A		B	
Approach Delay (s)	0.0		0.3		12.4	
Approach LOS					B	
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			42.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Horne Road & Common Street

2010 Existing Conditions
Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	3	13	9	330	306	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	14	14	14	14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.889				0.995	
Flt Protected	0.991			0.999		
Satd. Flow (prot)	1562	0	0	1785	1778	0
Flt Permitted	0.991			0.999		
Satd. Flow (perm)	1562	0	0	1785	1778	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	310			211	274	
Travel Time (s)	7.0			4.8	6.2	
Peak Hour Factor	0.57	0.57	0.87	0.87	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Parking (#/hr)			2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

4: Horne Road & Common Street

2010 Existing Conditions

Weekday Evening

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	13	9	330	306	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.57	0.57	0.87	0.87	0.91	0.91
Hourly flow rate (vph)	5	23	10	379	336	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				211	274	
pX, platoon unblocked	0.89	0.82	0.82			
vC, conflicting volume	742	342	348			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	306	89	97			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	99			
cM capacity (veh/h)	608	800	1239			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	28	390	348			
Volume Left	5	10	0			
Volume Right	23	0	12			
cSH	755	1239	1700			
Volume to Capacity	0.04	0.01	0.20			
Queue Length 95th (ft)	3	1	0			
Control Delay (s)	10.0	0.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	10.0	0.3	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			34.6%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Horne Road & Williston Road

2010 Existing Conditions
Weekday Evening

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	7	3	10	15	18	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.919		0.949	
Flt Protected		0.967			0.970	
Satd. Flow (prot)	0	1526	1450	0	1453	0
Flt Permitted		0.967			0.970	
Satd. Flow (perm)	0	1526	1450	0	1453	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		596	310		276	
Travel Time (s)		13.5	7.0		6.3	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.73	0.73
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

5: Horne Road & Williston Road

2010 Existing Conditions

Weekday Evening

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	7	3	10	15	18	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.73	0.73
Hourly flow rate (vph)	11	5	16	24	25	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	40				55	28
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	40				55	28
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	99
cM capacity (veh/h)	1583				951	1053
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	16	40	40			
Volume Left	11	0	25			
Volume Right	0	24	15			
cSH	1583	1700	988			
Volume to Capacity	0.01	0.02	0.04			
Queue Length 95th (ft)	1	0	3			
Control Delay (s)	5.1	0.0	8.8			
Lane LOS	A		A			
Approach Delay (s)	5.1	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			4.5			
Intersection Capacity Utilization			16.3%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Horne Road & Poplar Street

2010 Existing Conditions
Weekday Evening

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	16	11	28	6	3	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.946		0.975			
Flt Protected	0.971					0.994
Satd. Flow (prot)	1450	0	1596	0	0	1681
Flt Permitted	0.971					0.994
Satd. Flow (perm)	1450	0	1596	0	0	1681
Link Speed (mph)	30		30			30
Link Distance (ft)	596		290			271
Travel Time (s)	13.5		6.6			6.2
Peak Hour Factor	0.68	0.68	0.77	0.77	0.63	0.63
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Horne Road & Poplar Street

2010 Existing Conditions

Weekday Evening

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	16	11	28	6	3	22
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.68	0.68	0.77	0.77	0.63	0.63
Hourly flow rate (vph)	24	16	36	8	5	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	85	40			44	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	85	40			44	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			100	
cM capacity (veh/h)	919	1037			1577	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	40	44	40			
Volume Left	24	0	5			
Volume Right	16	8	0			
cSH	964	1700	1577			
Volume to Capacity	0.04	0.03	0.00			
Queue Length 95th (ft)	3	0	0			
Control Delay (s)	8.9	0.0	0.9			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	0.9			
Approach LOS	A					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			13.7%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Trapelo Road & Williston Road

2010 Existing Conditions
Saturday MIDDAY

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	513	28	38	525	17	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt	0.992				0.917	
Flt Protected				0.997	0.981	
Satd. Flow (prot)	3129	0	0	3145	1595	0
Flt Permitted				0.997	0.981	
Satd. Flow (perm)	3129	0	0	3145	1595	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	121			300	276	
Travel Time (s)	2.8			6.8	6.3	
Peak Hour Factor	0.93	0.93	0.95	0.95	0.87	0.87
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Parking (#/hr)	2	2	2	2		
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

3: Trapelo Road & Williston Road

2010 Existing Conditions

Saturday MIDDAY

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	513	28	38	525	17	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.95	0.95	0.87	0.87
Hourly flow rate (vph)	552	30	40	553	20	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				300		
pX, platoon unblocked					0.93	
vC, conflicting volume			582		923	291
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			582		772	291
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		94	95
cM capacity (veh/h)			1002		304	712
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	368	214	224	368	52	
Volume Left	0	0	40	0	20	
Volume Right	0	30	0	0	32	
cSH	1700	1700	1002	1700	473	
Volume to Capacity	0.22	0.13	0.04	0.22	0.11	
Queue Length 95th (ft)	0	0	3	0	9	
Control Delay (s)	0.0	0.0	1.9	0.0	13.5	
Lane LOS			A		B	
Approach Delay (s)	0.0		0.7		13.5	
Approach LOS					B	
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			44.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Horne Road & Common Street

2010 Existing Conditions
Saturday MIDDAY

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	7	26	19	281	248	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	14	14	14	14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.893				0.996	
Flt Protected	0.990			0.997		
Satd. Flow (prot)	1568	0	0	1782	1797	0
Flt Permitted	0.990			0.997		
Satd. Flow (perm)	1568	0	0	1782	1797	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	310			211	274	
Travel Time (s)	7.0			4.8	6.2	
Peak Hour Factor	0.69	0.69	0.93	0.93	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%
Parking (#/hr)			2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

4: Horne Road & Common Street

2010 Existing Conditions

Saturday MIDDAY

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	7	26	19	281	248	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.93	0.93	0.89	0.89
Hourly flow rate (vph)	10	38	20	302	279	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				211	274	
pX, platoon unblocked	0.95					
vC, conflicting volume	626	283	288			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	577	283	288			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	95	98			
cM capacity (veh/h)	449	761	1286			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	48	323	288			
Volume Left	10	20	0			
Volume Right	38	0	9			
cSH	663	1286	1700			
Volume to Capacity	0.07	0.02	0.17			
Queue Length 95th (ft)	6	1	0			
Control Delay (s)	10.9	0.6	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.9	0.6	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			40.4%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Horne Road & Williston Road

2010 Existing Conditions
Saturday MIDDAY

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	10	3	6	24	30	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.893		0.938	
Flt Protected		0.964			0.974	
Satd. Flow (prot)	0	1521	1409	0	1442	0
Flt Permitted		0.964			0.974	
Satd. Flow (perm)	0	1521	1409	0	1442	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		596	310		276	
Travel Time (s)		13.5	7.0		6.3	
Peak Hour Factor	0.65	0.65	0.63	0.63	0.74	0.74
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

5: Horne Road & Williston Road

2010 Existing Conditions

Saturday MIDDAY

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	3	6	24	30	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.65	0.65	0.63	0.63	0.74	0.74
Hourly flow rate (vph)	15	5	10	38	41	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	48				64	29
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	48				64	29
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	97
cM capacity (veh/h)	1573				938	1052
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	20	48	76			
Volume Left	15	0	41			
Volume Right	0	38	35			
cSH	1573	1700	988			
Volume to Capacity	0.01	0.03	0.08			
Queue Length 95th (ft)	1	0	6			
Control Delay (s)	5.6	0.0	8.9			
Lane LOS	A		A			
Approach Delay (s)	5.6	0.0	8.9			
Approach LOS			A			
Intersection Summary						
Average Delay			5.5			
Intersection Capacity Utilization			17.4%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Horne Road & Poplar Street

2010 Existing Conditions
Saturday MIDDAY

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	26	14	24	10	0	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.953		0.960			
Flt Protected	0.969					
Satd. Flow (prot)	1457	0	1623	0	0	1691
Flt Permitted	0.969					
Satd. Flow (perm)	1457	0	1623	0	0	1691
Link Speed (mph)	30		30			30
Link Distance (ft)	596		290			271
Travel Time (s)	13.5		6.6			6.2
Peak Hour Factor	0.71	0.71	0.77	0.77	0.66	0.66
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Horne Road & Poplar Street

2010 Existing Conditions

Saturday MIDDAY

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	26	14	24	10	0	29
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.71	0.71	0.77	0.77	0.66	0.66
Hourly flow rate (vph)	37	20	31	13	0	44
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	82	38			44	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	82	38			44	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	98			100	
cM capacity (veh/h)	925	1040			1577	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	56	44	44			
Volume Left	37	0	0			
Volume Right	20	13	0			
cSH	963	1700	1577			
Volume to Capacity	0.06	0.03	0.00			
Queue Length 95th (ft)	5	0	0			
Control Delay (s)	9.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			

2017 No-Build

Lanes, Volumes, Timings
3: Trapelo Road & Williston Road

2017 No-Build Conditions
Weekday Morning

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	869	27	27	474	14	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	13	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996				0.923	
Flt Protected				0.997	0.979	
Satd. Flow (prot)	1872	0	0	1614	1715	0
Flt Permitted				0.997	0.979	
Satd. Flow (perm)	1872	0	0	1614	1715	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	121			300	276	
Travel Time (s)	2.8			6.8	6.3	
Peak Hour Factor	0.94	0.94	0.89	0.89	0.78	0.78
Heavy Vehicles (%)	2%	0%	0%	1%	0%	6%
Parking (#/hr)	2	2	2	2		
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

3: Trapelo Road & Williston Road

2017 No-Build Conditions

Weekday Morning

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	869	27	27	474	14	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.89	0.89	0.78	0.78
Hourly flow rate (vph)	924	29	30	533	18	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				300		
pX, platoon unblocked					0.69	
vC, conflicting volume			953		1532	939
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			953		1547	939
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			96		79	92
cM capacity (veh/h)			729		84	315
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	953	563	42			
Volume Left	0	30	18			
Volume Right	29	0	24			
cSH	1700	729	145			
Volume to Capacity	0.56	0.04	0.29			
Queue Length 95th (ft)	0	3	28			
Control Delay (s)	0.0	1.1	39.8			
Lane LOS		A	E			
Approach Delay (s)	0.0	1.1	39.8			
Approach LOS			E			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			57.4%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Horne Road & Common Street

2017 No-Build Conditions
Weekday Morning

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	20	11	217	259	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	11	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.909				0.997	
Flt Protected	0.984			0.998		
Satd. Flow (prot)	1643	0	0	1886	1598	0
Flt Permitted	0.984			0.998		
Satd. Flow (perm)	1643	0	0	1886	1598	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	310			211	274	
Travel Time (s)	7.0			4.8	6.2	
Peak Hour Factor	0.65	0.65	0.88	0.88	0.82	0.82
Heavy Vehicles (%)	0%	0%	10%	1%	2%	0%
Parking (#/hr)			2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

4: Horne Road & Common Street

2017 No-Build Conditions

Weekday Morning

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	20	11	217	259	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.88	0.88	0.82	0.82
Hourly flow rate (vph)	15	31	12	247	316	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				211	274	
pX, platoon unblocked	0.90	0.88	0.88			
vC, conflicting volume	591	320	323			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	377	159	164			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	97	96	99			
cM capacity (veh/h)	562	785	1204			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	46	259	323			
Volume Left	15	12	0			
Volume Right	31	0	7			
cSH	693	1204	1700			
Volume to Capacity	0.07	0.01	0.19			
Queue Length 95th (ft)	5	1	0			
Control Delay (s)	10.6	0.5	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.6	0.5	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			30.4%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Horne Road & Williston Road

2017 No-Build Conditions
Weekday Morning

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	11	12	9	6	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.947		0.966	
Flt Protected		0.976			0.964	
Satd. Flow (prot)	0	1470	1495	0	1470	0
Flt Permitted		0.976			0.964	
Satd. Flow (perm)	0	1470	1495	0	1470	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		596	310		276	
Travel Time (s)		13.5	7.0		6.3	
Peak Hour Factor	0.83	0.83	0.65	0.65	0.77	0.77
Heavy Vehicles (%)	10%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

5: Horne Road & Williston Road

2017 No-Build Conditions

Weekday Morning

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	11	12	9	6	30	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.83	0.83	0.65	0.65	0.77	0.77
Hourly flow rate (vph)	13	14	14	9	39	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	23				59	18
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	23				59	18
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	99				96	99
cM capacity (veh/h)	1542				944	1066
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	28	23	52			
Volume Left	13	0	39			
Volume Right	0	9	13			
cSH	1542	1700	972			
Volume to Capacity	0.01	0.01	0.05			
Queue Length 95th (ft)	1	0	4			
Control Delay (s)	3.6	0.0	8.9			
Lane LOS	A		A			
Approach Delay (s)	3.6	0.0	8.9			
Approach LOS			A			
Intersection Summary						
Average Delay			5.5			
Intersection Capacity Utilization			17.9%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Horne Road & Poplar Street

2017 No-Build Conditions
Weekday Morning

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	15	5	86	20	4	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.965		0.975			
Flt Protected	0.964					0.990
Satd. Flow (prot)	1468	0	1630	0	0	1674
Flt Permitted	0.964					0.990
Satd. Flow (perm)	1468	0	1630	0	0	1674
Link Speed (mph)	30		30			30
Link Distance (ft)	596		290			271
Travel Time (s)	13.5		6.6			6.2
Peak Hour Factor	0.75	0.75	0.77	0.77	0.68	0.68
Heavy Vehicles (%)	0%	0%	0%	6%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Horne Road & Poplar Street

2017 No-Build Conditions
Weekday Morning

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	5	86	20	4	16
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.77	0.77	0.68	0.68
Hourly flow rate (vph)	20	7	112	26	6	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	160	125			138	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160	125			138	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	832	931			1459	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	27	138	29			
Volume Left	20	0	6			
Volume Right	7	26	0			
cSH	855	1700	1459			
Volume to Capacity	0.03	0.08	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	9.3	0.0	1.5			
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	1.5			
Approach LOS	A					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			15.7%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Trapelo Road & Williston Road

2017 No-Build Conditions
Weekday Evening

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	642	18	17	801	8	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	13	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996				0.907	
Flt Protected				0.999	0.985	
Satd. Flow (prot)	1890	0	0	1617	1754	0
Flt Permitted				0.999	0.985	
Satd. Flow (perm)	1890	0	0	1617	1754	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	121			300	276	
Travel Time (s)	2.8			6.8	6.3	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.67	0.67
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Parking (#/hr)	2	2	2	2		
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

3: Trapelo Road & Williston Road

2017 No-Build Conditions

Weekday Evening

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	642	18	17	801	8	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.67	0.67
Hourly flow rate (vph)	705	20	18	843	12	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				300		
pX, platoon unblocked					0.57	
vC, conflicting volume			725		1594	715
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			725		1666	715
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		80	94
cM capacity (veh/h)			887		60	434
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	725	861	39			
Volume Left	0	18	12			
Volume Right	20	0	27			
cSH	1700	887	149			
Volume to Capacity	0.43	0.02	0.26			
Queue Length 95th (ft)	0	2	25			
Control Delay (s)	0.0	0.5	37.6			
Lane LOS		A	E			
Approach Delay (s)	0.0	0.5	37.6			
Approach LOS			E			
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			65.8%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Horne Road & Common Street

2017 No-Build Conditions
Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	6	15	10	364	339	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	11	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.905				0.995	
Flt Protected	0.985			0.999		
Satd. Flow (prot)	1637	0	0	1896	1611	0
Flt Permitted	0.985			0.999		
Satd. Flow (perm)	1637	0	0	1896	1611	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	310			211	274	
Travel Time (s)	7.0			4.8	6.2	
Peak Hour Factor	0.57	0.57	0.87	0.87	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Parking (#/hr)			2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

4: Horne Road & Common Street

2017 No-Build Conditions

Weekday Evening

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	6	15	10	364	339	14
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.57	0.57	0.87	0.87	0.91	0.91
Hourly flow rate (vph)	11	26	11	418	373	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				211	274	
pX, platoon unblocked	0.92	0.85	0.85			
vC, conflicting volume	822	380	388			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	413	178	187			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	96	99			
cM capacity (veh/h)	545	737	1185			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	37	430	388			
Volume Left	11	11	0			
Volume Right	26	0	15			
cSH	669	1185	1700			
Volume to Capacity	0.06	0.01	0.23			
Queue Length 95th (ft)	4	1	0			
Control Delay (s)	10.7	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.7	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			37.2%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Horne Road & Williston Road

2017 No-Build Conditions
Weekday Evening

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	8	4	12	16	19	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.923		0.949	
Flt Protected		0.967			0.970	
Satd. Flow (prot)	0	1526	1457	0	1453	0
Flt Permitted		0.967			0.970	
Satd. Flow (perm)	0	1526	1457	0	1453	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		596	310		276	
Travel Time (s)		13.5	7.0		6.3	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.73	0.73
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

5: Horne Road & Williston Road

2017 No-Build Conditions

Weekday Evening

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	8	4	12	16	19	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.73	0.73
Hourly flow rate (vph)	13	6	19	25	26	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	44				63	32
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	44				63	32
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	98
cM capacity (veh/h)	1577				940	1048
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	19	44	42			
Volume Left	13	0	26			
Volume Right	0	25	16			
cSH	1577	1700	979			
Volume to Capacity	0.01	0.03	0.04			
Queue Length 95th (ft)	1	0	3			
Control Delay (s)	4.9	0.0	8.8			
Lane LOS	A		A			
Approach Delay (s)	4.9	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			17.3%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Horne Road & Poplar Street

2017 No-Build Conditions
Weekday Evening

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	18	12	30	7	3	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.945		0.975			
Flt Protected	0.971					0.994
Satd. Flow (prot)	1448	0	1597	0	0	1681
Flt Permitted	0.971					0.994
Satd. Flow (perm)	1448	0	1597	0	0	1681
Link Speed (mph)	30		30			30
Link Distance (ft)	596		290			271
Travel Time (s)	13.5		6.6			6.2
Peak Hour Factor	0.68	0.68	0.77	0.77	0.63	0.63
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Horne Road & Poplar Street

2017 No-Build Conditions

Weekday Evening

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	18	12	30	7	3	24
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.68	0.68	0.77	0.77	0.63	0.63
Hourly flow rate (vph)	26	18	39	9	5	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	91	44			48	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	91	44			48	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			100	
cM capacity (veh/h)	911	1032			1572	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	44	48	43			
Volume Left	26	0	5			
Volume Right	18	9	0			
cSH	956	1700	1572			
Volume to Capacity	0.05	0.03	0.00			
Queue Length 95th (ft)	4	0	0			
Control Delay (s)	8.9	0.0	0.8			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	0.8			
Approach LOS	A					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			13.8%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Trapelo Road & Williston Road

2016 No-Build Conditions
Saturday MIDDAY

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	556	30	41	569	18	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	13	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.917	
Flt Protected				0.997	0.981	
Satd. Flow (prot)	1885	0	0	1615	1766	0
Flt Permitted				0.997	0.981	
Satd. Flow (perm)	1885	0	0	1615	1766	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	121			300	276	
Travel Time (s)	2.8			6.8	6.3	
Peak Hour Factor	0.93	0.93	0.95	0.95	0.87	0.87
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Parking (#/hr)	2	2	2	2		
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

3: Trapelo Road & Williston Road

2016 No-Build Conditions

Saturday MIDDAY

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	556	30	41	569	18	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.95	0.95	0.87	0.87
Hourly flow rate (vph)	598	32	43	599	21	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				300		
pX, platoon unblocked					0.73	
vC, conflicting volume			630		1299	614
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			630		1224	614
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		85	93
cM capacity (veh/h)			962		139	496
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	630	642	55			
Volume Left	0	43	21			
Volume Right	32	0	34			
cSH	1700	962	252			
Volume to Capacity	0.37	0.04	0.22			
Queue Length 95th (ft)	0	4	20			
Control Delay (s)	0.0	1.2	23.2			
Lane LOS		A	C			
Approach Delay (s)	0.0	1.2	23.2			
Approach LOS			C			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			73.7%	ICU Level of Service		D
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Horne Road & Common Street

2016 No-Build Conditions
Saturday MIDDAY

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	14	30	21	313	280	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	11	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.908				0.995	
Flt Protected	0.984			0.997		
Satd. Flow (prot)	1641	0	0	1893	1626	0
Flt Permitted	0.984			0.997		
Satd. Flow (perm)	1641	0	0	1893	1626	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	310			211	274	
Travel Time (s)	7.0			4.8	6.2	
Peak Hour Factor	0.69	0.69	0.93	0.93	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%
Parking (#/hr)			2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

4: Horne Road & Common Street

2016 No-Build Conditions

Saturday MIDDAY

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	14	30	21	313	280	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.93	0.93	0.89	0.89
Hourly flow rate (vph)	20	43	23	337	315	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				211	274	
pX, platoon unblocked	0.93	0.90	0.90			
vC, conflicting volume	703	321	327			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	482	186	193			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	94	98			
cM capacity (veh/h)	499	773	1250			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	64	359	327			
Volume Left	20	23	0			
Volume Right	43	0	12			
cSH	658	1250	1700			
Volume to Capacity	0.10	0.02	0.19			
Queue Length 95th (ft)	8	1	0			
Control Delay (s)	11.1	0.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.1	0.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			43.7%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Horne Road & Williston Road

2016 No-Build Conditions
Saturday MIDDAY

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	11	4	7	26	32	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.894		0.937	
Flt Protected		0.964			0.974	
Satd. Flow (prot)	0	1521	1411	0	1440	0
Flt Permitted		0.964			0.974	
Satd. Flow (perm)	0	1521	1411	0	1440	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		596	310		276	
Travel Time (s)		13.5	7.0		6.3	
Peak Hour Factor	0.65	0.65	0.63	0.63	0.74	0.74
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

5: Horne Road & Williston Road

2016 No-Build Conditions
Saturday MIDDAY

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	11	4	7	26	32	28
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.65	0.65	0.63	0.63	0.74	0.74
Hourly flow rate (vph)	17	6	11	41	43	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	52				72	32
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	52				72	32
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				95	96
cM capacity (veh/h)	1566				927	1048
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	23	52	81			
Volume Left	17	0	43			
Volume Right	0	41	38			
cSH	1566	1700	980			
Volume to Capacity	0.01	0.03	0.08			
Queue Length 95th (ft)	1	0	7			
Control Delay (s)	5.4	0.0	9.0			
Lane LOS	A		A			
Approach Delay (s)	5.4	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			5.5			
Intersection Capacity Utilization			17.6%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Horne Road & Poplar Street

2016 No-Build Conditions
Saturday MIDDAY

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	29	15	26	12	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.954		0.957			
Flt Protected	0.968					
Satd. Flow (prot)	1457	0	1618	0	0	1691
Flt Permitted	0.968					
Satd. Flow (perm)	1457	0	1618	0	0	1691
Link Speed (mph)	30		30			30
Link Distance (ft)	596		290			271
Travel Time (s)	13.5		6.6			6.2
Peak Hour Factor	0.71	0.71	0.77	0.77	0.66	0.66
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

6: Horne Road & Poplar Street

2016 No-Build Conditions

Saturday MIDDAY

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	29	15	26	12	0	31
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.71	0.71	0.77	0.77	0.66	0.66
Hourly flow rate (vph)	41	21	34	16	0	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	89	42			49	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	89	42			49	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	98			100	
cM capacity (veh/h)	917	1035			1570	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	62	49	47			
Volume Left	41	0	0			
Volume Right	21	16	0			
cSH	954	1700	1570			
Volume to Capacity	0.06	0.03	0.00			
Queue Length 95th (ft)	5	0	0			
Control Delay (s)	9.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			

2017 Build

Lanes, Volumes, Timings
2: Trapelo Road & Site Driveway

2017 Build Conditions
Weekday Morning

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	818	85	45	503	0	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	12	12
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt	0.986					0.865
Flt Protected				0.996		
Satd. Flow (prot)	3373	0	0	1872	0	1611
Flt Permitted				0.996		
Satd. Flow (perm)	3373	0	0	1872	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	143			157	134	
Travel Time (s)	3.3			3.6	3.0	
Peak Hour Factor	0.94	0.94	0.89	0.89	0.85	0.85
Heavy Vehicles (%)	2%	2%	2%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

2: Trapelo Road & Site Driveway

2017 Build Conditions

Weekday Morning

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	818	85	45	503	0	64
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.89	0.89	0.85	0.85
Hourly flow rate (vph)	870	90	51	565	0	75
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				157		
pX, platoon unblocked					0.70	
vC, conflicting volume			961		1582	480
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			961		1616	480
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		100	86
cM capacity (veh/h)			712		62	532
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	580	380	616	75		
Volume Left	0	0	51	0		
Volume Right	0	90	0	75		
cSH	1700	1700	712	532		
Volume to Capacity	0.34	0.22	0.07	0.14		
Queue Length 95th (ft)	0	0	6	12		
Control Delay (s)	0.0	0.0	1.9	12.9		
Lane LOS			A	B		
Approach Delay (s)	0.0		1.9	12.9		
Approach LOS				B		
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			60.9%		ICU Level of Service	B
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Trapelo Road & Williston Road

2017 Build Conditions
Weekday Morning

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	902	0	8	499	1	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	13	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.880	
Flt Protected				0.999	0.994	
Satd. Flow (prot)	1879	0	0	1617	1684	0
Flt Permitted				0.999	0.994	
Satd. Flow (perm)	1879	0	0	1617	1684	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	121			143	276	
Travel Time (s)	2.8			3.3	6.3	
Peak Hour Factor	0.94	0.94	0.89	0.89	0.85	0.85
Heavy Vehicles (%)	2%	2%	2%	1%	2%	2%
Parking (#/hr)	2	2	2	2		
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

3: Trapelo Road & Williston Road

2017 Build Conditions

Weekday Morning

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	902	0	8	499	1	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.89	0.89	0.85	0.85
Hourly flow rate (vph)	960	0	9	561	1	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				300		
pX, platoon unblocked					0.78	
vC, conflicting volume			960		1538	960
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			960		1549	960
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	97
cM capacity (veh/h)			717		96	311
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	960	570	9			
Volume Left	0	9	1			
Volume Right	0	0	8			
cSH	1700	717	243			
Volume to Capacity	0.56	0.01	0.04			
Queue Length 95th (ft)	0	1	3			
Control Delay (s)	0.0	0.3	20.4			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.3	20.4			
Approach LOS			C			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			57.5%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Site Driveway & Common Street

2017 Build Conditions
Weekday Morning

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	91	32	14	223	262	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	11	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.965				0.984	
Flt Protected	0.964			0.997		
Satd. Flow (prot)	1675	0	0	1891	1577	0
Flt Permitted	0.964			0.997		
Satd. Flow (perm)	1675	0	0	1891	1577	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	139			211	274	
Travel Time (s)	3.2			4.8	6.2	
Peak Hour Factor	0.85	0.85	0.88	0.88	0.82	0.82
Heavy Vehicles (%)	2%	2%	2%	1%	2%	2%
Parking (#/hr)			2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

4: Site Driveway & Common Street

2017 Build Conditions
Weekday Morning

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	91	32	14	223	262	35
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.88	0.88	0.82	0.82
Hourly flow rate (vph)	107	38	16	253	320	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				211	274	
pX, platoon unblocked	0.88	0.86	0.86			
vC, conflicting volume	626	341	362			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	400	155	180			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	95	99			
cM capacity (veh/h)	529	768	1203			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	145	269	362			
Volume Left	107	16	0			
Volume Right	38	0	43			
cSH	575	1203	1700			
Volume to Capacity	0.25	0.01	0.21			
Queue Length 95th (ft)	25	1	0			
Control Delay (s)	13.3	0.6	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.3	0.6	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			36.9%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Horne Road & Williston Road

2017 Build Conditions
Weekday Morning

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	9	5	0	0	10	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.922	
Flt Protected		0.969			0.979	
Satd. Flow (prot)	0	1436	1578	0	1425	0
Flt Permitted		0.969			0.979	
Satd. Flow (perm)	0	1436	1578	0	1425	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		596	108		276	
Travel Time (s)		13.5	2.5		6.3	
Peak Hour Factor	0.83	0.83	0.65	0.65	0.77	0.77
Heavy Vehicles (%)	10%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

5: Horne Road & Williston Road

2017 Build Conditions

Weekday Morning

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	9	5	0	0	10	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.83	0.83	0.65	0.65	0.77	0.77
Hourly flow rate (vph)	11	6	0	0	13	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				28	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				28	0
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	99				99	98
cM capacity (veh/h)	1572				986	1091
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	17	0	31			
Volume Left	11	0	13			
Volume Right	0	0	18			
cSH	1572	1700	1044			
Volume to Capacity	0.01	0.00	0.03			
Queue Length 95th (ft)	1	0	2			
Control Delay (s)	4.7	0.0	8.6			
Lane LOS	A		A			
Approach Delay (s)	4.7	0.0	8.6			
Approach LOS			A			
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Horne Road & Poplar Street

2017 Build Conditions
Weekday Morning

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	17	2	90	17	2	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.984		0.979			
Flt Protected	0.958					0.995
Satd. Flow (prot)	1488	0	1640	0	0	1683
Flt Permitted	0.958					0.995
Satd. Flow (perm)	1488	0	1640	0	0	1683
Link Speed (mph)	30		30			30
Link Distance (ft)	596		290			271
Travel Time (s)	13.5		6.6			6.2
Peak Hour Factor	0.75	0.75	0.77	0.77	0.68	0.68
Heavy Vehicles (%)	0%	0%	0%	6%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

6: Horne Road & Poplar Street

2017 Build Conditions

Weekday Morning

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	17	2	90	17	2	18
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.77	0.77	0.68	0.68
Hourly flow rate (vph)	23	3	117	22	3	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	160	128			139	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160	128			139	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	834	928			1457	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	25	139	29			
Volume Left	23	0	3			
Volume Right	3	22	0			
cSH	843	1700	1457			
Volume to Capacity	0.03	0.08	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	9.4	0.0	0.8			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	0.8			
Approach LOS	A					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			15.8%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Trapelo Road & Site Driveway

2017 Build Conditions
Weekday Evening

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	 					
Volume (vph)	635	39	39	828	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	12	12
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt	0.991					0.865
Flt Protected				0.998		
Satd. Flow (prot)	3422	0	0	1877	0	1611
Flt Permitted				0.998		
Satd. Flow (perm)	3422	0	0	1877	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	143			157	134	
Travel Time (s)	3.3			3.6	3.0	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.85	0.85
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

2: Trapelo Road & Site Driveway

2017 Build Conditions

Weekday Evening

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	635	39	39	828	0	26
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	698	43	41	872	0	31
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)				157		
pX, platoon unblocked					0.56	
vC, conflicting volume			741		1673	370
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			741		1807	370
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	95
cM capacity (veh/h)			862		38	627
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	465	275	913	31		
Volume Left	0	0	41	0		
Volume Right	0	43	0	31		
cSH	1700	1700	862	627		
Volume to Capacity	0.27	0.16	0.05	0.05		
Queue Length 95th (ft)	0	0	4	4		
Control Delay (s)	0.0	0.0	1.3	11.0		
Lane LOS			A	B		
Approach Delay (s)	0.0		1.3	11.0		
Approach LOS				B		
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			71.2%		ICU Level of Service	C
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Trapelo Road & Williston Road

2017 Build Conditions
Weekday Evening

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	677	4	19	820	2	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	13	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999				0.890	
Flt Protected				0.999	0.991	
Satd. Flow (prot)	1895	0	0	1616	1698	0
Flt Permitted				0.999	0.991	
Satd. Flow (perm)	1895	0	0	1616	1698	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	121			143	276	
Travel Time (s)	2.8			3.3	6.3	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.85	0.85
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%
Parking (#/hr)	2	2	2	2		
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

3: Trapelo Road & Williston Road

2017 Build Conditions
Weekday Evening

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	677	4	19	820	2	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	744	4	20	863	2	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				300		
pX, platoon unblocked					0.58	
vC, conflicting volume			748		1649	746
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			748		1759	746
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		95	98
cM capacity (veh/h)			860		52	413
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	748	883	12			
Volume Left	0	20	2			
Volume Right	4	0	9			
cSH	1700	860	174			
Volume to Capacity	0.44	0.02	0.07			
Queue Length 95th (ft)	0	2	5			
Control Delay (s)	0.0	0.6	27.2			
Lane LOS		A	D			
Approach Delay (s)	0.0	0.6	27.2			
Approach LOS			D			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			68.4%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Site Driveway & Common Street

2017 Build Conditions
Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	83	51	54	365	337	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	11	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.949				0.980	
Flt Protected	0.970			0.994		
Satd. Flow (prot)	1658	0	0	1884	1584	0
Flt Permitted	0.970			0.994		
Satd. Flow (perm)	1658	0	0	1884	1584	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	139			211	274	
Travel Time (s)	3.2			4.8	6.2	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	1%	1%	2%
Parking (#/hr)			2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

4: Site Driveway & Common Street

2017 Build Conditions
Weekday Evening

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	83	51	54	365	337	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.91	0.91
Hourly flow rate (vph)	98	60	62	420	370	64
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				211	274	
pX, platoon unblocked	0.91	0.84	0.84			
vC, conflicting volume	946	402	434			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	537	194	232			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	92	94			
cM capacity (veh/h)	435	712	1123			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	158	482	434			
Volume Left	98	62	0			
Volume Right	60	0	64			
cSH	511	1123	1700			
Volume to Capacity	0.31	0.06	0.26			
Queue Length 95th (ft)	33	4	0			
Control Delay (s)	15.2	1.6	0.0			
Lane LOS	C	A				
Approach Delay (s)	15.2	1.6	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			61.2%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Horne Road & Williston Road

2017 Build Conditions
Weekday Evening

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	8	1	3	2	4	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.949		0.885	
Flt Protected		0.958			0.993	
Satd. Flow (prot)	0	1512	1498	0	1387	0
Flt Permitted		0.958			0.993	
Satd. Flow (perm)	0	1512	1498	0	1387	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		596	108		276	
Travel Time (s)		13.5	2.5		6.3	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.73	0.73
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

5: Horne Road & Williston Road

2017 Build Conditions

Weekday Evening

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	8	1	3	2	4	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.73	0.73
Hourly flow rate (vph)	13	2	5	3	5	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	8				33	6
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	8				33	6
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	97
cM capacity (veh/h)	1626				977	1082
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	14	8	34			
Volume Left	13	0	5			
Volume Right	0	3	29			
cSH	1626	1700	1064			
Volume to Capacity	0.01	0.00	0.03			
Queue Length 95th (ft)	1	0	2			
Control Delay (s)	6.4	0.0	8.5			
Lane LOS	A		A			
Approach Delay (s)	6.4	0.0	8.5			
Approach LOS			A			
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization			16.9%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Horne Road & Poplar Street

2017 Build Conditions
Weekday Evening

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	19	12	30	6	2	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.947		0.977			
Flt Protected	0.970					0.997
Satd. Flow (prot)	1450	0	1599	0	0	1686
Flt Permitted	0.970					0.997
Satd. Flow (perm)	1450	0	1599	0	0	1686
Link Speed (mph)	30		30			30
Link Distance (ft)	596		290			271
Travel Time (s)	13.5		6.6			6.2
Peak Hour Factor	0.68	0.68	0.77	0.77	0.63	0.63
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

6: Horne Road & Poplar Street

2017 Build Conditions

Weekday Evening

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	19	12	30	6	2	25
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.68	0.68	0.77	0.77	0.63	0.63
Hourly flow rate (vph)	28	18	39	8	3	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	89	43			47	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	89	43			47	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			100	
cM capacity (veh/h)	915	1033			1574	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	46	47	43			
Volume Left	28	0	3			
Volume Right	18	8	0			
cSH	957	1700	1574			
Volume to Capacity	0.05	0.03	0.00			
Queue Length 95th (ft)	4	0	0			
Control Delay (s)	8.9	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	0.6			
Approach LOS	A					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Trapelo Road & Site Driveway

2017 Build Conditions
Saturday MIDDAY

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	565	59	53	617	0	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	12	12
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt	0.986					0.865
Flt Protected				0.996		
Satd. Flow (prot)	3404	0	0	1872	0	1611
Flt Permitted				0.996		
Satd. Flow (perm)	3404	0	0	1872	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	143			157	129	
Travel Time (s)	3.3			3.6	2.9	
Peak Hour Factor	0.93	0.93	0.95	0.95	0.85	0.85
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

2: Trapelo Road & Site Driveway

2017 Build Conditions

Saturday MIDDAY

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	565	59	53	617	0	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	608	63	56	649	0	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)				157		
pX, platoon unblocked					0.72	
vC, conflicting volume			671		1400	335
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			671		1362	335
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		100	93
cM capacity (veh/h)			915		95	660
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	405	266	705	47		
Volume Left	0	0	56	0		
Volume Right	0	63	0	47		
cSH	1700	1700	915	660		
Volume to Capacity	0.24	0.16	0.06	0.07		
Queue Length 95th (ft)	0	0	5	6		
Control Delay (s)	0.0	0.0	1.6	10.9		
Lane LOS			A	B		
Approach Delay (s)	0.0		1.6	10.9		
Approach LOS				B		
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			59.6%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Trapelo Road & Williston Road

2017 Build Conditions

Saturday MIDDAY

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	608	4	21	604	3	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	13	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999				0.893	
Flt Protected				0.998	0.990	
Satd. Flow (prot)	1895	0	0	1615	1702	0
Flt Permitted				0.998	0.990	
Satd. Flow (perm)	1895	0	0	1615	1702	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	121			143	276	
Travel Time (s)	2.8			3.3	6.3	
Peak Hour Factor	0.93	0.93	0.95	0.95	0.85	0.85
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%
Parking (#/hr)	2	2	2	2		
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

3: Trapelo Road & Williston Road

2017 Build Conditions

Saturday MIDDAY

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	608	4	21	604	3	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	654	4	22	636	4	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				300		
pX, platoon unblocked					0.78	
vC, conflicting volume			658		1336	656
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			658		1290	656
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		97	97
cM capacity (veh/h)			930		137	466
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	658	658	19			
Volume Left	0	22	4			
Volume Right	4	0	15			
cSH	1700	930	322			
Volume to Capacity	0.39	0.02	0.06			
Queue Length 95th (ft)	0	2	5			
Control Delay (s)	0.0	0.6	16.9			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.6	16.9			
Approach LOS			C			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			58.8%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Site Driveway & Common Street

2017 Build Conditions
Saturday MIDDAY

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	136	60	61	316	286	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	11	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.959				0.970	
Flt Protected	0.967			0.992		
Satd. Flow (prot)	1670	0	0	1879	1579	0
Flt Permitted	0.967			0.992		
Satd. Flow (perm)	1670	0	0	1879	1579	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	139			211	274	
Travel Time (s)	3.2			4.8	6.2	
Peak Hour Factor	0.85	0.85	0.93	0.93	0.89	0.89
Heavy Vehicles (%)	2%	2%	2%	1%	0%	2%
Parking (#/hr)			2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

4: Site Driveway & Common Street

2017 Build Conditions

Saturday MIDDAY

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	136	60	61	316	286	81
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.93	0.93	0.89	0.89
Hourly flow rate (vph)	160	71	66	340	321	91
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				211	274	
pX, platoon unblocked	0.91	0.87	0.87			
vC, conflicting volume	838	367	412			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	580	199	251			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	61	90	94			
cM capacity (veh/h)	409	733	1145			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	231	405	412			
Volume Left	160	66	0			
Volume Right	71	0	91			
cSH	473	1145	1700			
Volume to Capacity	0.49	0.06	0.24			
Queue Length 95th (ft)	66	5	0			
Control Delay (s)	19.7	1.8	0.0			
Lane LOS	C	A				
Approach Delay (s)	19.7	1.8	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			5.0			
Intersection Capacity Utilization			61.2%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Horne Road & Williston Road

2017 Build Conditions
Saturday MIDDAY

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	9	0	2	2	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.932		0.865	
Flt Protected		0.950				
Satd. Flow (prot)	0	1499	1471	0	1365	0
Flt Permitted		0.950				
Satd. Flow (perm)	0	1499	1471	0	1365	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		596	108		276	
Travel Time (s)		13.5	2.5		6.3	
Peak Hour Factor	0.65	0.65	0.63	0.63	0.74	0.74
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

5: Horne Road & Williston Road

2017 Build Conditions

Saturday MIDDAY

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	9	0	2	2	0	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.65	0.65	0.63	0.63	0.74	0.74
Hourly flow rate (vph)	14	0	3	3	0	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	6				32	5
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	6				32	5
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	96
cM capacity (veh/h)	1628				978	1084
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	14	6	43			
Volume Left	14	0	0			
Volume Right	0	3	43			
cSH	1628	1700	1084			
Volume to Capacity	0.01	0.00	0.04			
Queue Length 95th (ft)	1	0	3			
Control Delay (s)	7.2	0.0	8.5			
Lane LOS	A		A			
Approach Delay (s)	7.2	0.0	8.5			
Approach LOS			A			
Intersection Summary						
Average Delay			7.3			
Intersection Capacity Utilization			17.2%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Horne Road & Poplar Street

2017 Build Conditions
Saturday MIDDAY

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	30	16	26	9	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.952		0.965			
Flt Protected	0.969					
Satd. Flow (prot)	1456	0	1632	0	0	1691
Flt Permitted	0.969					
Satd. Flow (perm)	1456	0	1632	0	0	1691
Link Speed (mph)	30		30			30
Link Distance (ft)	596		290			271
Travel Time (s)	13.5		6.6			6.2
Peak Hour Factor	0.71	0.71	0.77	0.77	0.66	0.66
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)	2	2	2	2	2	2
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

6: Horne Road & Poplar Street

2017 Build Conditions
Saturday MIDDAY

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	30	16	26	9	0	31
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.71	0.71	0.77	0.77	0.66	0.66
Hourly flow rate (vph)	42	23	34	12	0	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	87	40			45	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87	40			45	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			100	
cM capacity (veh/h)	919	1038			1575	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	65	45	47			
Volume Left	42	0	0			
Volume Right	23	12	0			
cSH	957	1700	1575			
Volume to Capacity	0.07	0.03	0.00			
Queue Length 95th (ft)	5	0	0			
Control Delay (s)	9.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			

Signalized Intersections

2010 Existing

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2010 Existing Conditions
Weekday Morning

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	75	16	688	38	16	365	97	2	15	124	4	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)		0		0	0		0		0		70	
Storage Lanes		0		0	0		0		0		1	
Taper Length (ft)		25		25	25		25		25		25	
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.993			0.969					0.850	
Flt Protected			0.994			0.998				0.995		
Satd. Flow (prot)	0	0	3166	0	0	3110	0	0	0	1795	1561	0
Flt Permitted			0.770			0.910				0.995		
Satd. Flow (perm)	0	0	2452	0	0	2836	0	0	0	1795	1561	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			6								23	
Link Speed (mph)			30			30				30		
Link Distance (ft)			300			221				274		
Travel Time (s)			6.8			5.0				6.2		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.82	0.82	0.82	0.82	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	1%	0%	2%	5%	0%	2%	1%	0%	0%	2%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Shared Lane Traffic (%)												
Turn Type	pm+pt	pm+pt			Perm				Split		Perm	
Protected Phases	5	5	2			6			8	8		
Permitted Phases	2	2			6						8	
Detector Phase	5	5	2		6	6			8	8	8	
Switch Phase												
Minimum Initial (s)	7.0	7.0	15.0		15.0	15.0			5.0	5.0	5.0	
Minimum Split (s)	12.0	12.0	35.0		35.0	35.0			28.0	28.0	28.0	
Total Split (s)	19.0	19.0	54.0	0.0	35.0	35.0	0.0	0.0	28.0	28.0	28.0	0.0
Total Split (%)	17.3%	17.3%	49.1%	0.0%	31.8%	31.8%	0.0%	0.0%	25.5%	25.5%	25.5%	0.0%
Maximum Green (s)	14.0	14.0	48.0		29.0	29.0			22.0	22.0	22.0	
Yellow Time (s)	3.0	3.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-2.0	0.0	-2.0	-2.0	0.0	0.0	-2.0	-2.0	-2.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead			Lag	Lag						
Lead-Lag Optimize?	Yes	Yes			Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0			3.0	3.0	3.0	
Recall Mode	None	None	Min		Min	Min			None	None	None	
Walk Time (s)			14.0		14.0	14.0			10.0	10.0	10.0	
Flash Dont Walk (s)			15.0		15.0	15.0			12.0	12.0	12.0	
Pedestrian Calls (#/hr)			0		0	0			0	0	0	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 95.9
Natural Cycle: 105

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2010 Existing Conditions
Weekday Morning

				
Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	7	214	226	84
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12
Storage Length (ft)		270		0
Storage Lanes		1		0
Taper Length (ft)		25		25
Lane Util. Factor	1.00	1.00	1.00	1.00
Frt			0.959	
Flt Protected		0.950		
Satd. Flow (prot)	0	1805	1610	0
Flt Permitted		0.950		
Satd. Flow (perm)	0	1805	1610	0
Right Turn on Red				Yes
Satd. Flow (RTOR)			16	
Link Speed (mph)			30	
Link Distance (ft)			873	
Travel Time (s)			19.8	
Peak Hour Factor	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	1%	0%
Parking (#/hr)			2	2
Shared Lane Traffic (%)				
Turn Type	Split	Split		
Protected Phases	4	4	4	
Permitted Phases				
Detector Phase	4	4	4	
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	
Minimum Split (s)	28.0	28.0	28.0	
Total Split (s)	28.0	28.0	28.0	0.0
Total Split (%)	25.5%	25.5%	25.5%	0.0%
Maximum Green (s)	22.0	22.0	22.0	
Yellow Time (s)	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	
Recall Mode	None	None	None	
Walk Time (s)	10.0	10.0	10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	
Pedestrian Calls (#/hr)	0	0	0	
Intersection Summary				

Lanes, Volumes, Timings 1: Trapelo Road & Cushing Avenue

2010 Existing Conditions
Weekday Morning

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Trapelo Road & Cushing Avenue

 ø2 54 s		 ø4 28 s		 ø8 28 s	
 ø5 19 s		 ø6 35 s			

Queues

2010 Existing Conditions

1: Trapelo Road & Cushing Avenue

Weekday Morning

						
Lane Group	EBT	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	860	585	180	28	235	329
v/c Ratio	0.78	0.46	0.56	0.09	0.54	0.82
Control Delay	28.3	20.0	44.6	17.0	39.6	52.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	20.0	44.6	17.0	39.6	52.9
Queue Length 50th (ft)	228	127	108	3	134	195
Queue Length 95th (ft)	344	172	151	21	234	#388
Internal Link Dist (ft)	220	141	194			793
Turn Bay Length (ft)				70	270	
Base Capacity (vph)	1313	1287	460	418	463	425
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.45	0.39	0.07	0.51	0.77

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2010 Existing Conditions

1: Trapelo Road & Cushing Avenue

Weekday Morning

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	75	16	688	38	16	365	97	2	15	124	4	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)			4.0			4.0				4.0	4.0	
Lane Util. Factor			0.95			0.95				1.00	1.00	
Frt			0.99			0.97				1.00	0.85	
Flt Protected			0.99			1.00				0.99	1.00	
Satd. Flow (prot)			3167			3112				1795	1561	
Flt Permitted			0.77			0.91				0.99	1.00	
Satd. Flow (perm)			2453			2836				1795	1561	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.82	0.82	0.82	0.82	0.77	0.77	0.77	0.77
Adj. Flow (vph)	79	17	724	40	20	445	118	2	19	161	5	23
RTOR Reduction (vph)	0	0	3	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	0	857	0	0	585	0	0	0	180	9	0
Heavy Vehicles (%)	1%	0%	2%	5%	0%	2%	1%	0%	0%	2%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Turn Type	pm+pt	pm+pt			Perm				Split		Perm	
Protected Phases	5	5	2			6			8	8		
Permitted Phases	2	2			6						8	
Actuated Green, G (s)			41.2			41.2				15.1	15.1	
Effective Green, g (s)			43.2			43.2				17.1	17.1	
Actuated g/C Ratio			0.45			0.45				0.18	0.18	
Clearance Time (s)			6.0			6.0				6.0	6.0	
Vehicle Extension (s)			3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)			1111			1284				322	280	
v/s Ratio Prot										c0.10		
v/s Ratio Perm			c0.35			0.21					0.01	
v/c Ratio			0.77			0.46				0.56	0.03	
Uniform Delay, d1			21.9			18.0				35.7	32.3	
Progression Factor			1.00			1.00				1.00	1.00	
Incremental Delay, d2			3.4			0.3				2.1	0.0	
Delay (s)			25.3			18.3				37.8	32.4	
Level of Service			C			B				D	C	
Approach Delay (s)			25.3			18.3				37.1		
Approach LOS			C			B				D		
Intersection Summary												
HCM Average Control Delay			28.5			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			95.4			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			74.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2010 Existing Conditions
Weekday Morning

				
Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	7	214	226	84
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	12	12	12	12
Total Lost time (s)		4.0	4.0	
Lane Util. Factor		1.00	1.00	
Frt		1.00	0.96	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1805	1611	
Flt Permitted		0.95	1.00	
Satd. Flow (perm)		1805	1611	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94
Adj. Flow (vph)	7	228	240	89
RTOR Reduction (vph)	0	0	12	0
Lane Group Flow (vph)	0	235	317	0
Heavy Vehicles (%)	0%	0%	1%	0%
Parking (#/hr)			2	2
Turn Type	Split	Split		
Protected Phases	4	4	4	
Permitted Phases				
Actuated Green, G (s)		21.1	21.1	
Effective Green, g (s)		23.1	23.1	
Actuated g/C Ratio		0.24	0.24	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		437	390	
v/s Ratio Prot		0.13	c0.20	
v/s Ratio Perm				
v/c Ratio		0.54	0.81	
Uniform Delay, d1		31.5	34.1	
Progression Factor		1.00	1.00	
Incremental Delay, d2		1.3	12.2	
Delay (s)		32.8	46.3	
Level of Service		C	D	
Approach Delay (s)			40.6	
Approach LOS			D	
Intersection Summary				

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2010 Existing Conditions

Weekday Morning

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	559	5	11	354	15	8	47	8	23	46	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		80	0		60	0		60
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850			0.850			0.850
Flt Protected		0.992			0.999			0.993			0.983	
Satd. Flow (prot)	0	1883	0	0	1817	1561	0	1871	1615	0	1662	1423
Flt Permitted		0.864			0.980			0.948			0.865	
Satd. Flow (perm)	0	1640	0	0	1783	1561	0	1786	1615	0	1463	1423
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						11			21			220
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		736			971			731			211	
Travel Time (s)		16.7			22.1			16.6			4.8	
Peak Hour Factor	0.94	0.94	0.94	0.89	0.89	0.89	0.39	0.39	0.39	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Shared Lane Traffic (%)												
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		Prot
Protected Phases		4			8	8		2	2		6	6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	55.0	55.0	0.0	55.0	55.0	55.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%	31.8%	31.8%	31.8%	31.8%	31.8%	31.8%
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	30.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 71.5
Natural Cycle: 80

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2010 Existing Conditions
Weekday Morning

Lane Group ø9

Lane Configurations

Volume (vph)

Ideal Flow (vphpl)

Lane Width (ft)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Right Turn on Red

Satd. Flow (RTOR)

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Parking (#/hr)

Shared Lane Traffic (%)

Turn Type

Protected Phases 9

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 4.0

Minimum Split (s) 20.0

Total Split (s) 20.0

Total Split (%) 18%

Maximum Green (s) 14.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 7.0

Pedestrian Calls (#/hr) 0

Intersection Summary

Lanes, Volumes, Timings
 7: Belmont Street & Common Street

2010 Existing Conditions
 Weekday Morning

Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Belmont Street & Common Street

 ø2	 ø4	 ø9
35 s	55 s	20 s
 ø6	 ø8	
35 s	55 s	

Queues

2010 Existing Conditions

7: Belmont Street & Common Street

Weekday Morning

							
Lane Group	EBT	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	723	410	17	142	21	80	220
v/c Ratio	0.62	0.32	0.02	0.46	0.07	0.31	0.51
Control Delay	8.5	4.9	2.4	31.5	11.6	29.2	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	4.9	2.4	31.5	11.6	29.2	8.7
Queue Length 50th (ft)	124	51	1	57	0	31	0
Queue Length 95th (ft)	260	102	6	42	3	65	46
Internal Link Dist (ft)	656	891		651		131	
Turn Bay Length (ft)			80		60		60
Base Capacity (vph)	1170	1272	1117	775	712	635	742
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.32	0.02	0.18	0.03	0.13	0.30
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

2010 Existing Conditions

7: Belmont Street & Common Street

Weekday Morning

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	559	5	11	354	15	8	47	8	23	46	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00			1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99			1.00	1.00		0.99	1.00		0.98	1.00
Satd. Flow (prot)		1882			1816	1561		1870	1615		1663	1423
Flt Permitted		0.86			0.98	1.00		0.95	1.00		0.86	1.00
Satd. Flow (perm)		1640			1783	1561		1786	1615		1462	1423
Peak-hour factor, PHF	0.94	0.94	0.94	0.89	0.89	0.89	0.39	0.39	0.39	0.86	0.86	0.86
Adj. Flow (vph)	123	595	5	12	398	17	21	121	21	27	53	220
RTOR Reduction (vph)	0	0	0	0	0	3	0	0	17	0	0	182
Lane Group Flow (vph)	0	723	0	0	410	14	0	142	4	0	80	38
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		Prot
Protected Phases		4			8	8		2	2		6	6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		50.0			50.0	50.0		11.5	11.5		11.5	11.5
Effective Green, g (s)		51.0			51.0	51.0		12.5	12.5		12.5	12.5
Actuated g/C Ratio		0.71			0.71	0.71		0.17	0.17		0.17	0.17
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1170			1272	1113		312	282		256	249
v/s Ratio Prot						0.01			0.00			0.03
v/s Ratio Perm	c0.44			0.23			c0.08			0.05		
v/c Ratio	0.62			0.32	0.01		0.46	0.01		0.31	0.15	
Uniform Delay, d1	5.3			3.8	3.0		26.4	24.4		25.7	25.0	
Progression Factor	1.00			1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0			0.1	0.0		1.1	0.0		0.7	0.3	
Delay (s)	6.2			4.0	3.0		27.5	24.4		26.5	25.3	
Level of Service	A			A	A		C	C		C	C	
Approach Delay (s)	6.2			3.9			27.1			25.6		
Approach LOS	A			A			C			C		
Intersection Summary												
HCM Average Control Delay		11.3					HCM Level of Service		B			
HCM Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		71.5					Sum of lost time (s)		8.0			
Intersection Capacity Utilization		75.7%					ICU Level of Service		D			
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2010 Existing Conditions

Weekday Evening

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	76	20	447	62	19	594	134	10	65	227	14	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)		0		0	0		0		0		70	
Storage Lanes		1		0	0		0		0		1	
Taper Length (ft)		25		25	25		25		25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.982			0.972					0.850	
Flt Protected		0.950				0.999				0.989		
Satd. Flow (prot)	0	1731	1564	0	0	3152	0	0	0	1802	1561	0
Flt Permitted		0.114				0.931				0.989		
Satd. Flow (perm)	0	208	1564	0	0	2937	0	0	0	1802	1561	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			8			1					33	
Link Speed (mph)			30			30				30		
Link Distance (ft)			300			221				274		
Travel Time (s)			6.8			5.0				6.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Shared Lane Traffic (%)												
Turn Type	pm+pt	pm+pt			Perm				Split		Perm	
Protected Phases	5	5	2			6			8	8		
Permitted Phases	2	2			6						8	
Detector Phase	5	5	2		6	6			8	8	8	
Switch Phase												
Minimum Initial (s)	7.0	7.0	15.0		15.0	15.0			5.0	5.0	5.0	
Minimum Split (s)	12.0	12.0	35.0		35.0	35.0			28.0	28.0	28.0	
Total Split (s)	19.0	19.0	54.0	0.0	35.0	35.0	0.0	0.0	28.0	28.0	28.0	0.0
Total Split (%)	17.3%	17.3%	49.1%	0.0%	31.8%	31.8%	0.0%	0.0%	25.5%	25.5%	25.5%	0.0%
Maximum Green (s)	14.0	14.0	48.0		29.0	29.0			22.0	22.0	22.0	
Yellow Time (s)	3.0	3.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-2.0	0.0	-2.0	-2.0	0.0	0.0	-2.0	-2.0	-2.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead			Lag	Lag						
Lead-Lag Optimize?	Yes	Yes			Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0			3.0	3.0	3.0	
Recall Mode	None	None	Min		Min	Min			None	None	None	
Walk Time (s)			14.0		14.0	14.0			10.0	10.0	10.0	
Flash Dont Walk (s)			15.0		15.0	15.0			12.0	12.0	12.0	
Pedestrian Calls (#/hr)			0		0	0			0	0	0	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 105.7
Natural Cycle: 105

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2010 Existing Conditions
Weekday Evening

				
Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	8	115	237	92
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12
Storage Length (ft)		270		0
Storage Lanes		1		0
Taper Length (ft)		25		25
Lane Util. Factor	1.00	1.00	1.00	1.00
Frt			0.958	
Flt Protected		0.950		
Satd. Flow (prot)	0	1805	1604	0
Flt Permitted		0.950		
Satd. Flow (perm)	0	1805	1604	0
Right Turn on Red				Yes
Satd. Flow (RTOR)			16	
Link Speed (mph)			30	
Link Distance (ft)			873	
Travel Time (s)			19.8	
Peak Hour Factor	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	1%
Parking (#/hr)			2	2
Shared Lane Traffic (%)				
Turn Type	Split	Split		
Protected Phases	4	4	4	
Permitted Phases				
Detector Phase	4	4	4	
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	
Minimum Split (s)	28.0	28.0	28.0	
Total Split (s)	28.0	28.0	28.0	0.0
Total Split (%)	25.5%	25.5%	25.5%	0.0%
Maximum Green (s)	22.0	22.0	22.0	
Yellow Time (s)	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	
Recall Mode	None	None	None	
Walk Time (s)	10.0	10.0	10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	
Pedestrian Calls (#/hr)	0	0	0	
Intersection Summary				

Lanes, Volumes, Timings
 1: Trapelo Road & Cushing Avenue

2010 Existing Conditions
 Weekday Evening

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Trapelo Road & Cushing Avenue

 Ø2 54 s		 Ø4 28 s		 Ø8 28 s	
 Ø5 19 s		 Ø6 35 s			

Queues

2010 Existing Conditions

1: Trapelo Road & Cushing Avenue

Weekday Evening

							
Lane Group	EBL	EBT	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	106	559	832	336	49	140	374
v/c Ratio	0.43	0.81	0.94	0.85	0.13	0.34	0.99
Control Delay	23.5	36.0	54.9	61.2	17.6	38.0	85.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	36.0	54.9	61.2	17.6	38.0	85.3
Queue Length 50th (ft)	42	321	290	216	8	80	244
Queue Length 95th (ft)	77	473	#434	#363	39	140	#447
Internal Link Dist (ft)		220	141	194			793
Turn Bay Length (ft)					70	270	
Base Capacity (vph)	308	745	889	410	380	411	377
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.75	0.94	0.82	0.13	0.34	0.99

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2010 Existing Conditions

1: Trapelo Road & Cushing Avenue

Weekday Evening

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	76	20	447	62	19	594	134	10	65	227	14	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0			4.0				4.0	4.0	
Lane Util. Factor		1.00	1.00			0.95				1.00	1.00	
Frt		1.00	0.98			0.97				1.00	0.85	
Flt Protected		0.95	1.00			1.00				0.99	1.00	
Satd. Flow (prot)		1731	1564			3150				1802	1561	
Flt Permitted		0.11	1.00			0.93				0.99	1.00	
Satd. Flow (perm)		208	1564			2936				1802	1561	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87	0.87
Adj. Flow (vph)	84	22	491	68	21	653	147	11	75	261	16	33
RTOR Reduction (vph)	0	0	4	0	0	1	0	0	0	0	26	0
Lane Group Flow (vph)	0	106	555	0	0	831	0	0	0	336	23	0
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Turn Type	pm+pt	pm+pt			Perm				Split		Perm	
Protected Phases	5	5	2			6			8	8		
Permitted Phases	2	2			6						8	
Actuated Green, G (s)		44.6	44.6			30.0				21.1	21.1	
Effective Green, g (s)		45.6	46.6			32.0				23.1	23.1	
Actuated g/C Ratio		0.43	0.44			0.30				0.22	0.22	
Clearance Time (s)		5.0	6.0			6.0				6.0	6.0	
Vehicle Extension (s)		3.0	3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)		242	690			889				394	341	
v/s Ratio Prot		0.04	c0.35							c0.19		
v/s Ratio Perm		0.14				c0.28					0.01	
v/c Ratio		0.44	0.80			0.94				0.85	0.07	
Uniform Delay, d1		21.4	25.6			35.8				39.7	32.8	
Progression Factor		1.00	1.00			1.00				1.00	1.00	
Incremental Delay, d2		1.3	6.7			16.5				16.2	0.1	
Delay (s)		22.6	32.3			52.4				55.8	32.8	
Level of Service		C	C			D				E	C	
Approach Delay (s)			30.8			52.4				52.9		
Approach LOS			C			D				D		
Intersection Summary												
HCM Average Control Delay			50.7		HCM Level of Service					D		
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			105.7		Sum of lost time (s)					16.0		
Intersection Capacity Utilization			95.8%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2010 Existing Conditions

Weekday Evening

				
Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	8	115	237	92
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	12	12	12	12
Total Lost time (s)		4.0	4.0	
Lane Util. Factor		1.00	1.00	
Frt		1.00	0.96	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1805	1604	
Flt Permitted		0.95	1.00	
Satd. Flow (perm)		1805	1604	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88
Adj. Flow (vph)	9	131	269	105
RTOR Reduction (vph)	0	0	12	0
Lane Group Flow (vph)	0	140	362	0
Heavy Vehicles (%)	0%	0%	1%	1%
Parking (#/hr)			2	2
Turn Type	Split	Split		
Protected Phases	4	4	4	
Permitted Phases				
Actuated Green, G (s)		22.0	22.0	
Effective Green, g (s)		24.0	24.0	
Actuated g/C Ratio		0.23	0.23	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		410	364	
v/s Ratio Prot		0.08	c0.23	
v/s Ratio Perm				
v/c Ratio		0.34	0.99	
Uniform Delay, d1		34.2	40.8	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.5	45.2	
Delay (s)		34.7	86.0	
Level of Service		C	F	
Approach Delay (s)			72.0	
Approach LOS			E	
Intersection Summary				

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2010 Existing Conditions

Weekday Evening

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	362	37	57	457	17	24	231	44	17	183	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		80	0		60	0		60
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990				0.850			0.850			0.850
Flt Protected		0.990			0.994			0.995			0.996	
Satd. Flow (prot)	0	1862	0	0	1810	1561	0	1874	1615	0	1684	1423
Flt Permitted		0.801			0.900			0.953			0.944	
Satd. Flow (perm)	0	1507	0	0	1638	1561	0	1794	1615	0	1596	1423
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				8			28			96
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		736			971			731			211	
Travel Time (s)		16.7			22.1			16.6			4.8	
Peak Hour Factor	0.89	0.89	0.89	0.94	0.94	0.94	0.84	0.84	0.84	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Shared Lane Traffic (%)												
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		Prot
Protected Phases		4			8	8		2	2		6	6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	50.0	50.0	0.0	50.0	50.0	50.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	45.5%	45.5%	0.0%	45.5%	45.5%	45.5%	36.4%	36.4%	36.4%	36.4%	36.4%	36.4%
Maximum Green (s)	45.0	45.0		45.0	45.0	45.0	35.0	35.0	35.0	35.0	35.0	35.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 72.4												
Natural Cycle: 90												

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2010 Existing Conditions
Weekday Evening

Lane Group ø9

Lane Configurations

Volume (vph)

Ideal Flow (vphpl)

Lane Width (ft)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Right Turn on Red

Satd. Flow (RTOR)

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Parking (#/hr)

Shared Lane Traffic (%)

Turn Type

Protected Phases 9

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 4.0

Minimum Split (s) 20.0

Total Split (s) 20.0

Total Split (%) 18%

Maximum Green (s) 14.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 7.0

Pedestrian Calls (#/hr) 0

Intersection Summary

Lanes, Volumes, Timings
 7: Belmont Street & Common Street

2010 Existing Conditions
 Weekday Evening

Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Belmont Street & Common Street

 ø2	 ø4	 ø9
40 s	50 s	20 s
 ø6	 ø8	
40 s	50 s	

Queues
7: Belmont Street & Common Street

2010 Existing Conditions
Weekday Evening

							
Lane Group	EBT	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	561	547	18	304	52	225	131
v/c Ratio	0.58	0.52	0.02	0.67	0.12	0.56	0.30
Control Delay	11.5	10.3	4.8	32.3	12.5	29.1	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	10.3	4.8	32.3	12.5	29.1	9.7
Queue Length 50th (ft)	124	115	1	122	8	87	12
Queue Length 95th (ft)	263	241	10	182	29	149	49
Internal Link Dist (ft)	656	891		651		131	
Turn Bay Length (ft)			80		60		60
Base Capacity (vph)	963	1044	998	895	820	796	758
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.52	0.02	0.34	0.06	0.28	0.17
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

2010 Existing Conditions

7: Belmont Street & Common Street

Weekday Evening

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	362	37	57	457	17	24	231	44	17	183	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	1.00
Frt		0.99			1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		1862			1810	1561		1874	1615		1684	1423
Flt Permitted		0.80			0.90	1.00		0.95	1.00		0.94	1.00
Satd. Flow (perm)		1507			1639	1561		1795	1615		1596	1423
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	112	407	42	61	486	18	29	275	52	19	206	131
RTOR Reduction (vph)	0	2	0	0	0	3	0	0	21	0	0	72
Lane Group Flow (vph)	0	559	0	0	547	15	0	304	31	0	225	59
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		Prot
Protected Phases		4			8	8		2	2		6	6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		45.1			45.1	45.1		17.2	17.2		17.2	17.2
Effective Green, g (s)		46.1			46.1	46.1		18.2	18.2		18.2	18.2
Actuated g/C Ratio		0.64			0.64	0.64		0.25	0.25		0.25	0.25
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		961			1045	995		452	407		402	358
v/s Ratio Prot						0.01			0.02			0.04
v/s Ratio Perm		c0.37			0.33			c0.17			0.14	
v/c Ratio		0.58			0.52	0.02		0.67	0.08		0.56	0.17
Uniform Delay, d1		7.5			7.1	4.8		24.4	20.6		23.6	21.1
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.9			0.5	0.0		3.9	0.1		1.7	0.2
Delay (s)		8.5			7.6	4.8		28.3	20.7		25.3	21.3
Level of Service		A			A	A		C	C		C	C
Approach Delay (s)		8.5			7.5			27.2			23.8	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM Average Control Delay			14.8				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			72.3				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			91.4%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2010 Existing Conditions
Saturday MIDDAY

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	83	22	385	57	26	383	95	12	65	151	19	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)		0		0	0		0		0		70	
Storage Lanes		0		0	0		0		0		1	
Taper Length (ft)		25		25	25		25		25		25	
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.984			0.969					0.850	
Flt Protected			0.991			0.997				0.985		
Satd. Flow (prot)	0	0	3168	0	0	3155	0	0	0	1798	1561	0
Flt Permitted			0.690			0.903				0.985		
Satd. Flow (perm)	0	0	2206	0	0	2857	0	0	0	1798	1561	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			15			2					60	
Link Speed (mph)			30			30				30		
Link Distance (ft)			300			221				274		
Travel Time (s)			6.8			5.0				6.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.94	0.94	0.94	0.94	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	0%	2%	0%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Shared Lane Traffic (%)												
Turn Type	pm+pt	pm+pt			Perm				Split		Perm	
Protected Phases	5	5	2			6			8	8		
Permitted Phases	2	2			6						8	
Detector Phase	5	5	2		6	6			8	8	8	
Switch Phase												
Minimum Initial (s)	7.0	7.0	15.0		15.0	15.0			5.0	5.0	5.0	
Minimum Split (s)	12.0	12.0	35.0		35.0	35.0			28.0	28.0	28.0	
Total Split (s)	19.0	19.0	54.0	0.0	35.0	35.0	0.0	0.0	28.0	28.0	28.0	0.0
Total Split (%)	17.3%	17.3%	49.1%	0.0%	31.8%	31.8%	0.0%	0.0%	25.5%	25.5%	25.5%	0.0%
Maximum Green (s)	14.0	14.0	48.0		29.0	29.0			22.0	22.0	22.0	
Yellow Time (s)	3.0	3.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-2.0	0.0	-2.0	-2.0	0.0	0.0	-2.0	-2.0	-2.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead			Lag	Lag						
Lead-Lag Optimize?	Yes	Yes			Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0			3.0	3.0	3.0	
Recall Mode	None	None	Min		Min	Min			None	None	None	
Walk Time (s)			14.0		14.0	14.0			10.0	10.0	10.0	
Flash Dont Walk (s)			15.0		15.0	15.0			12.0	12.0	12.0	
Pedestrian Calls (#/hr)			0		0	0			0	0	0	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 87.4
Natural Cycle: 105

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2010 Existing Conditions

Saturday MIDDAY

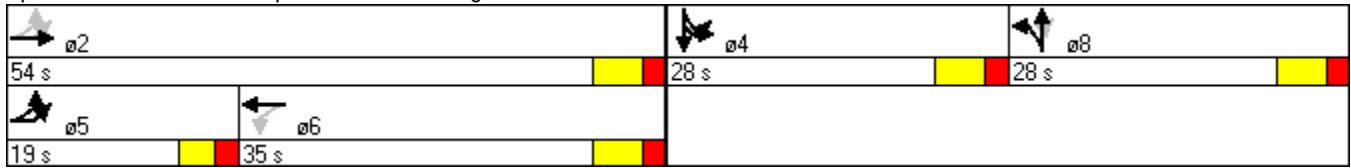
				
Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	6	97	164	106
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12
Storage Length (ft)		270		0
Storage Lanes		1		0
Taper Length (ft)		25		25
Lane Util. Factor	1.00	1.00	1.00	1.00
Frt			0.941	
Flt Protected		0.950		
Satd. Flow (prot)	0	1805	1591	0
Flt Permitted		0.950		
Satd. Flow (perm)	0	1805	1591	0
Right Turn on Red				Yes
Satd. Flow (RTOR)			27	
Link Speed (mph)			30	
Link Distance (ft)			873	
Travel Time (s)			19.8	
Peak Hour Factor	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	0%
Parking (#/hr)			2	2
Shared Lane Traffic (%)				
Turn Type	Split	Split		
Protected Phases	4	4	4	
Permitted Phases				
Detector Phase	4	4	4	
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	
Minimum Split (s)	28.0	28.0	28.0	
Total Split (s)	28.0	28.0	28.0	0.0
Total Split (%)	25.5%	25.5%	25.5%	0.0%
Maximum Green (s)	22.0	22.0	22.0	
Yellow Time (s)	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	
Recall Mode	None	None	None	
Walk Time (s)	10.0	10.0	10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	
Pedestrian Calls (#/hr)	0	0	0	
Intersection Summary				

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2010 Existing Conditions
Saturday MIDDAY

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Trapelo Road & Cushing Avenue



Queues

2010 Existing Conditions

1: Trapelo Road & Cushing Avenue

Saturday MIDDAY

	→	←	↑	↗	↘	↓
Lane Group	EBT	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	601	549	237	81	125	329
v/c Ratio	0.70	0.50	0.62	0.21	0.27	0.76
Control Delay	27.0	22.1	41.5	14.6	31.6	43.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	22.1	41.5	14.6	31.6	43.2
Queue Length 50th (ft)	143	121	120	9	54	153
Queue Length 95th (ft)	218	180	234	52	116	#313
Internal Link Dist (ft)	220	141	194			793
Turn Bay Length (ft)				70	270	
Base Capacity (vph)	1318	1221	513	488	515	473
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.45	0.46	0.17	0.24	0.70

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2010 Existing Conditions

Saturday MIDDAY

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	83	22	385	57	26	383	95	12	65	151	19	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)			4.0			4.0				4.0	4.0	
Lane Util. Factor			0.95			0.95				1.00	1.00	
Frt			0.98			0.97				1.00	0.85	
Flt Protected			0.99			1.00				0.99	1.00	
Satd. Flow (prot)			3167			3156				1799	1561	
Flt Permitted			0.69			0.90				0.99	1.00	
Satd. Flow (perm)			2207			2857				1799	1561	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.94	0.94	0.94	0.94	0.91	0.91	0.91	0.91
Adj. Flow (vph)	91	24	423	63	28	407	101	13	71	166	21	60
RTOR Reduction (vph)	0	0	9	0	0	1	0	0	0	0	47	0
Lane Group Flow (vph)	0	0	592	0	0	548	0	0	0	237	34	0
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	0%	2%	0%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Turn Type	pm+pt	pm+pt			Perm				Split		Perm	
Protected Phases	5	5	2			6			8	8		
Permitted Phases	2	2			6						8	
Actuated Green, G (s)			31.7			31.7				16.4	16.4	
Effective Green, g (s)			33.7			33.7				18.4	18.4	
Actuated g/C Ratio			0.39			0.39				0.21	0.21	
Clearance Time (s)			6.0			6.0				6.0	6.0	
Vehicle Extension (s)			3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)			858			1111				382	331	
v/s Ratio Prot										c0.13		
v/s Ratio Perm			c0.27			0.19					0.02	
v/c Ratio			0.69			0.49				0.62	0.10	
Uniform Delay, d1			22.1			20.0				31.0	27.5	
Progression Factor			1.00			1.00				1.00	1.00	
Incremental Delay, d2			2.3			0.3				3.1	0.1	
Delay (s)			24.5			20.4				34.1	27.6	
Level of Service			C			C				C	C	
Approach Delay (s)			24.5			20.4				32.5		
Approach LOS			C			C				C		
Intersection Summary												
HCM Average Control Delay			26.8			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			86.7			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			70.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2010 Existing Conditions

Saturday MIDDAY

				
Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	6	97	164	106
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	12	12	12	12
Total Lost time (s)		4.0	4.0	
Lane Util. Factor		1.00	1.00	
Frt		1.00	0.94	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1805	1592	
Flt Permitted		0.95	1.00	
Satd. Flow (perm)		1805	1592	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82
Adj. Flow (vph)	7	118	200	129
RTOR Reduction (vph)	0	0	20	0
Lane Group Flow (vph)	0	125	309	0
Heavy Vehicles (%)	0%	0%	0%	0%
Parking (#/hr)			2	2
Turn Type	Split	Split		
Protected Phases	4	4	4	
Permitted Phases				
Actuated Green, G (s)		20.6	20.6	
Effective Green, g (s)		22.6	22.6	
Actuated g/C Ratio		0.26	0.26	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		471	415	
v/s Ratio Prot		0.07	0.19	
v/s Ratio Perm				
v/c Ratio		0.27	0.74	
Uniform Delay, d1		25.5	29.4	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.3	7.1	
Delay (s)		25.8	36.5	
Level of Service		C	D	
Approach Delay (s)			33.5	
Approach LOS			C	
Intersection Summary				

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2010 Existing Conditions

Saturday MIDDAY

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	253	22	30	227	16	12	172	31	24	165	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		80	0		60	0		60
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850			0.850
Flt Protected		0.987			0.994			0.997			0.994	
Satd. Flow (prot)	0	1860	0	0	1810	1561	0	1877	1615	0	1681	1437
Flt Permitted		0.848			0.932			0.974			0.944	
Satd. Flow (perm)	0	1598	0	0	1697	1561	0	1833	1615	0	1596	1437
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				16			26			65
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		736			971			731			211	
Travel Time (s)		16.7			22.1			16.6			4.8	
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.90	0.90	0.90	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Parking (#/hr)										2	2	2
Shared Lane Traffic (%)												
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		Prot
Protected Phases		4			8	8		2	2		6	6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	55.0	55.0	0.0	55.0	55.0	55.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%	31.8%	31.8%	31.8%	31.8%	31.8%	31.8%
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	30.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 40.8
Natural Cycle: 60

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2010 Existing Conditions
Saturday MIDDAY

Lane Group ø9

Lane Configurations

Volume (vph)

Ideal Flow (vphpl)

Lane Width (ft)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Right Turn on Red

Satd. Flow (RTOR)

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Parking (#/hr)

Shared Lane Traffic (%)

Turn Type

Protected Phases 9

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 4.0

Minimum Split (s) 20.0

Total Split (s) 20.0

Total Split (%) 18%

Maximum Green (s) 14.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 7.0

Pedestrian Calls (#/hr) 0

Intersection Summary

Lanes, Volumes, Timings
 7: Belmont Street & Common Street

2010 Existing Conditions
 Saturday MIDDAY

Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Belmont Street & Common Street

 ø2	 ø4	 ø9
35 s	55 s	20 s
 ø6	 ø8	
35 s	55 s	

Queues

2010 Existing Conditions

7: Belmont Street & Common Street

Saturday MIDDAY

	→	←	↖	↑	↗	↓	↙
Lane Group	EBT	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	397	267	17	204	34	225	95
v/c Ratio	0.55	0.35	0.02	0.32	0.06	0.41	0.18
Control Delay	11.8	9.1	4.1	12.8	6.5	14.1	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	9.1	4.1	12.8	6.5	14.1	6.4
Queue Length 50th (ft)	54	33	0	31	1	35	4
Queue Length 95th (ft)	145	91	8	92	16	97	28
Internal Link Dist (ft)	656	891		651		131	
Turn Bay Length (ft)			80		60		60
Base Capacity (vph)	1565	1662	1529	1454	1286	1266	1153
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.16	0.01	0.14	0.03	0.18	0.08
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

7: Belmont Street & Common Street

2010 Existing Conditions

Saturday MIDDAY

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	253	22	30	227	16	12	172	31	24	165	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	1.00
Frt		0.99			1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99			0.99	1.00		1.00	1.00		0.99	1.00
Satd. Flow (prot)		1861			1810	1561		1876	1615		1680	1437
Flt Permitted		0.85			0.93	1.00		0.97	1.00		0.94	1.00
Satd. Flow (perm)		1598			1697	1561		1834	1615		1596	1437
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.90	0.90	0.90	0.84	0.84	0.84
Adj. Flow (vph)	105	269	23	31	236	17	13	191	34	29	196	95
RTOR Reduction (vph)	0	2	0	0	0	9	0	0	17	0	0	42
Lane Group Flow (vph)	0	395	0	0	267	8	0	204	17	0	225	53
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Parking (#/hr)										2	2	2
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		Prot
Protected Phases		4			8	8		2	2		6	6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.2			17.2	17.2		13.1	13.1		13.1	13.1
Effective Green, g (s)		18.2			18.2	18.2		14.1	14.1		14.1	14.1
Actuated g/C Ratio		0.45			0.45	0.45		0.35	0.35		0.35	0.35
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		722			766	705		642	565		558	503
v/s Ratio Prot						0.01			0.01			0.04
v/s Ratio Perm		c0.25			0.16			0.11			c0.14	
v/c Ratio		0.55			0.35	0.01		0.32	0.03		0.40	0.10
Uniform Delay, d1		8.0			7.2	6.1		9.6	8.6		9.9	8.8
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.9			0.3	0.0		0.3	0.0		0.5	0.1
Delay (s)		8.9			7.5	6.1		9.9	8.6		10.4	8.9
Level of Service		A			A	A		A	A		B	A
Approach Delay (s)		8.9			7.4			9.7			10.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			9.0				HCM Level of Service			A		
HCM Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			40.3				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			66.8%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

2017 No-Build

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2017 No-Build Conditions

Weekday Morning

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	80	17	738	44	19	390	104	2	18	133	4	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	11	11	10	11	11	11	10	11	11	11
Storage Length (ft)		0		0	105		0		0		0	
Storage Lanes		1		0	1		0		1		0	
Taper Length (ft)		25		25	25		25		25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.992			0.968				0.977		
Flt Protected		0.950			0.950				0.950			
Satd. Flow (prot)	0	1671	1560	0	1685	1528	0	0	1685	1765	0	0
Flt Permitted		0.168			0.085				0.950			
Satd. Flow (perm)	0	295	1560	0	151	1528	0	0	1685	1765	0	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			3							6		
Link Speed (mph)			30			30				30		
Link Distance (ft)			300			221				274		
Travel Time (s)			6.8			5.0				6.2		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.82	0.82	0.82	0.82	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	1%	0%	2%	5%	0%	2%	1%	0%	0%	2%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Shared Lane Traffic (%)												
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Detector Phase	5	5	2		1	6			3	8		
Switch Phase												
Minimum Initial (s)	3.0	3.0	12.0		3.0	12.0			6.0	12.0		
Minimum Split (s)	6.0	6.0	30.0		6.0	30.0			13.0	28.5		
Total Split (s)	8.0	8.0	56.0	0.0	8.0	56.0	0.0	0.0	22.0	34.0	0.0	0.0
Total Split (%)	6.7%	6.7%	46.7%	0.0%	6.7%	46.7%	0.0%	0.0%	18.3%	28.3%	0.0%	0.0%
Maximum Green (s)	5.0	5.0	49.0		5.0	49.0			15.0	27.0		
Yellow Time (s)	3.0	3.0	4.0		3.0	4.0			3.5	3.5		
All-Red Time (s)	0.0	0.0	3.0		0.0	3.0			3.5	3.5		
Lost Time Adjust (s)	1.0	1.0	-3.0	0.0	1.0	-3.0	0.0	0.0	-3.0	-3.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag			Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0		
Recall Mode	None	None	Min		None	Min			None	None		
Walk Time (s)			7.0			7.0				7.0		
Flash Dont Walk (s)			16.0			16.0				14.5		
Pedestrian Calls (#/hr)			0			0				0		

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 107.2
Natural Cycle: 130

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2017 No-Build Conditions

Weekday Morning

				
Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	8	229	243	90
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	11	11	11	16
Storage Length (ft)		0		50
Storage Lanes		1		1
Taper Length (ft)		25		25
Lane Util. Factor	1.00	1.00	1.00	1.00
Frt				0.850
Flt Protected		0.950		
Satd. Flow (prot)	0	1745	1618	1629
Flt Permitted		0.950		
Satd. Flow (perm)	0	1745	1618	1629
Right Turn on Red				Yes
Satd. Flow (RTOR)				49
Link Speed (mph)			30	
Link Distance (ft)			873	
Travel Time (s)			19.8	
Peak Hour Factor	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	1%	0%
Parking (#/hr)			2	2
Shared Lane Traffic (%)				
Turn Type	Prot	Prot		pm+ov
Protected Phases	7	7	4	5
Permitted Phases				4
Detector Phase	7	7	4	5
Switch Phase				
Minimum Initial (s)	6.0	6.0	12.0	3.0
Minimum Split (s)	13.0	13.0	28.5	6.0
Total Split (s)	22.0	22.0	34.0	8.0
Total Split (%)	18.3%	18.3%	28.3%	6.7%
Maximum Green (s)	15.0	15.0	27.0	5.0
Yellow Time (s)	3.5	3.5	3.5	3.0
All-Red Time (s)	3.5	3.5	3.5	0.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None
Walk Time (s)			7.0	
Flash Dont Walk (s)			14.5	
Pedestrian Calls (#/hr)			0	
Intersection Summary				

Lanes, Volumes, Timings

1: Trapelo Road & Cushing Avenue

2017 No-Build Conditions
Weekday Morning

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Trapelo Road & Cushing Avenue

 ø1	 ø2		 ø3		 ø4
8 s	56 s		22 s		34 s
 ø5	 ø6		 ø7		 ø8
8 s	56 s		22 s		34 s

Queues

2017 No-Build Conditions

1: Trapelo Road & Cushing Avenue

Weekday Morning

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	102	823	23	605	23	205	253	259	96
v/c Ratio	0.50	1.04	0.18	0.87	0.15	0.61	0.86	0.47	0.14
Control Delay	23.7	72.3	16.2	41.4	50.1	47.5	72.0	33.5	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	72.3	16.2	41.4	50.1	47.5	72.0	33.5	13.2
Queue Length 50th (ft)	33	525	7	359	15	131	176	133	18
Queue Length 95th (ft)	69	#996	20	#505	37	173	#352	253	61
Internal Link Dist (ft)		220		141		194		793	
Turn Bay Length (ft)			105						50
Base Capacity (vph)	205	788	132	745	284	501	294	553	708
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	0.50	1.04	0.17	0.81	0.08	0.41	0.86	0.47	0.14

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2017 No-Build Conditions

1: Trapelo Road & Cushing Avenue

Weekday Morning

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	80	17	738	44	19	390	104	2	18	133	4	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	11	10	11	11	11	10	11	11	11
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0		
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Frt		1.00	0.99		1.00	0.97			1.00	0.98		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		1671	1560		1685	1528			1685	1764		
Flt Permitted		0.17	1.00		0.09	1.00			0.95	1.00		
Satd. Flow (perm)		295	1560		151	1528			1685	1764		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.82	0.82	0.82	0.82	0.77	0.77	0.77	0.77
Adj. Flow (vph)	84	18	777	46	23	476	127	2	23	173	5	27
RTOR Reduction (vph)	0	0	2	0	0	0	0	0	0	5	0	0
Lane Group Flow (vph)	0	102	821	0	23	605	0	0	23	200	0	0
Heavy Vehicles (%)	1%	0%	2%	5%	0%	2%	1%	0%	0%	2%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Actuated Green, G (s)		56.0	51.1		49.9	48.0			2.9	21.5		
Effective Green, g (s)		54.1	54.1		47.9	51.0			5.9	24.5		
Actuated g/C Ratio		0.48	0.48		0.42	0.45			0.05	0.22		
Clearance Time (s)		3.0	7.0		3.0	7.0			7.0	7.0		
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		
Lane Grp Cap (vph)		189	743		76	686			88	380		
v/s Ratio Prot		c0.02	c0.53		0.00	0.40			0.01	0.11		
v/s Ratio Perm		0.24			0.13							
v/c Ratio		0.54	1.11		0.30	0.88			0.26	0.53		
Uniform Delay, d1		21.4	29.7		27.8	28.6			51.8	39.4		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		1.5	65.8		0.8	12.4			0.6	0.6		
Delay (s)		22.9	95.6		28.6	41.0			52.3	40.0		
Level of Service		C	F		C	D			D	D		
Approach Delay (s)			87.6			40.5				41.3		
Approach LOS			F			D				D		
Intersection Summary												
HCM Average Control Delay			61.2			HCM Level of Service			E			
HCM Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			113.6			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			81.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2017 No-Build Conditions

Weekday Morning

				
Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	8	229	243	90
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	11	11	11	16
Total Lost time (s)		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1745	1618	1629
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1745	1618	1629
Peak-hour factor, PHF	0.94	0.94	0.94	0.94
Adj. Flow (vph)	9	244	259	96
RTOR Reduction (vph)	0	0	0	33
Lane Group Flow (vph)	0	253	259	63
Heavy Vehicles (%)	0%	0%	1%	0%
Parking (#/hr)			2	2
Turn Type	Prot	Prot	pm+ov	
Protected Phases	7	7	4	5
Permitted Phases				4
Actuated Green, G (s)		15.1	33.7	38.7
Effective Green, g (s)		18.1	36.7	36.7
Actuated g/C Ratio		0.16	0.32	0.32
Clearance Time (s)		7.0	7.0	3.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		278	523	526
v/s Ratio Prot		c0.14	c0.16	0.00
v/s Ratio Perm				0.03
v/c Ratio		0.91	0.50	0.12
Uniform Delay, d1		46.9	31.0	27.1
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		31.1	0.3	0.0
Delay (s)		78.0	31.3	27.1
Level of Service		E	C	C
Approach Delay (s)			50.1	
Approach LOS			D	
Intersection Summary				

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2017 No-Build Conditions

Weekday Morning

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	124	599	5	12	381	16	9	50	9	25	51	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	10	11	11
Storage Length (ft)	0		0	0		80	0		60	50		0
Storage Lanes	0		0	0		1	0		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850			0.850		0.880	
Flt Protected		0.992			0.999			0.992		0.950		
Satd. Flow (prot)	0	1883	0	0	1817	1561	0	1869	1615	1499	1427	0
Flt Permitted		0.854			0.978			0.675		0.595		
Satd. Flow (perm)	0	1621	0	0	1779	1561	0	1272	1615	939	1427	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						10			23		182	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		736			971			731			211	
Travel Time (s)		16.7			22.1			16.6			4.8	
Peak Hour Factor	0.94	0.94	0.94	0.89	0.89	0.89	0.39	0.39	0.39	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Shared Lane Traffic (%)												
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
Total Split (s)	55.0	55.0	0.0	55.0	55.0	55.0	35.0	35.0	35.0	35.0	35.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%	31.8%	31.8%	31.8%	31.8%	31.8%	0.0%
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	
Yellow Time (s)	4.0	4.0		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	1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 73.4												
Natural Cycle: 90												

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2017 No-Build Conditions
Weekday Morning

Lane Group ø9

Lane Configurations

Volume (vph)

Ideal Flow (vphpl)

Lane Width (ft)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Right Turn on Red

Satd. Flow (RTOR)

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Parking (#/hr)

Shared Lane Traffic (%)

Turn Type

Protected Phases 9

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 4.0

Minimum Split (s) 20.0

Total Split (s) 20.0

Total Split (%) 18%

Maximum Green (s) 14.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 7.0

Pedestrian Calls (#/hr) 0

Intersection Summary

Lanes, Volumes, Timings
 7: Belmont Street & Common Street

2017 No-Build Conditions
 Weekday Morning

Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Belmont Street & Common Street

 ø2	 ø4	 ø9
35 s	55 s	20 s
 ø6	 ø8	
35 s	55 s	

Queues
7: Belmont Street & Common Street

2017 No-Build Conditions
Weekday Morning

							
Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	774	441	18	151	23	29	295
v/c Ratio	0.69	0.36	0.02	0.61	0.07	0.16	0.70
Control Delay	11.5	6.1	3.4	38.1	10.3	26.0	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	6.1	3.4	38.1	10.3	26.0	20.1
Queue Length 50th (ft)	152	60	1	63	0	11	45
Queue Length 95th (ft)	393	146	8	45	3	30	111
Internal Link Dist (ft)	656	891		651			131
Turn Bay Length (ft)			80		60	50	
Base Capacity (vph)	1129	1239	1091	539	697	398	709
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.36	0.02	0.28	0.03	0.07	0.42
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

2017 No-Build Conditions

7: Belmont Street & Common Street

Weekday Morning

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	124	599	5	12	381	16	9	50	9	25	51	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	12	12	12	10	11	11
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt		1.00			1.00	0.85		1.00	0.85	1.00	0.88	
Flt Protected		0.99			1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)		1882			1816	1561		1870	1615	1499	1427	
Flt Permitted		0.85			0.98	1.00		0.67	1.00	0.60	1.00	
Satd. Flow (perm)		1621			1778	1561		1271	1615	940	1427	
Peak-hour factor, PHF	0.94	0.94	0.94	0.89	0.89	0.89	0.39	0.39	0.39	0.86	0.86	0.86
Adj. Flow (vph)	132	637	5	13	428	18	23	128	23	29	59	236
RTOR Reduction (vph)	0	0	0	0	0	3	0	0	19	0	147	0
Lane Group Flow (vph)	0	774	0	0	441	15	0	151	4	29	148	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		50.1			50.1	50.1		13.2	13.2	13.2	13.2	
Effective Green, g (s)		51.1			51.1	51.1		14.2	14.2	14.2	14.2	
Actuated g/C Ratio		0.70			0.70	0.70		0.19	0.19	0.19	0.19	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1130			1240	1088		246	313	182	276	
v/s Ratio Prot						0.01			0.00		0.10	
v/s Ratio Perm		c0.48			0.25			c0.12		0.03		
v/c Ratio		0.68			0.36	0.01		0.61	0.01	0.16	0.54	
Uniform Delay, d1		6.4			4.5	3.4		27.0	23.9	24.6	26.6	
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.7			0.2	0.0		4.5	0.0	0.4	2.0	
Delay (s)		8.2			4.6	3.4		31.5	23.9	25.0	28.6	
Level of Service		A			A	A		C	C	C	C	
Approach Delay (s)		8.2			4.6			30.5			28.3	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM Average Control Delay			13.2				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			73.3				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			84.6%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2017 No-Build Conditions

Weekday Evening

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	81	21	478	72	25	636	143	11	75	247	15	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	11	11	10	11	11	11	10	11	11	11
Storage Length (ft)		0		0	105		0		0		0	
Storage Lanes		1		0	1		0		1		0	
Taper Length (ft)		25		25	25		25		25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.980			0.971				0.975		
Flt Protected		0.950			0.950				0.950			
Satd. Flow (prot)	0	1671	1561	0	1685	1548	0	0	1685	1776	0	0
Flt Permitted		0.075			0.234				0.950			
Satd. Flow (perm)	0	132	1561	0	415	1548	0	0	1685	1776	0	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			8			1				5		
Link Speed (mph)			30			30				30		
Link Distance (ft)			300			221				274		
Travel Time (s)			6.8			5.0				6.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Shared Lane Traffic (%)												
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Detector Phase	5	5	2		1	6			3	8		
Switch Phase												
Minimum Initial (s)	3.0	3.0	12.0		3.0	12.0			6.0	12.0		
Minimum Split (s)	6.0	6.0	30.0		6.0	30.0			13.0	28.5		
Total Split (s)	11.0	11.0	56.0	0.0	11.0	56.0	0.0	0.0	21.0	32.0	0.0	0.0
Total Split (%)	9.2%	9.2%	46.7%	0.0%	9.2%	46.7%	0.0%	0.0%	17.5%	26.7%	0.0%	0.0%
Maximum Green (s)	8.0	8.0	49.0		8.0	49.0			14.0	25.0		
Yellow Time (s)	3.0	3.0	4.0		3.0	4.0			3.5	3.5		
All-Red Time (s)	0.0	0.0	3.0		0.0	3.0			3.5	3.5		
Lost Time Adjust (s)	1.0	1.0	-3.0	0.0	1.0	-3.0	0.0	0.0	-3.0	-3.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag			Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0		
Recall Mode	None	None	Min		None	Min			None	None		
Walk Time (s)			7.0			7.0				7.0		
Flash Dont Walk (s)			16.0			16.0				14.5		
Pedestrian Calls (#/hr)			0			0				0		

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 116.4
Natural Cycle: 120

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2017 No-Build Conditions
Weekday Evening

				
Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	9	123	256	99
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	11	11	11	16
Storage Length (ft)		0		50
Storage Lanes		1		1
Taper Length (ft)		25		25
Lane Util. Factor	1.00	1.00	1.00	1.00
Frt				0.850
Flt Protected		0.950		
Satd. Flow (prot)	0	1745	1618	1613
Flt Permitted		0.950		
Satd. Flow (perm)	0	1745	1618	1613
Right Turn on Red				Yes
Satd. Flow (RTOR)				51
Link Speed (mph)			30	
Link Distance (ft)			873	
Travel Time (s)			19.8	
Peak Hour Factor	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	1%
Parking (#/hr)			2	2
Shared Lane Traffic (%)				
Turn Type	Prot	Prot		pm+ov
Protected Phases	7	7	4	5
Permitted Phases				4
Detector Phase	7	7	4	5
Switch Phase				
Minimum Initial (s)	6.0	6.0	12.0	3.0
Minimum Split (s)	13.0	13.0	28.5	6.0
Total Split (s)	21.0	21.0	32.0	11.0
Total Split (%)	17.5%	17.5%	26.7%	9.2%
Maximum Green (s)	14.0	14.0	25.0	8.0
Yellow Time (s)	3.5	3.5	3.5	3.0
All-Red Time (s)	3.5	3.5	3.5	0.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None
Walk Time (s)			7.0	
Flash Dont Walk (s)			14.5	
Pedestrian Calls (#/hr)			0	
Intersection Summary				

Lanes, Volumes, Timings

1: Trapelo Road & Cushing Avenue

2017 No-Build Conditions
Weekday Evening

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Trapelo Road & Cushing Avenue

 ø1	 ø2	 ø3	 ø4
11 s	56 s	21 s	32 s
 ø5	 ø6	 ø7	 ø8
11 s	56 s	21 s	32 s

Queues

2017 No-Build Conditions

1: Trapelo Road & Cushing Avenue

Weekday Evening

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	112	604	27	868	86	341	150	291	112
v/c Ratio	0.70	0.78	0.11	1.25	0.45	0.85	0.65	0.67	0.18
Control Delay	43.2	34.5	14.8	155.3	56.3	62.8	62.4	48.7	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.2	34.5	14.8	155.3	56.3	62.8	62.4	48.7	16.7
Queue Length 50th (ft)	43	401	10	~863	63	248	110	203	32
Queue Length 95th (ft)	#126	#633	25	#1112	109	#371	178	#328	75
Internal Link Dist (ft)		220		141		194		793	
Turn Bay Length (ft)			105						50
Base Capacity (vph)	163	777	287	693	247	432	255	434	617
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	0.69	0.78	0.09	1.25	0.35	0.79	0.59	0.67	0.18

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2017 No-Build Conditions

Weekday Evening

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	81	21	478	72	25	636	143	11	75	247	15	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	11	10	11	11	11	10	11	11	11
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0		
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Frt		1.00	0.98		1.00	0.97			1.00	0.97		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		1671	1562		1685	1548			1685	1776		
Flt Permitted		0.07	1.00		0.23	1.00			0.95	1.00		
Satd. Flow (perm)		132	1562		415	1548			1685	1776		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	23	525	79	27	699	157	12	86	284	17	40
RTOR Reduction (vph)	0	0	4	0	0	1	0	0	0	4	0	0
Lane Group Flow (vph)	0	112	600	0	27	867	0	0	86	337	0	0
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Actuated Green, G (s)		61.1	54.6		53.9	50.4			8.9	24.7		
Effective Green, g (s)		60.1	57.6		51.9	53.4			11.9	27.7		
Actuated g/C Ratio		0.50	0.48		0.44	0.45			0.10	0.23		
Clearance Time (s)		3.0	7.0		3.0	7.0			7.0	7.0		
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		
Lane Grp Cap (vph)		153	755		207	693			168	413		
v/s Ratio Prot		c0.04	0.38		0.00	c0.56			0.05	c0.19		
v/s Ratio Perm		0.33			0.05							
v/c Ratio		0.73	0.79		0.13	1.25			0.51	0.82		
Uniform Delay, d1		26.6	25.8		21.6	32.9			50.9	43.3		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		14.4	5.4		0.1	125.0			1.1	11.2		
Delay (s)		41.0	31.2		21.7	157.9			52.0	54.6		
Level of Service		D	C		C	F			D	D		
Approach Delay (s)			32.8			153.8				54.0		
Approach LOS			C			F				D		
Intersection Summary												
HCM Average Control Delay			80.5			HCM Level of Service			F			
HCM Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			119.2			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			85.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2017 No-Build Conditions

Weekday Evening

				
Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	9	123	256	99
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	11	11	11	16
Total Lost time (s)		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1745	1618	1613
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1745	1618	1613
Peak-hour factor, PHF	0.88	0.88	0.88	0.88
Adj. Flow (vph)	10	140	291	112
RTOR Reduction (vph)	0	0	0	36
Lane Group Flow (vph)	0	150	291	76
Heavy Vehicles (%)	0%	0%	1%	1%
Parking (#/hr)			2	2
Turn Type	Prot	Prot	pm+ov	
Protected Phases	7	7	4	5
Permitted Phases				4
Actuated Green, G (s)		12.4	28.2	35.9
Effective Green, g (s)		15.4	31.2	33.9
Actuated g/C Ratio		0.13	0.26	0.28
Clearance Time (s)		7.0	7.0	3.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		225	424	459
v/s Ratio Prot		c0.09	c0.18	0.01
v/s Ratio Perm				0.04
v/c Ratio		0.67	0.69	0.16
Uniform Delay, d1		49.5	39.6	32.0
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		5.7	3.7	0.1
Delay (s)		55.1	43.3	32.1
Level of Service		E	D	C
Approach Delay (s)			44.2	
Approach LOS			D	
Intersection Summary				

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2017 No-Build Conditions

Weekday Evening

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	390	41	61	492	18	27	248	47	18	196	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	10	11	11
Storage Length (ft)	0		0	0		80	0		60	50		0
Storage Lanes	0		0	0		1	0		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990				0.850			0.850		0.942	
Flt Protected		0.990			0.995			0.995		0.950		
Satd. Flow (prot)	0	1862	0	0	1811	1561	0	1874	1615	1499	1534	0
Flt Permitted		0.709			0.891			0.836		0.363		
Satd. Flow (perm)	0	1334	0	0	1622	1561	0	1574	1615	573	1534	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				8			28		31	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		736			971			731			211	
Travel Time (s)		16.7			22.1			16.6			4.8	
Peak Hour Factor	0.89	0.89	0.89	0.94	0.94	0.94	0.84	0.84	0.84	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Shared Lane Traffic (%)												
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
Total Split (s)	50.0	50.0	0.0	50.0	50.0	50.0	40.0	40.0	40.0	40.0	40.0	0.0
Total Split (%)	45.5%	45.5%	0.0%	45.5%	45.5%	45.5%	36.4%	36.4%	36.4%	36.4%	36.4%	0.0%
Maximum Green (s)	45.0	45.0		45.0	45.0	45.0	35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)	4.0	4.0		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	1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 77.1												
Natural Cycle: 110												

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2017 No-Build Conditions
Weekday Evening

Lane Group ø9

Lane Configurations

Volume (vph)

Ideal Flow (vphpl)

Lane Width (ft)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Right Turn on Red

Satd. Flow (RTOR)

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Parking (#/hr)

Shared Lane Traffic (%)

Turn Type

Protected Phases 9

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 4.0

Minimum Split (s) 20.0

Total Split (s) 20.0

Total Split (%) 18%

Maximum Green (s) 14.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 7.0

Pedestrian Calls (#/hr) 0

Intersection Summary

Lanes, Volumes, Timings
 7: Belmont Street & Common Street

2017 No-Build Conditions
 Weekday Evening

Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Belmont Street & Common Street

 ø2	 ø4	 ø9
40 s	50 s	20 s
 ø6	 ø8	
40 s	50 s	

Queues
7: Belmont Street & Common Street

2017 No-Build Conditions
Weekday Evening

							
Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	604	588	19	327	56	20	360
v/c Ratio	0.75	0.60	0.02	0.70	0.11	0.12	0.76
Control Delay	20.9	14.5	6.5	32.7	11.6	20.6	33.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	14.5	6.5	32.7	11.6	20.6	33.2
Queue Length 50th (ft)	187	158	2	138	10	7	142
Queue Length 95th (ft)	#475	344	13	201	30	22	229
Internal Link Dist (ft)	656	891		651			131
Turn Bay Length (ft)			80		60	50	
Base Capacity (vph)	803	974	941	740	773	269	737
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.60	0.02	0.44	0.07	0.07	0.49

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2017 No-Build Conditions

7: Belmont Street & Common Street

Weekday Evening

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	390	41	61	492	18	27	248	47	18	196	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	12	12	12	10	11	11
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.99			1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected		0.99			0.99	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1862			1810	1561		1874	1615	1499	1533	
Flt Permitted		0.71			0.89	1.00		0.84	1.00	0.36	1.00	
Satd. Flow (perm)		1332			1622	1561		1574	1615	573	1533	
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	120	438	46	65	523	19	32	295	56	20	220	140
RTOR Reduction (vph)	0	2	0	0	0	3	0	0	20	0	22	0
Lane Group Flow (vph)	0	602	0	0	588	16	0	327	36	20	338	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		45.3			45.3	45.3		21.7	21.7	21.7	21.7	
Effective Green, g (s)		46.3			46.3	46.3		22.7	22.7	22.7	22.7	
Actuated g/C Ratio		0.60			0.60	0.60		0.29	0.29	0.29	0.29	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		801			975	939		464	476	169	452	
v/s Ratio Prot						0.01			0.02		c0.22	
v/s Ratio Perm		c0.45			0.36			0.21		0.03		
v/c Ratio		0.75			0.60	0.02		0.70	0.08	0.12	0.75	
Uniform Delay, d1		11.2			9.6	6.2		24.2	19.6	19.8	24.6	
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		4.0			1.1	0.0		4.8	0.1	0.3	6.7	
Delay (s)		15.2			10.7	6.2		29.0	19.7	20.2	31.2	
Level of Service		B			B	A		C	B	C	C	
Approach Delay (s)		15.2			10.5			27.6			30.6	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM Average Control Delay			19.1				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			77.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			103.8%				ICU Level of Service		G			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2016 No-Build Conditions

Saturday MIDDAY

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	89	24	411	69	34	410	101	13	77	167	20	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	11	11	10	11	11	11	10	11	11	11
Storage Length (ft)		0		0	105		0		0		0	
Storage Lanes		1		0	1		0		1		0	
Taper Length (ft)		25		25	25		25		25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.978			0.967				0.950		
Flt Protected		0.950			0.950				0.950			
Satd. Flow (prot)	0	1685	1558	0	1685	1551	0	0	1652	1745	0	0
Flt Permitted		0.188			0.272				0.950			
Satd. Flow (perm)	0	333	1558	0	482	1551	0	0	1652	1745	0	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			10			2				15		
Link Speed (mph)			30			30				30		
Link Distance (ft)			300			221				274		
Travel Time (s)			6.8			5.0				6.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.94	0.94	0.94	0.94	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	0%	2%	0%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Shared Lane Traffic (%)												
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Detector Phase	5	5	2		1	6			3	8		
Switch Phase												
Minimum Initial (s)	3.0	3.0	12.0		3.0	12.0			6.0	12.0		
Minimum Split (s)	6.0	6.0	30.0		6.0	30.0			13.0	28.5		
Total Split (s)	8.0	8.0	55.0	0.0	8.0	55.0	0.0	0.0	18.5	28.5	0.0	0.0
Total Split (%)	7.3%	7.3%	50.0%	0.0%	7.3%	50.0%	0.0%	0.0%	16.8%	25.9%	0.0%	0.0%
Maximum Green (s)	5.0	5.0	48.0		5.0	48.0			11.5	21.5		
Yellow Time (s)	3.0	3.0	4.0		3.0	4.0			3.5	3.5		
All-Red Time (s)	0.0	0.0	3.0		0.0	3.0			3.5	3.5		
Lost Time Adjust (s)	1.0	1.0	-3.0	0.0	1.0	-3.0	0.0	0.0	-3.0	-3.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag			Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0		
Recall Mode	None	None	Min		None	Min			None	None		
Walk Time (s)			7.0			7.0				7.0		
Flash Dont Walk (s)			16.0			16.0				14.5		
Pedestrian Calls (#/hr)			0			0				0		

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 94.9
Natural Cycle: 90

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2016 No-Build Conditions

Saturday MIDDAY

				
Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	6	104	178	115
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	11	11	11	16
Storage Length (ft)		0		50
Storage Lanes		1		1
Taper Length (ft)		25		25
Lane Util. Factor	1.00	1.00	1.00	1.00
Frt				0.850
Flt Protected		0.950		
Satd. Flow (prot)	0	1745	1635	1629
Flt Permitted		0.950		
Satd. Flow (perm)	0	1745	1635	1629
Right Turn on Red				Yes
Satd. Flow (RTOR)				90
Link Speed (mph)			30	
Link Distance (ft)			873	
Travel Time (s)			19.8	
Peak Hour Factor	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	0%
Parking (#/hr)			2	2
Shared Lane Traffic (%)				
Turn Type	Prot	Prot		pm+ov
Protected Phases	7	7	4	5
Permitted Phases				4
Detector Phase	7	7	4	5
Switch Phase				
Minimum Initial (s)	6.0	6.0	12.0	3.0
Minimum Split (s)	13.0	13.0	28.5	6.0
Total Split (s)	18.5	18.5	28.5	8.0
Total Split (%)	16.8%	16.8%	25.9%	7.3%
Maximum Green (s)	11.5	11.5	21.5	5.0
Yellow Time (s)	3.5	3.5	3.5	3.0
All-Red Time (s)	3.5	3.5	3.5	0.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None
Walk Time (s)			7.0	
Flash Dont Walk (s)			14.5	
Pedestrian Calls (#/hr)			0	
Intersection Summary				

Lanes, Volumes, Timings
 1: Trapelo Road & Cushing Avenue

2016 No-Build Conditions
 Saturday MIDDAY

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Trapelo Road & Cushing Avenue

 ø1	 ø2	 ø3	 ø4
8 s	55 s	18.5 s	28.5 s
 ø5	 ø6	 ø7	 ø8
8 s	55 s	18.5 s	28.5 s

Queues

2016 No-Build Conditions

1: Trapelo Road & Cushing Avenue

Saturday MIDDAY

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	124	528	36	557	85	277	134	217	140
v/c Ratio	0.56	0.72	0.13	0.85	0.40	0.70	0.56	0.50	0.22
Control Delay	25.0	28.2	13.2	37.8	48.2	44.8	51.3	38.8	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	28.2	13.2	37.8	48.2	44.8	51.3	38.8	12.6
Queue Length 50th (ft)	40	277	11	306	51	155	80	122	22
Queue Length 95th (ft)	73	426	27	470	106	267	140	196	62
Internal Link Dist (ft)		220		141		194		793	
Turn Bay Length (ft)			105						50
Base Capacity (vph)	222	869	278	861	261	476	275	455	635
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	0.56	0.61	0.13	0.65	0.33	0.58	0.49	0.48	0.22
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

2016 No-Build Conditions

1: Trapelo Road & Cushing Avenue

Saturday MIDDAY

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	89	24	411	69	34	410	101	13	77	167	20	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	11	10	11	11	11	10	11	11	11
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0		
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Frt		1.00	0.98		1.00	0.97			1.00	0.95		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		1685	1559		1685	1552			1652	1744		
Flt Permitted		0.19	1.00		0.27	1.00			0.95	1.00		
Satd. Flow (perm)		333	1559		483	1552			1652	1744		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.94	0.94	0.94	0.94	0.91	0.91	0.91	0.91
Adj. Flow (vph)	98	26	452	76	36	436	107	14	85	184	22	71
RTOR Reduction (vph)	0	0	5	0	0	1	0	0	0	11	0	0
Lane Group Flow (vph)	0	124	523	0	36	556	0	0	85	266	0	0
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	0%	2%	0%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Actuated Green, G (s)		46.3	41.1		41.3	38.6			7.5	19.8		
Effective Green, g (s)		44.3	44.1		39.3	41.6			10.5	22.8		
Actuated g/C Ratio		0.45	0.45		0.40	0.43			0.11	0.23		
Clearance Time (s)		3.0	7.0		3.0	7.0			7.0	7.0		
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		
Lane Grp Cap (vph)		209	704		215	662			178	407		
v/s Ratio Prot		c0.03	0.34		0.00	c0.36			0.05	c0.15		
v/s Ratio Perm		0.24			0.06							
v/c Ratio		0.59	0.74		0.17	0.84			0.48	0.65		
Uniform Delay, d1		19.2	22.1		19.1	25.0			41.0	33.8		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		3.0	3.7		0.1	8.8			0.7	2.9		
Delay (s)		22.2	25.8		19.2	33.8			41.7	36.7		
Level of Service		C	C		B	C			D	D		
Approach Delay (s)			25.1			32.9				37.9		
Approach LOS			C			C				D		
Intersection Summary												
HCM Average Control Delay			31.4		HCM Level of Service					C		
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			97.6		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			68.2%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2016 No-Build Conditions

Saturday MIDDAY

				
Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	6	104	178	115
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	11	11	11	16
Total Lost time (s)		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1745	1635	1629
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1745	1635	1629
Peak-hour factor, PHF	0.82	0.82	0.82	0.82
Adj. Flow (vph)	7	127	217	140
RTOR Reduction (vph)	0	0	0	66
Lane Group Flow (vph)	0	134	217	74
Heavy Vehicles (%)	0%	0%	0%	0%
Parking (#/hr)			2	2
Turn Type	Prot	Prot	pm+ov	
Protected Phases	7	7	4	5
Permitted Phases				4
Actuated Green, G (s)		10.0	22.3	27.5
Effective Green, g (s)		13.0	25.3	25.5
Actuated g/C Ratio		0.13	0.26	0.26
Clearance Time (s)		7.0	7.0	3.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		232	424	426
v/s Ratio Prot		c0.08	0.13	0.01
v/s Ratio Perm				0.04
v/c Ratio		0.58	0.51	0.17
Uniform Delay, d1		39.7	30.9	27.9
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		2.2	0.4	0.1
Delay (s)		41.9	31.3	28.0
Level of Service		D	C	C
Approach Delay (s)			33.2	
Approach LOS			C	
Intersection Summary				

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2016 No-Build Conditions

Saturday MIDDAY

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	273	25	32	245	18	14	184	33	27	177	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	10	11	11
Storage Length (ft)	0		0	0		80	0		60	50		0
Storage Lanes	0		0	0		1	0		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850		0.951	
Flt Protected		0.987			0.994			0.996		0.950		
Satd. Flow (prot)	0	1860	0	0	1810	1561	0	1875	1615	1499	1555	0
Flt Permitted		0.841			0.930			0.966		0.612		
Satd. Flow (perm)	0	1585	0	0	1693	1561	0	1819	1615	966	1555	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				17			26		22	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		736			971			731			211	
Travel Time (s)		16.7			22.1			16.6			4.8	
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.90	0.90	0.90	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Parking (#/hr)										2	2	2
Shared Lane Traffic (%)												
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
Total Split (s)	55.0	55.0	0.0	55.0	55.0	55.0	35.0	35.0	35.0	35.0	35.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%	31.8%	31.8%	31.8%	31.8%	31.8%	0.0%
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	
Yellow Time (s)	4.0	4.0		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	1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 49.1												
Natural Cycle: 65												

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2016 No-Build Conditions
Saturday MIDDAY

Lane Group ø9

Lane Configurations

Volume (vph)

Ideal Flow (vphpl)

Lane Width (ft)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Right Turn on Red

Satd. Flow (RTOR)

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Parking (#/hr)

Shared Lane Traffic (%)

Turn Type

Protected Phases 9

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 4.0

Minimum Split (s) 20.0

Total Split (s) 20.0

Total Split (%) 18%

Maximum Green (s) 14.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 7.0

Pedestrian Calls (#/hr) 0

Intersection Summary

Lanes, Volumes, Timings
 7: Belmont Street & Common Street

2016 No-Build Conditions
 Saturday MIDDAY

Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Belmont Street & Common Street

 ø2	 ø4	 ø9
35 s	55 s	20 s
 ø6	 ø8	
35 s	55 s	

Queues

2016 No-Build Conditions

7: Belmont Street & Common Street

Saturday MIDDAY

							
Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	430	288	19	220	37	32	313
v/c Ratio	0.59	0.37	0.03	0.33	0.06	0.09	0.54
Control Delay	14.3	10.9	5.1	14.1	7.2	12.9	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	10.9	5.1	14.1	7.2	12.9	16.6
Queue Length 50th (ft)	76	45	0	42	2	6	60
Queue Length 95th (ft)	208	126	10	112	19	23	146
Internal Link Dist (ft)	656	891		651			131
Turn Bay Length (ft)			80		60	50	
Base Capacity (vph)	1464	1564	1443	1241	1110	659	1068
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.18	0.01	0.18	0.03	0.05	0.29
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

2016 No-Build Conditions

7: Belmont Street & Common Street

Saturday Midday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	273	25	32	245	18	14	184	33	27	177	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	12	12	12	10	11	11
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.99			1.00	0.85		1.00	0.85	1.00	0.95	
Flt Protected		0.99			0.99	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1859			1810	1561		1876	1615	1499	1555	
Flt Permitted		0.84			0.93	1.00		0.97	1.00	0.61	1.00	
Satd. Flow (perm)		1584			1692	1561		1819	1615	966	1555	
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.90	0.90	0.90	0.84	0.84	0.84
Adj. Flow (vph)	113	290	27	33	255	19	16	204	37	32	211	102
RTOR Reduction (vph)	0	2	0	0	0	9	0	0	16	0	14	0
Lane Group Flow (vph)	0	428	0	0	288	10	0	220	21	32	299	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Parking (#/hr)										2	2	2
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.5			21.5	21.5		16.8	16.8	16.8	16.8	
Effective Green, g (s)		22.5			22.5	22.5		17.8	17.8	17.8	17.8	
Actuated g/C Ratio		0.47			0.47	0.47		0.37	0.37	0.37	0.37	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		738			788	727		670	595	356	573	
v/s Ratio Prot						0.01			0.01		c0.19	
v/s Ratio Perm		c0.27			0.17			0.12		0.03		
v/c Ratio		0.58			0.37	0.01		0.33	0.03	0.09	0.52	
Uniform Delay, d1		9.4			8.3	6.9		11.0	9.8	10.0	11.9	
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.1			0.3	0.0		0.3	0.0	0.1	0.9	
Delay (s)		10.6			8.6	6.9		11.2	9.8	10.1	12.8	
Level of Service		B			A	A		B	A	B	B	
Approach Delay (s)		10.6			8.5			11.0			12.5	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM Average Control Delay			10.7				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			48.3				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			68.8%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

2017 Build

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2017 Build Conditions

Weekday Morning

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	82	17	727	56	37	373	104	2	84	138	4	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	11	11	10	11	11	11	10	11	11	11
Storage Length (ft)		0		0	105		0		0		0	
Storage Lanes		1		0	1		0		1		0	
Taper Length (ft)		25		25	25		25		25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.989			0.967				0.966		
Flt Protected		0.950			0.950				0.950			
Satd. Flow (prot)	0	1671	1555	0	1685	1527	0	0	1685	1747	0	0
Flt Permitted		0.215			0.081				0.950			
Satd. Flow (perm)	0	378	1555	0	144	1527	0	0	1685	1747	0	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			4							10		
Link Speed (mph)			30			30				30		
Link Distance (ft)			157			221				274		
Travel Time (s)			3.6			5.0				6.2		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.82	0.82	0.82	0.82	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	1%	0%	2%	5%	0%	2%	1%	0%	0%	2%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Shared Lane Traffic (%)												
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Detector Phase	5	5	2		1	6			3	8		
Switch Phase												
Minimum Initial (s)	3.0	3.0	12.0		3.0	12.0			6.0	12.0		
Minimum Split (s)	6.0	6.0	30.0		6.0	30.0			13.0	28.5		
Total Split (s)	8.0	8.0	58.0	0.0	8.0	58.0	0.0	0.0	20.0	32.0	0.0	0.0
Total Split (%)	6.7%	6.7%	48.3%	0.0%	6.7%	48.3%	0.0%	0.0%	16.7%	26.7%	0.0%	0.0%
Maximum Green (s)	5.0	5.0	51.0		5.0	51.0			13.0	25.0		
Yellow Time (s)	3.0	3.0	4.0		3.0	4.0			3.5	3.5		
All-Red Time (s)	0.0	0.0	3.0		0.0	3.0			3.5	3.5		
Lost Time Adjust (s)	1.0	1.0	-3.0	0.0	1.0	-3.0	0.0	0.0	-3.0	-3.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag			Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0		
Recall Mode	None	None	Min		None	Min			None	None		
Walk Time (s)			7.0			7.0				7.0		
Flash Dont Walk (s)			16.0			16.0				14.5		
Pedestrian Calls (#/hr)			0			0				0		

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 112.7
Natural Cycle: 130

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2017 Build Conditions

Weekday Morning

				
Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	8	229	244	91
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	11	11	11	16
Storage Length (ft)		0		50
Storage Lanes		1		1
Taper Length (ft)		25		25
Lane Util. Factor	1.00	1.00	1.00	1.00
Frt				0.850
Flt Protected		0.950		
Satd. Flow (prot)	0	1745	1618	1629
Flt Permitted		0.950		
Satd. Flow (perm)	0	1745	1618	1629
Right Turn on Red				Yes
Satd. Flow (RTOR)				49
Link Speed (mph)			30	
Link Distance (ft)			873	
Travel Time (s)			19.8	
Peak Hour Factor	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	1%	0%
Parking (#/hr)			2	2
Shared Lane Traffic (%)				
Turn Type	Prot	Prot		pm+ov
Protected Phases	7	7	4	5
Permitted Phases				4
Detector Phase	7	7	4	5
Switch Phase				
Minimum Initial (s)	6.0	6.0	12.0	3.0
Minimum Split (s)	13.0	13.0	28.5	6.0
Total Split (s)	22.0	22.0	34.0	8.0
Total Split (%)	18.3%	18.3%	28.3%	6.7%
Maximum Green (s)	15.0	15.0	27.0	5.0
Yellow Time (s)	3.5	3.5	3.5	3.0
All-Red Time (s)	3.5	3.5	3.5	0.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None
Walk Time (s)			7.0	
Flash Dont Walk (s)			14.5	
Pedestrian Calls (#/hr)			0	
Intersection Summary				

Lanes, Volumes, Timings
 1: Trapelo Road & Cushing Avenue

2017 Build Conditions
 Weekday Morning

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Trapelo Road & Cushing Avenue

 ø1	 ø2		 ø3		 ø4
8 s	58 s		20 s		34 s
 ø5	 ø6		 ø7		 ø8
8 s	58 s		22 s		32 s

Queues
1: Trapelo Road & Cushing Avenue

2017 Build Conditions

Weekday Morning

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	104	824	45	584	109	232	253	260	97
v/c Ratio	0.44	1.10	0.36	0.82	0.53	0.66	0.90	0.68	0.18
Control Delay	21.2	92.8	21.8	38.3	57.7	49.8	82.3	50.2	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.2	92.8	21.8	38.3	57.7	49.8	82.3	50.2	16.9
Queue Length 50th (ft)	36	~698	15	356	76	152	185	178	26
Queue Length 95th (ft)	71	#1011	33	482	117	195	#363	275	67
Internal Link Dist (ft)		77		141		194		793	
Turn Bay Length (ft)			105						50
Base Capacity (vph)	238	751	127	735	240	444	280	433	534
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	0.44	1.10	0.35	0.79	0.45	0.52	0.90	0.60	0.18

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2017 Build Conditions

1: Trapelo Road & Cushing Avenue

Weekday Morning

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	82	17	727	56	37	373	104	2	84	138	4	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	11	10	11	11	11	10	11	11	11
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0		
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Frt		1.00	0.99		1.00	0.97			1.00	0.97		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		1671	1555		1685	1527			1685	1747		
Flt Permitted		0.21	1.00		0.08	1.00			0.95	1.00		
Satd. Flow (perm)		378	1555		144	1527			1685	1747		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.82	0.82	0.82	0.82	0.77	0.77	0.77	0.77
Adj. Flow (vph)	86	18	765	59	45	455	127	2	109	179	5	48
RTOR Reduction (vph)	0	0	2	0	0	0	0	0	0	8	0	0
Lane Group Flow (vph)	0	104	822	0	45	584	0	0	109	224	0	0
Heavy Vehicles (%)	1%	0%	2%	5%	0%	2%	1%	0%	0%	2%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Actuated Green, G (s)		56.3	51.3		54.1	50.2			10.6	19.0		
Effective Green, g (s)		54.3	54.3		52.1	53.2			13.6	22.0		
Actuated g/C Ratio		0.48	0.48		0.46	0.47			0.12	0.19		
Clearance Time (s)		3.0	7.0		3.0	7.0			7.0	7.0		
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		
Lane Grp Cap (vph)		227	745		106	717			202	339		
v/s Ratio Prot		c0.02	c0.53		0.01	0.38			0.06	0.13		
v/s Ratio Perm		0.20			0.18							
v/c Ratio		0.46	1.10		0.42	0.81			0.54	0.66		
Uniform Delay, d1		19.8	29.5		26.1	25.8			46.9	42.2		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		0.5	64.9		1.0	6.7			1.4	3.7		
Delay (s)		20.3	94.4		27.1	32.5			48.3	45.9		
Level of Service		C	F		C	C			D	D		
Approach Delay (s)			86.1			32.1				46.7		
Approach LOS			F			C				D		
Intersection Summary												
HCM Average Control Delay			59.9			HCM Level of Service				E		
HCM Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			113.3			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			81.5%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2017 Build Conditions

Weekday Morning

				
Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	8	229	244	91
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	11	11	11	16
Total Lost time (s)		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1745	1618	1629
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1745	1618	1629
Peak-hour factor, PHF	0.94	0.94	0.94	0.94
Adj. Flow (vph)	9	244	260	97
RTOR Reduction (vph)	0	0	0	38
Lane Group Flow (vph)	0	253	260	59
Heavy Vehicles (%)	0%	0%	1%	0%
Parking (#/hr)			2	2
Turn Type	Prot	Prot	pm+ov	
Protected Phases	7	7	4	5
Permitted Phases				4
Actuated Green, G (s)		15.1	23.5	28.5
Effective Green, g (s)		18.1	26.5	26.5
Actuated g/C Ratio		0.16	0.23	0.23
Clearance Time (s)		7.0	7.0	3.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		279	378	381
v/s Ratio Prot		c0.14	c0.16	0.01
v/s Ratio Perm				0.03
v/c Ratio		0.91	0.69	0.16
Uniform Delay, d1		46.8	39.6	34.5
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		30.0	4.1	0.1
Delay (s)		76.8	43.7	34.6
Level of Service		E	D	C
Approach Delay (s)			56.0	
Approach LOS			E	
Intersection Summary				

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2017 Build Conditions

Weekday Morning

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	133	600	8	12	380	19	12	48	9	31	50	217
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	10	11	11
Storage Length (ft)	0		0	0		80	0		60	50		0
Storage Lanes	0		0	0		1	0		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998				0.850			0.850		0.878	
Flt Protected		0.991			0.999			0.990		0.950		
Satd. Flow (prot)	0	1879	0	0	1817	1561	0	1866	1615	1499	1424	0
Flt Permitted		0.845			0.977			0.585		0.591		
Satd. Flow (perm)	0	1602	0	0	1777	1561	0	1103	1615	933	1424	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				12			23		198	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		736			971			731			211	
Travel Time (s)		16.7			22.1			16.6			4.8	
Peak Hour Factor	0.94	0.94	0.94	0.89	0.89	0.89	0.39	0.39	0.39	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Shared Lane Traffic (%)												
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
Total Split (s)	55.0	55.0	0.0	55.0	55.0	55.0	35.0	35.0	35.0	35.0	35.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%	31.8%	31.8%	31.8%	31.8%	31.8%	0.0%
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	
Yellow Time (s)	4.0	4.0		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	1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Intersection Summary												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	73.8											
Natural Cycle:	110											

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2017 Build Conditions
Weekday Morning

Lane Group ø9

Lane Configurations

Volume (vph)

Ideal Flow (vphpl)

Lane Width (ft)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Right Turn on Red

Satd. Flow (RTOR)

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Parking (#/hr)

Shared Lane Traffic (%)

Turn Type

Protected Phases 9

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 4.0

Minimum Split (s) 20.0

Total Split (s) 20.0

Total Split (%) 18%

Maximum Green (s) 14.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 7.0

Pedestrian Calls (#/hr) 0

Intersection Summary

Lanes, Volumes, Timings
 7: Belmont Street & Common Street

2017 Build Conditions
 Weekday Morning

Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Belmont Street & Common Street

 ø2	 ø4	 ø9
35 s	55 s	20 s
 ø6	 ø8	
35 s	55 s	

Queues

2017 Build Conditions

7: Belmont Street & Common Street

Weekday Morning

							
Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	788	440	21	154	23	36	310
v/c Ratio	0.71	0.36	0.02	0.70	0.07	0.19	0.70
Control Delay	12.5	6.3	3.3	44.9	10.2	26.6	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	6.3	3.3	44.9	10.2	26.6	19.4
Queue Length 50th (ft)	168	64	1	66	0	14	45
Queue Length 95th (ft)	422	148	9	46	3	36	112
Internal Link Dist (ft)	656	891		651			131
Turn Bay Length (ft)			80		60	50	
Base Capacity (vph)	1110	1231	1085	464	693	393	714
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.36	0.02	0.33	0.03	0.09	0.43
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

7: Belmont Street & Common Street

2017 Build Conditions

Weekday Morning

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	133	600	8	12	380	19	12	48	9	31	50	217
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	12	12	12	10	11	11
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt		1.00			1.00	0.85		1.00	0.85	1.00	0.88	
Flt Protected		0.99			1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)		1880			1816	1561		1866	1615	1499	1424	
Flt Permitted		0.85			0.98	1.00		0.58	1.00	0.59	1.00	
Satd. Flow (perm)		1604			1777	1561		1102	1615	932	1424	
Peak-hour factor, PHF	0.94	0.94	0.94	0.89	0.89	0.89	0.39	0.39	0.39	0.86	0.86	0.86
Adj. Flow (vph)	141	638	9	13	427	21	31	123	23	36	58	252
RTOR Reduction (vph)	0	0	0	0	0	4	0	0	18	0	159	0
Lane Group Flow (vph)	0	788	0	0	440	17	0	154	5	36	151	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		50.1			50.1	50.1		13.7	13.7	13.7	13.7	
Effective Green, g (s)		51.1			51.1	51.1		14.7	14.7	14.7	14.7	
Actuated g/C Ratio		0.69			0.69	0.69		0.20	0.20	0.20	0.20	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1111			1230	1081		220	322	186	284	
v/s Ratio Prot						0.01			0.00		0.11	
v/s Ratio Perm		c0.49			0.25			c0.14		0.04		
v/c Ratio		0.71			0.36	0.02		0.70	0.01	0.19	0.53	
Uniform Delay, d1		6.9			4.6	3.5		27.5	23.7	24.6	26.5	
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.1			0.2	0.0		9.6	0.0	0.5	1.9	
Delay (s)		9.0			4.8	3.5		37.1	23.7	25.1	28.4	
Level of Service		A			A	A		D	C	C	C	
Approach Delay (s)		9.0			4.8			35.4			28.1	
Approach LOS		A			A			D			C	
Intersection Summary												
HCM Average Control Delay			14.2				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			73.8				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			86.1%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2017 Build Conditions

Weekday Evening

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	83	21	470	87	49	630	142	11	126	254	15	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	11	11	10	11	11	11	10	11	11	11
Storage Length (ft)		0		0	105		0		0		0	
Storage Lanes		1		0	1		0		1		0	
Taper Length (ft)		25		25	25		25		25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.976			0.971				0.968		
Flt Protected		0.950			0.950				0.950			
Satd. Flow (prot)	0	1671	1555	0	1685	1548	0	0	1685	1764	0	0
Flt Permitted		0.078			0.204				0.950			
Satd. Flow (perm)	0	137	1555	0	362	1548	0	0	1685	1764	0	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			10			1				8		
Link Speed (mph)			30			30				30		
Link Distance (ft)			157			221				274		
Travel Time (s)			3.6			5.0				6.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Shared Lane Traffic (%)												
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Detector Phase	5	5	2		1	6			3	8		
Switch Phase												
Minimum Initial (s)	3.0	3.0	12.0		3.0	12.0			6.0	12.0		
Minimum Split (s)	6.0	6.0	30.0		6.0	30.0			13.0	28.5		
Total Split (s)	11.0	11.0	56.0	0.0	11.0	56.0	0.0	0.0	19.0	34.0	0.0	0.0
Total Split (%)	9.2%	9.2%	46.7%	0.0%	9.2%	46.7%	0.0%	0.0%	15.8%	28.3%	0.0%	0.0%
Maximum Green (s)	8.0	8.0	49.0		8.0	49.0			12.0	27.0		
Yellow Time (s)	3.0	3.0	4.0		3.0	4.0			3.5	3.5		
All-Red Time (s)	0.0	0.0	3.0		0.0	3.0			3.5	3.5		
Lost Time Adjust (s)	1.0	1.0	-3.0	0.0	1.0	-3.0	0.0	0.0	-3.0	-3.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag			Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0		
Recall Mode	None	None	Min		None	Min			None	None		
Walk Time (s)			7.0			7.0				7.0		
Flash Dont Walk (s)			16.0			16.0				14.5		
Pedestrian Calls (#/hr)			0			0				0		

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 117.3
Natural Cycle: 130

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2017 Build Conditions

Weekday Evening

				
Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	9	123	258	111
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	11	11	11	16
Storage Length (ft)		0		50
Storage Lanes		1		1
Taper Length (ft)		25		25
Lane Util. Factor	1.00	1.00	1.00	1.00
Frt				0.850
Flt Protected		0.950		
Satd. Flow (prot)	0	1745	1618	1613
Flt Permitted		0.950		
Satd. Flow (perm)	0	1745	1618	1613
Right Turn on Red				Yes
Satd. Flow (RTOR)				59
Link Speed (mph)			30	
Link Distance (ft)			873	
Travel Time (s)			19.8	
Peak Hour Factor	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	1%
Parking (#/hr)			2	2
Shared Lane Traffic (%)				
Turn Type	Prot	Prot		pm+ov
Protected Phases	7	7	4	5
Permitted Phases				4
Detector Phase	7	7	4	5
Switch Phase				
Minimum Initial (s)	6.0	6.0	12.0	3.0
Minimum Split (s)	13.0	13.0	28.5	6.0
Total Split (s)	19.0	19.0	34.0	11.0
Total Split (%)	15.8%	15.8%	28.3%	9.2%
Maximum Green (s)	12.0	12.0	27.0	8.0
Yellow Time (s)	3.5	3.5	3.5	3.0
All-Red Time (s)	3.5	3.5	3.5	0.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None
Walk Time (s)			7.0	
Flash Dont Walk (s)			14.5	
Pedestrian Calls (#/hr)			0	
Intersection Summary				

Lanes, Volumes, Timings 1: Trapelo Road & Cushing Avenue

2017 Build Conditions
Weekday Evening

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Trapelo Road & Cushing Avenue

 ø1	 ø2	 ø3	 ø4
11 s	56 s	19 s	34 s
 ø5	 ø6	 ø7	 ø8
11 s	56 s	19 s	34 s

Queues

2017 Build Conditions

1: Trapelo Road & Cushing Avenue

Weekday Evening

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	114	612	54	860	145	370	150	293	126
v/c Ratio	0.72	0.83	0.23	1.25	0.70	0.86	0.71	0.76	0.22
Control Delay	44.6	39.7	16.5	154.9	69.1	62.4	68.6	54.9	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	39.7	16.5	154.9	69.1	62.4	68.6	54.9	16.4
Queue Length 50th (ft)	43	415	20	~850	109	267	113	209	35
Queue Length 95th (ft)	#130	#662	41	#1099	#185	#396	#193	303	79
Internal Link Dist (ft)		77		141		194		793	
Turn Bay Length (ft)			105						50
Base Capacity (vph)	163	737	262	688	216	458	223	415	577
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	0.70	0.83	0.21	1.25	0.67	0.81	0.67	0.71	0.22

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2017 Build Conditions

1: Trapelo Road & Cushing Avenue

Weekday Evening

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	83	21	470	87	49	630	142	11	126	254	15	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	11	10	11	11	11	10	11	11	11
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0		
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Frt		1.00	0.98		1.00	0.97			1.00	0.97		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		1671	1556		1685	1548			1685	1765		
Flt Permitted		0.08	1.00		0.20	1.00			0.95	1.00		
Satd. Flow (perm)		137	1556		361	1548			1685	1765		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87	0.87
Adj. Flow (vph)	91	23	516	96	54	692	156	12	145	292	17	61
RTOR Reduction (vph)	0	0	5	0	0	1	0	0	0	6	0	0
Lane Group Flow (vph)	0	114	607	0	54	859	0	0	145	364	0	0
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Actuated Green, G (s)		60.0	52.2		55.0	49.7			11.3	25.1		
Effective Green, g (s)		58.0	55.2		53.0	52.7			14.3	28.1		
Actuated g/C Ratio		0.49	0.47		0.45	0.45			0.12	0.24		
Clearance Time (s)		3.0	7.0		3.0	7.0			7.0	7.0		
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		
Lane Grp Cap (vph)		156	729		211	692			204	421		
v/s Ratio Prot		c0.04	0.39		0.01	c0.56			c0.09	c0.21		
v/s Ratio Perm		0.32			0.11							
v/c Ratio		0.73	0.83		0.26	1.24			0.71	0.86		
Uniform Delay, d1		26.4	27.3		21.5	32.6			49.8	43.1		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		14.0	7.7		0.2	120.9			9.3	16.1		
Delay (s)		40.5	35.0		21.7	153.5			59.1	59.2		
Level of Service		D	D		C	F			E	E		
Approach Delay (s)			35.9			145.7				59.2		
Approach LOS			D			F				E		
Intersection Summary												
HCM Average Control Delay			79.7			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			117.9			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			86.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2017 Build Conditions

Weekday Evening

				
Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	9	123	258	111
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	11	11	11	16
Total Lost time (s)		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1745	1618	1613
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1745	1618	1613
Peak-hour factor, PHF	0.88	0.88	0.88	0.88
Adj. Flow (vph)	10	140	293	126
RTOR Reduction (vph)	0	0	0	44
Lane Group Flow (vph)	0	150	293	82
Heavy Vehicles (%)	0%	0%	1%	1%
Parking (#/hr)			2	2
Turn Type	Prot	Prot	pm+ov	
Protected Phases	7	7	4	5
Permitted Phases				4
Actuated Green, G (s)		11.3	25.1	32.9
Effective Green, g (s)		14.3	28.1	30.9
Actuated g/C Ratio		0.12	0.24	0.26
Clearance Time (s)		7.0	7.0	3.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		212	386	423
v/s Ratio Prot		0.09	0.18	0.01
v/s Ratio Perm				0.04
v/c Ratio		0.71	0.76	0.19
Uniform Delay, d1		49.8	41.8	33.8
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		8.5	7.4	0.1
Delay (s)		58.3	49.2	33.9
Level of Service		E	D	C
Approach Delay (s)			48.2	
Approach LOS			D	
Intersection Summary				

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2017 Build Conditions

Weekday Evening

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	129	382	42	61	485	39	26	258	47	34	201	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	10	11	11
Storage Length (ft)	0		0	0		80	0		60	50		0
Storage Lanes	0		0	0		1	0		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990				0.850			0.850		0.938	
Flt Protected		0.988			0.994			0.995		0.950		
Satd. Flow (prot)	0	1858	0	0	1810	1561	0	1873	1615	1499	1527	0
Flt Permitted		0.635			0.886			0.839		0.364		
Satd. Flow (perm)	0	1194	0	0	1613	1561	0	1580	1615	574	1527	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				17			27			34
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		736			971			731			211	
Travel Time (s)		16.7			22.1			16.6			4.8	
Peak Hour Factor	0.89	0.89	0.89	0.94	0.94	0.94	0.84	0.84	0.84	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Shared Lane Traffic (%)												
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
Total Split (s)	50.0	50.0	0.0	50.0	50.0	50.0	40.0	40.0	40.0	40.0	40.0	0.0
Total Split (%)	45.5%	45.5%	0.0%	45.5%	45.5%	45.5%	36.4%	36.4%	36.4%	36.4%	36.4%	0.0%
Maximum Green (s)	45.0	45.0		45.0	45.0	45.0	35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)	4.0	4.0		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	1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 79.1												
Natural Cycle: 130												

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2017 Build Conditions
Weekday Evening

Lane Group ø9

Lane Configurations

Volume (vph)

Ideal Flow (vphpl)

Lane Width (ft)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Right Turn on Red

Satd. Flow (RTOR)

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Parking (#/hr)

Shared Lane Traffic (%)

Turn Type

Protected Phases 9

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 4.0

Minimum Split (s) 20.0

Total Split (s) 20.0

Total Split (%) 18%

Maximum Green (s) 14.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 7.0

Pedestrian Calls (#/hr) 0

Intersection Summary

Lanes, Volumes, Timings
 7: Belmont Street & Common Street

2017 Build Conditions
 Weekday Evening

Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Belmont Street & Common Street

 ø2	 ø4	 ø9
40 s	50 s	20 s
 ø6	 ø8	
40 s	50 s	

Queues

2017 Build Conditions

7: Belmont Street & Common Street

Weekday Evening

							
Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	621	581	41	338	56	38	386
v/c Ratio	0.88	0.61	0.04	0.69	0.11	0.21	0.77
Control Delay	33.6	15.9	6.6	31.1	11.5	22.2	33.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	15.9	6.6	31.1	11.5	22.2	33.1
Queue Length 50th (ft)	235	167	4	143	10	14	155
Queue Length 95th (ft)	#573	370	22	206	30	36	247
Internal Link Dist (ft)	656	891		651			131
Turn Bay Length (ft)			80		60	50	
Base Capacity (vph)	702	945	922	724	755	263	719
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.61	0.04	0.47	0.07	0.14	0.54

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2017 Build Conditions

7: Belmont Street & Common Street

Weekday Evening

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	129	382	42	61	485	39	26	258	47	34	201	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	12	12	12	10	11	11
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.99			1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected		0.99			0.99	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1859			1810	1561		1874	1615	1499	1527	
Flt Permitted		0.63			0.89	1.00		0.84	1.00	0.36	1.00	
Satd. Flow (perm)		1193			1614	1561		1580	1615	575	1527	
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	145	429	47	65	516	41	31	307	56	38	226	160
RTOR Reduction (vph)	0	2	0	0	0	7	0	0	19	0	23	0
Lane Group Flow (vph)	0	619	0	0	581	34	0	338	37	38	363	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	1%
Parking (#/hr)										2	2	2
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		45.3			45.3	45.3		23.7	23.7	23.7	23.7	
Effective Green, g (s)		46.3			46.3	46.3		24.7	24.7	24.7	24.7	
Actuated g/C Ratio		0.59			0.59	0.59		0.31	0.31	0.31	0.31	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		699			946	915		494	505	180	477	
v/s Ratio Prot						0.02			0.02		c0.24	
v/s Ratio Perm		c0.52			0.36			0.21		0.07		
v/c Ratio		0.89			0.61	0.04		0.68	0.07	0.21	0.76	
Uniform Delay, d1		14.1			10.6	6.9		23.7	19.1	20.0	24.5	
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		12.9			1.2	0.0		3.9	0.1	0.6	7.0	
Delay (s)		26.9			11.8	6.9		27.6	19.2	20.6	31.5	
Level of Service		C			B	A		C	B	C	C	
Approach Delay (s)		26.9			11.4			26.4			30.5	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM Average Control Delay			22.9				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			79.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			103.9%				ICU Level of Service		G			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2017 Build Conditions

Saturday MIDDAY

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	92	24	398	91	74	390	101	13	163	176	20	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	11	11	10	11	11	11	10	11	11	11
Storage Length (ft)		0		0	105		0		0		0	
Storage Lanes		1		0	1		0		1		0	
Taper Length (ft)		25		25	25		25		25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.972			0.966				0.941		
Flt Protected		0.950			0.950				0.950			
Satd. Flow (prot)	0	1685	1549	0	1685	1549	0	0	1652	1728	0	0
Flt Permitted		0.205			0.235				0.950			
Satd. Flow (perm)	0	364	1549	0	417	1549	0	0	1652	1728	0	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			14			2				20		
Link Speed (mph)			30			30				30		
Link Distance (ft)			157			221				274		
Travel Time (s)			3.6			5.0				6.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.94	0.94	0.94	0.94	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	0%	2%	0%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Shared Lane Traffic (%)												
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Detector Phase	5	5	2		1	6			3	8		
Switch Phase												
Minimum Initial (s)	3.0	3.0	12.0		3.0	12.0			6.0	12.0		
Minimum Split (s)	6.0	6.0	30.0		6.0	30.0			13.0	28.5		
Total Split (s)	8.0	8.0	55.0	0.0	8.0	55.0	0.0	0.0	19.0	28.5	0.0	0.0
Total Split (%)	7.3%	7.3%	50.0%	0.0%	7.3%	50.0%	0.0%	0.0%	17.3%	25.9%	0.0%	0.0%
Maximum Green (s)	5.0	5.0	48.0		5.0	48.0			12.0	21.5		
Yellow Time (s)	3.0	3.0	4.0		3.0	4.0			3.5	3.5		
All-Red Time (s)	0.0	0.0	3.0		0.0	3.0			3.5	3.5		
Lost Time Adjust (s)	1.0	1.0	-3.0	0.0	1.0	-3.0	0.0	0.0	-3.0	-3.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag			Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0		
Recall Mode	None	None	Min		None	Min			None	None		
Walk Time (s)			7.0			7.0				7.0		
Flash Dont Walk (s)			16.0			16.0				14.5		
Pedestrian Calls (#/hr)			0			0				0		

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 95.4
Natural Cycle: 90

Lanes, Volumes, Timings
1: Trapelo Road & Cushing Avenue

2017 Build Conditions

Saturday MIDDAY

				
Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	6	104	191	117
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	11	11	11	16
Storage Length (ft)		0		50
Storage Lanes		1		1
Taper Length (ft)		25		25
Lane Util. Factor	1.00	1.00	1.00	1.00
Frt				0.850
Flt Protected		0.950		
Satd. Flow (prot)	0	1745	1635	1629
Flt Permitted		0.950		
Satd. Flow (perm)	0	1745	1635	1629
Right Turn on Red				Yes
Satd. Flow (RTOR)				85
Link Speed (mph)			30	
Link Distance (ft)			873	
Travel Time (s)			19.8	
Peak Hour Factor	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	0%
Parking (#/hr)			2	2
Shared Lane Traffic (%)				
Turn Type	Prot	Prot		pm+ov
Protected Phases	7	7	4	5
Permitted Phases				4
Detector Phase	7	7	4	5
Switch Phase				
Minimum Initial (s)	6.0	6.0	12.0	3.0
Minimum Split (s)	13.0	13.0	28.5	6.0
Total Split (s)	18.5	18.5	28.0	8.0
Total Split (%)	16.8%	16.8%	25.5%	7.3%
Maximum Green (s)	11.5	11.5	21.0	5.0
Yellow Time (s)	3.5	3.5	3.5	3.0
All-Red Time (s)	3.5	3.5	3.5	0.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None
Walk Time (s)			7.0	
Flash Dont Walk (s)			14.5	
Pedestrian Calls (#/hr)			0	
Intersection Summary				

Lanes, Volumes, Timings 1: Trapelo Road & Cushing Avenue

2017 Build Conditions
Saturday MIDDAY

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Trapelo Road & Cushing Avenue

 ø1	 ø2	 ø3	 ø4
8 s	55 s	19 s	28 s
 ø5	 ø6	 ø7	 ø8
8 s	55 s	18.5 s	28.5 s

Queues
1: Trapelo Road & Cushing Avenue

2017 Build Conditions
Saturday MIDDAY

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	127	537	79	536	179	318	134	233	143
v/c Ratio	0.56	0.79	0.33	0.84	0.71	0.75	0.56	0.65	0.26
Control Delay	25.2	33.1	16.8	38.1	58.1	46.5	51.3	45.3	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	33.1	16.8	38.1	58.1	46.5	51.3	45.3	14.0
Queue Length 50th (ft)	43	294	26	301	111	177	81	133	26
Queue Length 95th (ft)	75	437	50	444	#239	#338	140	212	68
Internal Link Dist (ft)		77		141		194		793	
Turn Bay Length (ft)			105						50
Base Capacity (vph)	227	857	244	851	267	470	273	422	557
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	0.56	0.63	0.32	0.63	0.67	0.68	0.49	0.55	0.26

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2017 Build Conditions

1: Trapelo Road & Cushing Avenue

Saturday MIDDAY

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	92	24	398	91	74	390	101	13	163	176	20	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	11	10	11	11	11	10	11	11	11
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0		
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Frt		1.00	0.97		1.00	0.97			1.00	0.94		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		1685	1550		1685	1550			1652	1728		
Flt Permitted		0.21	1.00		0.24	1.00			0.95	1.00		
Satd. Flow (perm)		364	1550		417	1550			1652	1728		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.94	0.94	0.94	0.94	0.91	0.91	0.91	0.91
Adj. Flow (vph)	101	26	437	100	79	415	107	14	179	193	22	103
RTOR Reduction (vph)	0	0	8	0	0	1	0	0	0	15	0	0
Lane Group Flow (vph)	0	127	529	0	79	535	0	0	179	303	0	0
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	0%	2%	0%	0%	0%
Parking (#/hr)			5	5		5	5	5				
Turn Type	pm+pt	pm+pt			pm+pt				Prot			
Protected Phases	5	5	2		1	6			3	8		
Permitted Phases	2	2			6							
Actuated Green, G (s)		43.4	38.3		40.8	37.0			11.5	19.4		
Effective Green, g (s)		41.4	41.3		38.8	40.0			14.5	22.4		
Actuated g/C Ratio		0.43	0.43		0.41	0.42			0.15	0.23		
Clearance Time (s)		3.0	7.0		3.0	7.0			7.0	7.0		
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		
Lane Grp Cap (vph)		215	670		207	649			251	405		
v/s Ratio Prot		c0.03	0.34		0.01	c0.35			c0.11	c0.18		
v/s Ratio Perm		0.23			0.14							
v/c Ratio		0.59	0.79		0.38	0.82			0.71	0.75		
Uniform Delay, d1		20.3	23.4		19.5	24.6			38.5	33.9		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		2.9	5.7		0.4	8.0			7.7	6.5		
Delay (s)		23.1	29.1		19.9	32.6			46.3	40.4		
Level of Service		C	C		B	C			D	D		
Approach Delay (s)			27.9			31.0				42.5		
Approach LOS			C			C				D		
Intersection Summary												
HCM Average Control Delay			33.8		HCM Level of Service					C		
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			95.5		Sum of lost time (s)					12.0		
Intersection Capacity Utilization			69.5%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Trapelo Road & Cushing Avenue

2017 Build Conditions

Saturday MIDDAY

				
Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	6	104	191	117
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	11	11	11	16
Total Lost time (s)		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1745	1635	1629
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1745	1635	1629
Peak-hour factor, PHF	0.82	0.82	0.82	0.82
Adj. Flow (vph)	7	127	233	143
RTOR Reduction (vph)	0	0	0	66
Lane Group Flow (vph)	0	134	233	77
Heavy Vehicles (%)	0%	0%	0%	0%
Parking (#/hr)			2	2
Turn Type	Prot	Prot	pm+ov	
Protected Phases	7	7	4	5
Permitted Phases				4
Actuated Green, G (s)		10.0	17.9	23.0
Effective Green, g (s)		13.0	20.9	21.0
Actuated g/C Ratio		0.14	0.22	0.22
Clearance Time (s)		7.0	7.0	3.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		238	358	358
v/s Ratio Prot		0.08	0.14	0.01
v/s Ratio Perm				0.04
v/c Ratio		0.56	0.65	0.21
Uniform Delay, d1		38.6	34.0	30.5
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		1.8	3.2	0.1
Delay (s)		40.4	37.2	30.6
Level of Service		D	D	C
Approach Delay (s)			36.2	
Approach LOS			D	
Intersection Summary				

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2017 Build Conditions

Saturday MIDDAY

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	134	267	28	32	240	33	13	195	33	42	182	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	10	11	11
Storage Length (ft)	0		0	0		80	0		60	50		0
Storage Lanes	0		0	0		1	0		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991				0.850			0.850		0.945	
Flt Protected		0.985			0.994			0.997		0.950		
Satd. Flow (prot)	0	1855	0	0	1810	1561	0	1877	1615	1499	1545	0
Flt Permitted		0.808			0.926			0.972		0.579		
Satd. Flow (perm)	0	1521	0	0	1686	1561	0	1830	1615	914	1545	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				31			25		27	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		736			971			731			211	
Travel Time (s)		16.7			22.1			16.6			4.8	
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.90	0.90	0.90	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Parking (#/hr)										2	2	2
Shared Lane Traffic (%)												
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
Total Split (s)	55.0	55.0	0.0	55.0	55.0	55.0	35.0	35.0	35.0	35.0	35.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%	31.8%	31.8%	31.8%	31.8%	31.8%	0.0%
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	
Yellow Time (s)	4.0	4.0		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	1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 56.7												
Natural Cycle: 80												

Lanes, Volumes, Timings
7: Belmont Street & Common Street

2017 Build Conditions
Saturday MIDDAY

Lane Group ø9

Lane Configurations

Volume (vph)

Ideal Flow (vphpl)

Lane Width (ft)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Right Turn on Red

Satd. Flow (RTOR)

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Parking (#/hr)

Shared Lane Traffic (%)

Turn Type

Protected Phases 9

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 4.0

Minimum Split (s) 20.0

Total Split (s) 20.0

Total Split (%) 18%

Maximum Green (s) 14.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 7.0

Pedestrian Calls (#/hr) 0

Intersection Summary

Lanes, Volumes, Timings
 7: Belmont Street & Common Street

2017 Build Conditions
 Saturday MIDDAY

Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Belmont Street & Common Street

 ø2	 ø4	 ø9
35 s	55 s	20 s
 ø6	 ø8	
35 s	55 s	

Queues

2017 Build Conditions

7: Belmont Street & Common Street

Saturday MIDDAY

							
Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	457	283	34	231	37	50	344
v/c Ratio	0.62	0.35	0.04	0.35	0.06	0.15	0.59
Control Delay	15.8	11.2	4.2	16.5	8.6	15.9	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	11.2	4.2	16.5	8.6	15.9	19.8
Queue Length 50th (ft)	100	52	1	53	2	11	81
Queue Length 95th (ft)	239	128	14	138	22	38	190
Internal Link Dist (ft)	656	891		651			131
Turn Bay Length (ft)			80		60	50	
Base Capacity (vph)	1312	1453	1350	1094	976	546	935
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.19	0.03	0.21	0.04	0.09	0.37
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

2017 Build Conditions

7: Belmont Street & Common Street

Saturday MIDDAY

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	134	267	28	32	240	33	13	195	33	42	182	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	12	12	12	10	11	11
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.99			1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected		0.98			0.99	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1854			1810	1561		1877	1615	1499	1544	
Flt Permitted		0.81			0.93	1.00		0.97	1.00	0.58	1.00	
Satd. Flow (perm)		1522			1686	1561		1829	1615	914	1544	
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.90	0.90	0.90	0.84	0.84	0.84
Adj. Flow (vph)	143	284	30	33	250	34	14	217	37	50	217	127
RTOR Reduction (vph)	0	2	0	0	0	16	0	0	16	0	17	0
Lane Group Flow (vph)	0	455	0	0	283	18	0	231	21	50	327	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Parking (#/hr)										2	2	2
Turn Type	Perm			Perm		Prot	Perm		Prot	Perm		
Protected Phases		4			8	8		2	2		6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.2			26.2	26.2		19.6	19.6	19.6	19.6	
Effective Green, g (s)		27.2			27.2	27.2		20.6	20.6	20.6	20.6	
Actuated g/C Ratio		0.49			0.49	0.49		0.37	0.37	0.37	0.37	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		742			822	761		675	596	337	570	
v/s Ratio Prot						0.01			0.01		c0.21	
v/s Ratio Perm		c0.30			0.17			0.13		0.05		
v/c Ratio		0.61			0.34	0.02		0.34	0.04	0.15	0.57	
Uniform Delay, d1		10.5			8.8	7.4		12.7	11.3	11.7	14.1	
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.5			0.3	0.0		0.3	0.0	0.2	1.4	
Delay (s)		12.0			9.1	7.4		13.0	11.3	12.0	15.5	
Level of Service		B			A	A		B	B	B	B	
Approach Delay (s)		12.0			8.9			12.8			15.0	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM Average Control Delay			12.3				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			55.8				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			78.0%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

Appendix K

Parking Demand Count Data Sheets

Parking Occupancy Count - Cushing Square On-Street Parking

Project: Proposed Mixed Use Development - Trapelo Road & Common Street, Belmont, MA
Date: June 17, 2010

Cushing Square Parking Occupancy Study - Occupied Spaces

Counted By: SJM
Starting Time: 7:00 AM
Weather: 70/Partly Cloudy

Area #	Starting Time:										Average # cars Parked	Total Striped Spaces	Max % Occupancy	Average % Occupancy
	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45						
Common Street (North of Trapelo Road)	24	23	21	20	21	22	23	21			22	26	92.3%	84.1%
Trapelo Road (East of Common Street)	10	11	13	13	12	16	17	19			14	30	63.3%	46.3%
Belmont Street (East of Common Street)	0	0	0	1	2	5	5	6			2	12	50.0%	19.8%
Common Street (South of Belmont Street)	0	0	0	0	0	0	0	0			0	12	0.0%	0.0%
Common Street (btwn Trapelo & Belmont)	1	1	2	3	1	3	2	2			2	16	18.8%	11.7%
Belmont Street (West of Common Street)	0	1	0	2	12	16	16	15			8	15	106.7%	51.7%
Horne Road (btwn Williston & Common)	1	1	1	0	1	1	2	2			1	11	18.2%	10.2%
Horne Road (West of Williston)	8	6	5	5	6	6	5	5			6	22	36.4%	26.1%
Williston Road	0	1	1	0	1	2	2	4			1	5	80.0%	27.5%
Trapelo Road (West of Williston)	21	20	14	15	16	19	18	19			18	27	77.8%	65.7%
Trapelo Road (btwn Williston & Common)	4	4	8	8	7	10	9	10			8	11	90.9%	68.2%
Municipal Parking Lot (corner Williston & Trapelo)	32	25	20	17	21	18	17	16			21	50	64.0%	41.5%
Total Spaces	101	93	85	84	100	118	116	119			102	237	50.2%	43.0%
Percent Occupancy	42.6%	39.2%	35.9%	35.4%	42.2%	49.8%	48.9%	50.2%						
On-Street Only	69	68	65	67	79	100	99	103						

Parking Occupancy Count - Cushing Square On-Street Parking

Project: Proposed Mixed Use Development - Trapelo Road & Common Street, Belmont, MA
Date: June 17, 2010

Cushing Square Parking Occupancy Study - Occupied Spaces

Counted By:
Starting Time:

SJM
11:10 AM

Weather: 80/Mostly Sunny

Area #	Starting Time:										Average # cars Parked	Total Striped Spaces	Max % Occupancy	Average % Occupancy
	11:10	11:30	11:50	12:10	12:30	12:50								
Common Street (North of Trapelo Road)	16	18	19	16	17	16					17	26	73.1%	65.4%
Trapelo Road (East of Common Street)	27	25	27	28	26	27					27	30	93.3%	88.9%
Belmont Street (East of Common Street)	0	10	9	9	8	7					7	12	83.3%	59.7%
Common Street (South of Belmont Street)	0	0	0	0	0	0					0	12	0.0%	0.0%
Common Street (btwn Trapelo & Belmont)	12	8	10	10	8	10					10	16	75.0%	60.4%
Belmont Street (West of Common Street)	14	15	12	14	15	15					14	15	100.0%	94.4%
Horne Road (btwn Williston & Common)	4	3	4	3	4	4					4	11	36.4%	33.3%
Horne Road (West of Williston)	6	7	5	6	6	6					6	22	31.8%	27.3%
Williston Road	4	5	5	4	4	5					5	5	100.0%	90.0%
Trapelo Road (West of Williston)	27	28	28	28	27	29					28	27	107.4%	103.1%
Trapelo Road (btwn Williston & Common)	10	8	10	8	9	11					9	11	100.0%	84.8%
Municipal Parking Lot (corner Williston & Trapelo)	31	35	30	31	34	37					33	50	74.0%	66.0%
Total Spaces	151	162	159	157	158	167					159	237	70.5%	67.1%
Percent Occupancy	63.7%	68.4%	67.1%	66.2%	66.7%	70.5%					0			
On-Street Only	120	127	129	126	124	130	0	0	0	0				

Parking Occupancy Count - Cushing Square On-Street Parking

Project: Proposed Mixed Use Development - Trapelo Road & Common Street, Belmont, MA
Date: June 17, 2010

Cushing Square Parking Occupancy Study - Occupied Spaces

Counted By: LAS
Starting Time: 2:00 PM

Weather: 80/Mostly Sunny

Area #	Starting Time:								Average # cars Parked	Total Striped Spaces	Max % Occupancy	Average % Occupancy
	2:00	2:20	2:40	3:00	3:20	3:40	4:00	4:20				
Common Street (North of Trapelo Road)	13	11	14	16	20	26	20	Break	17	26	100.0%	65.9%
Trapelo Road (East of Common Street)	28	28	26	27	25	24	27		26	30	93.3%	88.1%
Belmont Street (East of Common Street)	7	8	10	8	9	8	9		8	12	83.3%	70.2%
Common Street (South of Belmont Street)	0	0	0	0	0	0	0		0	12	0.0%	0.0%
Common Street (btwn Trapelo & Belmont)	5	2	2	4	5	5	8		4	16	50.0%	27.7%
Belmont Street (West of Common Street)	8	7	8	10	4	5	5		7	15	66.7%	44.8%
Horne Road (btwn Williston & Common)	2	3	3	3	3	4	2		3	11	36.4%	26.0%
Horne Road (West of Williston)	7	7	9	9	8	5	6		7	22	40.9%	33.1%
Williston Road	2	3	3	3	4	4	5		3	5	100.0%	68.6%
Trapelo Road (West of Williston)	25	23	24	24	25	26	22		24	27	96.3%	89.4%
Trapelo Road (btwn Williston & Common)	6	9	10	9	9	7	10	9	11	90.9%	77.9%	
Municipal Parking Lot (corner Williston & Trapelo)	29	28	19	21	22	26	19	23	50	58.0%	46.9%	
Total Spaces	132	129	128	134	134	140	133	0	133	237	59.1%	56.1%

Parking Occupancy Count - Cushing Square On-Street Parking

Project: Proposed Mixed Use Development - Trapelo Road & Common Street, Belmont, MA
Date: June 17, 2010

Cushing Square Parking Occupancy Study - Occupied Spaces

Counted By: LAS
Starting Time: 4:40 PM
Weather: 80/Mostly Sunny

Area #	Starting Time:					Average # cars					Total Striped Spaces	Max % Occupancy	Average % Occupancy
	4:40	5:00	5:20	5:40	5:40	4:40	5:00	5:20	5:40	5:40			
Common Street (North of Trapelo Road)	17	22	24	24	24						26	92.3%	83.7%
Trapelo Road (East of Common Street)	22	18	23	21	21						30	76.7%	70.0%
Belmont Street (East of Common Street)	7	7	5	4	4						12	58.3%	47.9%
Common Street (South of Belmont Street)	0	0	0	0	0						12	0.0%	0.0%
Common Street (btwn Trapelo & Belmont)	3	4	5	7	7						16	43.8%	29.7%
Belmont Street (West of Common Street)	5	6	9	8	8						15	60.0%	46.7%
Horne Road (btwn Williston & Common)	3	2	0	1	1						11	27.3%	13.6%
Horne Road (West of Williston)	4	4	4	6	6						22	27.3%	20.5%
Williston Road	1	2	2	2	2						5	40.0%	35.0%
Trapelo Road (West of Williston)	21	23	17	16	16						27	85.2%	71.3%
Trapelo Road (btwn Williston & Common)	10	7	8	10	10						11	90.9%	79.5%
Municipal Parking Lot (corner Williston & Trapelo)	15	16	20	17	17						50	40.0%	34.0%
Total Spaces	108	111	117	116	116						237	49.4%	47.7%
Percent Occupancy	45.6%	46.8%	49.4%	48.9%	48.9%								
On-Street Only	93	95	97	99	99	0	0	0	0	0	0	0	0

Parking Occupancy Count - Cushing Square On-Street Parking

Project: Proposed Mixed Use Development - Trapelo Road & Common Street, Belmont, MA
Date: June 19, 2010

Cushing Square Parking Occupancy Study - Occupied Spaces

Counted By: SUM
Starting Time: 11:00 AM
Weather: 85/Sunny

Area #	Starting Time:										Average # cars Parked	Total Striped Spaces	Max % Occupancy	Average % Occupancy
	11:00	11:20	11:40	12:00	12:20	12:40								
Common Street (North of Trapelo Road)	25	24	22	24	22	23					23	26	96.2%	89.7%
Trapelo Road (East of Common Street)	26	26	25	25	27	24					26	30	90.0%	85.0%
Belmont Street (East of Common Street)	6	5	5	6	4	4					5	12	50.0%	41.7%
Common Street (South of Belmont Street)	0	0	0	0	0	0					0	12	0.0%	0.0%
Common Street (btwn Trapelo & Belmont)	7	8	7	7	4	5					6	16	50.0%	39.6%
Belmont Street (West of Common Street)	1	1	2	2	3	2					2	15	20.0%	12.2%
Horne Road (btwn Williston & Common)	8	5	5	5	4	3					5	11	72.7%	45.5%
Horne Road (West of Williston)	10	11	11	10	9	9					10	22	50.0%	45.5%
Williston Road	4	5	4	4	2	3					4	5	100.0%	73.3%
Trapelo Road (West of Williston)	25	24	24	25	22	21					24	27	92.6%	87.0%
Trapelo Road (btwn Williston & Common)	11	11	11	11	11	10					11	11	100.0%	98.5%
Municipal Parking Lot (corner Williston & Trapelo)	24	28	29	27	21	15					24	50	58.0%	48.0%
Total Spaces	147	148	145	146	129	119	0	0			139	237	62.4%	58.6%
Percent Occupancy	62.0%	62.4%	61.2%	61.6%	54.4%	50.2%	0.0%	0.0%						
On-Street Only	123	120	116	119	108	104	0	0						

Appendix L

Parking Demand Estimate Calculations

Parking Demand Assessment

Project: Cushing Square Redevelopment - Belmont, Massachusetts

Date: October 11, 2012

Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.

Source: Institute of Transportation Engineers - Parking Generation - 4th Ed.

Land Use: Quality Restaurant
 LUC: 931
 Size 5,000 SF

Average Maximum Parking Demand:

Weekday: 10.6 vehicles per 1,000 SF

Saturday: 16.4 vehicles per 1,000 SF

Based on ITE data and Belmont Zoning Ordinance, 10% reduction allowed on transit corridor

Weekday: 9.5 vehicles per 1,000 SF X 5,000 SF = **48 vehicles**

Saturday: 14.8 vehicles per 1,000 SF X 5,000 SF = **74 vehicles**

Parking Demand - Time of Day Distribution

Time	Weekday		Saturday	
	Percent of Peak	Demand	Percent of Peak	Demand
12:00-4:00 AM	0%	0	0%	0
5:00 AM	0%	0	0%	0
6:00 AM	0%	0	0%	0
7:00 AM	0%	0	0%	0
8:00 AM	0%	0	0%	0
9:00 AM	5%	2	5%	4
10:00 AM	7%	3	7%	5
11:00 AM	20%	10	20%	15
12:00 PM	51%	24	41%	30
1:00 PM	56%	27	53%	39
2:00 PM	40%	19	46%	34
3:00 PM	27%	13	38%	28
4:00 PM	27%	13	63%	47
5:00 PM	39%	19	80%	59
6:00 PM	71%	34	100%	74
7:00 PM	100%	48	93%	69
8:00 PM	97%	47	70%	52
9:00 PM	84%	40	33%	24
10:00 PM	48%	23	9%	7
11:00 PM	44%	21	0%	0

Note:

Percentages obtained from LUC 932 [High-Turnover (Sit-Down) Restaurant]

Parking Demand Assessment

Project: Cushing Square Redevelopment - Belmont, Massachusetts

Date: October 11, 2012

Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.

Source: Institute of Transportation Engineers - Parking Generation - 4th Ed.

Land Use: Starbucks
 LUC: 936
 Size: 2,000 SF

Maximum Parking Demand:

Weekday: **18 vehicles**

Saturday: **18 vehicles**

**Peak Parking Demand based on number of spaces provided at existing facility.

Parking Demand - Time of Day Distribution

Time	Weekday		Saturday	
	Percent of Peak	Demand	Percent of Peak	Demand
12:00-4:00 AM	0%	0	0%	0
5:00 AM	50%	9	80%	14
6:00 AM	70%	13	90%	16
7:00 AM	73%	13	100%	18
8:00 AM	100%	18	90%	16
9:00 AM	63%	11	80%	14
10:00 AM	57%	10	65%	12
11:00 AM	42%	8	62%	11
12:00 PM	39%	7	40%	7
1:00 PM	27%	5	32%	6
2:00 PM	25%	5	30%	5
3:00 PM	25%	5	30%	5
4:00 PM	25%	5	30%	5
5:00 PM	35%	6	35%	6
6:00 PM	35%	6	35%	6
7:00 PM	30%	5	30%	5
8:00 PM	25%	5	30%	5
9:00 PM	25%	5	25%	5
10:00 PM	25%	5	25%	5
11:00 PM	25%	5	25%	5
Note:				
ITE does not contain data for this time period; parking percentage assumed				

Parking Demand Assessment

Project: Cushing Square Redevelopment - Belmont, Massachusetts

Date: October 11, 2012

Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.

Source: Institute of Transportation Engineers - Parking Generation - 4th Ed.

Land Use: Apartments
 LUC: 221
 Size: 118 Units

Average Maximum Parking Demand:

Weekday: 1.2 vehicles per 1,000 SF X 118 SF = **142 vehicles**
 Saturday: 1.03 vehicles per 1,000 SF X 118 SF = **122 vehicles**

Parking Demand - Time of Day Distribution

Time	Weekday		Saturday	
	Percent of Peak	Demand	Percent of Peak	Demand
12:00-4:00 AM	100%	142	95%	116
5:00 AM	96%	136	100%	122
6:00 AM	92%	131	98%	120
7:00 AM	74%	105	94%	115
8:00 AM	64%	91	89%	109
9:00 AM	34%	48	59%	72
10:00 AM	32%	45	71%	87
11:00 AM	31%	44	67%	82
12:00 PM	30%	43	66%	81
1:00 PM	31%	44	64%	78
2:00 PM	33%	47	64%	78
3:00 PM	37%	53	69%	84
4:00 PM	44%	62	73%	89
5:00 PM	59%	84	78%	95
6:00 PM	69%	98	80%	98
7:00 PM	66%	94	83%	101
8:00 PM	75%	107	84%	102
9:00 PM	77%	109	87%	106
10:00 PM	92%	131	89%	109
11:00 PM	94%	133	95%	116
Note:				
Percentages obtained from LUC 221 - Low-Mid Rise Apartment				
*Rates obtained from Urban sites where discounted for transit				
Percentages obtained from LUC 224 (Rental Townhouse)				

Parking Demand Assessment

Project: Cushing Square Redevelopment - Belmont, Massachusetts

Date: October 11, 2012

Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.

Source: Institute of Transportation Engineers - Parking Generation - 4th Ed.

Land Use: Health and Fitness Club

LUC: 492

Size 3,300 SF

Average Maximum Parking Demand:

Weekday: 5.27 vehicles per 1,000 SF

Saturday: 2.89 vehicles per 1,000 SF

Based on ITE data and Belmont Zoning Ordinance, 10% reduction allowed on transit corridor

Weekday: 4.74 vehicles per 1,000 SF X 3,300 SF = **16 vehicles**

Saturday: 2.60 vehicles per 1,000 SF X 3,300 SF = **9 vehicles**

Parking Demand - Time of Day Distribution

Time	Weekday		Saturday	
	Percent of Peak	Demand	Percent of Peak	Demand
12:00-4:00 AM	0%	0	0%	0
5:00 AM	20%	3	20%	2
6:00 AM	20%	3	20%	2
7:00 AM	20%	3	20%	2
8:00 AM	20%	3	76%	7
9:00 AM	26%	4	94%	8
10:00 AM	51%	8	95%	9
11:00 AM	48%	8	100%	9
12:00 PM	42%	7	87%	8
1:00 PM	47%	8	82%	7
2:00 PM	38%	6	78%	7
3:00 PM	41%	7	73%	7
4:00 PM	61%	10	77%	7
5:00 PM	84%	13	72%	6
6:00 PM	91%	15	68%	6
7:00 PM	100%	16	94%	8
8:00 PM	50%	8	50%	5
9:00 PM	50%	8	50%	5
10:00 PM	25%	4	25%	2
11:00 PM	25%	4	25%	2
Note:				
ITE does not contain data for this time period; parking percentage assumed				

Parking Demand Assessment

Project: Cushing Square Redevelopment - Belmont, Massachusetts

Date: October 11, 2012

Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.

Source: Institute of Transportation Engineers - Parking Generation - 4th Ed.

Land Use: Shopping Center
 LUC: 820
 Size 27,200 SF

Average Maximum Parking Demand:

Weekday: 2.55 vehicles per 1,000 SF

Saturday: 2.87 vehicles per 1,000 SF

Based on ITE data and Belmont Zoning Ordinance, 10% reduction allowed on transit corridor

Weekday: 2.30 vehicles per 1,000 SF X 27,200 SF = **63 vehicles**

Saturday**: 2.58 vehicles per 1,000 SF X 27,200 SF = **70 vehicles**

Parking Demand - Time of Day Distribution

Time	Weekday		Saturday	
	Percent of Peak	Demand	Percent of Peak	Demand
12:00-4:00 AM	0%	0	0%	0
5:00 AM	0%	0	0%	0
6:00 AM	0%	0	0%	0
7:00 AM	5%	3	13%	9
8:00 AM	18%	11	27%	19
9:00 AM	38%	24	60%	42
10:00 AM	68%	43	75%	53
11:00 AM	91%	57	90%	63
12:00 PM	100%	63	100%	70
1:00 PM	97%	61	100%	70
2:00 PM	95%	60	98%	69
3:00 PM	88%	55	91%	64
4:00 PM	78%	49	76%	53
5:00 PM	62%	39	67%	47
6:00 PM	64%	40	72%	50
7:00 PM	77%	49	51%	36
8:00 PM	70%	44	52%	36
9:00 PM	42%	26	44%	31
10:00 PM	29%	18	29%	20
11:00 PM	0%	0	0%	0
Note:				
No data available, percentage is from Saturday data.				

Parking Demand Assessment

Project: Cushing Square Redevelopment - Belmont, Massachusetts
 Date: October 11, 2012
 Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
 Source: Institute of Transportation Engineers - Parking Generation - 4th Ed.

		Weekday Parking Demand					Saturday Parking Demand						
		Restaurant	Starbucks	Apartments	Health / Fitness	Retail	Total	Restaurant	Starbucks	Apartments	Health / Fitness	Retail	Total
Time													
12:00-4:00 AM		0	0	142	0	0	142	0	0	116	0	0	116
5:00 AM		0	9	136	0	0	145	0	14	122	2	0	138
6:00 AM		0	13	131	3	0	147	0	16	120	2	0	138
7:00 AM		0	13	105	3	3	124	0	18	115	2	9	144
8:00 AM		0	18	91	3	11	123	0	16	109	7	19	151
9:00 AM		2	11	48	3	24	88	4	14	72	8	42	140
10:00 AM		3	10	45	4	43	105	5	12	87	9	53	166
11:00 AM		10	8	44	8	57	127	15	11	82	9	63	180
12:00 PM		24	7	43	8	63	145	30	7	81	8	70	196
1:00 PM		27	5	44	7	61	144	39	6	78	7	70	200
2:00 PM		19	5	47	8	60	139	34	5	78	7	69	193
3:00 PM		13	5	53	6	55	132	28	5	84	7	64	188
4:00 PM		13	5	62	7	49	136	47	5	89	7	53	201
5:00 PM		19	6	84	10	39	158	59	6	95	6	47	213
6:00 PM		34	6	98	13	40	191	74	6	98	6	50	234
7:00 PM		48	5	94	15	49	211	69	5	101	8	36	219
8:00 PM		47	5	107	16	44	219	52	5	102	5	36	200
9:00 PM		40	5	109	8	26	188	24	5	106	5	31	171
10:00 PM		23	5	131	8	18	185	7	5	109	2	20	143
11:00 PM		21	5	133	4	0	163	0	5	116	2	0	123

Weekday Parking Demand:	219
Saturday Parking Demand:	234

Parking Demand Assessment

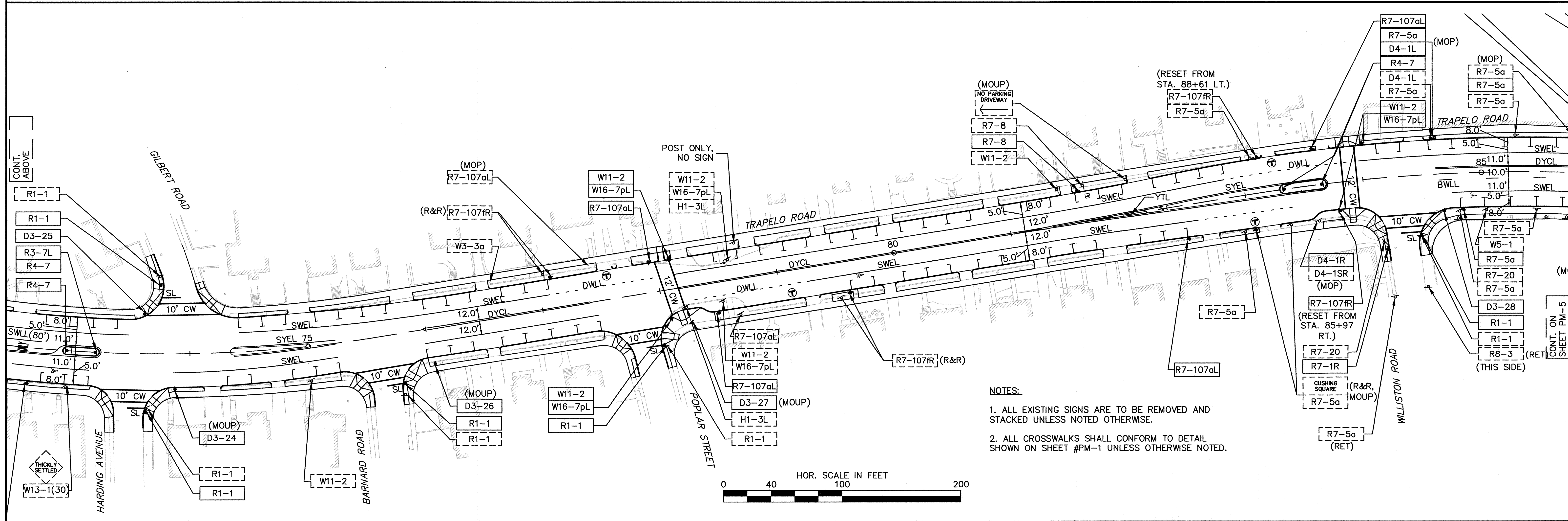
Project: Cushing Square Redevelopment - Belmont, Massachusetts
 Date: October 11, 2012
 Analyst: TEC, Inc. / Samuel W. Gregorio, E.I.T.
 Source: Institute of Transportation Engineers - Parking Generation - 4th Ed.

Time	Parking Supply			Weekday Parking Demand				Saturday Parking Demand			
	On-Site	On-Street	Total	On-Site	On-Street	Municipal Lot	Total	On-Site	On-Street	Municipal Lot	Total
12:00-4:00 AM	234	173	407	142	78	50	270	116	73	50	239
5:00 AM	234	173	407	145	75	50	270	138	70	50	258
6:00 AM	234	173	407	147	72	41	260	138	67	50	255
7:00 AM	234	173	407	124	69	32	225	144	64	46	254
8:00 AM	234	173	407	123	103	21	247	151	96	42	289
9:00 AM	234	173	407	88	112	26	226	140	105	38	283
10:00 AM	234	173	407	105	121	31	257	166	113	34	313
11:00 AM	234	173	407	127	129	35	291	180	123	29	332
12:00 PM	234	173	407	145	130	37	312	196	119	27	342
1:00 PM	234	173	407	144	120	33	297	200	112	30	342
2:00 PM	234	173	407	139	109	29	277	193	102	33	328
3:00 PM	234	173	407	132	114	26	272	188	107	36	331
4:00 PM	234	173	407	136	93	19	248	201	87	39	327
5:00 PM	234	173	407	158	99	20	277	213	93	42	348
6:00 PM	234	173	407	191	96	30	317	234	90	45	369
7:00 PM	234	173	407	211	93	40	344	219	87	48	354
8:00 PM	234	173	407	219	90	50	359	200	84	50	334
9:00 PM	234	173	407	188	87	50	325	171	81	50	302
10:00 PM	234	173	407	185	84	50	319	143	78	50	271
11:00 PM	234	173	407	163	81	50	294	123	76	50	249
Peak Parking Demand				219	130	50	359	234	123	50	369

Appendix M

Trapelo Road / Belmont Street Roadway Improvement Project Plans

STATE	FED. PROJ. AID NO.	SHEET NO.	TOTAL SHEETS
MASS.	xxxxx	PM-4	191
PROJ. FILE NO. 604688			

[illegible]

STATE	FED. PROJ. AID NO.	SHEET NO.	TOTAL SHEETS
MASS.	xxxxxx	PM-5	191
PROJ. FILE NO. 604688			

BELMONT / WATERTOWN

TRAPELO RD & BELMONT ST

STATE	FED. PROJ. AID NO.	SHEET NO.	TOTAL SHEETS
MASS.	xxxxx	PM-5	191

PROJ. FILE NO. 604688

PAVEMENT MARKING & SIGNING PLAN

NOTES:

- ALL EXISTING SIGNS ARE TO BE REMOVED AND STACKED UNLESS NOTED OTHERWISE.
- ALL CROSSWALKS SHALL CONFORM TO DETAIL SHOWN ON SHEET #PM-1 UNLESS OTHERWISE NOTED.

HOR. SCALE IN FEET

0 40 100 200