Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	1395	30	148	1710	15	109	9	136	39	6	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	15	12	12	12	11	12	12	13	12
Grade (%)		1%			2%			1%			1%	
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2		6.4	6.4	6.4		6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1796	3569	1560	1966	3466		1796	1827	1575		1845	
Flt Permitted	0.08	1.00	1.00	0.12	1.00		0.73	1.00	1.00		0.78	
Satd. Flow (perm)	148	3569	1560	252	3466		1372	1827	1575		1485	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.81	0.81	0.81	0.74	0.74	0.74
Adj. Flow (vph)	13	1468	32	161	1859	16	135	11	168	53	8	11
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	119	0	4	0
Lane Group Flow (vph)	13	1468	22	161	1875	0	135	11	49	0	68	0
Heavy Vehicles (%)	0%	4%	3%	0%	3%	0%	0%	0%	2%	0%	0%	0%
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	112.8	110.5	110.5	126.6	118.1		20.8	20.8	20.8		20.8	
Effective Green, g (s)	112.8	110.5	110.5	126.6	118.1		20.8	20.8	20.8		20.8	
Actuated g/C Ratio	0.70	0.69	0.69	0.79	0.74		0.13	0.13	0.13		0.13	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2		6.4	6.4	6.4		6.4	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	128	2465	1077	305	2558		178	238	205		193	
v/s Ratio Prot	0.00	0.41		c0.03	c0.54			0.01				
v/s Ratio Perm	0.07		0.01	0.38			c0.10		0.03		0.05	
v/c Ratio	0.10	0.60	0.02	0.53	0.73		0.76	0.05	0.24		0.35	
Uniform Delay, d1	11.6	13.0	7.8	11.5	12.0		67.2	60.9	62.5		63.4	
Progression Factor	1.00	1.00	1.00	3.28	0.49		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	1.1	0.0	0.7	0.8		16.8	0.1	0.6		1.1	
Delay (s)	11.9	14.1	7.8	38.2	6.7		84.0	61.0	63.1		64.5	
Level of Service	B	B	A	D	A		F	E	E		E	
Approach Delay (s)		13.9			9.2			72.0			64.5	
Approach LOS		B			A			E			E	

Intersection Summary				
HCM Average Control Delay	17.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	18.8	
Intersection Capacity Utilization	76.4%	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)	55	1489	26	68	1772	205	63	2	103	202	2	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	14	12	12	12	12	14	12	12	12	12
Grade (%)		1%			1%			0%			0%	
Total Lost time (s)	6.7	6.7	6.7	6.7	6.7		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95		0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.85		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1796	5011	1714	1761	3358		3502	1728		1805	1630	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.24	1.00	
Satd. Flow (perm)	1796	5011	1714	1761	3358		3502	1728		452	1630	
Peak-hour factor, PHF	0.91	0.91	0.91	0.97	0.97	0.97	0.84	0.84	0.84	0.71	0.71	0.71
Adj. Flow (vph)	60	1636	29	70	1827	211	75	2	123	285	3	54
RTOR Reduction (vph)	0	0	12	0	5	0	0	86	0	0	48	0
Lane Group Flow (vph)	60	1636	17	70	2033	0	75	39	0	285	9	0
Heavy Vehicles (%)	0%	3%	0%	2%	5%	8%	0%	0%	0%	0%	0%	0%
Turn Type	Prot		Perm	Prot			Prot			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2							4		
Actuated Green, G (s)	6.3	92.4	92.4	11.0	97.1		12.2	10.3		36.7	18.0	
Effective Green, g (s)	6.3	92.4	92.4	11.0	97.1		12.2	10.3		36.7	18.0	
Actuated g/C Ratio	0.04	0.58	0.58	0.07	0.61		0.08	0.06		0.23	0.11	
Clearance Time (s)	6.7	6.7	6.7	6.7	6.7		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	71	2894	990	121	2038		267	111		272	183	
v/s Ratio Prot	0.03	0.33		c0.04	c0.61		0.02	0.02		c0.13	0.01	
v/s Ratio Perm			0.01							c0.11		
v/c Ratio	0.85	0.57	0.02	0.58	1.00		0.28	0.35		1.05	0.05	
Uniform Delay, d1	76.4	21.2	14.4	72.3	31.3		69.8	71.6		57.4	63.4	
Progression Factor	1.06	0.68	0.72	0.93	0.89		1.00	1.00		1.00	1.00	
Incremental Delay, d2	49.9	0.7	0.0	3.4	13.6		0.6	1.9		67.6	0.1	
Delay (s)	130.5	15.2	10.4	70.2	41.4		70.3	73.6		125.1	63.5	
Level of Service	F	B	B	E	D		E	E		F	E	
Approach Delay (s)		19.1			42.3			72.4			114.8	
Approach LOS		B			D			E			F	

Intersection Summary				
HCM Average Control Delay	40.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	19.9	
Intersection Capacity Utilization	85.4%	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)	391	1308	95	143	843	480	164	411	262	366	178	1038
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	14	12	12	12
Grade (%)		2%			2%			-4%			1%	
Total Lost time (s)	4.0	7.0	4.0	4.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	0.91	0.86	0.91	0.91	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1670	4891	1583	1787	3504	1537	1675	3266	1568	1557	3226	1502
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00
Satd. Flow (perm)	1670	4891	1583	1787	3504	1537	1675	3266	1568	1557	3226	1502
Peak-hour factor, PHF	0.83	0.83	0.83	0.94	0.94	0.94	0.66	0.66	0.66	0.94	0.94	0.94
Adj. Flow (vph)	471	1576	114	152	897	511	248	623	397	389	189	1104
RTOR Reduction (vph)	0	0	0	0	0	0	0	6	155	0	0	0
Lane Group Flow (vph)	471	1576	114	152	897	511	223	721	163	194	384	1104
Heavy Vehicles (%)	7%	5%	1%	0%	2%	4%	0%	0%	2%	5%	3%	7%
Turn Type	Prot		Free	Prot		Free	Split		Perm	Split		Free
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			Free			Free			8			Free
Actuated Green, G (s)	43.0	66.7	160.0	16.3	40.0	160.0	33.0	33.0	33.0	19.0	19.0	160.0
Effective Green, g (s)	43.0	66.7	160.0	16.3	40.0	160.0	33.0	33.0	33.0	19.0	19.0	160.0
Actuated g/C Ratio	0.27	0.42	1.00	0.10	0.25	1.00	0.21	0.21	0.21	0.12	0.12	1.00
Clearance Time (s)	4.0	7.0		4.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	449	2039	1583	182	876	1537	345	674	323	185	383	1502
v/s Ratio Prot	c0.28	0.32		0.09	c0.26		0.13	c0.22		c0.12	0.12	
v/s Ratio Perm			0.07			0.33			0.10			0.74
v/c Ratio	1.05	0.77	0.07	0.84	1.02	0.33	0.65	1.07	0.51	1.05	1.00	0.74
Uniform Delay, d1	58.5	40.1	0.0	70.5	60.0	0.0	58.2	63.5	56.3	70.5	70.5	0.0
Progression Factor	1.10	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	51.6	2.4	0.1	26.8	36.6	0.6	4.1	55.0	1.2	79.6	46.6	3.2
Delay (s)	115.9	34.2	0.1	97.3	96.6	0.6	62.3	118.5	57.5	150.1	117.1	3.2
Level of Service	F	C	A	F	F	A	E	F	E	F	F	A
Approach Delay (s)		50.2			65.2			93.3			46.2	
Approach LOS		D			E			F			D	

Intersection Summary				
HCM Average Control Delay	60.9	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.05			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	88.8%	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)	19	1395	74	204	1521	10	181	13	273	33	12	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	15	12	12	12	11	12	12	13	12
Grade (%)		1%			2%			1%			1%	
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2		6.4	6.4	6.4		6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1796	3675	1591	1966	3535		1796	1827	1591		1862	
Flt Permitted	0.10	1.00	1.00	0.09	1.00		0.74	1.00	1.00		0.81	
Satd. Flow (perm)	182	3675	1591	182	3535		1390	1827	1591		1551	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.84	0.84	0.84	0.75	0.75	0.75
Adj. Flow (vph)	20	1438	76	222	1653	11	215	15	325	44	16	8
RTOR Reduction (vph)	0	0	33	0	0	0	0	0	160	0	3	0
Lane Group Flow (vph)	20	1438	43	222	1664	0	215	15	165	0	65	0
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	82.2	78.7	78.7	101.2	91.5		26.2	26.2	26.2		26.2	
Effective Green, g (s)	82.2	78.7	78.7	101.2	91.5		26.2	26.2	26.2		26.2	
Actuated g/C Ratio	0.59	0.56	0.56	0.72	0.65		0.19	0.19	0.19		0.19	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2		6.4	6.4	6.4		6.4	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	147	2066	894	339	2310		260	342	298		290	
v/s Ratio Prot	0.00	0.39		c0.08	c0.47			0.01				
v/s Ratio Perm	0.08		0.03	0.40			c0.15		0.10		0.04	
v/c Ratio	0.14	0.70	0.05	0.65	0.72		0.83	0.04	0.55		0.22	
Uniform Delay, d1	14.9	22.0	13.8	26.7	15.9		54.7	46.6	51.6		48.3	
Progression Factor	1.00	1.00	1.00	1.68	1.12		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.4	2.0	0.1	2.2	1.0		18.9	0.1	2.2		0.4	
Delay (s)	15.3	24.0	13.9	47.0	18.8		73.7	46.7	53.8		48.7	
Level of Service	B	C	B	D	B		E	D	D		D	
Approach Delay (s)		23.4			22.1			61.3			48.7	
Approach LOS		C			C			E			D	

Intersection Summary				
HCM Average Control Delay	28.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.8	
Intersection Capacity Utilization	79.6%	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)	47	1591	63	168	1626	291	72	1	193	189	2	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	14	12	12	12	12	14	12	12	12	12
Grade (%)		1%			1%			0%			0%	
Total Lost time (s)	6.7	6.7	6.7	6.7	6.7		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95		0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.85		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1796	5110	1680	1796	3481		3502	1724		1736	1631	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.27	1.00	
Satd. Flow (perm)	1796	5110	1680	1796	3481		3502	1724		497	1631	
Peak-hour factor, PHF	0.91	0.91	0.91	0.96	0.96	0.96	0.84	0.84	0.84	0.75	0.75	0.75
Adj. Flow (vph)	52	1748	69	175	1694	303	86	1	230	252	3	49
RTOR Reduction (vph)	0	0	35	0	10	0	0	207	0	0	44	0
Lane Group Flow (vph)	52	1748	34	175	1987	0	86	24	0	252	8	0
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	0%	0%	0%	4%	0%	0%
Turn Type	Prot		Perm	Prot			Prot			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2							4		
Actuated Green, G (s)	4.2	69.0	69.0	18.4	83.2		11.5	9.5		31.4	14.7	
Effective Green, g (s)	4.2	69.0	69.0	18.4	83.2		11.5	9.5		31.4	14.7	
Actuated g/C Ratio	0.03	0.49	0.49	0.13	0.59		0.08	0.07		0.22	0.10	
Clearance Time (s)	6.7	6.7	6.7	6.7	6.7		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	54	2519	828	236	2069		288	117		259	171	
v/s Ratio Prot	0.03	0.34		c0.10	c0.57		0.02	0.01		c0.12	0.00	
v/s Ratio Perm			0.02							c0.10		
v/c Ratio	0.96	0.69	0.04	0.74	0.96		0.30	0.21		0.97	0.05	
Uniform Delay, d1	67.8	27.4	18.4	58.5	26.8		60.5	61.7		50.7	56.4	
Progression Factor	1.11	0.60	0.32	1.17	0.57		1.00	1.00		1.00	1.00	
Incremental Delay, d2	92.1	1.2	0.1	8.2	9.4		0.6	0.9		48.1	0.1	
Delay (s)	167.3	17.7	5.9	76.9	24.7		61.0	62.6		98.7	56.5	
Level of Service	F	B	A	E	C		E	E		F	E	
Approach Delay (s)		21.4			28.9			62.1			91.5	
Approach LOS		C			C			E			F	

Intersection Summary				
HCM Average Control Delay	32.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	1.01			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.4	
Intersection Capacity Utilization	102.0%	ICU Level of Service	G	
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)	313	1545	115	141	1008	180	97	54	140	168	88	980
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	14	12	12	12
Grade (%)		2%			2%			-4%			1%	
Total Lost time (s)	4.0	7.0	4.0	4.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	0.91	0.86	0.91	0.91	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1718	5034	1599	1769	3574	1567	1675	3040	1568	1571	3214	1545
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (perm)	1718	5034	1599	1769	3574	1567	1675	3040	1568	1571	3214	1545
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.68	0.68	0.68	0.87	0.87	0.87
Adj. Flow (vph)	326	1609	120	153	1096	196	143	79	206	193	101	1126
RTOR Reduction (vph)	0	0	0	0	0	0	0	94	94	0	0	0
Lane Group Flow (vph)	326	1609	120	153	1096	196	112	119	9	96	198	1126
Heavy Vehicles (%)	4%	2%	0%	1%	0%	2%	0%	0%	2%	4%	5%	4%
Turn Type	Prot		Free	Prot		Free	Split		Perm	Split		Free
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			Free			Free			8			Free
Actuated Green, G (s)	30.6	73.1	140.0	16.8	59.3	140.0	12.8	12.8	12.8	12.3	12.3	140.0
Effective Green, g (s)	30.6	73.1	140.0	16.8	59.3	140.0	12.8	12.8	12.8	12.3	12.3	140.0
Actuated g/C Ratio	0.22	0.52	1.00	0.12	0.42	1.00	0.09	0.09	0.09	0.09	0.09	1.00
Clearance Time (s)	4.0	7.0		4.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	376	2628	1599	212	1514	1567	153	278	143	138	282	1545
v/s Ratio Prot	c0.19	0.32		0.09	0.31		0.07	0.04		0.06	0.06	
v/s Ratio Perm			0.08			0.13			0.01			c0.73
v/c Ratio	0.87	0.61	0.08	0.72	0.72	0.13	0.73	0.43	0.07	0.70	0.70	0.73
Uniform Delay, d1	52.7	23.5	0.0	59.3	33.5	0.0	61.9	60.1	58.1	62.0	62.1	0.0
Progression Factor	1.16	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.6	0.7	0.1	11.5	3.0	0.2	16.5	1.1	0.2	14.2	7.7	3.1
Delay (s)	75.0	19.4	0.1	70.8	36.6	0.2	78.4	61.2	58.3	76.2	69.8	3.1
Level of Service	E	B	A	E	D	A	E	E	E	E	E	A
Approach Delay (s)		27.1			35.3			65.0			17.3	
Approach LOS		C			D			E			B	

Intersection Summary				
HCM Average Control Delay	29.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	4.0	
Intersection Capacity Utilization	71.5%	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)	12	1395	30	148	1710	15	109	9	136	39	6	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	15	12	12	12	11	12	12	13	12
Grade (%)		1%			2%			1%			1%	
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2		6.4	6.4	6.4		6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1796	3569	1560	1966	3466		1796	1827	1575		1845	
Flt Permitted	0.08	1.00	1.00	0.12	1.00		0.73	1.00	1.00		0.78	
Satd. Flow (perm)	148	3569	1560	252	3466		1372	1827	1575		1485	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.81	0.81	0.81	0.74	0.74	0.74
Adj. Flow (vph)	13	1468	32	161	1859	16	135	11	168	53	8	11
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	119	0	4	0
Lane Group Flow (vph)	13	1468	22	161	1875	0	135	11	49	0	68	0
Heavy Vehicles (%)	0%	4%	3%	0%	3%	0%	0%	0%	2%	0%	0%	0%
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	112.8	110.5	110.5	126.6	118.1		20.8	20.8	20.8		20.8	
Effective Green, g (s)	112.8	110.5	110.5	126.6	118.1		20.8	20.8	20.8		20.8	
Actuated g/C Ratio	0.70	0.69	0.69	0.79	0.74		0.13	0.13	0.13		0.13	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2		6.4	6.4	6.4		6.4	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	128	2465	1077	305	2558		178	238	205		193	
v/s Ratio Prot	0.00	0.41		c0.03	c0.54			0.01				
v/s Ratio Perm	0.07		0.01	0.38			c0.10		0.03		0.05	
v/c Ratio	0.10	0.60	0.02	0.53	0.73		0.76	0.05	0.24		0.35	
Uniform Delay, d1	11.6	13.0	7.8	11.5	12.0		67.2	60.9	62.5		63.4	
Progression Factor	1.00	1.00	1.00	2.75	0.17		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	1.1	0.0	1.0	1.2		16.8	0.1	0.6		1.1	
Delay (s)	11.9	14.1	7.8	32.5	3.2		84.0	61.0	63.1		64.5	
Level of Service	B	B	A	C	A		F	E	E		E	
Approach Delay (s)		13.9			5.5			72.0			64.5	
Approach LOS		B			A			E			E	

Intersection Summary				
HCM Average Control Delay	15.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	18.8	
Intersection Capacity Utilization	76.4%	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)	55	1489	26	68	1772	205	63	2	103	202	2	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	14	12	12	12	12	14	12	12	12	12
Grade (%)		1%			1%			0%			0%	
Total Lost time (s)	6.7	6.7	6.7	6.7	6.7	6.7	6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	0.97	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1796	5011	1714	1761	3421	1488	3502	1728		3502	1630	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1796	5011	1714	1761	3421	1488	3502	1728		3502	1630	
Peak-hour factor, PHF	0.91	0.91	0.91	0.97	0.97	0.97	0.84	0.84	0.84	0.71	0.71	0.71
Adj. Flow (vph)	60	1636	29	70	1827	211	75	2	123	285	3	54
RTOR Reduction (vph)	0	0	11	0	0	51	0	102	0	0	48	0
Lane Group Flow (vph)	60	1636	18	70	1827	160	75	23	0	285	9	0
Heavy Vehicles (%)	0%	3%	0%	2%	5%	8%	0%	0%	0%	0%	0%	0%
Turn Type	Prot		Perm	Prot		Prot	Split			Split		
Protected Phases	5	2		1	6	6	8	8		4	4	
Permitted Phases			2									
Actuated Green, G (s)	7.4	97.6	97.6	10.9	101.1	101.1	8.5	8.5		16.6	16.6	
Effective Green, g (s)	7.4	97.6	97.6	10.9	101.1	101.1	8.5	8.5		16.6	16.6	
Actuated g/C Ratio	0.05	0.61	0.61	0.07	0.63	0.63	0.05	0.05		0.10	0.10	
Clearance Time (s)	6.7	6.7	6.7	6.7	6.7	6.7	6.5	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	83	3057	1046	120	2162	940	186	92		363	169	
v/s Ratio Prot	0.03	0.33		c0.04	c0.53	0.11	c0.02	0.01		c0.08	0.01	
v/s Ratio Perm			0.01									
v/c Ratio	0.72	0.54	0.02	0.58	0.85	0.17	0.40	0.25		0.79	0.05	
Uniform Delay, d1	75.3	18.1	12.3	72.3	23.3	12.1	73.3	72.7		70.0	64.6	
Progression Factor	0.90	0.85	1.14	1.09	0.69	0.27	1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.6	0.6	0.0	3.6	2.2	0.2	1.4	1.4		10.6	0.1	
Delay (s)	90.2	15.9	14.0	82.4	18.4	3.5	74.7	74.1		80.6	64.7	
Level of Service	F	B	B	F	B	A	E	E		F	E	
Approach Delay (s)		18.5			19.0			74.3			78.0	
Approach LOS		B			B			E			E	

Intersection Summary				
HCM Average Control Delay	25.9	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	26.4	
Intersection Capacity Utilization	79.9%	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)	391	1308	95	143	843	480	164	411	262	366	178	1038
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	14	12	12	12
Grade (%)		2%			2%			-4%			1%	
Total Lost time (s)	4.0	7.0	4.0	4.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	0.91	0.86	0.91	0.91	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1670	4891	1583	1787	3504	1537	1675	3266	1568	1557	3226	1502
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00
Satd. Flow (perm)	1670	4891	1583	1787	3504	1537	1675	3266	1568	1557	3226	1502
Peak-hour factor, PHF	0.83	0.83	0.83	0.94	0.94	0.94	0.66	0.66	0.66	0.94	0.94	0.94
Adj. Flow (vph)	471	1576	114	152	897	511	248	623	397	389	189	1104
RTOR Reduction (vph)	0	0	0	0	0	0	0	6	160	0	0	0
Lane Group Flow (vph)	471	1576	114	152	897	511	223	721	158	194	384	1104
Heavy Vehicles (%)	7%	5%	1%	0%	2%	4%	0%	0%	2%	5%	3%	7%
Turn Type	Prot		Free	Prot		Free	Split		Perm	Split		Free
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			Free			Free			8			Free
Actuated Green, G (s)	43.0	66.7	160.0	16.3	40.0	160.0	33.0	33.0	33.0	19.0	19.0	160.0
Effective Green, g (s)	43.0	66.7	160.0	16.3	40.0	160.0	33.0	33.0	33.0	19.0	19.0	160.0
Actuated g/C Ratio	0.27	0.42	1.00	0.10	0.25	1.00	0.21	0.21	0.21	0.12	0.12	1.00
Clearance Time (s)	4.0	7.0		4.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	449	2039	1583	182	876	1537	345	674	323	185	383	1502
v/s Ratio Prot	c0.28	0.32		0.09	c0.26		0.13	c0.22		c0.12	0.12	
v/s Ratio Perm			0.07			0.33			0.10			0.74
v/c Ratio	1.05	0.77	0.07	0.84	1.02	0.33	0.65	1.07	0.49	1.05	1.00	0.74
Uniform Delay, d1	58.5	40.1	0.0	70.5	60.0	0.0	58.2	63.5	56.1	70.5	70.5	0.0
Progression Factor	0.93	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	52.7	2.5	0.1	26.8	36.6	0.6	4.1	55.0	1.2	79.6	46.6	3.2
Delay (s)	106.8	37.6	0.1	97.3	96.6	0.6	62.3	118.5	57.3	150.1	117.1	3.2
Level of Service	F	D	A	F	F	A	E	F	E	F	F	A
Approach Delay (s)		50.7			65.2			93.3			46.2	
Approach LOS		D			E			F			D	

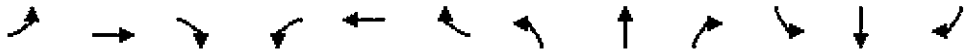
Intersection Summary				
HCM Average Control Delay	61.1	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.05			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	88.8%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	1395	74	204	1521	10	181	13	273	33	12	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	15	12	12	12	11	12	12	13	12
Grade (%)		1%			2%			1%			1%	
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2		6.4	6.4	6.4		6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1796	3675	1591	1966	3535		1796	1827	1591		1862	
Flt Permitted	0.10	1.00	1.00	0.09	1.00		0.74	1.00	1.00		0.81	
Satd. Flow (perm)	182	3675	1591	182	3535		1390	1827	1591		1551	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.84	0.84	0.84	0.75	0.75	0.75
Adj. Flow (vph)	20	1438	76	222	1653	11	215	15	325	44	16	8
RTOR Reduction (vph)	0	0	33	0	0	0	0	0	160	0	3	0
Lane Group Flow (vph)	20	1438	43	222	1664	0	215	15	165	0	65	0
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	82.2	78.7	78.7	101.2	91.5		26.2	26.2	26.2		26.2	
Effective Green, g (s)	82.2	78.7	78.7	101.2	91.5		26.2	26.2	26.2		26.2	
Actuated g/C Ratio	0.59	0.56	0.56	0.72	0.65		0.19	0.19	0.19		0.19	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2		6.4	6.4	6.4		6.4	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	147	2066	894	339	2310		260	342	298		290	
v/s Ratio Prot	0.00	0.39		c0.08	c0.47			0.01				
v/s Ratio Perm	0.08		0.03	0.40			c0.15		0.10		0.04	
v/c Ratio	0.14	0.70	0.05	0.65	0.72		0.83	0.04	0.55		0.22	
Uniform Delay, d1	14.9	22.0	13.8	26.7	15.9		54.7	46.6	51.6		48.3	
Progression Factor	1.00	1.00	1.00	1.73	0.96		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.4	2.0	0.1	3.1	1.4		18.9	0.1	2.2		0.4	
Delay (s)	15.3	24.0	13.9	49.2	16.6		73.7	46.7	53.8		48.7	
Level of Service	B	C	B	D	B		E	D	D		D	
Approach Delay (s)		23.4			20.4			61.3			48.7	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	79.6%	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)	47	1591	63	168	1626	291	72	1	193	189	2	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	14	12	12	12	12	14	12	12	12	12
Grade (%)		1%			1%			0%			0%	
Total Lost time (s)	6.7	6.7	6.7	6.7	6.7	6.7	6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	0.97	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1796	5110	1680	1796	3556	1607	3502	1724		3367	1631	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1796	5110	1680	1796	3556	1607	3502	1724		3367	1631	
Peak-hour factor, PHF	0.91	0.91	0.91	0.96	0.96	0.96	0.84	0.84	0.84	0.75	0.75	0.75
Adj. Flow (vph)	52	1748	69	175	1694	303	86	1	230	252	3	49
RTOR Reduction (vph)	0	0	33	0	0	88	0	185	0	0	44	0
Lane Group Flow (vph)	52	1748	36	175	1694	215	86	46	0	252	8	0
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	0%	0%	0%	4%	0%	0%
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2			6						
Actuated Green, G (s)	5.8	72.1	72.1	18.4	84.7	84.7	9.9	9.9		13.2	13.2	
Effective Green, g (s)	5.8	72.1	72.1	18.4	84.7	84.7	9.9	9.9		13.2	13.2	
Actuated g/C Ratio	0.04	0.52	0.52	0.13	0.60	0.60	0.07	0.07		0.09	0.09	
Clearance Time (s)	6.7	6.7	6.7	6.7	6.7	6.7	6.5	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	74	2632	865	236	2151	972	248	122		317	154	
v/s Ratio Prot	0.03	0.34		c0.10	c0.48		0.02	c0.03		c0.07	0.00	
v/s Ratio Perm			0.02			0.13						
v/c Ratio	0.70	0.66	0.04	0.74	0.79	0.22	0.35	0.38		0.79	0.05	
Uniform Delay, d1	66.2	25.0	16.8	58.5	20.9	12.6	62.0	62.1		62.1	57.7	
Progression Factor	1.04	0.51	0.14	1.10	0.50	0.22	1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.0	1.0	0.1	8.2	2.0	0.4	0.8	2.0		12.9	0.1	
Delay (s)	89.2	13.8	2.5	72.6	12.6	3.2	62.8	64.1		74.9	57.8	
Level of Service	F	B	A	E	B	A	E	E		E	E	
Approach Delay (s)		15.5			16.1			63.7			72.0	
Approach LOS		B			B			E			E	

Intersection Summary				
HCM Average Control Delay	22.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.4	
Intersection Capacity Utilization	87.7%	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)	313	1545	115	141	1008	180	97	54	140	168	88	980
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	14	12	12	12
Grade (%)		2%			2%			-4%			1%	
Total Lost time (s)	4.0	7.0	4.0	4.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	0.91	0.86	0.91	0.91	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1718	5034	1599	1769	3574	1567	1675	3040	1568	1571	3214	1545
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (perm)	1718	5034	1599	1769	3574	1567	1675	3040	1568	1571	3214	1545
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.68	0.68	0.68	0.87	0.87	0.87
Adj. Flow (vph)	326	1609	120	153	1096	196	143	79	206	193	101	1126
RTOR Reduction (vph)	0	0	0	0	0	0	0	93	93	0	0	0
Lane Group Flow (vph)	326	1609	120	153	1096	196	112	120	10	96	198	1126
Heavy Vehicles (%)	4%	2%	0%	1%	0%	2%	0%	0%	2%	4%	5%	4%
Turn Type	Prot		Free	Prot		Free	Split		Perm	Split		Free
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			Free			Free			8			Free
Actuated Green, G (s)	30.6	72.0	140.0	16.8	58.2	140.0	13.3	13.3	13.3	12.9	12.9	140.0
Effective Green, g (s)	30.6	72.0	140.0	16.8	58.2	140.0	13.3	13.3	13.3	12.9	12.9	140.0
Actuated g/C Ratio	0.22	0.51	1.00	0.12	0.42	1.00	0.10	0.10	0.10	0.09	0.09	1.00
Clearance Time (s)	4.0	7.0		4.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	376	2589	1599	212	1486	1567	159	289	149	145	296	1545
v/s Ratio Prot	c0.19	0.32		0.09	0.31		0.07	0.04		0.06	0.06	
v/s Ratio Perm			0.08			0.13			0.01			c0.73
v/c Ratio	0.87	0.62	0.08	0.72	0.74	0.13	0.70	0.41	0.07	0.66	0.67	0.73
Uniform Delay, d1	52.7	24.3	0.0	59.3	34.5	0.0	61.4	59.7	57.7	61.4	61.5	0.0
Progression Factor	1.29	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.2	0.8	0.1	11.5	3.3	0.2	13.2	1.0	0.2	10.8	5.6	3.1
Delay (s)	82.1	20.3	0.1	70.8	37.8	0.2	74.7	60.6	57.9	72.3	67.1	3.1
Level of Service	F	C	A	E	D	A	E	E	E	E	E	A
Approach Delay (s)		29.0			36.2			63.7			16.7	
Approach LOS		C			D			E			B	

Intersection Summary				
HCM Average Control Delay	30.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	4.0	
Intersection Capacity Utilization	71.5%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Queue Analysis

QUEUE ANALYSIS SUMMARY

Intersection	Direction	Mvmt	Available Storage (ft)	Existing PM		Existing SAT		2013 PM - No Build		2013 SAT - No Build		2013 PM - Build		2013 SAT - Build		2013 PM IMPRV		2013 SAT IMPRV	
				50th % Q Length (ft)	95th % Q Length (ft)	50th % Q Length (ft)	95th % Q Length (ft)	50th % Q Length (ft)	95th % Q Length (ft)	50th % Q Length (ft)	95th % Q Length (ft)	50th % Q Length (ft)	95th % Q Length (ft)	50th % Q Length (ft)	95th % Q Length (ft)	50th % Q Length (ft)	95th % Q Length (ft)	50th % Q Length (ft)	95th % Q Length (ft)
Carlisle Pike & K-Mart Dr./Jeffrey Rd	EB	L	190	3	8	4	10	3	9	5	15	3	9	5	14	3	9	5	14
		TT		327	397	340	413	393	549	439	580	401	592	486	680	401	592	486	680
		R	350	0	12	0	21	0	14	0	25	0	14	0	27	0	14	0	27
	WB	L	150	63	m47	85	157	18	m75	72	#212	46	m23	142	m172	12	m32	127	m208
		TTR		402	459	178	142	84	187	390	292	334	m76	402	m404	334	m64	312	442
	NB	L		138	193	~199	#332	138	185	169	248	138	185	189	250	138	185	189	250
		T		10	28	12	31	10	27	11	28	10	27	11	28	10	27	11	28
		R		0	47	67	146	28	75	188	256	29	78	109	179	29	76	109	179
	SB	LTR		65	95	52	83	65	91	49	73	65	91	50	75	65	91	50	75
Carlisle Pike & Holiday Inn Dr./Van Patten Dr.	EB	L	200	47	m98	21	m35	45	m79	20	#32	66	m#146	50	m#79	63	m#110	49	m72
		TTT		72	194	139	214	179	180	258	226	201	253	231	297	216	330	173	219
		R	340	0	m5	0	m10	0	m3	1	m3	0	m5	1	m4	0	m9	1	m1
	WB	L	250	69	m106	129	193	72	m104	163	232	73	m89	163	m226	75	m92	161	m224
		TTR		332	m384	597	746	353	m980	302	416	655	m#771	307	#1124	378	m#373	308	318
		R		-	-	-	-	-	-	-	-	-	-	-	-	0	m0	5	14
	NB	LL		39	63	39	52	40	65	39	64	40	65	40	64	39	64	39	51
		TR		2	56	1	61	2	56	1	61	34	89	6	69	17	73	28	93
	SB	L		36	56	28	45	37	56	26	45	~261	#300	214	#244	151	158	117	136
		TR		3	26	3	26	3	25	3	25	3	25	3	28	3	27	3	30
Carlisle Pike & SR 581 Ramp/Gateway Drive	EB	L	450	230	m373	156	242	264	#444	154	259	~516	m#622	313	m404	~525	#673	315	m414
		TTT		482	#527	448	562	419	473	266	183	484	m497	208	m294	539	398	188	335
		R	300	0	0	0	0	0	0	0	0	0	m0	0	m0	0	m0	0	m0
	WB	L	260	156	232	136	#232	156	#278	135	209	156	#278	135	209	158	#278	135	209
		TT		397	#564	315	473	463	#582	368	499	~523	#661	451	558	~523	#661	461	572
		R	400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NB	L		234	235	108	127	229	230	108	131	237	239	109	135	237	236	108	134
		LTTR		~464	363	54	59	437	355	54	61	~485	368	55	63	~485	365	54	62
		R		24	8	0	21	114	84	0	23	130	110	0	23	124	104	0	23
	SB	L	350	198	280	90	145	221	#383	93	154	~241	#429	94	#170	~241	#429	93	157
		LTT		204	251	90	123	216	#298	96	135	~225	#347	97	138	~225	#347	96	137
		R	350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

~ - The approach is above capacity and the queue length could be much longer.
# - The volume for the 95th percentile cycle exceeds capacity.
m - The volume for the 95th percentile queue is metered by an upstream signal.

Improvements at Holiday inn/ Van Patten Dr consist of adding a 200' westbound right turn lane, adding a second left turn lane to Holiday Inn Drive, and changing side street signal operation to split phase.

Traffic Signal Permits

PERMIT NO. 6412	SHEET 3 OF 3
DATE ISSUED 5-1-69	DATE REVISED

MOVEMENT, PHASING, AND SEQUENCE CHART

PHASE	1+5	1+6	2+5	2+6	4+8	Ø2 PREEMPT	Ø6 PREEMPT	Ø4 PREEMPT	Ø8 PREEMPT	EMERGENCY FLASH
INTERVAL	1 2 3	4 5 6	7 8 9	10 11 12	13 14 15	16 17 18 19	20 21 22 23	24 25 26 27	28 29 30 31	
SIGNAL 1	R R R	R Y R	R R R	G Y R	R R R	R R R	G Y R	R R R	R R R	Y
2	R R R	G Y R	R R R	G Y R	R R R	R R R	G Y R	R R R	R R R	Y
3	R R R	R R R	R Y R	G Y R	R R R	G Y R	R R R	R R R	R R R	Y
4	R R R	R R R	G Y R	G Y R	R R R	G Y R	R R R	R R R	R R R	Y
5,8	R R R	R R R	R R R	R R R	G Y R	R R R	R R R	G Y R	R R R	R
7,8	R R R	R R R	R R R	R R R	G Y R	R R R	R R R	R R R	G Y R	R
9	R R R	G Y R	R R R	G Y R	R R R	R R R	R R R	R R R	R R R	Y
10	R R R	R R R	G Y R	G Y R	R R R	R R R	R R R	R R R	R R R	Y
FAIL SAFE A	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF ON OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF
FAIL SAFE B	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	ON OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF
FAIL SAFE C	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF ON OFF	OFF OFF OFF	OFF OFF OFF	OFF
FAIL SAFE D	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF ON	OFF OFF OFF	ON OFF OFF	OFF
FIXED	4.6 1.6	4.6 1.6	4.6 1.6	4.6 1.6	3.5 2.9	* ** 4.6 1.6	* ** 4.6 1.6	* ** 3.5 2.9	* ** 3.5 2.9	
MINIMUM	3	3	–	17	3					
ADDED INIT	**	–	–	1.5	–					
MAX INITIAL	–	–	–	30	–					
PASSAGE	3	3	3	6	3					
TBR	–	–	–	25	–					
TTR	–	–	–	20	–					
MIN GAP	–	–	–	4.0	–					
MAX I	15	15	18	90	25					
PEDESTRIAN	–	–	–	16	22					
MEMORY	NON-LOCK	NON-LOCK	NON-LOCK	MIN RECALL	NON-LOCK					

UPON PEDESTRIAN ACTUATION ONLY

1. R/<-G- IF FOLLOWED BY 1+6
2. R/<-G- IF FOLLOWED BY 2+5
3. G/<-Y- IF FOLLOWED BY 2+6
4. G IF FOLLOWED BY 2+6
5. G IF FOLLOWED BY 1+6
6. G IF FOLLOWED BY 2+5
7. TIMING WILL BE AS SHOWN IN PHASE 2+6. IT MAY TIME OUT IN THIS PHASE OR BE COMPLETED IN PHASE 2+6.

* SELECTIVE CLEARANCE INTERVAL INCLUDES THE NORMAL ALL-RED INTERVALS
** FOR DURATION OF EMERGENCY PREEMPTION

DETECTOR NOTES

1. DETECTOR 1 CALLS AND EXTENDS PHASE 1, PRESENCE.
2. DETECTORS 2a,2b CALL AND EXTEND PHASE 2, PRESENCE.
3. DETECTOR 4 CALLS AND EXTENDS PHASE 4, PRESENCE, DELAY.
4. DETECTOR 5 CALLS AND EXTENDS PHASE 5, PRESENCE.
5. DETECTORS 6a,6b CALL AND EXTEND PHASE 6, PRESENCE.
6. DETECTORS 8a,8b CALL AND EXTEND PHASE 8, PRESENCE.

THIS SIGNAL SHALL BE INTERCONNECTED WITH ADJACENT SIGNALS.

EMERGENCY VEHICLE PREEMPTION NOTES

CONTROLLER TO BE EQUIPPED WITH EMERGENCY PREEMPTION EQUIPMENT FOR EACH APPROACH WHICH SHALL PROVIDE A SELECTIVE CLEARANCE INTERVAL. A GREEN INDICATION WILL BE GIVEN TO THE PREEMPTED APPROACH AND A RED INDICATION ON ALL OTHER APPROACHES.

1. IF PREEMPTION OCCURS DURING FLASHING OPERATION, SIGNALS REMAIN IN FLASH.
2. UPON COMPLETION OF PREEMPTION, OPERATION RESUMES IN PHASE 2+6
3. PREEMPTED APPROACH SHALL PROVIDE AN INDICATION (FAIL-SAFE LAMP) TO THE DRIVER OF THE APPROACHING EMERGENCY VEHICLE WHEN THE EQUIPMENT HAS PREEMPTED THE TRAFFIC SIGNAL FOR THAT APPROACH.
4. THE FAIL-SAFE INDICATION SHALL BE A FLASHING WHITE LIGHT ON THE APPROACH WHICH PREEMPTION IS PROVIDED.

GENERAL NOTES

INSTALLATION, OPERATION AND MAINTENANCE OF THIS TRAFFIC SIGNAL SHALL BE IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION REGULATIONS ON OFFICIAL TRAFFIC CONTROL DEVICES.

NO MODIFICATION OF THIS INSTALLATION IS PERMITTED UNLESS PRIOR APPROVAL IS GRANTED, IN WRITING, BY THE DEPARTMENT.

ALL MAINTENANCE NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS, INCLUDING TRIMMING TREES, IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED BY THE PERMITTEE, UNLESS OTHERWISE INDICATED. EXCEPT THE LONGITUDINAL PAVEMENT MARKINGS ON STATE HIGHWAYS, WHICH WILL BE MAINTAINED BY THE DEPARTMENT.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF THE CURB OR EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM HORIZONTAL CLEARANCE OF 2 FEET.

THE BOTTOM OF SIGNAL HEADS AND SIGNS ERECTED OVER THE ROADWAY SHALL NOT BE LESS THAN 15 FEET NOR MORE THAN 19 FEET ABOVE THE ROADWAY. THE BOTTOM OF POST MOUNTED SIGNAL HEADS SHALL NOT BE LESS THAN 8 FEET NOR MORE THAN 15 FEET ABOVE THE SIDEWALK OR PAVEMENT GRADE.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNAL HEADS, MEASURED AT RIGHT ANGLES TO THE APPROACH, SHALL BE 8 FEET.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR EMBANKMENT REMOVAL, CURBING AND/OR SIDEWALK, DRAINAGE STRUCTURES, CHANGES IN HIGHWAY GEOMETRY, PAVEMENT WIDENING, OR INSTALLATION OF ADDITIONAL LANES.

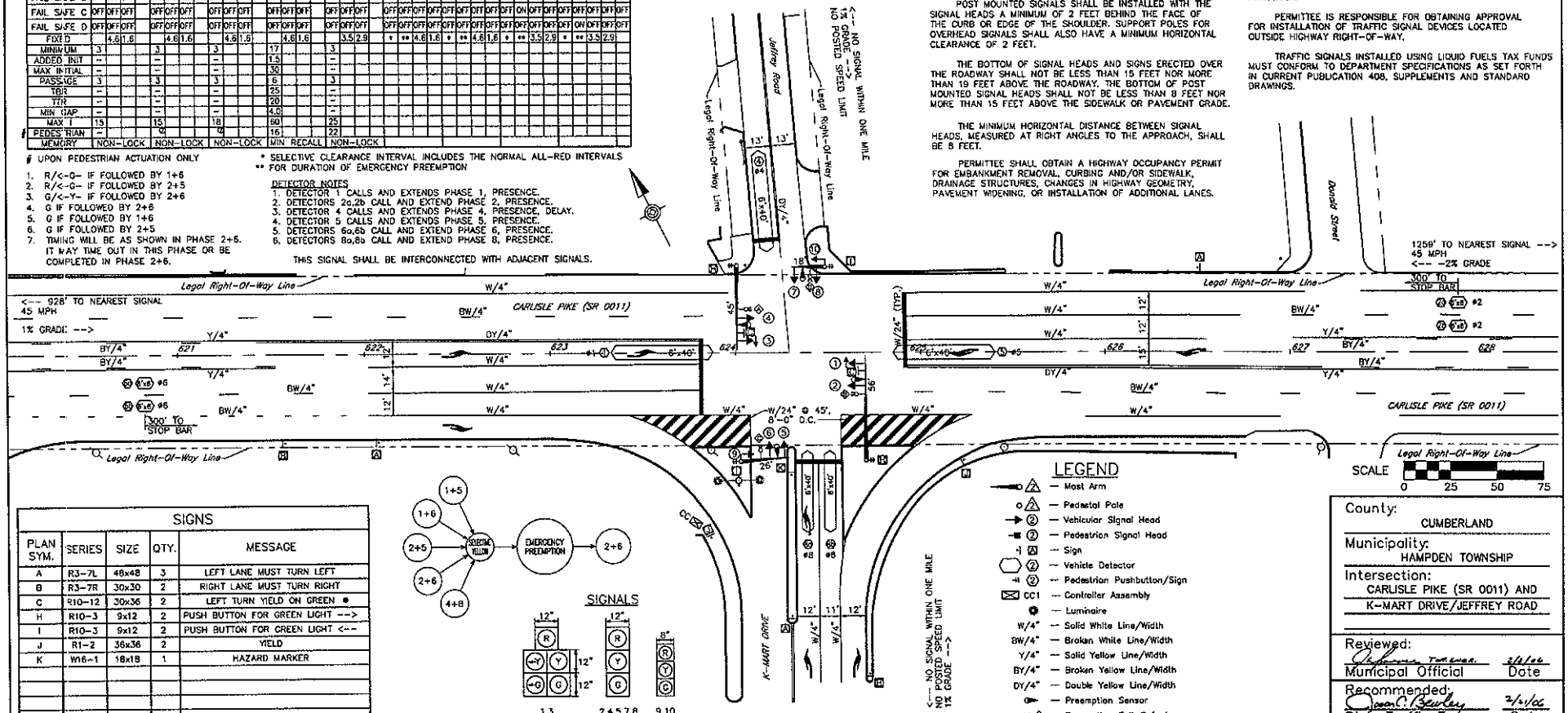
CONDUIT INSTALLED IN ASPHALT ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 199, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, CONSULT WITH UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE DEPARTMENT OF TRANSPORTATION PAVEMENT MARKING HANDBOOK.

PERMITTEE IS RESPONSIBLE FOR OBTAINING APPROVAL FOR INSTALLATION OF TRAFFIC SIGNAL DEVICES LOCATED OUTSIDE HIGHWAY RIGHT-OF-WAY.

TRAFFIC SIGNALS INSTALLED USING LIQUID FUELS TAX FUNDS MUST CONFORM TO DEPARTMENT SPECIFICATIONS AS SET FORTH IN CURRENT PUBLICATION 408, SUPPLEMENTS AND STANDARD DRAWINGS.



SIGNS

PLAN SYM.	SERIES	SIZE	QTY.	MESSAGE
A	R3-7L	48x48	3	LEFT LANE MUST TURN LEFT
B	R3-7R	30x30	2	RIGHT LANE MUST TURN RIGHT
C	R10-12	30x36	2	LEFT TURN YIELD ON GREEN ●
H	R10-3	9x12	2	PUSH BUTTON FOR GREEN LIGHT -->
I	R10-3	9x12	2	PUSH BUTTON FOR GREEN LIGHT <--
J	R1-2	36x36	2	YIELD
K	W16-1	18x18	1	HAZARD MARKER

SIGNALS

LEGEND

- Mast Arm
- Pedestal Pole
- Vehicular Signal Head
- Pedestrian Signal Head
- Sign
- Vehicle Detector
- Pedestrian Pushbutton/Sign
- CC1 — Controller Assembly
- Luminaire
- W/4" — Solid White Line/Width
- BW/4" — Broken White Line/Width
- Y/4" — Solid Yellow Line/Width
- BY/4" — Broken Yellow Line/Width
- DY/4" — Double Yellow Line/Width
- Preemption Sensor
- Preemption Fail-Safe Lamp

County: CUMBERLAND

Municipality: HAMPDEN TOWNSHIP

Intersection: CARLISLE PIKE (SR 0011) AND K-MART DRIVE/JEFFREY ROAD

Reviewed: _____ 2/2/06
Municipal Official — Date

Recommended: _____ 2/2/06
Dist. Traffic Eng. — Date

Permit No. 6412 Sheet 2 of 3

Date Issued 5-1-69 Date Revised 11-8-90

COORDINATION PROGRAM

PLAN NO.	DAY OF WEEK M	T	W	T	F	S	S	TIME	CYCLE	OFFSET	SPLIT	REMARKS
1	/	/	/	/	/			0600				AM 120
2	/	/	/	/	/			0900				AVG. 110
3	/	/	/	/	/			1200	4			AVG. 125
4	/	/	/	/	/			1330	7			AVG. 140
5	/	/	/	/	/			1500	8			PM 160
6	/	/	/	/	/			1800	7			AVG. 140
7	/	/	/	/	/			1900	5			AVG. 110
8	/	/	/	/	/			000				FREE
9						/	/	0700	5			AVG. 110
10						/	/	1100	7			AVG. 140
11						/	/	1900	5			AVG. 110
12						/	/	000				FREE

OFFSETS (SEC.)

CYCLE NO. :	4	5	6	7	8
LENGTH : (SEC.)	125	110	120	140	160
OFFSET 1	5	22	116	123	150

SPLITS (%)

CYCLE	SPLIT	PHASE 1	2	3	4	5	6	7	8
4		19	59		22	19	59		22
5		19	55		26	19	55		26
6		17	59		24	17	59		24
7		17	63		20	17	63		20
8		17	65		18	17	65		18

* PHASE TIME INCLUDES CHANGE AND CLEARANCE INTERVAL TIMES

FILE: 7

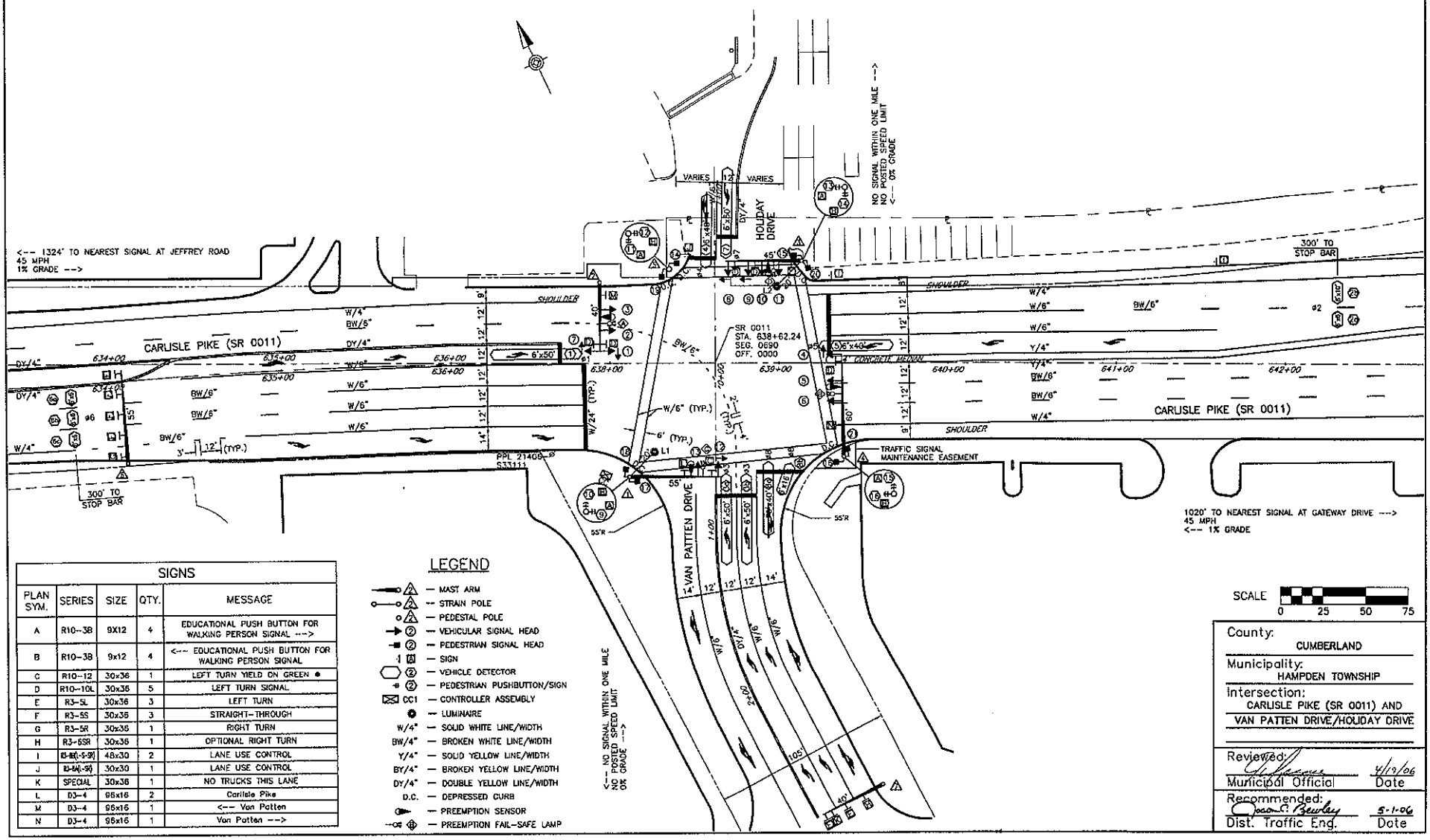
County: CUMBERLAND

Municipality: HAMPDEN TOWNSHIP

Intersection: CARLISLE PIKE (SR 0011), JEFFREY ROAD AND K-MART DRIVE

T021

PERMIT NO. 6769	SHEET 3 OF 4
DATE ISSUED 2-24-71	DATE REVISED



SIGNS				
PLAN SYM.	SERIES	SIZE	QTY.	MESSAGE
A	R10-3B	9X12	4	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON SIGNAL -->
B	R10-3B	9x12	4	<-- EDUCATIONAL PUSH BUTTON FOR WALKING PERSON SIGNAL
C	R10-12	30x36	1	LEFT TURN YIELD ON GREEN ●
D	R10-10L	30x36	5	LEFT TURN SIGNAL
E	R3-5L	30x36	3	LEFT TURN
F	R3-5S	30x36	3	STRAIGHT-THROUGH
G	R3-5R	30x36	1	RIGHT TURN
H	R3-5SR	30x36	1	OPTIONAL RIGHT TURN
I	R3-8[-5-5R]	48x30	2	LANE USE CONTROL
J	R3-8[-5R]	30x30	1	LANE USE CONTROL
K	SPECIAL	30x36	1	NO TRUCKS THIS LANE
L	D3-4	96x16	2	Carlisle Pike
M	D3-4	96x16	1	<-- Van Patten
N	D3-4	96x16	1	Van Patten -->

LEGEND

- MAST ARM
- STRAIN POLE
- PEDESTAL POLE
- VEHICULAR SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- SIGN
- VEHICLE DETECTOR
- PEDESTRIAN PUSHBUTTON/SIGN
- CC1 — CONTROLLER ASSEMBLY
- LUMINAIRE
- W/4" — SOLID WHITE LINE/WIDTH
- BW/4" — BROKEN WHITE LINE/WIDTH
- Y/4" — SOLID YELLOW LINE/WIDTH
- BY/4" — BROKEN YELLOW LINE/WIDTH
- DY/4" — DOUBLE YELLOW LINE/WIDTH
- D.C. — DEPRESSED CURB
- PREEMPTION SENSOR
- PREEMPTION FAIL-SAFE LAMP

SCALE 0 25 50 75

County: CUMBERLAND

Municipality: HAMPDEN TOWNSHIP

Intersection: CARLISLE PIKE (SR 0011) AND VAN PATTEN DRIVE/HOLIDAY DRIVE

Reviewed: _____ Municipal Official 4/19/06 Date

Recommended: Jason C. Brawley Dist. Traffic Eng. 5-1-06 Date

105184P2 REV 4/10/06

T021

PERMIT NO. 6769	SHEET 4 OF 4
DATE ISSUED 2-24-71	DATE REVISED

MOVEMENT, PHASING, AND SEQUENCE CHART

PHASE	1+5	1+6	2+5	2+6	3+7	3+8	4+7	4+8	ø2 PREEMPT	ø6 PREEMPT	ø4 PREEMPT	ø8 PREEMPT	EMERGENCY FLASH
SIGNAL \ INTERVAL	1 2 3	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	
1		R R R R		R R R R	R R R	R R R R	R R R R	R R R R		R R R	R R R	R R R	
2,3	R R R	R R R R	G G	C C	R R R	R R R R	R R R R	R R R R	G	R R R	R R R	R R R	Y
4,7		R R R R	R R R R	R R R R	R R R	R R R R	R R R R	R R R R	R R R		R R R	R R R	
5,6	R R R	G G	R R R R	G G	R R R	R R R R	R R R R	R R R R	R R R	G	R R R	R R R	Y
8,9	R R R	R R R	R R R R	R R R R	R R R	R R R R	R R R R	R R R R	R R R	R R R		R R R	
10,11	R R R	R R R	R R R R	R R R R	R R R	G G	R R R R	R R R G	G	R R R	R R R		
12	R R R	R R R	R R R R	R R R R	R R R	R R R	R R R R	G G	R R R	R R R	R R R	G Y R	
13	R R R	R R R	R R R R	R R R R	R R R	G G	R R R R	G G	R R R	R R R	G Y R	R R R	
14,15	H H H	H H H M	FH H H M	FH H H M	FH H H	H H H H	H H H H	H H H H	H H H	H H H	H H H	H H H	
16,17	H H H	M FH H	H H H M	FH H H	H H H	H H H H	H H H H	H H H H	H H H	H H H	H H H	H H H	
18,19	H H H	H H H	H H H H	H H H H	H H H	H H H H	M FH H H	M FH H H	H H H	H H H	H H H	H H H	
20,21	H H H	H H H	H H H H	H H H H	H H H	M FH H H	H H H H	M FH H H	H H H	H H H	H H H	H H H	
FAIL SAFE A	OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	ON OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	
FAIL SAFE B	OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF	ON OFF OFF	OFF OFF OFF	OFF OFF OFF	
FAIL SAFE C	OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	ON OFF OFF	OFF OFF OFF	
FAIL SAFE D	OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	OFF OFF OFF	ON OFF OFF	
FIXED	4.2 2.5	4.2 2.5	4.2 2.5	4.2 2.5	3.0 3.5	3.0 3.5	3.0 3.5	3.0 3.5	* ** 4.2 2.5	* ** 4.2 2.5	* ** 3.0 3.5	* ** 3.0 3.5	
MINIMUM	3	3	3	15	3	3	3	3					
ADDED INIT	-	-	-	3	-	-	-	-					
MAX INITIAL	-	-	-	30	-	-	-	-					
PASSAGE	3	3	3	6	3	3	3	3					
TBR	-	-	-	30	-	-	-	-					
TTR	-	-	-	15	-	-	-	-					
MIN GAP	-	-	-	3	-	-	-	-					
MAXIMUM	12	12	12	45	20	30	20	24					
# PEDESTRIAN	-	0	0	23 25	-	0	0	21 24					
MEMORY	NON-LOCK	NON-LOCK	NON-LOCK	MIN RECALL	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	

UPON PEDESTRIAN ACTUATION, OTHERWISE "HAND" AT ALL TIMES.
* SELECTIVE CLEARANCE INTERVAL INCLUDES THE NORMAL ALL-RED INTERVALS
** FOR DURATION OF EMERGENCY PREEMPTION

SIGNALIZATION NOTES

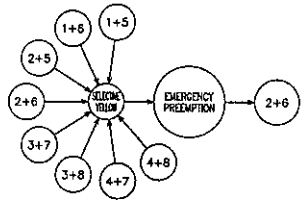
1.) LT. G ARROW IF FOLLOWED BY 2+5
2.) LT. G ARROW IF FOLLOWED BY 1+6
3.) LT. G ARROW IF FOLLOWED BY 1+5
4.) G IF FOLLOWED BY 2+6
5.) G IF FOLLOWED BY 2+5
6.) G IF FOLLOWED BY 1+6
7.) LT. G ARROW IF FOLLOWED BY 3+8
8.) R/<-G- IF FOLLOWED BY 4+7
9.) G IF FOLLOWED BY 4+8
10.) G/<-Y- IF FOLLOWED BY 4+8
11.) G IF FOLLOWED BY 3+8
12.) G IF FOLLOWED BY 4+7
13.) TIMING WILL BE AS SHOWN IN PHASE 2+6. INTERVALS 1 AND 2 MAY TIME OUT IN THIS PHASE OR MAY BE COMPLETED IN PHASE 2+6.
14.) TIMING WILL BE AS SHOWN IN PHASE 4+8. INTERVALS 1 AND 2 MAY TIME OUT IN THIS PHASE OR MAY BE COMPLETED IN PHASE 4+8.
15.) SIGNAL TO BE HARDWIRE INTERCONNECTED WITH EXISTING TRAFFIC CONTROL SYSTEM ON THE CARLISLE PIKE (SR 0011).

DETECTOR NOTES

DETECTOR 1 CALLS AND EXTENDS PHASE 1, PRESENCE
DETECTORS 2a AND 2b CALL AND EXTEND PHASE 2, PRESENCE
DETECTORS 3a AND 3b CALL AND EXTEND PHASE 3, PRESENCE
DETECTOR 4 CALLS AND EXTENDS PHASE 4, PRESENCE
DETECTOR 5 CALLS AND EXTENDS PHASE 5, PRESENCE
DETECTORS 6a, 6b AND 6c CALL AND EXTEND PHASE 6, PRESENCE
DETECTOR 7 CALLS AND EXTENDS PHASE 7, PRESENCE
DETECTORS 8a AND 8b CALL AND EXTEND PHASE 8, PRESENCE

EMERGENCY PREEMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PREEMPTION FOR ALL APPROACHES WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
- THIS FAIL SAFE SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL BEGIN FLASHING WHEN THE PREEMPTION PHASE DISPLAYS PREEMPTION GREEN FOR THE EMERGENCY VEHICLE APPROACH. LOCATION OF THE EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS, EXCEPT THE GREEN INDICATIONS FOR THE PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE, FOLLOWED BY SELECTIVE CLEARANCES DEPENDENT UPON THE PHASE IN WHICH THE PREEMPTION OCCURS. THE "GREEN" INDICATIONS FOR THE PREEMPTED PHASE SHALL REMAIN "GREEN" FOR THE DURATION OF SIGNAL PREEMPTION AND "RED" INDICATIONS DISPLAYED FOR ALL OTHER PHASES.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PREEMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF SIGNALS HAVE BEEN ACTUATED BY PEDESTRIAN PUSHBUTTON, AND THE SIGNAL IS PREEMPTED, THE PEDESTRIAN TIME SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES, BEFORE GOING INTO EMERGENCY PREEMPTION.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE ARE FLASHING, ALL SIGNALS SHALL REMAIN FLASHING.
- UPON COMPLETION OF PREEMPTION PHASES IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 1 SHALL FOLLOW.
- IN EMERGENCY PREEMPTION, NO PRIORITY SHALL BE ESTABLISHED. PREEMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.



GENERAL NOTES

INSTALLATION, OPERATION AND MAINTENANCE OF THIS TRAFFIC SIGNAL SHALL BE IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION REGULATIONS ON OFFICIAL TRAFFIC CONTROL DEVICES.

NO MODIFICATION OF THIS INSTALLATION IS PERMITTED UNLESS PRIOR APPROVAL IS GRANTED, IN WRITING, BY THE DEPARTMENT.

ALL MAINTENANCE NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS, INCLUDING TRIMMING TREES, IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED BY THE PERMITTEE, UNLESS OTHERWISE INDICATED. EXCEPT THE LONGITUDINAL PAVEMENT MARKINGS ON STATE HIGHWAYS, WHICH WILL BE MAINTAINED BY THE DEPARTMENT.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF THE CURB OR EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM HORIZONTAL CLEARANCE OF 2 FEET.

THE BOTTOM OF SIGNAL HEADS AND SIGNS ERECTED OVER THE ROADWAY SHALL NOT BE LESS THAN 15 FEET NOR MORE THAN 19 FEET ABOVE THE ROADWAY. THE BOTTOM OF POST MOUNTED SIGNAL HEADS SHALL NOT BE LESS THAN 8 FEET NOR MORE THAN 15 FEET ABOVE THE SIDEWALK OR PAVEMENT GRADE.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNAL HEADS, MEASURED AT RIGHT ANGLES TO THE APPROACH, SHALL BE 8 FEET.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR EMBANKMENT REMOVAL, CURBING AND/OR SIDEWALK, DRAINAGE STRUCTURES, CHANGES IN HIGHWAY GEOMETRY, PAVEMENT WIDENING, OR INSTALLATION OF ADDITIONAL LANES.

CONDUIT INSTALLED IN ASPHALT ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

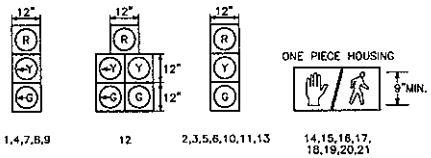
THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 187, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES. PRIOR TO CONSTRICTION, CONSULT WITH UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE DEPARTMENT OF TRANSPORTATION PAVEMENT MARKING HANDBOOK.

PERMITTEE IS RESPONSIBLE FOR OBTAINING APPROVAL FOR INSTALLATION OF TRAFFIC SIGNAL DEVICES LOCATED OUTSIDE HIGHWAY RIGHT-OF-WAY.

TRAFFIC SIGNALS INSTALLED USING LIQUID FUELS TAX FUNDS MUST CONFORM TO DEPARTMENT SPECIFICATIONS AS SET FORTH IN CURRENT PUBLICATION 408, SUPPLEMENTS AND STANDARD DRAWINGS.

SIGNALS



1,4,7,8,9 | 12 | 2,3,5,6,10,11,13 | 14,15,16,17, 18,19,20,21

ALL OVERHEAD SIGNALS TO HAVE BACKPLATES
SIGNALS 1,4,7,8,9 TO HAVE TUNNEL VISORS

SCALE 0 25 50 75

County: CUMBERLAND
Municipality: HAMPDEN TOWNSHIP
Intersection: CARLISLE PIKE (SR 0011) AND VAN PATTEN DRIVE/HOLIDAY DRIVE

Reviewed: _____ Municipal Official — 4/19/06 Date
Recommended: Dean C. Bewley Dist. Traffic Eng. — 5-1-06 Date

PERMIT NO.: 6769 SHEET 2 OF 4

DATE ISSUED: 2/24/1971 DATE REVISED: 11/3/2006

COORDINATION PROGRAM

EVENT NO.	DAY OF WEEK M	T	W	T	F	S	S	TIME	CYCLE	SPLIT	OFFSET	REMARKS
1	x	x	x	x	x			6:00	6	1	1	AM 120
2	x	x	x	x	x			9:00	5	1	1	AVG 110
3	x	x	x	x	x			12:00	4	1	1	AVG 125
4	x	x	x	x	x			13:30	7	1	1	AVG 140
5	x	x	x	x	x			15:00	8	1	1	AM 160
6	x	x	x	x	x			18:00	7	1	1	AVG 140
7	x	x	x	x	x			19:00	5	1	1	AVG 110
8	x	x	x	x	x			0:00				FREE
9						x	x	7:00	5	1	1	AVG 110
10						x	x	11:00	7	1	1	AVG 140
11						x	x	19:00	5	1	1	AVG 110
12						x	x	0:00				FREE
13												

OFFSETS (SEC.)

	CYCLE NO.:	4	5	6	7	8	-
	LENGTH: (SEC.)	125	110	120	140	160	
OFFSET	1	2	36	37	6	9	
	2						
	3						
	4						

SPLITS (%)

CYCLE	SPLIT	PHASE 1	2	3	4	5	6	7	8
4	1	12	54	19	15	20	46	11	23
5	1	12	62	14	12	23	51	13	13
6	1	14	56	15	15	14	56	12	18
7	1	12	50	21	17	23	39	10	28
8	1	9	54	24	13	18	45	9	28

OFFSET REFERENCED TO:
Beginning of Main St green

* PHASE TIME INCLUDES CHANGE AND CLEARANCE INTERVAL TIMES

MASTER: Carlisle Pike, Skyport Rd, and Wingate Dr

FILE: T021

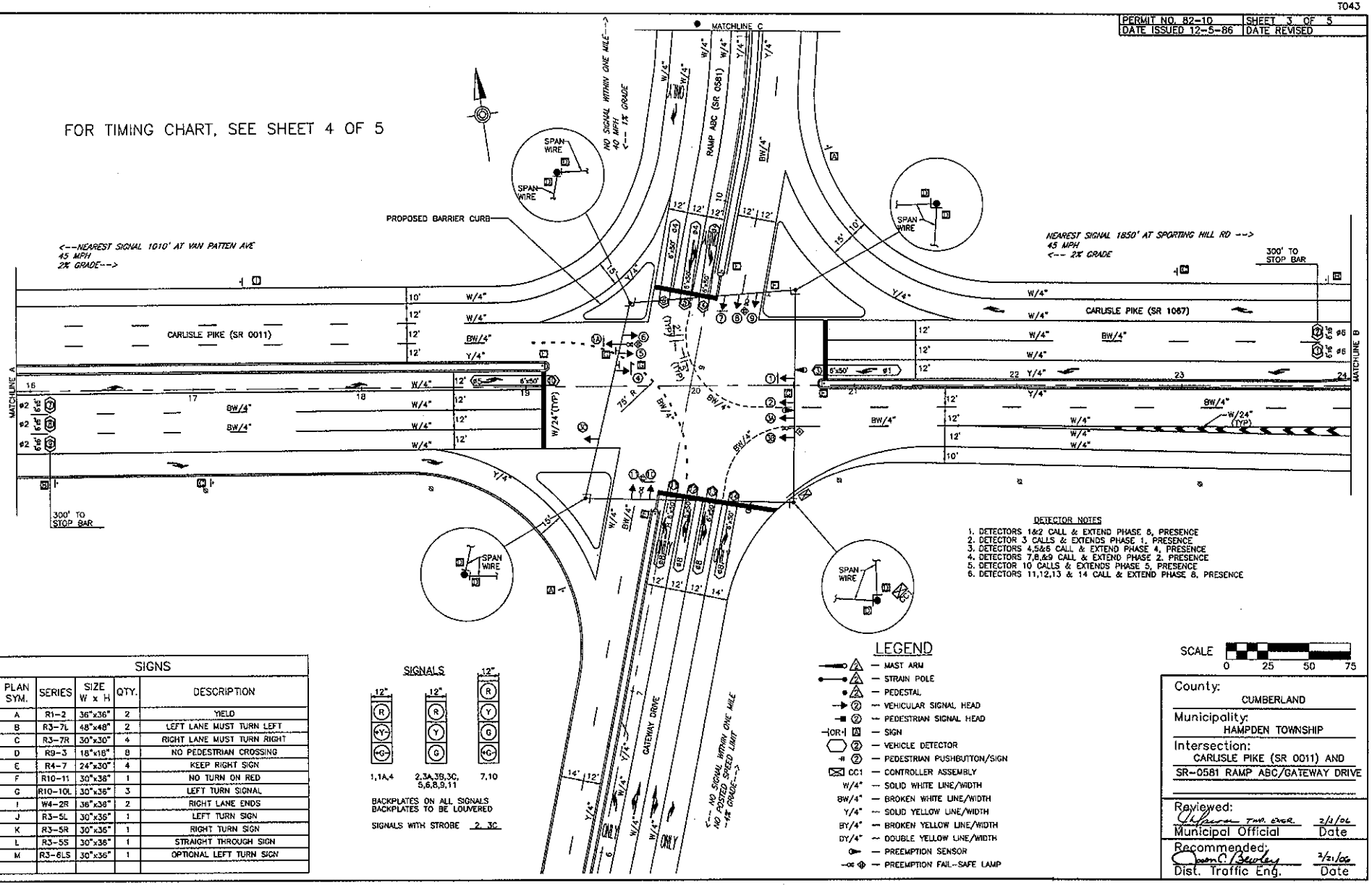
COUNTY:
Cumberland

MUNICIPALITY:
Hampden Township

INTERSECTION:
Carlisle Pk (SR 0011), Van Patten Dr & Holiday Inn Drwy

T043

PERMIT NO. 82-10	SHEET 3 OF 5
DATE ISSUED 12-5-86	DATE REVISED



SIGNS				
PLAN SYM.	SERIES	SIZE W x H	QTY.	DESCRIPTION
A	R1-2	36"x36"	2	YIELD
B	R3-7L	48"x48"	2	LEFT LANE MUST TURN LEFT
C	R3-7R	30"x30"	4	RIGHT LANE MUST TURN RIGHT
D	R9-3	18"x18"	8	NO PEDESTRIAN CROSSING
E	R4-7	24"x30"	4	KEEP RIGHT SIGN
F	R10-11	30"x36"	1	NO TURN ON RED
G	R10-10L	30"x36"	3	LEFT TURN SIGNAL
I	W4-2R	36"x36"	2	RIGHT LANE ENDS
J	R3-5L	30"x36"	1	LEFT TURN SIGN
K	R3-5R	30"x36"	1	RIGHT TURN SIGN
L	R3-5S	30"x36"	1	STRAIGHT THROUGH SIGN
M	R3-6LS	30"x36"	1	OPTIONAL LEFT TURN SIGN

SIGNALS

BACKPLATES ON ALL SIGNALS
BACKPLATES TO BE LOUVERED

SIGNALS WITH STROBE 2, 3C

LEGEND

- MAST ARM
- STRAIN POLE
- PEDESTAL
- VEHICULAR SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- SIGN
- VEHICLE DETECTOR
- PEDESTRIAN PUSHBUTTON/SIGN
- CC1 — CONTROLLER ASSEMBLY
- W/4" — SOLID WHITE LINE/WIDTH
- BW/4" — BROKEN WHITE LINE/WIDTH
- Y/4" — SOLID YELLOW LINE/WIDTH
- BY/4" — BROKEN YELLOW LINE/WIDTH
- DY/4" — DOUBLE YELLOW LINE/WIDTH
- PREEMPTION SENSOR
- PREEMPTION FAIL-SAFE LAMP

SCALE 0 25 50 75

County: CUMBERLAND

Municipality: HAMPDEN TOWNSHIP

Intersection: CARLISLE PIKE (SR 0011) AND SR-0581 RAMP ABC/GATEWAY DRIVE

Reviewed: Municipal Official — 2/1/06 Date

Recommended: Dist. Traffic Eng. — 2/21/06 Date

105178P1 DEC 6/22/05 REV. 1/31/06

PERMIT NO. 82-10	SHEET 4 OF 5
DATE ISSUED 12-5-88	DATE REVISED

MOVEMENT, PHASING, AND SEQUENCE CHART

PHASE	1+5			2+5			1+6			2+6			4			8			#2 PREEMPT				#6 PREEMPT				#4 PREEMPT				#8 PREEMPT				FLASHING
INTERVAL / SIGNAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
1, 1A	<-G-	Y	R	<-G-	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	MOTOR VEHICLE SIGNALS	<-G-	Y	R	MOTOR VEHICLE SIGNALS	R	R	R	MOTOR VEHICLE SIGNALS	R	R	R	MOTOR VEHICLE SIGNALS	R	R	R	OFF
2,3A,3B,3C	R	R	R	G	Y	R	R	R	R	G	Y	R	R	R	R	R	R	R		G	Y	R		R	R	R		R	R	R		R	R	R	Y
4	<-G-	Y	R	R	R	R	<-G-	Y	R	R	R	R	R	R	R	R	R	R		R	R	R		R	R	R		R	R	R		R	R	R	OFF
5,6	R	R	R	R	R	R	G	Y	R	G	Y	R	R	R	R	R	R	R		R	R	R		G	Y	R		R	R	R		R	R	R	Y
7	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R		R	R	R		R	R	R		R	R	R		G	Y	R	R
8	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R		R	R	R		R	R	R		R	R	R		G	Y	R	R
9	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R		R	R	R		R	R	R		R	R	R		G	Y	R	R
10	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R		R	R	R		R	R	R		G	Y	R		R	R	R	R
11	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R		R	R	R		R	R	R		G	Y	R		R	R	R	R
FAIL SAFE A	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
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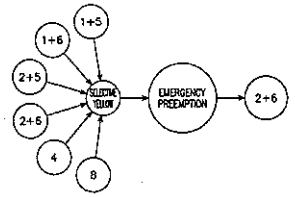
FAIL SAFE C	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FAIL SAFE D	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
FIXED		3.0	1.0		3.0	1.0		3.0	1.0		4.5	2.5		4.5	2.5		4.5	2.5	*	**	4.5	2.5	*	**	4.5	2.5	*	**	4.5	2.5	*	**	4.5	2.5	
MIN. GREEN	3			3			3			8			3			3																			
SEC./ACT.										1.5																									
MAX. INITIAL										35																									
PASSAGE	3			3			3			6			3			3																			
7BR										25																									
TTR										20																									
MIN GAP										4																									
MAXIMUM	10			22			10			60			33			36																			
MEMORY	NON-LOCK			NON-LOCK			NON-LOCK			MIN RECALL			NON-LOCK			NON-LOCK																			

* SELECTIVE CLEARANCE INTERVAL INCLUDES THE NORMAL ALL-RED INTERVALS
** FOR DURATION OF EMERGENCY PREEMPTION

1. <-G- IF FOLLOWED BY 2+5
2. G IF FOLLOWED BY 2+6
3. G IF FOLLOWED BY 2+5
4. <-G- IF FOLLOWED BY 1+6
5. G IF FOLLOWED BY 2+6
6. G IF FOLLOWED BY 1+6



GENERAL NOTES

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THE BOTTOM OF SIGNAL HEADS AND SIGNS ERECTED OVER THE ROADWAY SHALL NOT BE LESS THAN 15 FEET NOR MORE THAN 19 FEET ABOVE THE ROADWAY. THE BOTTOM OF POST MOUNTED SIGNAL HEADS SHALL NOT BE LESS THAN 8 FEET NOR MORE THAN 15 FEET ABOVE THE SIDEWALK OR PAVEMENT GRADE.

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PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR EMBANKMENT REMOVAL, CURBING AND/OR SIDEWALK, DRAINAGE STRUCTURES, CHANGES IN HIGHWAY GEOMETRY, PAVEMENT WIDENING, OR INSTALLATION OF ADDITIONAL LANES.

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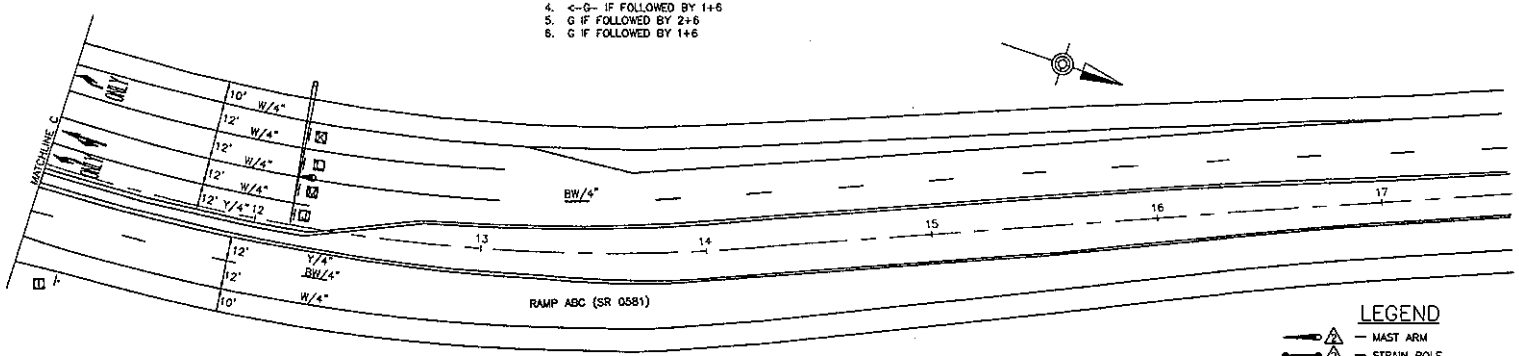
THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 199, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, CONSULT WITH UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE DEPARTMENT OF TRANSPORTATION PAVEMENT MARKING HANDBOOK.

PERMITTEE IS RESPONSIBLE FOR OBTAINING APPROVAL FOR INSTALLATION OF TRAFFIC SIGNAL DEVICES LOCATED OUTSIDE HIGHWAY RIGHT-OF-WAY.

TRAFFIC SIGNALS INSTALLED USING LIQUID FUELS TAX FUNDS MUST CONFORM TO DEPARTMENT SPECIFICATIONS AS SET FORTH IN CURRENT PUBLICATION 408, SUPPLEMENTS AND STANDARD DRAWINGS.



EMERGENCY VEHICLE PREEMPTION NOTES

CONTROLLER TO BE EQUIPPED WITH EMERGENCY PREEMPTION EQUIPMENT FOR EACH APPROACH WHICH SHALL PROVIDE A SELECTIVE CLEARANCE INTERVAL. A GREEN INDICATION WILL BE GIVEN TO THE PREEMPTED APPROACH AND A RED INDICATION ON ALL OTHER APPROACHES.

1. IF PREEMPTION OCCURS DURING FLASHING OPERATION, SIGNALS REMAIN IN FLASH.
2. UPON COMPLETION OF PREEMPTION, OPERATION RESUMES IN PHASE 2+6
3. PREEMPTED APPROACH SHALL PROVIDE AN INDICATION (FAIL-SAFE LAMP) TO THE DRIVER OF THE APPROACHING EMERGENCY VEHICLE WHEN THE EQUIPMENT HAS PREEMPTED THE TRAFFIC SIGNAL FOR THAT APPROACH.
4. THE FAIL-SAFE INDICATION SHALL BE A FLASHING WHITE LIGHT ON THE APPROACH WHICH PREEMPTION IS PROVIDED.

LEGEND

- MAST ARM
- STRAIN POLE
- PEDESTAL
- VEHICULAR SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- SIGN
- VEHICLE DETECTOR
- PEDESTRIAN PUSHBUTTON/SIGN
- CC1 — CONTROLLER ASSEMBLY
- W/4" — SOLID WHITE LINE/WIDTH
- BW/4" — BROKEN WHITE LINE/WIDTH
- Y/4" — SOLID YELLOW LINE/WIDTH
- BY/4" — BROKEN YELLOW LINE/WIDTH
- DY/4" — DOUBLE YELLOW LINE/WIDTH
- PREEMPTION SENSOR
- PREEMPTION FAIL-SAFE LAMP

SCALE 0 25 50 75

County: CUMBERLAND

Municipality: HAMPDEN TOWNSHIP

Intersection: CARLISLE PIKE (SR 0011) AND SR-0581 RAMP ABC/GATEWAY DRIVE

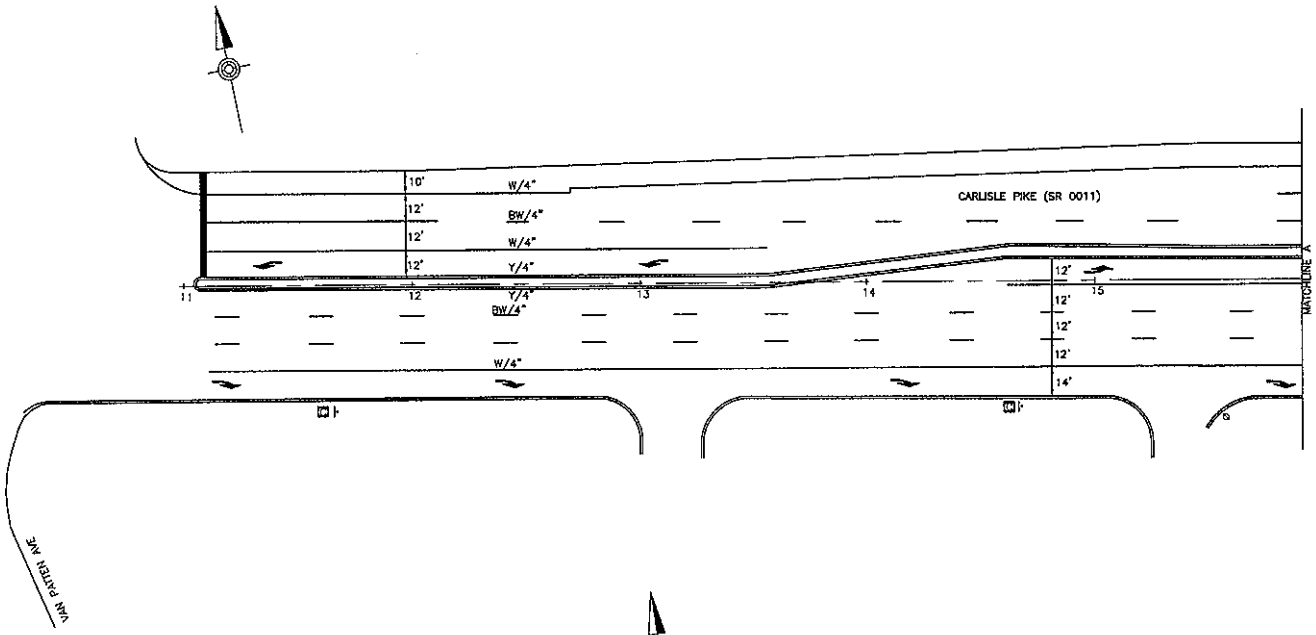
Reviewed: _____ Municipal Official — 2/3/06 Date

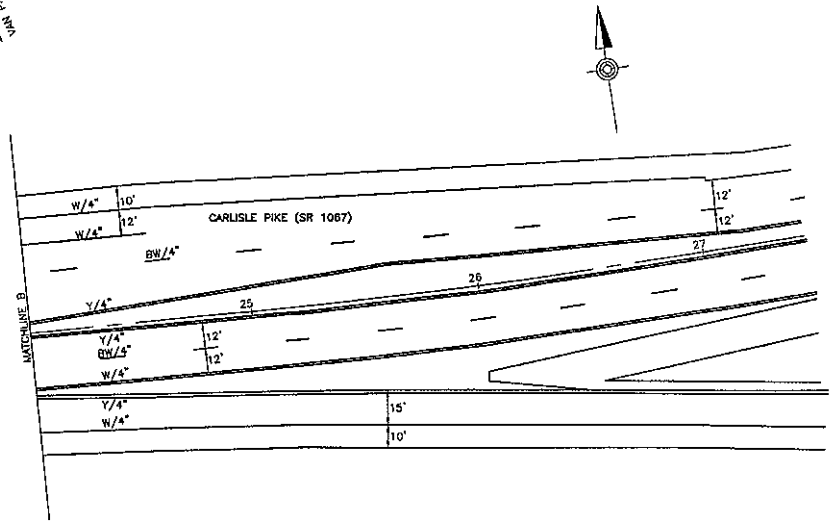
Recommended: _____ Dist. Traffic Eng. — 2/21/06 Date

105178P1A OEC 8/22/05 REV. 1/31/06

T043

PERMIT NO. 82-10	SHEET 5 OF 5
DATE ISSUED 12-5-86	DATE REVISED





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SCALE 0 25 50 75

County: CUMBERLAND

Municipality: HAMPDEN TOWNSHIP

Intersection: CARLISLE PIKE (SR 0011) AND SR-0581 RAMP ABC/GATEWAY DRIVE

Reviewed: Municipal Official — Date 2/3/06

Recommended: Dist. Traffic Eng. — Date 2/2/06

105178P1B GEC 8/23/05 REV. 1/31/06

PERMIT NO.: 82-10 SHEET 2 OF 5

DATE ISSUED: 12/5/1996 DATE REVISED: 1/23/2004

COORDINATION PROGRAM

EVENT NO.	DAY OF WEEK M	T	W	T	F	S	S	TIME	CYCLE	SPLIT	OFFSET	REMARKS
1	x	x	x	x	x			6:00	6	1	1	AM 120
2	x	x	x	x	x			9:00	5	1	1	AVG 110
3	x	x	x	x	x			12:00	4	1	1	AVG 125
4	x	x	x	x	x			13:30	7	1	1	AVG 140
5	x	x	x	x	x			15:00	8	1	1	AM 160
6	x	x	x	x	x			18:00	7	1	1	AVG 140
7	x	x	x	x	x			19:00	5	1	1	AVG 110
8	x	x	x	x	x			0:00				FREE
9						x	x	7:00	5	1	1	AVG 110
10						x	x	11:00	7	1	1	AVG 140
11						x	x	19:00	5	1	1	AVG 110
12						x	x	0:00				FREE
13												

OFFSETS (SEC.)

	CYCLE NO.:	4	5	6	7	8	-
	LENGTH: (SEC.)	125	110	120	140	160	
OFFSET	1	90	103	39	92	11	
	2						
	3						
	4						

SPLITS (%)

CYCLE	SPLIT	PHASE 1	2	3	4	5	6	7	8
4	1	17	34		22	22	34		22
5	1	14	33		24	19	33		24
6	1	16	25		32	29	25		14
7	1	15	33		19	20	33		28
8	1	17	26		26	22	26		26

OFFSET REFERENCED TO:
Carlisle Pike, Skyport Rd, and Wingate Dr

* PHASE TIME INCLUDES CHANGE AND CLEARANCE INTERVAL TIMES

MASTER: Carlisle Pike, Skyport Rd, and Wingate Dr

FILE: T043

COUNTY:
Cumberland

MUNICIPALITY:
Hampden Township

INTERSECTION:
Carlisle Pike (SR 0011), Gateway Dr & SR 0581 Ramps A, B, and C

Casino Trip Generation and Distribution

TRAFFIC PLANNING AND DESIGN, INC.
Est. 1989
2500 East High Street, Ste 650
Pottstown, PA 19464
Phone: 610.326.3100
Fax: 610.326.9410
TPD@TrafficPD.com
www.TrafficPD.com

December 15, 2009

Ms. Deborah Casey
East Hanover Township
8848 Jonestown Road
Grantville, PA 17028

RE: Trip Generation Analysis
Proposed Hollywood Casino at Penn National Expansion
East Hanover Township, Dauphin County, PA
TPD# PNGI.A.00004

Dear Ms. Casey:

Traffic Planning and Design, Inc. (TPD) has conducted a trip generation analysis for the proposed Hollywood Casino at Penn National expansion in East Hanover Township, Dauphin County, Pennsylvania. The purpose of this analysis was to determine the trip generation associated with proposed Hollywood Casino at Penn National expansion. Although the existing site currently consists of 2,377 slot machines (gaming positions), the existing site was previously approved for 3,000 slot machines (gaming positions). In order to determine the increase in traffic associated with the proposed Hollywood Casino at Penn National expansion, a comparison between the trip generation of the "Approved Scenario" and the trip generation of the "Proposed Scenario" was analyzed. As such, this trip generation analysis focused on the following scenarios:

- *"Existing Scenario"* – currently consists of 2,377 existing slot machines (gaming positions);
- *"Approved Scenario"* – development was previously approved with 3,000 slot machines (gaming positions);
- *"Proposed Scenario"* – proposed expansion will include a total of 820 additional gaming positions, including 200 additional slot machines (200 gaming positions), 60 table games with a maximum 7 gaming positions each (420 gaming positions); and 20 poker tables with a maximum 10 gaming positions each (200 gaming positions).

EXISTING TRAFFIC VOLUMES

In order to determine the existing site-generated traffic at Hollywood Casino at Penn National, traffic volumes at the Casino's main patron accesses were evaluated (Bow Creek Road and Fox Run Road Accesses). The Fire House Road (stable access to race track) and Mountain Road (employee/delivery) accesses were not included in this analysis which is consistent with the previous traffic study completed for the original project.

Automatic Traffic Recorders (ATR) Counts

Automatic traffic recorder (ATR) counts were conducted along the Casino's main patron accesses to/from Bow Creek Road and Fox Run Road. The ATR counts were conducted from Wednesday, September 30, 2009 through Friday, October 9, 2009. **Table 1** summarizes the current daily traffic volumes (i.e. 24-hour volume) for each access during the analyzed period. The ATR data sheets are included in **Attachment A.**

TABLE 1
ATR COUNT SUMMARY – DAILY TRAFFIC VOLUMES
EXISTING HOLLYWOOD CASINO AT PENN NATIONAL

Date of Traffic Counts	Casino Patron Access			Percentage of Highest Total
	Bow Creek Road Access	Fox Run Road Access	Combined	
24-Hour Period – Weekday				
Friday, October 2, 2009	9,168	1,962	**11,130**	**87.4%**
Monday, October 5, 2009	5,466	1,097	6,563	51.5%
Tuesday, October 6, 2009	6,544	1,462	8,066	63.3%
Wednesday, October 7, 2009	6,347	1,425	7,772	61.0%
Thursday, October 8, 2009	6,955	1,707	8,662	68.0%
24-Hour Period – Weekend				
Saturday, October 3, 2009	10,296	2,437	**12,733**	**100%**
Sunday, October 4, 2009	8,559	1,652	10,211	80.2%

As outlined in **Table 1**, based on the results of the ATR counts, it was determined that the peak 24-hour weekday period occurred on Friday, and the peak 24-hour weekend period occurred on Saturday. Based on the results of the ATR counts, the Saturday peak hour of the generator occurred between 10:30-11:30 P.M. (924 total trips). However, in order to be consistent with the previous traffic study completed for the original project, the Saturday peak hour of the generator was analyzed between 5:00-9:00 P.M. (904 total trips). It is important to note that the difference between the Saturday peak hours is marginal (20 trips, approximately 2.2% difference).

This trip generation analysis focused on the following peak periods, based on the results of the ATR counts:

- 24-Hour Weekday (Friday);
- 24-Hour Saturday;
- Weekday (Friday) P.M. Peak Hour of Adjacent Street Traffic (highest hourly volume between 4:00-6:00 P.M.);
- Saturday Peak Hour of the Generator (highest hourly volume between 5:00-9:00 P.M.).

Manual Turning Movement Counts

Based on the results of the ATR counts, manual turning movement counts were conducted during the weekday (Friday) P.M. (4:00-6:00 P.M.) peak period and Saturday evening (5:00-9:00 P.M.) peak period at the following patron access locations:

- Bow Creek Road and the Site Access (patron access);
- Fox Run Road and the Site Access (patron access).

The counts were taken at fifteen-minute intervals on the following days:

- Friday, October 16, 2009;
- Saturday, October 17, 2009.

For a given peak traffic period, the "peak hour" consists of the four consecutive fifteen-minute intervals during which the highest traffic volumes occur. **Table 2** shows the existing trip generation for the existing Hollywood Casino at Penn National for the weekday and Saturday 24-hour periods, and the weekday P.M. peak hour of adjacent street traffic (highest hourly volume between 4:00-6:00 P.M.) and

Saturday peak hour of the generator (highest hourly volume between 5:00-9:00 P.M.). The manual turning movement counts are included in **Attachment B**.

TABLE 2
SITE-GENERATED TRAFFIC VOLUMES
EXISTING HOLLYWOOD CASINO AT PENN NATIONAL

Time Period	Site-Generated Total Trips	
	ATR Counts	Manual Counts
24-Hour Period		
Weekday	11,130	---
Saturday	12,733	---
Peak Hour Period		
Weekday P.M. Peak Hour[1]	699	799
Saturday Peak Hour[2]	904	1,008

1. Peak Hour of Adjacent Street Traffic (Highest Hourly Volume between 4:00-6:00 P.M.)
2. Peak Hour of the Generator (Highest Hourly Volume between 5:00-9:00 P.M.)

TRIP GENERATION INFORMATION

Site-Generated Trip Generation Rates

Utilizing the data collected from the ATR and manual turning movement counts, trip generation rates were calculated to relate the number of trips generated during the analyzed time periods, to the number of gaming positions that currently exist. As previously outlined the existing Hollywood Casino at Penn National currently consists of 2,377 slot machines (2,377 gaming positions). **Table 3** shows the existing trip generation rates for the analyzed time periods. ***In order to take a conservative approach, the higher trip generation rates in boldface were utilized for all further calculations.***

TABLE 3
TRIP GENERATION RATES
EXISTING HOLLYWOOD CASINO AT PENN NATIONAL

Time Period	Trip Generation Rates	
	ATR Counts	Manual Counts
24-Hour Period		
Weekday	**T = 4.682*(X)**	---
Saturday	**T = 5.357*(X)**	---
Peak Hour Period		
Weekday P.M. Peak Hour[1]	T = 0.294*(X)	**T = 0.336*(X)**
Saturday Peak Hour[2]	T = 0.380*(X)	**T = 0.424*(X)**

T = Total Trips X = Number of Gaming Positions

1. Peak Hour of Adjacent Street Traffic (Highest Hourly Volume between 4:00-6:00 P.M.)
2. Peak Hour of the Generator (Highest Hourly Volume between 5:00-9:00 P.M.)

"Approved Scenario" Trip Generation

As previously outlined the existing Hollywood Casino at Penn National was previously approved with 3,000 slot machines (3,000 gaming positions). Therefore, based on the above calculated site-generated trip generation rates (shown in boldface in Table 3), TPD developed the trip generation for the "Approved Scenario" for the analyzed time periods, as shown in **Table 4.**

TABLE 4
TRIP GENERATION – "APPROVED SCENARIO"

Time Period	Trip Generation Rates	X	Total Trips
24-Hour Period			
Weekday	T = 4.682*(X)	3,000	14,046
Saturday	T = 5.357*(X)	3,000	16,071
Peak Hour Period			
Weekday P.M. Peak Hour[1]	T = 0.336*(X)	3,000	1,008
Saturday Peak Hour[2]	T = 0.424*(X)	3,000	1,272

T = Total Trips X = Number of Gaming Positions

1. Peak Hour of Adjacent Street Traffic (Highest Hourly Volume between 4:00-6:00 P.M.)
2. Peak Hour of the Generator (Highest Hourly Volume between 5:00-9:00 P.M.)

"Proposed Scenario" Trip Generation

The proposed Hollywood Casino at Penn National will consist of 820 additional gaming positions, as outlined below:

- 200 additional slot machines (200 gaming positions);
- 60 table games with a maximum 7 gaming positions each (420 gaming positions);
- 20 poker tables with a maximum 10 gaming positions each (200 gaming positions).

In order to determine the increase in traffic associated with the proposed Hollywood Casino at Penn National expansion, a comparison between the trip generation of the "Approved Scenario" and the trip generation of the "Proposed Scenario" was analyzed. **Table 5** shows the increase in traffic associated with the proposed expansion of the facilities for the analyzed time periods.

TABLE 5
TRIP GENERATION CALCULATIONS

Development Scenario	Total Trips	
	Weekday (Friday)	Saturday
24-Hour Period		
Existing Scenario (2,377 Gaming Positions)	11,130	12,733
Approved Scenario (3,000 Gaming Positions)	14,046	16,071
Proposed Expansion (820 Gaming Positions)	**3,839**	**4,393**
Proposed Scenario (3,820 Gaming Positions)	17,885	20,464
Peak Hour Period		
Existing Scenario (2,377 Gaming Positions)	799	1,008
Approved Scenario (3,000 Gaming Positions)	1,008	1,272
Proposed Expansion (820 Gaming Positions)	**276**	**348**
Proposed Scenario (3,820 Gaming Positions)	1,284	1,620

As shown in **Table 5**, based on the site-generated trip generation rates, the proposed Hollywood Casino at Penn National expansion will generate **276 additional total vehicle-trips** during the weekday (Friday) P.M. peak hour of adjacent street traffic (one hour between 4:00-6:00 P.M.) and **348 additional total vehicle-trips** during the Saturday peak hour of the generator (one hour between (5:00-9:00 P.M.).

Please do not hesitate to contact me with any questions.

Sincerely,
TRAFFIC PLANNING AND DESIGN, INC.

John M. Pyne

John M. Pyne, P.E.
Principal

Attachments (Attachment A-B)

cc: Jodie Evans, P.E., PTOE, *McMahon Associates*
Jack R. Rauen, *Penn National Gaming, Inc.*
Barry Leonard, *Penn National Gaming, Inc.*
Frank Quigley, *Penn National Gaming, Inc.*
Charles M. Courtney, Esq., *McNees Wallace & Nurick LLC*
James McCarthy, P.E., *McCarthy Engineering Associates*
Eric Mountz, P.E., PTOE, *TPD*

TRIP DISTRIBUTION OF PENN HARRIS CASINO

Based on Market Study by Gaming Market Advisors

Market Area	Annual Visits	Percentage of Total
Harrisburg West	476,327	43.4%
I-76 West	57,794	5.3%
Secondary South	215,059	19.6%
Secondary North	69,678	6.3%
Secondary East	191,821	17.5%
Tertiary South	87,813	8.0%
TOTAL	1,098,492	100.0%

				1 Rt 11 west
		3 DIRECTION ASSIGNMENTS		2 581 Ramps
ROUTE ASSIGNMENT				3 Carlisle Pike East
Area	To/From	Percent within Area	% of Total Trips	Direction Assignment
Harrisburg West				
		0.21	9.0%	1
Route assigned by census block group		0.31	13.4%	2
using google map directions		0.48	21.0%	3
I-76 West				
northern area	various to Rt 11	0.15	0.8%	1
western	Tpke	0.15	0.8%	2
southern & east of Tpke exit 201	various to I-81	0.70	3.7%	2
Secondary South				
	I-81, US 15, or I-83	1.0	19.6%	2
Secondary North				
	11/15, 22/322	1.0	6.3%	2
Secondary East				
	283 to I-83, I-76, I-81	0.90	15.7%	2
Harrisburg downtown	Market/Taylor Bridges	0.10	1.7%	3
Tertiary South	I-83, US 15, I-81	1.0	8.0%	2

		sum	used
1	Rt 11 West	9.80%	10%
2	581 Ramps	67.50%	70%
3	Carlisle Pike East	22.70%	20%

Number of total visits/year used for percentage distribution of traffic. GMA provided Zip Codes in each area and census block breakdown for Harrisburg West

Casino Overnight Demand Summary, 2013				
	Win Per Trip	Total Visits	% Overnight	RND
Harrisburg West	$74	476,327	0.5%	2,382
I-76 West	$53	57,794	1.5%	867
Secondary South	$57	215,059	1.5%	3,226
Secondary North	$49	69,678	1.5%	1,045
Secondary East	$60	191,821	3.0%	5,755
Tertiary South	$64	87,813	3.0%	2,634
TOTAL	$60	1,098,492	1.4%	15,909
Source: GMA				

Combining the impacts of the loss of the Holiday Inn flag and the incremental demand generated by the casino, GMA estimated that the property will operate at 70% occupancy in 2013. With the casino generating 15,909 RND and overall occupancy at 70%, latent demand would account for 45,156 RND. Based on actual win per room figures at similar casino hotels across the country, GMA estimated average win per room at $55 for the latent demand segment. In total, non-casino hotel demand is projected to generate $2.5 million in gaming revenue for the Project.

Penn Harris Casino Hotel Demand Summary, 2013	
Rooms	239
Occupancy	70%
Casino RND	15,909
Non-Casino RND	45,156
Non-Casino Win Per Room	$55
Incremental Gaming Revenue	$2,483,573
Source: GMA	

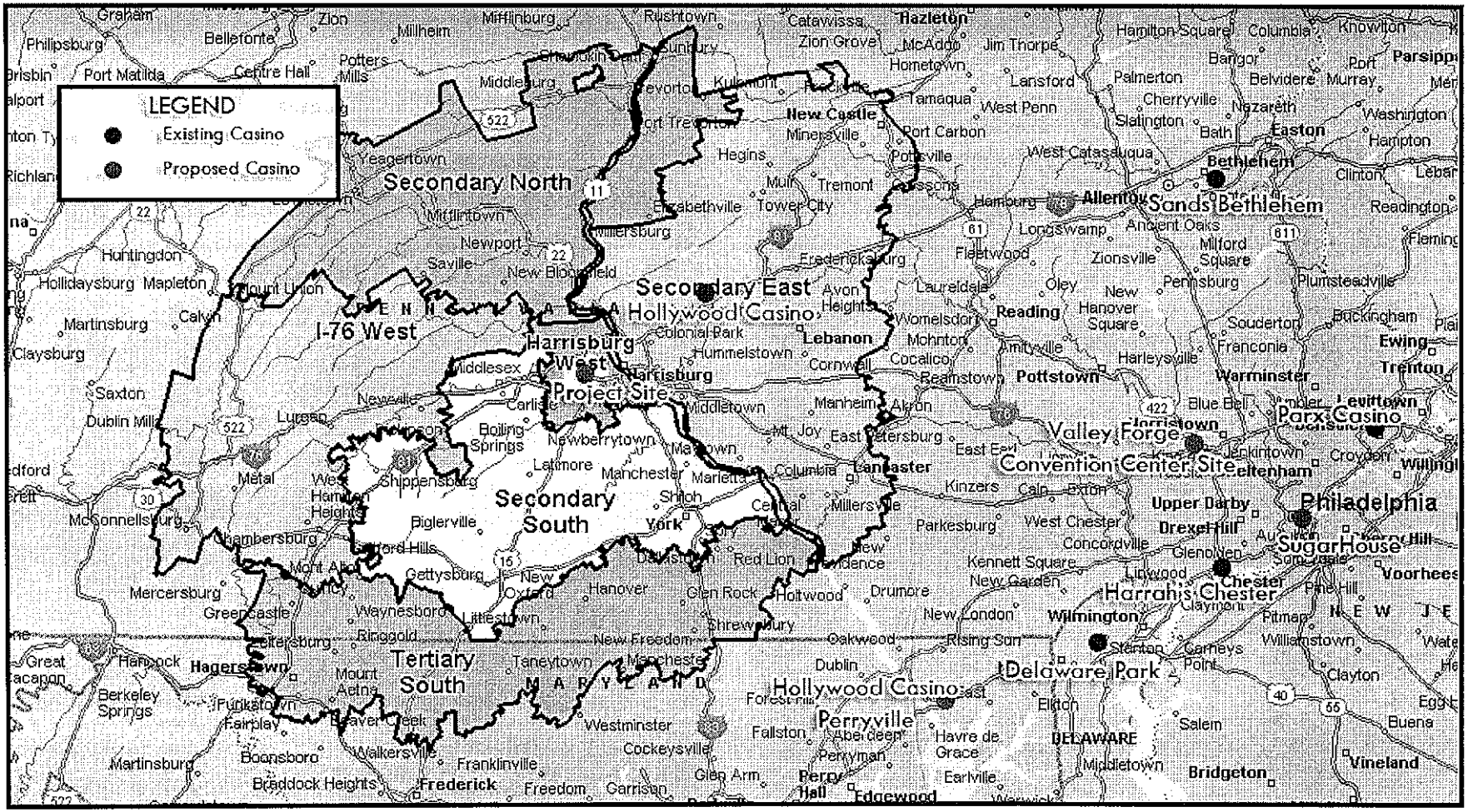
Forecasts of Annual Gaming Revenue

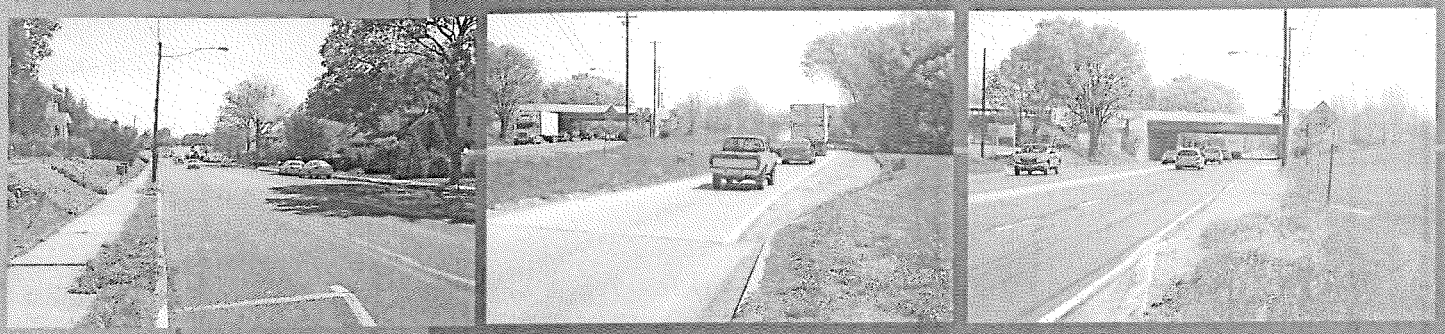
Combining both market segments, GMA projects the Penn Harris Casino will generate $75.3 million in gaming revenue in 2013, the expected first stabilized year of operations for the Project. The vast majority, approximately 97%, of this revenue will be contributed by the Local market.

PennHarris Casino Gaming Revenue Summary, 2013		
Local Market	$	72,806,563
Non-Casino Hotel Demand	$	2,483,573
TOTAL	$	75,290,136
Source: GMA		

With gaming revenues projected for 2013, GMA estimated revenues for the first five years of operation for the Project. As part of this process, GMA adjusted gaming revenues based on a typical ramp-up period for a casino of this size and scope. Gaming revenues for 2012 were

Greater Harrisburg Market





CLASH TRANSPORTATION STUDY

(Camp Hill/Lower Allen/Shiremanstown/Hampden)

Completed For:

Tri-County Regional Planning Commission
112 Market Street, 2nd Floor
Harrisburg, PA 17101-2015

Completed By:

McCormick Taylor
Engineers & Planners Since 1946

75 Shannon Road
Harrisburg, PA 17112

December 2008

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

TECHNICAL FILES

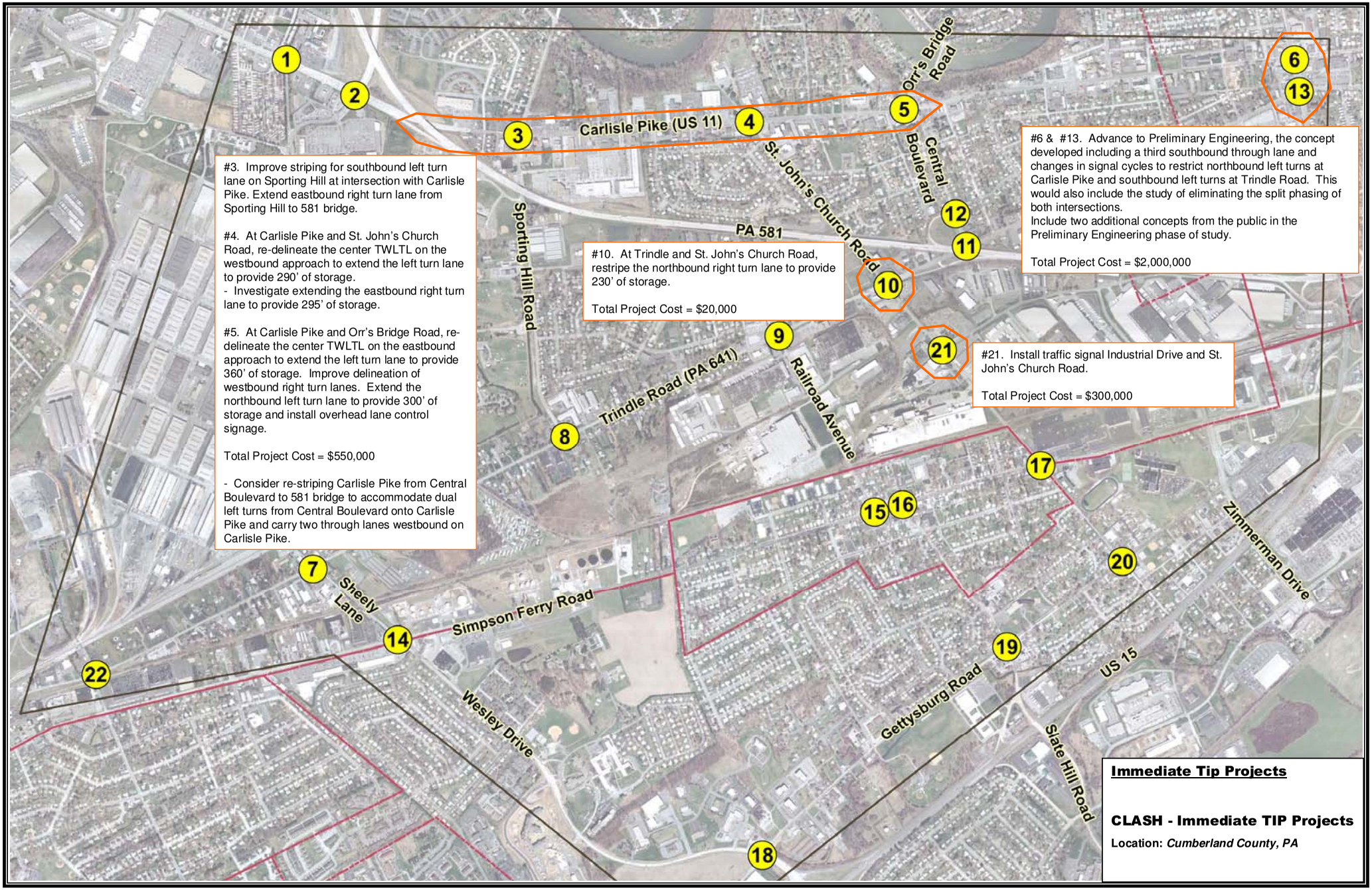
EXECUTIVE SUMMARY

The Tri-County Regional Planning Commission (TCRPC) initiated the Borough of Camp Hill/Lower Allen/Shiremanstown/Hampden Township (CLASH) Circulation Study to identify transportation alternatives to improve circulation within the study area and to the nearby limited-access highways of US 15 and PA 581. The study area includes a mix of land uses including residential, commercial, and industrial types which require the local roadway network to support a significant amount of local, commuter, and truck traffic.

The study involved a significant data collection and analysis program, a public involvement and outreach effort, and the development of intersection improvements and packages of improvements that could be utilized in future planning and Long Range Transportation Plan updates. The focus of the study was to identify system and corridor improvements that would be beneficial to the 22 intersection study area. The study also evaluated the impact of completing the interchange at PA 581 and St. John's Church Road as well as network and system improvements for pedestrians, bicyclists and transit users.

The product of this study includes this final report which documents the existing conditions and analysis completed for the base condition as well as 2020 and 2030 transportation network analysis and improvements to be considered in the future. Another product of this study is a Microsoft Excel tool (included on the CD) that can be utilized in future planning and programming efforts if year of expenditure for improvements change or item unit costs change. This tool includes cost estimates and quantity back-up for each series of transportation improvements at each intersection for the immediate, 2020, and 2030 design years. This allows interactive selection of projects and groups of projects into one package of improvements and for changes in unit prices and year of expenditure costs. In this way, the document can be a living readily useable tool for the future of transportation planning in the CLASH area. The intersection summary figures also include relevant environmental and right-of-way issues that may be encountered for each set of improvements.

The initial series of projects for consideration on the current TIP are shown in the figure on the following page. Projects for future year considerations are shown in the 2020 and 2030 sections of the report and are shown in detail in the intersection improvement graphics in the Appendix.


1
2
3
Carlisle Pike (US 11)
4
5
Orr's Bridge Road
6
13
Central Boulevard
St. John's Church Road
12
11
PA 581
Sporting Hill Road
10
9
21
Trindle Road (PA 641)
Railroad Avenue
8
17
15
16
Zimmerman Drive
20
7
Sheely Lane
Simpson Ferry Road
14
19
US 15
22
Wesley Drive
Gettysburg Road
Slate Hill Road
18
#3. Improve striping for southbound left turn lane on Sporting Hill at intersection with Carlisle Pike. Extend eastbound right turn lane from Sporting Hill to 581 bridge.
#4. At Carlisle Pike and St. John's Church Road, re-delineate the center TWLTL on the westbound approach to extend the left turn lane to provide 290' of storage.
- Investigate extending the eastbound right turn lane to provide 295' of storage.
#5. At Carlisle Pike and Orr's Bridge Road, re-delineate the center TWLTL on the eastbound approach to extend the left turn lane to provide 360' of storage. Improve delineation of westbound right turn lanes. Extend the northbound left turn lane to provide 300' of storage and install overhead lane control signage.
Total Project Cost = $550,000
- Consider re-striping Carlisle Pike from Central Boulevard to 581 bridge to accommodate dual left turns from Central Boulevard onto Carlisle Pike and carry two through lanes westbound on Carlisle Pike.
#10. At Trindle and St. John's Church Road, restripe the northbound right turn lane to provide 230' of storage.
Total Project Cost = $20,000
#6 & #13. Advance to Preliminary Engineering, the concept developed including a third southbound through lane and changes in signal cycles to restrict northbound left turns at Carlisle Pike and southbound left turns at Trindle Road. This would also include the study of eliminating the split phasing of both intersections.
Include two additional concepts from the public in the Preliminary Engineering phase of study.
Total Project Cost = $2,000,000
#21. Install traffic signal Industrial Drive and St. John's Church Road.
Total Project Cost = $300,000
Immediate Tip Projects
CLASH - Immediate TIP Projects
Location: Cumberland County, PA

I. INTRODUCTION

A. Background

The Tri-County Regional Planning Commission (TCRPC) initiated the Borough of Camp Hill/Lower Allen/Shiremanstown/Hampden Township (CLASH) Circulation Study to identify transportation alternatives to improve circulation within the study area and to the nearby limited-access highways of US 15 and PA 581. The study area includes a mix of land uses including residential, commercial, and industrial types which require the local roadway network to support a significant amount of local, commuter, and truck traffic.

Major roadways including US 15 and PA 581 provide the study area access to the Capital Beltway and high speed connections to other destinations. Localized within the study area is the partial interchange at Trindle Road and PA 581. This interchange provides access to westbound exiting traffic and eastbound entering traffic. Vehicles wishing to enter westbound or exit eastbound are forced to other interchanges or to utilize the local roadway network. This leads to a heavy volume of truck traffic on local roadways and to additional congestion on the local roadway network.

In its current configuration, the US 15/PA 581 interchange is severely congested and encourages motorists, including trucks, to use other, local and regional roads to avoid the interchange. This diversion of traffic, compounds the circulation issues within the study area. The US 15/PA 581 interchange is proposed to be redesigned and is scheduled to be under construction in March of 2008. It is anticipated that the reconfiguration of the US 15/PA 581 interchange will reduce the diversion of traffic onto the study area's roadways. This impact was reviewed as part of the CLASH study.

Several of the roadways and intersections in the study area are becoming increasingly congested which hinders the flow of traffic volume and limits mobility to motorists. The primary goal of this study is to establish the best means to improve circulation and ease congestion within the study area, including access between the study area and nearby US 15 and PA 581.

Six coordination meetings were held with the Study Review Committee (SRC) throughout the study. The meetings were held to review project progress, exchange information, and to obtain consensus. The project kick-off meeting was held April 16, 2007. At the meeting, the project stakeholders were established, the study area was reviewed, the scope of work and project goals were identified, the data collection efforts were summarized, the analysis methodology was determined, and the project scheduled outlined. A status meeting was held June 18, 2007 to summarize the traffic count and truck origin and destination study results, to review the employee zip code information, and to reach an agreement on the next steps of the project. Land use, existing traffic conditions, modifications to the regional traffic model, and the method of summarizing improvement concepts were also discussed. On October 24, 2007, a status meeting was held to discuss future traffic volumes, initial alternatives for 2020 and 2030 projects, and pedestrian and transit options. A dry-run for the public meeting was held on December 18, 2007, and the layout and displays for the public meeting were discussed. On January 23, 2008, the

public meeting was held. A semi-final meeting was conducted on May 15, 2008 and a final meeting held on September 4, 2008 to review the presentation and final report. A presentation to HATS was completed on September 12, 2008.

B. Project Location

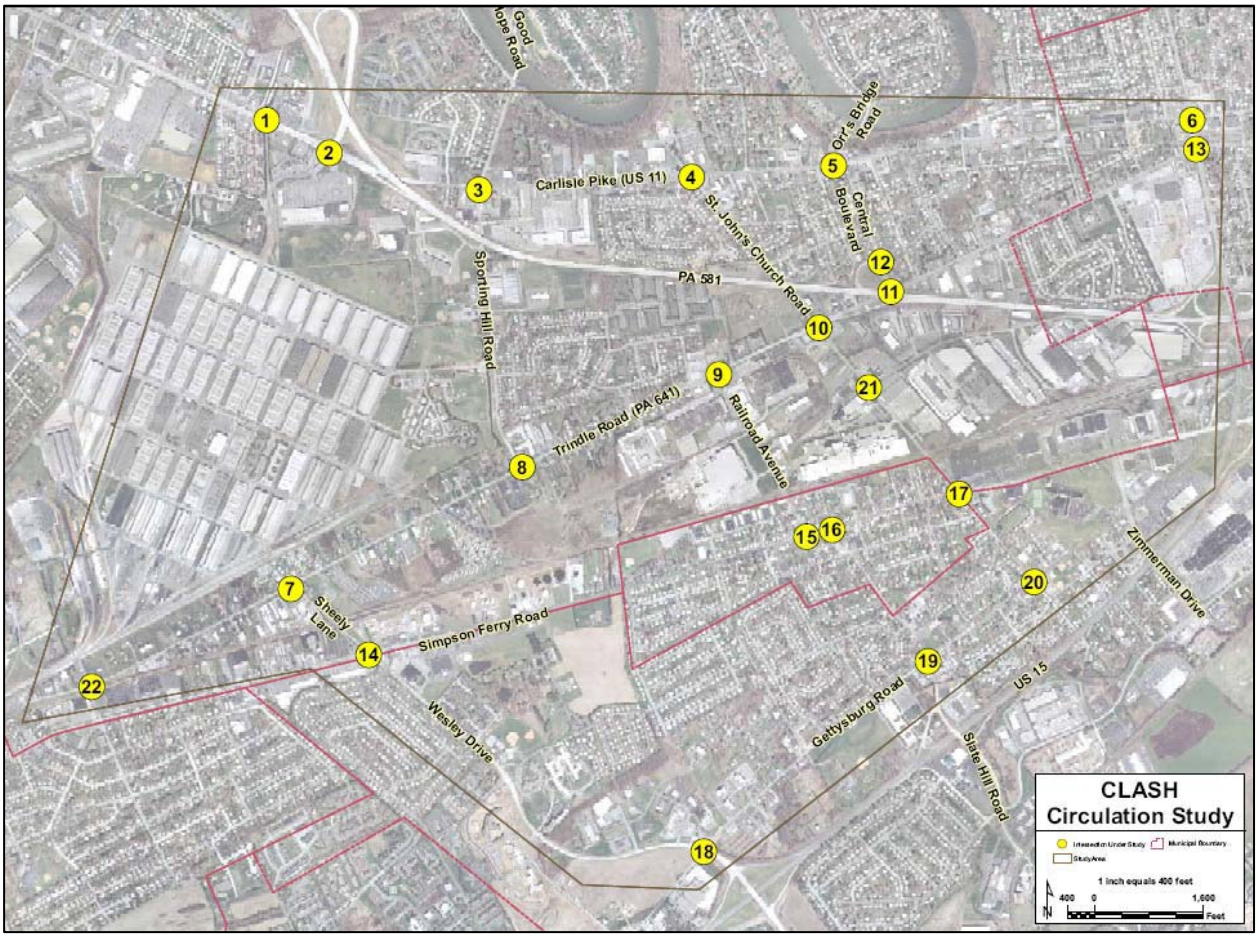
The CLASH study area is located in eastern Cumberland County, Pennsylvania and includes all of Shiremanstown Borough and parts of Borough of Camp Hill Borough, East Pennsboro Township, Hampden Township, and Lower Allen Township. The study area is bounded by the following roadways and is shown in **Figure 1.1**:

- North – Carlisle Pike/Market Street between Van Patton Drive and 32nd Street
- Southeast – US 15 between Carlisle Pike/Market Street and Wesley Drive
- Southwest – Wesley Drive/Sheely Lane between US 15 and Trindle Road/PA 641
- Northwest – Trindle Road/PA 641, Sporting Hill Road, and PA 581 between Sheely Lane and Carlisle Pike

Twenty-two (22) intersections were included in the study area and are indicated by the numbered circles shown on **Figure 1.1**.

The CLASH study area also supports several employment centers which in addition to attracting commuter traffic, generates significant truck traffic. The employment centers include the Naval Inventory Control Point (NAVICP) which employs over 5,000 people, Shaffer Trucking and ABF Freight Systems each employing over 800 people. Several other truck generating businesses also exist within the study area, primarily centered along Industrial Road and Railroad Avenue. Such businesses include Arnold Logistics, Arnold Transportation, New Penn Trucking, Eastern Consolidating and Distributing, Ward Trucking, and Carlisle Carriers. These businesses all create a significant volume of freight in the range of 10 to 150 trucks per day per business.

Figure 1.1 – Site Map and Traffic Count Locations



C. Major Area Transportation Projects

In addition to this study and its recommendations, there is one major transportation project that will affect the CLASH study area, the US 15/PA 581 Improvements Project. PennDOT set forth the US 15/PA 581 Improvements Project to design and construct highway improvements that will improve safety and alleviate traffic congestion. The project involves major reconfiguration of the US 15/PA 581 interchange and a relocation of a local interchange on US 15, **Figure 1.2** gives an overview of the project improvements.

Mainline roadway improvements include:

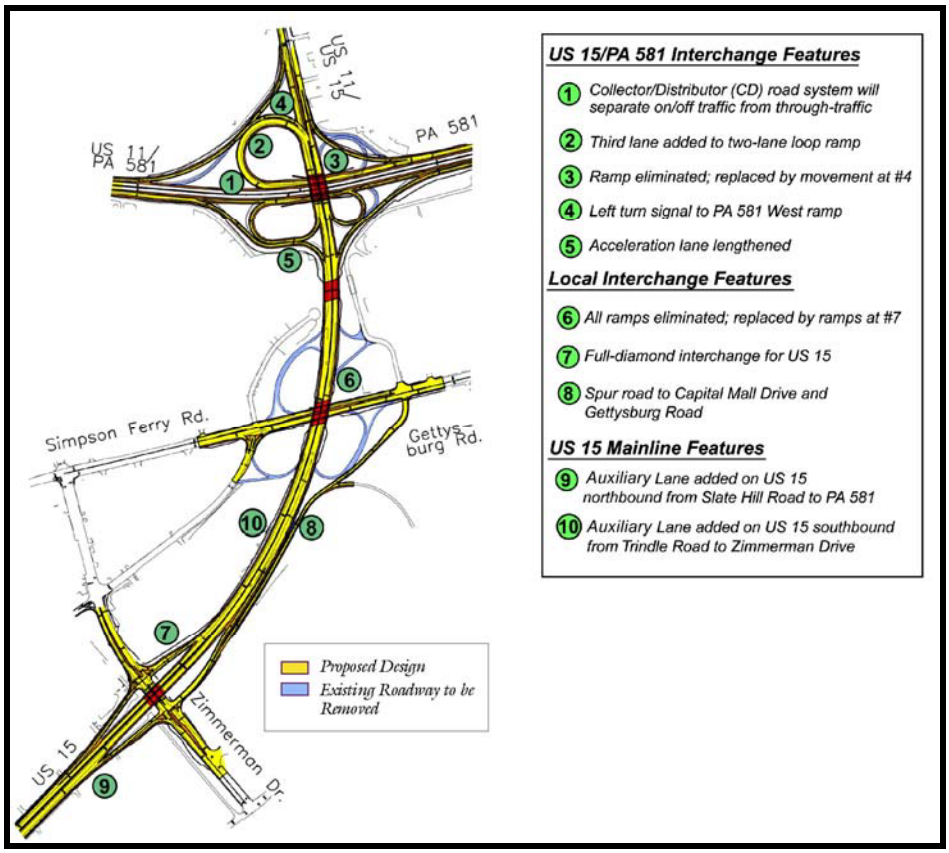
- The reconfiguration of the existing US 15/PA 581 interchange to improve traffic flow via a new collector-distributor system which will separate ramp movements from through traffic.
- The relocation of the existing US 15 interchange at Gettysburg Road to a new urban diamond interchange at Zimmerman Drive (to be renamed Lower Allen Drive) which will improve acceleration and deceleration lane lengths and eliminate substandard weave conditions.
- Widening for new auxiliary lanes on both US 15 between the Slate Hill Road interchange and Harvard Avenue, and on PA 581 eastbound between US 15 and the I-83 interchange.

Local network improvements include:
Roadway improvements will be made on the following local roads: Simpson Ferry Road (SR 2014), Gettysburg Road (SR 2027), Hartzdale Drive, Zimmerman Drive (Lower Allen Drive), and Capital City Mall Drive.

Simpson Ferry Road will have an added westbound lane between Zimmerman Drive (Lower Allen Drive) and St. John's Church Road to accommodate the dual left turning moving from northbound Zimmerman Drive (Lower Allen Drive) and to alleviate congestion along Simpson Ferry Road. Due to the new interchange with US 15 at Zimmerman Road (Lower Allen Drive), the entire cross-section of Zimmerman Drive (Lower Allen Drive) will be updated. At the intersection of Gettysburg Road and Slate Hill Road/Locust Street, left turn lanes will be added to Gettysburg Road to improve the operation of the intersection. Lastly, at the intersection of Hartzdale Drive and Slate Hill Road improvements include turn lane reconfiguration and the addition of new turn lanes. The traffic signals along the Zimmerman Drive (Lower Allen Drive) corridor and the traffic signals along the Gettysburg Road will be interconnected.

Due to the roadway improvements and the interchange relocation, traffic patterns and volumes within the project area are expected to change. These changes were addressed in the CLASH Circulation Study future volume development.

Figure 1.2 – US 15/PA 581 Project Improvements



D. Data Reviewed

In order to complete a thorough analysis of the corridor, the following data was collected and reviewed:

- Signal plans for the 16 signalized study intersections.
- Field sketches of each of the 22 intersections.
- Corridor characteristics taken from field visits, including sidewalk and curb locations, speed limits, number of lanes and turning lanes, and any other noteworthy features.
- Peak hour turning movement count data for all of the intersections collected between April 24 and April 26 2007 and on May 3, 2007 between 7:00-8:00AM and 4:00-5:00PM.
- Traffic signal equipment inventory collected May 3, 2007.
- Truck Following O-D study performed from 7:00AM to 12:00 PM and 1:00 PM to 6:00 PM on May 31, 2007 to capture commercial vehicle travel patterns.
- Phone interviews with several trucking firms in and around the study area.
- Transit information from the Capital Area Transit.
- Zip code information obtained from the West Shore Tax Bureau that links local residents to their employers and local employers to their employee's place of residence.
- Cumberland County zoning/land use maps.

In addition to these data sources, several field visits were conducted to identify and document existing conditions. During these visits, photographs along with visual information on intersection and signal characteristics were obtained. Photographs of the study intersections and roadways can be found on a CD located in Appendix B.

II. EXISTING CONDITIONS

A. Description of Roadway Network

This section describes the existing conditions found within the study area and will consist of two parts. The first section is a general description of the various corridors found within the study area. The second section is a description of each of the 22 intersections that were studied.

1. Corridors

According to the County Functional Class Map, the corridors of interest within the study area can be defined and classified as shown in **Table 2.1**. Following the table are descriptions of each of the main corridors. It should be noted that there are currently no formal bicycle routes or Intelligent Transportation Systems (ITS) located within the study area.

Table 2.1 – Classification of CLASH Corridors

Corridor	SR	Intersecting Roadways		Classification
		Start	End	
Carlisle Pike	1010	Van Patton Road	32nd Street (US 11/15)	Other Principal Arterial Highway
Trindle Road	641	Gilmore Road	32nd Street (US 11/15)	Other Principal Arterial Highway
Simpson Ferry Road	2014	Sheely Lane/ Wesley Drive	St. John's Church Road	Minor Arterial
Gettysburg Road	2027	Wesley Drive	St. John's Church Road	Urban Collector
St. John's Church Road	2029	Gettysburg Road	Simpson Ferry Road	Urban Collector
St. John's Church Road	2029	Simpson Ferry Road	Carlisle Pike	Minor Arterial
Sporting Hill Road	1013	Trindle Road	Carlisle Pike	Minor Arterial
Sheely Lane/ Wesley Drive	2021	Gettysburg Road	Trindle Road	Minor Arterial
Central Boulevard	1021	Trindle Road	Carlisle Pike	Urban Collector
Railroad Ave	2025	Simpson Ferry Road	Trindle Road	Urban Collector

Carlisle Pike: Van Patton Road to 32nd Street (US11/15)

Carlisle Pike is located at the northern-most edge of the study area and can be found in Hampden Township and the Borough of Camp Hill. Traveling eastbound from the intersection with Van Patton Drive, the roadway has a varying cross-section with three eastbound and two westbound through lanes in each direction along with designated left and right turn lanes at the intersections. Beginning on the eastern side of Sporting Hill Road, the roadway has a single lane in each direction with a center two-way-left-turn-lane. On the eastern side of 34th Street (within the Borough of Camp Hill) to the intersection with 32nd Street (US11/15), a single westbound and two eastbound through lanes are present. The shoulder widths vary from 4' to 10' when traveling from west to east. Curbs are located intermittently on either one or both sides of the roadway throughout the section. In Hampden Township, sidewalk is non-existent except for a short stretch near the border with the Borough of Camp Hill, while the Borough of Camp Hill has sidewalk on both sides of Carlisle Pike. For specific locations of sidewalk, see **Figure 2.3**. On-street parking is not permissible along the corridor and the posted speed is 40 miles per hour (MPH). The surrounding area includes a mix of residential and commercial land uses. There are eight signalized intersections within the section, with several of the traffic signals currently utilizing time based coordination.

EB Carlisle Pike – PA581 Ramps

EB Carlisle Pike – 36th Street

Trindle Road: Gilmore Road to 32nd Street (US11/15)

Trindle Road is located in the central portion of the study area within Hampden Township and the Borough of Camp Hill. Traveling westbound from the intersection with 32nd Street, the roadway has a single eastbound and westbound through lane. From 34th Street to June Drive, the roadway has the same cross-section with the addition of a center two-way-left-turn-lane. Finally, from June Drive to Gilmore Road (Navy Gate), a single westbound and eastbound through lane exist. The shoulder widths vary from 4' to 12'. Curbs are located intermittently on either one or both sides of the roadway throughout the section. Sidewalk exists primarily in the Borough of Camp Hill with only intermittent short stretches through Hampden Township. For specific locations where sidewalk is present, see **Figure 2.3**. On-street parking is only permissible

WB Trindle Road – Approaching PA581

between 34th Street and the approach to Central Boulevard. The posted speed is 40 MPH for the entire section. The surrounding area includes a mix of residential and commercial land uses. There are seven signalized intersections within the section; several of the traffic signals currently utilize time based coordination.

Simpson Ferry Road: Sheely Lane/Wesley Drive to St. John's Church Road

Simpson Ferry Road is located in the central portion of the study area and serves as the municipal border between Hampden Township and Lower Allen Township as well as becoming Main Street in Shiremanstown Borough. Traveling eastbound from the intersection with Sheely Lane/Wesley Drive, the roadway has one lane in both the eastbound and westbound direction, with a center two-way-left-turn-lane in front of the businesses. In Shiremanstown Borough, single eastbound and westbound lanes continue, while the lane widths increase significantly (~30' lanes). Shoulder widths are narrow outside of the Borough, and widen to become on street parking within the Borough. Curbing exists on the eastbound lane for nearly the entire length of the corridor and only on the westbound lane in the Shiremanstown Borough. Sidewalk is present almost exclusively within Shiremanstown Borough, except for a short stretch in front of some of the businesses near the intersection with Sheely Lane/Wesley Drive. For specific locations where sidewalk is present, see **Figure** 2.3. On-street parking is only permissible within Shiremanstown Borough. The posted speed is 40 MPH and transitions to 35 MPH in the Borough. The surrounding area includes a mix of residential and commercial land uses. There are two signalized intersections within the corridor and the traffic signals are currently uncoordinated.

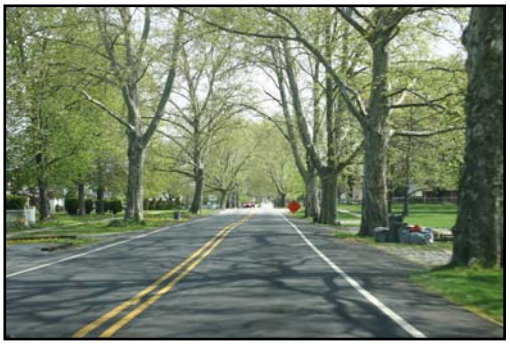
WB Simpson Ferry Road Approaching Sheely Lane/Wesley Drive

WB Simpson Ferry Road – Shiremanstown Borough

Gettysburg Road: Sheely Lane/Wesley Drive to St. John's Church Road

Gettysburg Road is located in the southern portion of the study area and lies entirely in Lower Allen Township. Traveling eastbound from the intersection with Sheely Lane/Wesley Drive, the roadway has one lane in both the eastbound and westbound direction. Approximately 500' from the intersection, the cross-section narrows significantly and shoulder widths range from two feet to four feet. Curbing exists intermittently and sidewalk is more prevalent along the western half of the alignment. For specific locations where sidewalk is present, see **Figure 2.3**. On-street parking is not permitted. The posted speed is 35 MPH, with a 15 MPH zone near the school. The surrounding area includes a mix of residential and commercial land uses. There are three signalized intersections within the corridor and the traffic signals are currently uncoordinated.

EB Gettysburg Road – Near Wesley Drive



EB Gettysburg Road – Approaching St. John's Church Road

St John's Church Road: Gettysburg Road to Carlisle Pike

St. John's Church Road is located in the center of the study area and lies in both Lower Allen and Hampden Township. Traveling northbound from the intersection with Gettysburg Road, the roadway has one lane in both the northbound and southbound direction with a narrow cross-section and shoulder widths ranging from 0'-2'. The cross-section changes significantly at the intersection with Simpson Ferry Road where the lane widths increase from 10' to 12' and a center two-way-left-turn-lane begins. At the intersection with Trindle Road, the turn lane ends, and the cross-section widens again. Curbing and sidewalk exist sporadically and are more prevalent on the northern half of the corridor. For specific locations where sidewalk is present, see **Figure 2.3**. On-street parking is permitted north of the PA 581 overpass. The posted speed is 35 MPH and transitions to 45 MPH at the intersection with Simpson Ferry Road and down to

NB St. John's Church Road – Industrial Drive

NB St. John's Church Road – North of the PA 581 Overpass

40 MPH at the intersection with Trindle Road. The surrounding area includes a mix of residential and commercial, and industrial land uses, with the industrial area centered primarily between Simpson Ferry Road and Trindle Road. There are four signalized intersections within the corridor and the traffic signals are currently uncoordinated.

Sporting Hill Road: Carlisle Pike to Trindle Road

NB Sporting Hill Road – East Naval Gate

Sporting Hill Road is located in the western portion of the study area and lies entirely in Hampden Township. Traveling southbound from the intersection with Carlisle Pike, the roadway has one lane in both the northbound and southbound direction. The shoulder widths vary from 4' to 6'. Curbing exists intermittently and sidewalk is concentrated near the residential neighborhood on the eastern side of the roadway. For specific locations where sidewalk is present, see **Figure** 2.3. On-street parking is not permitted and the posted speed is 35 MPH. The surrounding area includes a mix of residential and commercial land uses. There are five signalized intersections within the corridor and the traffic signals are currently uncoordinated.

Sheely Lane/Wesley Drive: Trindle Road to Gettysburg Road

SB Sheely Lane – Trindle Road

Sheely Lane and Wesley Drive are located in the western portion of the study area. Sheely Lane lies north of Simpson Ferry Road in Hampden Township. Wesley Drive lies south of Simpson Ferry Road in Lower Allen Township. Traveling southbound from the intersection with Trindle Road, the roadway has one lane in both the northbound and southbound directions with a narrow cross-section. The shoulder widths vary from zero feet to two feet. This corridor has no curbing or sidewalks. Beginning at the intersection with Simpson Ferry Road, single northbound and southbound lanes still exist, with shoulder widths varying from 2' to 12'. Curbing exists intermittently and sidewalk is concentrated near the residential neighborhood, mainly on the eastern side of the roadway. For specific locations where sidewalk is present, see **Figure 2.3**. On-street parking is not permitted and the posted speed is 40 MPH. The surrounding area includes a mix of residential and commercial land uses. There are five signalized intersections within the corridor and the traffic signals are currently uncoordinated.

SB Wesley Drive – Approaching Gettysburg Road

Central Boulevard: Trindle Road to Carlisle Pike

Central Boulevard is located in the central portion of the study area and lies in Hampden Township. Traveling northbound from the intersection with Trindle Road, there is one lane in both the northbound and southbound directions. The cross-section is wide, with 12' lanes and 20' shoulders and decreases significantly after the intersection with the PA 581 off-ramp where the shoulder widths are two feet to four feet. This corridor has intermittent curbing with the sidewalks being located primarily on the eastern side. For specific locations where sidewalk is present, see **Figure 2.3**. On-street parking is permitted along the eastern side, and the posted speed is 35 MPH. The surrounding area is primarily residential. There is only one signalized intersection within the corridor and it lies at the intersection with the Carlisle Pike.

SB Central Boulevard – PA 581 Off-ramp

Railroad Avenue: Simpson Ferry Road to Trindle Road

Railroad Avenue is located in the central portion of the study area and lies in both Hampden Township and Shiremanstown Borough. Traveling southbound from the intersection with Trindle Road, there is one lane in both the northbound and southbound directions. Shoulder widths vary from zero feet to four feet. This corridor has intermittent curbing and sidewalk located primarily in the Shiremanstown Borough. On-street parking is not permitted, and the posted speed is 35 MPH. The surrounding area is primarily commercial and industrial land uses. There is only one signalized intersection within the corridor and it lies at the intersection with Trindle Road.

SB Railroad Avenue – Trindle Road

2. Intersections

A total of 22 intersections were studied, varying from stop-controlled intersections to multi-lane, custom-phased signal controlled intersections. A list of the 22 intersections can be found below, followed by brief descriptions of each. A photo log of the intersections can be found on the CD in Appendix B. In addition, graphics detailing the intersection lane configuration can be found in **Figures 2.1a** and **2.1b**, the location of sidewalks is in **Figure 2.3**, and bus routes/bus stops are located in **Figure 2.4**.

1. Carlisle Pike (US 11) and Van Patton Road
2. Carlisle Pike (US 11) and Gateway Drive/PA 581 off-ramps

3. Carlisle Pike and Sporting Hill Road
4. Carlisle Pike and St. John's Church Road
5. Carlisle Pike and Orr's Bridge Road/Central Boulevard
6. Carlisle Pike/Market Street and 32nd Street (US 11/15)
7. Trindle Road (PA 641) and Sheely Lane
8. Trindle Road (PA 641) and Sporting Hill Road
9. Trindle Road (PA 641) and Railroad Avenue
10. Trindle Road (PA 641) and St. John's Church Road
11. Trindle Road (PA 641) and Central Boulevard
12. Central Boulevard and PA 581 westbound off-ramp
13. Trindle Road (PA 641) and 32nd Street (US 15)
14. Simpson Ferry Road and Sheely Lane/Wesley Drive
15. Main Street (Simpson Ferry Road) and Railroad Avenue
16. Main Street (Simpson Ferry Road) and Locust Street
17. Simpson Ferry Road and St. John's Church Road
18. Gettysburg Road and Wesley Drive
19. Gettysburg Road and Slate Hill Road/Locust Street
20. Gettysburg Road and St. John's Church Road
21. Industrial Road and St. John's Church Road
22. Trindle Road and Gilmore Road (Navy Gate)

Signalized Intersections

On May 3rd, 2007 a field view of the traffic signal equipment within the CLASH study area was completed. The review included a visual investigation of the controller assembly and the traffic signal installation. The inventory of the controller assemblies included documenting the type of controller, conflict monitor, and detector amplifiers as well as the number of positions available on the back panel. The review of the traffic signal installation included documenting the general condition of the mast arms, pedestrian accommodations, and the pavement marking condition. A good/fair/poor rating was applied to both the traffic signal installation and the controller assembly. These Equipment Inventory Sheets can be found in Appendix C.

- *Carlisle Pike (US 11) and Van Patton Road (1)*

  The intersection has a wide cross-section with right and left turn lanes from the eastbound, northbound, and westbound approaches. The southbound approach is a driveway from a hotel/bar with faded pavement markings. Pedestrian crossing is permitted only on the westbound, northbound, and southbound approaches; however, dedicated pedestrian signals are not provided. The signal is fully actuated and coordinated with the other signals along Carlisle Pike.

- *Carlisle Pike (US11) and Gateway Drive/PA 581 off-ramps (2)*

  The intersection has a wide cross-section with multiple approach lanes from each direction. Left turn lanes exist in each direction while channelized right turn lanes are

present on the southbound, eastbound, and westbound approaches. Pedestrian movements are not permitted or accommodated for on any of the approaches. The signal is fully actuated and coordinated with the other signals along Carlisle Pike.

- *Carlisle Pike and Sporting Hill Road (3)*

  This four way intersection has a smaller cross-section than the previous two. Left turn lanes are provided for each approach with recent upgrades including the addition of a second left turn lane on the northbound approach. Pedestrian movements are permitted and accommodated for each approach with the appropriate crosswalks, signalization, and push-buttons for actuation.

- *Carlisle Pike and St. John's Church Road (4)*

  This four way intersection is on a skew with St. John's Church Road approaching Carlisle Pike at a steep angle. Left and right turn lanes exist on the eastbound and westbound approaches with the northbound approach having a right turn lane only. There is a high volume of truck traffic on the eastbound and northbound approaches while the southbound approach and northbound through movements see minimal traffic. There are no pedestrian accommodations at this intersection.

- *Carlisle Pike and Orr's Bridge Road/Central Boulevard (5)*

  This is an offset intersection combining a T-intersection and a four way intersection into one signal. The southbound, eastbound, and westbound approaches have left turn lanes with the westbound approach having an extended right turn lane that is broken by the southbound approach of the Central Boulevard intersection. This southbound approach is a driveway. Pedestrians are not accommodated at the intersection.

- *Carlisle Pike/Market Street and 32nd Street (US 11/15) (6)*

  This is a wide four way intersection with left turn lanes on each approach. The southbound approach has a right turn lane while the northbound approach has a channelized right lane. Pedestrian movements are permitted and accommodated on each approach with the appropriate crosswalks, signalization, and push-buttons for actuation.

- *Trindle Road (PA 641) and Sheely Lane (7)*

  This four way intersection has a relatively small cross-section, but has left turn lanes on the eastbound and westbound approaches. The northbound approach has several restrictive roadside elements and as such has no turn lanes. The southbound approach carries a low volume and is in need of improved delineation. Pedestrian movements are only permitted and provided for on the eastbound and southbound approaches.

- *Trindle Road (PA 641) and Sporting Hill Road (8)*

  This T-intersection has a wide cross-section and includes a left turn lane on the eastbound approach, a right turn lane on the westbound approach, and both a right and left turn lane on the southbound approach. There are no crosswalks at this intersection; however, pedestrians are permitted to cross the eastbound and southbound approaches where signals and pushbuttons are present.

- *Trindle Road (PA 641) and Railroad Avenue (9)*

  The eastbound, westbound, and northbound approaches of this intersection have left turn lanes provided. The southbound approach to the intersection is a driveway with minimal delineation. Pedestrian movements are accommodated on each approach. The northbound approach is wide as it sees a significant percentage of truck traffic from the industrial area to the south of the intersection.

- *Trindle Road (PA 641) and St. John's Church Road (10)*

  This four way intersection has a high volume with a large percentage of truck traffic. As such, left and right turn lanes exist at each approach. Due to the high volume of truck traffic, the turn lanes are long. Pedestrians are not accommodated on any approach.

- *Trindle Road (PA 641) and 32nd Street (US 15) (13)*

  Trindle Road intersects 32nd Street (US 15) at a skew. Left turn lanes are provided for on all approaches with right turn lanes existing on only the southbound and eastbound approaches. Pedestrian movements are permitted and accommodated on each approach with the appropriate crosswalks, signalization, and push-buttons for actuation.

- *Simpson Ferry Road and Sheely Lane/Wesley Drive (14)*

  This intersection is on a skew. Left turn lanes are provided on all approaches, with the northbound and southbound approaches having channelized right turn movements. Pedestrians are permitted to cross on each approach. Pushbuttons are provided however pedestrian specific signals are not provided and crosswalks are not present.

- *Simpson Ferry Road and St. John's Church Road (17)*

  Left turn lanes are present on each approach, with right turn lanes being provided on the westbound and southbound approaches. Pedestrians are provided for and accommodated on each approach. This intersection sees a high volume of truck traffic traveling into and out of the industrial area to the north of the intersection. In addition, this intersection will have updates to the westbound approach as part of the 15/581 Interchange Project. See

Chapter 4, 2020 Projections and Improvements, for a detailed description of the 15/581 Project updates.

- *Gettysburg Road and Wesley Drive (18)*

  This four way intersection has left turn lanes in both the eastbound and westbound direction. In addition, it has a right turn lane in the southbound direction and a channelized right turn lane in the westbound direction. The northbound approach has a narrower cross-section than the other three approaches. Pedestrians are only permitted and accommodated on the eastbound approach.

- *Gettysburg Road and Slate Hill Road/Locust Street (19)*

  This intersection has a narrow cross-section and no turn lanes on any approach. Pedestrians are provided for and accommodated on each approach with crosswalks, signals and push buttons. This intersection will have several updates as part of the 15-581 Interchange Project. See Chapter 4, 2020 Projections and Improvements, for a detailed description of the 15/581 Project updates.

Unsignalized Intersections

- *Trindle Road (PA 641) and Central Boulevard (11)*

  The intersection is a stop-controlled T-intersection. Trindle Road has a free movement in both the eastbound and westbound directions, while southbound Central Boulevard is stop-controlled. There are no pedestrian crosswalks, and the only sidewalk is located in the northeast corner of the intersection.

- *Central Boulevard and PA 581 westbound off-ramp (12)*

  The intersection is stop-controlled with the eastbound approach being a one-way off-ramp from PA 581. Central Boulevard has a free movement in both the northbound and southbound directions while the eastbound and westbound approaches are stop-ontrolled. The eastbound approach also has a channelized right turn to accommodate the high volume of traffic exiting PA 581.

- *Main Street (Simpson Ferry Road) and Railroad Avenue (15)*

  The intersection is a stop-controlled T-intersection with free movements on the eastbound and westbound approaches. There are pedestrian crosswalks located on the eastbound and southbound approach with a sidewalk running along the entire southern edge of Main Street.

- *Main Street (Simpson Ferry Road) and Locust Street (16)*

  The intersection is stop-controlled with free movements on the eastbound and westbound approaches. The northbound approach is narrow, and there are pedestrian crosswalks located on the westbound, northbound, and southbound approaches.

- *Gettysburg Road and St. John's Church Road (20)*

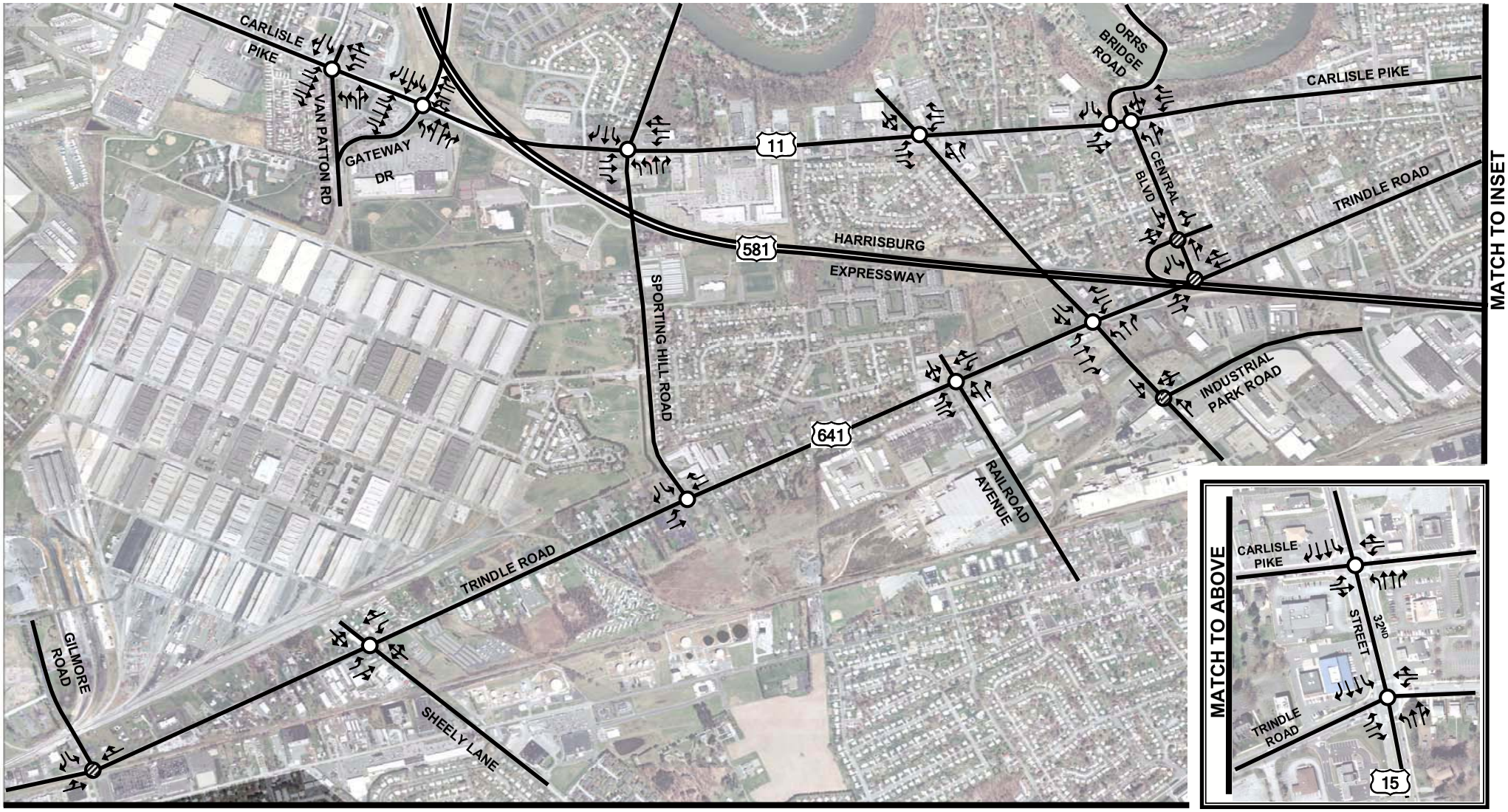
  The intersection is stop-controlled with free movements on the eastbound and westbound approaches. Crosswalks are present on the northbound and southbound approaches only.

- *Industrial Drive and St. John's Church Road (21)*

  The intersection is a stop-controlled T-intersection with free movements on the northbound and southbound approaches. A center two-way-left-turn-lane exists to accommodate traffic turning from the northbound and southbound approaches. A crosswalk is not present at this intersection.

- *Trindle Road (PA 641) and Gilmore Road (Navy Gate) (22)*

  The intersection is a stop-controlled T-intersection with free movements on the eastbound and westbound approaches. It is used mainly by employees of the Navy Depot. There are no crosswalks present at this intersection.



LEGEND

- Study Intersection Signalized
- Study Intersection Unsignalized

N

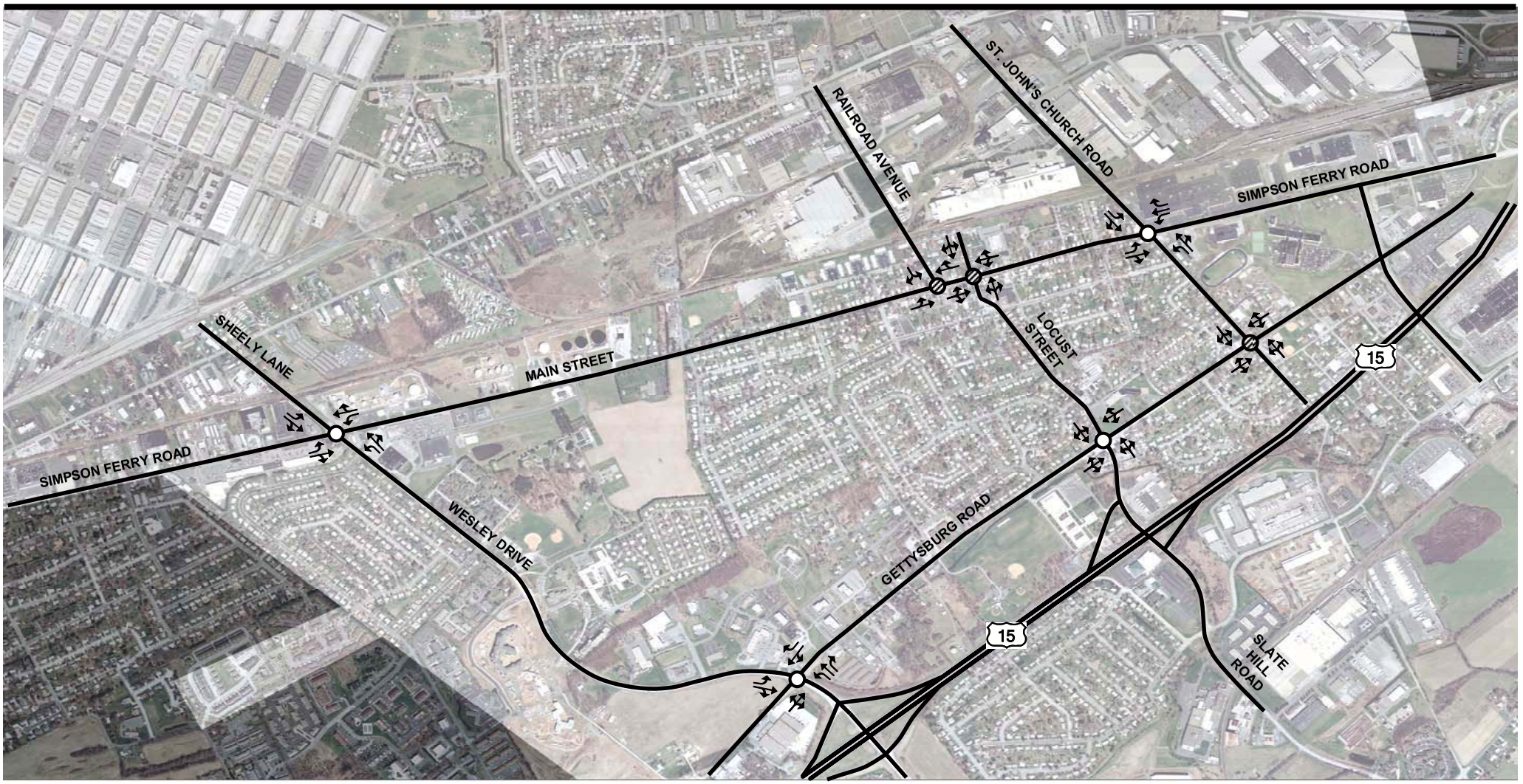
FIGURE # 2.1a

Existing Conditions

Location: ***Cumberland County, Pennsylvania***

McCormick Taylor
Engineers & Planners Since 1946

MATCH TO PREVIOUS SHEET



LEGEND

- Study Intersection Signalized
- Study Intersection Unsignalized

N

FIGURE # 2.1b
Existing Conditions

Location: *Cumberland County, Pennsylvania*

McCormick Taylor
Engineers & Planners Since 1946

B. Pedestrian Network

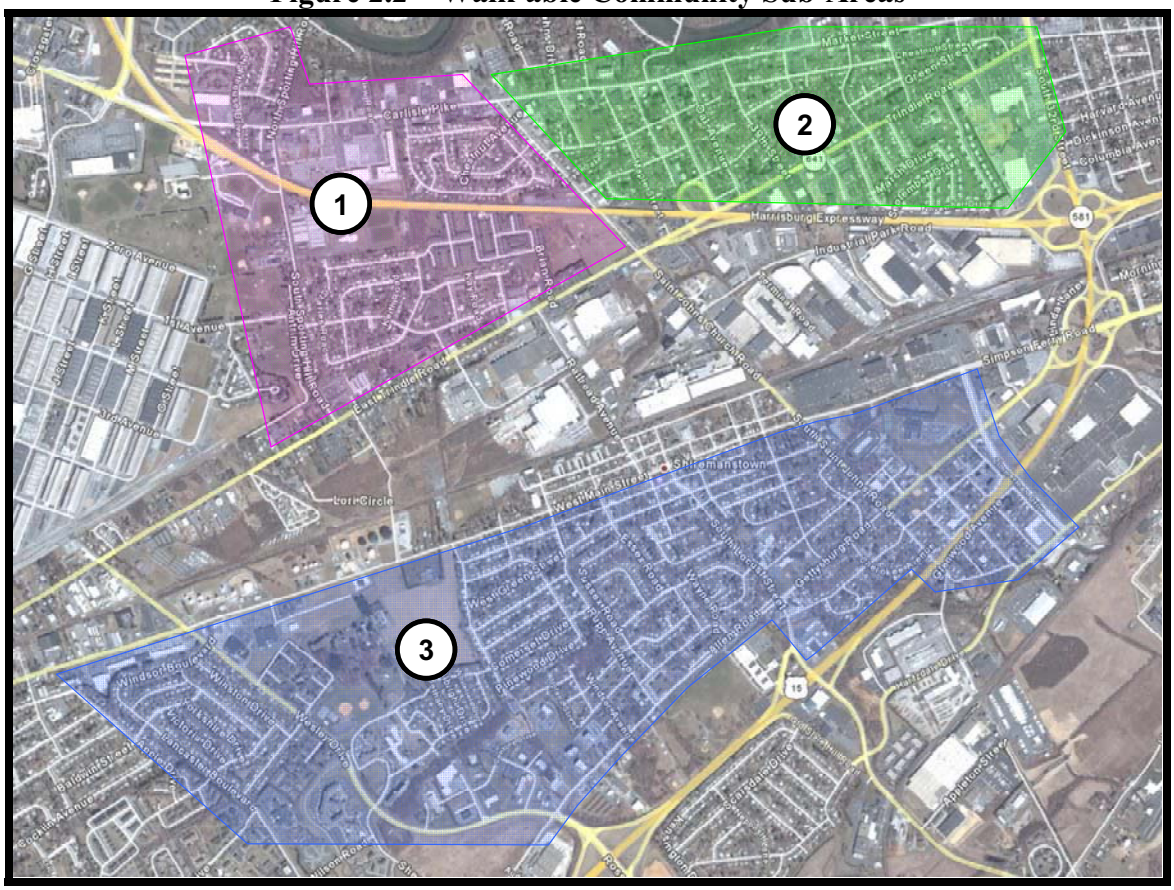
As part of the overall project goals, an in-depth evaluation of the existing pedestrian network was undertaken to develop recommendations for construction of sidewalks to better facilitate the interaction between pedestrians and transit and also to create a walk-able community. A walk-able community can be defined in various ways, but generally it is where people of all ages and ability have access to their community "on foot" and there is not a reliance on the automobile.

Characteristics of a walk-able community can be as follows:

- Continuous Systems/Connectivity. Provide a complete system of interconnected streets, pedestrian walkways, and other pedestrian facilities to increase pedestrian travel.
- Shortened Trips and Convenient Access. Provide connections between popular origins and destinations, between dead-end streets or cul-de-sacs, or as shortcuts through open spaces.
- Linkages to a Variety of Land Uses/Regional Connectivity. Provide pedestrian circulation and access to shopping malls, transit, downtown, schools, parks, offices, mixed-use developments, and other communities within the region.
- Coordination between Jurisdictions – put pedestrian facilities in place to meet current and future needs by ensuring close coordination between jurisdictions and other modes of transportation. Maintain close coordination and cooperation with the state transportation department.
- Pedestrian-Supportive Land-Use Patterns. Use a grid street layout with short blocks in business districts and downtowns to enhance pedestrian mobility.
- Well-Functioning Facilities. Ensure adequate width and sight distance, accessible grades, and alignment to avoid blind corners for all pedestrian facilities. Make sure common problems, such as poor drainage, are avoided.
- Designated Space. Delineate, sign, and mark pedestrian facilities, as appropriate.
- Security and Visibility. Design walkways to ensure a secure environment for pedestrians. Lighting, increased visibility, open sight-lines, and access to police and emergency vehicles are important considerations.
- Automobiles are Not the Only Consideration. Design streets to accommodate all modes of transportation. Reduce or manage parking supply using methods that encourage walking.
- Accessible and Appropriately Located Transit. Situate transit facilities adjacent to work, residential areas, shopping, and recreational facilities to encourage pedestrian trips. Transit stops and centers should typically be located in areas of supporting densities. Providing adequate pedestrian facilities to access transit is essential to its success as an alternate mode of travel.
- Pedestrian Furnishings. Provide furnishings, such as benches, restrooms, drinking fountains, artwork, architectural fountains (especially for play!), and other similar elements to create more attractive and functional environments for pedestrians.
- Proper Maintenance. Provide frequent cleanup and repair on a regular basis to ensure continued use of areas by pedestrians.

To evaluate the walk-able community concepts and to provide guidance for making the decisions for planned sidewalk, data regarding the location of existing sidewalks was gathered. Information regarding the local transit system and existing land-uses for the region was also obtained to define the community and to determine where additional sidewalk connections would be best served. This data was used to target sub-areas where further sidewalk construction would be beneficial in creating a walk-able community. These sub-areas are shown in **Figure 2.2**.

Figure 2.2 – Walk-able Community Sub-Areas



Existing sidewalk was mapped using both field data and aerial imagery. The sidewalk mapped in the field together with the aerial imagery allowed the development of an existing sidewalk network. The existing sidewalk network is shown in **Figure 2.3**.

Figure 2.3 – Existing Sidewalk Locations

In addition to the existing sidewalk locations, the existing transit service location has a large influence on the walk-able community concept. Lastly, existing land-use also contributes to the development of recommendations for proposed sidewalk locations in the area. The area is a mix of commercial, industrial, residential, and retail that can all be linked via sidewalk. By linking these various land-uses with sidewalk, a walk-able community can be achieved. A completed sidewalk network for each of the three zones would link the residential areas with places of work, to grocery stores, retail locations, restaurants, and transit.

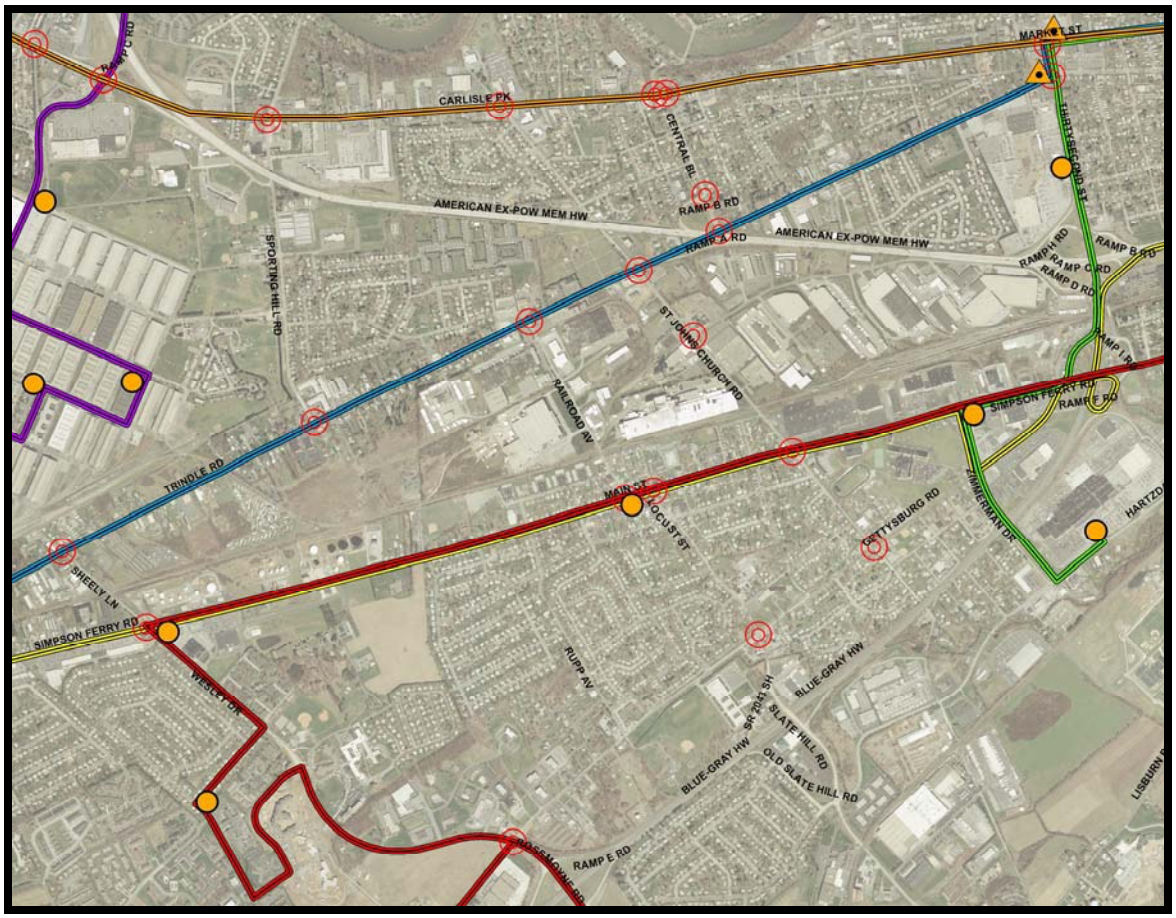
C. Transit Service

Within the study area, the local transit service is provided by the Cumberland-Dauphin-Harrisburg Transit Authority (a.k.a. Capital Area Transit, or CAT). CAT currently has two divisions – a Fixed Route Bus Division and a Shared Ride/Paratransit Division. CAT operates numerous routes throughout the Capital Area, which provide weekday, and Saturday services. Within the study area, there are five CAT bus routes. These routes are mapped in **Figure 2.4**:

- Route 81 (shown in purple)
- Route B (shown in red)
- Route C (shown in orange)
- Route D (shown in green)
- Route M (shown in blue)
- Route MX (shown in yellow)

The routes provide service Monday through Friday from about 6:00AM to 7:00PM and Saturdays from about 7:30AM to 5:30PM. The bus stop locations in **Figure 2.4** are represented by orange circles with an orange triangle representing a transfer location between bus routes. The location of the bus routes and their individual stops in relation to the existing sidewalk infrastructure was an important consideration as locations for future sidewalk where developed. For specific information on a particular bus route, refer to the CAT westbound site at **www.cattransit.com**.

Figure 2.4 – Existing Bus Routes and Bus Stops



D. Traffic Data

In order to determine the overall quality of current traffic operations, traffic data was collected including, intersection counts, a truck-following O-D study, and interviews with trucking companies.

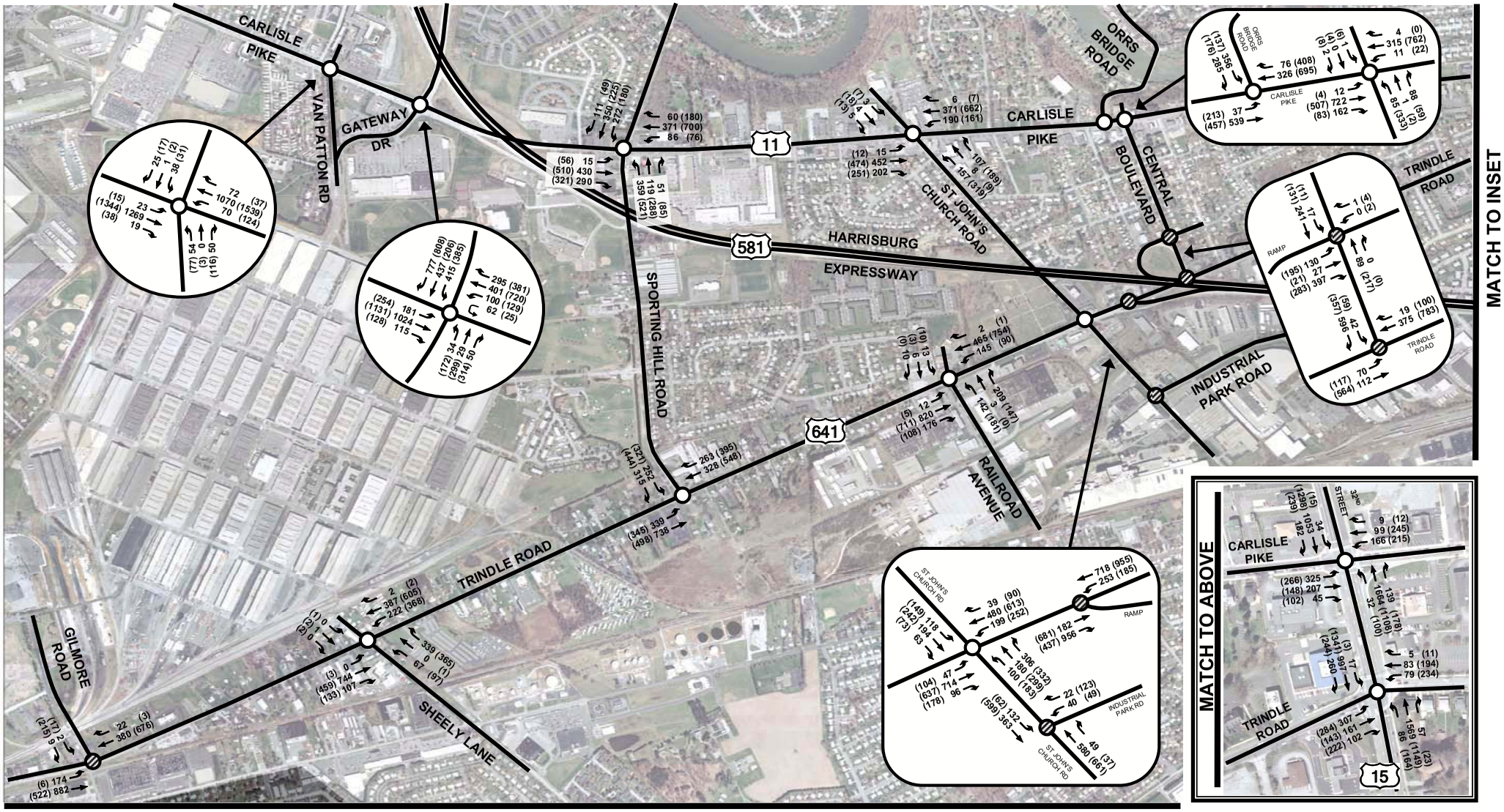
1. Intersection Counts

Manual intersection turning movement counts were collected at twenty-two (22) locations (the study intersections from Section A) during one hour of the AM and PM peak periods.

Peak AM Hour:	*7:00AM – 8:00 AM*
Peak PM Hour:	*4:00PM – 5:00 PM*

The manual counts summarized automobile, truck, and pedestrian movements by approach. The traffic data collection was performed by a sub consultant, Design Support Services. This task also included summarizing the count data to develop the truck percentages, the

peak hour factor, and the existing base year AM and PM peak hour volumes. Volume figures (**Figure 2.5** and **Figure 2.6**) were developed for the existing weekday AM and PM peak hour turning movements. Additionally, the existing Level of Service (LOS) is included in **Figures 2.7** and **2.8**. The intersection count sheets are included in Technical Files, Section 1.



LEGEND

- Study Intersection Signalized
- Study Intersection Unsignalized
- AM (PM) Turning Movement Traffic Volume

N

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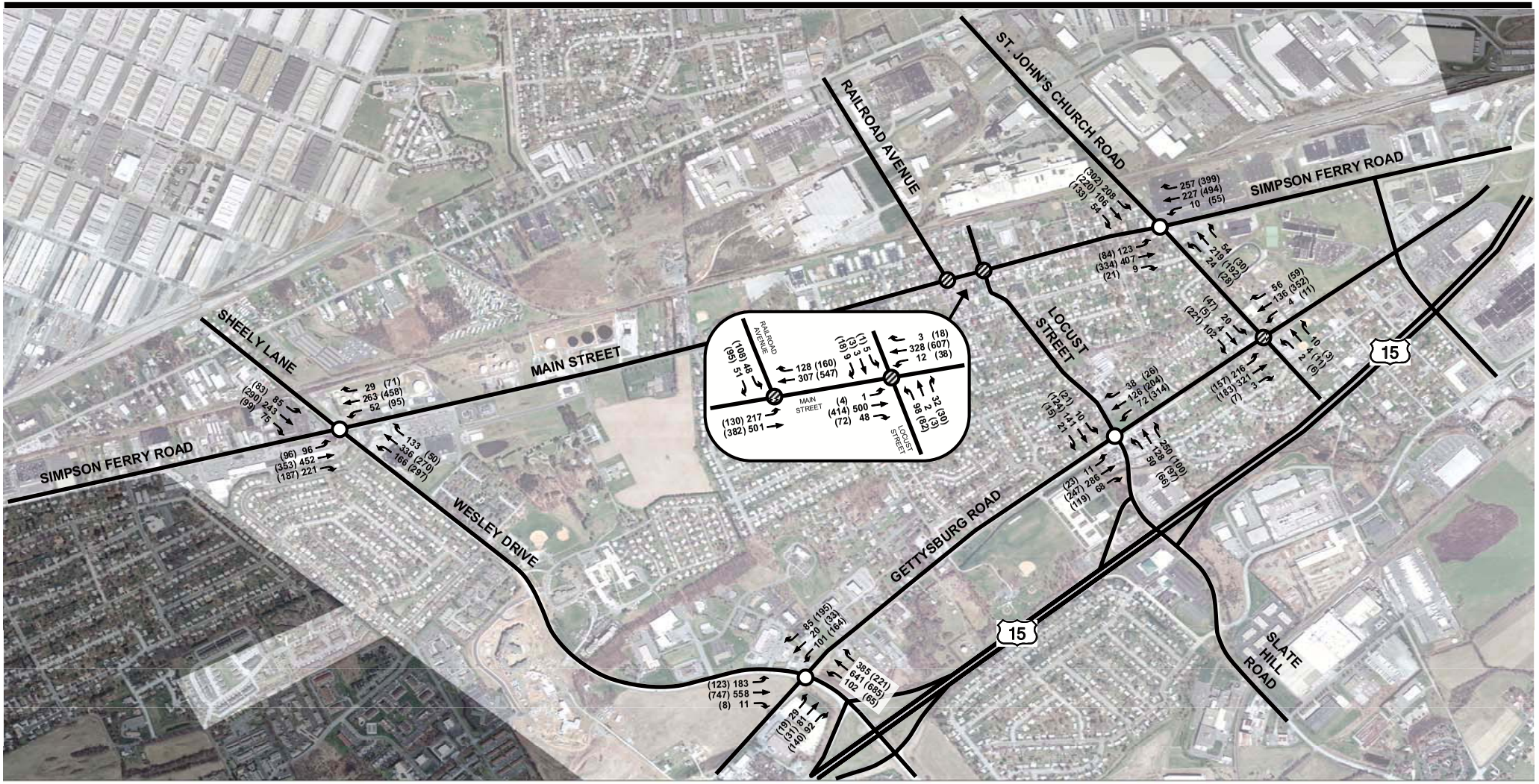
FIGURE # 2.5 Turning Movements Total Vehicles

Existing Conditions

Location: *Cumberland County, Pennsylvania*

MATCH TO PREVIOUS SHEET



LEGEND

- Study Intersection Signalized
- Study Intersection Unsignalized
- AM (PM) Turning Movement Traffic Volume

N

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FIGURE # 2.6 Turning Movements Total Vehicles

Existing Conditions

Location: *Cumberland County, Pennsylvania*