Appendix C

Traffic Methodology

Appendix C-1

- HCM Signalized Intersection Capacity Analysis Report
- Queue Length Report

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	653	74	312	617	20	189	20	307	27	17	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3485		1770	3522		1770	1863	1583	1770	1763	
Flt Permitted	0.39	1.00		0.14	1.00		0.49	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	723	3485		259	3522		920	1863	1583	1384	1763	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	710	80	339	671	22	205	22	334	29	18	10
RTOR Reduction (vph)	0	10	0	0	3	0	0	0	95	0	8	0
Lane Group Flow (vph)	11	780	0	339	690	0	205	22	239	29	20	0
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	23.6	22.8		43.2	36.4		24.1	24.1	38.5	19.7	19.7	
Effective Green, g (s)	23.6	22.8		43.2	36.4		24.1	24.1	38.5	19.7	19.7	
Actuated g/C Ratio	0.27	0.26		0.50	0.42		0.28	0.28	0.44	0.23	0.23	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	206	914		379	1475		314	517	701	321	400	
v/s Ratio Prot	0.00	0.22		c0.15	0.20		c0.05	0.01	0.06	c0.00	0.01	
v/s Ratio Perm	0.01			c0.30			c0.14		0.09	0.02		
v/c Ratio	0.05	0.85		0.89	0.47		0.65	0.04	0.34	0.09	0.05	
Uniform Delay, d1	23.2	30.5		21.5	18.2		27.4	23.0	15.9	26.5	26.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	7.8		22.5	0.2		4.8	0.2	0.3	0.1	0.2	
Delay (s)	23.3	38.2		44.0	18.5		32.2	23.1	16.2	26.7	26.5	
Level of Service	C	D		D	B		C	C	B	C	C	
Approach Delay (s)		38.0			26.9			22.3			26.6	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	86.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	154	794	123	64	493	226	60	202	84	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0				
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95				
Frt	1.00	0.98		1.00	0.95			0.96				
Flt Protected	0.95	1.00		0.95	1.00			0.99				
Satd. Flow (prot)	1770	3468		1770	3372			3382				
Flt Permitted	0.20	1.00		0.22	1.00			0.99				
Satd. Flow (perm)	364	3468		419	3372			3382				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	167	863	134	70	536	246	65	220	91	0	0	0
RTOR Reduction (vph)	0	20	0	0	88	0	0	50	0	0	0	0
Lane Group Flow (vph)	167	977	0	70	694	0	0	326	0	0	0	0
Turn Type	pm+pt			pm+pt			Perm					
Protected Phases	7	4		3	8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)	27.6	21.6		20.0	17.8			16.3				
Effective Green, g (s)	27.6	21.6		20.0	17.8			16.3				
Actuated g/C Ratio	0.48	0.37		0.34	0.31			0.28				
Clearance Time (s)	6.0	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)	318	1289		195	1033			949				
v/s Ratio Prot	c0.05	c0.28		0.01	0.21							
v/s Ratio Perm	0.20			0.11				0.10				
v/c Ratio	0.53	0.76		0.36	0.67			0.34				
Uniform Delay, d1	9.9	16.0		13.3	17.6			16.6				
Progression Factor	1.00	1.00		1.00	1.00			1.00				
Incremental Delay, d2	1.6	2.6		1.1	1.7			1.0				
Delay (s)	11.5	18.6		14.4	19.3			17.6				
Level of Service	B	B		B	B			B				
Approach Delay (s)		17.6			18.9			17.6			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	638	24	28	544	0	100	0	78	349	114	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		6.0		6.0	6.0	6.0	6.0
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.97	1.00	1.00
Frt		0.99		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)		3520		1770	3539		1770		1583	3433	1863	1583
Flt Permitted		1.00		0.19	1.00		0.68		1.00	0.95	1.00	1.00
Satd. Flow (perm)		3520		345	3539		1262		1583	3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	693	26	30	591	0	109	0	85	379	124	209
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	64	0	0	70
Lane Group Flow (vph)	0	715	0	30	591	0	109	0	21	379	124	139
Turn Type				pm+pt			custom		custom	Prot		Perm
Protected Phases		4		3	8					1	6	
Permitted Phases				8			2		2			6
Actuated Green, G (s)		15.6		23.1	23.1		16.4		16.4	9.8	32.2	32.2
Effective Green, g (s)		15.6		23.1	23.1		16.4		16.4	9.8	32.2	32.2
Actuated g/C Ratio		0.23		0.34	0.34		0.24		0.24	0.15	0.48	0.48
Clearance Time (s)		6.0		6.0	6.0		6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		816		150	1215		308		386	500	891	757
v/s Ratio Prot		c0.20		0.00	c0.17					c0.11	0.07	
v/s Ratio Perm				0.06			c0.09		0.01			0.09
v/c Ratio	0.88	0.20	0.49	0.35	0.05	0.76	0.14	0.18				
Uniform Delay, d1	24.9	16.2	17.4	21.1	19.5	27.6	9.8	10.0				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	10.4	0.7	0.3	3.2	0.3	6.5	0.3	0.5				
Delay (s)	35.4	16.9	17.7	24.2	19.8	34.1	10.1	10.6				
Level of Service	D	B	B	C	B	C	B	B				
Approach Delay (s)	35.4		17.7		22.3		23.0					
Approach LOS	D		B		C		C					

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	67.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	132	103	17	639	100	75	7	1297	552	62	1457	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.94		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1824		3433	1743		1770	3539	1583	1770	3528	
Flt Permitted	0.95	1.00		0.95	1.00		0.06	1.00	1.00	0.06	1.00	
Satd. Flow (perm)	1770	1824		3433	1743		119	3539	1583	115	3528	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	143	112	18	695	109	82	8	1410	600	67	1584	33
RTOR Reduction (vph)	0	4	0	0	21	0	0	0	317	0	1	0
Lane Group Flow (vph)	143	126	0	695	170	0	8	1410	283	67	1616	0
Turn Type	Split			Split			pm+pt		Perm	pm+pt		
Protected Phases	6	6		2	2		7	4		3	8	
Permitted Phases							4		4	8		
Actuated Green, G (s)	16.0	16.0		27.0	27.0		63.4	62.6	62.6	68.2	65.0	
Effective Green, g (s)	16.0	16.0		27.0	27.0		63.4	62.6	62.6	68.2	65.0	
Actuated g/C Ratio	0.12	0.12		0.20	0.20		0.48	0.47	0.47	0.51	0.49	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	213	220		698	354		67	1668	746	99	1727	
v/s Ratio Prot	c0.08	0.07		c0.20	0.10		0.00	0.40		c0.02	c0.46	
v/s Ratio Perm							0.06		0.18	0.33		
v/c Ratio	0.67	0.57		1.00	0.48		0.12	0.85	0.38	0.68	0.94	
Uniform Delay, d1	55.9	55.2		52.8	46.7		28.7	30.8	22.6	25.8	31.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.6	10.3		33.0	4.6		0.8	4.1	0.3	16.8	10.0	
Delay (s)	71.5	65.5		85.9	51.3		29.5	35.0	22.9	42.6	41.9	
Level of Service	E	E		F	D		C	C	C	D	D	
Approach Delay (s)		68.6			78.4			31.4			42.0	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM Average Control Delay	45.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	132.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	243	840	0	0	906	92	83	339	207	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	1770	3539			3539	1583	1770	3539	1583			
Flt Permitted	0.16	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	300	3539			3539	1583	1770	3539	1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	264	913	0	0	985	100	90	368	225	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	69	0	0	83	0	0	0
Lane Group Flow (vph)	264	913	0	0	985	31	90	368	142	0	0	0
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	31.8	31.8			18.8	18.8	16.0	16.0	16.0			
Effective Green, g (s)	31.8	31.8			18.8	18.8	16.0	16.0	16.0			
Actuated g/C Ratio	0.53	0.53			0.31	0.31	0.27	0.27	0.27			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	332	1882			1113	498	474	947	424			
v/s Ratio Prot	c0.09	0.26			0.28			c0.10				
v/s Ratio Perm	c0.33					0.02	0.05		0.09			
v/c Ratio	0.80	0.49			0.88	0.06	0.19	0.39	0.34			
Uniform Delay, d1	10.9	8.8			19.5	14.3	16.9	17.9	17.6			
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	12.4	0.2			8.6	0.1	0.9	1.2	2.1			
Delay (s)	23.3	9.0			28.1	14.4	17.8	19.1	19.7			
Level of Service	C	A			C	B	B	B	B			
Approach Delay (s)		12.2			26.8			19.1			0.0	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	947	73	143	783	0	0	0	0	97	437	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0					6.0	6.0	6.0
Lane Util. Factor		0.95		1.00	0.95					1.00	0.95	1.00
Frt		0.99		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		3501		1770	3539					1770	3539	1583
Flt Permitted		1.00		0.15	1.00					0.95	1.00	1.00
Satd. Flow (perm)		3501		284	3539					1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1029	79	155	851	0	0	0	0	105	475	255
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	96
Lane Group Flow (vph)	0	1099	0	155	851	0	0	0	0	105	475	159
Turn Type				pm+pt						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		20.2		30.0	30.0					16.2	16.2	16.2
Effective Green, g (s)		20.2		30.0	30.0					16.2	16.2	16.2
Actuated g/C Ratio		0.35		0.52	0.52					0.28	0.28	0.28
Clearance Time (s)		6.0		6.0	6.0					6.0	6.0	6.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1215		243	1824					493	985	441
v/s Ratio Prot		c0.31		0.04	c0.24						c0.13	
v/s Ratio Perm				0.29						0.06		0.10
v/c Ratio	0.90	0.64	0.47							0.21	0.48	0.36
Uniform Delay, d1	18.1	10.9	9.0							16.1	17.5	16.8
Progression Factor	1.00	1.00	1.00							1.00	1.00	1.00
Incremental Delay, d2	9.6	5.4	0.2							1.0	1.7	2.3
Delay (s)	27.7	16.3	9.2							17.1	19.2	19.1
Level of Service	C	B	A							B	B	B
Approach Delay (s)	27.7		10.3			0.0			18.9			
Approach LOS	C		B			A			B			

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	501	766	927	106	165	488
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3485		1770	1583
Flt Permitted	0.10	1.00	1.00		0.95	1.00
Satd. Flow (perm)	196	3539	3485		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	545	833	1008	115	179	530
RTOR Reduction (vph)	0	0	9	0	0	407
Lane Group Flow (vph)	545	833	1114	0	179	123
Turn Type	pm+pt					Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	62.1	62.1	32.1		13.4	13.4
Effective Green, g (s)	62.1	62.1	32.1		13.4	13.4
Actuated g/C Ratio	0.71	0.71	0.37		0.15	0.15
Clearance Time (s)	6.0	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)	571	2512	1278		271	242
v/s Ratio Prot	c0.26	0.24	0.32		c0.10	
v/s Ratio Perm	c0.42					0.08
v/c Ratio	0.95	0.33	0.87	0.66	0.51	
Uniform Delay, d1	24.5	4.8	25.8	34.9	34.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.5	0.1	8.3	5.9	1.7	
Delay (s)	51.0	4.9	34.1	40.8	35.7	
Level of Service	D	A	C	D	D	
Approach Delay (s)		23.1	34.1	37.0		
Approach LOS		C	C	D		

Intersection Summary			
HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	87.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	1134	129	459	908	29	322	34	522	21	13	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		0.97	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3485		3433	3523		3433	1863	1583	1770	1761	
Flt Permitted	0.28	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	524	3485		3433	3523		3433	1863	1583	1770	1761	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	1233	140	499	987	32	350	37	567	23	14	8
RTOR Reduction (vph)	0	7	0	0	2	0	0	0	404	0	7	0
Lane Group Flow (vph)	18	1366	0	499	1017	0	350	37	163	23	15	0
Turn Type	pm+pt			Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4								2			
Actuated Green, G (s)	47.6	47.6		17.0	60.1		15.4	15.4	15.4	16.0	16.0	
Effective Green, g (s)	47.6	47.6		17.0	60.1		15.4	15.4	15.4	16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.14	0.50		0.13	0.13	0.13	0.13	0.13	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	255	1382		486	1764		441	239	203	236	235	
v/s Ratio Prot	0.00	c0.39		c0.15	0.29		0.10	0.02		c0.01	0.01	
v/s Ratio Perm	0.03								c0.10			
v/c Ratio	0.07	0.99		1.03	0.58		0.79	0.15	0.80	0.10	0.06	
Uniform Delay, d1	22.6	35.9		51.5	21.0		50.8	46.5	50.8	45.7	45.5	
Progression Factor	0.68	0.70		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	14.7		47.8	0.5		13.7	1.4	27.3	0.8	0.5	
Delay (s)	15.3	39.7		99.3	21.5		64.4	47.9	78.1	46.5	46.0	
Level of Service	B	D		F	C		E	D	E	D	D	
Approach Delay (s)		39.4			47.1			71.9			46.2	
Approach LOS		D			D			E			D	

Intersection Summary			
HCM Average Control Delay	50.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	198	1023	158	102	789	362	122	410	170	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0				
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95				
Frt	1.00	0.98		1.00	0.95			0.96				
Flt Protected	0.95	1.00		0.95	1.00			0.99				
Satd. Flow (prot)	1770	3468		1770	3372			3381				
Flt Permitted	0.17	1.00		0.18	1.00			0.99				
Satd. Flow (perm)	310	3468		339	3372			3381				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	215	1112	172	111	858	393	133	446	185	0	0	0
RTOR Reduction (vph)	0	19	0	0	77	0	0	53	0	0	0	0
Lane Group Flow (vph)	215	1265	0	111	1174	0	0	711	0	0	0	0
Turn Type	pm+pt			pm+pt			Perm					
Protected Phases	7	4		3	8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)	29.2	24.0		25.2	22.0			14.8				
Effective Green, g (s)	29.2	24.0		25.2	22.0			14.8				
Actuated g/C Ratio	0.49	0.40		0.42	0.37			0.25				
Clearance Time (s)	6.0	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)	277	1387		219	1236			834				
v/s Ratio Prot	c0.07	c0.36		0.03	0.35							
v/s Ratio Perm	0.31			0.19				0.21				
v/c Ratio	0.78	0.91		0.51	0.95			0.85				
Uniform Delay, d1	21.9	17.0		23.4	18.5			21.6				
Progression Factor	0.92	0.78		0.49	0.57			1.00				
Incremental Delay, d2	8.8	6.5		1.5	13.3			10.8				
Delay (s)	28.9	19.7		13.1	23.9			32.3				
Level of Service	C	B		B	C			C				
Approach Delay (s)		21.0			23.0			32.3			0.0	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1018	38	40	772	0	145	0	113	424	138	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		6.0		6.0	6.0	6.0	6.0
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.97	1.00	1.00
Frt		0.99		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)		3520		1770	3539		1770		1583	3433	1863	1583
Flt Permitted		1.00		0.09	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (perm)		3520		174	3539		1770		1583	3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1107	41	43	839	0	158	0	123	461	150	253
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	79	0	0	127
Lane Group Flow (vph)	0	1146	0	43	839	0	158	0	44	461	150	126
Turn Type				pm+pt			Prot		custom	Prot		Perm
Protected Phases		4		3	8		5			1	6	
Permitted Phases				8					2			6
Actuated Green, G (s)		45.1		55.3	55.3		19.1		26.2	20.5	27.6	27.6
Effective Green, g (s)		45.1		55.3	55.3		19.1		26.2	20.5	27.6	27.6
Actuated g/C Ratio		0.38		0.46	0.46		0.16		0.22	0.17	0.23	0.23
Clearance Time (s)		6.0		6.0	6.0		6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1323		136	1631		282		346	586	428	364
v/s Ratio Prot		c0.33		0.01	c0.24		c0.09			c0.13	c0.08	
v/s Ratio Perm				0.13					0.03			0.08
v/c Ratio	0.87	0.32	0.51	0.56	0.13	0.79	0.35	0.35				
Uniform Delay, d1	34.7	42.8	22.9	46.6	37.7	47.7	38.7	38.6				
Progression Factor	0.67	0.90	0.83	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	3.6	0.5	0.1	2.5	0.8	6.9	2.3	2.6				
Delay (s)	26.7	39.1	19.0	49.1	38.5	54.5	40.9	41.2				
Level of Service	C	D	B	D	D	D	D	D				
Approach Delay (s)	26.7		20.0		44.5		48.3					
Approach LOS	C		C		D		D					

Intersection Summary			
HCM Average Control Delay	32.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	369	288	47	762	151	113	10	1813	771	107	2123	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		6.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	0.97	0.95		0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.98		1.00	0.94		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3465		3433	1743		1770	5085	1583	1770	5067	
Flt Permitted	0.95	1.00		0.95	1.00		0.07	1.00	1.00	0.07	1.00	
Satd. Flow (perm)	3433	3465		3433	1743		131	5085	1583	126	5067	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	313	51	828	164	123	11	1971	838	116	2308	57
RTOR Reduction (vph)	0	12	0	0	23	0	0	0	323	0	2	0
Lane Group Flow (vph)	401	352	0	828	264	0	11	1971	515	116	2363	0
Turn Type	Prot			Prot			pm+pt		Perm	pm+pt		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							4		4	8		
Actuated Green, G (s)	16.6	11.2		27.0	19.6		57.6	56.8	56.8	64.0	59.0	
Effective Green, g (s)	16.6	11.2		27.0	19.6		57.6	56.8	56.8	64.0	59.0	
Actuated g/C Ratio	0.14	0.09		0.22	0.16		0.48	0.47	0.47	0.53	0.49	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	475	323		772	285		74	2407	749	136	2491	
v/s Ratio Prot	c0.12	0.10		c0.24	0.15		0.00	0.39		c0.04	c0.47	
v/s Ratio Perm							0.07		0.33	0.42		
v/c Ratio	0.84	1.09		1.07	0.92		0.15	0.82	0.69	0.85	0.95	
Uniform Delay, d1	50.4	54.4		46.5	49.5		26.2	27.2	24.7	23.1	29.1	
Progression Factor	1.00	1.00		0.60	0.55		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.9	76.5		51.8	34.2		0.9	2.3	2.6	37.3	8.7	
Delay (s)	63.3	130.9		79.9	61.6		27.1	29.5	27.3	60.4	37.8	
Level of Service	E	F		E	E		C	C	C	E	D	
Approach Delay (s)		95.5			75.2			28.8			38.9	
Approach LOS		F			E			C			D	

Intersection Summary			
HCM Average Control Delay	46.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	301	1041	0	0	1181	120	148	605	370	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	1770	3539			3539	1583	1770	3539	1583			
Flt Permitted	0.09	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	167	3539			3539	1583	1770	3539	1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	327	1132	0	0	1284	130	161	658	402	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	44	0	0	64	0	0	0
Lane Group Flow (vph)	327	1132	0	0	1284	86	161	658	338	0	0	0
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	60.0	60.0			38.6	38.6	28.0	28.0	28.0			
Effective Green, g (s)	60.0	60.0			38.6	38.6	28.0	28.0	28.0			
Actuated g/C Ratio	0.60	0.60			0.39	0.39	0.28	0.28	0.28			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	347	2123			1366	611	496	991	443			
v/s Ratio Prot	c0.15	0.32			0.36			0.19				
v/s Ratio Perm	c0.42					0.05	0.09		c0.21			
v/c Ratio	0.94	0.53			0.94	0.14	0.32	0.66	0.76			
Uniform Delay, d1	34.4	11.8			29.6	19.9	28.5	31.8	33.0			
Progression Factor	0.47	0.22			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	21.4	0.1			12.5	0.1	1.7	3.5	11.8			
Delay (s)	37.5	2.8			42.1	20.0	30.2	35.3	44.7			
Level of Service	D	A			D	C	C	D	D			
Approach Delay (s)		10.5			40.1			37.8			0.0	
Approach LOS		B			D			D			A	

Intersection Summary			
HCM Average Control Delay	28.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1204	93	194	1065	0	0	0	0	123	552	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0					6.0	6.0	6.0
Lane Util. Factor		0.95		1.00	0.95					1.00	0.95	1.00
Frt		0.99		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		3501		1770	3539					1770	3539	1583
Flt Permitted		1.00		0.08	1.00					0.95	1.00	1.00
Satd. Flow (perm)		3501		151	3539					1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1309	101	211	1158	0	0	0	0	134	600	323
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	0	66
Lane Group Flow (vph)	0	1404	0	211	1158	0	0	0	0	134	600	257
Turn Type				pm+pt						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		43.4		60.5	60.5					27.5	27.5	27.5
Effective Green, g (s)		43.4		60.5	60.5					27.5	27.5	27.5
Actuated g/C Ratio		0.43		0.60	0.60					0.28	0.28	0.28
Clearance Time (s)		6.0		6.0	6.0					6.0	6.0	6.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1519		271	2141					487	973	435
v/s Ratio Prot		c0.40		c0.09	0.33						c0.17	
v/s Ratio Perm				0.38						0.08		0.16
v/c Ratio	0.92			0.78	0.54					0.28	0.62	0.59
Uniform Delay, d1	26.8			25.8	11.6					28.4	31.6	31.4
Progression Factor	0.82			2.01	0.16					1.00	1.00	1.00
Incremental Delay, d2	8.9			6.7	0.1					1.4	2.9	5.8
Delay (s)	30.7			58.5	2.0					29.8	34.6	37.2
Level of Service	C			E	A					C	C	D
Approach Delay (s)	30.7				10.7		0.0				34.8	
Approach LOS	C				B		A				C	

Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	696	1065	1209	138	300	888
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	0.97	0.95	0.95		0.97	0.88
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	3539	3485		3433	2787
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	3539	3485		3433	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	757	1158	1314	150	326	965
RTOR Reduction (vph)	0	0	8	0	0	582
Lane Group Flow (vph)	757	1158	1456	0	326	383
Turn Type	Prot					Perm
Protected Phases	1	6	2		8	
Permitted Phases						8
Actuated Green, G (s)	23.0	72.6	43.6		15.4	15.4
Effective Green, g (s)	23.0	72.6	43.6		15.4	15.4
Actuated g/C Ratio	0.23	0.73	0.44		0.15	0.15
Clearance Time (s)	6.0	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)	790	2569	1519		529	429
v/s Ratio Prot	c0.22	0.33	c0.42		0.09	
v/s Ratio Perm						c0.14
v/c Ratio	0.96	0.45	0.96		0.62	0.89
Uniform Delay, d1	38.0	5.6	27.3		39.5	41.5
Progression Factor	1.00	1.00	0.48		1.00	1.00
Incremental Delay, d2	22.1	0.1	13.4		2.1	20.3
Delay (s)	60.1	5.7	26.5		41.7	61.7
Level of Service	E	A	C		D	E
Approach Delay (s)		27.2	26.5		56.7	
Approach LOS		C	C		E	

Intersection Summary			
HCM Average Control Delay	35.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	198	1023	158	147	881	441	85	287	119	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0				
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95				
Frt	1.00	0.98		1.00	0.95			0.96				
Flt Protected	0.95	1.00		0.95	1.00			0.99				
Satd. Flow (prot)	1770	3468		1770	3362			3382				
Flt Permitted	0.07	1.00		0.11	1.00			0.99				
Satd. Flow (perm)	125	3468		198	3362			3382				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	215	1112	172	160	958	479	92	312	129	0	0	0
RTOR Reduction (vph)	0	10	0	0	52	0	0	26	0	0	0	0
Lane Group Flow (vph)	215	1274	0	160	1385	0	0	507	0	0	0	0
Turn Type	pm+pt			pm+pt			Perm					
Protected Phases	7	4		3	8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)	79.0	61.0		73.0	58.0			26.0				
Effective Green, g (s)	79.0	61.0		73.0	58.0			26.0				
Actuated g/C Ratio	0.66	0.51		0.61	0.48			0.22				
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0				
Lane Grp Cap (vph)	329	1763		317	1625			733				
v/s Ratio Prot	c0.10	0.37		0.06	c0.41							
v/s Ratio Perm	0.33			0.24				0.15				
v/c Ratio	0.65	0.72		0.50	0.85			0.69				
Uniform Delay, d1	36.6	22.9		34.0	27.2			43.3				
Progression Factor	0.89	0.14		0.74	0.16			1.00				
Incremental Delay, d2	6.9	1.8		2.9	3.1			5.3				
Delay (s)	39.5	5.0		28.3	7.6			48.6				
Level of Service	D	A		C	A			D				
Approach Delay (s)		10.0			9.7			48.6			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: Bulter Ave & San Francisco St

Lone Tree Overpass - 2030 Build PM
1/10/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	198	1023	158	147	881	441	85	287	119	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0				
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95				
Frt	1.00	0.98		1.00	0.95			0.96				
Flt Protected	0.95	1.00		0.95	1.00			0.99				
Satd. Flow (prot)	1770	3468		1770	3362			3382				
Flt Permitted	0.07	1.00		0.11	1.00			0.99				
Satd. Flow (perm)	125	3468		198	3362			3382				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	215	1112	172	160	958	479	92	312	129	0	0	0
RTOR Reduction (vph)	0	10	0	0	52	0	0	26	0	0	0	0
Lane Group Flow (vph)	215	1274	0	160	1385	0	0	507	0	0	0	0
Turn Type	pm+pt			pm+pt			Perm					
Protected Phases	7	4		3	8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)	79.0	61.0		73.0	58.0			26.0				
Effective Green, g (s)	79.0	61.0		73.0	58.0			26.0				
Actuated g/C Ratio	0.66	0.51		0.61	0.48			0.22				
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0				
Lane Grp Cap (vph)	329	1763		317	1625			733				
v/s Ratio Prot	c0.10	0.37		0.06	c0.41							
v/s Ratio Perm	0.33			0.24				0.15				
v/c Ratio	0.65	0.72		0.50	0.85			0.69				
Uniform Delay, d1	36.6	22.9		34.0	27.2			43.3				
Progression Factor	0.89	0.14		0.74	0.16			1.00				
Incremental Delay, d2	6.9	1.8		2.9	3.1			5.3				
Delay (s)	39.5	5.0		28.3	7.6			48.6				
Level of Service	D	A		C	A			D				
Approach Delay (s)		10.0			9.7			48.6			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1147	43	52	988	0	97	0	75	166	54	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		6.0		6.0	6.0	6.0	6.0
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.97	1.00	1.00
Frt		0.99		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)		3520		1770	3539		1770		1583	3433	1863	1583
Flt Permitted		1.00		0.08	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (perm)		3520		152	3539		1770		1583	3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1247	47	57	1074	0	105	0	82	180	59	99
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	63	0	0	83
Lane Group Flow (vph)	0	1292	0	57	1074	0	105	0	19	180	59	16
Turn Type				pm+pt			Prot		custom	Prot		Perm
Protected Phases		4		3	8		5			1	6	
Permitted Phases				8					2			6
Actuated Green, G (s)		51.6		62.1	62.1		20.7		28.2	11.7	19.2	19.2
Effective Green, g (s)		51.6		62.1	62.1		20.7		28.2	11.7	19.2	19.2
Actuated g/C Ratio		0.43		0.52	0.52		0.17		0.23	0.10	0.16	0.16
Clearance Time (s)		6.0		6.0	6.0		6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1514		139	1831		305		372	335	298	253
v/s Ratio Prot		c0.37		0.02	c0.30		c0.06			c0.05	c0.03	
v/s Ratio Perm				0.20					0.01			0.01
v/c Ratio	0.85	0.41	0.59	0.34	0.05	0.54	0.20	0.06				
Uniform Delay, d1	30.8	42.5	20.1	43.7	35.5	51.6	43.7	42.8				
Progression Factor	0.76	0.31	0.48	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	2.1	1.2	0.3	0.7	0.3	1.7	0.3	0.1				
Delay (s)	25.5	14.2	10.0	44.4	35.8	53.2	44.0	42.9				
Level of Service	C	B	A	D	D	D	D	D				
Approach Delay (s)	25.5		10.2		40.6		48.6					
Approach LOS	C		B		D		D					

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	348	272	45	885	139	104	10	1750	888	98	1993	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95		0.97	1.00		1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.98		1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3464		3433	1743		1770	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.08	1.00	1.00	0.07	1.00	1.00
Satd. Flow (perm)	3433	3464		3433	1743		147	5085	1583	138	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	378	296	49	962	151	113	11	1902	965	107	2166	51
RTOR Reduction (vph)	0	12	0	0	24	0	0	0	378	0	0	5
Lane Group Flow (vph)	378	333	0	962	240	0	11	1902	587	107	2166	46
Turn Type	Prot			Prot			pm+pt		Perm	pm+pt		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	19.0	11.2		30.0	22.2		51.6	50.8	50.8	58.0	54.0	54.0
Effective Green, g (s)	19.0	11.2		30.0	22.2		51.6	50.8	50.8	58.0	54.0	54.0
Actuated g/C Ratio	0.16	0.09		0.25	0.18		0.43	0.42	0.42	0.48	0.45	0.45
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	544	323		858	322		74	2153	670	121	2288	712
v/s Ratio Prot	0.11	c0.10		c0.28	0.14		0.00	0.37		c0.03	c0.43	
v/s Ratio Perm							0.06		0.37	0.40		0.03
v/c Ratio	0.69	1.03		1.12	0.75		0.15	0.88	0.88	0.88	0.95	0.06
Uniform Delay, d1	47.8	54.4		45.0	46.2		27.3	31.9	31.7	25.6	31.6	18.7
Progression Factor	1.00	1.00		0.65	0.61		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	58.5		68.2	13.0		0.9	4.7	12.3	47.9	9.1	0.0
Delay (s)	51.6	112.9		97.6	41.2		28.3	36.6	44.0	73.5	40.8	18.7
Level of Service	D	F		F	D		C	D	D	E	D	B
Approach Delay (s)		80.8			85.5			39.0			41.8	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM Average Control Delay	52.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	251	867	0	0	1029	104	37	151	92	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	1770	3539			3539	1583	1770	3539	1583			
Flt Permitted	0.13	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	234	3539			3539	1583	1770	3539	1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	273	942	0	0	1118	113	40	164	100	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	63	0	0	75	0	0	0
Lane Group Flow (vph)	273	942	0	0	1118	50	40	164	25	0	0	0
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	48.1	48.1			30.0	30.0	19.9	19.9	19.9			
Effective Green, g (s)	48.1	48.1			30.0	30.0	19.9	19.9	19.9			
Actuated g/C Ratio	0.60	0.60			0.38	0.38	0.25	0.25	0.25			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	373	2128			1327	594	440	880	394			
v/s Ratio Prot	c0.11	0.27			c0.32			c0.05				
v/s Ratio Perm	0.33					0.03	0.02		0.02			
v/c Ratio	0.73	0.44			0.84	0.08	0.09	0.19	0.06			
Uniform Delay, d1	23.0	8.7			22.8	16.1	23.1	23.7	22.9			
Progression Factor	0.34	0.12			0.84	0.64	1.00	1.00	1.00			
Incremental Delay, d2	4.3	0.1			4.5	0.1	0.4	0.5	0.3			
Delay (s)	12.2	1.1			23.8	10.4	23.5	24.1	23.2			
Level of Service	B	A			C	B	C	C	C			
Approach Delay (s)		3.6			22.5			23.8			0.0	
Approach LOS		A			C			C			A	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1102	85	162	887	0	0	0	0	95	430	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0					6.0	6.0	6.0
Lane Util. Factor		0.95		1.00	0.95					1.00	0.95	1.00
Frt		0.99		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		3501		1770	3539					1770	3539	1583
Flt Permitted		1.00		0.10	1.00					0.95	1.00	1.00
Satd. Flow (perm)		3501		188	3539					1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1198	92	176	964	0	0	0	0	103	467	251
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	0	106
Lane Group Flow (vph)	0	1282	0	176	964	0	0	0	0	103	467	145
Turn Type				pm+pt						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		33.6		47.4	47.4					20.6	20.6	20.6
Effective Green, g (s)		33.6		47.4	47.4					20.6	20.6	20.6
Actuated g/C Ratio		0.42		0.59	0.59					0.26	0.26	0.26
Clearance Time (s)		6.0		6.0	6.0					6.0	6.0	6.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1470		266	2097					456	911	408
v/s Ratio Prot		c0.37		c0.06	0.27						c0.13	
v/s Ratio Perm				0.33						0.06		0.09
v/c Ratio	0.87			0.66	0.46					0.23	0.51	0.35
Uniform Delay, d1	21.2			25.4	9.1					23.4	25.4	24.3
Progression Factor	0.69			0.65	0.06					1.00	1.00	1.00
Incremental Delay, d2	5.6			3.8	0.1					1.1	2.1	2.4
Delay (s)	20.3			20.2	0.6					24.6	27.5	26.7
Level of Service	C			C	A					C	C	C
Approach Delay (s)	20.3				3.6		0.0				26.9	
Approach LOS	C				A		A				C	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	555	849	866	99	319	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	0.97	0.95	0.95		0.97	0.88
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	3539	3485		3433	2787
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	3539	3485		3433	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	603	923	941	108	347	1040
RTOR Reduction (vph)	0	0	10	0	0	618
Lane Group Flow (vph)	603	923	1039	0	347	422
Turn Type	Prot					Perm
Protected Phases	1	6	2		8	
Permitted Phases						8
Actuated Green, G (s)	16.6	51.2	28.6		16.8	16.8
Effective Green, g (s)	16.6	51.2	28.6		16.8	16.8
Actuated g/C Ratio	0.21	0.64	0.36		0.21	0.21
Clearance Time (s)	6.0	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)	712	2265	1246		721	585
v/s Ratio Prot	c0.18	0.26	c0.30		0.10	
v/s Ratio Perm						c0.15
v/c Ratio	0.85	0.41	0.83		0.48	0.72
Uniform Delay, d1	30.5	7.0	23.5		27.8	29.4
Progression Factor	1.00	1.00	0.36		1.00	1.00
Incremental Delay, d2	9.2	0.1	6.1		0.5	4.4
Delay (s)	39.7	7.1	14.6		28.3	33.8
Level of Service	D	A	B		C	C
Approach Delay (s)		20.0	14.6		32.4	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	724	483	655	982	428	643
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	0.97	0.95	0.97	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	3433	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	787	525	712	1067	465	699
RTOR Reduction (vph)	0	358	0	0	0	529
Lane Group Flow (vph)	787	167	712	1067	465	170
Turn Type		Perm	Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Actuated Green, G (s)	22.1	22.1	20.4	48.5	19.5	19.5
Effective Green, g (s)	22.1	22.1	20.4	48.5	19.5	19.5
Actuated g/C Ratio	0.28	0.28	0.25	0.61	0.24	0.24
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	978	437	875	2146	837	679
v/s Ratio Prot	c0.22		c0.21	0.30	c0.14	
v/s Ratio Perm		0.11				0.06
v/c Ratio	0.80	0.38	0.81	0.50	0.56	0.25
Uniform Delay, d1	26.9	23.4	28.0	8.9	26.5	24.4
Progression Factor	0.53	0.74	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	0.5	5.8	0.2	2.7	0.9
Delay (s)	19.0	17.9	33.9	9.1	29.1	25.3
Level of Service	B	B	C	A	C	C
Approach Delay (s)	18.6			19.0	26.8	
Approach LOS	B			B	C	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	790	339	693	205	22	334	29	28
v/c Ratio	0.04	0.97	0.84	0.42	0.59	0.04	0.36	0.10	0.08
Control Delay	12.6	57.4	37.8	15.5	33.2	23.2	5.0	27.2	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	57.4	37.8	15.5	33.2	23.2	5.0	27.2	20.2
Queue Length 50th (ft)	3	205	116	106	74	7	30	12	7
Queue Length 95th (ft)	10	#328	#246	188	#191	27	64	33	28
Internal Link Dist (ft)		282		5348		486			303
Turn Bay Length (ft)	100		100		150		150	50	
Base Capacity (vph)	256	812	436	1638	348	573	959	302	368
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	0.04	0.97	0.78	0.42	0.59	0.04	0.35	0.10	0.08

Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	NBT
Lane Group Flow (vph)	167	997	70	782	376
v/c Ratio	0.46	0.73	0.28	0.71	0.36
Control Delay	11.8	18.7	11.0	19.4	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	18.7	11.0	19.4	15.2
Queue Length 50th (ft)	28	157	11	108	46
Queue Length 95th (ft)	55	224	27	165	80
Internal Link Dist (ft)		544		810	282
Turn Bay Length (ft)	150		150		
Base Capacity (vph)	376	1501	247	1196	1039
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.44	0.66	0.28	0.65	0.36

Intersection Summary

Lane Group	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	719	30	591	109	85	379	124	209
v/c Ratio	0.83	0.15	0.55	0.34	0.18	0.71	0.13	0.24
Control Delay	33.6	16.5	20.3	24.8	7.0	35.6	10.2	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	16.5	20.3	24.8	7.0	35.6	10.2	5.1
Queue Length 50th (ft)	124	8	98	31	0	67	20	12
Queue Length 95th (ft)	#255	24	141	84	32	#143	58	53
Internal Link Dist (ft)	1000		544				289	
Turn Bay Length (ft)		150		100		100		100
Base Capacity (vph)	896	195	1457	324	469	543	944	868
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.15	0.41	0.34	0.18	0.70	0.13	0.24

Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	143	130	695	191	8	1410	600	67	1617
v/c Ratio	0.64	0.56	0.96	0.49	0.07	0.86	0.57	0.60	0.90
Control Delay	68.3	61.3	75.1	43.7	15.9	38.1	4.0	39.9	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	61.3	75.1	43.7	15.9	38.1	4.0	39.9	37.0
Queue Length 50th (ft)	117	101	302	124	3	556	0	27	600
Queue Length 95th (ft)	#198	170	#428	203	11	664	65	#77	#893
Internal Link Dist (ft)		456		1000		1095			958
Turn Bay Length (ft)	50		350		150		750	150	
Base Capacity (vph)	222	233	725	389	109	1633	1053	111	1792
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	0.64	0.56	0.96	0.49	0.07	0.86	0.57	0.60	0.90

Intersection Summary

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

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	264	913	985	100	90	368	225
v/c Ratio	0.80	0.49	0.89	0.18	0.19	0.39	0.44
Control Delay	30.0	9.9	31.4	4.8	18.3	19.4	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	9.9	31.4	4.8	18.3	19.4	12.7
Queue Length 50th (ft)	48	98	174	0	25	57	32
Queue Length 95th (ft)	#152	140	#281	27	56	90	84
Internal Link Dist (ft)		613	912			317	
Turn Bay Length (ft)	150			150			
Base Capacity (vph)	332	1895	1126	572	474	948	507
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	0.80	0.48	0.87	0.17	0.19	0.39	0.44

Intersection Summary

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

Lane Group	EBT	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	1108	155	851	105	475	255
v/c Ratio	0.89	0.56	0.48	0.21	0.47	0.47
Control Delay	28.7	15.8	10.0	18.6	19.8	12.6
Queue Delay	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	15.8	10.0	18.6	19.8	12.6
Queue Length 50th (ft)	193	26	90	29	76	35
Queue Length 95th (ft)	#312	#54	128	64	116	92
Internal Link Dist (ft)	262		613		969	
Turn Bay Length (ft)		150		150		150
Base Capacity (vph)	1318	275	2017	505	1009	547
Starvation Cap Reductn	15	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	0.85	0.56	0.42	0.21	0.47	0.47

Intersection Summary

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

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	545	833	1123	179	530
v/c Ratio	0.95	0.33	0.87	0.66	0.82
Control Delay	52.7	5.5	35.1	47.0	16.7
Queue Delay	0.0	0.0	57.6	0.0	0.0
Total Delay	52.7	5.5	92.7	47.0	16.7
Queue Length 50th (ft)	249	84	304	94	24
Queue Length 95th (ft)	#468	115	#438	161	#177
Internal Link Dist (ft)		377	262	1918	
Turn Bay Length (ft)	300			150	
Base Capacity (vph)	571	2510	1286	324	683
Starvation Cap Reductn	0	0	287	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.95	0.33	1.12	0.55	0.78

Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	18	1373	499	1019	350	37	567	23	22
v/c Ratio	0.07	1.07	1.03	0.58	0.64	0.13	0.88	0.10	0.09
Control Delay	17.6	66.7	98.3	24.0	53.5	44.7	26.7	47.0	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	66.7	98.3	24.0	53.5	44.7	26.7	47.0	34.6
Queue Length 50th (ft)	7	~603	~212	245	132	25	76	16	10
Queue Length 95th (ft)	m9	m#721	#321	398	184	57	#294	42	35
Internal Link Dist (ft)		282		3365		486			303
Turn Bay Length (ft)	100		350		200		150	50	
Base Capacity (vph)	273	1285	486	1851	544	295	641	236	242
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	0.07	1.07	1.03	0.55	0.64	0.13	0.88	0.10	0.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBT
Lane Group Flow (vph)	215	1284	111	1251	764
v/c Ratio	0.90	0.91	0.46	0.95	0.80
Control Delay	48.4	22.9	10.9	25.1	26.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	22.9	10.9	25.1	26.7
Queue Length 50th (ft)	45	276	13	116	122
Queue Length 95th (ft)	m#122	#384	m27	#315	#205
Internal Link Dist (ft)		544		810	282
Turn Bay Length (ft)	150		150		
Base Capacity (vph)	238	1407	242	1313	953
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.90	0.91	0.46	0.95	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1148	43	839	158	123	461	150	253
v/c Ratio	0.87	0.28	0.53	0.56	0.28	0.79	0.33	0.50
Control Delay	27.5	24.8	19.6	55.4	14.3	57.8	42.8	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	24.8	19.6	55.4	14.3	57.8	42.8	19.3
Queue Length 50th (ft)	317	18	202	114	14	176	101	57
Queue Length 95th (ft)	384	m19	m211	187	71	231	169	147
Internal Link Dist (ft)	1000		544				289	
Turn Bay Length (ft)		150		100		150		100
Base Capacity (vph)	1441	151	1770	280	439	658	448	506
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.28	0.47	0.56	0.28	0.70	0.33	0.50

Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	401	364	828	287	11	1971	838	116	2365
v/c Ratio	0.85	0.77	1.07	0.76	0.10	0.89	0.81	0.87	0.95
Control Delay	67.6	60.2	81.0	35.7	16.5	37.9	14.7	70.3	39.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	60.2	81.0	35.7	16.5	37.9	14.7	70.3	39.0
Queue Length 50th (ft)	157	140	~366	164	4	507	152	44	597
Queue Length 95th (ft)	#232	#203	#486	#315	14	579	364	#160	#856
Internal Link Dist (ft)		456		1000		975			958
Turn Bay Length (ft)	250		600		150		750	200	
Base Capacity (vph)	486	473	772	377	115	2204	1033	134	2493
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	0.83	0.77	1.07	0.76	0.10	0.89	0.81	0.87	0.95

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.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	327	1132	1284	130	161	658	402
v/c Ratio	0.94	0.53	0.94	0.20	0.32	0.66	0.79
Control Delay	42.9	3.2	44.1	10.7	30.8	35.7	38.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.9	3.2	44.1	10.7	30.8	35.7	38.7
Queue Length 50th (ft)	163	40	405	23	81	194	187
Queue Length 95th (ft)	m#212	m44	#550	62	138	257	#338
Internal Link Dist (ft)		613	912			317	
Turn Bay Length (ft)	150			150			
Base Capacity (vph)	348	2123	1380	661	496	991	507
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	0.94	0.53	0.93	0.20	0.32	0.66	0.79

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	1410	211	1158	134	600	323
v/c Ratio	0.92	0.78	0.54	0.28	0.62	0.64
Control Delay	32.2	50.5	2.4	31.1	35.4	30.0
Queue Delay	5.6	0.0	0.1	0.0	0.0	0.1
Total Delay	37.8	50.5	2.5	31.1	35.4	30.1
Queue Length 50th (ft)	204	105	40	68	179	133
Queue Length 95th (ft)	#324	m123	m37	121	240	232
Internal Link Dist (ft)	262		613		969	
Turn Bay Length (ft)		150		150		150
Base Capacity (vph)	1550	286	2194	487	973	501
Starvation Cap Reductn	109	0	0	0	0	0
Spillback Cap Reductn	0	0	223	0	0	5
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.74	0.59	0.28	0.62	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	757	1158	1464	326	965
v/c Ratio	0.96	0.45	0.96	0.62	0.95
Control Delay	62.3	6.3	28.1	45.0	31.8
Queue Delay	0.0	0.0	0.0	1.4	0.0
Total Delay	62.3	6.3	28.1	46.4	31.8
Queue Length 50th (ft)	246	138	180	100	105
Queue Length 95th (ft)	#365	174	#613	146	#253
Internal Link Dist (ft)		377	262	1918	
Turn Bay Length (ft)	400			150	250
Base Capacity (vph)	790	2569	1529	549	1024
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	89	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.96	0.45	0.96	0.71	0.94

Intersection Summary

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

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	251	753	251	285	1137	280	842	280	248	742	248
v/c Ratio	0.98	0.76	0.40	0.69	0.99	0.61	0.89	0.50	0.54	0.79	0.45
Control Delay	86.4	33.2	5.1	59.9	65.6	55.4	55.3	16.6	53.5	47.8	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.4	33.2	5.1	59.9	65.6	55.4	55.3	16.6	53.5	47.8	13.3
Queue Length 50th (ft)	94	196	9	109	458	107	331	60	93	281	39
Queue Length 95th (ft)	m#179	320	m58	155	#615	153	#442	146	137	355	114
Internal Link Dist (ft)		282			3365		486			259	
Turn Bay Length (ft)	200		250	150		150		150	150		150
Base Capacity (vph)	257	992	624	458	1144	458	944	555	458	944	556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.76	0.40	0.62	0.99	0.61	0.89	0.50	0.54	0.79	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBT
Lane Group Flow (vph)	215	1284	160	1437	533
v/c Ratio	0.65	0.72	0.51	0.86	0.70
Control Delay	39.6	5.0	22.2	7.6	46.4
Queue Delay	0.0	0.3	0.0	0.0	0.0
Total Delay	39.6	5.3	22.2	7.6	46.4
Queue Length 50th (ft)	126	77	45	151	190
Queue Length 95th (ft)	m181	131	m73	m130	253
Internal Link Dist (ft)		544		810	282
Turn Bay Length (ft)	150		150		
Base Capacity (vph)	329	1773	316	1677	758
Starvation Cap Reductn	0	100	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.65	0.77	0.51	0.86	0.70

Intersection Summary

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

Lane Group	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1294	57	1074	105	82	180	59	99
v/c Ratio	0.85	0.37	0.60	0.34	0.18	0.54	0.19	0.28
Control Delay	25.9	12.0	10.7	47.5	10.5	57.5	48.9	11.9
Queue Delay	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	12.0	10.9	47.5	10.5	57.5	48.9	11.9
Queue Length 50th (ft)	412	9	96	72	0	69	41	0
Queue Length 95th (ft)	m418	m6	68	128	46	104	86	52
Internal Link Dist (ft)	1000		544				289	
Turn Bay Length (ft)		150		100		150		100
Base Capacity (vph)	1653	159	2012	305	451	458	366	390
Starvation Cap Reductn	0	0	264	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.36	0.61	0.34	0.18	0.39	0.16	0.25

Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	378	345	962	264	11	1902	965	107	2166	51
v/c Ratio	0.69	0.73	1.12	0.64	0.10	0.98	0.95	0.91	0.95	0.07
Control Delay	55.3	57.9	97.9	29.5	19.1	52.1	31.4	87.2	42.0	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	57.9	97.9	29.5	19.1	52.1	31.4	87.2	42.0	17.6
Queue Length 50th (ft)	144	132	~435	133	4	526	305	46	556	17
Queue Length 95th (ft)	197	184	#567	236	15	#644	#658	#158	#798	48
Internal Link Dist (ft)		456		1000		975			958	
Turn Bay Length (ft)	200		300		150		750	150		50
Base Capacity (vph)	544	473	858	415	115	1949	1011	118	2288	718
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.73	1.12	0.64	0.10	0.98	0.95	0.91	0.95	0.07

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.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	273	942	1118	113	40	164	100
v/c Ratio	0.73	0.44	0.84	0.17	0.09	0.19	0.21
Control Delay	16.0	1.4	25.1	3.3	26.0	25.8	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	1.4	25.1	3.3	26.0	25.8	7.3
Queue Length 50th (ft)	46	18	281	5	16	35	0
Queue Length 95th (ft)	m72	m11	355	m18	42	62	37
Internal Link Dist (ft)		613	1672			317	
Turn Bay Length (ft)	150			150			
Base Capacity (vph)	393	2256	1416	694	440	879	468
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	0.42	0.79	0.16	0.09	0.19	0.21

Intersection Summary

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

Lane Group	EBT	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	1290	176	964	103	467	251
v/c Ratio	0.87	0.67	0.46	0.23	0.51	0.49
Control Delay	21.8	23.0	1.0	26.5	28.6	15.5
Queue Delay	1.1	0.0	0.1	0.0	0.0	0.0
Total Delay	22.9	23.0	1.0	26.5	28.6	15.6
Queue Length 50th (ft)	212	53	8	42	108	45
Queue Length 95th (ft)	254	m79	11	85	158	115
Internal Link Dist (ft)	262		613		969	
Turn Bay Length (ft)		150		150		150
Base Capacity (vph)	1539	292	2212	457	913	515
Starvation Cap Reductn	89	0	0	0	0	0
Spillback Cap Reductn	0	0	197	0	0	8
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.60	0.48	0.23	0.51	0.50

Intersection Summary

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

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	603	923	1049	347	1040
v/c Ratio	0.85	0.41	0.83	0.48	0.86
Control Delay	43.3	8.1	16.6	29.6	16.0
Queue Delay	0.0	0.0	0.6	0.1	0.0
Total Delay	43.3	8.1	17.3	29.7	16.0
Queue Length 50th (ft)	149	114	145	75	61
Queue Length 95th (ft)	#229	152	#365	114	153
Internal Link Dist (ft)		377	262	1918	
Turn Bay Length (ft)	250			150	150
Base Capacity (vph)	730	2264	1258	815	1258
Starvation Cap Reductn	0	0	46	0	0
Spillback Cap Reductn	0	20	0	43	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.83	0.41	0.87	0.45	0.83

Intersection Summary

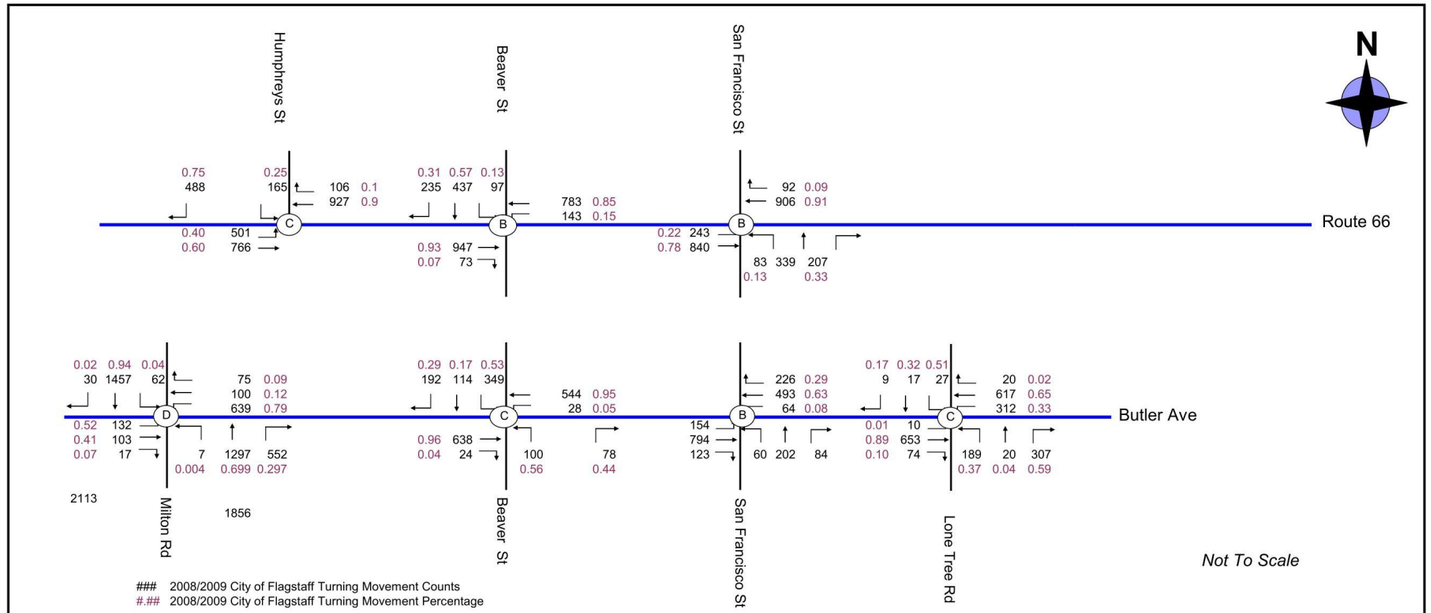
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	787	525	712	1067	465	699
v/c Ratio	0.81	0.72	0.81	0.50	0.55	0.69
Control Delay	21.3	9.3	36.2	9.6	30.3	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	9.3	36.2	9.6	30.3	14.9
Queue Length 50th (ft)	151	52	167	128	109	66
Queue Length 95th (ft)	206	83	228	169	158	136
Internal Link Dist (ft)	1672			345	1029	
Turn Bay Length (ft)		100	250		150	40
Base Capacity (vph)	1017	740	944	2256	840	1008
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	0.77	0.71	0.75	0.47	0.55	0.69

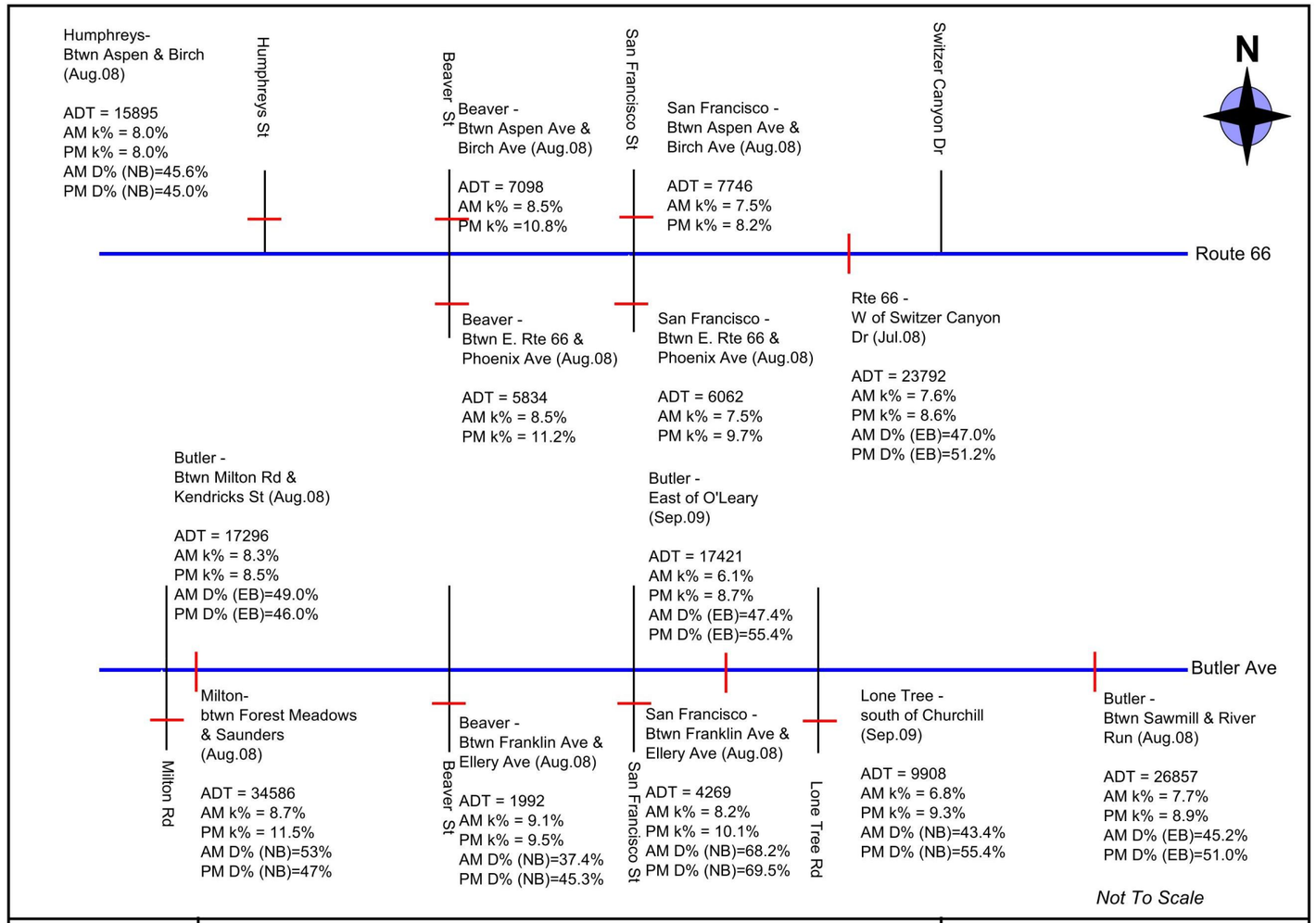
Intersection Summary

Appendix C-2

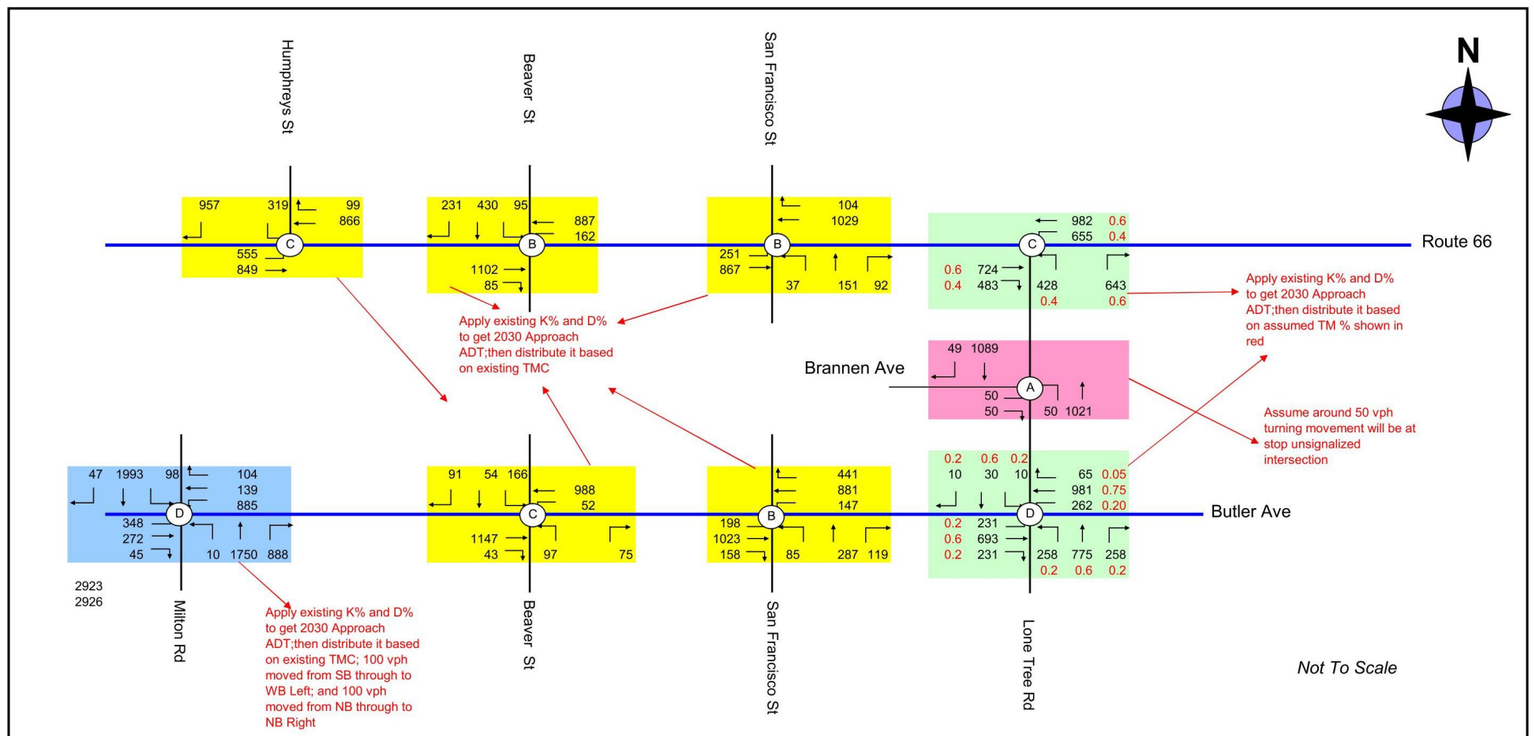
- Existing PM Turning Movement Counts and Distribution
- Existing ADT, K Factors and D Factors
- 2030 Build Condition Turning Movement Volumes Calculation



PB 100 YEARS	2008/2009 PM Peak Turning Movement Volumes & Distributions	City of Flagstaff Lone Tree Overpass Study



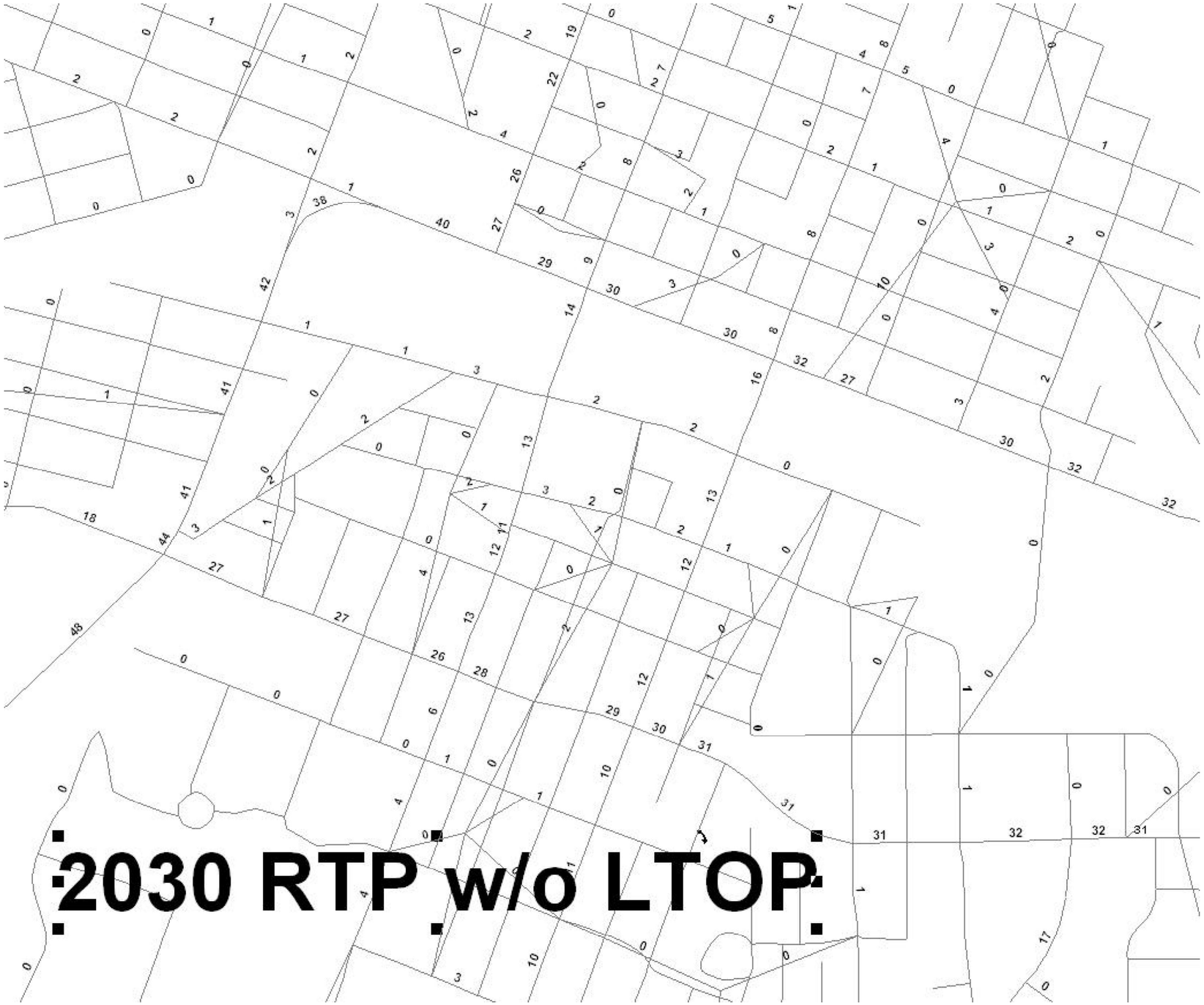
PB 100 YEARS	Existing (2008/2009) Average Daily Traffic Volumes, Peak Hour Factor (K%) & Directional Factor (D%)	City of Flagstaff Lone Tree Overpass Study

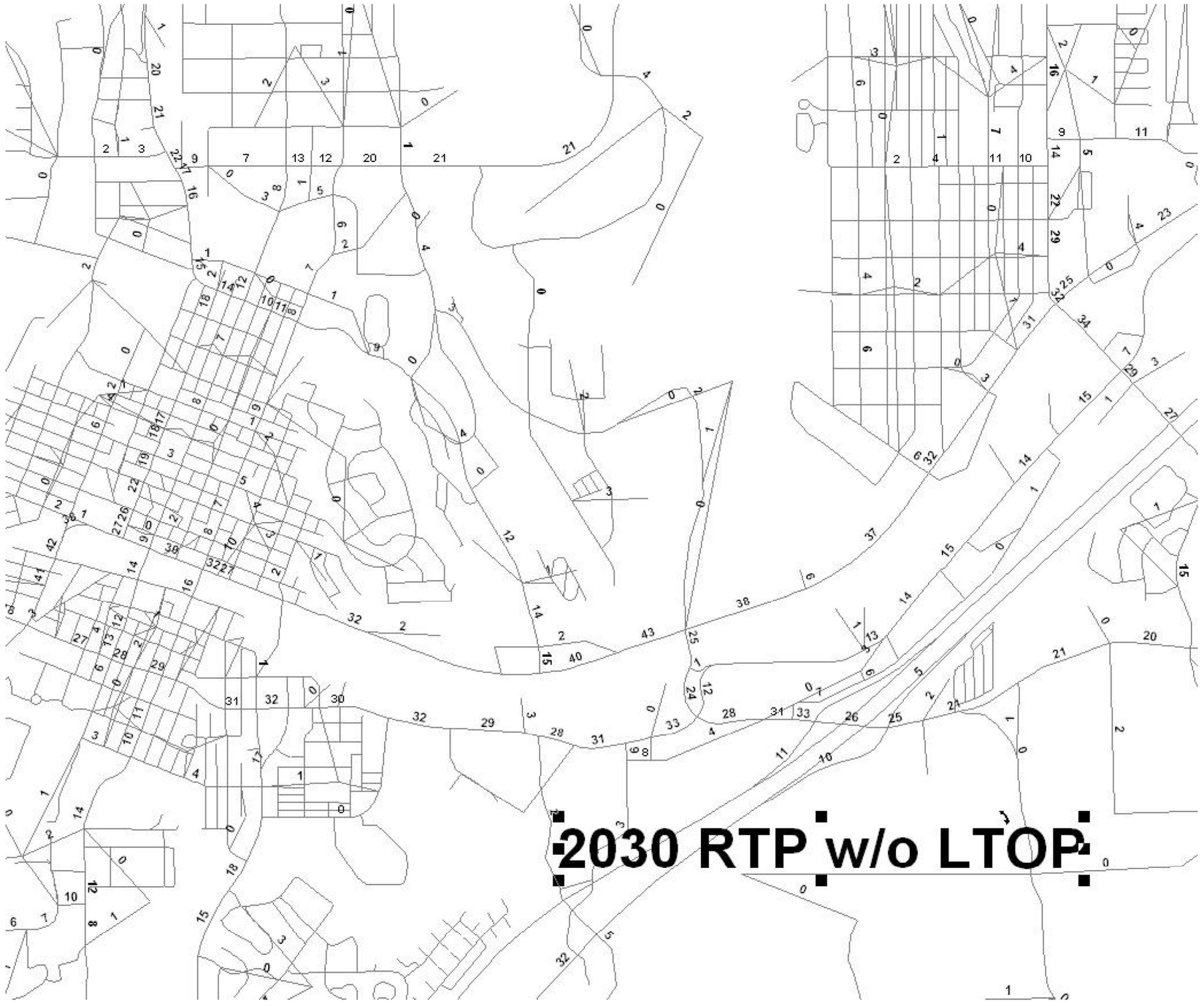


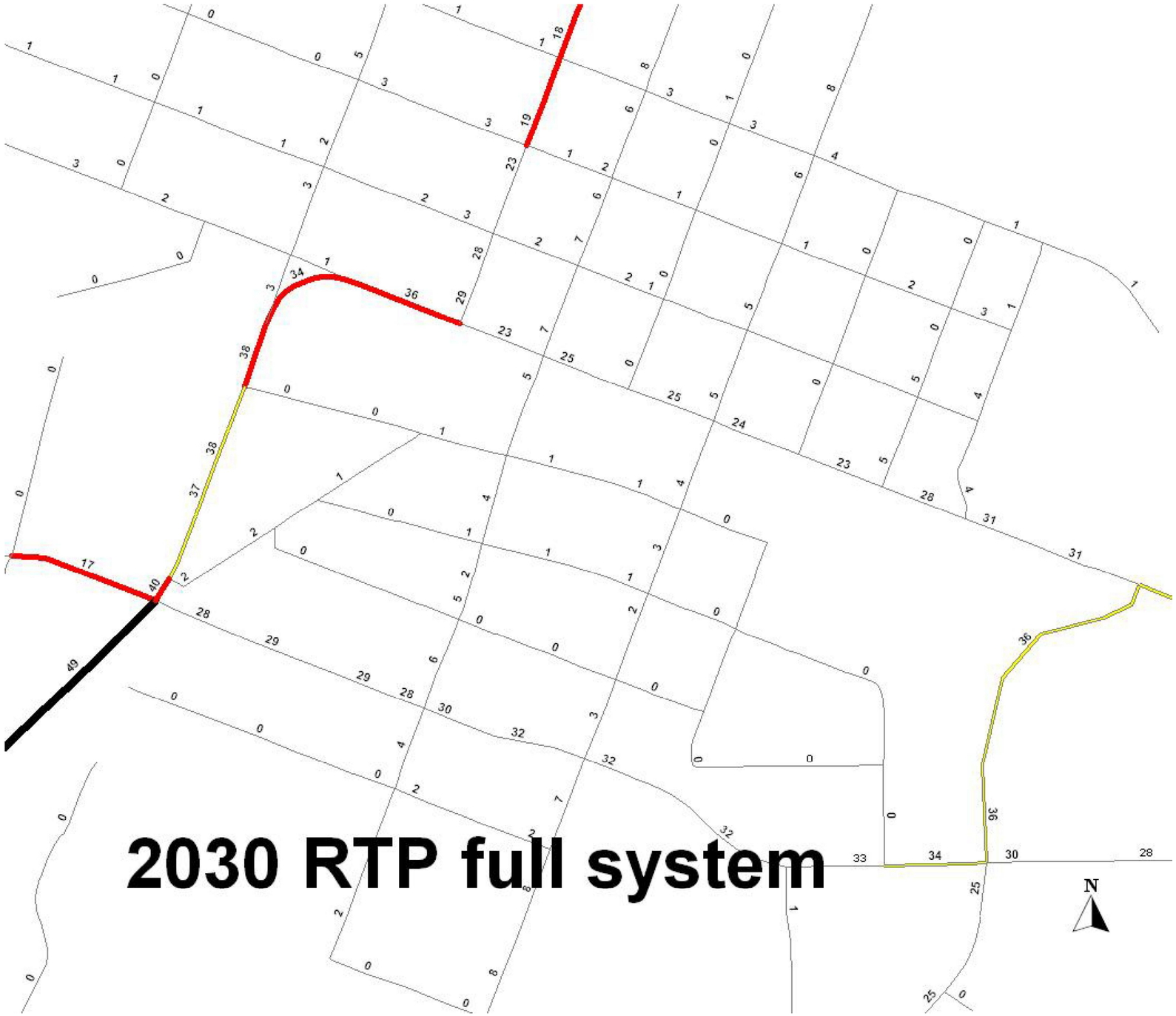
PB 100 YEARS	2030 Build PM Peak Turning Movement Volumes Calculation	City of Flagstaff Lone Tree Overpass Study

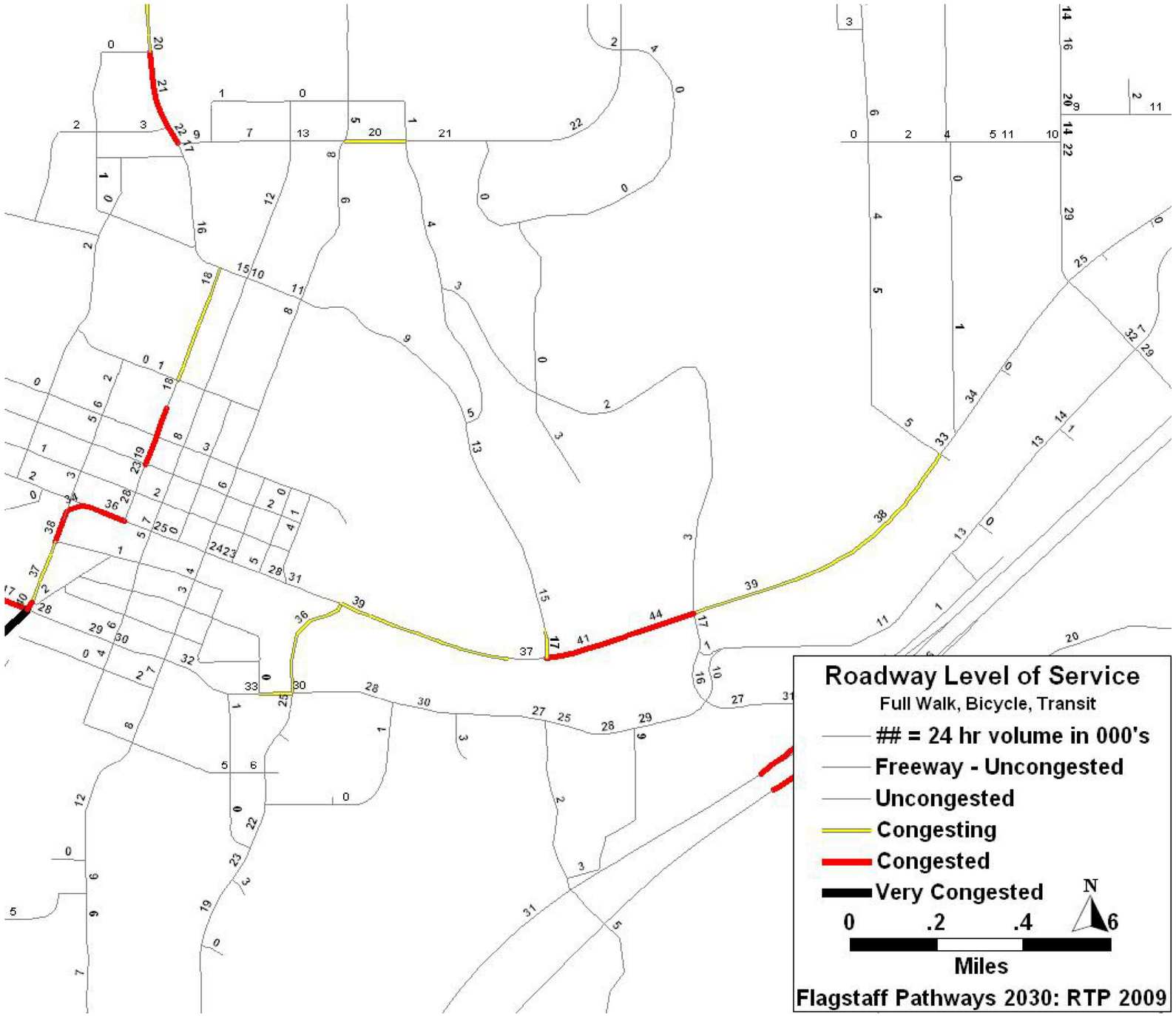
Appendix C-3

- FMPO 2030 No Build ADT
- FMPO 2030 Build ADT


2030 RTP w/o LTOP


2030 RTP w/o LTOP


2030 RTP full system
N


Roadway Level of Service
Full Walk, Bicycle, Transit
= 24 hr volume in 000's
Freeway - Uncongested
Uncongested
Congesting
Congested
Very Congested
N
0 .2 .4 6
Miles
Flagstaff Pathways 2030: RTP 2009