pennsylvania
DEPARTMENT OF TRANSPORTATION

Traffic Design Report (APPENDICES)
Route 228 Mars RR Bridge West Expansion

ECMS Project #E03625

02.13.2018

PennDOT Engineering District 10, Butler County

Cranberry Township, Adams Township, and Seven Fields Borough

WRA

List of Appendices

Appendix A

Traffic Volume Data

Contents:

- Average Daily Traffic (ADT) Counts
- Intersection Turning Movement Counts (Weekday AM/PM)
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Appendix A1:

Average Daily Traffic (ADT) Counts

Average Daily Traffic (ADT) Data Summary

Project: *SR 228 - Widening Project*
Location: *SR 228 b/w Franklin St & Beaver Ext Dr*
Direction: *Eastbound*

Work Order: *35004*
ADT Site Code: *#1*
Compiled By: *LNW*
Reviewed By: *XW*

Start Time	Mon	Tue	Wed	Thu 10/6/2016	Fri 10/7/2016	Sat 10/8/2016	Sun 10/9/2016	Mon 10/10/2016	Tue 10/11/2016	Wed 10/12/2016	Thu	Fri	Sat	Sun	Avg Daily (7-Day)	Avg Wkdy (Tue-Thu)	Avg Friday	Avg Saturday	Avg Sunday
12:00 AM				89	96	151	186	72	78	68					106	78	96	151	186
01:00				43	64	104	84	38	48	52					62	48	64	104	84
02:00				38	49	56	51	32	37	39					43	38	49	56	51
03:00				36	38	38	32	32	39	41					37	39	38	38	32
04:00				58	52	36	25	48	49	50					45	52	52	36	25
05:00				167	172	77	53	160	167	164					137	166	172	77	53
06:00				424	398	152	92	379	431	388					323	414	398	152	92
07:00				611	602	265	154	540	616	623					487	617	602	265	154
08:00				**718**	**721**	395	284	**647**	**741**	**714**					**603**	**724**	**721**	395	284
09:00				640	672	**575**	**420**	541	628	670					592	646	672	**575**	**420**
10:00				680	665	724	588	571	678	677					655	678	665	724	588
11:00				758	818	770	793	740	794	779					779	777	818	770	793
12:00 PM				**881**	917	905	**954**	796	815	825					870	840	917	905	**954**
01:00				860	938	**1,051**	952	799	869	**912**					**912**	880	938	**1,051**	952
02:00				879	**1,050**	980	736	**895**	**949**	867					908	**898**	**1,050**	980	736
03:00				1,115	1,074	916	834	1,091	998	1,048					1,011	1,054	1,074	916	834
04:00				1,104	1,101	932	782	1,147	1,175	**1,186**					1,061	1,155	1,101	932	782
05:00				**1,227**	**1,123**	942	**940**	**1,179**	**1,183**	1,156					**1,107**	**1,189**	**1,123**	942	**940**
06:00				1,161	1,112	**1,040**	707	991	1,094	1,070					1,025	1,108	1,112	**1,040**	707
07:00				953	848	822	604	816	863	892					828	903	848	822	604
08:00				727	645	706	463	612	640	710					643	692	645	706	463
09:00				544	535	555	274	401	481	453					463	493	535	555	274
10:00				283	399	368	150	254	288	274					288	282	399	368	150
11:00				182	305	274	97	129	133	174					185	163	305	274	97
Day Total	**0**	**0**	**0**	**14,178**	**14,394**	**12,834**	**10,255**	**12,910**	**13,794**	**13,832**	**0**	**0**	**0**	**0**	**13,171**	**13,935**	**14,394**	**12,834**	**10,255**
									87										
% Avg Daily	0%	0%	0%	108%	109%	97%	78%	98%	8100%	105%	0%	0%	0%	0%	**100%**	106%	109%	97%	78%
% Avg WkDay	0%	0%	0%	102%	103%	92%	74%	93%	7100%	99%	0%	0%	0%	0%	95%	**100%**	103%	92%	74%
AM Peak Volume	0	0	0	718	721	575	420	647	741	714	0	0	0	0	603	724	721	575	420
MID Peak Volume	0	0	0	881	1050	1051	954	895	949	912	0	0	0	0	912	898	1050	1051	954
PM Peak Volume	0	0	0	1227	1123	1040	940	1179	1183	1186	0	0	0	0	1107	1189	1123	1040	940

Avg Wkdy ADT:	**13,935**	**AADT Adjust:**	**0.962**	**AADT:** **13,400**

NOTES: *2015 October AADT Adjustment Factor For: TPG 3 Urban - Other Principal Arterials*

Average Daily Traffic (ADT) Data Summary

Project: *SR 228 - Widening Project*
Location: *SR 228 b/w Franklin St & Beaver Ext Dr*
Direction: *Westbound*

Work Order: *35004*
ADT Site Code: *#1*
Compiled By: *LNW*
Reviewed By: *XW*

Start Time	Mon	Tue	Wed	Thu 10/6/2016	Fri 10/7/2016	Sat 10/8/2016	Sun 10/9/2016	Mon 10/10/2016	Tue 10/11/2016	Wed 10/12/2016	Thu	Fri	Sat	Sun	Avg Daily (7-Day)	Avg Wkdy (Tue-Thu)	Avg Friday	Avg Saturday	Avg Sunday
12:00 AM				54	39	78	103	33	43	54					58	50	39	78	103
01:00				21	24	48	46	31	21	31					32	24	24	48	46
02:00				41	33	30	56	28	24	33					35	33	33	30	56
03:00				65	59	32	35	60	63	67					54	65	59	32	35
04:00				143	142	60	35	147	144	160					119	149	142	60	35
05:00				422	399	129	78	414	451	438					333	437	399	129	78
06:00				1,017	953	225	158	854	1,018	984					744	1,006	953	225	158
07:00				**1,124**	**1,125**	434	364	**1,086**	**1,138**	**1,089**					**909**	**1,117**	**1,125**	434	364
08:00				1,075	1,048	651	463	997	1,056	1,043					905	1,058	1,048	651	463
09:00				934	902	**945**	**873**	860	904	937					908	925	902	**945**	**873**
10:00				763	791	994	886	816	808	826					841	799	791	994	886
11:00				877	**993**	996	**1,027**	815	817	823					907	839	**993**	996	**1,027**
12:00 PM				**939**	988	**1,053**	891	**895**	**921**	**897**					**941**	**919**	988	**1,053**	891
01:00				834	894	938	674	823	783	873					831	830	894	938	674
02:00				848	808	882	699	747	794	750					790	797	808	882	699
03:00				811	928	942	628	850	886	857					843	851	928	942	628
04:00				**964**	**930**	933	**819**	**887**	**916**	947					**914**	**942**	**930**	933	**819**
05:00				953	917	**1,004**	670	869	891	**955**					894	933	917	**1,004**	670
06:00				810	844	707	541	731	776	785					742	790	844	707	541
07:00				656	651	599	431	541	567	595					577	606	651	599	431
08:00				476	473	479	387	366	380	412					425	423	473	479	387
09:00				308	495	397	178	267	240	261					307	270	495	397	178
10:00				187	306	319	115	151	156	145					197	163	306	319	115
11:00				106	150	213	90	74	84	79					114	90	150	213	90
Day Total	**0**	**0**	**0**	**14,428**	**14,892**	**13,088**	**10,247**	**13,342**	**13,881**	**14,041**	**0**	**0**	**0**	**0**	**13,417**	**14,117**	**14,892**	**13,088**	**10,247**
% Avg Daily	0%	0%	0%	108%	111%	98%	76%	99%	103%	105%	0%	0%	0%	0%	**100%**	105%	111%	98%	76%
% Avg WkDay	0%	0%	0%	102%	105%	93%	73%	95%	98%	99%	0%	0%	0%	0%	95%	**100%**	105%	93%	73%
AM Peak Volume	0	0	0	1124	1125	945	873	1086	1138	1089	0	0	0	0	909	1117	1125	945	873
MID Peak Volume	0	0	0	939	993	1053	1027	895	921	897	0	0	0	0	941	919	993	1053	1027
PM Peak Volume	0	0	0	964	930	1004	819	887	916	955	0	0	0	0	914	942	930	1004	819

Avg Wkdy ADT: **14,117**

AADT Adjust: **0.962**

AADT: **13,600**

NOTES: *2015 October AADT Adjustment Factor For: TPG 3 Urban - Other Principal Arterials*

Average Daily Traffic (ADT) Data Summary

Project: *SR 228 - Widening Project*
Location: *SR 228 b/w Franklin St & Beaver Ext Dr*
Direction: *Combined EB & WB*

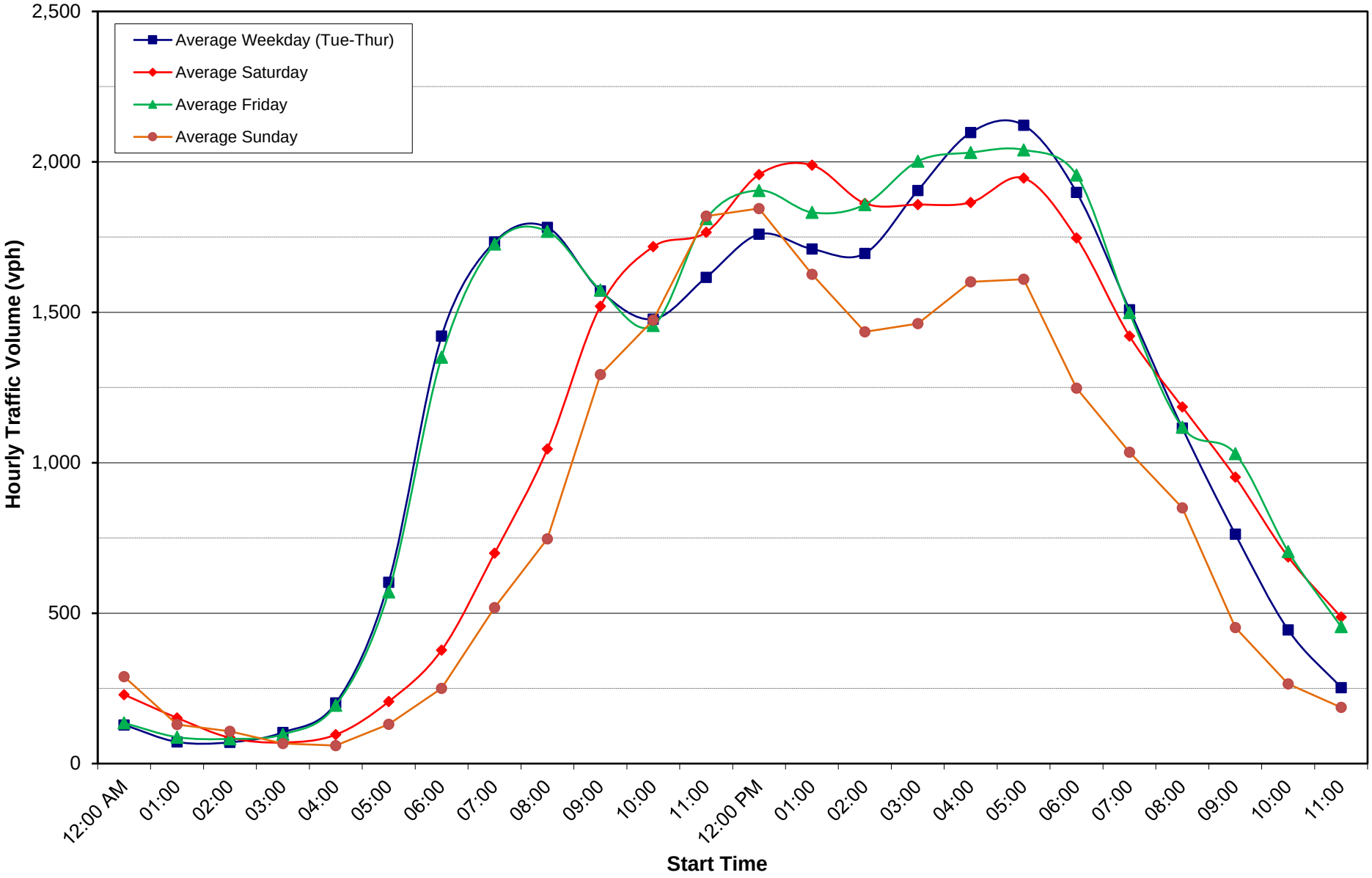
Work Order: *35004*
ADT Site Code: *#1*
Compiled By: *LNW*
Reviewed By: *XW*

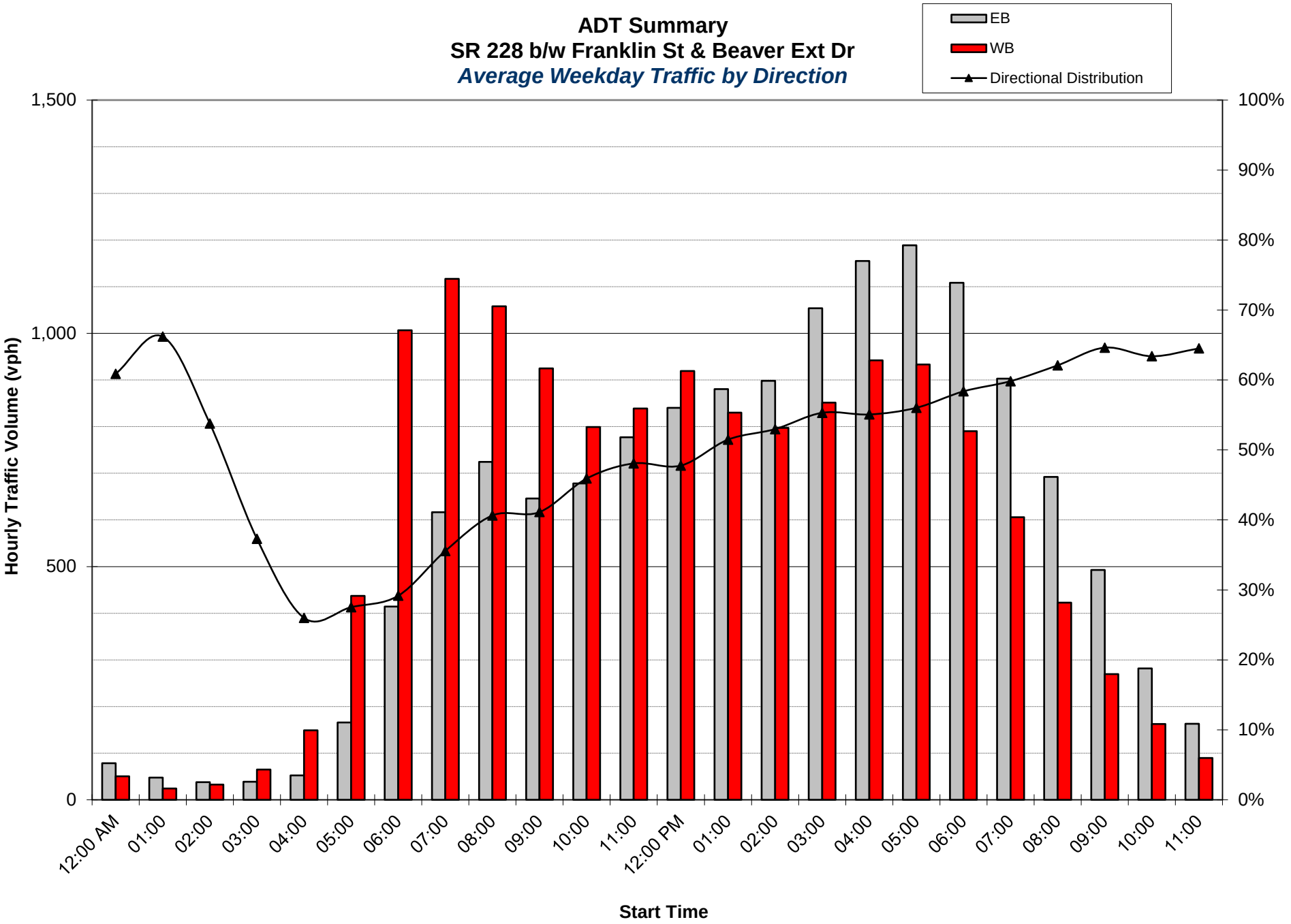
Start	Average Daily (7-Day)				Average Weekday (Tue-Thur)				Average Friday				Average Saturday				Average Sunday			
Time	EB	WB	Total	Dir Dist	EB	WB	Total	Dir Dist	EB	WB	Total	Dir Dist	EB	WB	Total	Dir Dist	EB	WB	Total	Dir Dist
12:00 AM	106	58	**163**	**65%**	78	50	**129**	**61%**	96	39	**135**	**71%**	151	78	**229**	**66%**	186	103	**289**	**64%**
01:00	62	32	**94**	**66%**	48	24	**72**	**66%**	64	24	**88**	**73%**	104	48	**152**	**68%**	84	46	**130**	**65%**
02:00	43	35	**78**	**55%**	38	33	**71**	**54%**	49	33	**82**	**60%**	56	30	**86**	**65%**	51	56	**107**	**48%**
03:00	37	54	**91**	**40%**	39	65	**104**	**37%**	38	59	**97**	**39%**	38	32	**70**	**54%**	32	35	**67**	**48%**
04:00	45	119	**164**	**28%**	52	149	**201**	**26%**	52	142	**194**	**27%**	36	60	**96**	**38%**	25	35	**60**	**42%**
05:00	137	333	**470**	**29%**	166	437	**603**	**28%**	172	399	**571**	**30%**	77	129	**206**	**37%**	53	78	**131**	**40%**
06:00	323	744	**1,068**	**30%**	414	1,006	**1,421**	**29%**	398	953	**1,351**	**29%**	152	225	**377**	**40%**	92	158	**250**	**37%**
07:00	487	**909**	**1,396**	**35%**	617	**1,117**	**1,734**	**36%**	602	**1,125**	**1,727**	**35%**	265	434	**699**	**38%**	154	364	**518**	**30%**
08:00	**603**	905	**1,508**	**40%**	**724**	1,058	**1,782**	**41%**	**721**	1,048	**1,769**	**41%**	395	651	**1,046**	**38%**	284	463	**747**	**38%**
09:00	592	908	**1,500**	**39%**	646	925	**1,571**	**41%**	672	902	**1,574**	**43%**	**575**	**945**	**1,520**	**38%**	**420**	**873**	**1,293**	**32%**
10:00	655	841	**1,495**	**44%**	678	799	**1,477**	**46%**	665	791	**1,456**	**46%**	724	994	**1,718**	**42%**	588	886	**1,474**	**40%**
11:00	779	907	**1,686**	**46%**	777	839	**1,616**	**48%**	818	**993**	**1,811**	**45%**	770	996	**1,766**	**44%**	793	**1,027**	**1,820**	**44%**
12:00 PM	870	**941**	**1,811**	**48%**	840	**919**	**1,759**	**48%**	917	988	**1,905**	**48%**	905	**1,053**	**1,958**	**46%**	**954**	891	**1,845**	**52%**
01:00	**912**	831	**1,743**	**52%**	880	830	**1,710**	**51%**	938	894	**1,832**	**51%**	**1,051**	938	**1,989**	**53%**	952	674	**1,626**	**59%**
02:00	908	790	**1,698**	**53%**	**898**	797	**1,696**	**53%**	**1,050**	808	**1,858**	**57%**	980	882	**1,862**	**53%**	736	699	**1,435**	**51%**
03:00	1,011	843	**1,854**	**55%**	1,054	851	**1,905**	**55%**	1,074	928	**2,002**	**54%**	916	942	**1,858**	**49%**	834	628	**1,462**	**57%**
04:00	1,061	**914**	**1,975**	**54%**	1,155	**942**	**2,097**	**55%**	1,101	**930**	**2,031**	**54%**	932	933	**1,865**	**50%**	782	**819**	**1,601**	**49%**
05:00	**1,107**	894	**2,001**	**55%**	**1,189**	933	**2,122**	**56%**	**1,123**	917	**2,040**	**55%**	942	**1,004**	**1,946**	**48%**	**940**	670	**1,610**	**58%**
06:00	1,025	742	**1,767**	**58%**	1,108	790	**1,899**	**58%**	1,112	844	**1,956**	**57%**	**1,040**	707	**1,747**	**60%**	707	541	**1,248**	**57%**
07:00	828	577	**1,405**	**59%**	903	606	**1,509**	**60%**	848	651	**1,499**	**57%**	822	599	**1,421**	**58%**	604	431	**1,035**	**58%**
08:00	643	425	**1,068**	**60%**	692	423	**1,115**	**62%**	645	473	**1,118**	**58%**	706	479	**1,185**	**60%**	463	387	**850**	**54%**
09:00	463	307	**770**	**60%**	493	270	**762**	**65%**	535	495	**1,030**	**52%**	555	397	**952**	**58%**	274	178	**452**	**61%**
10:00	288	197	**485**	**59%**	282	163	**444**	**63%**	399	306	**705**	**57%**	368	319	**687**	**54%**	150	115	**265**	**57%**
11:00	185	114	**299**	**62%**	163	90	**253**	**65%**	305	150	**455**	**67%**	274	213	**487**	**56%**	97	90	**187**	**52%**
Day Total	13,171	13,417	**26,588**	**50%**	13,935	14,117	**28,051**	**50%**	14,394	14,892	**29,286**	**49%**	12,834	13,088	**25,922**	**50%**	10,255	10,247	**20,502**	**50%**
% Avg Daily	100%	100%	**100%**	**-**	106%	105%	**106%**	**-**	109%	111%	**110%**	**-**	97%	98%	**97%**	**-**	78%	76%	**77%**	**-**
% Avg WkDay	95%	95%	**95%**	**-**	100%	100%	**100%**	**-**	103%	105%	**104%**	**-**	92%	93%	**92%**	**-**	74%	73%	**73%**	**-**
AM Peak Volume	603	909	**1508**	-	724	1117	**1782**	-	721	1125	**1769**	-	575	945	**1520**	-	420	873	**1293**	-
MD Peak Volume	912	941	**1811**	-	898	919	**1759**	-	1050	993	**1905**	-	1051	1053	**1989**	-	954	1027	**1845**	-
PM Peak Volume	1107	914	**2001**	-	1189	942	**2122**	-	1123	930	**2040**	-	1040	1004	**1946**	-	940	819	**1610**	-

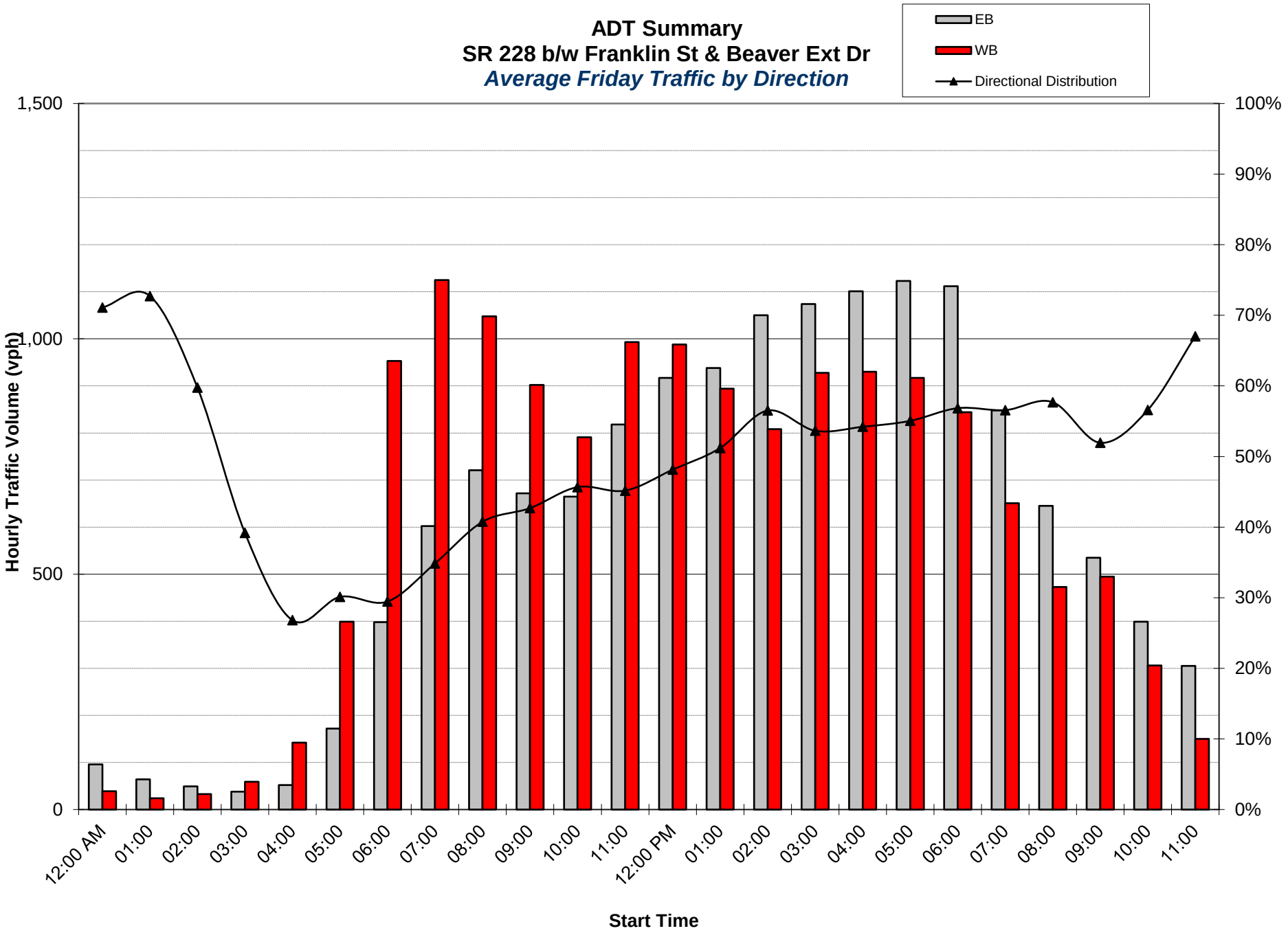
Avg Wkdy ADT:	**28,051**
AADT Adjust:	**0.962**
AADT:	**27,000**

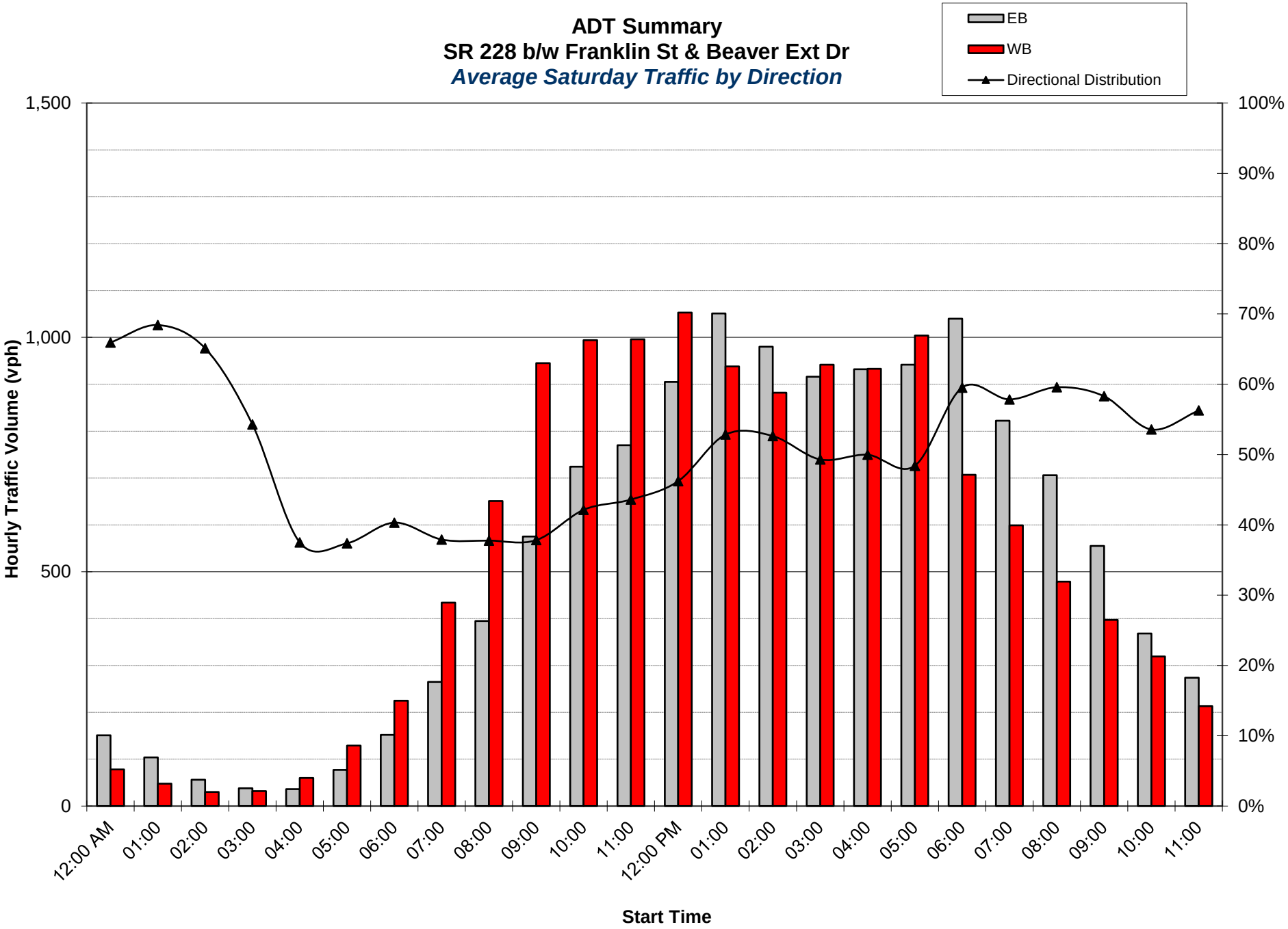
NOTES: *2015 October AADT Adjustment Factor For: TPG 3 Urban - Other Principal Arterials*

ADT Summary
SR 228
Two-Way Hourly Volumes by Day

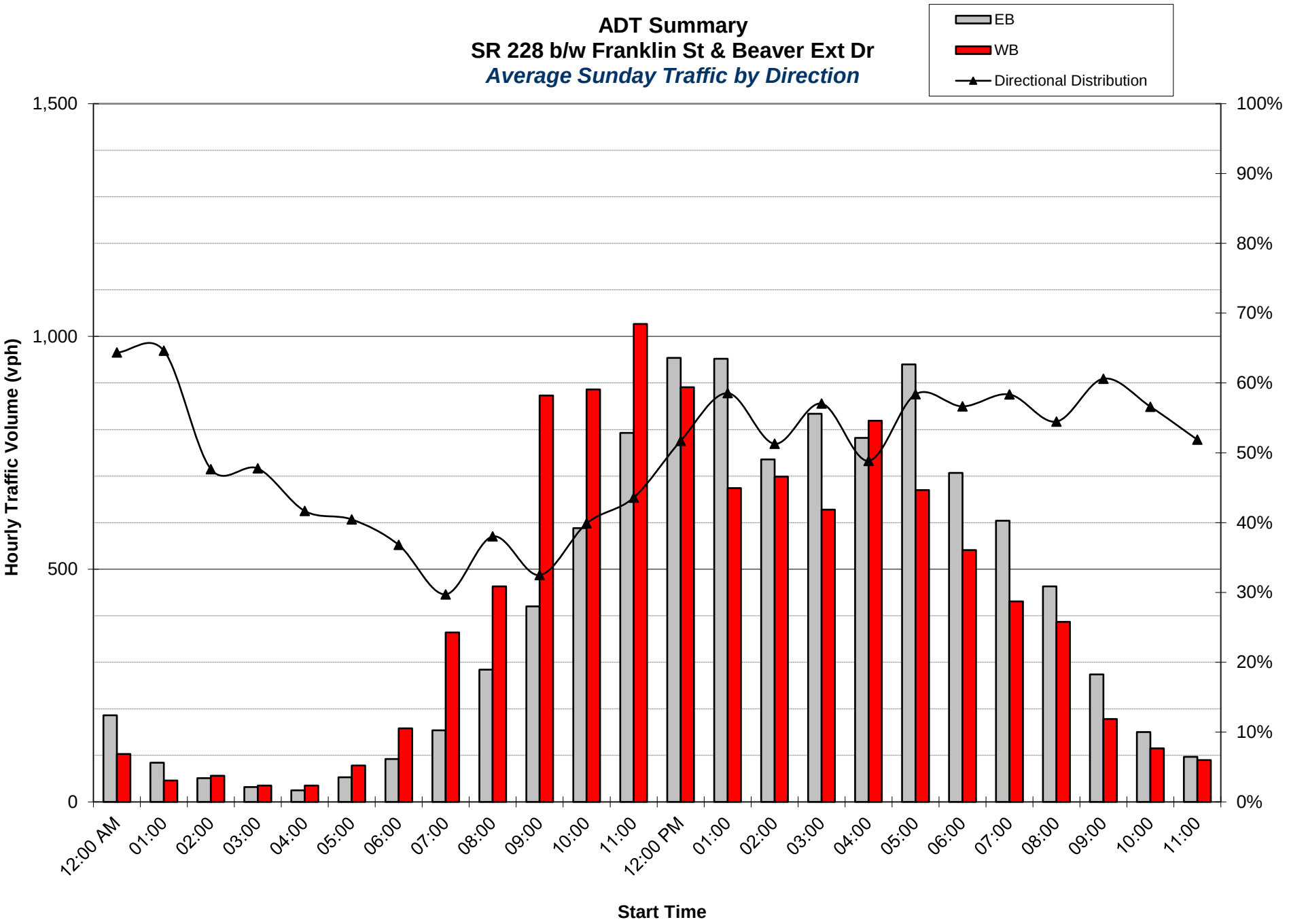



ADT Summary
SR 228 b/w Franklin St & Beaver Ext Dr
Average Weekday Traffic by Direction
EB
WB
Directional Distribution
Hourly Traffic Volume (vph)
1,500
1,000
500
0
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
12:00 AM
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00 PM
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
Start Time


ADT Summary
SR 228 b/w Franklin St & Beaver Ext Dr
Average Friday Traffic by Direction
EB
WB
Directional Distribution
1,500
1,000
500
0
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Hourly Traffic Volume (vph)
12:00 AM
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00 PM
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
Start Time


ADT Summary
SR 228 b/w Franklin St & Beaver Ext Dr
Average Saturday Traffic by Direction
EB
WB
Directional Distribution
Hourly Traffic Volume (vph)
1,500
1,000
500
0
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
12:00 AM
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00 PM
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
Start Time

ADT Summary
SR 228 b/w Franklin St & Beaver Ext Dr
Average Sunday Traffic by Direction



Appendix A2:

Intersection Turning Movement Counts (Weekday AM/PM)

WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Franklin Rd
Cloudy & 50's
Counted by WRA

File Name : 225 - SR 228 @ Franklin Rd 10-11-2016
Site Code : 225
Start Date : 10/11/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Franklin Rd Northbound					Franklin Rd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	4	120	7	0	131	8	271	33	0	312	9	9	12	0	30	10	48	6	0	64	537
07:15 AM	7	163	20	0	190	7	253	37	0	297	7	26	10	0	43	15	65	18	0	98	628
07:30 AM	12	161	39	0	212	10	223	51	0	284	11	46	20	0	77	21	85	14	0	120	693
07:45 AM	18	185	13	0	216	13	283	61	0	357	20	23	21	0	64	15	93	24	0	132	769
Total	41	629	79	0	749	38	1030	182	0	1250	47	104	63	0	214	61	291	62	0	414	2627
08:00 AM	23	198	14	0	235	9	239	57	0	305	27	32	28	0	87	11	94	11	0	116	743
08:15 AM	19	191	9	0	219	15	227	57	0	299	37	43	43	0	123	10	84	16	0	110	751
08:30 AM	7	206	11	0	224	10	208	23	0	241	19	25	26	0	70	7	62	20	0	89	624
08:45 AM	9	153	14	0	176	7	223	29	0	259	14	16	15	0	45	16	44	19	0	79	559
Total	58	748	48	0	854	41	897	166	0	1104	97	116	112	0	325	44	284	66	0	394	2677
04:00 PM	24	249	49	0	322	21	206	21	0	248	35	46	23	0	104	18	28	31	0	77	751
04:15 PM	14	219	38	0	271	16	218	36	0	270	27	64	19	0	110	12	48	26	0	86	737
04:30 PM	18	205	75	0	298	12	217	39	0	268	51	61	32	0	144	10	48	44	0	102	812
04:45 PM	19	250	63	0	332	18	249	35	0	302	47	69	36	0	152	14	38	14	0	66	852
Total	75	923	225	0	1223	67	890	131	0	1088	160	240	110	0	510	54	162	115	0	331	3152
05:00 PM	10	243	57	0	310	20	278	28	0	326	47	90	32	0	169	15	30	15	0	60	865
05:15 PM	12	249	85	0	346	18	214	21	0	253	43	92	26	0	161	14	44	22	0	80	840
05:30 PM	22	271	65	0	358	15	200	29	0	244	38	77	26	0	141	14	37	12	0	63	806
05:45 PM	18	223	65	0	306	22	163	33	0	218	62	77	20	0	159	12	57	18	0	87	770
Total	62	986	272	0	1320	75	855	111	0	1041	190	336	104	0	630	55	168	67	0	290	3281
Grand Total	236	3286					3672	590	0	4483	494	796	389	0	1679	214	905	310	0	1429	11737
Apprch %	5.7	79.3	15.1	0		4.9	81.9	13.2	0		29.4	47.4	23.2	0		15	63.3	21.7	0		
Total %	2	28	5.3	0	35.3	1.9	31.3	5	0	38.2	4.2	6.8	3.3	0	14.3	1.8	7.7	2.6	0	12.2	
Lights	229	3086	611	0	3926	217	3485	577	0	4279	478	777	374	0	1629	207	883	302	0	1392	11226
% Lights	97	93.9	97.9	0	94.7	98.2	94.9	97.8	0	95.4	96.8	97.6	96.1	0	97	96.7	97.6	97.4	0	97.4	95.6
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	7	200	13	0	220	4	187	13	0	204	16	19	15	0	50	7	22	8	0	37	511
% Trucks	3	6.1	2.1	0	5.3	1.8	5.1	2.2	0	4.6	3.2	2.4	3.9	0	3	3.3	2.4	2.6	0	2.6	4.4

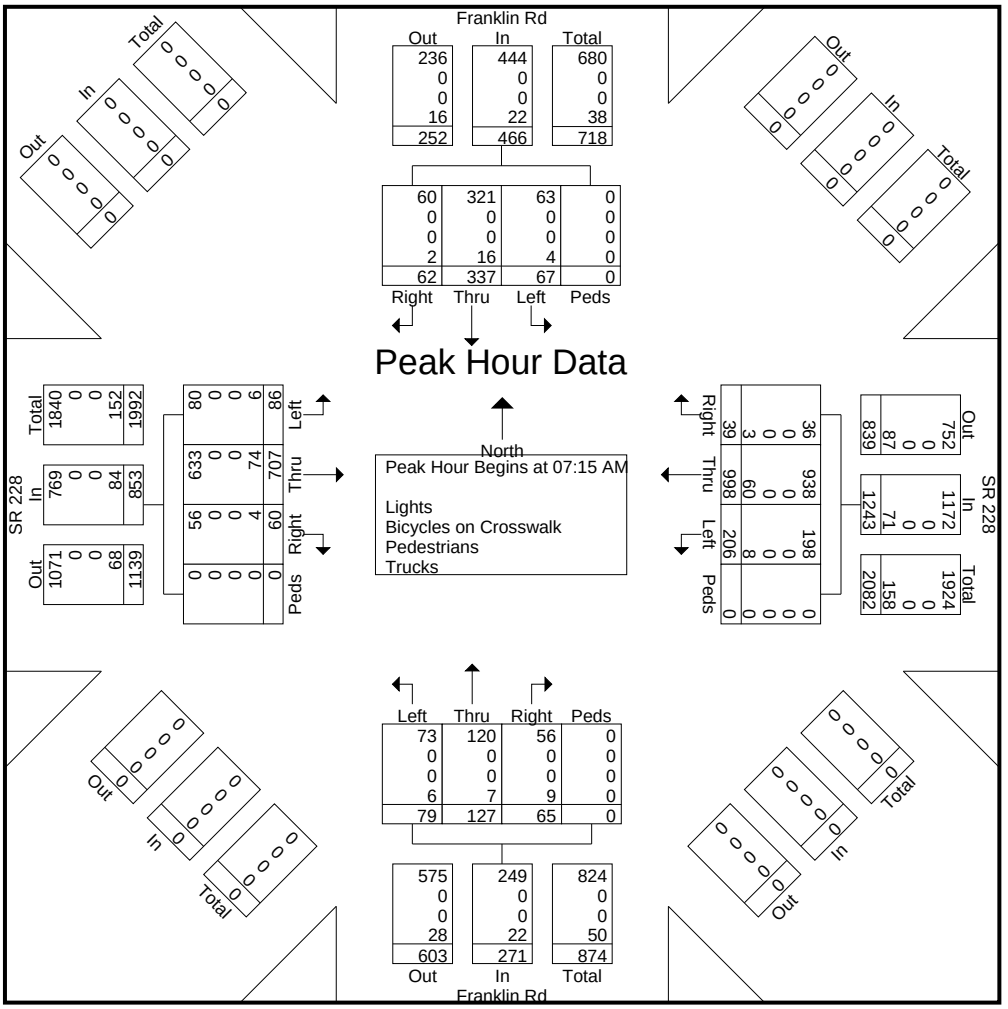
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Franklin Rd
Cloudy & 50's
Counted by WRA

File Name : 225 - SR 228 @ Franklin Rd 10-11-2016
Site Code : 225
Start Date : 10/11/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Franklin Rd Northbound					Franklin Rd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	7	163	20	0	190	7	253	37	0	297	7	26	10	0	43	15	65	18	0	98	628
07:30 AM	12	161	**39**									**46**				**21**					
07:45 AM	**18**	**185**	**13**	**0**	**216**	**13**	**283**	**61**	**0**	**357**	20	23	21	0	64	15	93	**24**	**0**	**132**	**769**
08:00 AM	**23**	**198**	14	0	**235**	9	239	57	0	305	**27**		**28**	0	**87**	11	**94**	11	0	116	743
Total Volume	60	707	86	0	853	39	998	206	0	1243	65	127	79	0	271	62	337	67	0	466	2833
% App. Total	7	82.9	10.1	0		3.1	80.3	16.6	0		24	46.9	29.2	0		13.3	72.3	14.4	0		
PHF	.652	.893	.551	.000	.907	.750	.882	.844	.000	.870	.602	.690	.705	.000	.779	.738	.896	.698	.000	.883	.921
Lights	56	633	80	0	769	36	938	198	0	1172	56	120	73	0	249	60	321	63	0	444	2634
% Lights	93.3	89.5	93.0	0	90.2	92.3	94.0	96.1	0	94.3	86.2	94.5	92.4	0	91.9	96.8	95.3	94.0	0	95.3	93.0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	4	74	6	0	84	3	60	8	0	71	9	7	6	0	22	2	16	4	0	22	199
% Trucks	6.7	10.5	7.0	0	9.8	7.7	6.0	3.9	0	5.7	13.8	5.5	7.6	0	8.1	3.2	4.7	6.0	0	4.7	7.0



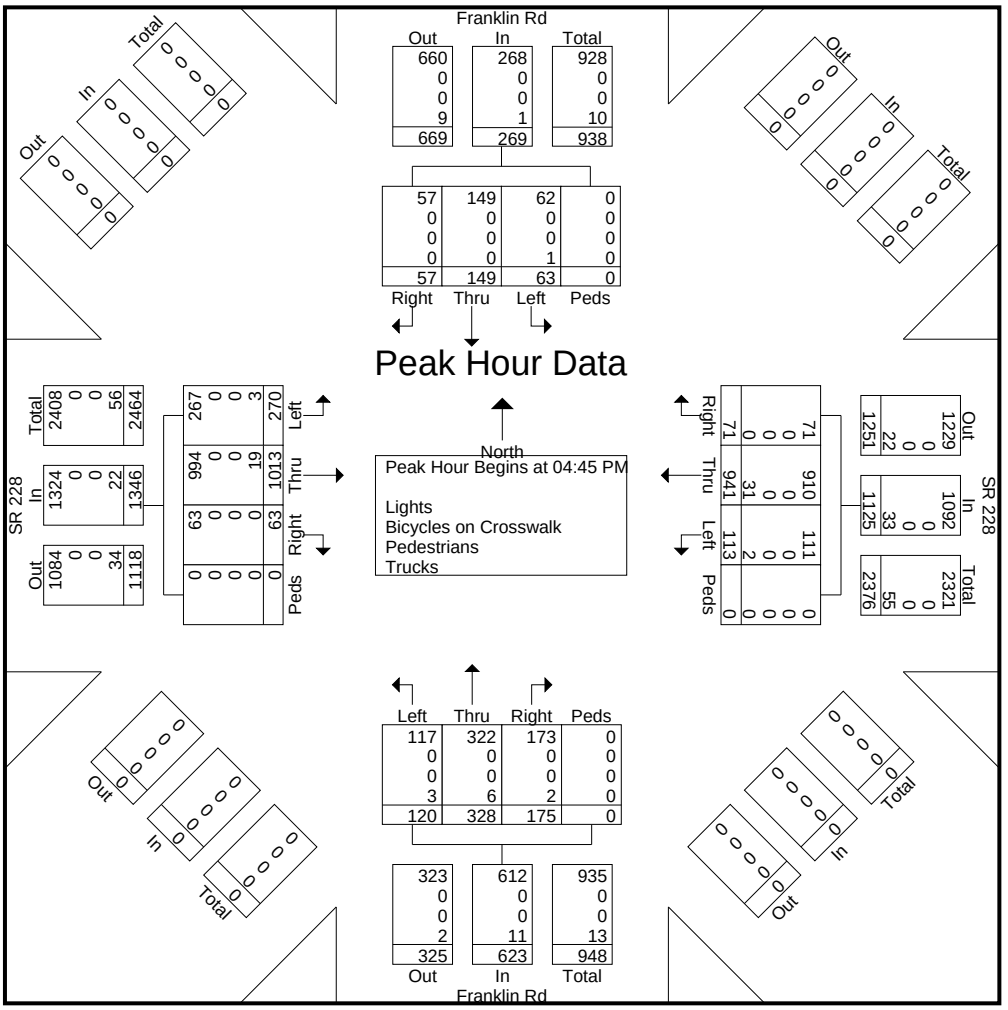
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Franklin Rd
Cloudy & 50's
Counted by WRA

File Name : 225 - SR 228 @ Franklin Rd 10-11-2016
Site Code : 225
Start Date : 10/11/2016
Page No : 3

	SR 228 Eastbound					SR 228 Westbound					Franklin Rd Northbound					Franklin Rd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	19	250	63	0	332	18	249	**35**			**47**		**36**	0	152	14	38	14	0	66	852
05:00 PM	10	243	57	0	310	**20**	**278**			**326**	47	90	32	0	**169**	**15**					**865**
05:15 PM	12	249	**85**									**92**					**44**	**22**		**80**	840
05:30 PM	**22**	**271**	65	0	**358**	15	200	29	0	244	38	77	26	0	141	14	37	12	0	63	806
Total Volume	63	1013	270	0	1346	71	941	113	0	1125	175	328	120	0	623	57	149	63	0	269	3363
% App. Total	4.7	75.3	20.1	0		6.3	83.6	10	0		28.1	52.6	19.3	0		21.2	55.4	23.4	0		
PHF	.716	.935	.794	.000	.940	.888	.846	.807	.000	.863	.931	.891	.833	.000	.922	.950	.847	.716	.000	.841	.972
Lights	63	994	267	0	1324	71	910	111	0	1092	173	322	117	0	612	57	149	62	0	268	3296
% Lights	100	98.1	98.9	0	98.4	100	96.7	98.2	0	97.1	98.9	98.2	97.5	0	98.2	100	100	98.4	0	99.6	98.0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	0	19	3	0	22	0	31	2	0	33	2	6	3	0	11	0	0	1	0	1	67
% Trucks	0	1.9	1.1	0	1.6	0	3.3	1.8	0	2.9	1.1	1.8	2.5	0	1.8	0	0	1.6	0	0.4	2.0



WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Castle Creek West
Cloudy & 50's
Counted by WRA

File Name : 230 - SR 228 @ Castle Creek West 10-11-2016
Site Code : 230
Start Date : 10/11/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Castle Creek West Northbound					High Point Dr Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	16	133	1	0	150	0	285	11	0	296	9	0	20	0	29	9	2	0	0	11	486
07:15 AM	19	146	1	0	166	0	294	20	0	314	7	1	13	0	21	3	1	0	0	4	505
07:30 AM	31	162	2	0	195	0	262	13	0	275	5	2	17	0	24	4	2	1	0	7	501
07:45 AM	53	175	4	0	232	0	276	35	0	311	11	4	37	0	52	4	8	3	0	15	610
Total	119	616	8	0	743	0	1117	79	0	1196	32	7	87	0	126	20	13	4	0	37	2102
08:00 AM	47	190	2	0	239	1	277	32	0	310	10	1	19	0	30	16	3	0	0	19	598
08:15 AM	42	205	2	0	249	1	284	23	0	308	12	0	25	0	37	5	6	1	0	12	606
08:30 AM	37	221	8	0	266	0	224	13	0	237	9	4	21	0	34	5	8	0	0	13	550
08:45 AM	25	149	2	0	176	0	240	14	0	254	7	2	18	0	27	4	5	0	0	9	466
Total	151	765	14	0	930	2	1025	82	0	1109	38	7	83	0	128	30	22	1	0	53	2220
04:00 PM	33	260	10	0	303	0	209	19	0	228	12	7	51	0	70	7	4	0	0	11	612
04:15 PM	18	259	8	0	285	0	212	16	0	228	13	8	39	0	60	6	4	0	0	10	583
04:30 PM	27	270	7	0	304	0	213	11	0	224	16	12	70	0	98	9	5	0	0	14	640
04:45 PM	43	276	6	0	325	0	224	12	0	236	12	12	50	0	74	12	8	1	0	21	656
Total	121	1065	31	0	1217	0	858	58	0	916	53	39	210	0	302	34	21	1	0	56	2491
05:00 PM	37	237	9	0	283	1	236	16	0	253	31	16	68	0	115	2	7	1	0	10	661
05:15 PM	30	279	13	0	322	0	225	18	0	243	13	6	39	0	58	10	5	0	0	15	638
05:30 PM	41	274	10	0	325	1	196	7	0	204	24	11	29	0	64	8	5	0	0	13	606
05:45 PM	42	278	10	0	330	0	175	20	0	195	13	9	29	0	51	9	7	1	0	17	593
Total	150	1068	42	0	1260	2	832	61	0	895	81	42	165	0	288	29	24	2	0	55	2498
Grand Total	541	3514					3832	280	0	4116	204	95	545	0	844	113	80	8	0	201	9311
Apprch %	13	84.7	2.3	0		0.1	93.1	6.8	0		24.2	11.3	64.6	0		56.2	39.8	4	0		
Total %	5.8	37.7	1	0	44.6	0	41.2	3	0	44.2	2.2	1	5.9	0	9.1	1.2	0.9	0.1	0	2.2	
Lights	522	3312	94	0	3928	4	3638	276	0	3918	196	93	538	0	827	113	80	8	0	201	8874
% Lights	96.5	94.3	98.9	0	94.7	100	94.9	98.6	0	95.2	96.1	97.9	98.7	0	98	100	100	100	0	100	95.3
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	19	202	1	0	222	0	194	4	0	198	8	2	7	0	17	0	0	0	0	0	437
% Trucks	3.5	5.7	1.1	0	5.3	0	5.1	1.4	0	4.8	3.9	2.1	1.3	0	2	0	0	0	0	0	4.7

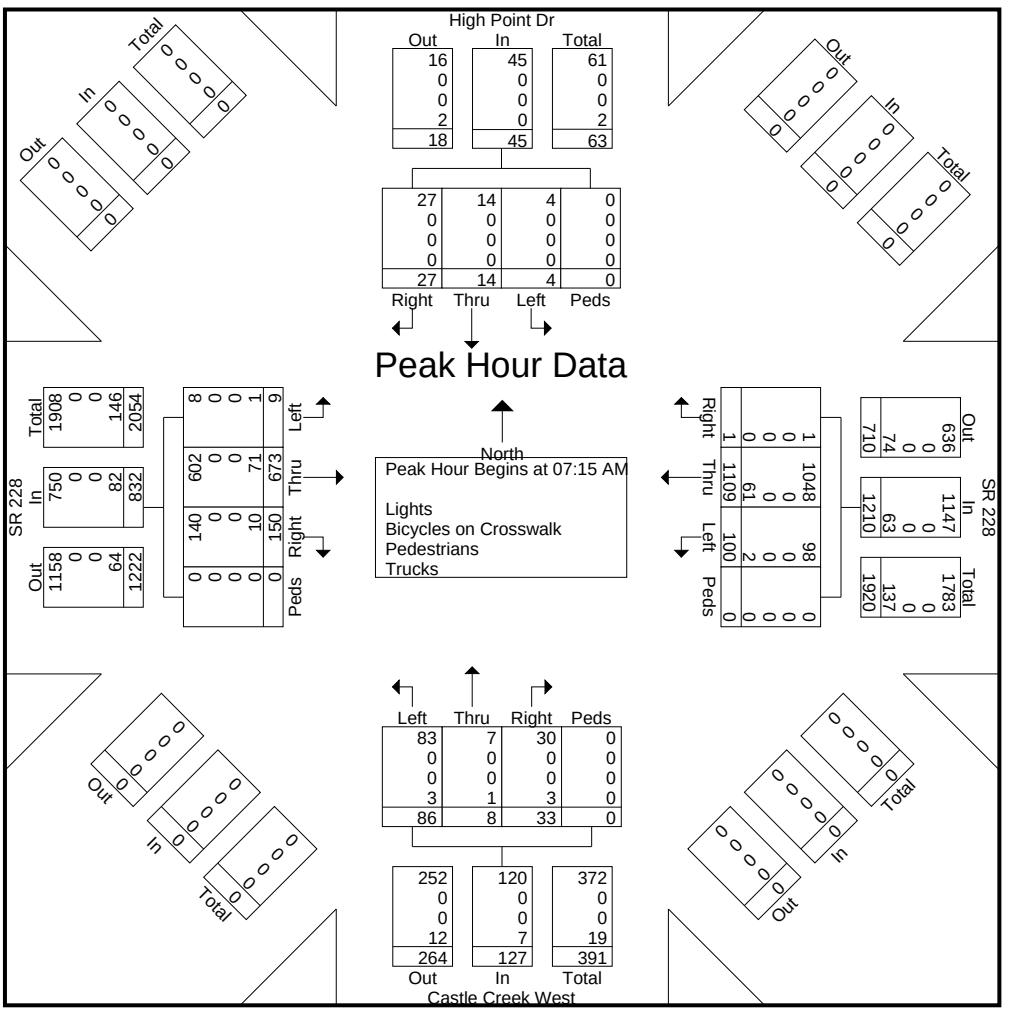
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Castle Creek West
Cloudy & 50's
Counted by WRA

File Name : 230 - SR 228 @ Castle Creek West 10-11-2016
Site Code : 230
Start Date : 10/11/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Castle Creek West Northbound					High Point Dr Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	19	146	1	0	166	0	**294**			**314**	7	1	13	0	21	3	1	0	0	4	505
07:30 AM	31	162	2	0	195	0	262	13	0	275	5	2	17	0	24	4	2	1	0	7	501
07:45 AM	**53**		**4**					**35**			**11**	**4**	**37**	0	**52**	4	**8**	**3**			**610**
08:00 AM	47	**190**	2	0	**239**	**1**	277	32	0	310	10	1	19	0	30	**16**				**19**	598
Total Volume	150	673	9	0	832	1	1109	100	0	1210	33	8	86	0	127	27	14	4	0	45	2214
% App. Total																					
PHF	.708	.886	.563	.000	.870	.250	.943	.714	.000	.963	.750	.500	.581	.000	.611	.422	.438	.333	.000	.592	.907
Lights	140	602	8	0	750	1	1048	98	0	1147	30	7	83	0	120	27	14	4	0	45	2062
% Lights	93.3	89.5	88.9	0	90.1	100	94.5	98.0	0	94.8	90.9	87.5	96.5	0	94.5	100	100	100	0	100	93.1
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	10	71	1	0	82	0	61	2	0	63	3	1	3	0	7	0	0	0	0	0	152
% Trucks	6.7	10.5	11.1	0	9.9	0	5.5	2.0	0	5.2	9.1	12.5	3.5	0	5.5	0	0	0	0	0	6.9



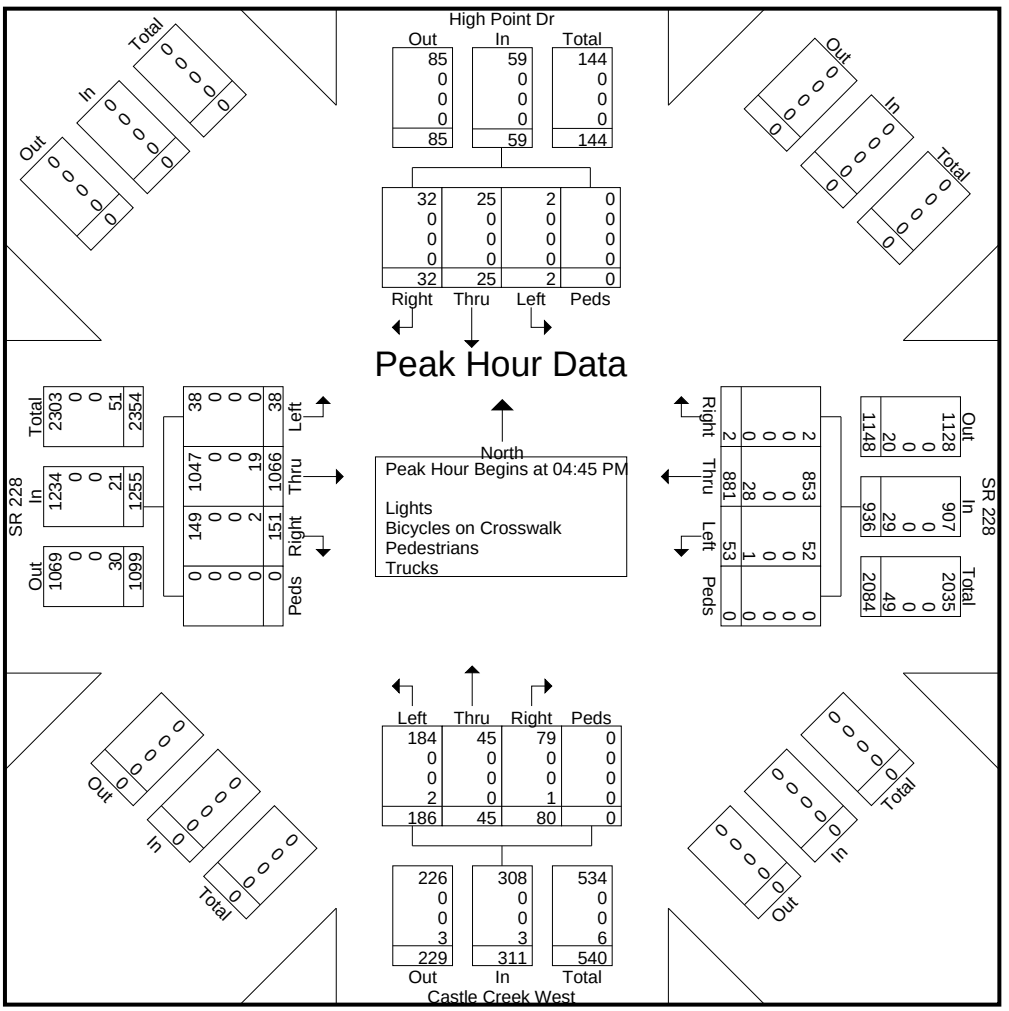
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Castle Creek West
Cloudy & 50's
Counted by WRA

File Name : 230 - SR 228 @ Castle Creek West 10-11-2016
Site Code : 230
Start Date : 10/11/2016
Page No : 3

	SR 228 Eastbound					SR 228 Westbound					Castle Creek West Northbound					High Point Dr Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	**43**				**325**	0	224	12	0	236	12	12	50	0	74	**12**	**8**	**1**		**21**	656
05:00 PM	37	237	9	0	283	**1**	**236**			**253**	**31**	**16**	**68**	0	**115**	2	7	1	0	10	**661**
05:15 PM	30	**279**	**13**					**18**													
05:30 PM	**41**	**274**	**10**	**0**	**325**	**1**	**196**	**7**	**0**	**204**	**24**	**11**	**29**	**0**	**64**	**8**	**5**	**0**	**0**	**13**	**606**
Total Volume	151	1066	38	0	1255	2	881	53	0	936	80	45	186	0	311	32	25	2	0	59	2561
% App. Total	12	84.9	3	0		0.2	94.1	5.7	0		25.7	14.5	59.8	0		54.2	42.4	3.4	0		
PHF	.878	.955	.731	.000	.965	.500	.933	.736	.000	.925	.645	.703	.684	.000	.676	.667	.781	.500	.000	.702	.969
Lights	149	1047	38	0	1234	2	853	52	0	907	79	45	184	0	308	32	25	2	0	59	2508
% Lights	98.7	98.2	100	0	98.3	100	96.8	98.1	0	96.9	98.8	100	98.9	0	99.0	100	100	100	0	100	97.9
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	2	19	0	0	21	0	28	1	0	29	1	0	2	0	3	0	0	0	0	0	53
% Trucks	1.3	1.8	0	0	1.7	0	3.2	1.9	0	3.1	1.3	0	1.1	0	1.0	0	0	0	0	0	2.1



WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Castle Creek East
Cloudy & 50's
Counted by WRA

File Name : 235 - SR 228 @ Castle Creek East 10-11-2016
Site Code : 235
Start Date : 10/11/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Castle Creek East Northbound					High Point Dr Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	6	117	5	0	128	5	270	7	0	282	8	1	12	0	21	10	0	1	0	11	442
07:15 AM	5	147	3	0	155	7	275	7	0	289	8	4	11	0	23	7	1	3	0	11	478
07:30 AM	5	158	5	0	168	8	261	4	0	273	12	8	17	0	37	16	0	1	0	17	495
07:45 AM	4	161	6	0	171	3	285	10	0	298	7	4	6	0	17	16	2	3	0	21	507
Total	20	583	19	0	622	23	1091	28	0	1142	35	17	46	0	98	49	3	8	0	60	1922
08:00 AM	6	175	6	0	187	6	280	9	0	295	8	4	13	0	25	11	1	3	0	15	522
08:15 AM	5	174	18	0	197	4	275	7	0	286	8	4	7	0	19	12	0	5	0	17	519
08:30 AM	4	201	11	0	216	5	224	7	2	238	7	2	5	0	14	9	0	5	1	15	483
08:45 AM	4	146	9	0	159	6	236	5	0	247	4	3	1	0	8	10	2	2	0	14	428
Total	19	696	44	0	759	21	1015	28	2	1066	27	13	26	0	66	42	3	15	1	61	1952
04:00 PM	7	252	25	0	284	11	197	8	0	216	12	6	7	0	25	13	4	6	0	23	548
04:15 PM	5	262	20	0	287	6	195	15	1	217	20	4	6	0	30	9	6	7	1	23	557
04:30 PM	7	273	27	3	310	3	220	8	0	231	21	9	4	3	37	6	5	5	0	16	594
04:45 PM	7	260	20	0	287	8	221	10	0	239	34	6	7	0	47	11	9	5	1	26	599
Total	26	1047	92	3	1168	28	833	41	1	903	87	25	24	3	139	39	24	23	2	88	2298
05:00 PM	9	258	32	0	299	5	240	15	0	260	19	6	1	0	26	11	7	10	0	28	613
05:15 PM	6	248	32	0	286	2	197	19	0	218	29	8	5	0	42	10	5	13	0	28	574
05:30 PM	5	298	21	0	324	6	208	12	0	226	27	10	4	0	41	9	8	11	0	28	619
05:45 PM	6	256	28	0	290	3	188	13	0	204	20	3	6	0	29	15	10	7	0	32	555
Total	26	1060	113	0	1199	16	833	59	0	908	95	27	16	0	138	45	30	41	0	116	2361
Grand Total	91	3386					3772	156	3	4019	244	82	112	3	441	175	60	87	3	325	8533
Apprch %	2.4	90.3	7.2	0.1		2.2	93.9	3.9	0.1		55.3	18.6	25.4	0.7		53.8	18.5	26.8	0.9		
Total %	1.1	39.7	3.1	0	43.9	1	44.2	1.8	0	47.1	2.9	1	1.3	0	5.2	2.1	0.7	1	0	3.8	
Lights	90	3197	262	0	3549	88	3601	153	0	3842	243	80	109	0	432	173	60	83	0	316	8139
% Lights	98.9	94.4	97.8	0	94.7	100	95.5	98.1	0	95.6	99.6	97.6	97.3	0	98	98.9	100	95.4	0	97.2	95.4
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	3	3	0	0	0	3	3	0	0	0	3	3	0	0	0	3	3	12
% Pedestrians	0	0	0	100	0.1	0	0	0	100	0.1	0	0	0	100	0.7	0	0	0	100	0.9	0.1
Trucks	1	189	6	0	196	0	171	3	0	174	1	2	3	0	6	2	0	4	0	6	382
% Trucks	1.1	5.6	2.2	0	5.2	0	4.5	1.9	0	4.3	0.4	2.4	2.7	0	1.4	1.1	0	4.6	0	1.8	4.5

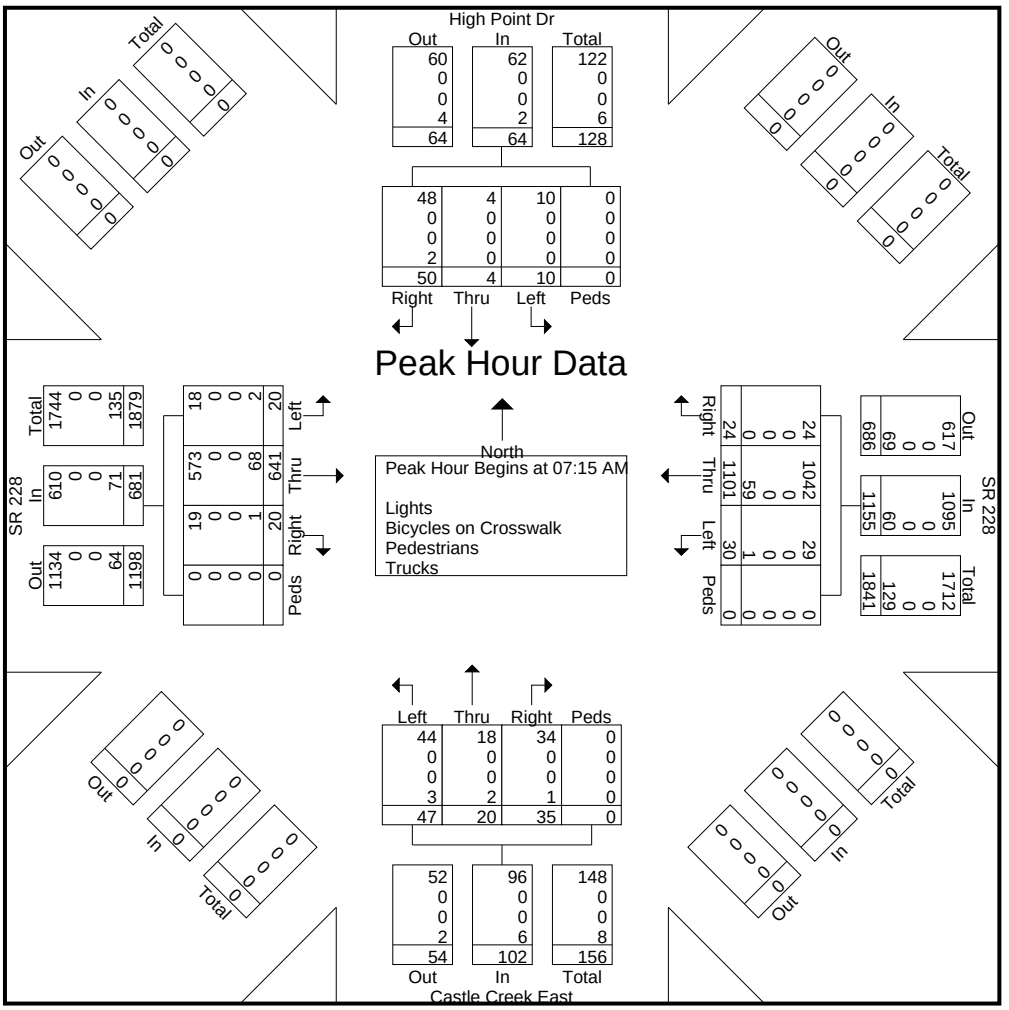
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Castle Creek East
Cloudy & 50's
Counted by WRA

File Name : 235 - SR 228 @ Castle Creek East 10-11-2016
Site Code : 235
Start Date : 10/11/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Castle Creek East Northbound					High Point Dr Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	5	147	3	0	155	7	275	7	0	289	8	4	11	0	23	7	1	**3**			
07:30 AM	**5**	**158**	**5**	**0**	**168**	**8**	261	4	0	273	**12**	**8**	**17**	0	**37**	**16**	**0**	**1**	**0**	**17**	**495**
07:45 AM	**4**	**161**	**6**	**0**	**171**	**3**	**285**	**10**	**0**	**298**	7	4	6	0	17	16	**2**	3	0	**21**	507
08:00 AM	**6**	**175**	6	0	**187**	6	280	9	0	295	8	4	13	0	25	11	1	3	0	15	**522**
Total Volume	20	641	20	0	681	24	1101	30	0	1155	35	20	47	0	102	50	4	10	0	64	2002
% App. Total																					
PHF	.833	.916	.833	.000	.910	.750	.966	.750	.000	.969	.729	.625	.691	.000	.689	.781	.500	.833	.000	.762	.959
Lights	19	573	18	0	610	24	1042	29	0	1095	34	18	44	0	96	48	4	10	0	62	1863
% Lights	95.0	89.4	90.0	0	89.6	100	94.6	96.7	0	94.8	97.1	90.0	93.6	0	94.1	96.0	100	100	0	96.9	93.1
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	1	68	2	0	71	0	59	1	0	60	1	2	3	0	6	2	0	0	0	2	139
% Trucks	5.0	10.6	10.0	0	10.4	0	5.4	3.3	0	5.2	2.9	10.0	6.4	0	5.9	4.0	0	0	0	3.1	6.9



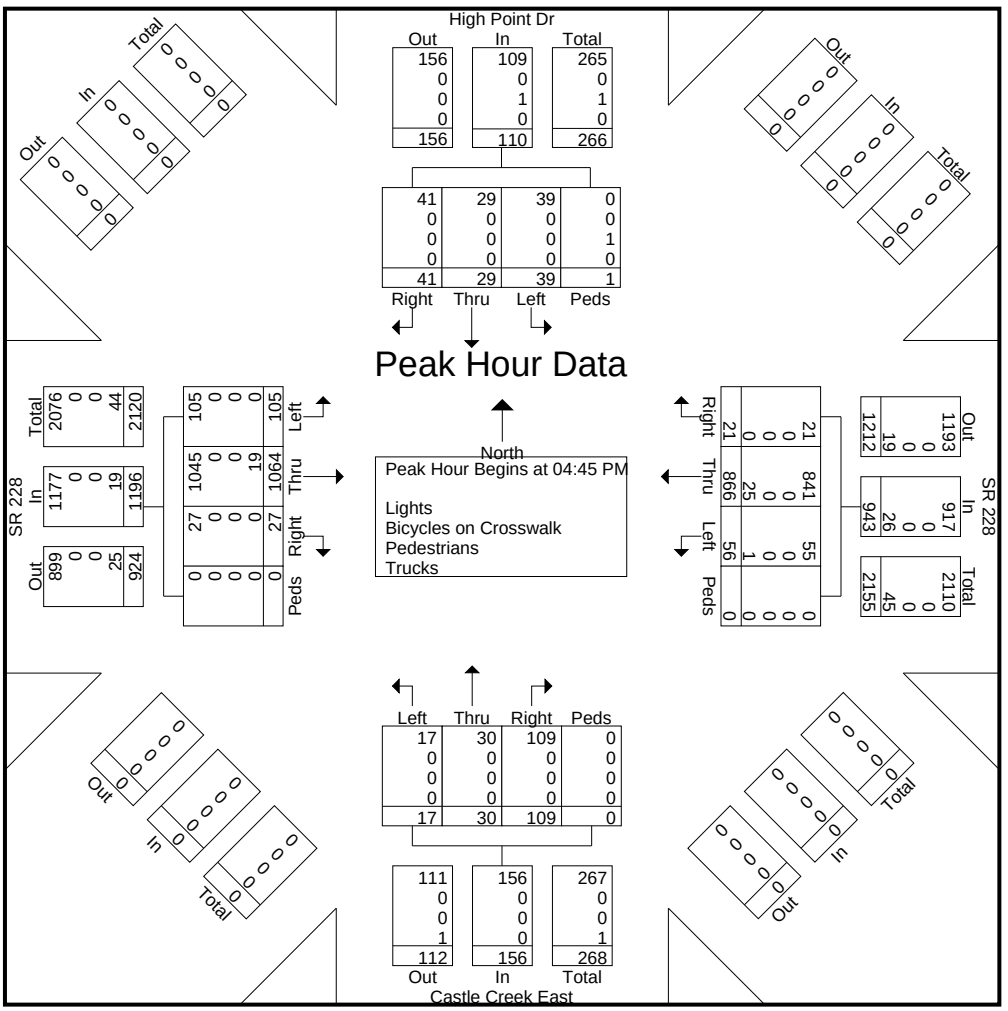
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Castle Creek East
Cloudy & 50's
Counted by WRA

File Name : 235 - SR 228 @ Castle Creek East 10-11-2016
Site Code : 235
Start Date : 10/11/2016
Page No : 3

	SR 228 Eastbound					SR 228 Westbound					Castle Creek East Northbound					High Point Dr Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	7	260	20	0	287	**8**	221	10	0	239	**34**		**7**	0	**47**	**11**	**9**	5	**1**		
05:00 PM	**9**	**258**	**32**	**0**	**299**	**5**	**240**	**15**	**0**	**260**	19	6	1	0	26	11	7	10	0	**28**	613
05:15 PM	6	248	32	0	286	2	197	**19**			27	**10**	**4**	**0**	**41**			**13**			
05:30 PM	**5**	**298**	21	0	**324**	6	208	12	0	226						**9**	**8**	**11**	**0**	**28**	**619**
Total Volume	27	1064	105	0	1196	21	866	56	0	943	109	30	17	0	156	41	29	39	1	110	2405
% App. Total	2.3	89	8.8	0		2.2	91.8	5.9	0		69.9	19.2	10.9	0		37.3	26.4	35.5	0.9		
PHF	.750	.893	.820	.000	.923	.656	.902	.737	.000	.907	.801	.750	.607	.000	.830	.932	.806	.750	.250	.982	.971
Lights	27	1045	105	0	1177	21	841	55	0	917	109	30	17	0	156	41	29	39	0	109	2359
% Lights	100	98.2	100	0	98.4	100	97.1	98.2	0	97.2	100	100	100	0	100	100	100	100	0	99.1	98.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.9	0.0
Trucks	0	19	0	0	19	0	25	1	0	26	0	0	0	0	0	0	0	0	0	0	45
% Trucks	0	1.8	0	0	1.6	0	2.9	1.8	0	2.8	0	0	0	0	0	0	0	0	0	0	1.9



WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Seven Fields Blvd
Cloudy & 50's
Counted by WRA

File Name : 240 - SR 228 @ Seven Fields 10-11-2016
Site Code : 240
Start Date : 10/11/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Adams Shoppes Northbound					Seven Fields Blvd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	4	117	7	1	129	17	256	0	0	273	0	2	5	0	7	24	0	4	0	28	437
07:15 AM	0	126	23	0	149	19	257	0	0	276	2	1	2	0	5	28	0	6	0	34	464
07:30 AM	1	143	22	0	166	25	236	0	0	261	1	3	10	0	14	33	2	8	0	43	484
07:45 AM	3	152	18	1	174	28	249	0	0	277	1	1	10	0	12	34	2	11	0	47	510
Total	8	538	70	2	618	89	998	0	0	1087	4	7	27	0	38	119	4	29	0	152	1895
08:00 AM	2	165	21	0	188	23	278	0	0	301	0	0	6	0	6	22	1	7	0	30	525
08:15 AM	14	157	25	0	196	20	242	0	0	262	0	3	11	0	14	37	1	11	0	49	521
08:30 AM	3	186	18	0	207	26	207	0	0	233	2	2	7	0	11	23	1	10	0	34	485
08:45 AM	7	118	22	0	147	32	220	0	0	252	0	3	4	0	7	20	0	14	0	34	440
Total	26	626	86	0	738	101	947	0	0	1048	2	8	28	0	38	102	3	42	0	147	1971
04:00 PM	20	234	21	0	275	27	179	3	0	209	3	10	17	0	30	27	8	39	0	74	588
04:15 PM	21	236	35	0	292	27	190	4	0	221	3	12	6	0	21	23	8	34	0	65	599
04:30 PM	24	248	26	0	298	32	196	3	0	231	1	5	11	0	17	31	8	44	0	83	629
04:45 PM	32	245	33	0	310	39	205	6	0	250	3	2	6	0	11	31	6	39	0	76	647
Total	97	963	115	0	1175	125	770	16	0	911	10	29	40	0	79	112	30	156	0	298	2463
05:00 PM	24	218	33	0	275	39	194	3	0	236	5	7	15	0	27	48	2	50	0	100	638
05:15 PM	15	256	23	0	294	34	177	2	0	213	3	4	10	0	17	35	8	50	0	93	617
05:30 PM	32	275	29	0	336	36	198	2	0	236	2	6	6	0	14	21	9	42	0	72	658
05:45 PM	26	239	18	1	284	24	179	1	0	204	5	8	10	0	23	19	11	47	0	77	588
Total	97	988	103	1	1189	133	748	8	0	889	15	25	41	0	81	123	30	189	0	342	2501
Grand Total	228	3115	374	3	3720	448	3463	24	0	3935	31	69	136	0	236	456	67	416	0	939	8830
Apprch %	6.1	83.7	10.1	0.1		11.4	88	0.6	0		13.1	29.2	57.6	0		48.6	7.1	44.3	0		
Total %	2.6	35.3	4.2	0	42.1	5.1	39.2	0.3	0	44.6	0.4	0.8	1.5	0	2.7	5.2	0.8	4.7	0	10.6	
Lights	224	2928	366	0	3518	438	3289	24	0	3751	29	68	135	0	232	442	67	407	0	916	8417
% Lights	98.2	94	97.9	0	94.6	97.8	95	100	0	95.3	93.5	98.6	99.3	0	98.3	96.9	100	97.8	0	97.6	95.3
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	33.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Pedestrians	0	0	0	66.7	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	4	187	8	0	199	10	174	0	0	184	2	1	1	0	4	14	0	9	0	23	410
% Trucks	1.8	6	2.1	0	5.3	2.2	5	0	0	4.7	6.5	1.4	0.7	0	1.7	3.1	0	2.2	0	2.4	4.6

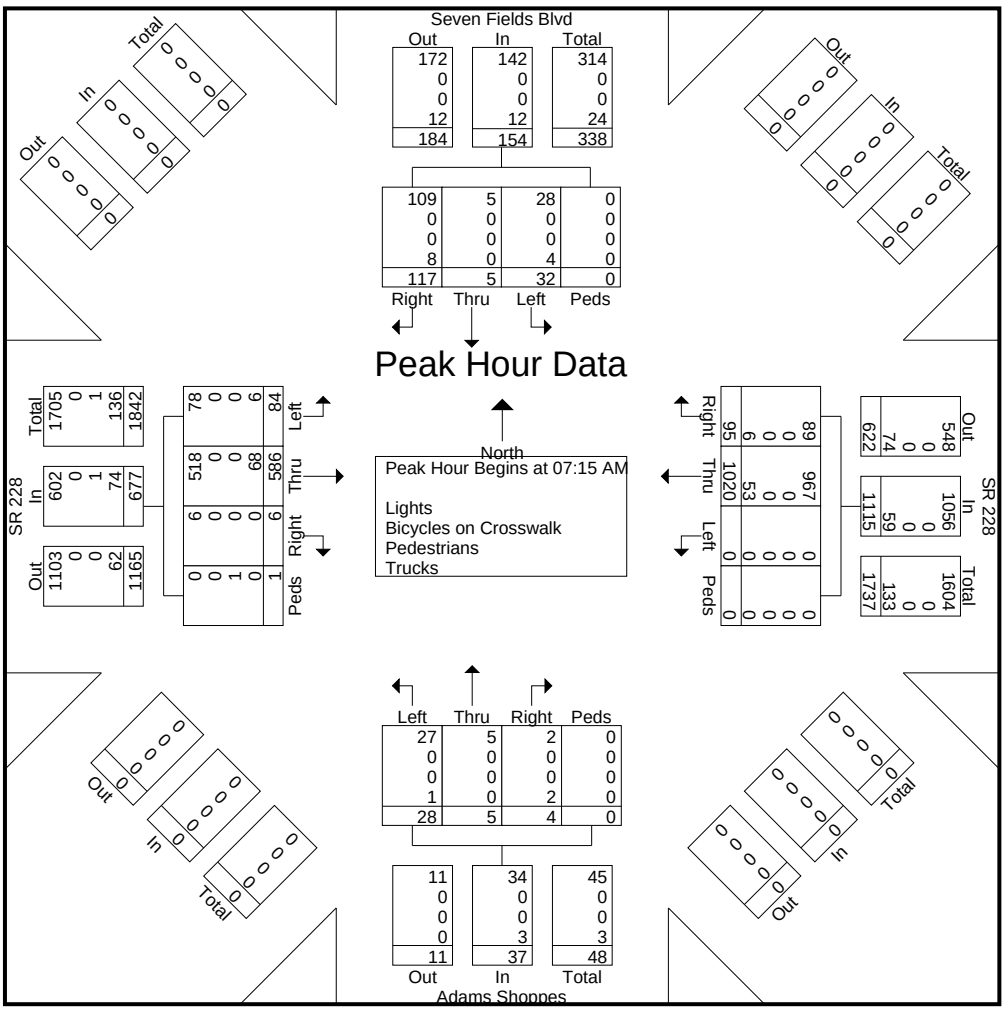
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Seven Fields Blvd
Cloudy & 50's
Counted by WRA

File Name : 240 - SR 228 @ Seven Fields 10-11-2016
Site Code : 240
Start Date : 10/11/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Adams Shoppes Northbound					Seven Fields Blvd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	126	**23**								**2**										
07:30 AM	**1**	**143**	**22**	**0**	**166**	**25**	**236**	**0**	**0**	**261**	**1**	**3**	**10**	0	**14**	33	**2**	8	0	43	484
07:45 AM	**3**			**1**		**28**	249	0	0	277	1	1	10	0	12	**34**		**11**		**47**	510
08:00 AM	2	**165**	21	0	**188**	23	**278**			**301**	0	0	6	0	6	22	1	7	0	30	**525**
Total Volume	6	586	84	1	677	95	1020	0	0	1115	4	5	28	0	37	117	5	32	0	154	1983
% App. Total																					
PHF	.500	.888	.913	.250	.900	.848	.917	.000	.000	.926	.500	.417	.700	.000	.661	.860	.625	.727	.000	.819	.944
Lights	6	518	78	0	602	89	967	0	0	1056	2	5	27	0	34	109	5	28	0	142	1834
% Lights	100	88.4	92.9	0	88.9	93.7	94.8	0	0	94.7	50.0	100	96.4	0	91.9	93.2	100	87.5	0	92.2	92.5
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Pedestrians	0	0	0	100	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Trucks	0	68	6	0	74	6	53	0	0	59	2	0	1	0	3	8	0	4	0	12	148
% Trucks	0	11.6	7.1	0	10.9	6.3	5.2	0	0	5.3	50.0	0	3.6	0	8.1	6.8	0	12.5	0	7.8	7.5



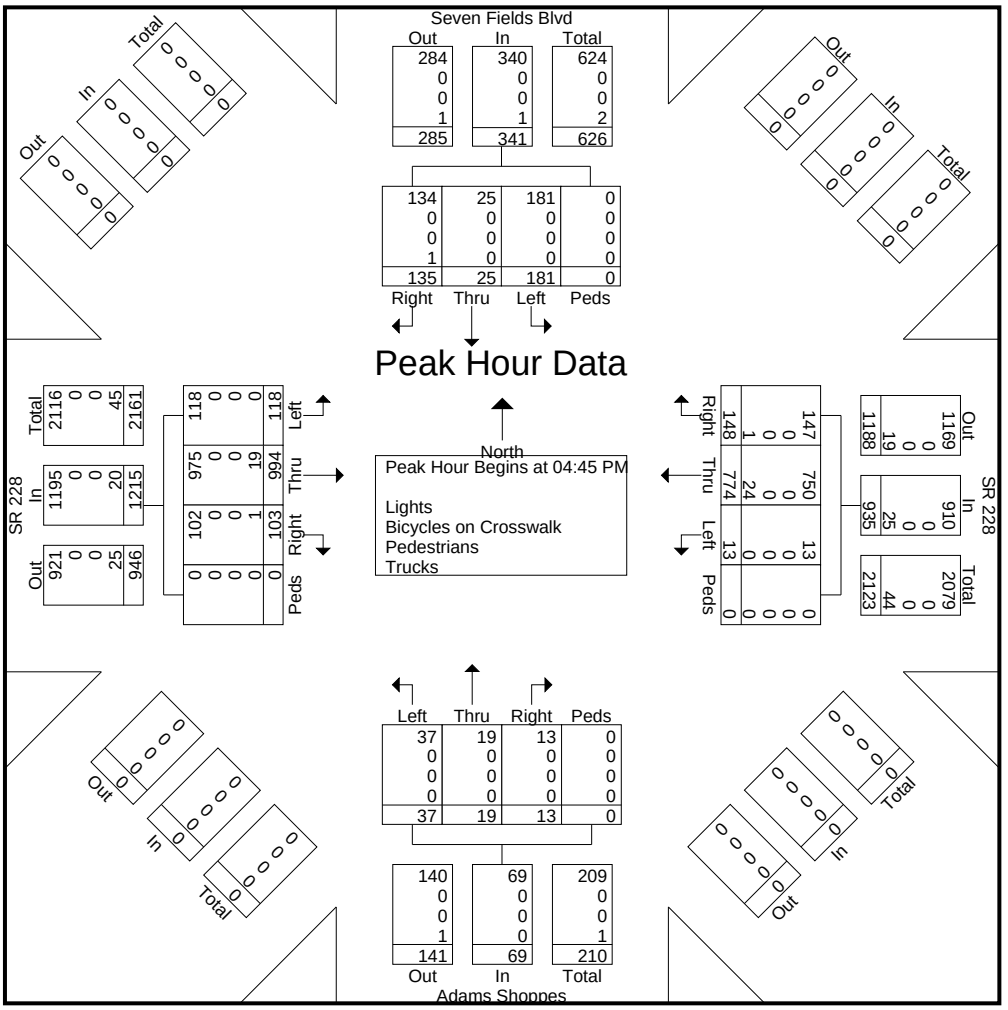
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Seven Fields Blvd
Cloudy & 50's
Counted by WRA

File Name : 240 - SR 228 @ Seven Fields 10-11-2016
Site Code : 240
Start Date : 10/11/2016
Page No : 3

	SR 228 Eastbound					SR 228 Westbound					Adams Shoppes Northbound					Seven Fields Blvd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	**32**		**33**			**39**	**205**	**6**		**250**	3	2	6	0	11	31	6	39	0	76	647
05:00 PM	24	218	33	0	275	39	194	3	0	236	**5**	**7**	**15**	0	**27**	**48**		**50**		**100**	638
05:15 PM	15	256	23	0	294	34	177	2	0	213	3	4	10	0	17	35	8	50	0	93	617
05:30 PM	32	**275**	29	0	**336**	36	198	2	0	236	2	6	6	0	14	21	**9**	42	0	72	**658**
Total Volume	103	994	118	0	1215	148	774	13	0	935	13	19	37	0	69	135	25	181	0	341	2560
% App. Total	8.5	81.8	9.7	0		15.8	82.8	1.4	0		18.8	27.5	53.6	0		39.6	7.3	53.1	0		
PHF	.805	.904	.894	.000	.904	.949	.944	.542	.000	.935	.650	.679	.617	.000	.639	.703	.694	.905	.000	.853	.973
Lights	102	975	118	0	1195	147	750	13	0	910	13	19	37	0	69	134	25	181	0	340	2514
% Lights	99.0	98.1	100	0	98.4	99.3	96.9	100	0	97.3	100	100	100	0	100	99.3	100	100	0	99.7	98.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	1	19	0	0	20	1	24	0	0	25	0	0	0	0	0	1	0	0	0	1	46
% Trucks	1.0	1.9	0	0	1.6	0.7	3.1	0	0	2.7	0	0	0	0	0	0.7	0	0	0	0.3	1.8



WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Adams Ridge Rd
Cloudy & 50's
Counted by WRA

File Name : 245 - SR 228 @ Adams Ridge Rd 10-11-2016
Site Code : 245
Start Date : 10/11/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Adams Ridge Rd Northbound					Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	15	109	0	0	124	0	170	16	0	186	51	0	100	0	151	0	0	0	0	0	461
07:15 AM	12	121	0	0	133	0	193	10	0	203	72	0	80	0	152	0	0	0	0	0	488
07:30 AM	15	141	0	0	156	0	154	13	0	167	43	0	100	0	143	0	0	0	0	0	466
07:45 AM	15	150	0	0	165	0	199	10	0	209	48	0	88	0	136	0	0	0	0	0	510
Total	57	521	0	0	578	0	716	49	0	765	214	0	368	0	582	0	0	0	0	0	1925
08:00 AM	16	150	0	0	166	0	200	13	0	213	39	0	88	0	127	0	0	0	0	0	506
08:15 AM	34	129	0	0	163	0	175	14	0	189	46	0	98	0	144	0	0	0	0	0	496
08:30 AM	32	163	0	0	195	0	149	16	0	165	37	0	70	0	107	0	0	0	0	0	467
08:45 AM	21	93	0	0	114	0	171	12	0	183	22	0	68	0	90	0	0	0	0	0	387
Total	103	535	0	0	638	0	695	55	0	750	144	0	324	0	468	0	0	0	0	0	1856
04:00 PM	82	188	0	0	270	0	184	30	0	214	29	0	30	0	59	0	0	0	0	0	543
04:15 PM	65	207	0	0	272	0	176	43	0	219	29	0	47	0	76	0	0	0	0	0	567
04:30 PM	76	215	0	0	291	0	182	36	0	218	31	0	43	0	74	0	0	0	0	0	583
04:45 PM	79	205	0	0	284	0	204	39	0	243	47	0	51	0	98	0	0	0	0	0	625
Total	302	815	0	0	1117	0	746	148	0	894	136	0	171	0	307	0	0	0	0	0	2318
05:00 PM	91	191	0	0	282	0	199	55	0	254	30	0	35	0	65	0	0	0	0	0	601
05:15 PM	93	213	0	0	306	0	181	38	0	219	38	0	55	0	93	0	0	0	0	0	618
05:30 PM	114	190	0	0	304	0	158	44	0	202	27	0	54	0	81	0	0	0	0	0	587
05:45 PM	107	208	0	0	315	0	168	31	0	199	45	0	42	0	87	0	0	0	0	0	601
Total	405	802	0	0	1207	0	706	168	0	874	140	0	186	0	326	0	0	0	0	0	2407
Grand Total	867	2673	0	0	3540	0	2863	420	0	3283	634	0	1049	0	1683	0	0	0	0	0	8506
Apprch %	24.5	75.5	0	0		0	87.2	12.8	0		37.7	0	62.3	0		0	0	0	0		
Total %	10.2	31.4	0	0	41.6	0	33.7	4.9	0	38.6	7.5	0	12.3	0	19.8	0	0	0	0	0	
Lights	848	2505	0	0	3353	0	2691	410	0	3101	615	0	1032	0	1647	0	0	0	0	0	8101
% Lights	97.8	93.7	0	0	94.7	0	94	97.6	0	94.5	97	0	98.4	0	97.9	0	0	0	0	0	95.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	19	168	0	0	187	0	172	10	0	182	19	0	17	0	36	0	0	0	0	0	405
% Trucks	2.2	6.3	0	0	5.3	0	6	2.4	0	5.5	3	0	1.6	0	2.1	0	0	0	0	0	4.8

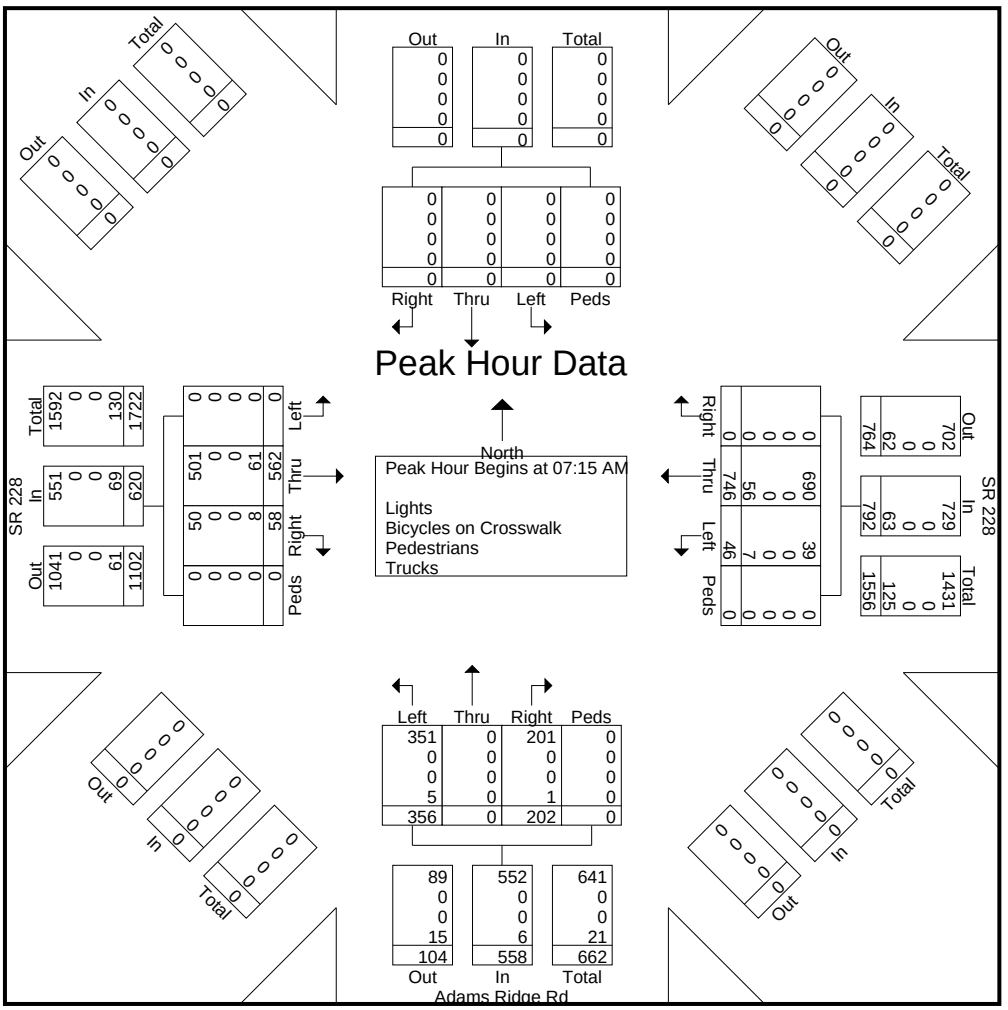
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Adams Ridge Rd
Cloudy & 50's
Counted by WRA

File Name : 245 - SR 228 @ Adams Ridge Rd 10-11-2016
Site Code : 245
Start Date : 10/11/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Adams Ridge Rd Northbound					Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	12	121	0	0	133	0	193	10	0	203	**72**				**152**	0	0	0	0	0	488
07:30 AM	15	141	0	0	156	0	154	**13**					**100**	0	143	0	0	0	0	0	466
07:45 AM	15	**150**	0	0	165	0	199	10	0	209	48	0	88	0	136	0	0	0	0	0	**510**
08:00 AM	**16**				**166**	0	**200**			**213**	39	0	88	0	127	0	0	0	0	0	506
Total Volume	58	562	0	0	620	0	746	46	0	792	202	0	356	0	558	0	0	0	0	0	1970
% App. Total	9.4	90.6	0	0		0	94.2	5.8	0		36.2	0	63.8	0		0	0	0	0		
PHF	.906	.937	.000	.000	.934	.000	.933	.885	.000	.930	.701	.000	.890	.000	.918	.000	.000	.000	.000	.000	.966
Lights	50	501	0	0	551	0	690	39	0	729	201	0	351	0	552	0	0	0	0	0	1832
% Lights	86.2	89.1	0	0	88.9	0	92.5	84.8	0	92.0	99.5	0	98.6	0	98.9	0	0	0	0	0	93.0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	8	61	0	0	69	0	56	7	0	63	1	0	5	0	6	0	0	0	0	0	138
% Trucks	13.8	10.9	0	0	11.1	0	7.5	15.2	0	8.0	0.5	0	1.4	0	1.1	0	0	0	0	0	7.0



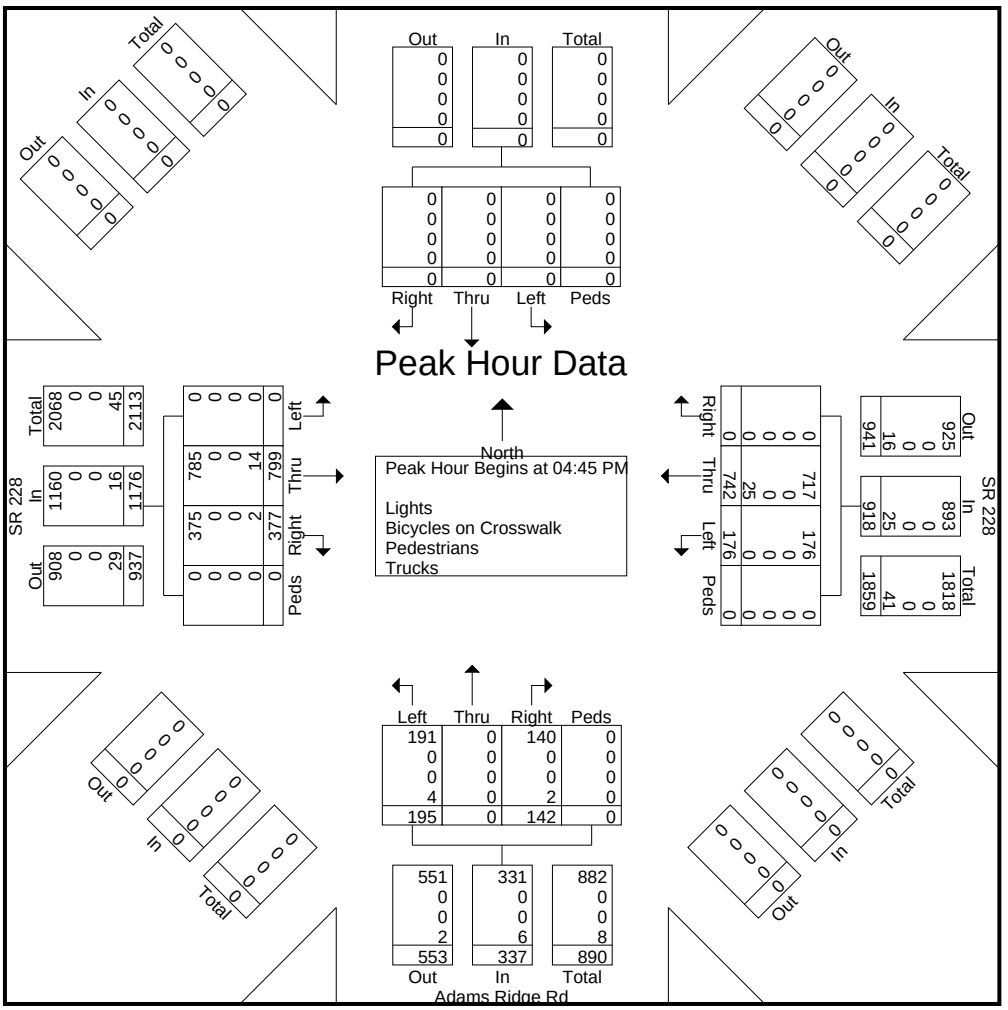
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Adams Ridge Rd
Cloudy & 50's
Counted by WRA

File Name : 245 - SR 228 @ Adams Ridge Rd 10-11-2016
Site Code : 245
Start Date : 10/11/2016
Page No : 3

	SR 228 Eastbound					SR 228 Westbound					Adams Ridge Rd Northbound					Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	79	205	0	0	284	0	**204**				**47**				**98**	0	0	0	0	0	**625**
05:00 PM	91	191	0	0	282	0	199	**55**		**254**	30	0	35	0	65	0	0	0	0	0	601
05:15 PM	93	**213**	0	0	**306**	0	181	38	0	219	38	0	**55**	0	93	0	0	0	0	0	618
05:30 PM	**114**																				
Total Volume	377	799	0	0	1176	0	742	176	0	918	142	0	195	0	337	0	0	0	0	0	2431
% App. Total	32.1	67.9	0	0		0	80.8	19.2	0		42.1	0	57.9	0		0	0	0	0		
PHF	.827	.938	.000	.000	.961	.000	.909	.800	.000	.904	.755	.000	.886	.000	.860	.000	.000	.000	.000	.000	.972
Lights	375	785	0	0	1160	0	717	176	0	893	140	0	191	0	331	0	0	0	0	0	2384
% Lights	99.5	98.2	0	0	98.6	0	96.6	100	0	97.3	98.6	0	97.9	0	98.2	0	0	0	0	0	98.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	2	14	0	0	16	0	25	0	0	25	2	0	4	0	6	0	0	0	0	0	47
% Trucks	0.5	1.8	0	0	1.4	0	3.4	0	0	2.7	1.4	0	2.1	0	1.8	0	0	0	0	0	1.9



WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Myoma Rd
Cloudy & 50's
Counted by WRA

File Name : 250 - SR 228 @ Myoma Rd 10-11-2016
Site Code : 250
Start Date : 10/11/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Northbound					Myoma Rd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	153	11	0	164	6	186	0	0	192	0	0	0	0	0	8	0	2	0	10	366
07:15 AM	0	180	16	0	196	4	189	0	0	193	0	0	0	0	0	6	0	3	0	9	398
07:30 AM	0	170	15	0	185	7	173	0	0	180	0	0	0	0	0	11	0	0	0	11	376
07:45 AM	0	169	23	0	192	13	200	0	0	213	0	0	0	0	0	16	0	4	0	20	425
Total	0	672	65	0	737	30	748	0	0	778	0	0	0	0	0	41	0	9	0	50	1565
08:00 AM	0	166	18	0	184	7	186	0	0	193	0	0	0	0	0	10	0	2	1	13	390
08:15 AM	0	150	21	0	171	7	176	0	0	183	0	0	0	0	0	9	0	2	0	11	365
08:30 AM	0	190	24	0	214	8	167	0	0	175	0	0	0	0	0	6	0	0	0	6	395
08:45 AM	0	141	6	0	147	9	185	0	0	194	0	0	0	0	0	12	0	1	0	13	354
Total	0	647	69	0	716	31	714	0	0	745	0	0	0	0	0	37	0	5	1	43	1504
04:00 PM	0	221	8	0	229	7	207	0	0	214	0	0	0	0	0	15	0	3	0	18	461
04:15 PM	0	216	13	0	229	8	194	0	0	202	0	0	0	0	0	10	0	3	0	13	444
04:30 PM	0	229	14	0	243	5	207	0	0	212	0	0	0	0	0	21	0	6	0	27	482
04:45 PM	0	240	24	0	264	3	227	0	0	230	0	0	0	0	0	18	0	1	0	19	513
Total	0	906	59	0	965	23	835	0	0	858	0	0	0	0	0	64	0	13	0	77	1900
05:00 PM	0	200	15	0	215	9	229	0	0	238	0	0	0	0	0	9	0	0	0	9	462
05:15 PM	0	221	31	0	252	5	193	0	0	198	0	0	0	0	0	19	0	4	0	23	473
05:30 PM	0	195	18	0	213	9	213	0	0	222	0	0	0	0	0	9	0	4	0	13	448
05:45 PM	0	228	19	0	247	15	180	0	0	195	0	0	0	0	0	21	0	1	0	22	464
Total	0	844	83	0	927	38	815	0	0	853	0	0	0	0	0	58	0	9	0	67	1847
Grand Total	0	3069	276	0	3345	122	3112	0	0	3234	0	0	0	0	0	200	0	36	1	237	6816
Apprch %	0	91.7	8.3	0		3.8	96.2	0	0		0	0	0	0		84.4	0	15.2	0.4		
Total %	0	45	4	0	49.1	1.8	45.7	0	0	47.4	0	0	0	0	0	2.9	0	0.5	0	3.5	
Lights	0	2892	273	0	3165	118	2952	0	0	3070	0	0	0	0	0	194	0	34	0	228	6463
% Lights	0	94.2	98.9	0	94.6	96.7	94.9	0	0	94.9	0	0	0	0	0	97	0	94.4	0	96.2	94.8
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.4	0
Trucks	0	177	3	0	180	4	160	0	0	164	0	0	0	0	0	6	0	2	0	8	352
% Trucks	0	5.8	1.1	0	5.4	3.3	5.1	0	0	5.1	0	0	0	0	0	3	0	5.6	0	3.4	5.2

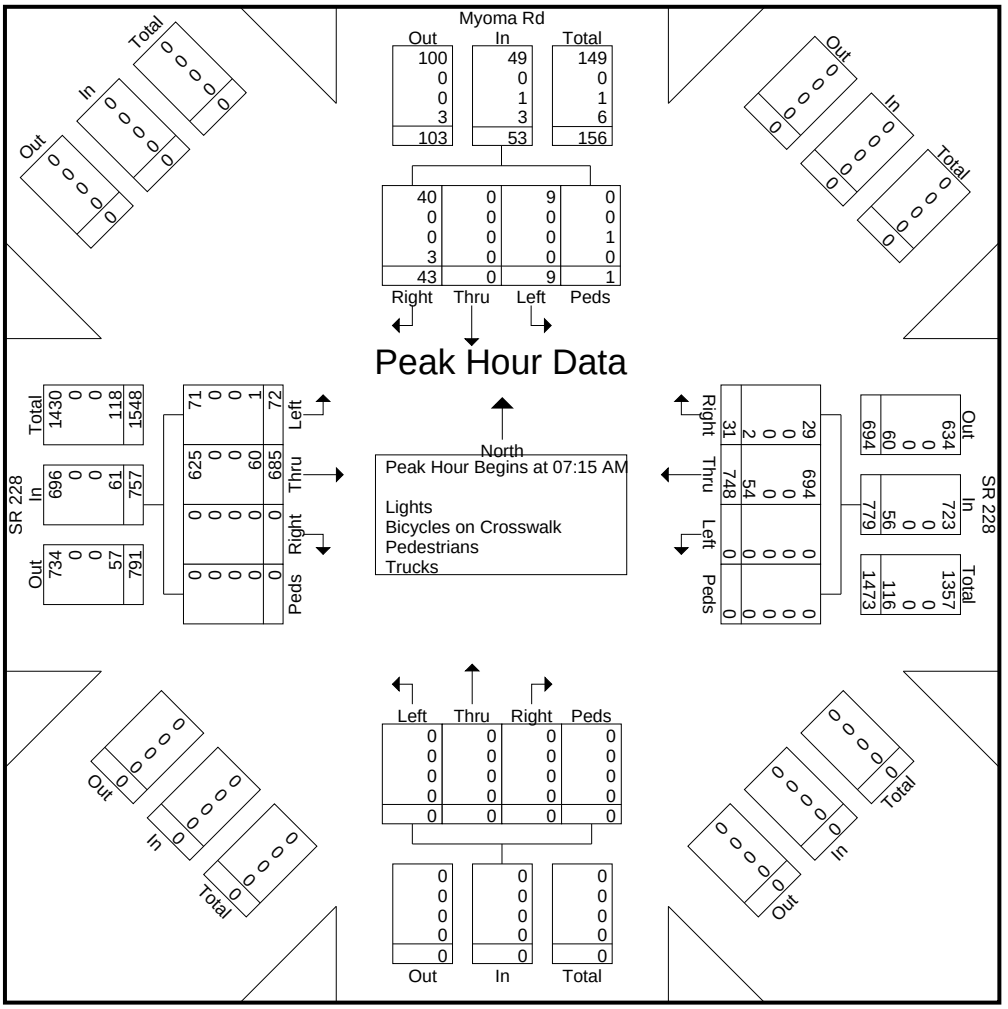
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Myoma Rd
Cloudy & 50's
Counted by WRA

File Name : 250 - SR 228 @ Myoma Rd 10-11-2016
Site Code : 250
Start Date : 10/11/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Northbound					Myoma Rd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	**180**	16	0	**196**	4	189	0	0	193	0	0	0	0	0	6	0	3	0	9	398
07:30 AM	0	170	15	0	185	7	173	0	0	180	0	0	0	0	0	11	0	0	0	11	376
07:45 AM	0	169	**23**			**13**	**200**			**213**	0	0	0	0	0	**16**		**4**		**20**	**425**
08:00 AM	0	166	18	0	184	7	186	0	0	193	0	0	0	0	0	10	0	2	**1**		
Total Volume	0	685	72	0	757	31	748	0	0	779	0	0	0	0	0	43	0	9	1	53	1589
% App. Total	0	90.5	9.5	0		4	96	0	0		0	0	0	0		81.1	0	17	1.9		
PHF	.000	.951	.783	.000	.966	.596	.935	.000	.000	.914	.000	.000	.000	.000	.000	.672	.000	.563	.250	.663	.935
Lights	0	625	71	0	696	29	694	0	0	723	0	0	0	0	0	40	0	9	0	49	1468
% Lights	0	91.2	98.6	0	91.9	93.5	92.8	0	0	92.8	0	0	0	0	0	93.0	0	100	0	92.5	92.4
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1.9	0.1
Trucks	0	60	1	0	61	2	54	0	0	56	0	0	0	0	0	3	0	0	0	3	120
% Trucks	0	8.8	1.4	0	8.1	6.5	7.2	0	0	7.2	0	0	0	0	0	7.0	0	0	0	5.7	7.6



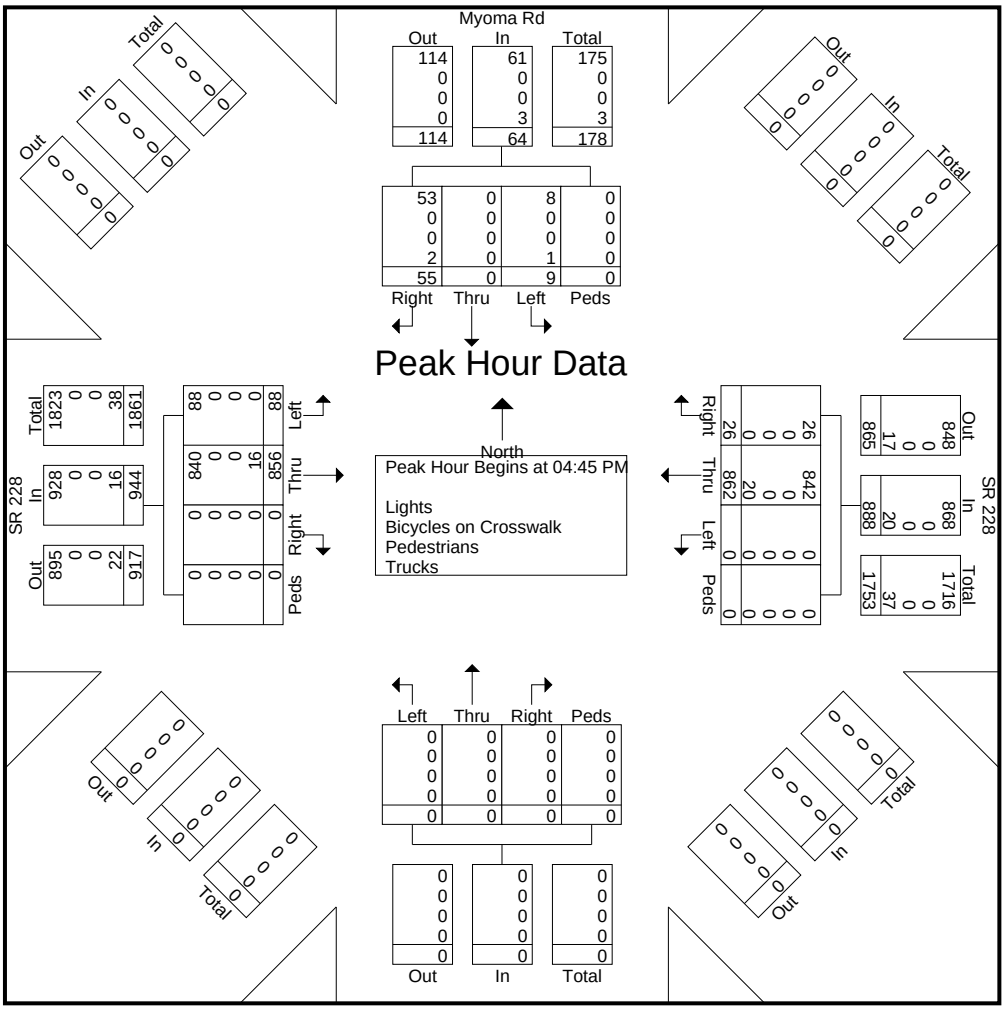
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Myoma Rd
Cloudy & 50's
Counted by WRA

File Name : 250 - SR 228 @ Myoma Rd 10-11-2016
Site Code : 250
Start Date : 10/11/2016
Page No : 3

	SR 228 Eastbound					SR 228 Westbound					Northbound					Myoma Rd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	**240**	24	0	**264**	3	227	0	0	230	0	0	0	0	0	18	0	1	0	19	**513**
05:00 PM	0	200	15	0	215	**9**	**229**			**238**	0	0	0	0	0	9	0	0	0	9	462
05:15 PM	0	221	**31**													**19**		**4**		**23**	473
05:30 PM	0	195	18	0	213	9	213	0	0	222	0	0	0	0	0	9	0	4	0	13	448
Total Volume	0	856	88	0	944	26	862	0	0	888	0	0	0	0	0	55	0	9	0	64	1896
% App. Total	0	90.7	9.3	0		2.9	97.1	0	0		0	0	0	0		85.9	0	14.1	0		
PHF	.000	.892	.710	.000	.894	.722	.941	.000	.000	.933	.000	.000	.000	.000	.000	.724	.000	.563	.000	.696	.924
Lights	0	840	88	0	928	26	842	0	0	868	0	0	0	0	0	53	0	8	0	61	1857
% Lights	0	98.1	100	0	98.3	100	97.7	0	0	97.7	0	0	0	0	0	96.4	0	88.9	0	95.3	97.9
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	0	16	0	0	16	0	20	0	0	20	0	0	0	0	0	2	0	1	0	3	39
% Trucks	0	1.9	0	0	1.7	0	2.3	0	0	2.3	0	0	0	0	0	3.6	0	11.1	0	4.7	2.1



WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Heritage Creek
Cloudy & 50's
Counted by WRA

File Name : 255 - SR 228 @ Heritage Creek 10-11-2016
Site Code : 255
Start Date : 10/11/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Heritage Creek Northbound					Heritage Creek Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	4	145	8	0	157	31	186	2	0	219	0	1	1	0	2	7	0	38	0	45	423
07:15 AM	3	176	7	0	186	41	198	1	0	240	0	0	1	0	1	7	1	53	0	61	488
07:30 AM	8	161	12	0	181	60	186	3	0	249	0	0	2	0	2	9	1	26	0	36	468
07:45 AM	12	149	12	0	173	46	203	10	0	259	1	1	0	0	2	8	6	49	0	63	497
Total	27	631	39	0	697	178	773	16	0	967	1	2	4	0	7	31	8	166	0	205	1876
08:00 AM	13	151	13	0	177	55	194	13	0	262	0	0	1	0	1	9	8	40	0	57	497
08:15 AM	10	136	15	0	161	45	176	2	0	223	1	1	1	0	3	7	4	34	0	45	432
08:30 AM	15	156	18	0	189	37	176	7	0	220	1	3	5	0	9	17	5	38	0	60	478
08:45 AM	7	137	7	0	151	49	174	6	0	229	2	0	4	0	6	9	3	30	0	42	428
Total	45	580	53	0	678	186	720	28	0	934	4	4	11	0	19	42	20	142	0	204	1835
04:00 PM	6	220	7	0	233	37	203	16	0	256	9	3	13	0	25	12	10	67	0	89	603
04:15 PM	14	217	3	0	234	42	185	7	0	234	8	4	13	0	25	9	10	64	0	83	576
04:30 PM	14	198	14	0	226	53	192	10	0	255	9	15	24	0	48	10	10	54	0	74	603
04:45 PM	7	218	7	0	232	40	210	9	0	259	4	3	9	0	16	16	6	64	0	86	593
Total	41	853	31	0	925	172	790	42	0	1004	30	25	59	0	114	47	36	249	0	332	2375
05:00 PM	10	207	10	0	227	52	223	10	0	285	2	9	18	0	29	7	3	77	0	87	628
05:15 PM	5	211	21	0	237	58	185	7	0	250	4	6	12	0	22	8	4	49	0	61	570
05:30 PM	9	186	13	0	208	47	193	4	0	244	5	7	10	0	22	9	3	79	0	91	565
05:45 PM	16	199	12	0	227	40	193	5	0	238	4	9	12	0	25	11	8	51	0	70	560
Total	40	803	56	0	899	197	794	26	0	1017	15	31	52	0	98	35	18	256	0	309	2323
Grand Total	153	2867	179	0	3199	733	3077	112	0	3922	50	62	126	0	238	155	82	813	0	1050	8409
Apprch %	4.8	89.6	5.6	0		18.7	78.5	2.9	0		21	26.1	52.9	0		14.8	7.8	77.4	0		
Total %	1.8	34.1	2.1	0	38	8.7	36.6	1.3	0	46.6	0.6	0.7	1.5	0	2.8	1.8	1	9.7	0	12.5	
Lights	151	2678	174	0	3003	711	2896	111	0	3718	49	62	125	0	236	152	82	776	0	1010	7967
% Lights	98.7	93.4	97.2	0	93.9	97	94.1	99.1	0	94.8	98	100	99.2	0	99.2	98.1	100	95.4	0	96.2	94.7
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	2	189	5	0	196	22	181	1	0	204	1	0	1	0	2	3	0	37	0	40	442
% Trucks	1.3	6.6	2.8	0	6.1	3	5.9	0.9	0	5.2	2	0	0.8	0	0.8	1.9	0	4.6	0	3.8	5.3

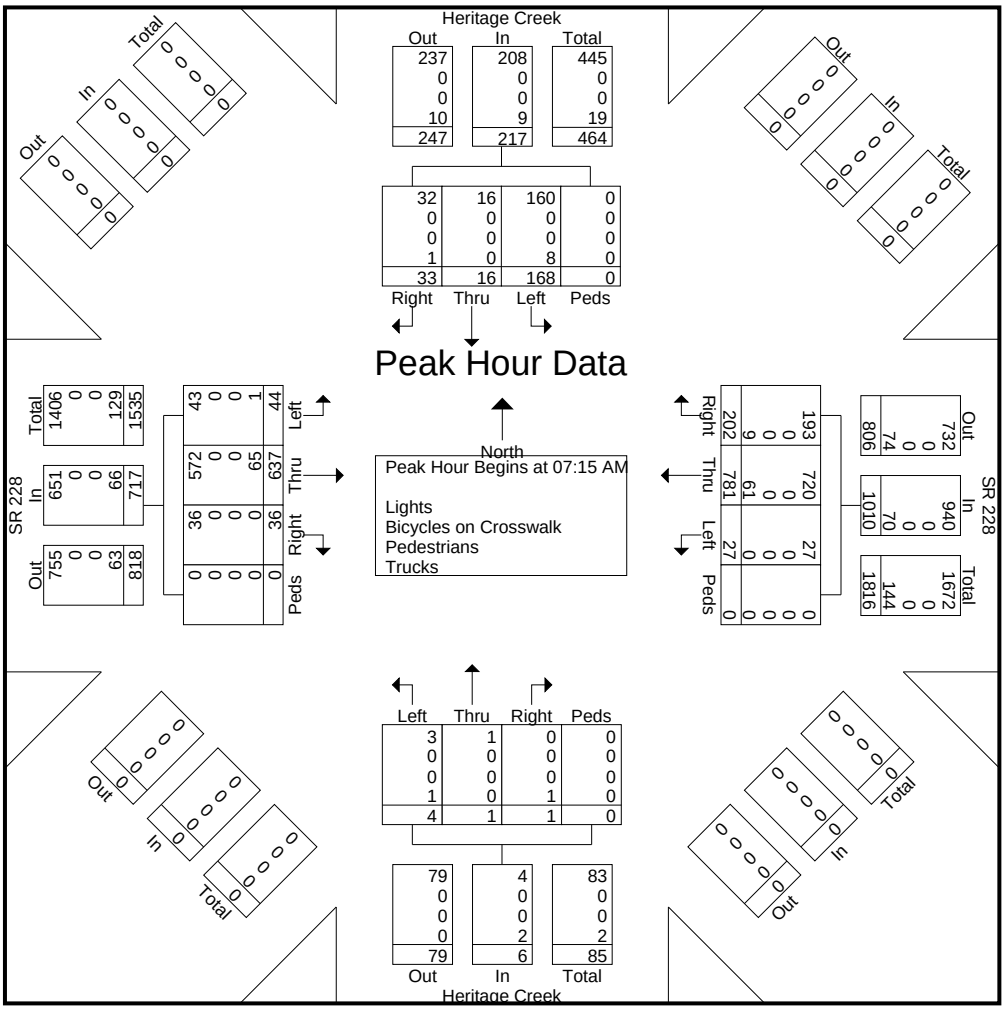
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Heritage Creek
Cloudy & 50's
Counted by WRA

File Name : 255 - SR 228 @ Heritage Creek 10-11-2016
Site Code : 255
Start Date : 10/11/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Heritage Creek Northbound					Heritage Creek Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	3	**176**	7	0	**186**	41	198	1	0	240	0	0	1	0	1	7	1	**53**			
07:30 AM	**8**	**161**	**12**	**0**	**181**	**60**	186	3	0	249	0	0	**2**	0	**2**	**9**	**1**	**26**	**0**	**36**	**468**
07:45 AM	**12**	**149**	**12**	**0**	**173**	**46**	**203**	**10**	**0**	**259**	**1**	**1**	**0**	**0**	**2**	**8**	**6**	**49**	**0**	**63**	**497**
08:00 AM	**13**		**13**					**13**		**262**	0	0	1	0	1	9	**8**	40	0	57	497
Total Volume	36	637	44	0	717	202	781	27	0	1010	1	1	4	0	6	33	16	168	0	217	1950
% App. Total	5	88.8	6.1	0		20	77.3	2.7	0		16.7	16.7	66.7	0		15.2	7.4	77.4	0		
PHF	.692	.905	.846	.000	.964	.842	.962	.519	.000	.964	.250	.250	.500	.000	.750	.917	.500	.792	.000	.861	.981
Lights	36	572	43	0	651	193	720	27	0	940	0	1	3	0	4	32	16	160	0	208	1803
% Lights	100	89.8	97.7	0	90.8	95.5	92.2	100	0	93.1	0	100	75.0	0	66.7	97.0	100	95.2	0	95.9	92.5
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	0	65	1	0	66	9	61	0	0	70	1	0	1	0	2	1	0	8	0	9	147
% Trucks	0	10.2	2.3	0	9.2	4.5	7.8	0	0	6.9	100	0	25.0	0	33.3	3.0	0	4.8	0	4.1	7.5



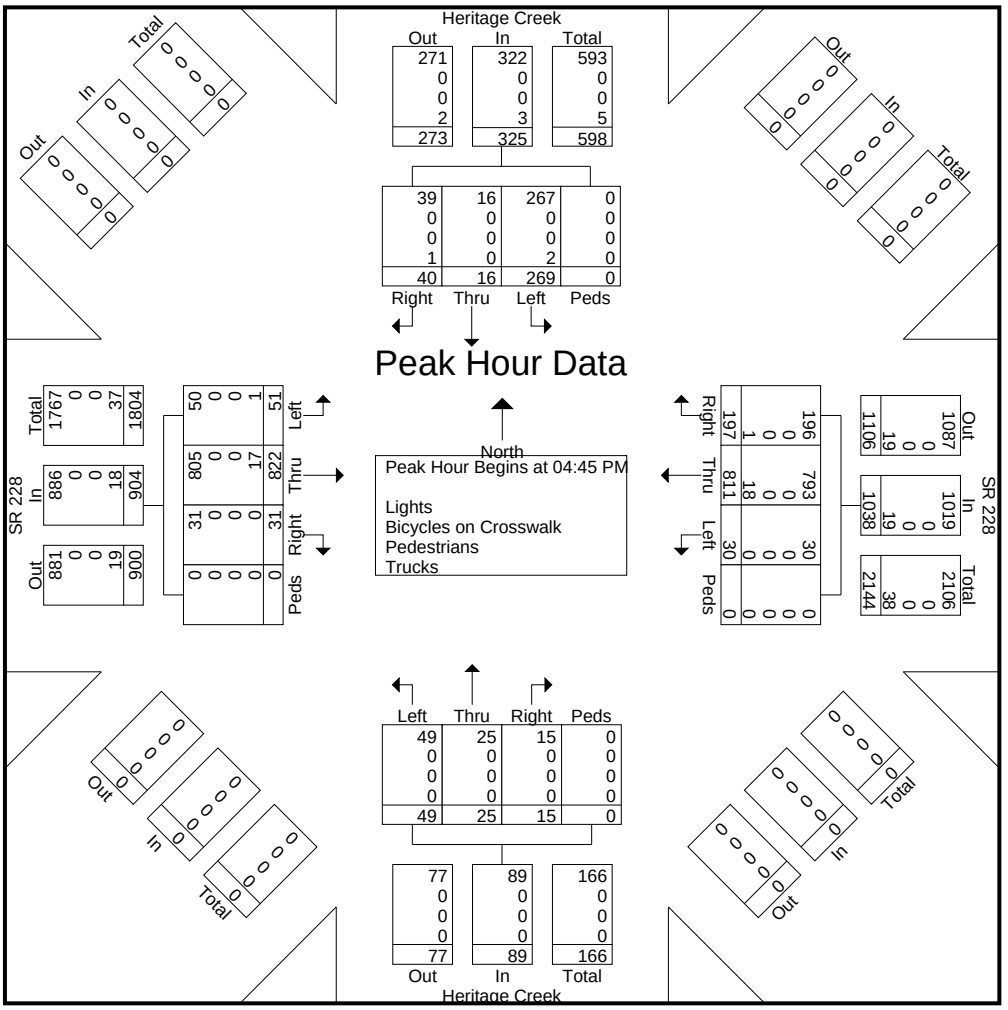
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Heritage Creek
Cloudy & 50's
Counted by WRA

File Name : 255 - SR 228 @ Heritage Creek 10-11-2016
Site Code : 255
Start Date : 10/11/2016

	SR 228 Eastbound					SR 228 Westbound					Heritage Creek Northbound					Heritage Creek Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	7	**218**	7	0	232	40	210	9	0	259	4	3	9	0	16	**16**	**6**	64	0	86	593
05:00 PM	**10**						**223**	**10**		**285**	2	**9**	**18**	0	**29**	7	3	77	0	87	**628**
05:15 PM	5	211	**21**		**237**	**58**	185	7	0	250	4	6	12	0	22	8	4	49	0	61	570
05:30 PM	9	186	13	0	208	47	193	4	0	244	**5**							**79**		**91**	565
Total Volume	31	822	51	0	904	197	811	30	0	1038	15	25	49	0	89	40	16	269	0	325	2356
% App. Total	3.4	90.9	5.6	0		19	78.1	2.9	0		16.9	28.1	55.1	0		12.3	4.9	82.8	0		
PHF	.775	.943	.607	.000	.954	.849	.909	.750	.000	.911	.750	.694	.681	.000	.767	.625	.667	.851	.000	.893	.938
Lights	31	805	50	0	886	196	793	30	0	1019	15	25	49	0	89	39	16	267	0	322	2316
% Lights	100	97.9	98.0	0	98.0	99.5	97.8	100	0	98.2	100	100	100	0	100	97.5	100	99.3	0	99.1	98.3
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	0	17	1	0	18	1	18	0	0	19	0	0	0	0	0	1	0	2	0	3	40
% Trucks	0	2.1	2.0	0	2.0	0.5	2.2	0	0	1.8	0	0	0	0	0	2.5	0	0.7	0	0.9	1.7



WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Scharberry Ln
Cloudy & 50's
Counted by WRA

File Name : 260 - SR 228 @ Scharberry Ln 10-08-2016
Site Code : 260
Start Date : 10/11/2016
Page No : 1

Groups Printed- Lights - Trucks

	SR 228 Eastbound					SR 228 Westbound					Scharberry Ln Northbound					Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	161	0	0	161	0	217	0	0	217	0	0	0	0	0	0	0	0	0	0	378
07:15 AM	1	226	0	0	227	0	208	0	0	208	0	0	0	0	0	0	0	0	0	0	435
07:30 AM	0	183	0	0	183	0	231	0	0	231	0	0	0	0	0	0	0	0	0	0	414
07:45 AM	2	196	0	0	198	0	248	0	0	248	0	0	0	0	0	0	0	0	0	0	446
Total	3	766	0	0	769	0	904	0	0	904	0	0	0	0	0	0	0	0	0	0	1673
08:00 AM	1	183	0	0	184	0	254	0	0	254	0	0	0	0	0	0	0	0	0	0	438
08:15 AM	0	162	0	0	162	0	220	1	0	221	0	0	0	0	0	0	0	0	0	0	383
08:30 AM	0	178	0	0	178	0	210	1	0	211	0	0	0	0	0	0	0	0	0	0	389
08:45 AM	0	190	0	0	190	0	215	0	0	215	0	0	0	0	0	0	0	0	0	0	405
Total	1	713	0	0	714	0	899	2	0	901	0	0	0	0	0	0	0	0	0	0	1615
04:00 PM	1	247	0	0	248	0	236	1	0	237	0	0	0	0	0	0	0	0	0	0	485
04:15 PM	1	292	0	0	293	0	224	1	0	225	0	0	0	0	0	0	0	0	0	0	518
04:30 PM	0	244	0	0	244	0	256	0	0	256	0	0	0	0	0	0	0	0	0	0	500
04:45 PM	0	282	0	0	282	0	263	1	0	264	0	0	0	0	0	0	0	0	0	0	546
Total	2	1065	0	0	1067	0	979	3	0	982	0	0	0	0	0	0	0	0	0	0	2049
05:00 PM	0	276	0	0	276	0	271	0	0	271	7	0	0	0	7	0	0	0	0	0	554
05:15 PM	1	267	0	0	268	0	234	0	0	234	5	0	0	0	5	0	0	0	0	0	507
05:30 PM	2	269	0	0	271	0	245	0	0	245	12	0	0	0	12	0	0	0	0	0	528
05:45 PM	0	247	0	0	247	0	226	2	0	228	9	0	0	0	9	0	0	0	0	0	484
Total	3	1059	0	0	1062	0	976	2	0	978	33	0	0	0	33	0	0	0	0	0	2073
Grand Total	9	3603	0	0	3612	0	3758	7	0	3765	33	0	0	0	33	0	0	0	0	0	7410
Apprch %	0.2	99.8	0	0		0	99.8	0.2	0		100	0	0	0		0	0	0	0		
Total %	0.1	48.6	0	0	48.7	0	50.7	0.1	0	50.8	0.4	0	0	0	0.4	0	0	0	0	0	
Lights	9	3391	0	0	3400	0	3572	7	0	3579	33	0	0	0	33	0	0	0	0	0	7012
% Lights	100	94.1	0	0	94.1	0	95.1	100	0	95.1	100	0	0	0	100	0	0	0	0	0	94.6
Trucks	0	212	0	0	212	0	186	0	0	186	0	0	0	0	0	0	0	0	0	0	398
% Trucks	0	5.9	0	0	5.9	0	4.9	0	0	4.9	0	0	0	0	0	0	0	0	0	0	5.4

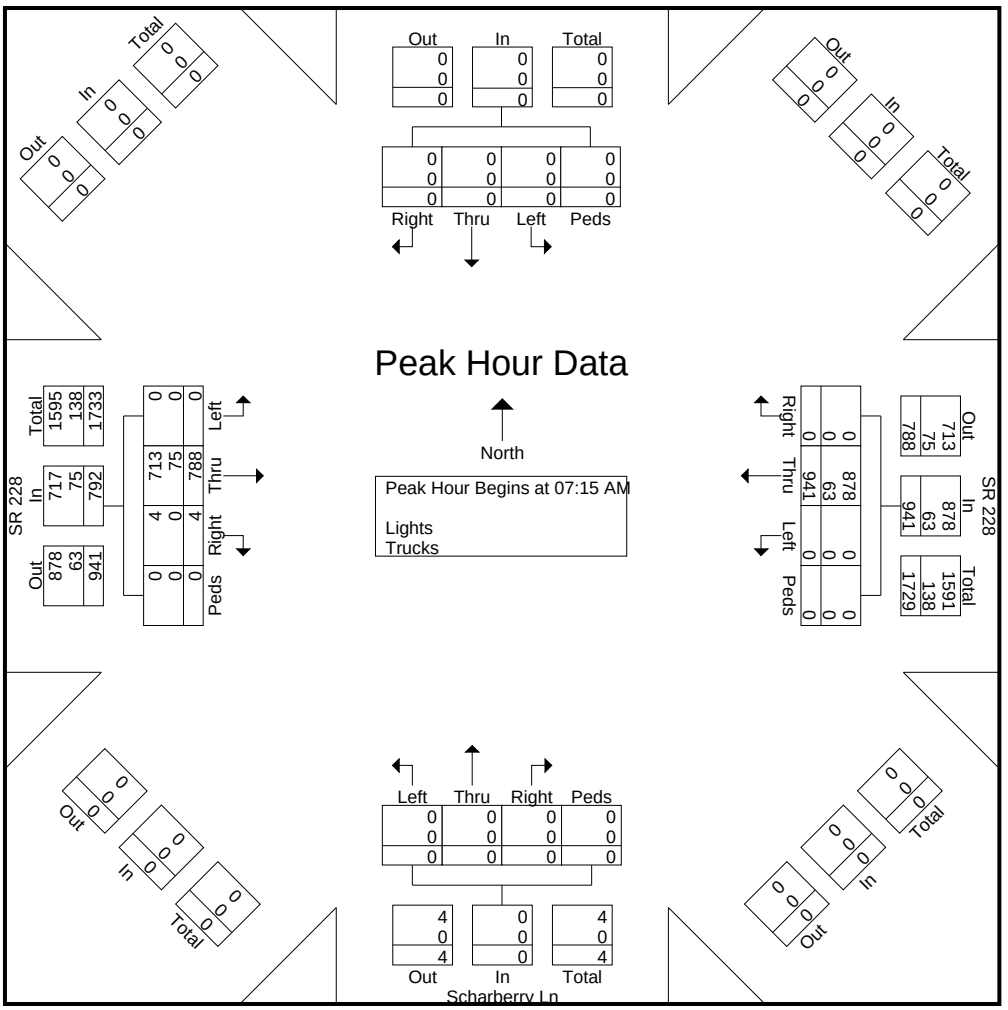
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Scharberry Ln
Cloudy & 50's
Counted by WRA

File Name : 260 - SR 228 @ Scharberry Ln 10-08-2016
Site Code : 260
Start Date : 10/11/2016

	SR 228 Eastbound					SR 228 Westbound					Scharberry Ln Northbound					Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	1	**226**	0	0	**227**	0	208	0	0	208	0	0	0	0	0	0	0	0	0	0	435
07:30 AM	0	183	0	0	183	0	231	0	0	231	0	0	0	0	0	0	0	0	0	0	414
07:45 AM	**2**																				**446**
08:00 AM	1	183	0	0	184	0	**254**			**254**	0	0	0	0	0	0	0	0	0	0	438
Total Volume	4	788	0	0	792	0	941	0	0	941	0	0	0	0	0	0	0	0	0	0	1733
% App. Total	0.5	99.5	0	0		0	100	0	0		0	0	0	0		0	0	0	0		
PHF	.500	.872	.000	.000	.872	.000	.926	.000	.000	.926	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.971
Lights	4	713	0	0	717	0	878	0	0	878	0	0	0	0	0	0	0	0	0	0	1595
% Lights	100	90.5	0	0	90.5	0	93.3	0	0	93.3	0	0	0	0	0	0	0	0	0	0	92.0
Trucks	0	75	0	0	75	0	63	0	0	63	0	0	0	0	0	0	0	0	0	0	138
% Trucks	0	9.5	0	0	9.5	0	6.7	0	0	6.7	0	0	0	0	0	0	0	0	0	0	8.0



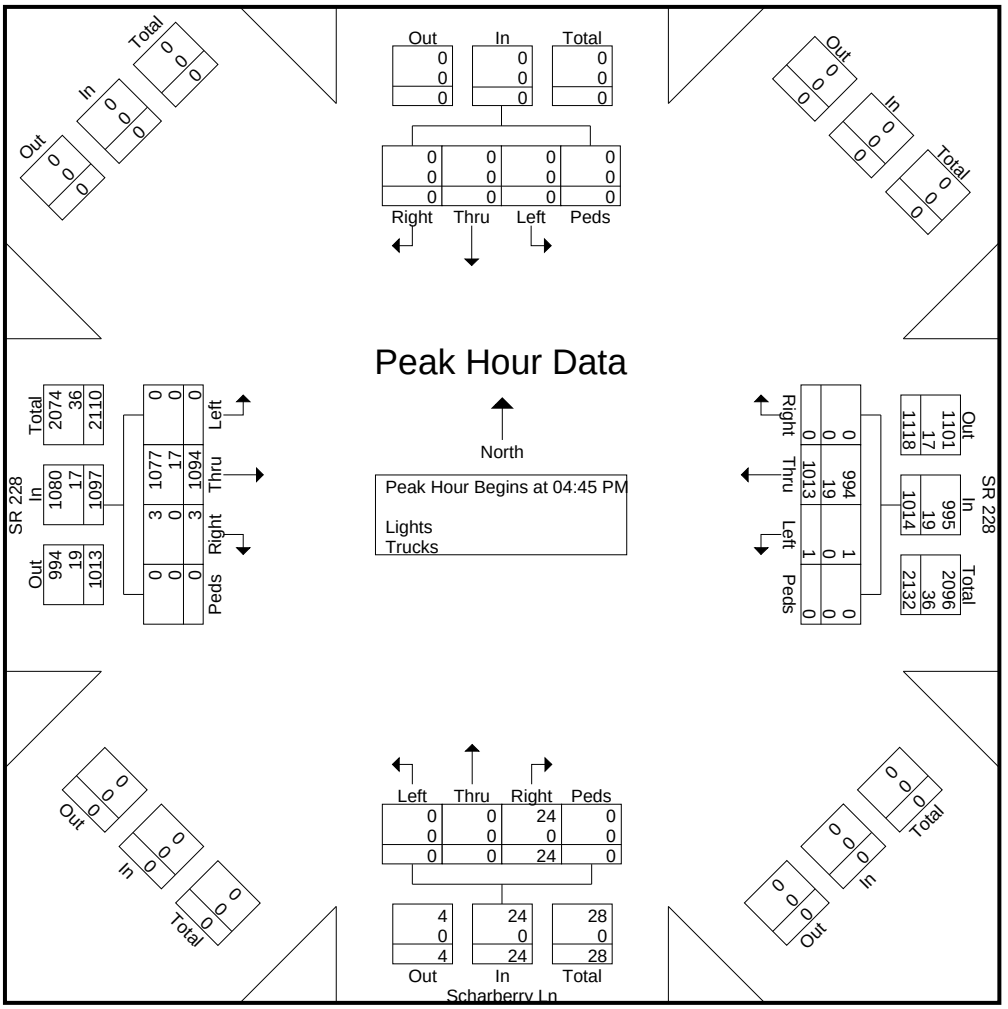
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Scharberry Ln
Cloudy & 50's
Counted by WRA

File Name : 260 - SR 228 @ Scharberry Ln 10-08-2016
Site Code : 260
Start Date : 10/11/2016
Page No : 3

	SR 228 Eastbound					SR 228 Westbound					Scharberry Ln Northbound					Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	**282**	0	0	**282**	0	263	**1**													
05:00 PM	**0**	**276**	**0**	**0**	**276**	**0**	**271**	**0**	**0**	**271**	7	0	0	0	7	0	0	0	0	0	**554**
05:15 PM	1	267	0	0	268	0	234	0	0	234	5	0	0	0	5	0	0	0	0	0	507
05:30 PM	**2**										**12**				**12**	0	0	0	0	0	528
Total Volume	3	1094	0	0	1097	0	1013	1	0	1014	24	0	0	0	24	0	0	0	0	0	2135
% App. Total																					
PHF	.375	.970	.000	.000	.973	.000	.935	.250	.000	.935	.500	.000	.000	.000	.500	.000	.000	.000	.000	.000	.963
Lights	3	1077	0	0	1080	0	994	1	0	995	24	0	0	0	24	0	0	0	0	0	2099
% Lights	100	98.4	0	0	98.5	0	98.1	100	0	98.1	100	0	0	0	100	0	0	0	0	0	98.3
Trucks	0	17	0	0	17	0	19	0	0	19	0	0	0	0	0	0	0	0	0	0	36
% Trucks	0	1.6	0	0	1.5	0	1.9	0	0	1.9	0	0	0	0	0	0	0	0	0	0	1.7



WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Beaver St Ext
Cloudy & 50's
Counted by WRA

File Name : 265 - SR 228 @ Beaver St Ext 10-11-2016
Site Code : 265
Start Date : 10/11/2016
Page No : 1

Groups Printed- Lights - Trucks

	SR 228 Eastbound					SR 228 Westbound					Northbound					Beaver St Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	146	12	0	158	1	194	0	0	195	0	0	0	0	0	23	0	0	0	23	376
07:15 AM	0	194	34	0	228	0	190	0	0	190	0	0	0	0	0	33	0	0	0	33	451
07:30 AM	0	155	24	0	179	0	218	0	0	218	0	0	0	0	0	30	0	0	0	30	427
07:45 AM	0	176	20	0	196	0	221	0	0	221	0	0	0	0	0	33	0	0	0	33	450
Total	0	671	90	0	761	1	823	0	0	824	0	0	0	0	0	119	0	0	0	119	1704
08:00 AM	0	168	5	0	173	0	227	0	0	227	0	0	0	0	0	28	0	0	0	28	428
08:15 AM	0	155	10	0	165	0	212	0	0	212	0	0	0	0	0	13	0	0	0	13	390
08:30 AM	0	164	13	0	177	0	193	0	0	193	0	0	0	0	0	23	0	0	0	23	393
08:45 AM	0	169	16	0	185	0	193	0	0	193	0	0	0	0	0	32	0	0	0	32	410
Total	0	656	44	0	700	0	825	0	0	825	0	0	0	0	0	96	0	0	0	96	1621
04:00 PM	0	214	32	0	246	3	209	0	0	212	0	0	0	0	0	30	0	0	0	30	488
04:15 PM	0	230	67	0	297	4	201	0	0	205	0	0	0	0	0	24	0	0	0	24	526
04:30 PM	0	192	41	0	233	1	225	0	0	226	0	0	0	0	0	35	0	1	0	36	495
04:45 PM	0	216	64	0	280	0	225	0	0	225	0	0	0	0	0	39	0	0	0	39	544
Total	0	852	204	0	1056	8	860	0	0	868	0	0	0	0	0	128	0	1	0	129	2053
05:00 PM	0	220	58	0	278	1	238	0	0	239	0	0	0	0	0	31	0	0	0	31	548
05:15 PM	0	203	72	0	275	0	207	0	0	207	0	0	0	0	0	30	0	0	0	30	512
05:30 PM	0	218	61	0	279	2	209	0	0	211	0	0	0	0	0	34	0	0	0	34	524
05:45 PM	0	201	53	0	254	1	201	0	0	202	0	0	0	0	0	25	0	0	0	25	481
Total	0	842	244	0	1086	4	855	0	0	859	0	0	0	0	0	120	0	0	0	120	2065
Grand Total	0	3021	582	0	3603	13	3363	0	0	3376	0	0	0	0	0	463	0	1	0	464	7443
Apprch %	0	83.8	16.2	0		0.4	99.6	0	0		0	0	0	0		99.8	0	0.2	0		
Total %	0	40.6	7.8	0	48.4	0.2	45.2	0	0	45.4	0	0	0	0	0	6.2	0	0	0	6.2	
Lights	0	2790	581	0	3371	13	3167	0	0	3180	0	0	0	0	0	462	0	1	0	463	7014
% Lights	0	92.4	99.8	0	93.6	100	94.2	0	0	94.2	0	0	0	0	0	99.8	0	100	0	99.8	94.2
Trucks	0	231	1	0	232	0	196	0	0	196	0	0	0	0	0	1	0	0	0	1	429
% Trucks	0	7.6	0.2	0	6.4	0	5.8	0	0	5.8	0	0	0	0	0	0.2	0	0	0	0.2	5.8

WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
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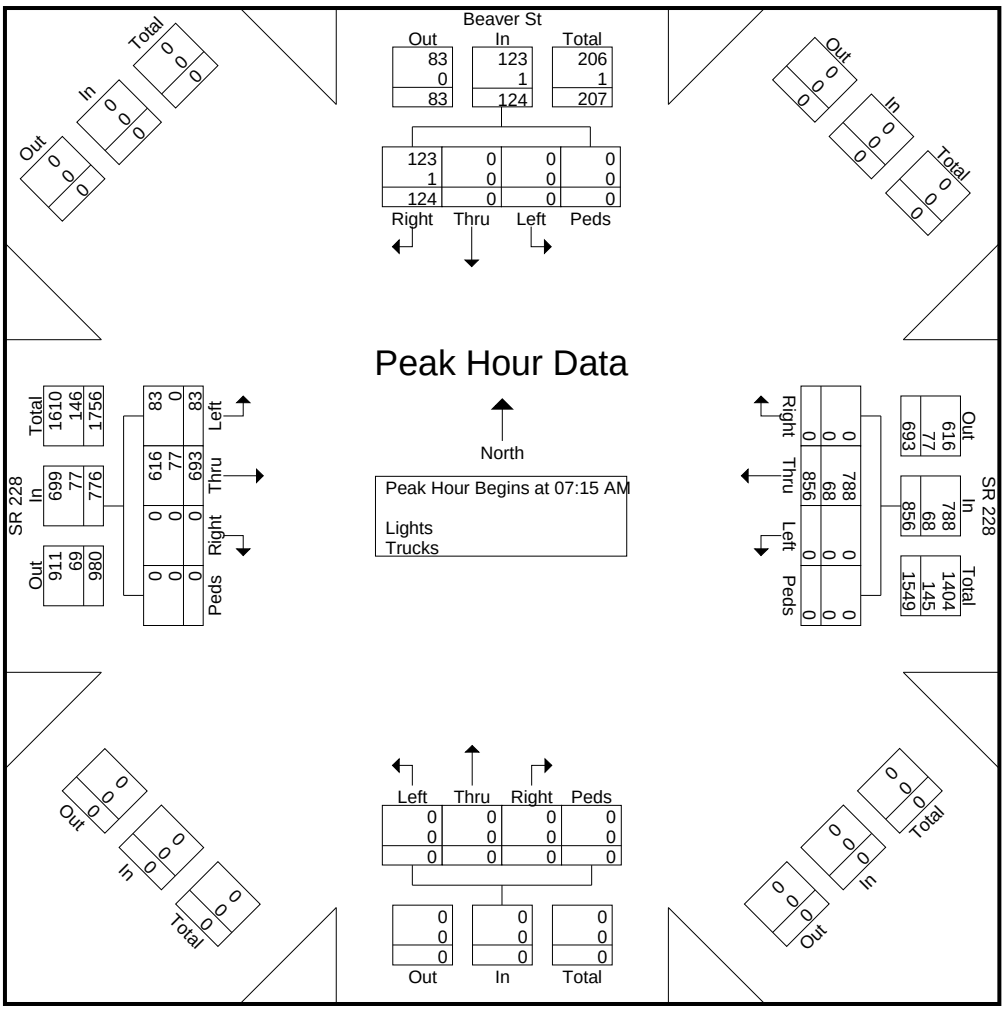
SR 228 Widening
Beaver St Ext
Cloudy & 50's
Counted by WRA

File Name : 265 - SR 228 @ Beaver St Ext 10-11-2016
Site Code : 265
Start Date : 10/11/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Northbound					Beaver St Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	**194**	**34**		**228**	0	190	0	0	190	0	0	0	0	0	**33**				**33**	**451**
07:30 AM	0	155	24	0	179	0	218	0	0	218	0	0	0	0	0	30	0	0	0	30	427
07:45 AM	0	176	20	0	196	0	221	0	0	221	0	0	0	0	0	33	0	0	0	33	450
08:00 AM	0	168	5	0	173	0	**227**			**227**	0	0	0	0	0	28	0	0	0	28	428
Total Volume	0	693	83	0	776	0	856	0	0	856	0	0	0	0	0	124	0	0	0	124	1756
% App. Total	0	89.3	10.7	0		0	100	0	0		0	0	0	0		100	0	0	0		
PHF	.000	.893	.610	.000	.851	.000	.943	.000	.000	.943	.000	.000	.000	.000	.000	.939	.000	.000	.000	.939	.973
Lights	0	616	83	0	699	0	788	0	0	788	0	0	0	0	0	123	0	0	0	123	1610
% Lights	0	88.9	100	0	90.1	0	92.1	0	0	92.1	0	0	0	0	0	99.2	0	0	0	99.2	91.7
Trucks	0	77	0	0	77	0	68	0	0	68	0	0	0	0	0	1	0	0	0	1	146
% Trucks	0	11.1	0	0	9.9	0	7.9	0	0	7.9	0	0	0	0	0	0.8	0	0	0	0.8	8.3



WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
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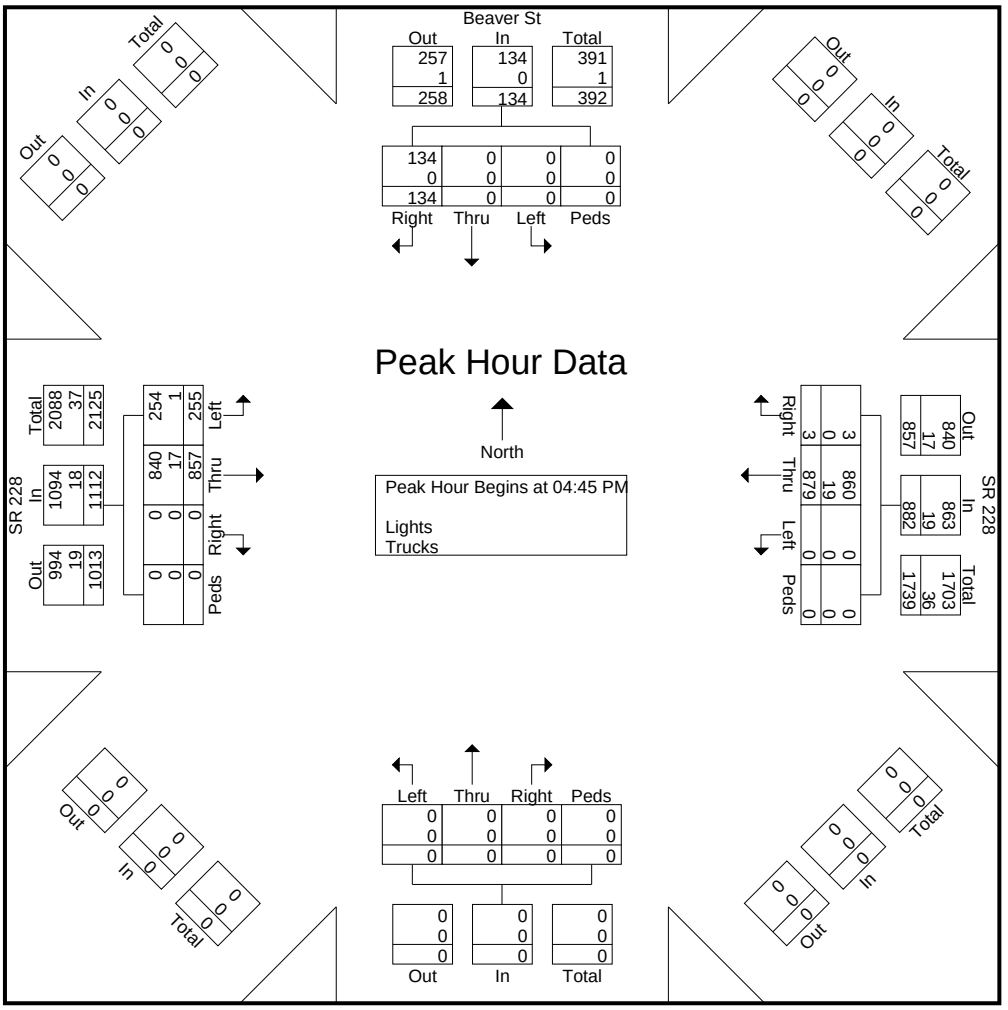
SR 228 Widening
Beaver St Ext
Cloudy & 50's
Counted by WRA

File Name : 265 - SR 228 @ Beaver St Ext 10-11-2016
Site Code : 265
Start Date : 10/11/2016
Page No : 3

	SR 228 Eastbound					SR 228 Westbound					Northbound					Beaver St Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	216	64	0	**280**	0	225	0	0	225	0	0	0	0	0	**39**				**39**	544
05:00 PM	0	**220**	58	0	278	1	**238**			**239**	0	0	0	0	0	31	0	0	0	31	**548**
05:15 PM	0	203	**72**																		
05:30 PM	**0**	**218**	**61**	**0**	**279**	**2**	209	0	0	211	0	0	0	0	0	34	0	0	0	34	524
Total Volume	0	857	255	0	1112	3	879	0	0	882	0	0	0	0	0	134	0	0	0	134	2128
% App. Total	0	77.1	22.9	0		0.3	99.7	0	0		0	0	0	0		100	0	0	0		
PHF	.000	.974	.885	.000	.993	.375	.923	.000	.000	.923	.000	.000	.000	.000	.000	.859	.000	.000	.000	.859	.971
Lights	0	840	254	0	1094	3	860	0	0	863	0	0	0	0	0	134	0	0	0	134	2091
% Lights	0	98.0	99.6	0	98.4	100	97.8	0	0	97.8	0	0	0	0	0	100	0	0	0	100	98.3
Trucks	0	17	1	0	18	0	19	0	0	19	0	0	0	0	0	0	0	0	0	0	37
% Trucks	0	2.0	0.4	0	1.6	0	2.2	0	0	2.2	0	0	0	0	0	0	0	0	0	0	1.7



Appendix A3:

Intersection Turning Movement Counts (Saturday)

WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Franklin Rd
Cloudy & 50's
Counted by WRA

File Name : 225 - SR 228 @ Franklin Rd 10-08-2016
Site Code : 225
Start Date : 10/8/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Franklin Rd Northbound					Franklin Rd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	6	188	35	0	229	13	220	18	0	251	21	24	26	0	71	21	31	24	0	76	627
11:15 AM	18	172	32	0	222	16	240	21	0	277	15	27	32	0	74	12	21	22	0	55	628
11:30 AM	18	194	37	0	249	13	240	13	0	266	16	19	29	0	64	17	37	24	0	78	657
11:45 AM	16	173	27	1	217	22	261	16	0	299	23	30	26	0	79	23	40	36	1	100	695
Total	58	727	131	1	917	64	961	68	0	1093	75	100	113	0	288	73	129	106	1	309	2607
12:00 PM	19	200	28	0	247	19	272	16	0	307	24	38	17	0	79	22	34	22	0	78	711
12:15 PM	22	188	22	0	232	23	279	34	0	336	29	28	21	0	78	23	31	23	0	77	723
12:30 PM	24	221	18	0	263	19	271	30	0	320	27	31	15	1	74	30	30	33	0	93	750
12:45 PM	17	199	25	0	241	13	226	16	0	255	24	34	19	0	77	17	42	37	0	96	669
Total	82	808	93	0	983	74	1048	96	0	1218	104	131	72	1	308	92	137	115	0	344	2853
Grand Total	140	1535					2009	164	0	2311	179	231	185	1	596	165	266	221	1	653	5460
Apprch %	7.4	80.8	11.8	0.1		6	86.9	7.1	0		30	38.8	31	0.2		25.3	40.7	33.8	0.2		
Total %	2.6	28.1	4.1	0	34.8	2.5	36.8	3	0	42.3	3.3	4.2	3.4	0	10.9	3	4.9	4	0	12	
Lights	140	1503	220	0	1863	135	1968	163	0	2266	177	230	182	0	589	161	264	220	0	645	5363
% Lights	100	97.9	98.2	0	98.1	97.8	98	99.4	0	98.1	98.9	99.6	98.4	0	98.8	97.6	99.2	99.5	0	98.8	98.2
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	3
% Pedestrians	0	0	0	100	0.1	0	0	0	0	0	0	0	0	100	0.2	0	0	0	100	0.2	0.1
Trucks	0	32	4	0	36	3	41	1	0	45	2	1	3	0	6	4	2	1	0	7	94
% Trucks	0	2.1	1.8	0	1.9	2.2	2	0.6	0	1.9	1.1	0.4	1.6	0	1	2.4	0.8	0.5	0	1.1	1.7

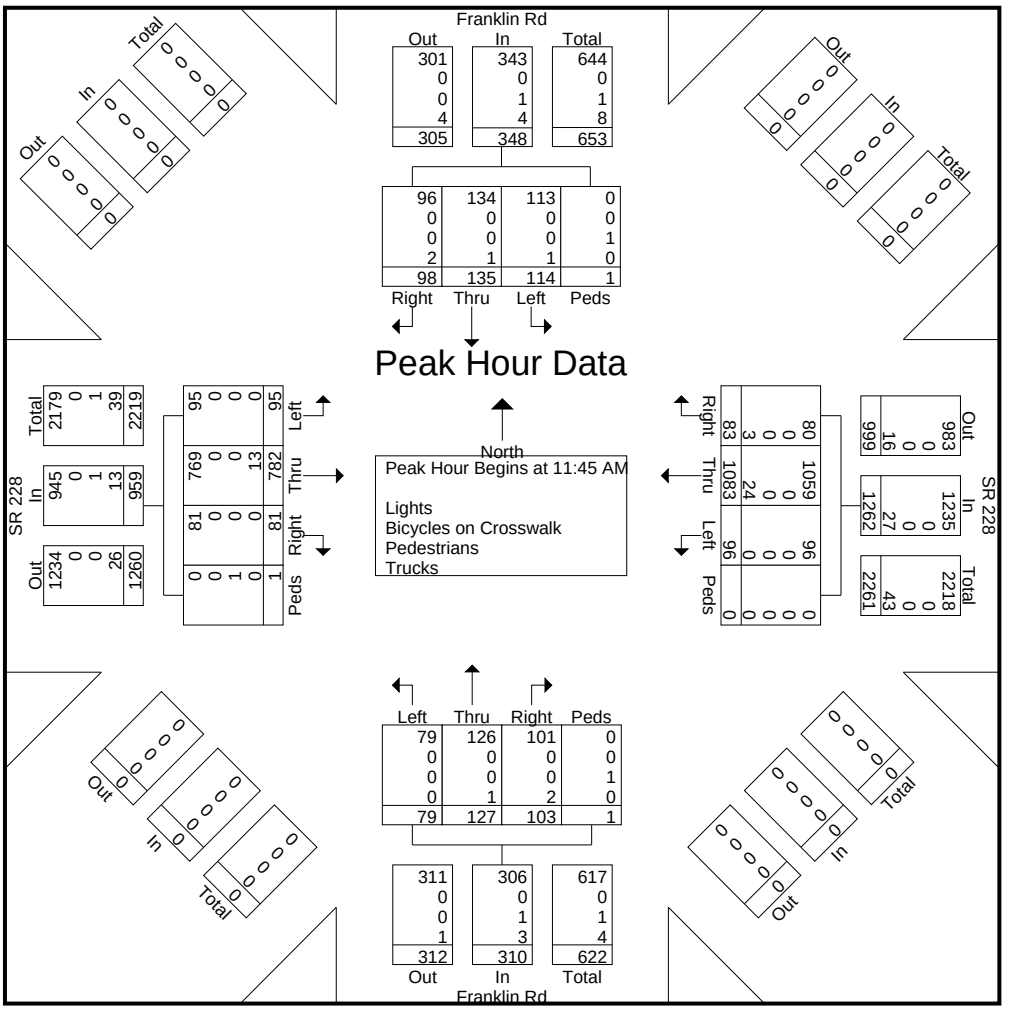
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Franklin Rd
Cloudy & 50's
Counted by WRA

File Name : 225 - SR 228 @ Franklin Rd 10-08-2016
Site Code : 225
Start Date : 10/8/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Franklin Rd Northbound					Franklin Rd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	16	173	27	**1**									**26**	0	**79**	23	**40**	**36**	**1**	**100**	695
12:00 PM	19	200	**28**									**38**									
12:15 PM	**22**	**188**	**22**	**0**	**232**	**23**	**279**	**34**	**0**	**336**	**29**	**28**	**21**	**0**	**78**	**23**	**31**	**23**	**0**	**77**	**723**
12:30 PM	**24**	**221**	18	0	**263**	19	271	30	0	320	27	31	15	**1**	**74**	**30**	**30**	**33**	**0**	**93**	**750**
Total Volume	81	782	95	1	959	83	1083	96	0	1262	103	127	79	1	310	98	135	114	1	348	2879
% App. Total																					
PHF	.844	.885	.848	.250	.912	.902	.970	.706	.000	.939	.888	.836	.760	.250	.981	.817	.844	.792	.250	.870	.960
Lights	81	769	95	0	945	80	1059	96	0	1235	101	126	79	0	306	96	134	113	0	343	2829
% Lights	100	98.3	100	0	98.5	96.4	97.8	100	0	97.9	98.1	99.2	100	0	98.7	98.0	99.3	99.1	0	98.6	98.3
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	3
% Pedestrians	0	0	0	100	0.1	0	0	0	0	0	0	0	0	100	0.3	0	0	0	100	0.3	0.1
Trucks	0	13	0	0	13	3	24	0	0	27	2	1	0	0	3	2	1	1	0	4	47
% Trucks	0	1.7	0	0	1.4	3.6	2.2	0	0	2.1	1.9	0.8	0	0	1.0	2.0	0.7	0.9	0	1.1	1.6



WRA
2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Castle Creek West
Cloudy & 50's
Counted by WRA

File Name : 230 - SR 228 @ Castle Creek West 10-08-2016
Site Code : 230
Start Date : 10/8/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Castle Creek West Northbound					High Point Dr Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	40	196	7	0	243	0	220	9	0	229	16	3	40	0	59	26	4	0	0	30	561
11:15 AM	33	170	8	0	211	0	238	17	0	255	11	4	39	0	54	15	6	0	0	21	541
11:30 AM	33	183	18	0	234	0	233	14	0	247	12	5	39	0	56	7	3	0	0	10	547
11:45 AM	39	177	7	0	223	0	257	14	0	271	16	4	30	0	50	9	2	0	0	11	555
Total	145	726	40	0	911	0	948	54	0	1002	55	16	148	0	219	57	15	0	0	72	2204
12:00 PM	22	200	16	0	238	0	276	12	1	289	14	2	39	0	55	8	0	0	1	9	591
12:15 PM	29	200	11	0	240	0	285	8	0	293	11	4	34	0	49	9	3	0	0	12	594
12:30 PM	32	237	8	0	277	0	249	14	0	263	12	2	36	0	50	11	1	0	0	12	602
12:45 PM	42	223	7	0	272	0	212	7	0	219	14	5	20	0	39	7	7	0	1	15	545
Total	125	860	42	0	1027	0	1022	41	1	1064	51	13	129	0	193	35	11	0	2	48	2332
Grand Total	270	1586					1970	95	1	2066	106	29	277	0	412	92	26	0	2	120	4536
Apprch %	13.9	81.8	4.2	0		0	95.4	4.6	0		25.7	7	67.2	0		76.7	21.7	0	1.7		
Total %	6	35	1.8	0	42.7	0	43.4	2.1	0	45.5	2.3	0.6	6.1	0	9.1	2	0.6	0	0	2.6	
Lights	268	1554	81	0	1903	0	1926	95	0	2021	105	29	276	0	410	91	26	0	0	117	4451
% Lights	99.3	98	98.8	0	98.2	0	97.8	100	0	97.8	99.1	100	99.6	0	99.5	98.9	100	0	0	97.5	98.1
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0.8	0
Pedestrians	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
% Pedestrians	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	50	0.8	0
Trucks	2	32	1	0	35	0	44	0	0	44	1	0	1	0	2	1	0	0	0	1	82
% Trucks	0.7	2	1.2	0	1.8	0	2.2	0	0	2.1	0.9	0	0.4	0	0.5	1.1	0	0	0	0.8	1.8

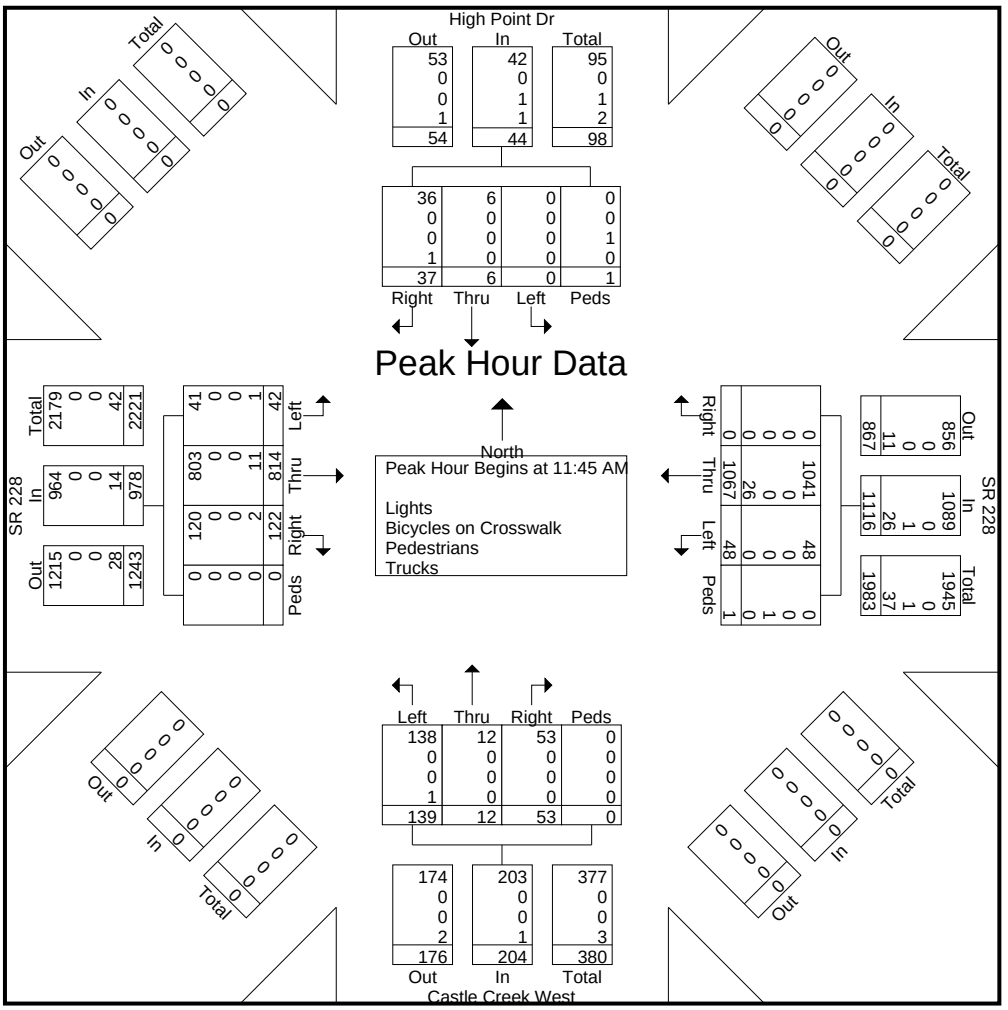
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Castle Creek West
Cloudy & 50's
Counted by WRA

File Name : 230 - SR 228 @ Castle Creek West 10-08-2016
Site Code : 230
Start Date : 10/8/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Castle Creek West Northbound					High Point Dr Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	**39**							**14**			**16**	**4**									
12:00 PM	**22**	**200**	**16**	**0**	**238**	**0**	**276**	**12**	**1**	289	14	2	**39**	0	**55**	8	0	0	**1**	**9**	**591**
12:15 PM	**29**	**200**	**11**	**0**	**240**	**0**	**285**	**8**	**0**	**293**	11	4	34	0	49	9	**3**	0	0	**12**	594
12:30 PM	32	**237**	8	0	**277**	0	249	14	0	263	12	2	36	0	50	**11**					**602**
Total Volume	122	814	42	0	978	0	1067	48	1	1116	53	12	139	0	204	37	6	0	1	44	2342
% App. Total																					
PHF	.782	.859	.656	.000	.883	.000	.936	.857	.250	.952	.828	.750	.891	.000	.927	.841	.500	.000	.250	.917	.973
Lights	120	803	41	0	964	0	1041	48	0	1089	53	12	138	0	203	36	6	0	0	42	2298
% Lights	98.4	98.6	97.6	0	98.6	0	97.6	100	0	97.6	100	100	99.3	0	99.5	97.3	100	0	0	95.5	98.1
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
% Pedestrians	0	0	0	0	0	0	0	0	100	0.1	0	0	0	0	0	0	0	0	100	2.3	0.1
Trucks	2	11	1	0	14	0	26	0	0	26	0	0	1	0	1	1	0	0	0	1	42
% Trucks	1.6	1.4	2.4	0	1.4	0	2.4	0	0	2.3	0	0	0.7	0	0.5	2.7	0	0	0	2.3	1.8



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Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Castle Creek East
Cloudy & 50's
Counted by WRA

File Name : 235 - SR 228 @ Castle Creek East 10-08-2016
Site Code : 235
Start Date : 10/8/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Castle Creek East Northbound					High Point Dr Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	7	190	9	0	206	4	213	13	0	230	8	3	7	0	18	9	1	4	0	14	468
11:15 AM	3	165	13	0	181	3	240	9	0	252	14	3	3	0	20	10	6	3	0	19	472
11:30 AM	2	171	18	0	191	3	235	9	1	248	11	5	2	0	18	7	2	1	0	10	467
11:45 AM	0	185	11	1	197	3	264	5	2	274	10	4	7	0	21	8	3	3	1	15	507
Total	12	711	51	1	775	13	952	36	3	1004	43	15	19	0	77	34	12	11	1	58	1914
12:00 PM	5	193	18	1	217	0	277	5	0	282	4	9	1	0	14	14	3	2	1	20	533
12:15 PM	6	194	9	0	209	4	272	9	0	285	12	7	4	0	23	6	6	2	0	14	531
12:30 PM	4	257	8	0	269	2	249	5	0	256	10	5	3	0	18	13	2	0	0	15	558
12:45 PM	7	211	9	0	227	3	214	8	0	225	9	3	3	0	15	7	2	4	0	13	480
Total	22	855	44	1	922	9	1012	27	0	1048	35	24	11	0	70	40	13	8	1	62	2102
Grand Total	34	1566					1964	63	3	2052	78	39	30	0	147	74	25	19	2	120	4016
Apprch %	2	92.3	5.6	0.1		1.1	95.7	3.1	0.1		53.1	26.5	20.4	0		61.7	20.8	15.8	1.7		
Total %	0.8	39	2.4	0	42.3	0.5	48.9	1.6	0.1	51.1	1.9	1	0.7	0	3.7	1.8	0.6	0.5	0	3	
Lights	34	1535	93	0	1662	22	1924	63	0	2009	78	39	30	0	147	73	25	19	0	117	3935
% Lights	100	98	97.9	0	97.9	100	98	100	0	97.9	100	100	100	0	100	98.6	100	100	0	97.5	98
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	2	0	0	0	3	3	0	0	0	0	0	0	0	0	2	2	7
% Pedestrians	0	0	0	100	0.1	0	0	0	100	0.1	0	0	0	0	0	0	0	0	100	1.7	0.2
Trucks	0	31	2	0	33	0	40	0	0	40	0	0	0	0	0	1	0	0	0	1	74
% Trucks	0	2	2.1	0	1.9	0	2	0	0	1.9	0	0	0	0	0	1.4	0	0	0	0.8	1.8

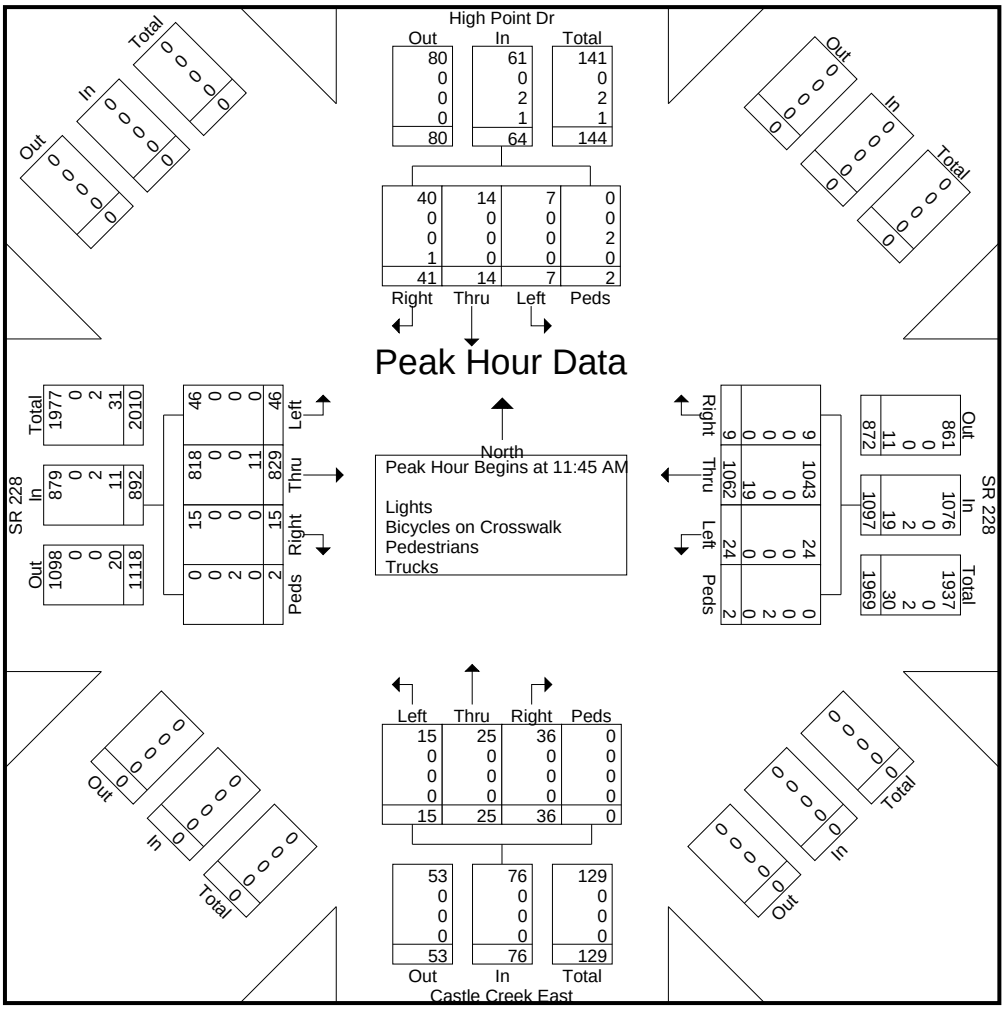
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Castle Creek East
Cloudy & 50's
Counted by WRA

File Name : 235 - SR 228 @ Castle Creek East 10-08-2016
Site Code : 235
Start Date : 10/8/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Castle Creek East Northbound					High Point Dr Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	185	11	**1**					**2**	274	10	4	**7**	0	21	8	3	**3**	**1**		
12:00 PM	**5**	**193**	**18**	**1**	**217**	**0**	**277**	**5**	**0**	**282**	**4**	**9**	**1**	**0**	**14**	**14**	**3**	**2**	**1**	**20**	533
12:15 PM	**6**					**4**	272	**9**		**285**	**12**				**23**	6	**6**	2	0	14	531
12:30 PM	4	**257**	8	0	**269**	2	249	5	0	256	10	5	3	0	18	13	2	0	0	15	**558**
Total Volume	15	829	46	2	892	9	1062	24	2	1097	36	25	15	0	76	41	14	7	2	64	2129
% App. Total																					
PHF	.625	.806	.639	.500	.829	.563	.958	.667	.250	.962	.750	.694	.536	.000	.826	.732	.583	.583	.500	.800	.954
Lights	15	818	46	0	879	9	1043	24	0	1076	36	25	15	0	76	40	14	7	0	61	2092
% Lights	100	98.7	100	0	98.5	100	98.2	100	0	98.1	100	100	100	0	100	97.6	100	100	0	95.3	98.3
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	2	0	0	0	2	2	0	0	0	0	0	0	0	0	2	2	6
% Pedestrians	0	0	0	100	0.2	0	0	0	100	0.2	0	0	0	0	0	0	0	0	100	3.1	0.3
Trucks	0	11	0	0	11	0	19	0	0	19	0	0	0	0	0	1	0	0	0	1	31
% Trucks	0	1.3	0	0	1.2	0	1.8	0	0	1.7	0	0	0	0	0	2.4	0	0	0	1.6	1.5



WRA
2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Seven Fields Blvd
Cloudy & 50's
Counted by WRA

File Name : 240 - SR 228 @ Seven Fields 10-08-2016
Site Code : 240
Start Date : 10/8/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Adams Shoppes Northbound					Seven Fields Blvd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	22	181	13	0	216	48	179	4	0	231	1	8	12	0	21	34	4	34	0	72	540
11:15 AM	21	146	13	0	180	38	221	3	0	262	4	9	11	0	24	20	15	35	0	70	536
11:30 AM	18	139	25	2	184	34	203	3	0	240	8	11	15	0	34	26	9	25	0	60	518
11:45 AM	19	149	20	0	188	43	226	6	0	275	2	5	17	0	24	28	3	49	0	80	567
Total	80	615	71	2	768	163	829	16	0	1008	15	33	55	0	103	108	31	143	0	282	2161
12:00 PM	22	155	30	2	209	39	231	1	0	271	4	12	17	0	33	33	3	28	0	64	577
12:15 PM	18	176	19	0	213	36	243	2	0	281	4	6	10	0	20	31	5	23	0	59	573
12:30 PM	19	211	19	0	249	51	220	2	0	273	5	7	16	0	28	19	9	39	0	67	617
12:45 PM	26	189	22	0	237	31	175	4	0	210	9	1	15	0	25	36	6	35	0	77	549
Total	85	731	90	2	908	157	869	9	0	1035	22	26	58	0	106	119	23	125	0	267	2316
Grand Total	165	1346	161	4	1676	320	1698	25	0	2043	37	59	113	0	209	227	54	268	0	549	4477
Apprch %	9.8	80.3	9.6	0.2		15.7	83.1	1.2	0		17.7	28.2	54.1	0		41.3	9.8	48.8	0		
Total %	3.7	30.1	3.6	0.1	37.4	7.1	37.9	0.6	0	45.6	0.8	1.3	2.5	0	4.7	5.1	1.2	6	0	12.3	
Lights	165	1316	159	0	1640	320	1657	24	0	2001	37	59	113	0	209	226	54	267	0	547	4397
% Lights	100	97.8	98.8	0	97.9	100	97.6	96	0	97.9	100	100	100	0	100	99.6	100	99.6	0	99.6	98.2
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
% Pedestrians	0	0	0	100	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Trucks	0	30	2	0	32	0	41	1	0	42	0	0	0	0	0	1	0	1	0	2	76
% Trucks	0	2.2	1.2	0	1.9	0	2.4	4	0	2.1	0	0	0	0	0	0.4	0	0.4	0	0.4	1.7

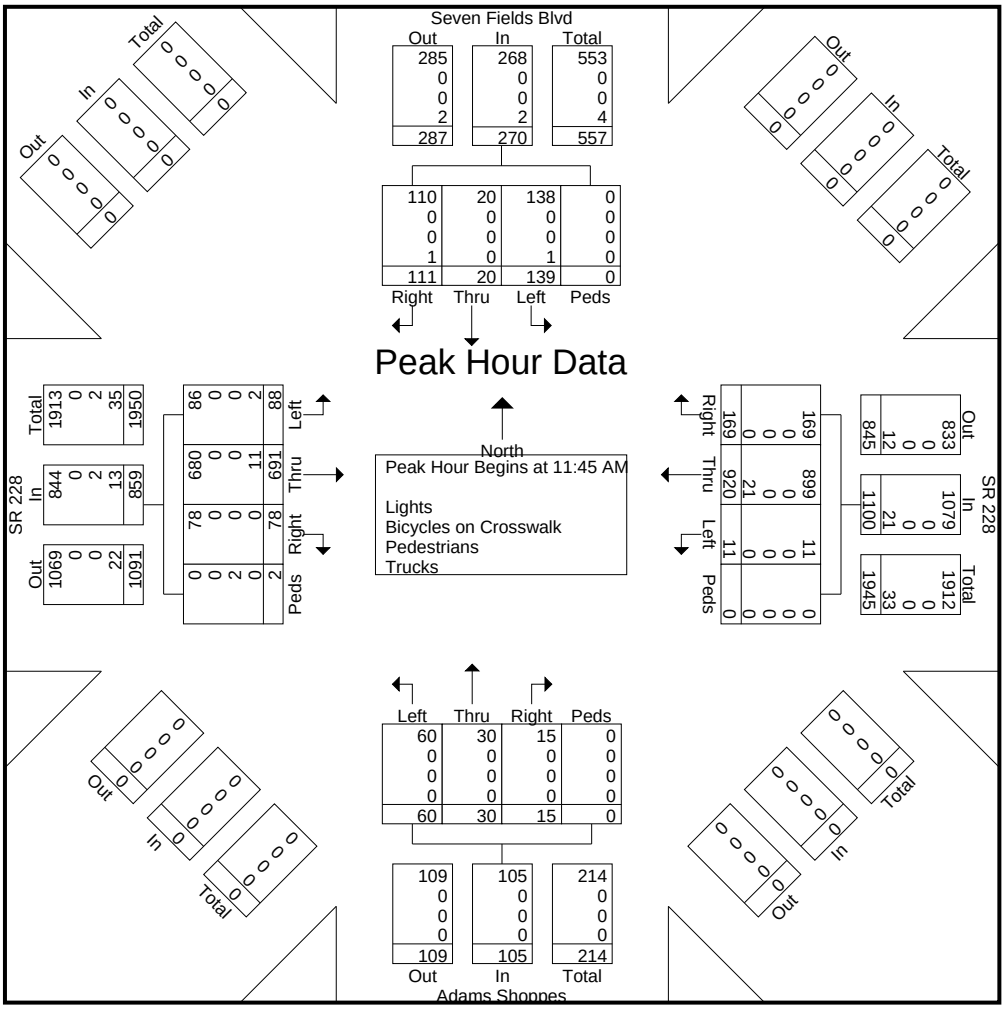
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Seven Fields Blvd
Cloudy & 50's
Counted by WRA

File Name : 240 - SR 228 @ Seven Fields 10-08-2016
Site Code : 240
Start Date : 10/8/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Adams Shoppes Northbound					Seven Fields Blvd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	19	149	20	0	188	43	226	**6**					**17**	0	24	28	3	**49**		**80**	567
12:00 PM	**22**		**30**	**2**								**12**			**33**	**33**					
12:15 PM	**18**	**176**	**19**	**0**	**213**	**36**	**243**	**2**	**0**	**281**	4	6	10	0	20	31	5	23	0	59	573
12:30 PM	19	**211**	19	0	**249**	**51**	220	2	0	273	**5**						**9**	39	0	67	**617**
Total Volume	78	691	88	2	859	169	920	11	0	1100	15	30	60	0	105	111	20	139	0	270	2334
% App. Total	9.1	80.4	10.2	0.2		15.4	83.6	1	0		14.3	28.6	57.1	0		41.1	7.4	51.5	0		
PHF	.886	.819	.733	.250	.862	.828	.947	.458	.000	.979	.750	.625	.882	.000	.795	.841	.556	.709	.000	.844	.946
Lights	78	680	86	0	844	169	899	11	0	1079	15	30	60	0	105	110	20	138	0	268	2296
% Lights	100	98.4	97.7	0	98.3	100	97.7	100	0	98.1	100	100	100	0	100	99.1	100	99.3	0	99.3	98.4
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Pedestrians	0	0	0	100	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Trucks	0	11	2	0	13	0	21	0	0	21	0	0	0	0	0	1	0	1	0	2	36
% Trucks	0	1.6	2.3	0	1.5	0	2.3	0	0	1.9	0	0	0	0	0	0.9	0	0.7	0	0.7	1.5



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2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Adams Ridge Rd
Cloudy & 50's
Counted by WRA

File Name : 245 - SR 228 @ Adams Ridge Rd 10-08-2016
Site Code : 245
Start Date : 10/8/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Adams Ridge Rd Northbound					Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	46	158	0	0	204	0	175	28	0	203	24	0	62	0	86	0	0	0	0	0	493
11:15 AM	49	139	0	0	188	0	202	21	0	223	27	0	59	0	86	0	0	0	0	0	497
11:30 AM	40	140	0	0	180	0	190	28	0	218	31	0	59	0	90	0	0	0	0	0	488
11:45 AM	59	146	0	0	205	0	219	30	0	249	26	0	57	0	83	0	0	0	0	0	537
Total	194	583	0	0	777	0	786	107	0	893	108	0	237	0	345	0	0	0	0	0	2015
12:00 PM	38	141	0	0	179	0	204	34	0	238	28	0	66	0	94	0	0	0	0	0	511
12:15 PM	51	147	0	0	198	0	219	28	0	247	17	0	62	0	79	0	0	0	0	0	524
12:30 PM	64	192	0	0	256	0	211	27	0	238	29	0	58	0	87	0	0	0	0	0	581
12:45 PM	42	182	0	0	224	0	159	42	0	201	21	0	50	0	71	0	0	0	0	0	496
Total	195	662	0	0	857	0	793	131	0	924	95	0	236	0	331	0	0	0	0	0	2112
Grand Total	389	1245	0	0	1634	0	1579	238	0	1817	203	0	473	0	676	0	0	0	0	0	4127
Apprch %	23.8	76.2	0	0		0	86.9	13.1	0		30	0	70	0		0	0	0	0		
Total %	9.4	30.2	0	0	39.6	0	38.3	5.8	0	44	4.9	0	11.5	0	16.4	0	0	0	0	0	
Lights	387	1217	0	0	1604	0	1539	235	0	1774	201	0	469	0	670	0	0	0	0	0	4048
% Lights	99.5	97.8	0	0	98.2	0	97.5	98.7	0	97.6	99	0	99.2	0	99.1	0	0	0	0	0	98.1
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	2	28	0	0	30	0	40	3	0	43	2	0	4	0	6	0	0	0	0	0	79
% Trucks	0.5	2.2	0	0	1.8	0	2.5	1.3	0	2.4	1	0	0.8	0	0.9	0	0	0	0	0	1.9

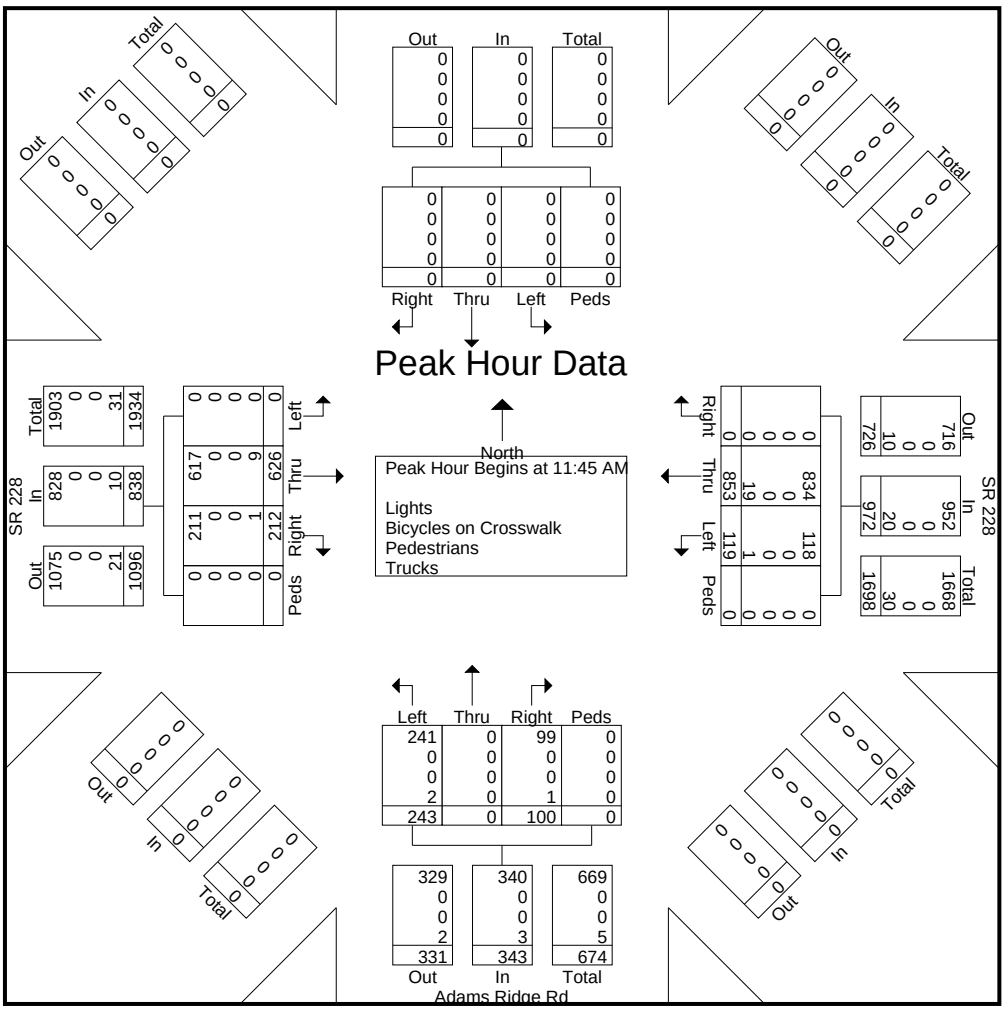
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Adams Ridge Rd
Cloudy & 50's
Counted by WRA

File Name : 245 - SR 228 @ Adams Ridge Rd 10-08-2016
Site Code : 245
Start Date : 10/8/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Adams Ridge Rd Northbound					Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	59	146	0	0	205	0	**219**			**249**	26	0	57	0	83	0	0	0	0	0	537
12:00 PM	38	141	0	0	179	0	204	**34**					**66**	0	**94**	0	0	0	0	0	511
12:15 PM	51	147	0	0	198	0	219	28	0	247	17	0	62	0	79	0	0	0	0	0	524
12:30 PM	**64**	**192**	0	0	**256**	0	211	27	0	238	**29**										**581**
Total Volume	212	626	0	0	838	0	853	119	0	972	100	0	243	0	343	0	0	0	0	0	2153
% App. Total	25.3	74.7	0	0		0	87.8	12.2	0		29.2	0	70.8	0		0	0	0	0		
PHF	.828	.815	.000	.000	.818	.000	.974	.875	.000	.976	.862	.000	.920	.000	.912	.000	.000	.000	.000	.000	.926
Lights	211	617	0	0	828	0	834	118	0	952	99	0	241	0	340	0	0	0	0	0	2120
% Lights	99.5	98.6	0	0	98.8	0	97.8	99.2	0	97.9	99.0	0	99.2	0	99.1	0	0	0	0	0	98.5
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	1	9	0	0	10	0	19	1	0	20	1	0	2	0	3	0	0	0	0	0	33
% Trucks	0.5	1.4	0	0	1.2	0	2.2	0.8	0	2.1	1.0	0	0.8	0	0.9	0	0	0	0	0	1.5



WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Myoma Rd
Cloudy & 50's
Counted by WRA

File Name : 250 - SR 228 @ Myoma Rd 10-08-2016
Site Code : 250
Start Date : 10/8/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Northbound					Myoma Rd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	0	168	16	0	184	2	196	0	0	198	0	0	0	0	0	10	0	4	0	14	396
11:15 AM	0	146	16	0	162	9	206	0	0	215	0	0	0	0	0	11	0	8	0	19	396
11:30 AM	0	152	20	0	172	6	205	0	0	211	0	0	0	0	0	13	0	1	0	14	397
11:45 AM	0	155	12	0	167	4	250	0	0	254	0	0	0	0	0	10	0	4	0	14	435
Total	0	621	64	0	685	21	857	0	0	878	0	0	0	0	0	44	0	17	0	61	1624
12:00 PM	0	166	10	0	176	14	228	0	0	242	0	0	0	0	0	16	0	0	0	16	434
12:15 PM	0	151	13	0	164	9	223	0	0	232	0	0	0	0	0	12	0	2	0	14	410
12:30 PM	0	205	16	0	221	7	229	0	0	236	0	0	0	0	0	10	0	1	0	11	468
12:45 PM	0	185	21	0	206	4	193	0	0	197	0	0	0	0	0	11	0	3	0	14	417
Total	0	707	60	0	767	34	873	0	0	907	0	0	0	0	0	49	0	6	0	55	1729
Grand Total	0	1328	124	0	1452	55	1730	0	0	1785	0	0	0	0	0	93	0	23	0	116	3353
Apprch %	0	91.5	8.5	0		3.1	96.9	0	0		0	0	0	0		80.2	0	19.8	0		
Total %	0	39.6	3.7	0	43.3	1.6	51.6	0	0	53.2	0	0	0	0	0	2.8	0	0.7	0	3.5	
Lights	0	1304	122	0	1426	54	1692	0	0	1746	0	0	0	0	0	92	0	21	0	113	3285
% Lights	0	98.2	98.4	0	98.2	98.2	97.8	0	0	97.8	0	0	0	0	0	98.9	0	91.3	0	97.4	98
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	0	24	2	0	26	1	38	0	0	39	0	0	0	0	0	1	0	2	0	3	68
% Trucks	0	1.8	1.6	0	1.8	1.8	2.2	0	0	2.2	0	0	0	0	0	1.1	0	8.7	0	2.6	2

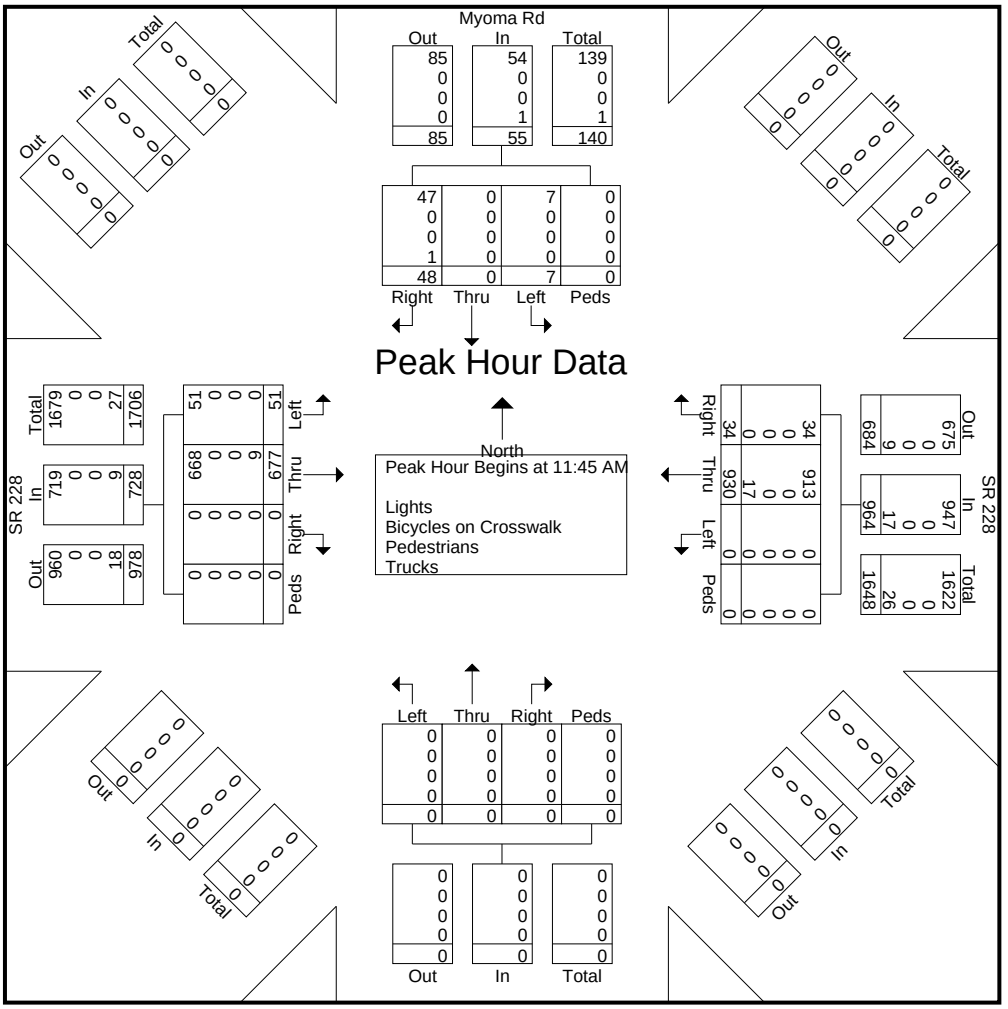
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Myoma Rd
Cloudy & 50's
Counted by WRA

File Name : 250 - SR 228 @ Myoma Rd 10-08-2016
Site Code : 250
Start Date : 10/8/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Northbound					Myoma Rd Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	155	12	0	167	4	**250**			**254**	0	0	0	0	0	10	0	**4**			
12:00 PM	**0**	**166**	**10**	**0**	**176**	**14**	228	0	0	242	0	0	0	0	0	**16**	**0**	**0**	**0**	**16**	434
12:15 PM	0	151	13	0	164	9	223	0	0	232	0	0	0	0	0	12	0	2	0	14	410
12:30 PM	0	**205**	**16**		**221**	7	229	0	0	236	0	0	0	0	0	10	0	1	0	11	**468**
Total Volume	0	677	51	0	728	34	930	0	0	964	0	0	0	0	0	48	0	7	0	55	1747
% App. Total	0	93	7	0		3.5	96.5	0	0		0	0	0	0		87.3	0	12.7	0		
PHF	.000	.826	.797	.000	.824	.607	.930	.000	.000	.949	.000	.000	.000	.000	.000	.750	.000	.438	.000	.859	.933
Lights	0	668	51	0	719	34	913	0	0	947	0	0	0	0	0	47	0	7	0	54	1720
% Lights	0	98.7	100	0	98.8	100	98.2	0	0	98.2	0	0	0	0	0	97.9	0	100	0	98.2	98.5
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	0	9	0	0	9	0	17	0	0	17	0	0	0	0	0	1	0	0	0	1	27
% Trucks	0	1.3	0	0	1.2	0	1.8	0	0	1.8	0	0	0	0	0	2.1	0	0	0	1.8	1.5



WRA
2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Heritage Creek
Cloudy & 50's
Counted by WRA

File Name : 255 - SR 228 @ Heritage Creek 10-08-2016
Site Code : 255
Start Date : 10/8/2016
Page No : 1

Groups Printed- Lights - Bicycles on Crosswalk - Pedestrians - Trucks

	SR 228 Eastbound					SR 228 Westbound					Heritage Creek Northbound					Heritage Creek Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	12	159	4	0	175	23	185	7	0	215	3	1	8	0	12	10	2	30	0	42	444
11:15 AM	2	144	8	0	154	26	200	5	0	231	4	0	8	0	12	8	1	25	0	34	431
11:30 AM	8	150	5	0	163	22	197	5	0	224	1	1	9	0	11	7	2	26	0	35	433
11:45 AM	7	143	9	0	159	21	249	5	0	275	1	1	6	0	8	5	0	26	0	31	473
Total	29	596	26	0	651	92	831	22	0	945	9	3	31	0	43	30	5	107	0	142	1781
12:00 PM	9	153	6	0	168	28	222	9	0	259	1	1	5	0	7	13	4	38	0	55	489
12:15 PM	4	139	13	0	156	30	226	8	0	264	1	1	5	0	7	9	1	27	0	37	464
12:30 PM	9	187	9	0	205	20	221	8	0	249	3	4	8	0	15	8	2	31	0	41	510
12:45 PM	5	170	12	0	187	18	180	7	0	205	4	3	18	0	25	8	1	29	0	38	455
Total	27	649	40	0	716	96	849	32	0	977	9	9	36	0	54	38	8	125	0	171	1918
Grand Total	56	1245	66	0	1367	188	1680	54	0	1922	18	12	67	0	97	68	13	232	0	313	3699
Apprch %	4.1	91.1	4.8	0		9.8	87.4	2.8	0		18.6	12.4	69.1	0		21.7	4.2	74.1	0		
Total %	1.5	33.7	1.8	0	37	5.1	45.4	1.5	0	52	0.5	0.3	1.8	0	2.6	1.8	0.4	6.3	0	8.5	
Lights	55	1217	65	0	1337	188	1644	52	0	1884	18	12	66	0	96	66	13	231	0	310	3627
% Lights	98.2	97.8	98.5	0	97.8	100	97.9	96.3	0	98	100	100	98.5	0	99	97.1	100	99.6	0	99	98.1
Bicycles on Crosswalk																					
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	1	28	1	0	30	0	36	2	0	38	0	0	1	0	1	2	0	1	0	3	72
% Trucks	1.8	2.2	1.5	0	2.2	0	2.1	3.7	0	2	0	0	1.5	0	1	2.9	0	0.4	0	1	1.9

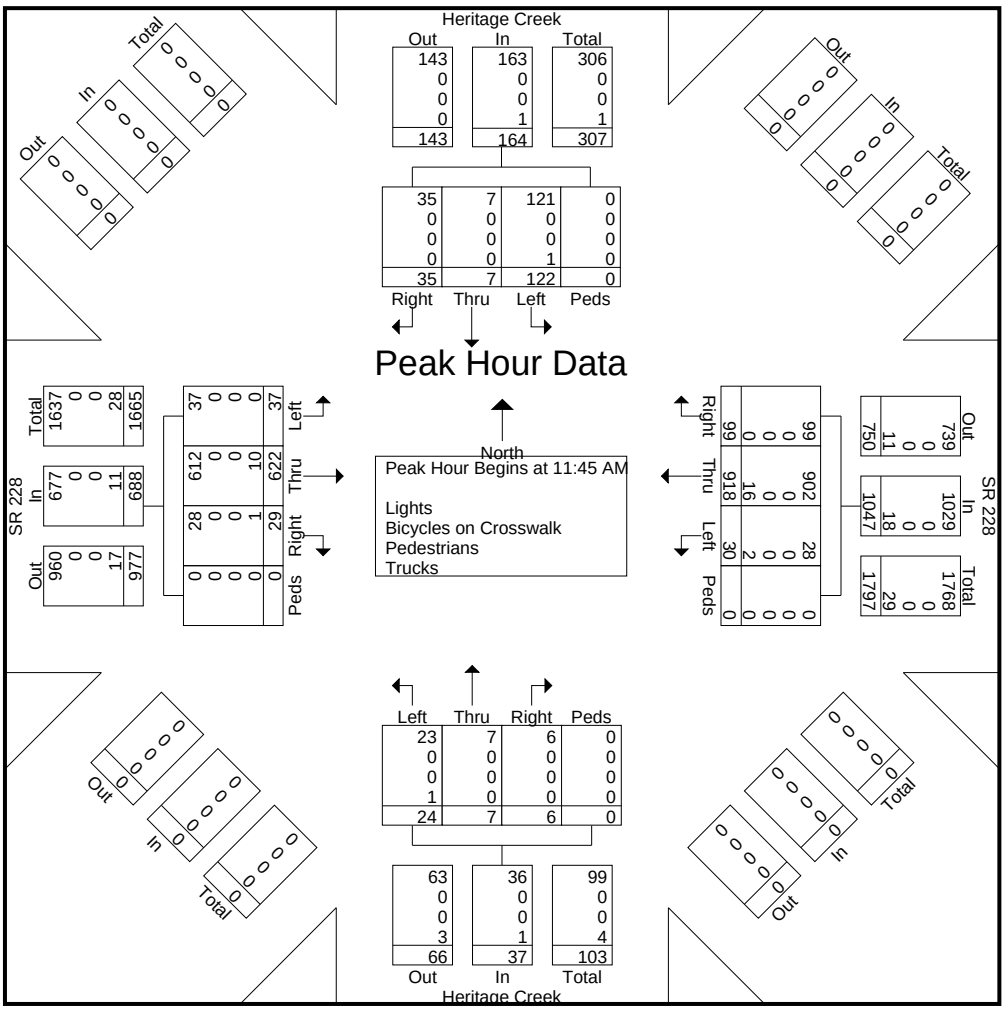
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Heritage Creek
Cloudy & 50's
Counted by WRA

File Name : 255 - SR 228 @ Heritage Creek 10-08-2016
Site Code : 255
Start Date : 10/8/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Heritage Creek Northbound					Heritage Creek Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	7	143	9	0	159	21	**249**			**275**	1	1	6	0	8	5	0	26	0	31	473
12:00 PM	**9**							**9**								**13**	**4**	**38**		**55**	489
12:15 PM	4	139	**13**			**30**	226	8	0	264	1	1	5	0	7	9	1	27	0	37	464
12:30 PM	9	**187**	9	0	**205**	20	221	8	0	249	**3**	**4**	**8**	0	**15**	8	2	31	0	41	**510**
Total Volume	29	622	37	0	688	99	918	30	0	1047	6	7	24	0	37	35	7	122	0	164	1936
% App. Total	4.2	90.4	5.4	0		9.5	87.7	2.9	0		16.2	18.9	64.9	0		21.3	4.3	74.4	0		
PHF	.806	.832	.712	.000	.839	.825	.922	.833	.000	.952	.500	.438	.750	.000	.617	.673	.438	.803	.000	.745	.949
Lights	28	612	37	0	677	99	902	28	0	1029	6	7	23	0	36	35	7	121	0	163	1905
% Lights	96.6	98.4	100	0	98.4	100	98.3	93.3	0	98.3	100	100	95.8	0	97.3	100	100	99.2	0	99.4	98.4
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	1	10	0	0	11	0	16	2	0	18	0	0	1	0	1	0	0	1	0	1	31
% Trucks	3.4	1.6	0	0	1.6	0	1.7	6.7	0	1.7	0	0	4.2	0	2.7	0	0	0.8	0	0.6	1.6



WRA
2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Scharberry Ln
Cloudy & 50's
Counted by WRA

File Name : 260 - SR 228 @ Scharberry Ln 10-08-2016
Site Code : 260
Start Date : 10/8/2016
Page No : 1

Groups Printed- Lights - Trucks

	SR 228 Eastbound					SR 228 Westbound					Scharberry Ln Northbound					Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	0	183	0	0	183	0	214	0	0	214	2	0	0	0	2	0	0	0	0	0	399
11:15 AM	0	164	0	0	164	0	227	0	0	227	1	0	0	0	1	0	0	0	0	0	392
11:30 AM	0	185	0	0	185	0	223	0	0	223	1	0	0	0	1	0	0	0	0	0	409
11:45 AM	0	164	0	0	164	0	271	0	0	271	2	0	0	0	2	0	0	0	0	0	437
Total	0	696	0	0	696	0	935	0	0	935	6	0	0	0	6	0	0	0	0	0	1637
12:00 PM	0	176	0	0	176	0	250	0	0	250	4	0	0	0	4	0	0	0	0	0	430
12:15 PM	1	175	0	0	176	0	264	1	0	265	1	0	1	0	2	0	0	0	0	0	443
12:30 PM	1	200	0	0	201	0	246	1	0	247	3	0	0	0	3	0	0	0	0	0	451
12:45 PM	0	222	0	0	222	0	201	0	0	201	9	0	0	0	9	0	0	0	0	0	432
Total	2	773	0	0	775	0	961	2	0	963	17	0	1	0	18	0	0	0	0	0	1756
Grand Total	2	1469	0	0	1471	0	1896	2	0	1898	23	0	1	0	24	0	0	0	0	0	3393
Apprch %	0.1	99.9	0	0		0	99.9	0.1	0		95.8	0	4.2	0		0	0	0	0		
Total %	0.1	43.3	0	0	43.4	0	55.9	0.1	0	55.9	0.7	0	0	0	0.7	0	0	0	0	0	
Lights	2	1438	0	0	1440	0	1856	2	0	1858	22	0	1	0	23	0	0	0	0	0	3321
% Lights	100	97.9	0	0	97.9	0	97.9	100	0	97.9	95.7	0	100	0	95.8	0	0	0	0	0	97.9
Trucks	0	31	0	0	31	0	40	0	0	40	1	0	0	0	1	0	0	0	0	0	72
% Trucks	0	2.1	0	0	2.1	0	2.1	0	0	2.1	4.3	0	0	0	4.2	0	0	0	0	0	2.1

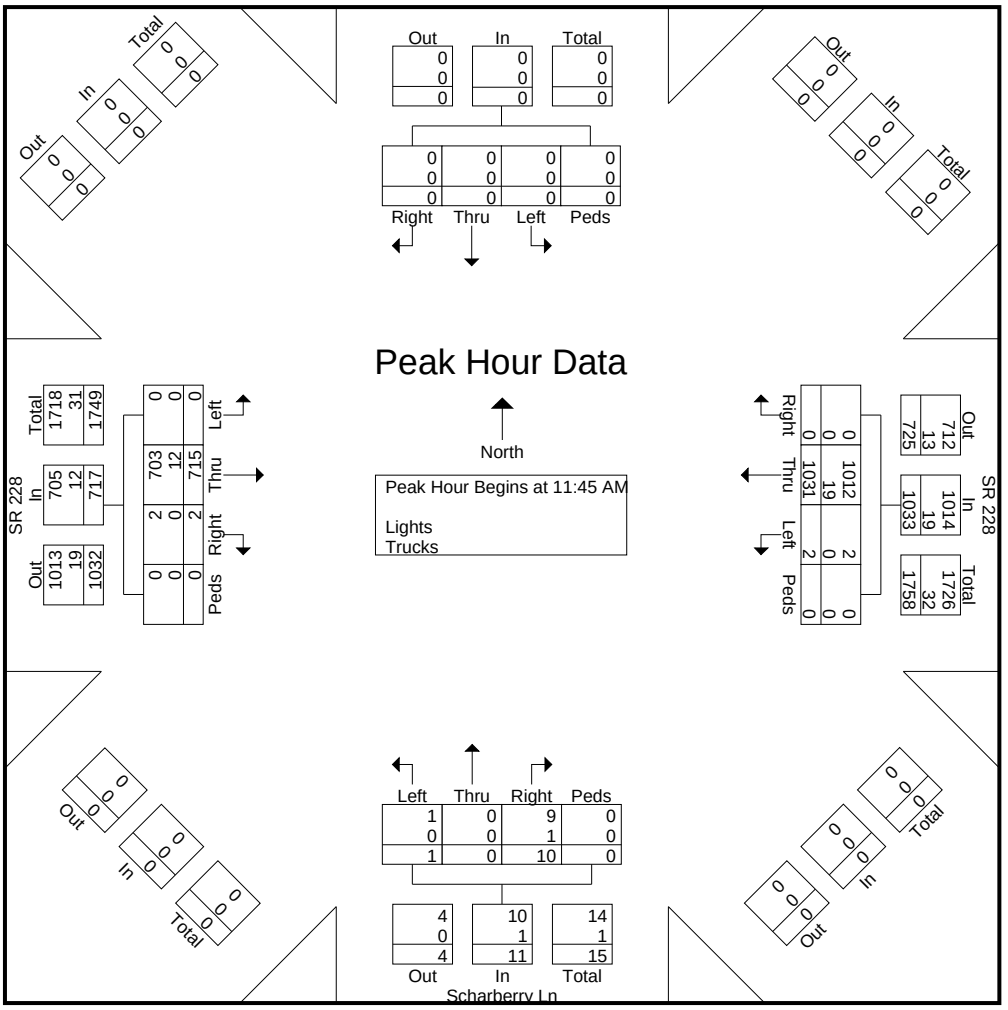
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Scharberry Ln
Cloudy & 50's
Counted by WRA

File Name : 260 - SR 228 @ Scharberry Ln 10-08-2016
Site Code : 260
Start Date : 10/8/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Scharberry Ln Northbound					Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	164	0	0	164	0	**271**			**271**	2	0	0	0	2	0	0	0	0	0	437
12:00 PM	0	176	0	0	176	0	250	0	0	250	**4**				**4**	0	0	0	0	0	430
12:15 PM	**1**							**1**					**1**	0	2	0	0	0	0	0	443
12:30 PM	1	**200**	0	0	**201**	0	246	1	0	247	3	0	0	0	3	0	0	0	0	0	**451**
Total Volume	2	715	0	0	717	0	1031	2	0	1033	10	0	1	0	11	0	0	0	0	0	1761
% App. Total																					
PHF	.500	.894	.000	.000	.892	.000	.951	.500	.000	.953	.625	.000	.250	.000	.688	.000	.000	.000	.000	.000	.976
Lights	2	703	0	0	705	0	1012	2	0	1014	9	0	1	0	10	0	0	0	0	0	1729
% Lights	100	98.3	0	0	98.3	0	98.2	100	0	98.2	90.0	0	100	0	90.9	0	0	0	0	0	98.2
Trucks	0	12	0	0	12	0	19	0	0	19	1	0	0	0	1	0	0	0	0	0	32
% Trucks	0	1.7	0	0	1.7	0	1.8	0	0	1.8	10.0	0	0	0	9.1	0	0	0	0	0	1.8



WRA
2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Beaver St Ext
Cloudy & 50's
Counted by WRA

File Name : 265 - SR 228 @ Beaver St Ext 10-08-2016
Site Code : 265
Start Date : 10/8/2016
Page No : 1

Groups Printed- Lights - Trucks

	SR 228 Eastbound					SR 228 Westbound					Northbound					Beaver St Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	0	168	16	0	184	0	190	0	0	190	0	0	0	0	0	24	0	0	0	24	398
11:15 AM	0	138	26	0	164	0	193	0	0	193	0	0	0	0	0	33	0	0	0	33	390
11:30 AM	0	158	28	0	186	1	198	0	0	199	0	0	0	0	0	27	0	0	0	27	412
11:45 AM	0	142	24	0	166	0	237	0	0	237	0	0	0	0	0	29	0	0	0	29	432
Total	0	606	94	0	700	1	818	0	0	819	0	0	0	0	0	113	0	0	0	113	1632
12:00 PM	0	154	25	0	179	0	221	0	0	221	0	0	0	0	0	28	0	0	0	28	428
12:15 PM	0	147	25	0	172	1	236	0	0	237	0	0	0	0	0	27	0	0	0	27	436
12:30 PM	0	179	26	0	205	1	219	0	0	220	0	0	0	0	0	28	0	0	0	28	453
12:45 PM	0	211	18	0	229	0	184	0	0	184	0	0	0	0	0	17	0	0	0	17	430
Total	0	691	94	0	785	2	860	0	0	862	0	0	0	0	0	100	0	0	0	100	1747
Grand Total	0	1297	188	0	1485	3	1678	0	0	1681	0	0	0	0	0	213	0	0	0	213	3379
Apprch %	0	87.3	12.7	0		0.2	99.8	0	0		0	0	0	0		100	0	0	0		
Total %	0	38.4	5.6	0	43.9	0.1	49.7	0	0	49.7	0	0	0	0	0	6.3	0	0	0	6.3	
Lights	0	1275	187	0	1462	3	1634	0	0	1637	0	0	0	0	0	211	0	0	0	211	3310
% Lights	0	98.3	99.5	0	98.5	100	97.4	0	0	97.4	0	0	0	0	0	99.1	0	0	0	99.1	98
Trucks	0	22	1	0	23	0	44	0	0	44	0	0	0	0	0	2	0	0	0	2	69
% Trucks	0	1.7	0.5	0	1.5	0	2.6	0	0	2.6	0	0	0	0	0	0.9	0	0	0	0.9	2

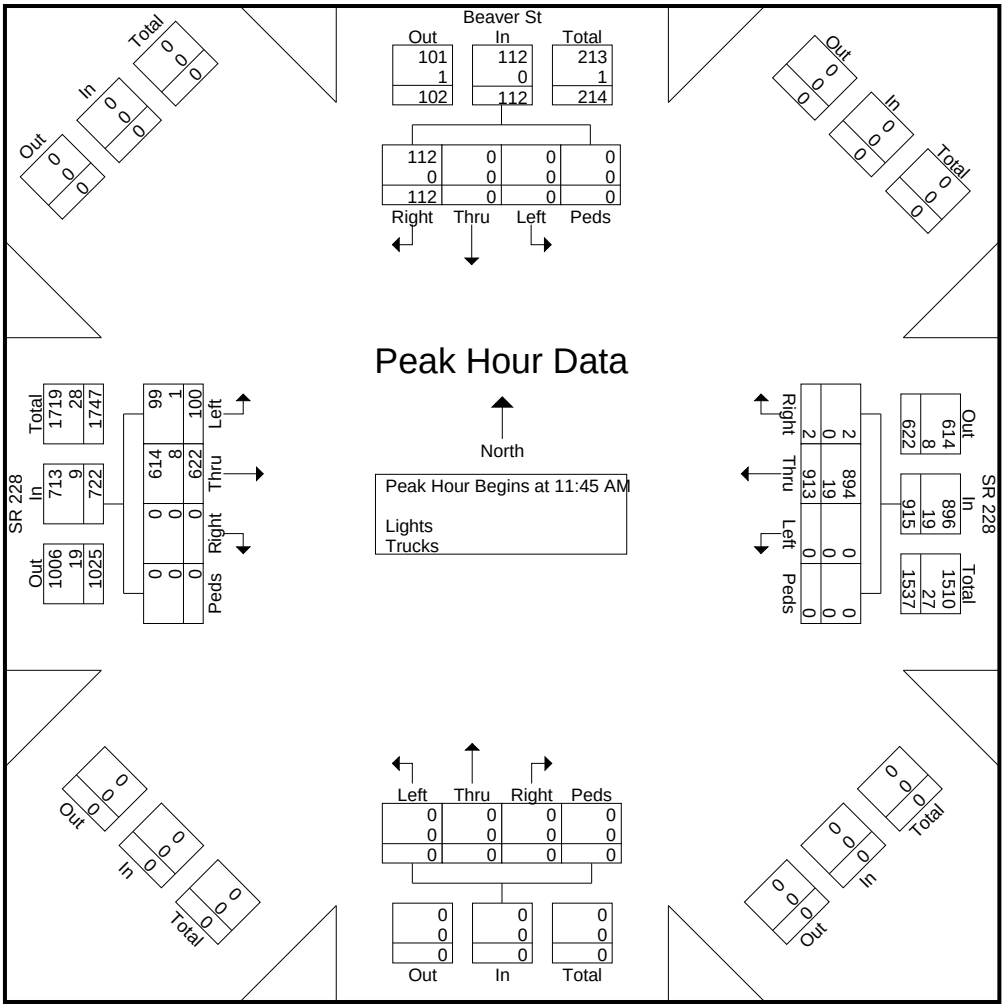
WRA

2009 MacKenzie Way, Suite 240
Cranberry Twp, PA 16066
724.779.7940

SR 228 Widening
Beaver St Ext
Cloudy & 50's
Counted by WRA

File Name : 265 - SR 228 @ Beaver St Ext 10-08-2016
Site Code : 265
Start Date : 10/8/2016
Page No : 2

	SR 228 Eastbound					SR 228 Westbound					Northbound					Beaver St Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	142	24	0	166	0	**237**			**237**	0	0	0	0	0	**29**				**29**	432
12:00 PM	0	154	25	0	179	0	221	0	0	221	0	0	0	0	0	28	0	0	0	28	428
12:15 PM	0	147	25	0	172	**1**	236	0	0	237	0	0	0	0	0	27	0	0	0	27	436
12:30 PM	0	**179**	**26**		**205**	1	219	0	0	220	0	0	0	0	0	28	0	0	0	28	**453**
Total Volume	0	622	100	0	722	2	913	0	0	915	0	0	0	0	0	112	0	0	0	112	1749
% App. Total	0	86.1	13.9	0		0.2	99.8	0	0		0	0	0	0		100	0	0	0		
PHF	.000	.869	.962	.000	.880	.500	.963	.000	.000	.965	.000	.000	.000	.000	.000	.966	.000	.000	.000	.966	.965
Lights	0	614	99	0	713	2	894	0	0	896	0	0	0	0	0	112	0	0	0	112	1721
% Lights	0	98.7	99.0	0	98.8	100	97.9	0	0	97.9	0	0	0	0	0	100	0	0	0	100	98.4
Trucks	0	8	1	0	9	0	19	0	0	19	0	0	0	0	0	0	0	0	0	0	28
% Trucks	0	1.3	1.0	0	1.2	0	2.1	0	0	2.1	0	0	0	0	0	0	0	0	0	0	1.6



Appendix B

Traffic Volume Balancing and Projection Data

Contents:

- 2016 Base Year
- 2025 Opening Year
- 2045 Design Year

Appendix B1:

2016 Base Year

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Base Year - Volumes Balancing

Project: SR 228 - Mars RR Bridge West Expansion
Location: SR 228 (Mars Rd) - Cranberry Township
Date: 12/28/2016

Time Period: AM Peak
Compiled By: Lauren Weimer
Reviewed By: CDR

Color Coding Legend

- Decreased Volume
- Changed +5 to 10 Vehicles
- Changed +15 to 20 Vehicles
- Changed + >20 Vehicles
- Allowed Imbalance

Raw Original Volumes

Enter raw peak hour volumes from traffic count data

225

		EB		
	853	60 / 707 / 86	1139	
603	Out/In	SR 228	Out/In	466
NB	79 / 127 / 65	Franklin Rd / TEV:2833 / 10/11/2016	62 / 337 / 67	SB
271	Out/In	7:15 am to 8:15 am	Out/In	252
	206	998	39	
	839	WB	1243	
-7			21	

230

	832	150 / 673 / 9	1222	
264	Out/In	SR 228	Out/In	45
230	86 / 8 / 33	Castle Creek West / TEV:2214 / 10/11/2016	27 / 14 / 4	
127	Out/In	7:15 am to 8:15 am	Out/In	18
	100	1109	1	
	710		1210	
-29			12	

235

	681	20 / 641 / 20	1198	
54	Out/In	SR 228	Out/In	64
235	47 / 20 / 35	Castle Creek East / TEV:2002 / 10/11/2016	50 / 4 / 10	
102	Out/In	7:15 am to 8:15 am	Out/In	64
	30	1101	24	
	686		1155	
-10			-10	

240

	676	6 / 586 / 84	1165	
11	Out/In	SR 228	Out/In	154
240	28 / 5 / 4	Seven Fields Blvd / TEV:1982 / 10/11/2016	117 / 5 / 32	
37	Out/In	7:15 am to 8:15 am	Out/In	184
	0	1020	95	
	622		1115	
-2			13	

245

	620	58 / 562	1102	
104	Out/In	SR 228	Out/In	0
245	356 / 0 / 202	Adams Ridge Rd / TEV:1970 / 10/11/2016		T-Intersection
558	Out/In	7:15 am to 8:15 am	Out/In	0
	46	746		
	764		792	
-34			1	

250

	730	658 / 72	791	
0	Out/In	SR 228	Out/In	52
250		Myoma Rd / TEV:1561 / 10/11/2016	43 / 0 / 9	T-Intersection
0	Out/In	7:15 am to 8:15 am	Out/In	103
		748	31	
	667		779	
50			-39	

255

	717	36 / 637 / 44	818	
79	Out/In	SR 228	Out/In	217
255	4 / 1 / 1	Heritage Creek Dr / TEV:1950 / 10/11/2016	33 / 16 / 168	
6	Out/In	7:15 am to 8:15 am	Out/In	247
	27	781	202	
	806		1010	
-14			69	

260

	792	4 / 788	941		
4	Out/In	SR 228	Out/In	0	
260	0 / 0 / 0	Scharberry Ln / TEV:1733 / 10/11/2016			T-Intersection / Unsignalized
0	Out/In	7:15 am to 8:15 am	Out/In	0	
	0	941			
	788		941		
-12			-39		

265

	776	693 / 83	980		
0	Out/In	SR 228	Out/In	124	
265		Beaver St Ext / TEV:1756 / 10/11/2016	124 / 0 / 0		T-Intersection / Unsignalized
0	Out/In	7:15 am to 8:15 am	Out/In	83	
		856	0		
	693		856		

Modified / Balanced Volumes

Rounded peak hour volumes, highlighted / color-coded to show data overrides during balancing

225

	850	60 / 705 / 85	1140	
600	Out/In	SR 228	Out/In	460
225	80 / 125 / 65	Franklin Rd / TEV:2825 / 10/11/2016	60 / 335 / 65	
270	Out/In	7:15 am to 8:15 am	Out/In	250
	205	1000	40	
	835		1245	
OK 0			30	NG

230

	835	150 / 675 / 10	1215	
265	Out/In	SR 228	Out/In	45
230	85 / 10 / 35	Castle Creek West / TEV:2215 / 10/11/2016	25 / 15 / 5	
130	Out/In	7:15 am to 8:15 am	Out/In	20
	100	1105	0	
	715		1205	
NG -35			0	OK

235

	680	20 / 640 / 20	1205	
55	Out/In	SR 228	Out/In	65
235	50 / 20 / 35	Castle Creek East / TEV:2010 / 10/11/2016	50 / 5 / 10	
105	Out/In	7:15 am to 8:15 am	Out/In	65
	30	1105	25	
	685		1160	
OK 0			0	OK

240

	685	10 / 585 / 90	1160	
15	Out/In	SR 228	Out/In	150
240	25 / 5 / 5	Seven Fields Blvd / TEV:1985 / 10/11/2016	115 / 5 / 30	
35	Out/In	7:15 am to 8:15 am	Out/In	190
	0	1020	95	
	620		1115	
OK 0			0	OK

245

	620	60 / 560	1115		
110	Out/In	SR 228	Out/In	0	
245	360 / 0 / 195	Adams Ridge Rd / TEV:1980 / 10/11/2016			T-Intersection
555	Out/In	7:15 am to 8:15 am	Out/In	0	
	50	755			
	755		805		
NG -10			0	OK	

250

	745	670 / 75	805		
0	Out/In	SR 228	Out/In	55	
250		Myoma Rd / TEV:1595 / 10/11/2016	45 / 0 / 10		T-Intersection
0	Out/In	7:15 am to 8:15 am	Out/In	110	
		760	35		
	680		795		
NG 20			-5	NG	

255

	700	35 / 625 / 40	800	
75	Out/In	SR 228	Out/In	210
255	5 / 0 / 0	Heritage Creek Dr / TEV:1905 / 10/11/2016	30 / 15 / 165	
5	Out/In	7:15 am to 8:15 am	Out/In	240
	25	765	200	
	790		990	
OK 0			0	OK

260

	790	5 / 785	990		
5	Out/In	SR 228	Out/In	0	
260	0 / 0 / 0	Scharberry Ln / TEV:1780 / 10/11/2016			T-Intersection / Unsignalized
0	Out/In	7:15 am to 8:15 am	Out/In	0	
	0	990			
	785		990		
OK 0			0	OK	

265

	785	700 / 85	990		
0	Out/In	SR 228	Out/In	130	
265		Beaver St Ext / TEV:1775 / 10/11/2016	130 / 0 / 0		T-Intersection / Unsignalized
0	Out/In	7:15 am to 8:15 am	Out/In	85	
		860	0		
	700		860		

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Base Year - Volumes Balancing

Project:	SR 228 - Mars RR Bridge West Expansion
Location:	SR 228 (Mars Rd) - Cranberry Township
Date:	12/28/2016
Time Period:	PM Peak
Compiled By:	Lauren Weimer
Reviewed By:	CDR

Color Coding Legend

- Decreased Volume
- Changed +5 to 10 Vehicles
- Changed +15 to 20 Vehicles
- Changed + >20 Vehicles
- Allowed Imbalance

Raw Original Volumes

Enter raw peak hour volumes from traffic count data

225

EB: 1346 | 63 1013 270 | 1118
NB: 325 Out/In
120 Franklin Rd 57
328 TEV:3363 149
175 10/11/2016 63
623 Out/In 4:45 pm to 5:45 pm Out/In 669
SB: 269 Out/In
113 941 71
WB: 1251 | 1125
4 | 26

230

1255 | 151 1066 38 | 1099
229 Out/In SR 228 Out/In 59
186 Castle Creek West 32
45 TEV:2561 25
80 10/11/2016 2
311 Out/In 4:45 pm to 5:45 pm Out/In 85
53 881 2
1148 | 936
48 | 12

235

1196 | 27 1064 105 | 924
112 Out/In SR 228 Out/In 109
17 Castle Creek East 41
30 TEV:2404 29
109 10/11/2016 39
156 Out/In 4:45 pm to 5:45 pm Out/In 156
56 866 21
1212 | 943
3 | -3

240

1215 | 103 994 118 | 946
141 Out/In SR 228 Out/In 341
37 Seven Fields Blvd 135
19 TEV:2560 25
13 10/11/2016 181
69 Out/In 4:45 pm to 5:45 pm Out/In 285
13 774 148
1188 | 935
-12 | -2

245 (T-Intersection)

1176 | 377 799 | 937
553 Out/In SR 228 Out/In 0
195 Adams Ridge Rd
0 TEV:2431
142 10/11/2016
337 Out/In 4:45 pm to 5:45 pm Out/In 0
176 742
941 | 918
3 | 1

250 (T-Intersection)

944 | 856 88 | 917
0 Out/In SR 228 Out/In 64
Myoma Rd 55
TEV:1896 0
10/11/2016 9
0 Out/In 4:45 pm to 5:45 pm Out/In 114
862 26
865 | 888
39 | -12

255

904 | 31 822 51 | 900
77 Out/In SR 228 Out/In 325
49 Heritage Creek Dr 40
25 TEV:2356 16
15 10/11/2016 269
89 Out/In 4:45 pm to 5:45 pm Out/In 273
30 811 197
1106 | 1038
-9 | 25

260 (T-Intersection, Unsignalized)

1097 | 3 1094 | 1013
4 Out/In SR 228 Out/In 0
0 Scharberry Ln
0 TEV:2135
24 10/11/2016
24 Out/In 4:45 pm to 5:45 pm Out/In 0
1 1013
1118 | 1014
-6 | 1

265 (T-Intersection, Unsignalized)

1112 | 857 255 | 1013
0 Out/In SR 228 Out/In 134
Beaver St Ext 134
TEV:2128 0
10/11/2016 0
0 Out/In 4:45 pm to 5:45 pm Out/In 258
879 3
857 | 882

Modified / Balanced Volumes

Rounded peak hour volumes, highlighted / color-coded to show data overrides during balancing

225

1350 | 65 1015 270 | 1115
330 Out/In SR 228 Out/In 270
120 Franklin Rd 55
330 TEV:3370 150
175 10/11/2016 65
625 Out/In 4:45 pm to 5:45 pm Out/In 670
115 940 70
1255 | 1125
OK 0 | 40 NG

230

1255 | 150 1065 40 | 1085
230 Out/In SR 228 Out/In 55
185 Castle Creek West 30
45 TEV:2545 25
80 10/11/2016 0
310 Out/In 4:45 pm to 5:45 pm Out/In 85
55 870 0
1145 | 925
NG 50 | 0 OK

235

1195 | 25 1065 105 | 925
110 Out/In SR 228 Out/In 110
15 Castle Creek East 40
30 TEV:2405 30
110 10/11/2016 40
155 Out/In 4:45 pm to 5:45 pm Out/In 155
55 870 20
1215 | 945
OK 0 | 0 OK

240

1215 | 105 995 115 | 945
145 Out/In SR 228 Out/In 340
35 Seven Fields Blvd 135
20 TEV:2565 25
15 10/11/2016 180
70 Out/In 4:45 pm to 5:45 pm Out/In 285
15 775 150
1190 | 940
OK 0 | 0 OK

245 (T-Intersection)

1190 | 375 815 | 940
550 Out/In SR 228 Out/In 0
200 Adams Ridge Rd
0 TEV:2450
145 10/11/2016
345 Out/In 4:45 pm to 5:45 pm Out/In 0
175 740
960 | 915
OK 0 | 0 OK

250 (T-Intersection)

960 | 870 90 | 915
0 Out/In SR 228 Out/In 70
Myoma Rd 55
TEV:1915 0
10/11/2016 15
0 Out/In 4:45 pm to 5:45 pm Out/In 115
860 25
885 | 885
NG 5 | -5 NG

255

890 | 30 810 50 | 890
75 Out/In SR 228 Out/In 330
50 Heritage Creek Dr 40
25 TEV:2335 15
15 10/11/2016 275
90 Out/In 4:45 pm to 5:45 pm Out/In 270
30 800 195
1100 | 1025
OK 0 | 0 OK

260 (T-Intersection, Unsignalized)

1100 | 5 1095 | 1025
5 Out/In SR 228 Out/In 0
0 Scharberry Ln
0 TEV:2150
25 10/11/2016
25 Out/In 4:45 pm to 5:45 pm Out/In 0
0 1025
1120 | 1025
OK 0 | 0 OK

265 (T-Intersection, Unsignalized)

1120 | 860 260 | 1025
0 Out/In SR 228 Out/In 135
Beaver St Ext 135
TEV:2150 0
10/11/2016 0
0 Out/In 4:45 pm to 5:45 pm Out/In 265
890 5
860 | 895

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Base Year - Volumes Balancing

Project: SR 228 - Mars RR Bridge West Expansion
Location: SR 228 (Mars Rd) - Cranberry Township
Date: 12/28/2016

Time Period: SAT Peak
Compiled By: Lauren Weimer
Reviewed By: CDR

Color Coding Legend

- Decreased Volume
- Changed +5 to 10 Vehicles
- Changed +15 to 20 Vehicles
- Changed + >20 Vehicles
- Allowed Imbalance

Raw Original Volumes

Enter raw peak hour volumes from traffic count data

225 — SR 228 & Franklin Rd

EB: 958 | 81 | 782 | 95 | 1260
NB: 312 Out/In | 79 | 127 | 103 | 309 Out/In
SB: 347 Out/In | 98 | 135 | 114 | 305 Out/In
WB: 999 | 96 | 1083 | 83 | 1262
Franklin Rd | TEV:2876 | 10/8/2016 | 11:45 am to 12:45 pm

-21 | 19

230 — SR 228 & Castle Creek West

978 | 122 | 814 | 42 | 1243
176 Out/In | 139 | 12 | 53 | 204 Out/In
43 Out/In | 37 | 6 | 0 | 54 Out/In
867 | 48 | 1067 | 0 | 1115
Castle Creek West | TEV:2340 | 10/8/2016 | 11:45 am to 12:45 pm

23 | -3

235 — SR 228 & Castle Creek East

890 | 15 | 829 | 46 | 1118
53 Out/In | 15 | 25 | 36 | 76 Out/In
62 Out/In | 41 | 14 | 7 | 80 Out/In
872 | 24 | 1062 | 9 | 1095
Castle Creek East | TEV:2123 | 10/8/2016 | 11:45 am to 12:45 pm

-15 | 4

240 — SR 228 & Seven Fields Blvd

857 | 78 | 691 | 88 | 1091
109 Out/In | 60 | 30 | 15 | 105 Out/In
270 Out/In | 111 | 20 | 139 | 287 Out/In
845 | 11 | 920 | 169 | 1100
Seven Fields Blvd | TEV:2332 | 10/8/2016 | 11:45 am to 12:45 pm

-7 | 4

245 — SR 228 & Adams Ridge Rd (T-Intersection)

838 | 212 | 626 | 1096
331 Out/In | 243 | 0 | 100 | 343 Out/In
0 Out/In | 0 | 0 | 0 | 0 Out/In
726 | 119 | 853 | 972
Adams Ridge Rd | TEV:2153 | 10/8/2016 | 11:45 am to 12:45 pm

2 | -6

250 — SR 228 & Myoma Rd (T-Intersection)

728 | 677 | 51 | 978
0 Out/In | 0 | 48 | 0 | 0 Out/In
55 Out/In | 48 | 0 | 7 | 85 Out/In
684 | 930 | 34 | 964
Myoma Rd | TEV:1747 | 10/8/2016 | 11:45 am to 12:45 pm

4 | -13

255 — SR 228 & Heritage Creek Dr

688 | 29 | 622 | 37 | 977
66 Out/In | 24 | 7 | 6 | 37 Out/In
164 Out/In | 35 | 7 | 122 | 143 Out/In
750 | 30 | 918 | 99 | 1047
Heritage Creek Dr | TEV:1936 | 10/8/2016 | 11:45 am to 12:45 pm

-33 | 15

260 — SR 228 & Scharberry Ln (T-Intersection, Unsignalized)

717 | 2 | 715 | 1032
4 Out/In | 1 | 0 | 10 | 11 Out/In
0 Out/In | 0 | 0 | 0 | 0 Out/In
725 | 2 | 1031 | 1033
Scharberry Ln | TEV:1761 | 10/8/2016 | 11:45 am to 12:45 pm

-3 | 8

265 — SR 228 & Beaver St Ext (T-Intersection, Unsignalized)

722 | 622 | 100 | 1025
0 Out/In | 0 | 112 | 0 Out/In
112 | 0 | 0 | 102
622 | 913 | 2 | 915
Beaver St Ext | TEV:1749 | 10/8/2016 | 11:45 am to 12:45 pm

Modified / Balanced Volumes

Rounded peak hour volumes, highlighted / color-coded to show data overrides during balancing

225 — SR 228 & Franklin Rd

955 | 80 | 780 | 95 | 1265
310 Out/In | 80 | 125 | 100 | 305 Out/In
350 Out/In | 100 | 135 | 115 | 305 Out/In
995 | 95 | 1085 | 85 | 1265
Franklin Rd | TEV:2875 | 10/8/2016 | 11:45 am to 12:45 pm

OK 0 | 25 NG

230 — SR 228 & Castle Creek West

995 | 125 | 825 | 45 | 1240
180 Out/In | 140 | 10 | 55 | 205 Out/In
40 Out/In | 35 | 5 | 0 | 55 Out/In
880 | 50 | 1065 | 0 | 1115
Castle Creek West | TEV:2355 | 10/8/2016 | 11:45 am to 12:45 pm

NG 10 | 0 OK

235 — SR 228 & Castle Creek East

890 | 15 | 830 | 45 | 1115
55 Out/In | 15 | 25 | 30 | 70 Out/In
60 Out/In | 40 | 15 | 5 | 80 Out/In
865 | 25 | 1060 | 10 | 1095
Castle Creek East | TEV:2115 | 10/8/2016 | 11:45 am to 12:45 pm

OK 0 | 0 OK

240 — SR 228 & Seven Fields Blvd

865 | 80 | 695 | 90 | 1095
110 Out/In | 60 | 30 | 15 | 105 Out/In
275 Out/In | 115 | 20 | 140 | 290 Out/In
850 | 10 | 920 | 170 | 1100
Seven Fields Blvd | TEV:2345 | 10/8/2016 | 11:45 am to 12:45 pm

OK 0 | 0 OK

245 — SR 228 & Adams Ridge Rd (T-Intersection)

850 | 215 | 635 | 1100
335 Out/In | 245 | 0 | 100 | 345 Out/In
0 Out/In | 0 | 0 | 0 | 0 Out/In
735 | 120 | 855 | 975
Adams Ridge Rd | TEV:2170 | 10/8/2016 | 11:45 am to 12:45 pm

OK 0 | 0 OK

250 — SR 228 & Myoma Rd (T-Intersection)

735 | 685 | 50 | 975
0 Out/In | 0 | 45 | 10 | 0 Out/In
55 Out/In | 45 | 0 | 10 | 90 Out/In
695 | 930 | 40 | 970
Myoma Rd | TEV:1760 | 10/8/2016 | 11:45 am to 12:45 pm

NG -10 | 0 OK

255 — SR 228 & Heritage Creek Dr

685 | 30 | 615 | 40 | 970
70 Out/In | 25 | 10 | 5 | 40 Out/In
160 Out/In | 35 | 10 | 115 | 145 Out/In
735 | 30 | 910 | 95 | 1035
Heritage Creek Dr | TEV:1920 | 10/8/2016 | 11:45 am to 12:45 pm

OK 0 | 0 OK

260 — SR 228 & Scharberry Ln (T-Intersection, Unsignalized)

735 | 5 | 730 | 1035
10 Out/In | 0 | 0 | 10 | 10 Out/In
0 Out/In | 0 | 0 | 0 | 0 Out/In
740 | 5 | 1035 | 1040
Scharberry Ln | TEV:1785 | 10/8/2016 | 11:45 am to 12:45 pm

OK 0 | 0 OK

265 — SR 228 & Beaver St Ext (T-Intersection, Unsignalized)

740 | 635 | 105 | 1040
0 Out/In | 0 | 115 | 0 Out/In
115 | 0 | 0 | 105 Out/In
635 | 925 | 0 | 925
Beaver St Ext | TEV:1780 | 10/8/2016 | 11:45 am to 12:45 pm

Appendix B2:

2025 Opening Year

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Opening Year 2025 No-Build - Volumes

Project: SR 228 - Mars RR Bridge West Expansion
Location: SR 228 (Mars Rd) - Cranberry Township
Date: 4/18/2017

Time Period: AM Peak
Compiled By: XW
Reviewed By: CDR

Base Information:

Existing Year =	2016
Future Year =	2025
# of Years =	9
Growth Rate =	0.87%
Growth Rate + 1 =	1.0087
Growth Rate + 1 =	1.0052
Growth Rate + 1 =	1.0081
Growth Rate + 1 =	1.0050

Definitions:

EV = Existing Volumes
FV = Future Volumes
Y = # of years
GR = Growth Rate
Cranberry Township (BUCO) = 0.87% /year
Seven Fields Borough (BUCO) = 0.52% /year
Adams Township (BUCO) = 0.81% /year
Mars Borough (BUCO) = 0.50% /year

Linear Growth Equation:

FV = (((EV x GR) - EV) x Y) + EV)

Color Coding Legend

- Decreased Volume
- Changed +5 to 10 Vehicles
- Changed +15 to 20 Vehicles
- Changed + >20 Vehicles
- Allowed Imbalance

Base Balanced Volumes

Enter base balanced peak hour volumes from TMC balanced sheet

EB

			850				1140				
			⇩	60	705	85	⇧				
		600	⇦ Out/In	SR 228		Out/In ⇦	460				
NB	225		80	Franklin Rd		60			SB		
			125	TEV:2825		335					
			65	10/11/2016		65					
		270	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	250				
			⇩	205	1000	40	⇧				
			835				1245				

WB

		0	⇩			⇧	30				
			835				1215				
			⇩	150	675	10	⇧				
		265	⇦ Out/In	SR 228		Out/In ⇦	45				
	230		85	Castle Creek West		25					
			10	TEV:2215		15					
			35	10/11/2016		5					
		130	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	20				
			⇩	100	1105	0	⇧				
			715				1205				
		-35	⇩			⇧	0				
			680				1205				
			⇩	20	640	20	⇧				
		55	⇦ Out/In	SR 228		Out/In ⇦	65				
	235		50	Castle Creek East		50					
			20	TEV:2010		5					
			35	10/11/2016		10					
		105	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	65				
			⇩	30	1105	25	⇧				
			685				1160				
		0	⇩			⇧	0				
			685				1160				
			⇩	10	585	90	⇧				
		15	⇦ Out/In	SR 228		Out/In ⇦	150				
	240		25	Seven Fields Blvd		115					
			5	TEV:1985		5					
			5	10/11/2016		30					
		35	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	190				
			⇩	0	1020	95	⇧				
			620				1115				
		0	⇩			⇧	0				
			620				1115				
			⇩	60	560		⇧				
		110	⇦ Out/In	SR 228		Out/In ⇦	0				
	245		360	Adams Ridge Rd							
			0	TEV:1980							
			195	10/11/2016							
		555	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	0				
			⇩	50	755		⇧				
			755				805				
		-10	⇩			⇧	0				
			745				805				
			⇩		670	75	⇧				
		0	⇦ Out/In	SR 228		Out/In ⇦	55				
	250			Myoma Rd		45					
				TEV:1595		0					
				10/11/2016		10					
		0	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	110				
			⇩		760	35	⇧				
			680				795				
		20	⇩			⇧	-5				
			700				800				
			⇩	35	625	40	⇧				
		75	⇦ Out/In	SR 228		Out/In ⇦	210				
	255		5	Heritage Creek Dr		30					
			0	TEV:1905		15					
			0	10/11/2016		165					
		5	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	240				
			⇩	25	765	200	⇧				
			790				990				
		0	⇩			⇧	0				
			790				990				
			⇩	5	785		⇧				
		5	⇦ Out/In	SR 228		Out/In ⇦	0				
	260		0	Scharberry Ln							
			0	TEV:1780							
			0	10/11/2016							
		0	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	0				
			⇩	0	990		⇧				
			785				990				
		0	⇩			⇧	0				
			785				990				
			⇩		700	85	⇧				
		0	⇦ Out/In	SR 228		Out/In ⇦	130				
	265			Beaver St Ext		130					
				TEV:1775		0					
				10/11/2016		0					
		0	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	85				
			⇩		860	0	⇧				
			700				860				

T-Intersection | Unsignalized

Opening Year 2025 No-Build Volumes

Increased by the growth rate determined from the SPC Cycle 10 travel demand model

			917				1229				
			⇩	65	760	92	⇧				
		647	⇦ Out/In	SR 228		Out/In ⇦	496				
	225		86	Franklin Rd		65					
			135	TEV:3046		361					
			70	10/11/2016		70					
		291	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	270				
			⇩	221	1078	43	⇧				
			900				1342				
		-5	⇩			⇧	36				
			895				1307				
			⇩	157	728	10	⇧				
		277	⇦ Out/In	SR 228		Out/In ⇦	47				
	230		89	Castle Creek West		26					
			10	TEV:2375		16					
			37	10/11/2016		5					
		136	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	21				
			⇩	105	1192	0	⇧				
			770				1296				
		-38	⇩			⇧	0				
			732				1296				
			⇩	21	690	21	⇧				
		58	⇦ Out/In	SR 228		Out/In ⇦	68				
	235		52	Castle Creek East		52					
			21	TEV:2159		5					
			37	10/11/2016		10					
		110	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	68				
			⇩	31	1192	26	⇧				
			737				1249				
		-2	⇩			⇧	3				
			735				1246				
			⇩	10	631	94	⇧				
		16	⇦ Out/In	SR 228		Out/In ⇦	157				
	240		26	Seven Fields Blvd		120					
			5	TEV:2128		5					
			5	10/11/2016		31					
		37	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	199				
			⇩	0	1100	99	⇧				
			667				1199				
		-2	⇩			⇧	3				
			665				1196				
			⇩	64	601		⇧				
		118	⇦ Out/In	SR 228		Out/In ⇦	0				
	245		386	Adams Ridge Rd							
			0	TEV:2124							
			209	10/11/2016							
		595	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	0				
			⇩	54	810		⇧				
		810					864				
		-11	⇩			⇧	0				
			799				864				
			⇩		719	80	⇧				
		0	⇦ Out/In	SR 228		Out/In ⇦	59				
	250			Myoma Rd		48					
				TEV:1711		0					
				10/11/2016		11					
		0	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	118				
			⇩		815	38	⇧				
		730					853				
		21	⇩			⇧	-5				
			751				858				
			⇩	38	671	43	⇧				
		80	⇦ Out/In	SR 228		Out/In ⇦	225				
	255		5	Heritage Creek Dr		32					
			0	TEV:2044		16					
			0	10/11/2016		177					
		5	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	257				
			⇩	27	821	215	⇧				
		848					1062				
		0	⇩			⇧	0				
			848				1062				
			⇩	5	842		⇧				
		5	⇦ Out/In	SR 228		Out/In ⇦	0				
	260		0	Scharberry Ln							
			0	TEV:1910							
			0	10/11/2016							
		0	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	0				
			⇩	0	1062		⇧				
		842					1062				
		-2	⇩			⇧	4				
			840				1059				
			⇩		751	89	⇧				
		0	⇦ Out/In	SR 228		Out/In ⇦	136				
	265			Beaver St Ext		136					
				TEV:1898		0					
				10/11/2016		0					
		0	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	89				
			⇩		923	0	⇧				
		751					923				

T-Intersection | Unsignalized

Opening Year 2025 No-Build w/ Development

Rounded peak hour volumes, highlighted / color-coded to show data overrides during balancing

			1000				1355				
			⇩	65	835	100	⇧				
		680	⇦ Out/In	SR 228		Out/In ⇦	515				
	225		125	Franklin Rd		75					
			140	TEV:3315		365					
			85	10/11/2016		75					
		350	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	285				
			⇩	250	1155	45	⇧				
			995				1450				
		OK 0	⇩			⇧	30 NG				
			995				1420				
			⇩	165	815	15	⇧				
		285	⇦ Out/In	SR 228		Out/In ⇦	50				
	230		95	Castle Creek West		30					
			10	TEV:2590		15					
			40	10/11/2016		5					
		145	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	25				
			⇩	105	1295	0	⇧				
			860				1400				
		NG -35	⇩			⇧	0 OK				
			825				1400				
			⇩	25	775	25	⇧				
		60	⇦ Out/In	SR 228		Out/In ⇦	70				
	235		50	Castle Creek East		55					
			20	TEV:2350		5					
			35	10/11/2016		10					
		105	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	70				
			⇩	30	1295	25	⇧				
			820				1350				
		OK 0	⇩			⇧	0 OK				
			820				1350				
			⇩	10	710	100	⇧				
		15	⇦ Out/In	SR 228		Out/In ⇦	170				
	240		25	Seven Fields Blvd		130					
			5	TEV:2320		5					
			5	10/11/2016		35					
		35	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	205				
			⇩	0	1195	100	⇧				
			750				1295				
		OK 0	⇩			⇧	0 OK				
			750				1295				
			⇩	70	680		⇧				
		125	⇦ Out/In	SR 228		Out/In ⇦	0				
	245		410	Adams Ridge Rd							
			0	TEV:2325							
			225	10/11/2016							
		635	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	0				
			⇩	55	885		⇧				
		905					940				
		NG -10	⇩			⇧	0 OK				
			895				940				
			⇩		810	85	⇧				
		0	⇦ Out/In	SR 228		Out/In ⇦	65				
	250			Myoma Rd		50					
				TEV:1890		0					
				10/11/2016		15					
		0	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	125				
			⇩		890	40	⇧				
		825					930				
		NG 20	⇩			⇧	-5 NG				
			845				935				
			⇩	115	685	45	⇧				
		205	⇦ Out/In	SR 228		Out/In ⇦	225				
	255		45	Heritage Creek Dr		35					
			0	TEV:2295		15					
			35	10/11/2016		175					
		80	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	260				
			⇩	75	855	215	⇧				
		895					1145				
		OK 0	⇩			⇧	0 OK				
			895				1145				
			⇩	5	890		⇧				
		5	⇦ Out/In	SR 228		Out/In ⇦	0				
	260		0	Scharberry Ln							
			0	TEV:2040							
			0	10/11/2016							
		0	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	0				
			⇩	0	1145		⇧				
		890					1145				
		OK 0	⇩			⇧	0 OK				
			890				1145				
			⇩		795	95	⇧				
		0	⇦ Out/In	SR 228		Out/In ⇦	150				
	265			Beaver St Ext		150					
				TEV:2035		0					
				10/11/2016		0					
		0	⇨ Out/In	7:15 am to 8:15 am		Out/In ⇨	95				
			⇩		995	0	⇧				
		795					995				

T-Intersection | Unsignalized

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Opening Year 2025 No-Build - Volumes

Project: SR 228 - Mars RR Bridge West Expansion
Location: SR 228 (Mars Rd) - Cranberry Township
Date: 4/18/2017

Time Period: PM Peak
Compiled By: XW
Reviewed By: CDR

Base Information:

Existing Year =	2016
Future Year =	2025
# of Years =	9
Growth Rate =	0.87%
Growth Rate + 1 =	1.0087
Growth Rate + 1 =	1.0052
Growth Rate + 1 =	1.0081
Growth Rate + 1 =	1.0050

Definitions:

EV = Existing Volumes
FV = Future Volumes
Y = # of years
GR = Growth Rate
Cranberry Township (BUCO) = 0.87% /year
Seven Fields Borough (BUCO) = 0.52% /year
Adams Township (BUCO) = 0.81% /year
Mars Borough (BUCO) = 0.50% /year

Linear Growth Equation:

FV = (((EV x GR) - EV) x Y) + EV)

Color Coding Legend

- Decreased Volume
- Changed +5 to 10 Vehicles
- Changed +15 to 20 Vehicles
- Changed + >20 Vehicles
- Allowed Imbalance

Base Balanced Volumes

Enter base balanced peak hour volumes from TMC balanced sheet

225

			1350				1115		
			⇩	65	1015	270	⇧		
	330	⇦ Out/In	SR 228			Out/In ⇦	270		
			120	Franklin Rd		55			
			330	TEV:3370		150			
			175	10/11/2016		65			
	625	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	670		
			⇩	115	940	70	⇧		
			1255				1125		
	0	⇩				⇧	40		

230

			1255				1085		
			⇩	150	1065	40	⇧		
	230	⇦ Out/In	SR 228			Out/In ⇦	55		
			185	Castle Creek West		30			
			45	TEV:2545		25			
			80	10/11/2016		0			
	310	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	85		
			⇩	55	870	0	⇧		
			1145				925		
	50	⇩				⇧	0		

235

			1195				925		
			⇩	25	1065	105	⇧		
	110	⇦ Out/In	SR 228			Out/In ⇦	110		
			15	Castle Creek East		40			
			30	TEV:2405		30			
			110	10/11/2016		40			
	155	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	155		
			⇩	55	870	20	⇧		
			1215				945		
	0	⇩				⇧	0		

240

			1215				945		
			⇩	105	995	115	⇧		
	145	⇦ Out/In	SR 228			Out/In ⇦	340		
			35	Seven Fields Blvd		135			
			20	TEV:2565		25			
			15	10/11/2016		180			
	70	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	285		
			⇩	15	775	150	⇧		
			1190				940		
	0	⇩				⇧	0		

245

			1190				940		
			⇩	375	815		⇧		
	550	⇦ Out/In	SR 228			Out/In ⇦	0		
			200	Adams Ridge Rd					
			0	TEV:2450					
			145	10/11/2016					
	345	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0		
			⇩	175	740		⇧		
			960				915		
	0	⇩				⇧	0		

T-Intersection

250

			960				915		
			⇩		870	90	⇧		
	0	⇦ Out/In	SR 228			Out/In ⇦	70		
			Myoma Rd			55			
			TEV:1915			0			
			10/11/2016			15			
	0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	115		
			⇩		860	25	⇧		
			885				885		
	5	⇩				⇧	-5		

T-Intersection

255

			890				890		
			⇩	30	810	50	⇧		
	75	⇦ Out/In	SR 228			Out/In ⇦	330		
			50	Heritage Creek Dr		40			
			25	TEV:2335		15			
			15	10/11/2016		275			
	90	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	270		
			⇩	30	800	195	⇧		
			1100				1025		
	0	⇩				⇧	0		

260

			1100				1025		
			⇩	5	1095		⇧		
	5	⇦ Out/In	SR 228			Out/In ⇦	0		
			0	Scharberry Ln					
			0	TEV:2150					
			25	10/11/2016					
	25	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0		
			⇩	0	1025		⇧		
			1120				1025		
	0	⇩				⇧	0		

T-Intersection Unsignalized

265

			1120				1025		
			⇩		860	260	⇧		
	0	⇦ Out/In	SR 228			Out/In ⇦	135		
			Beaver St Ext			135			
			TEV:2150			0			
			10/11/2016			0			
	0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	265		
			⇩		890	5	⇧		
			860				895		

T-Intersection Unsignalized

Opening Year 2025 No-Build Volumes

Increased by the growth rate determined from the SPC Cycle 10 travel demand model

225

			1456				1202		
			⇩	70	1094	291	⇧		
	356	⇦ Out/In	SR 228			Out/In ⇦	291		
			129	Franklin Rd		59			
			356	TEV:3634		162			
			189	10/11/2016		70			
	674	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	722		
			⇩	124	1014	75	⇧		
			1353				1213		
	-6	⇩				⇧	50		

230

			1347				1163		
			⇩	157	1148	42	⇧		
	241	⇦ Out/In	SR 228			Out/In ⇦	58		
			194	Castle Creek West		31			
			47	TEV:2725		26			
			84	10/11/2016		0			
	325	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	89		
			⇩	58	938	0	⇧		
			1232				996		
	52	⇩				⇧	0		

235

			1284				996		
			⇩	26	1148	110	⇧		
	115	⇦ Out/In	SR 228			Out/In ⇦	115		
			16	Castle Creek East		42			
			31	TEV:2579		31			
			115	10/11/2016		42			
	162	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	162		
			⇩	58	938	21	⇧		
			1305				1017		
	-2	⇩				⇧	3		

240

			1303				1014		
			⇩	110	1073	120	⇧		
	152	⇦ Out/In	SR 228			Out/In ⇦	356		
			37	Seven Fields Blvd		141			
			21	TEV:2741		26			
			16	10/11/2016		188			
	73	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	298		
			⇩	16	836	157	⇧		
			1277				1008		
	0	⇩				⇧	0		

245

			1277				1009		
			⇩	402	874		⇧		
	590	⇦ Out/In	SR 228			Out/In ⇦	0		
			215	Adams Ridge Rd					
			0	TEV:2629					
			156	10/11/2016					
	370	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0		
			⇩	188	794		⇧		
			1030				982		
	0	⇩				⇧	0		

T-Intersection

250

			1030				982		
			⇩		933	97	⇧		
	0	⇦ Out/In	SR 228			Out/In ⇦	75		
			Myoma Rd			59			
			TEV:2055			0			
			10/11/2016			16			
	0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	123		
			⇩		923	27	⇧		
			950				950		
	5	⇩				⇧	-5		

T-Intersection

255

			955				955		
			⇩	32	869	54	⇧		
	80	⇦ Out/In	SR 228			Out/In ⇦	354		
			54	Heritage Creek Dr		43			
			27	TEV:2505		16			
			16	10/11/2016		295			
	97	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	290		
			⇩	32	858	209	⇧		
			1180				1100		
	0	⇩				⇧	0		

260

			1180				1100		
			⇩	5	1175		⇧		
	5	⇦ Out/In	SR 228			Out/In ⇦	0		
			0	Scharberry Ln					
			0	TEV:2307					
			27	10/11/2016					
	27	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0		
			⇩	0	1100		⇧		
			1202				1100		
	-7	⇩				⇧	4		

T-Intersection Unsignalized

265

			1194				1096		
			⇩		923	272	⇧		
	0	⇦ Out/In	SR 228			Out/In ⇦	141		
			Beaver St Ext			141			
			TEV:2296			0			
			10/11/2016			0			
	0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	277		
			⇩		955	5	⇧		
			923				960		

T-Intersection Unsignalized

Opening Year 2025 No-Build w/ Development

Rounded peak hour volumes, highlighted / color-coded to show data overrides during balancing

225

			1620				1405		
			⇩	75	1230	315	⇧		
	410	⇦ Out/In	SR 228			Out/In ⇦	315		
			180	Franklin Rd		75			
			360	TEV:4085		165			
			210	10/11/2016		75			
	750	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	755		
			⇩	170	1150	80	⇧		
			1515				1400		
OK	0	⇩				⇧	40	NG	

230

			1515				1360		
			⇩	170	1305	40	⇧		
	260	⇦ Out/In	SR 228			Out/In ⇦	60		
			210	Castle Creek West		35			
			45	TEV:3100		25			
			90	10/11/2016		0			
	345	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	85		
			⇩	65	1115	0	⇧		
			1395				1180		
NG	50	⇩				⇧	0	OK	

235

			1445				1180		
			⇩	25	1310	110	⇧		
	115	⇦ Out/In	SR 228			Out/In ⇦	115		
			15	Castle Creek East		45			
			30	TEV:2920		30			
			115	10/11/2016		40			
	160	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	160		
			⇩	60	1120	20	⇧		
			1465				1200		
OK	0	⇩				⇧	0	OK	

240

			1465				1200		
			⇩	110	1225	130	⇧		
	150	⇦ Out/In	SR 228			Out/In ⇦	385		
			40	Seven Fields Blvd		155			
			20	TEV:3120		25			
			15	10/11/2016		205			
	75	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	325		
			⇩	15	1005	175	⇧		
			1445				1195		
OK	0	⇩				⇧	0	OK	

245

			1445				1195		
			⇩	425	1020		⇧		
	640	⇦ Out/In	SR 228			Out/In ⇦	0		
			230	Adams Ridge Rd					
			0	TEV:3030					
			175	10/11/2016					
	405	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0		
			⇩	215	965		⇧		
			1195				1180		
OK	0	⇩				⇧	0	OK	

T-Intersection

250

			1195				1180		
			⇩		1095	100	⇧		
	0	⇦ Out/In	SR 228			Out/In ⇦	80		
			Myoma Rd			65			
			TEV:2415			0			
			10/11/2016			15			
	0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	125		
			⇩		1115	25	⇧		
			1110				1140		
NG	5	⇩				⇧	-5	NG	

T-Intersection

255

			1115				1145		
			⇩	215	845	55	⇧		
	385	⇦ Out/In	SR 228			Out/In ⇦	355		
			235	Heritage Creek Dr		45			
			25	TEV:3140		15			
			180	10/11/2016		295			
	440	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	290		
			⇩	155	865	210	⇧		
			1320				1230		
OK	0	⇩				⇧	0	OK	

260

			1320				1230		
			⇩	5	1315		⇧		
	5	⇦ Out/In	SR 228			Out/In ⇦	0		
			0	Scharberry Ln					
			0	TEV:2575					
			25	10/11/2016					
	25	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0		
			⇩	0	1230		⇧		
			1340				1230		
OK	0	⇩				⇧	0	OK	

T-Intersection Unsignalized

265

			1340				1230		
			⇩		1035	305	⇧		
	0	⇦ Out/In	SR 228			Out/In ⇦	160		
			Beaver St Ext			160			
			TEV:2575			0			
			10/11/2016			0			
	0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	310		
			⇩		1070	5	⇧		
			1035				1075		
OK	0	⇩				⇧	0	OK	

T-Intersection Unsignalized

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Opening Year 2025 No-Build - Volumes

Project: SR 228 - Mars RR Bridge West Expansion
Location: SR 228 (Mars Rd) - Cranberry Township
Date: 4/18/2017

Time Period: SAT Peak
Compiled By: XW
Reviewed By: CDR

Base Information:

Existing Year =	2016
Future Year =	2025
# of Years =	9
Growth Rate =	0.87%
Growth Rate + 1 =	1.0087
Growth Rate + 1 =	1.0052
Growth Rate + 1 =	1.0081
Growth Rate + 1 =	1.0050

Definitions:

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Y = # of years
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Cranberry Township (BUCO) = 0.87% /year
Seven Fields Borough (BUCO) = 0.52% /year
Adams Township (BUCO) = 0.81% /year
Mars Borough (BUCO) = 0.50% /year

Linear Growth Equation:

FV = (((EV x GR) - EV) x Y) + EV)

Color Coding Legend

- Decreased Volume
- Changed +5 to 10 Vehicles
- Changed +15 to 20 Vehicles
- Changed + >20 Vehicles
- Allowed Imbalance

Base Balanced Volumes

Enter base balanced peak hour volumes from TMC balanced sheet

225 — SR 228 — Franklin Rd — TEV:2875 — 10/8/2016 — 11:45 am to 12:45 pm

		955				1265				
		⇩	80	780	95	⇧				
310	⇦ Out/In	SR 228				Out/In ⇦	350			
	80	Franklin Rd				100				
	125	TEV:2875				135				
	100	10/8/2016				115				
305	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	305			
		⇩	95	1085	85	⇧				
		995				1265				
0	⇩					⇧	25			

230 — SR 228 — Castle Creek West — TEV:2355 — 10/8/2016 — 11:45 am to 12:45 pm

		995				1240				
		⇩	125	825	45	⇧				
180	⇦ Out/In	SR 228				Out/In ⇦	40			
	140	Castle Creek West				35				
	10	TEV:2355				5				
	55	10/8/2016				0				
205	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	55			
		⇩	50	1065	0	⇧				
		880				1115				
10	⇩					⇧	0			

235 — SR 228 — Castle Creek East — TEV:2115 — 10/8/2016 — 11:45 am to 12:45 pm

		890				1115				
		⇩	15	830	45	⇧				
55	⇦ Out/In	SR 228				Out/In ⇦	60			
	15	Castle Creek East				40				
	25	TEV:2115				15				
	30	10/8/2016				5				
70	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	80			
		⇩	25	1060	10	⇧				
		865				1095				
0	⇩					⇧	0			

240 — SR 228 — Seven Fields Blvd — TEV:2345 — 10/8/2016 — 11:45 am to 12:45 pm

		865				1095				
		⇩	80	695	90	⇧				
110	⇦ Out/In	SR 228				Out/In ⇦	275			
	60	Seven Fields Blvd				115				
	30	TEV:2345				20				
	15	10/8/2016				140				
105	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	290			
		⇩	10	920	170	⇧				
		850				1100				
0	⇩					⇧	0			

245 — SR 228 — Adams Ridge Rd — TEV:2170 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

		850				1100				
		⇩	215	635		⇧				
335	⇦ Out/In	SR 228				Out/In ⇦	0			
	245	Adams Ridge Rd								
	0	TEV:2170								
	100	10/8/2016								
345	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	0			
		⇩	120	855		⇧				
		735				975				
0	⇩					⇧	0			

250 — SR 228 — Myoma Rd — TEV:1760 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

		735				975				
		⇩		685	50	⇧				
0	⇦ Out/In	SR 228				Out/In ⇦	55			
		Myoma Rd				45				
		TEV:1760				0				
		10/8/2016				10				
0	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	90			
		⇩		930	40	⇧				
		695				970				
-10	⇩					⇧	0			

255 — SR 228 — Heritage Creek Dr — TEV:1920 — 10/8/2016 — 11:45 am to 12:45 pm

		685				970				
		⇩	30	615	40	⇧				
70	⇦ Out/In	SR 228				Out/In ⇦	160			
	25	Heritage Creek Dr				35				
	10	TEV:1920				10				
	5	10/8/2016				115				
40	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	145			
		⇩	30	910	95	⇧				
		735				1035				
0	⇩					⇧	0			

260 — SR 228 — Scharberry Ln — TEV:1785 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

		735				1035				
		⇩	5	730		⇧				
10	⇦ Out/In	SR 228				Out/In ⇦	0			
	0	Scharberry Ln								
	0	TEV:1785								
	10	10/8/2016								
10	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	0			
		⇩	5	1035		⇧				
		740				1040				
0	⇩					⇧	0			

265 — SR 228 — Beaver St Ext — TEV:1780 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

		740				1040				
		⇩		635	105	⇧				
0	⇦ Out/In	SR 228				Out/In ⇦	115			
		Beaver St Ext				115				
		TEV:1780				0				
		10/8/2016				0				
0	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	105			
		⇩		925	0	⇧				
		635				925				

Opening Year 2025 No-Build Volumes

Increased by the growth rate determined from the SPC Cycle 10 travel demand model

225 — SR 228 — Franklin Rd — TEV:3100 — 10/8/2016 — 11:45 am to 12:45 pm

		1030				1364				
		⇩	86	841	102	⇧				
334	⇦ Out/In	SR 228				Out/In ⇦	377			
	86	Franklin Rd				108				
	135	TEV:3100				146				
	108	10/8/2016				124				
329	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	329			
		⇩	102	1170	92	⇧				
		1073				1364				
-5	⇩					⇧	32			

230 — SR 228 — Castle Creek West — TEV:2525 — 10/8/2016 — 11:45 am to 12:45 pm

		1068				1332				
		⇩	131	890	47	⇧				
188	⇦ Out/In	SR 228				Out/In ⇦	42			
	147	Castle Creek West				37				
	10	TEV:2525				5				
	58	10/8/2016				0				
215	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	58			
		⇩	52	1148	0	⇧				
		947				1201				
11	⇩					⇧	0			

235 — SR 228 — Castle Creek East — TEV:2274 — 10/8/2016 — 11:45 am to 12:45 pm

		958				1201				
		⇩	16	895	47	⇧				
58	⇦ Out/In	SR 228				Out/In ⇦	63			
	16	Castle Creek East				42				
	26	TEV:2274				16				
	31	10/8/2016				5				
73	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	84			
		⇩	26	1143	10	⇧				
		932				1180				
-4	⇩					⇧	4			

240 — SR 228 — Seven Fields Blvd — TEV:2506 — 10/8/2016 — 11:45 am to 12:45 pm

		927				1175				
		⇩	84	749	94	⇧				
115	⇦ Out/In	SR 228				Out/In ⇦	288			
	63	Seven Fields Blvd				120				
	31	TEV:2506				21				
	16	10/8/2016				147				
110	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	304			
		⇩	10	992	178	⇧				
		912				1180				
0	⇩					⇧	0			

245 — SR 228 — Adams Ridge Rd — TEV:2328 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

		912				1180				
		⇩	231	681		⇧				
359	⇦ Out/In	SR 228				Out/In ⇦	0			
	263	Adams Ridge Rd								
	0	TEV:2328								
	107	10/8/2016								
370	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	0			
		⇩	129	917		⇧				
		789				1046				
0	⇩					⇧	0			

250 — SR 228 — Myoma Rd — TEV:1888 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

		789				1046				
		⇩		735	54	⇧				
0	⇦ Out/In	SR 228				Out/In ⇦	59			
		Myoma Rd				48				
		TEV:1888				0				
		10/8/2016				11				
0	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	97			
		⇩		998	43	⇧				
		746				1041				
-11	⇩					⇧	0			

255 — SR 228 — Heritage Creek Dr — TEV:2060 — 10/8/2016 — 11:45 am to 12:45 pm

		735				1041				
		⇩	32	660	43	⇧				
75	⇦ Out/In	SR 228				Out/In ⇦	172			
	27	Heritage Creek Dr				38				
	11	TEV:2060				11				
	5	10/8/2016				123				
43	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	156			
		⇩	32	976	102	⇧				
		789				1110				
0	⇩					⇧	0			

260 — SR 228 — Scharberry Ln — TEV:1915 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

		789				1110				
		⇩	5	783		⇧				
11	⇦ Out/In	SR 228				Out/In ⇦	0			
	0	Scharberry Ln								
	0	TEV:1915								
	11	10/8/2016								
11	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	0			
		⇩	5	1110		⇧				
		794				1116				
-3	⇩					⇧	3			

265 — SR 228 — Beaver St Ext — TEV:1904 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

		791				1113				
		⇩		681	110	⇧				
0	⇦ Out/In	SR 228				Out/In ⇦	120			
		Beaver St Ext				120				
		TEV:1904				0				
		10/8/2016				0				
0	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	110			
		⇩		992	0	⇧				
		681				992				

Opening Year 2025 No-Build w/ Development

Rounded peak hour volumes, highlighted / color-coded to show data overrides during balancing

225 — SR 228 — Franklin Rd — TEV:3595 — 10/8/2016 — 11:45 am to 12:45 pm

		1205				1595				
		⇩	95	990	120	⇧				
395	⇦ Out/In	SR 228				Out/In ⇦	410			
	140	Franklin Rd				130				
	140	TEV:3595				150				
	130	10/8/2016				130				
410	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	355			
		⇩	150	1325	95	⇧				
		1250				1570				
OK	0	⇩				⇧	25	NG		

230 — SR 228 — Castle Creek West — TEV:2925 — 10/8/2016 — 11:45 am to 12:45 pm

		1250				1545				
		⇩	145	1060	45	⇧				
205	⇦ Out/In	SR 228				Out/In ⇦	45			
	165	Castle Creek West				40				
	10	TEV:2925				5				
	60	10/8/2016				0				
235	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	55			
		⇩	55	1340	0	⇧				
		1120				1395				
NG	10	⇩				⇧	0	OK		

235 — SR 228 — Castle Creek East — TEV:2635 — 10/8/2016 — 11:45 am to 12:45 pm

		1130				1395				
		⇩	15	1070	45	⇧				
55	⇦ Out/In	SR 228				Out/In ⇦	60			
	15	Castle Creek East				40				
	25	TEV:2635				15				
	30	10/8/2016				5				
70	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	80			
		⇩	25	1340	10	⇧				
		1105				1375				
OK	0	⇩				⇧	0	OK		

240 — SR 228 — Seven Fields Blvd — TEV:2905 — 10/8/2016 — 11:45 am to 12:45 pm

		1105				1375				
		⇩	85	915	105	⇧				
115	⇦ Out/In	SR 228				Out/In ⇦	315			
	65	Seven Fields Blvd				135				
	30	TEV:2905				20				
	15	10/8/2016				160				
110	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	325			
		⇩	10	1175	190	⇧				
		1090				1375				
OK	0	⇩				⇧	0	OK		

245 — SR 228 — Adams Ridge Rd — TEV:2725 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

		1090				1375				
		⇩	250	840		⇧				
390	⇦ Out/In	SR 228				Out/In ⇦	0			
	290	Adams Ridge Rd								
	0	TEV:2725								
	120	10/8/2016								
410	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	0			
		⇩	140	1085		⇧				
		960				1225				
OK	0	⇩				⇧	0	OK		

250 — SR 228 — Myoma Rd — TEV:2240 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

		960				1225				
		⇩		900	60	⇧				
0	⇦ Out/In	SR 228				Out/In ⇦	60			
		Myoma Rd				50				
		TEV:2240				0				
		10/8/2016				10				
0	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	105			
		⇩		1175	45	⇧				
		910				1220				
NG	-10	⇩				⇧	0	OK		

255 — SR 228 — Heritage Creek Dr — TEV:2620 — 10/8/2016 — 11:45 am to 12:45 pm

		900				1220				
		⇩	185	670	45	⇧				
330	⇦ Out/In	SR 228				Out/In ⇦	175			
	155	Heritage Creek Dr				40				
	10	TEV:2620				10				
	115	10/8/2016				125				
280	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	160			
		⇩	135	1025	105	⇧				
		910				1265				
OK	0	⇩				⇧	0	OK		

260 — SR 228 — Scharberry Ln — TEV:2190 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

		910				1265				
		⇩	5	905		⇧				
10	⇦ Out/In	SR 228				Out/In ⇦	0			
	0	Scharberry Ln								
	0	TEV:2190								
	10	10/8/2016								
10	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	0			
		⇩	5	1265		⇧				
		915				1270				
OK	0	⇩				⇧	0	OK		

265 — SR 228 — Beaver St Ext — TEV:2185 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

		915				1270				
		⇩		785	130	⇧				
0	⇦ Out/In	SR 228				Out/In ⇦	140			
		Beaver St Ext				140				
		TEV:2185				0				
		10/8/2016				0				
0	⇨ Out/In	11:45 am to 12:45 pm				Out/In ⇨	130			
		⇩		1130	0	⇧				
		785				1130				
OK	0	⇩				⇧	0	OK		

Appendix B3:

2045 Design Year

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Design Year 2045 No-Build - Volumes

Project: SR 228 - Mars RR Bridge West Expansion
Location: SR 228 (Mars Rd) - Cranberry Township
Date: 4/18/2017

Time Period: AM Peak
Compiled By: XW
Reviewed By: CDR

Base Information:

Existing Year =	2016
Future Year =	2045
# of Years =	29
Growth Rate =	0.87%
Growth Rate + 1 =	1.0087
Growth Rate + 1 =	1.0052
Growth Rate + 1 =	1.0081
Growth Rate + 1 =	1.0050

Definitions:

EV = Existing Volumes
FV = Future Volumes
Y = # of years
GR = Growth Rate
Cranberry Township (BUCO) = 0.87% /year
Seven Fields Borough (BUCO) = 0.52% /year
Adams Township (BUCO) = 0.81% /year
Mars Borough (BUCO) = 0.50% /year

Linear Growth Equation:

FV = (((EV x GR) - EV) x Y) + EV)

Color Coding Legend

- Decreased Volume
- Changed +5 to 10 Vehicles
- Changed +15 to 20 Vehicles
- Changed + >20 Vehicles
- Allowed Imbalance

Base Balanced Volumes

Enter base balanced peak hour volumes from TMC balanced sheet

EB

				850				1140				
				⇩	60	705	85	⇧				
		600	⇦ Out/In	SR 228			Out/In ⇦	460				
				Franklin Rd	80		60					
NB	225			TEV:2825	125		335		SB			
				10/11/2016	65		65					
		270	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	250				
				⇩	205	1000	40	⇧				
				835				1245				

WB

		0	⇩				⇧	30				
				835				1215				
				⇩	150	675	10	⇧				
		265	⇦ Out/In	SR 228			Out/In ⇦	45				
				Castle Creek West	85		25					
	230			TEV:2215	10		15					
				10/11/2016	35		5					
		130	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	20				
				⇩	100	1105	0	⇧				
				715				1205				
		-35	⇩				⇧	0				
				680				1205				
				⇩	20	640	20	⇧				
		55	⇦ Out/In	SR 228			Out/In ⇦	65				
				Castle Creek East	50		50					
	235			TEV:2010	20		5					
				10/11/2016	35		10					
		105	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	65				
				⇩	30	1105	25	⇧				
				685				1160				
		0	⇩				⇧	0				
				685				1160				
				⇩	10	585	90	⇧				
		15	⇦ Out/In	SR 228			Out/In ⇦	150				
				Seven Fields Blvd	25		115					
	240			TEV:1985	5		5					
				10/11/2016	5		30					
		35	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	190				
				⇩	0	1020	95	⇧				
				620				1115				
		0	⇩				⇧	0				
				620				1115				
				⇩	60	560		⇧				
		110	⇦ Out/In	SR 228			Out/In ⇦	0				
				Adams Ridge Rd	360							
	245			TEV:1980	0							
				10/11/2016	195							
		555	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	0				
				⇩	50	755		⇧				
				755				805				
		-10	⇩				⇧	0				
				745				805				
				⇩		670	75	⇧				
		0	⇦ Out/In	SR 228			Out/In ⇦	55				
				Myoma Rd			45					
	250			TEV:1595			0					
				10/11/2016			10					
		0	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	110				
				⇩		760	35	⇧				
				680				795				
		20	⇩				⇧	-5				
				700				800				
				⇩	35	625	40	⇧				
		75	⇦ Out/In	SR 228			Out/In ⇦	210				
				Heritage Creek Dr	5		30					
	255			TEV:1905	0		15					
				10/11/2016	0		165					
		5	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	240				
				⇩	25	765	200	⇧				
				790				990				
		0	⇩				⇧	0				
				790				990				
				⇩	5	785		⇧				
		5	⇦ Out/In	SR 228			Out/In ⇦	0				
				Scharberry Ln	0							
	260			TEV:1780	0							
				10/11/2016	0							
		0	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	0				
				⇩	0	990		⇧				
				785				990				
		0	⇩				⇧	0				
				785				990				
				⇩		700	85	⇧				
		0	⇦ Out/In	SR 228			Out/In ⇦	130				
				Beaver St Ext			130					
	265			TEV:1775			0					
				10/11/2016			0					
		0	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	85				
				⇩		860	0	⇧				
				700				860				

T-Intersection

Unsignalized

Design Year 2045 No-Build Volumes

Increased by the growth rate determined from the SPC Cycle 10 travel demand model

				1064				1428				
				⇩	75	883	106	⇧				
		751	⇦ Out/In	SR 228			Out/In ⇦	576				
				Franklin Rd	100		75					
	225			TEV:3538	157		420					
				10/11/2016	81		81					
		338	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	313				
				⇩	257	1252	50	⇧				
				1046				1559				
		-16	⇩				⇧	49				
				1029				1510				
				⇩	173	845	12	⇧				
		305	⇦ Out/In	SR 228			Out/In ⇦	52				
				Castle Creek West	98		29					
	230			TEV:2730	12		17					
				10/11/2016	40		6					
		150	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	23				
				⇩	115	1384	0	⇧				
				891				1499				
		-44	⇩				⇧	0				
				848				1499				
				⇩	23	801	23	⇧				
		63	⇦ Out/In	SR 228			Out/In ⇦	75				
				Castle Creek East	58		58					
	235			TEV:2490	23		6					
				10/11/2016	40		12					
		121	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	75				
				⇩	35	1384	29	⇧				
				853				1447				
		-6	⇩				⇧	9				
				848				1438				
				⇩	12	733	104	⇧				
		17	⇦ Out/In	SR 228			Out/In ⇦	173				
				Seven Fields Blvd	29		132					
	240			TEV:2447	6		6					
				10/11/2016	6		35					
		40	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	219				
				⇩	0	1277	109	⇧				
				773				1387				
		-7	⇩				⇧	10				
				766				1377				
				⇩	74	692		⇧				
		136	⇦ Out/In	SR 228			Out/In ⇦	0				
				Adams Ridge Rd	445							
	245			TEV:2445	0							
				10/11/2016	241							
		685	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	0				
				⇩	62	932		⇧				
				932				994				
		-12	⇩				⇧	0				
				920				994				
				⇩		827	93	⇧				
		0	⇦ Out/In	SR 228			Out/In ⇦	68				
				Myoma Rd			56					
	250			TEV:1970			0					
				10/11/2016			12					
		0	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	136				
				⇩		939	43	⇧				
				840				982				
		25	⇩				⇧	-6				
				864				988				
				⇩	43	772	49	⇧				
		93	⇦ Out/In	SR 228			Out/In ⇦	259				
				Heritage Creek Dr	6		37					
	255			TEV:2352	0		19					
				10/11/2016	0		204					
		6	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	296				
				⇩	31	945	247	⇧				
				976				1223				
		0	⇩				⇧	0				
				976				1223				
				⇩	6	969		⇧				
		6	⇦ Out/In	SR 228			Out/In ⇦	0				
				Scharberry Ln	0							
	260			TEV:2198	0							
				10/11/2016	0							
		0	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	0				
				⇩	0	1223		⇧				
				969				1223				
		-8	⇩				⇧	12				
				962				1211				
				⇩		864	97	⇧				
		0	⇦ Out/In	SR 228			Out/In ⇦	149				
				Beaver St Ext			149					
	265			TEV:2173			0					
				10/11/2016			0					
		0	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	97				
				⇩		1062	0	⇧				
				864				1062				

T-Intersection

Unsignalized

Design Year 2045 No-Build w/ Development

Sites A + B + F

				1150				1555				
				⇩	75	960	115	⇧				
		785	⇦ Out/In	SR 228			Out/In ⇦	595				
				Franklin Rd	140		85					
	225			TEV:3805	160		425					
				10/11/2016	95		85					
		395	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	325				
				⇩	285	1330	50	⇧				
				1140				1665				
		OK	0	⇩			⇧	30	NG			
				1140				1635				
				⇩	190	935	15	⇧				
		320	⇦ Out/In	SR 228			Out/In ⇦	50				
				Castle Creek West	110		30					
	230			TEV:2960	10		15					
				10/11/2016	40		5					
		160	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	25				
				⇩	115	1495	0	⇧				
				980				1610				
		NG	-35	⇩			⇧	0	OK			
				945				1610				
				⇩	25	890	30	⇧				
		65	⇦ Out/In	SR 228			Out/In ⇦	75				
				Castle Creek East	60		60					
	235			TEV:2700	25		5					
				10/11/2016	40		10					
		125	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	85				
				⇩	35	1490	30	⇧				
				940				1555				
		OK	0	⇩			⇧	0	OK			
				940				1555				
				⇩	10	815	115	⇧				
		15	⇦ Out/In	SR 228			Out/In ⇦	185				
				Seven Fields Blvd	30		145					
	240			TEV:2655	5		5					
				10/11/2016	5		35					
		40	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	230				
				⇩	0	1380	110	⇧				
				855				1490				
		NG	5	⇩			⇧	-5	NG			
				860				1495				
				⇩	85	775		⇧				
		150	⇦ Out/In	SR 228			Out/In ⇦	0				
				Adams Ridge Rd	475							
	245			TEV:2675	0							
				10/11/2016	255							
		730	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	0				
				⇩	65	1020		⇧				
				1030				1085				
		NG	-10	⇩			⇧	-5	NG			
				1020				1090				
				⇩		920	100	⇧				
		0	⇦ Out/In	SR 228			Out/In ⇦	75				
				Myoma Rd			65					
	250			TEV:2170			0					
				10/11/2016			10					
		0	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	150				
				⇩		1025	50	⇧				
				930				1075				
		NG	20	⇩			⇧	0	OK			
				950				1075				
				⇩	120	785	45	⇧				
		220	⇦ Out/In	SR 228			Out/In ⇦	265				
				Heritage Creek Dr	45		40					
	255			TEV:2610	0		20					
				10/11/2016	35		205					
		80	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	290				
				⇩	80	990	245	⇧				
				1025				1315				
		OK	0	⇩			⇧	0	OK			
				1025				1315				
				⇩	5	1020		⇧				
		5	⇦ Out/In	SR 228			Out/In ⇦	0				
				Scharberry Ln	0							
	260			TEV:2340	0							
				10/11/2016	0							
		0	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	0				
				⇩	0	1315		⇧				
				1020				1315				
		OK	0	⇩			⇧	-5	NG			
				1020				1320				
				⇩		915	105	⇧				
		0	⇦ Out/In	SR 228			Out/In ⇦	165				
				Beaver St Ext			165					
	265			TEV:2340			0					
				10/11/2016			0					
		0	⇨ Out/In	7:15 am to 8:15 am			Out/In ⇨	105				
				⇩		1155	0	⇧				
				915				1155				

T-Intersection

Unsignalized

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Design Year 2045 No-Build - Volumes

Project: SR 228 - Mars RR Bridge West Expansion
Location: SR 228 (Mars Rd) - Cranberry Township
Date: 4/18/2017

Time Period: PM Peak
Compiled By: XW
Reviewed By: CDR

Base Information:

Existing Year =	2016
Future Year =	2045
# of Years =	29
Growth Rate =	0.87%
Growth Rate + 1 =	1.0087
Growth Rate + 1 =	1.0052
Growth Rate + 1 =	1.0081
Growth Rate + 1 =	1.0050

Definitions:

EV = Existing Volumes
FV = Future Volumes
Y = # of years
GR = Growth Rate
Cranberry Township (BUCO) = 0.87% /year
Seven Fields Borough (BUCO) = 0.52% /year
Adams Township (BUCO) = 0.81% /year
Mars Borough (BUCO) = 0.50% /year

Linear Growth Equation:

FV = (((EV x GR) - EV) x Y) + EV)

Color Coding Legend

- Decreased Volume
- Changed +5 to 10 Vehicles
- Changed +15 to 20 Vehicles
- Changed + >20 Vehicles
- Allowed Imbalance

Base Balanced Volumes

Enter base balanced peak hour volumes from TMC balanced sheet

225

		1350			1115	
		⇩	65	1015	270	⇧
330	⇦ Out/In	SR 228			Out/In ⇦	270
	120	Franklin Rd			55	
	330	TEV:3370			150	
	175	10/11/2016			65	
625	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	670
	⇩	115	940	70	⇧	
		1255			1125	

0 ⇩ ⇧ 40

230

		1255			1085	
		⇩	150	1065	40	⇧
230	⇦ Out/In	SR 228			Out/In ⇦	55
	185	Castle Creek West			30	
	45	TEV:2545			25	
	80	10/11/2016			0	
310	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	85
	⇩	55	870	0	⇧	
		1145			925	

50 ⇩ ⇧ 0

235

		1195			925	
		⇩	25	1065	105	⇧
110	⇦ Out/In	SR 228			Out/In ⇦	110
	15	Castle Creek East			40	
	30	TEV:2405			30	
	110	10/11/2016			40	
155	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	155
	⇩	55	870	20	⇧	
		1215			945	

0 ⇩ ⇧ 0

240

		1215			945	
		⇩	105	995	115	⇧
145	⇦ Out/In	SR 228			Out/In ⇦	340
	35	Seven Fields Blvd			135	
	20	TEV:2565			25	
	15	10/11/2016			180	
70	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	285
	⇩	15	775	150	⇧	
		1190			940	

0 ⇩ ⇧ 0

245 T-Intersection

		1190			940	
		⇩	375	815		⇧
550	⇦ Out/In	SR 228			Out/In ⇦	0
	200	Adams Ridge Rd				
	0	TEV:2450				
	145	10/11/2016				
345	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0
	⇩	175	740		⇧	
		960			915	

0 ⇩ ⇧ 0

250 T-Intersection

		960			915	
		⇩		870	90	⇧
0	⇦ Out/In	SR 228			Out/In ⇦	70
		Myoma Rd			55	
		TEV:1915			0	
		10/11/2016			15	
0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	115
	⇩		860	25	⇧	
		885			885	

5 ⇩ ⇧ -5

255

		890			890	
		⇩	30	810	50	⇧
75	⇦ Out/In	SR 228			Out/In ⇦	330
	50	Heritage Creek Dr			40	
	25	TEV:2335			15	
	15	10/11/2016			275	
90	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	270
	⇩	30	800	195	⇧	
		1100			1025	

0 ⇩ ⇧ 0

260 T-Intersection Unsignalized

		1100			1025	
		⇩	5	1095		⇧
5	⇦ Out/In	SR 228			Out/In ⇦	0
	0	Scharberry Ln				
	0	TEV:2150				
	25	10/11/2016				
25	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0
	⇩	0	1025		⇧	
		1120			1025	

0 ⇩ ⇧ 0

265 T-Intersection Unsignalized

		1120			1025	
		⇩		860	260	⇧
0	⇦ Out/In	SR 228			Out/In ⇦	135
		Beaver St Ext			135	
		TEV:2150			0	
		10/11/2016			0	
0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	265
	⇩		890	5	⇧	
		860			895	

Design Year 2045 No-Build Volumes

Increased by the growth rate determined from the SPC Cycle 10 travel demand model

225

		1691			1396	
		⇩	81	1271	338	⇧
413	⇦ Out/In	SR 228			Out/In ⇦	338
	150	Franklin Rd			69	
	413	TEV:4220			188	
	219	10/11/2016			81	
783	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	839
	⇩	144	1177	88	⇧	
		1572			1409	

-19 ⇩ ⇧ 72

230

		1552			1337	
		⇩	173	1334	46	⇧
265	⇦ Out/In	SR 228			Out/In ⇦	63
	213	Castle Creek West			35	
	52	TEV:3125			29	
	92	10/11/2016			0	
357	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	98
	⇩	63	1090	0	⇧	
		1426			1153	

58 ⇩ ⇧ 0

235

		1483			1153	
		⇩	29	1334	121	⇧
127	⇦ Out/In	SR 228			Out/In ⇦	127
	17	Castle Creek East			46	
	35	TEV:2964			35	
	127	10/11/2016			46	
178	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	178
	⇩	63	1090	23	⇧	
		1506			1176	

-7 ⇩ ⇧ 10

240

		1499			1166	
		⇩	121	1246	132	⇧
167	⇦ Out/In	SR 228			Out/In ⇦	391
	40	Seven Fields Blvd			155	
	23	TEV:3131			29	
	17	10/11/2016			207	
81	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	328
	⇩	17	971	173	⇧	
		1470			1160	

-1 ⇩ ⇧ 0

245 T-Intersection

		1470			1161	
		⇩	463	1006		⇧
679	⇦ Out/In	SR 228			Out/In ⇦	0
	247	Adams Ridge Rd				
	0	TEV:3026				
	179	10/11/2016				
426	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0
	⇩	216	914		⇧	
		1186			1130	

0 ⇩ ⇧ 0

250 T-Intersection

		1186			1130	
		⇩		1074	111	⇧
0	⇦ Out/In	SR 228			Out/In ⇦	86
		Myoma Rd			68	
		TEV:2365			0	
		10/11/2016			19	
0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	142
	⇩		1062	31	⇧	
		1093			1093	

6 ⇩ ⇧ -6

255

		1099			1099	
		⇩	37	1000	62	⇧
93	⇦ Out/In	SR 228			Out/In ⇦	408
	62	Heritage Creek Dr			49	
	31	TEV:2883			19	
	19	10/11/2016			340	
111	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	333
	⇩	37	988	241	⇧	
		1358			1266	

0 ⇩ ⇧ 0

260 T-Intersection Unsignalized

		1358			1266	
		⇩	6	1352		⇧
6	⇦ Out/In	SR 228			Out/In ⇦	0
	0	Scharberry Ln				
	0	TEV:2655				
	31	10/11/2016				
31	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0
	⇩	0	1266		⇧	
		1383			1266	

-23 ⇩ ⇧ 12

265 T-Intersection Unsignalized

		1360			1254	
		⇩		1062	298	⇧
0	⇦ Out/In	SR 228			Out/In ⇦	155
		Beaver St Ext			155	
		TEV:2619			0	
		10/11/2016			0	
0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	303
	⇩		1099	6	⇧	
		1062			1105	

Design Year 2045 No-Build w/ Development

Sites A + B + F

225

		1855			1605	
		⇩	85	1410	360	⇧
470	⇦ Out/In	SR 228			Out/In ⇦	365
	200	Franklin Rd			85	
	420	TEV:4690			195	
	245	10/11/2016			85	
865	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	875
	⇩	190	1320	95	⇧	
		1740			1605	

NG -5 ⇩ ⇧ 40 NG

230

		1735			1565	
		⇩	185	1500	50	⇧
285	⇦ Out/In	SR 228			Out/In ⇦	70
	245	Castle Creek West			40	
	50	TEV:3545			30	
	95	10/11/2016			0	
390	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	100
	⇩	70	1280	0	⇧	
		1595			1350	

NG 55 ⇩ ⇧ 0 OK

235

		1650			1350	
		⇩	30	1500	120	⇧
130	⇦ Out/In	SR 228			Out/In ⇦	130
	20	Castle Creek East			50	
	35	TEV:3330			35	
	125	10/11/2016			45	
180	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	180
	⇩	65	1280	25	⇧	
		1670			1370	

OK 0 ⇩ ⇧ 0 OK

240

		1670			1370	
		⇩	125	1400	145	⇧
170	⇦ Out/In	SR 228			Out/In ⇦	425
	45	Seven Fields Blvd			175	
	25	TEV:3540			30	
	15	10/11/2016			220	
85	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	365
	⇩	15	1150	195	⇧	
		1635			1360	

OK 0 ⇩ ⇧ 0 OK

245 T-Intersection

		1635			1360	
		⇩	485	1150		⇧
730	⇦ Out/In	SR 228			Out/In ⇦	0
	265	Adams Ridge Rd				
	0	TEV:3435				
	195	10/11/2016				
460	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0
	⇩	245	1095		⇧	
		1345			1340	

NG 5 ⇩ ⇧ 0 OK

250 T-Intersection

		1350			1340	
		⇩		1235	115	⇧
0	⇦ Out/In	SR 228			Out/In ⇦	100
		Myoma Rd			80	
		TEV:2745			0	
		10/11/2016			20	
0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	150
	⇩		1260	35	⇧	
		1255			1295	

NG 5 ⇩ ⇧ -5 NG

255

		1260			1300	
		⇩	215	980	65	⇧
395	⇦ Out/In	SR 228			Out/In ⇦	415
	240	Heritage Creek Dr			55	
	30	TEV:3530			20	
	180	10/11/2016			340	
450	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	335
	⇩	160	1005	240	⇧	
		1500			1405	

NG 0 ⇩ ⇧ 0 OK

260 T-Intersection Unsignalized

		1500			1405	
		⇩	10	1490		⇧
10	⇦ Out/In	SR 228			Out/In ⇦	0
	0	Scharberry Ln				
	0	TEV:2935				
	30	10/11/2016				
30	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	0
	⇩	0	1405		⇧	
		1520			1405	

OK 0 ⇩ ⇧ 0 OK

265 T-Intersection Unsignalized

		1520			1405	
		⇩		1185	335	⇧
0	⇦ Out/In	SR 228			Out/In ⇦	180
		Beaver St Ext			180	
		TEV:2930			0	
		10/11/2016			0	
0	⇨ Out/In	4:45 pm to 5:45 pm			Out/In ⇨	340
	⇩		1225	5	⇧	
		1185			1230	

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Design Year 2045 No-Build - Volumes

Project: SR 228 - Mars RR Bridge West Expansion
Location: SR 228 (Mars Rd) - Cranberry Township
Date: 4/18/2017

Time Period: SAT Peak
Compiled By: XW
Reviewed By: CDR

Base Information:

Existing Year =	2016
Future Year =	2045
# of Years =	29
Growth Rate =	0.87%
Growth Rate + 1 =	1.0087
Growth Rate + 1 =	1.0052
Growth Rate + 1 =	1.0081
Growth Rate + 1 =	1.0050

Definitions:

EV = Existing Volumes
FV = Future Volumes
Y = # of years
GR = Growth Rate
Cranberry Township (BUCO) = 0.87% /year
Seven Fields Borough (BUCO) = 0.52% /year
Adams Township (BUCO) = 0.81% /year
Mars Borough (BUCO) = 0.50% /year

Linear Growth Equation:

FV = (((EV x GR) - EV) x Y) + EV)

Color Coding Legend

- Decreased Volume
- Changed +5 to 10 Vehicles
- Changed +15 to 20 Vehicles
- Changed + >20 Vehicles
- Allowed Imbalance

Base Balanced Volumes

Enter base balanced peak hour volumes from TMC balanced sheet

225 — SR 228 @ Franklin Rd — TEV:2875 — 10/8/2016 — 11:45 am to 12:45 pm

			955			1265					
			⇩	80	780	95	⇧				
310	⇦ Out/In		SR 228			Out/In ⇦	350				
	80		Franklin Rd			100					
225	125		TEV:2875			135					
	100		10/8/2016			115					
305	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	305				
	⇩	95	1085	85	⇧						
	995			1265							
0	⇩				⇧	25					

230 — SR 228 @ Castle Creek West — TEV:2355 — 10/8/2016 — 11:45 am to 12:45 pm

			995			1240					
			⇩	125	825	45	⇧				
180	⇦ Out/In		SR 228			Out/In ⇦	40				
	140		Castle Creek West			35					
230	10		TEV:2355			5					
	55		10/8/2016			0					
205	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	55				
	⇩	50	1065	0	⇧						
	880			1115							
10	⇩				⇧	0					

235 — SR 228 @ Castle Creek East — TEV:2115 — 10/8/2016 — 11:45 am to 12:45 pm

			890			1115					
			⇩	15	830	45	⇧				
55	⇦ Out/In		SR 228			Out/In ⇦	60				
	15		Castle Creek East			40					
235	25		TEV:2115			15					
	30		10/8/2016			5					
70	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	80				
	⇩	25	1060	10	⇧						
	865			1095							
0	⇩				⇧	0					

240 — SR 228 @ Seven Fields Blvd — TEV:2345 — 10/8/2016 — 11:45 am to 12:45 pm

			865			1095					
			⇩	80	695	90	⇧				
110	⇦ Out/In		SR 228			Out/In ⇦	275				
	60		Seven Fields Blvd			115					
240	30		TEV:2345			20					
	15		10/8/2016			140					
105	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	290				
	⇩	10	920	170	⇧						
	850			1100							
0	⇩				⇧	0					

245 — SR 228 @ Adams Ridge Rd — TEV:2170 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

			850			1100					
			⇩	215	635		⇧				
335	⇦ Out/In		SR 228			Out/In ⇦	0				
	245		Adams Ridge Rd								
245	0		TEV:2170								
	100		10/8/2016								
345	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	0				
	⇩	120	855		⇧						
	735			975							
0	⇩				⇧	0					

250 — SR 228 @ Myoma Rd — TEV:1760 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

			735			975					
			⇩		685	50	⇧				
0	⇦ Out/In		SR 228			Out/In ⇦	55				
			Myoma Rd			45					
250			TEV:1760			0					
			10/8/2016			10					
0	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	90				
	⇩		930	40	⇧						
	695			970							
-10	⇩				⇧	0					

255 — SR 228 @ Heritage Creek Dr — TEV:1920 — 10/8/2016 — 11:45 am to 12:45 pm

			685			970					
			⇩	30	615	40	⇧				
70	⇦ Out/In		SR 228			Out/In ⇦	160				
	25		Heritage Creek Dr			35					
255	10		TEV:1920			10					
	5		10/8/2016			115					
40	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	145				
	⇩	30	910	95	⇧						
	735			1035							
0	⇩				⇧	0					

260 — SR 228 @ Scharberry Ln — TEV:1785 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

			735			1035					
			⇩	5	730		⇧				
10	⇦ Out/In		SR 228			Out/In ⇦	0				
	0		Scharberry Ln								
260	0		TEV:1785								
	10		10/8/2016								
10	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	0				
	⇩	5	1035		⇧						
	740			1040							
0	⇩				⇧	0					

265 — SR 228 @ Beaver St Ext — TEV:1780 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

			740			1040					
			⇩		635	105	⇧				
0	⇦ Out/In		SR 228			Out/In ⇦	115				
			Beaver St Ext			115					
265			TEV:1780			0					
			10/8/2016			0					
0	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	105				
	⇩		925	0	⇧						
	635			925							

Design Year 2045 No-Build Volumes

Increased by the growth rate determined from the SPC Cycle 10 travel demand model

225 — SR 228 @ Franklin Rd — TEV:3600 — 10/8/2016 — 11:45 am to 12:45 pm

			1196			1584					
			⇩	100	977	119	⇧				
388	⇦ Out/In		SR 228			Out/In ⇦	438				
	100		Franklin Rd			125					
225	157		TEV:3600			169					
	125		10/8/2016			144					
382	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	382				
	⇩	119	1359	106	⇧						
	1246			1584							
-17	⇩				⇧	49					

230 — SR 228 @ Castle Creek West — TEV:2902 — 10/8/2016 — 11:45 am to 12:45 pm

			1229			1535					
			⇩	144	1033	52	⇧				
207	⇦ Out/In		SR 228			Out/In ⇦	46				
	161		Castle Creek West			40					
230	12		TEV:2902			6					
	63		10/8/2016			0					
236	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	63				
	⇩	58	1334	0	⇧						
	1096			1391							
12	⇩				⇧	1					

235 — SR 228 @ Castle Creek East — TEV:2626 — 10/8/2016 — 11:45 am to 12:45 pm

			1108			1391					
			⇩	17	1039	52	⇧				
63	⇦ Out/In		SR 228			Out/In ⇦	69				
	17		Castle Creek East			46					
235	29		TEV:2626			17					
	35		10/8/2016			6					
81	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	92				
	⇩	29	1327	12	⇧						
	1080			1368							
-14	⇩				⇧	14					

240 — SR 228 @ Seven Fields Blvd — TEV:2863 — 10/8/2016 — 11:45 am to 12:45 pm

			1066			1354					
			⇩	92	870	104	⇧				
127	⇦ Out/In		SR 228			Out/In ⇦	316				
	69		Seven Fields Blvd			132					
240	35		TEV:2863			23					
	17		10/8/2016			161					
121	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	334				
	⇩	12	1152	196	⇧						
	1049			1359							
1	⇩				⇧	1					

245 — SR 228 @ Adams Ridge Rd — TEV:2680 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

			1050			1358					
			⇩	266	784		⇧				
414	⇦ Out/In		SR 228			Out/In ⇦	0				
	303		Adams Ridge Rd								
245	0		TEV:2680								
	123		10/8/2016								
426	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	0				
	⇩	148	1056		⇧						
	908			1204							
0	⇩				⇧	0					

250 — SR 228 @ Myoma Rd — TEV:2173 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

			908			1204					
			⇩		846	62	⇧				
0	⇦ Out/In		SR 228			Out/In ⇦	68				
			Myoma Rd			56					
250			TEV:2173			0					
			10/8/2016			12					
0	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	111				
	⇩		1148	49	⇧						
	858			1198							
-12	⇩				⇧	0					

255 — SR 228 @ Heritage Creek Dr — TEV:2371 — 10/8/2016 — 11:45 am to 12:45 pm

			846			1198					
			⇩	37	759	49	⇧				
86	⇦ Out/In		SR 228			Out/In ⇦	198				
	31		Heritage Creek Dr			43					
255	12		TEV:2371			12					
	6		10/8/2016			142					
49	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	179				
	⇩	37	1124	117	⇧						
	908			1278							
0	⇩				⇧	0					

260 — SR 228 @ Scharberry Ln — TEV:2204 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

			908			1278					
			⇩	6	901		⇧				
12	⇦ Out/In		SR 228			Out/In ⇦	0				
	0		Scharberry Ln								
260	0		TEV:2204								
	12		10/8/2016								
12	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	0				
	⇩	6	1278		⇧						
	914			1284							
-9	⇩				⇧	10					

265 — SR 228 @ Beaver St Ext — TEV:2178 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

			904			1274					
			⇩		784	120	⇧				
0	⇦ Out/In		SR 228			Out/In ⇦	132				
			Beaver St Ext			132					
265			TEV:2178			0					
			10/8/2016			0					
0	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	120				
	⇩		1142	0	⇧						
	784			1142							

Design Year 2045 No-Build w/ Development

Sites A + B + F

225 — SR 228 @ Franklin Rd — TEV:4095 — 10/8/2016 — 11:45 am to 12:45 pm

			1365			1815					
			⇩	105	1125	135	⇧				
445	⇦ Out/In		SR 228			Out/In ⇦	475				
	155		Franklin Rd			145					
225	160		TEV:4095			175					
	150		10/8/2016			155					
465	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	405				
	⇩	165	1515	110	⇧						
	1430			1790							
OK	0	⇩			⇧	25	NG				

230 — SR 228 @ Castle Creek West — TEV:3345 — 10/8/2016 — 11:45 am to 12:45 pm

			1430			1765					
			⇩	165	1210	55	⇧				
235	⇦ Out/In		SR 228			Out/In ⇦	50				
	180		Castle Creek West			45					
230	10		TEV:3345			5					
	70		10/8/2016			0					
260	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	65				
	⇩	65	1540	0	⇧						
	1280			1605							
NG	10	⇩			⇧	5	NG				

235 — SR 228 @ Castle Creek East — TEV:3015 — 10/8/2016 — 11:45 am to 12:45 pm

			1290			1600					
			⇩	20	1220	50	⇧				
65	⇦ Out/In		SR 228			Out/In ⇦	65				
	20		Castle Creek East			45					
235	30		TEV:3015			15					
	35		10/8/2016			5					
85	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	90				
	⇩	30	1535	10	⇧						
	1260			1575							
NG	-5	⇩			⇧	-5	NG				

240 — SR 228 @ Seven Fields Blvd — TEV:3305 — 10/8/2016 — 11:45 am to 12:45 pm

			1255			1580					
			⇩	95	1040	120	⇧				
130	⇦ Out/In		SR 228			Out/In ⇦	355				
	75		Seven Fields Blvd			155					
240	35		TEV:3305			25					
	15		10/8/2016			175					
125	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	365				
	⇩	10	1350	210	⇧						
	1230			1570							
OK	0	⇩			⇧	5	NG				

245 — SR 228 @ Adams Ridge Rd — TEV:3095 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

			1230			1565					
			⇩	285	945		⇧				
445	⇦ Out/In		SR 228			Out/In ⇦	0				
	330		Adams Ridge Rd								
245	0		TEV:3095								
	140		10/8/2016								
470	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	0				
	⇩	160	1235		⇧						
	1085			1395							
OK	0	⇩			⇧	-5	NG				

250 — SR 228 @ Myoma Rd — TEV:2550 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection

			1085			1400					
			⇩		1020	65	⇧				
0	⇦ Out/In		SR 228			Out/In ⇦	70				
			Myoma Rd			60					
250			TEV:2550			0					
			10/8/2016			10					
0	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	120				
	⇩		1340	55	⇧						
	1030			1395							
NG	-10	⇩			⇧	0	OK				

255 — SR 228 @ Heritage Creek Dr — TEV:2945 — 10/8/2016 — 11:45 am to 12:45 pm

			1020			1395					
			⇩	190	775	55	⇧				
340	⇦ Out/In		SR 228			Out/In ⇦	200				
	155		Heritage Creek Dr			50					
255	10		TEV:2945			10					
	115		10/8/2016			140					
280	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	180				
	⇩	140	1190	115	⇧						
	1030			1445							
OK	0	⇩			⇧	0	OK				

260 — SR 228 @ Scharberry Ln — TEV:2490 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

			1030			1445					
			⇩	5	1025		⇧				
10	⇦ Out/In		SR 228			Out/In ⇦	0				
	0		Scharberry Ln								
260	0		TEV:2490								
	10		10/8/2016								
10	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	0				
	⇩	5	1445		⇧						
	1035			1450							
OK	0	⇩			⇧	0	OK				

265 — SR 228 @ Beaver St Ext — TEV:2485 — 10/8/2016 — 11:45 am to 12:45 pm — T-Intersection — Unsignalized

			1035			1450					
			⇩		900	135	⇧				
0	⇦ Out/In		SR 228			Out/In ⇦	155				
			Beaver St Ext			155					
265			TEV:2485			0					
			10/8/2016			0					
0	⇨ Out/In		11:45 am to 12:45 pm			Out/In ⇨	135				
	⇩		1295	0	⇧						
	900			1295							
OK	0	⇩			⇧	0	OK				

Appendix C

Traffic Engineering Study Data

Contents:

- Travel Time and Delay
- Intersection Stopped Delay
- Queuing
- Saturation Flow Rates
- Lane Utilization
- General Field Observations

Appendix C1:

Travel Time and Delay

Entered artery 7:55:22 am (606 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	26	26	1658	1658	2	2	24	24	44.2	44.2	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	50	75	2628	4287	15	16	35	59	36	38.8	51	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	33	109	1972	6259	9	26	24	83	40.5	39.3	56	40	0	0
to Seven Fields Blvd (#240)	240	EB	12	121	775	7034	2	28	10	93	43	39.7	54	40	0	0
to Adams Ridge Blvd (#245)	245	EB	11	132	680	7714	1	30	10	103	40.7	39.8	47	40	0	0
to Myoma Rd (#250)	250	EB	31	163	1812	9526	6	36	25	127	40.3	39.9	50	40	0	0
to Heritage Creek Dr (#255)	255	EB	56	219	3072	12598	18	54	37	165	37.7	39.3	56	50	0	0
to Scharberry Ln (#260)	260	EB	38	257	2444	15042	7	61	31	196	43.5	39.9	53	50	0	0
to Beaver St Ext (#265)	265	EB	4	261	253	15295	1	62	3	199	43.8	40	53	50	0	0

Entered artery 8:36:17 am (629 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	23	23	1658	1658	0	0	24	24	48.4	48.4	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	50	73	2629	4287	14	14	35	59	36.2	40.1	51	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	33	106	1970	6257	9	23	24	83	41.1	40.4	56	40	0	0
to Seven Fields Blvd (#240)	240	EB	12	118	775	7031	3	25	10	93	42.4	40.6	54	40	0	0
to Adams Ridge Blvd (#245)	245	EB	12	130	680	7711	2	27	10	103	40	40.6	47	40	0	0
to Myoma Rd (#250)	250	EB	33	163	1813	9525	9	36	25	127	37.1	39.9	50	40	0	0
to Heritage Creek Dr (#255)	255	EB	45	208	3072	12597	8	44	37	165	46	41.2	56	50	0	0
to Scharberry Ln (#260)	260	EB	40	249	2447	15044	9	53	31	196	41.3	41.2	53	50	0	0
to Beaver St Ext (#265)	265	EB	4	253	253	15297	1	54	3	199	38.4	41.2	53	50	0	0

Entered artery 8:41:04 am (509 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	40	40	1658	1658	16	16	24	24	28.4	28.4	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	65	105	2629	4287	30	46	35	59	27.4	27.8	51	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	41	146	1969	6256	17	63	24	83	32.8	29.2	56	40	0	0
to Seven Fields Blvd (#240)	240	EB	16	162	775	7031	6	69	10	93	33.5	29.6	54	40	0	0
to Adams Ridge Blvd (#245)	245	EB	12	174	680	7711	2	71	10	103	39.7	30.3	47	40	0	0
to Myoma Rd (#250)	250	EB	32	206	1813	9524	7	78	25	127	38.4	31.6	50	40	0	0
to Heritage Creek Dr (#255)	255	EB	51	257	3073	12598	14	92	37	165	41	33.5	56	50	0	0
to Scharberry Ln (#260)	260	EB	40	296	2445	15043	9	101	31	196	42	34.6	53	50	0	0
to Beaver St Ext (#265)	265	EB	4	300	253	15296	0	101	3	199	48.5	34.8	53	50	0	0

Entered artery 8:19:23 am (68 seconds) traveling Eastbound from Franklin Rd (#225)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	30	30	1658	1658	6	6	24	24	40.3	40.3	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	82	112	2634	4292	47	53	35	59	21.8	21.8	51	40	1	1
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	34	146	1966	6258	10	63	24	83	39.3	26.9	56	40	0	1
to Seven Fields Blvd (#240)	240	EB	19	165	775	7033	9	72	10	93	28	27.1	54	40	0	1
to Adams Ridge Blvd (#245)	245	EB	15	180	680	7713	5	77	10	103	31.3	27.5	47	40	0	1
to Myoma Rd (#250)	250	EB	30	210	1813	9526	6	83	25	128	40.6	29.7	50	40	0	1
to Heritage Creek Dr (#255)	255	EB	51	261	3077	12603	14	97	37	165	41	32.2	56	50	0	1
to Scharberry Ln (#260)	260	EB	31	292	2451	15054	0	97	31	196	53.5	34.7	53	50	0	1
to Beaver St Ext (#265)	265	EB	3	295	253	15307	0	97	3	199	53.1	34.9	53	50	0	1

Entered artery 8:36:14 am (62 seconds) traveling Eastbound from Franklin Rd (#225)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	30	30	1658	1658	6	6	24	24	40.3	40.3	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	35	65	2629	4287	0	6	35	59	50.7	50.7	51	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	24	89	1967	6254	0	6	24	83	56.6	53.1	56	40	0	0
to Seven Fields Blvd (#240)	240	EB	10	99	775	7029	0	6	10	93	54.2	53.2	54	40	0	0
to Adams Ridge Blvd (#245)	245	EB	33	132	684	7713	23	29	10	103	14.1	40.6	47	40	1	1
to Myoma Rd (#250)	250	EB	29	161	1813	9526	4	33	25	128	43.1	41.1	50	40	0	1
to Heritage Creek Dr (#255)	255	EB	43	204	3074	12600	5	38	37	165	48.9	43	56	50	0	1
to Scharberry Ln (#260)	260	EB	39	243	2446	15046	8	46	31	196	42.6	43	53	50	0	1
to Beaver St Ext (#265)	265	EB	4	247	253	15299	1	47	3	199	43.1	43	53	50	0	1

Entered artery 7:30:42 am (11 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	12	12	1006	1006	0	0	12	12	55.3	55.3	56	50	0	0
to Scharberry Ln (#260)	260	WB	3	15	253	1259	0	0	3	15	58.6	56	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	30	45	2453	3712	0	0	30	45	56.6	56.4	55	50	0	0
to Myoma Rd (#250)	250	WB	36	81	3086	6798	0	0	36	81	59	57.6	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	31	112	1814	8611	8	8	23	104	39.6	52.6	53	50	0	0
to Seven Fields Blvd (#240)	240	WB	17	129	679	9291	7	14	10	115	27.1	49.2	45	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	15	144	775	10066	3	17	12	126	35.3	47.7	45	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	59	202	1966	12032	29	46	30	156	22.9	40.5	45	40	1	1
to Franklin Rd (#225)	225	WB	96	298	2631	14663	56	102	40	196	18.7	33.5	45	40	1	2

Entered artery 8:03:09 am (10 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	15	15	1006	1006	3	3	12	12	46	46	56	50	0	0
to Scharberry Ln (#260)	260	WB	4	19	253	1259	1	3	3	15	46.2	46.1	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	42	60	2452	3712	12	15	30	45	40.2	42	55	50	0	0
to Myoma Rd (#250)	250	WB	69	129	3086	6798	34	49	36	81	30.4	35.8	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	99	228	1819	8617	75	124	23	104	12.6	25.7	53	50	1	1
to Seven Fields Blvd (#240)	240	WB	16	244	680	9296	6	130	10	115	29.1	26	45	40	0	1
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	14	258	775	10071	2	132	12	126	38	26.6	45	40	0	1
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	46	304	1955	12026	16	148	30	156	29.1	27	45	40	0	1
to Franklin Rd (#225)	225	WB	76	380	2631	14658	36	184	40	196	23.6	26.3	45	40	1	2

Entered artery 8:15:28 am (13 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	17	17	1006	1006	4	4	12	12	41.1	41.1	56	50	0	0
to Scharberry Ln (#260)	260	WB	4	20	253	1259	0	5	3	15	48.4	42.4	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	39	59	2452	3711	9	14	30	45	43.3	43	55	50	0	0
to Myoma Rd (#250)	250	WB	43	102	3085	6796	7	21	36	81	49	45.5	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	102	204	1819	8615	79	100	23	104	12.1	28.8	53	50	1	1
to Seven Fields Blvd (#240)	240	WB	27	231	680	9296	16	116	10	115	17.5	27.5	45	40	0	1
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	23	254	775	10071	11	128	12	126	22.7	27	45	40	0	1
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	67	321	1954	12024	37	165	30	156	19.8	25.5	45	40	1	2
to Franklin Rd (#225)	225	WB	63	384	2628	14652	23	188	40	196	28.4	26	45	40	0	2

Entered artery 8:26:25 am (8 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	12	12	1006	1006	0	0	12	12	57.7	57.7	56	50	0	0
to Scharberry Ln (#260)	260	WB	3	15	253	1259	0	0	3	15	58.2	57.8	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	39	54	2450	3709	9	9	30	45	42.6	46.8	55	50	0	0
to Myoma Rd (#250)	250	WB	59	113	3086	6795	23	32	36	81	35.8	41.1	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	75	188	1814	8609	52	84	23	104	16.5	31.2	53	50	1	1
to Seven Fields Blvd (#240)	240	WB	21	208	679	9288	10	94	10	115	22.5	30.4	45	40	0	1
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	19	227	775	10063	7	101	12	126	28.5	30.2	45	40	0	1
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	68	295	1953	12016	39	139	30	156	19.5	27.7	45	40	1	2
to Franklin Rd (#225)	225	WB	47	343	2628	14644	7	147	40	196	37.9	29.1	45	40	0	2

Entered artery 8:43:18 am (4 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	14	14	1006	1006	2	2	12	12	47.8	47.8	56	50	0	0
to Scharberry Ln (#260)	260	WB	4	19	253	1259	1	3	3	15	40.5	46.1	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	53	71	2451	3710	23	26	30	45	31.6	35.4	55	50	0	0
to Myoma Rd (#250)	250	WB	42	114	3083	6793	7	33	36	81	49.7	40.7	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	30	143	1813	8606	6	39	23	104	41.9	41	53	50	0	0
to Seven Fields Blvd (#240)	240	WB	21	164	680	9286	11	50	10	115	22	38.5	45	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	13	178	775	10061	2	51	12	126	39.3	38.6	45	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	49	227	1955	12016	19	71	30	156	27.1	36.1	45	40	1	1
to Franklin Rd (#225)	225	WB	40	267	2628	14644	0	71	40	196	44.9	37.4	45	40	0	1

Entered artery 4:17:09 pm (547 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	75	75	1667	1667	52	52	24	24	15.1	15.1	48	40	1	1
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	83	158	2634	4302	48	100	35	59	21.6	18.5	51	40	1	2
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	46	204	1977	6279	22	122	24	83	29.3	20.9	56	40	1	3
to Seven Fields Blvd (#240)	240	EB	20	225	775	7054	11	132	10	93	25.8	21.4	54	40	0	3
to Adams Ridge Blvd (#245)	245	EB	14	239	680	7734	4	136	10	103	32.9	22.1	47	40	0	3
to Myoma Rd (#250)	250	EB	30	269	1813	9547	5	141	25	127	41.8	24.2	50	40	0	3
to Heritage Creek Dr (#255)	255	EB	57	325	3068	12614	19	160	37	165	37	26.4	56	50	0	3
to Scharberry Ln (#260)	260	EB	97	423	2435	15049	66	227	31	196	17	24.3	53	50	1	4
to Beaver St Ext (#265)	265	EB	10	433	253	15302	7	233	3	199	17.3	24.1	53	50	0	4

Entered artery 4:56:50 pm (601 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	96	96	1673	1673	73	73	24	24	11.8	11.8	48	40	1	1
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	84	181	2638	4312	49	122	35	59	21.3	16.3	51	40	1	2
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	49	230	1974	6286	25	147	24	83	27.6	18.7	56	40	1	3
to Seven Fields Blvd (#240)	240	EB	16	246	775	7061	6	153	10	93	32.5	19.6	54	40	0	3
to Adams Ridge Blvd (#245)	245	EB	11	257	680	7741	1	154	10	103	41.3	20.5	47	40	0	3
to Myoma Rd (#250)	250	EB	25	282	1813	9554	0	155	25	127	49	23.1	50	40	0	3
to Heritage Creek Dr (#255)	255	EB	37	320	3067	12621	0	155	37	165	55.9	26.9	56	50	0	3
to Scharberry Ln (#260)	260	EB	109	428	2438	15059	78	233	31	196	15.3	24	53	50	2	5
to Beaver St Ext (#265)	265	EB	20	449	254	15313	17	249	3	199	8.6	23.3	53	50	1	6

Entered artery 5:44:23 pm (765 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	26	26	1658	1658	2	2	24	24	43.5	43.5	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	137	163	2629	4287	101	104	35	59	13.1	18	51	40	2	2
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	36	199	1969	6256	12	116	24	83	37.2	21.5	56	40	0	2
to Seven Fields Blvd (#240)	240	EB	49	248	778	7034	39	155	10	93	10.8	19.4	54	40	1	3
to Adams Ridge Blvd (#245)	245	EB	16	264	680	7714	6	161	10	103	28.9	19.9	47	40	0	3
to Myoma Rd (#250)	250	EB	30	294	1813	9527	5	166	25	127	41.4	22.1	50	40	0	3
to Heritage Creek Dr (#255)	255	EB	53	347	3072	12599	15	182	37	165	39.6	24.8	56	50	0	3
to Scharberry Ln (#260)	260	EB	39	386	2446	15044	8	190	31	196	42.5	26.6	53	50	0	3
to Beaver St Ext (#265)	265	EB	4	390	253	15298	1	191	3	199	41.3	26.7	53	50	0	3

Entered artery 3:50:56 pm (8 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	126	126	1662	1662	102	102	24	24	9	9	48	40	2	2
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	94	219	2632	4294	59	161	35	59	19.1	13.3	51	40	1	3
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	71	291	1977	6271	47	208	24	83	18.9	14.7	56	40	1	4
to Seven Fields Blvd (#240)	240	EB	15	306	775	7046	5	213	10	93	34.6	15.7	54	40	0	4
to Adams Ridge Blvd (#245)	245	EB	10	316	680	7726	1	214	10	103	44.3	16.6	47	40	0	4
to Myoma Rd (#250)	250	EB	29	346	1813	9539	5	218	25	127	42.1	18.8	50	40	0	4
to Heritage Creek Dr (#255)	255	EB	98	444	3077	12615	61	279	37	165	21.3	19.4	56	50	1	5
to Scharberry Ln (#260)	260	EB	48	493	2437	15053	17	297	31	196	34.3	20.8	53	50	0	5
to Beaver St Ext (#265)	265	EB	5	497	253	15306	2	298	3	199	35.6	21	53	50	0	5

Entered artery 4:13:32 pm (8 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	43	43	1744	1744	19	19	24	24	27.6	27.6	48	40	1	1
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	135	178	2546	4289	100	119	35	59	12.8	16.4	51	40	2	3
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	92	270	1975	6264	68	188	24	83	14.6	15.8	56	40	2	5
to Seven Fields Blvd (#240)	240	EB	46	316	775	7040	36	223	10	93	11.6	15.2	54	40	1	6
to Adams Ridge Blvd (#245)	245	EB	15	332	680	7720	5	229	10	103	30.3	15.9	47	40	0	6
to Myoma Rd (#250)	250	EB	34	365	1813	9533	9	238	25	127	36.6	17.8	50	40	0	6
to Heritage Creek Dr (#255)	255	EB	195	560	3075	12607	157	395	37	165	10.8	15.3	56	50	2	8
to Scharberry Ln (#260)	260	EB	157	718	2434	15042	126	522	31	196	10.5	14.3	53	50	2	10
to Beaver St Ext (#265)	265	EB	13	731	254	15295	10	532	3	199	13	14.3	53	50	0	10

Entered artery 4:29:57 pm (17 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	17	17	1006	1006	4	4	12	12	41.3	41.3	56	50	0	0
to Scharberry Ln (#260)	260	WB	4	20	253	1259	1	5	3	15	44.7	41.9	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	39	60	2444	3703	9	14	30	45	42.7	42.4	55	50	0	0
to Myoma Rd (#250)	250	WB	42	102	3080	6783	7	21	36	81	49.4	45.3	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	30	132	1813	8596	6	27	23	104	41.8	44.5	53	50	0	0
to Seven Fields Blvd (#240)	240	WB	12	143	680	9276	1	29	10	115	40.2	44.2	45	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	13	156	775	10051	1	30	12	126	39.7	43.8	45	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	64	221	1964	12015	35	65	30	156	20.8	37.1	45	40	1	1
to Franklin Rd (#225)	225	WB	66	287	2629	14643	26	91	40	196	27.1	34.8	45	40	1	2

Entered artery 5:09:28 pm (9 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	15	15	1006	1006	3	3	12	12	44.4	44.4	56	50	0	0
to Scharberry Ln (#260)	260	WB	4	19	253	1259	1	4	3	15	42.7	44.1	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	62	81	2448	3707	32	36	30	45	27	31.1	55	50	1	1
to Myoma Rd (#250)	250	WB	47	128	3081	6788	12	48	36	81	44.6	36	59	50	0	1
to Adams Ridge Blvd (#245)	245	WB	34	162	1813	8601	11	58	23	104	36.4	36.1	53	50	0	1
to Seven Fields Blvd (#240)	240	WB	10	173	680	9281	0	58	10	115	45.8	36.7	45	40	0	1
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	12	185	775	10056	0	58	12	126	44	37.2	45	40	0	1
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	63	248	1960	12016	34	92	30	156	21.1	33	45	40	1	2
to Franklin Rd (#225)	225	WB	57	305	2628	14644	17	109	40	196	31.3	32.7	45	40	0	2

Entered artery 4:04:10 pm (11 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	19	19	1006	1006	6	6	12	12	36.9	36.9	56	50	0	0
to Scharberry Ln (#260)	260	WB	5	23	253	1259	2	8	3	15	36.5	36.8	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	71	94	2443	3702	41	49	30	45	23.5	26.8	55	50	1	1
to Myoma Rd (#250)	250	WB	53	148	3078	6779	18	67	36	81	39.2	31.3	59	50	0	1
to Adams Ridge Blvd (#245)	245	WB	70	218	1813	8592	47	114	23	104	17.5	26.9	53	50	1	2
to Seven Fields Blvd (#240)	240	WB	17	235	680	9273	6	120	10	115	27.9	26.9	45	40	0	2
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	15	250	775	10047	3	123	12	126	35.9	27.5	45	40	0	2
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	70	320	1966	12013	40	163	30	156	19.1	25.6	45	40	1	3
to Franklin Rd (#225)	225	WB	60	380	2627	14641	20	184	40	196	29.7	26.3	45	40	1	4

Entered artery 4:26:55 pm (14 seconds) traveling Westbound from Beaver St Ext (#265)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	17	17	1006	1006	4	4	12	12	40.9	40.9	56	50	0	0
to Scharberry Ln (#260)	260	WB	3	20	253	1259	0	4.3	3	15	59.4	59.4	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	49	69	2441	3700	19	23	30	45	34.2	35.6	55	50	0	0
to Myoma Rd (#250)	250	WB	55	124	3075	6775	19	42	36	81	38.2	36.9	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	63	187	1813	8588	39	81	23	104	19.7	30.5	53	50	2	2
to Seven Fields Blvd (#240)	240	WB	17	204	680	9268	6	87	10	114	28.1	30.3	45	40	0	2
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	14	218	775	10043	2	89	12	126	37.7	30.8	45	40	0	2
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	69	287	1965	12008	39	128	30	156	19.4	27.9	45	40	1	3
to Franklin Rd (#225)	225	WB	47	334	2628	14636	7	135	40	196	38.3	29.4	45	40	0	3

Entered artery 4:47:17 pm (7 seconds) traveling Westbound from Beaver St Ext (#265)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	17	17	1006	1006	4	4	12	12	41	41	56	50	0	0
to Scharberry Ln (#260)	260	WB	4	21	253	1259	1	5.3	3	15	45.4	45.4	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	86	107	2453	3712	56	61	30	45	19.5	20.6	55	50	1	1
to Myoma Rd (#250)	250	WB	51	158	3078	6790	16	77	36	81	41.1	28	59	50	0	1
to Adams Ridge Blvd (#245)	245	WB	50	208	1813	8603	27	104	23	104	24.6	27.1	53	50	1	2
to Seven Fields Blvd (#240)	240	WB	14	222	680	9283	4	108	10	114	32.5	27.5	45	40	0	2
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	13	235	775	10058	1	109	12	126	40.1	28.2	45	40	0	2
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	30	265	1963	12021	1	110	30	156	43.9	30.2	45	40	0	2
to Franklin Rd (#225)	225	WB	105	370	2653	14674	65	175	40	196	17.3	26.3	45	40	1	3

Entered artery 11:09:55 am (149 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	30	30	1659	1659	7	7	24	24	37.5	37.5	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	46	76	2629	4287	11	17	35	59	39	38.4	51	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	32	109	1968	6255	8	26	24	83	41.4	39.3	56	40	0	0
to Seven Fields Blvd (#240)	240	EB	26	134	775	7030	16	42	10	93	20.4	35.6	54	40	0	0
to Adams Ridge Blvd (#245)	245	EB	12	147	680	7710	2	44	10	103	37.5	35.8	47	40	0	0
to Myoma Rd (#250)	250	EB	33	179	1813	9523	8	52	25	127	37.9	36.2	50	40	0	0
to Heritage Creek Dr (#255)	255	EB	48	228	3074	12597	11	63	37	165	43.4	37.7	56	50	0	0
to Scharberry Ln (#260)	260	EB	53	281	2448	15045	22	85	31	196	31.7	36.6	53	50	0	0
to Beaver St Ext (#265)	265	EB	7	288	253	15299	4	89	3	199	23.4	36.2	53	50	0	0

Entered artery 11:25:12 am (97 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	43	43	1658	1658	19	19	24	24	26.3	26.3	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	68	111	2638	4296	33	52	35	59	26.5	26.4	51	40	1	1
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	32	143	1967	6263	8	60	24	83	41.6	29.8	56	40	0	1
to Seven Fields Blvd (#240)	240	EB	12	155	775	7038	2	62	10	93	45.1	31	54	40	0	1
to Adams Ridge Blvd (#245)	245	EB	10	164	680	7718	0	62	10	103	48.8	32	47	40	0	1
to Myoma Rd (#250)	250	EB	24	189	1813	9531	0	61	25	127	50.7	34.4	50	40	0	1
to Heritage Creek Dr (#255)	255	EB	39	228	3073	12604	2	63	37	165	53.2	37.7	56	50	0	1
to Scharberry Ln (#260)	260	EB	39	267	2449	15053	8	71	31	196	42.8	38.4	53	50	0	1
to Beaver St Ext (#265)	265	EB	4	271	253	15306	0	72	3	199	48.9	38.6	53	50	0	1

Entered artery 11:40:15 am (93 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	30	30	1658	1658	6	6	24	24	38.1	38.1	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	42	72	2629	4287	7	13	35	59	42.9	40.9	51	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	67	138	1970	6257	43	55	24	83	20.2	30.9	56	40	2	2
to Seven Fields Blvd (#240)	240	EB	20	158	775	7032	10	65	10	93	27	30.4	54	40	0	2
to Adams Ridge Blvd (#245)	245	EB	12	170	680	7712	2	67	10	103	38.1	31	47	40	0	2
to Myoma Rd (#250)	250	EB	27	197	1813	9525	2	70	25	127	45.6	33	50	40	0	2
to Heritage Creek Dr (#255)	255	EB	41	238	3072	12597	3	73	37	165	51.3	36.1	56	50	0	2
to Scharberry Ln (#260)	260	EB	32	270	2447	15044	1	74	31	196	51.3	38	53	50	0	2
to Beaver St Ext (#265)	265	EB	5	275	253	15298	2	76	3	199	34.3	37.9	53	50	0	2

Entered artery 11:55:11 am (70 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	33	33	1658	1658	9	9	24	24	34.3	34.3	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	78	111	2629	4287	43	52	35	59	22.9	26.3	51	40	1	1
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	31	142	1968	6255	7	59	24	83	43.3	30	56	40	0	1
to Seven Fields Blvd (#240)	240	EB	14	156	775	7030	4	64	10	93	37.6	30.7	54	40	0	1
to Adams Ridge Blvd (#245)	245	EB	10	167	680	7710	0	64	10	103	44.9	31.6	47	40	0	1
to Myoma Rd (#250)	250	EB	30	197	1813	9523	5	69	25	127	41	33	50	40	0	1
to Heritage Creek Dr (#255)	255	EB	48	245	3072	12596	11	80	37	165	43.3	35	56	50	0	1
to Scharberry Ln (#260)	260	EB	36	281	2448	15044	5	85	31	196	46.4	36.5	53	50	0	1
to Beaver St Ext (#265)	265	EB	4	285	253	15297	1	86	3	199	45.2	36.6	53	50	0	1

Entered artery 2:42:22 pm (87 seconds) traveling Eastbound from Turnaround (Kristoffer Dr) (#220)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Franklin Rd (#225)	225	EB	28	28	1658	1658	5	5	24	24	40.2	40.2	48	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	EB	55	84	2629	4287	20	25	35	59	32.4	35	51	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	EB	67	150	1973	6260	43	67	24	83	20.2	28.4	56	40	1	1
to Seven Fields Blvd (#240)	240	EB	16	167	775	7035	7	74	10	93	32.2	28.8	54	40	0	1
to Adams Ridge Blvd (#245)	245	EB	41	208	682	7717	31	105	10	103	11.3	25.3	47	40	1	2
to Myoma Rd (#250)	250	EB	51	259	1813	9530	26	131	25	127	24.3	25.1	50	40	1	3
to Heritage Creek Dr (#255)	255	EB	66	325	3073	12603	29	160	37	165	31.7	26.5	56	50	1	4
to Scharberry Ln (#260)	260	EB	46	370	2444	15048	15	174	31	196	36.5	27.7	53	50	0	4
to Beaver St Ext (#265)	265	EB	4	374	253	15301	1	175	3	199	44.4	27.9	53	50	0	4

Entered artery 11:17:33 am (55 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	15	15	1005	1005	2	2	12	12	47	47	56	50	0	0
to Scharberry Ln (#260)	260	WB	4	18	253	1259	1	3	3	15	44.5	46.5	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	36	54	2451	3710	6	9	30	45	46.8	46.7	55	50	0	0
to Myoma Rd (#250)	250	WB	50	104	3085	6796	14	23	36	81	42.3	44.6	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	43	147	1814	8609	20	43	23	104	28.6	39.9	53	50	0	0
to Seven Fields Blvd (#240)	240	WB	13	160	679	9289	2	45	10	115	37	39.7	45	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	14	173	774	10063	2	47	12	126	38.7	39.6	45	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	39	212	1953	12016	9	56	30	156	34.4	38.7	45	40	0	0
to Franklin Rd (#225)	225	WB	84	296	2640	14656	44	99	40	196	21.5	33.8	45	40	1	1

Entered artery 11:32:29 am (58 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	15	15	1006	1006	2	2	12	12	46.6	46.6	56	50	0	0
to Scharberry Ln (#260)	260	WB	4	19	253	1259	1	4	3	15	40.6	45.2	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	37	56	2448	3707	7	11	30	45	45.1	45.1	55	50	0	0
to Myoma Rd (#250)	250	WB	46	102	3085	6792	10	21	36	81	46.2	45.6	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	59	160	1820	8612	36	56	23	104	21.1	36.6	53	50	1	1
to Seven Fields Blvd (#240)	240	WB	20	181	679	9291	10	66	10	115	22.8	35.1	45	40	0	1
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	14	195	775	10066	2	68	12	126	38.2	35.3	45	40	0	1
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	34	229	1952	12018	4	72	30	156	39.1	35.9	45	40	0	1
to Franklin Rd (#225)	225	WB	66	294	2630	14648	26	98	40	196	27.2	33.9	45	40	1	2

Entered artery 11:48:27 am (58 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	13	13	1006	1006	1	1	12	12	51.9	51.9	56	50	0	0
to Scharberry Ln (#260)	260	WB	3	17	253	1259	0	1	3	15	51.7	51.8	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	31	48	2448	3708	1	2	30	45	53.7	53.1	55	50	0	0
to Myoma Rd (#250)	250	WB	40	87	3087	6794	4	6	36	81	53.2	53.1	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	49	136	1814	8608	25	32	23	104	25.5	43.2	53	50	1	1
to Seven Fields Blvd (#240)	240	WB	14	150	680	9289	4	35	10	115	32.8	42.2	45	40	0	1
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	12	162	775	10063	0	36	12	126	43	42.3	45	40	0	1
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	59	222	1960	12024	30	65	30	156	22.5	37	45	40	1	2
to Franklin Rd (#225)	225	WB	43	265	2628	14652	3	68	40	196	41.7	37.8	45	40	0	2

Entered artery 12:02:11 pm (35 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	14	14	1006	1006	2	2	12	12	47.5	47.5	56	50	0	0
to Scharberry Ln (#260)	260	WB	4	18	253	1259	1	3	3	15	47.1	47.4	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	34	52	2448	3707	4	6	30	45	49.7	48.9	55	50	0	0
to Myoma Rd (#250)	250	WB	40	92	3084	6792	4	11	36	81	52.7	50.5	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	33	124	1813	8605	9	20	23	104	37.9	47.2	53	50	0	0
to Seven Fields Blvd (#240)	240	WB	52	176	696	9301	42	62	10	115	9.1	36	45	40	1	1
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	14	190	775	10076	2	64	12	126	37.6	36.1	45	40	0	1
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	33	223	1955	12031	3	67	30	156	40.8	36.8	45	40	0	1
to Franklin Rd (#225)	225	WB	85	308	2640	14671	45	112	40	196	21.1	32.4	45	40	1	2

Entered artery 2:50:49 pm (23 seconds) traveling Westbound from Turnaround (#261)

Node	NID	Dir	TT	CTT	TL	CTL	Delay	CD	RT	CRT	AS	CAS	DS	PLS	Stops	CStops
to Beaver St Ext (#265)	265	WB	13	13	1005	1005	1	1	12	12	51.8	51.8	56	50	0	0
to Scharberry Ln (#260)	260	WB	3	16	253	1259	0	1	3	15	53.2	52.1	56	50	0	0
to Heritage Creek Dr (#255)	255	WB	32	48	2449	3708	2	3	30	45	52.2	52.2	55	50	0	0
to Myoma Rd (#250)	250	WB	45	93	3085	6793	9	13	36	81	46.7	49.6	59	50	0	0
to Adams Ridge Blvd (#245)	245	WB	41	134	1813	8606	18	30	23	104	30.2	43.7	53	50	0	0
to Seven Fields Blvd (#240)	240	WB	14	148	680	9285	3	33	10	115	34.3	42.8	45	40	0	0
to High Pointe Dr / Castle Creek Dr (#235)	235	WB	15	163	775	10061	3	36	12	126	35.7	42.2	45	40	0	0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	WB	66	229	1958	12019	36	72	30	156	20.3	35.9	45	40	1	1
to Franklin Rd (#225)	225	WB	46	274	2628	14647	6	78	40	196	39.2	36.4	45	40	0	1

Appendix C2:

Intersection Stopped Delay

Whitman, Requardt & Associates, LLP

2009 Mackenzie Way - Suite 240
Cranberry Twp, PA 16066
724-779-7940 lweimer@wrallp.com
People Focused - Project Driven

Route 228 Mars West RR Bridge Expansion
SR 228 & Beaver St
Intersection Stopped Delay Study
Counted by WRA

File Name : AM Stop Delay @ Beaver St
Site Code : 00000123
Start Date : 10/20/2016

Ln.	No.	Joined Queue	Released From Queue	Delay
1	1	8:45:01 AM	8:45:10 AM	9
1	2	8:45:14 AM	8:45:18 AM	4
1	3	8:45:40 AM	8:45:48 AM	8
1	4	8:45:54 AM	8:45:58 AM	4
1	5	8:47:24 AM	8:47:28 AM	4
1	6	8:48:50 AM	8:48:58 AM	8
1	7	8:50:05 AM	8:51:05 AM	60
1	8	8:50:12 AM	8:51:08 AM	56
1	9	8:51:04 AM	8:51:10 AM	6
1	10	8:51:11 AM	8:51:17 AM	6
1	11	8:51:13 AM	8:51:26 AM	13
1	12	8:51:19 AM	8:51:58 AM	39
1	13	8:51:59 AM	8:52:20 AM	21
1	14	8:52:38 AM	8:52:40 AM	2
1	15	8:53:12 AM	8:53:24 AM	12
1	16	8:53:16 AM	8:53:30 AM	14
1	17	8:53:34 AM	8:54:03 AM	29
1	18	8:53:49 AM	8:54:37 AM	48
1	19	8:54:46 AM	8:54:48 AM	2
1	20	8:54:47 AM	8:54:50 AM	3
2	1	8:48:33 AM	8:48:46 AM	13
2	2	8:48:34 AM	8:48:47 AM	13
2	3	8:48:35 AM	8:48:48 AM	13
2	4	8:48:37 AM	8:48:49 AM	12
2	5	8:50:45 AM	8:51:06 AM	21
2	6	8:50:47 AM	8:51:07 AM	20
2	7	8:50:53 AM	8:51:07 AM	14
2	8	8:52:11 AM	8:52:21 AM	10
2	9	8:52:15 AM	8:52:23 AM	8

Summary Information:

8:45:00 AM - 8:55:00 AM	EB Left	SB
Total Vehicle Count:	20	9
Delayed Vehicle Count:	20	9
Through Vehicle Count:	0	0
Average Stopped Time:	17.40	13.778
Maximum Stopped Time:	60	21
Min. Secs. for Delay:	0	0
Average Queue:	0.59	0.535
Queue Density:	1.36	2.510
Maximum Queue:	3	4
Delay in Vehicle Hour:	0.59	0.54
Total Delay:	348	124

Whitman, Requardt & Associates, LLP

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Cranberry Twp, PA 16066
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People Focused - Project Driven

Route 228 Mars West RR Bridge Expansion
SR 228 & Beaver St
Intersection Stopped Delay Study
Counted by WRA

File Name : PM Stop Delay @ Beaver St
Site Code : 00000333
Start Date : 10/20/2016

Ln.	No.	Joined Queue	Released From Queue	Delay
1	1	4:27:00 PM	4:27:03 PM	3
1	2	4:27:07 PM	4:27:33 PM	26
1	3	4:27:48 PM	4:28:05 PM	17
1	4	4:28:54 PM	4:30:20 PM	86
1	5	4:29:00 PM	4:30:49 PM	109
1	6	4:30:26 PM	4:30:57 PM	31
1	7	4:30:28 PM	4:31:09 PM	41
1	8	4:30:37 PM	4:31:51 PM	74
1	9	4:30:40 PM	4:31:55 PM	75
1	10	4:30:50 PM	4:32:15 PM	85
1	11	4:30:59 PM	4:32:17 PM	78
1	12	4:31:25 PM	4:32:34 PM	69
1	13	4:31:25 PM	4:32:44 PM	79
1	14	4:32:01 PM	4:32:55 PM	54
1	15	4:32:20 PM	4:32:57 PM	37
1	16	4:32:54 PM	4:33:02 PM	8
1	17	4:33:04 PM	4:33:09 PM	5
1	18	4:34:37 PM	4:34:51 PM	14
1	19	4:34:59 PM	4:35:21 PM	22
1	20	4:36:06 PM	4:36:13 PM	7
1	21	4:36:46 PM	4:37:16 PM	30
1	22	4:37:11 PM	4:37:22 PM	11
1	23	4:37:24 PM	4:37:29 PM	5
1	24	4:38:07 PM	4:38:11 PM	4
1	25	4:39:14 PM	4:39:28 PM	14
1	26	4:39:27 PM	4:39:37 PM	10
1	27	4:39:32 PM	4:39:52 PM	20
2	1	4:27:39 PM	4:28:06 PM	27
2	2	4:27:43 PM	4:28:08 PM	25
2	3	4:27:48 PM	4:28:09 PM	21
2	4	4:27:51 PM	4:28:12 PM	21
2	5	4:27:52 PM	4:28:13 PM	21
2	6	4:27:53 PM	4:28:16 PM	23
2	7	4:27:54 PM	4:28:18 PM	24
2	8	4:27:55 PM	4:28:22 PM	27
2	9	4:27:59 PM	4:28:26 PM	27
2	10	4:28:02 PM	4:28:29 PM	27
2	11	4:29:04 PM	4:29:44 PM	40
2	12	4:29:23 PM	4:29:59 PM	36
2	13	4:29:36 PM	4:30:01 PM	25
2	14	4:29:40 PM	4:30:21 PM	41
2	15	4:29:42 PM	4:30:29 PM	47
2	16	4:29:50 PM	4:30:30 PM	40
2	17	4:30:08 PM	4:30:31 PM	23
2	18	4:30:09 PM	4:30:33 PM	24
2	19	4:30:14 PM	4:30:36 PM	22
2	20	4:30:18 PM	4:30:42 PM	24
2	21	4:31:06 PM	4:31:08 PM	2
2	22	4:31:12 PM	4:31:53 PM	41
2	23	4:31:21 PM	4:31:56 PM	35
2	24	4:31:28 PM	4:32:05 PM	37
2	25	4:31:31 PM	4:32:11 PM	40
2	26	4:31:33 PM	4:32:24 PM	51
2	27	4:32:39 PM	4:32:45 PM	6
2	28	4:32:40 PM	4:32:58 PM	18
2	29	4:32:41 PM	4:32:59 PM	18
2	30	4:32:43 PM	4:33:01 PM	18
2	31	4:32:46 PM	4:33:03 PM	17

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People Focused - Project Driven

Route 228 Mars West RR Bridge Expansion
SR 228 & Beaver St
Intersection Stopped Delay Study
Counted by WRA

File Name : PM Stop Delay @ Beaver St
Site Code : 00000333
Start Date : 10/20/2016

Ln.	No.	Joined Queue	Released From Queue	Delay	
2	32	4:32:47 PM	4:33:06 PM	19	
2	33	4:32:49 PM	4:33:06 PM	17	
2	34	4:32:51 PM	4:33:07 PM	16	
2	35	4:33:20 PM	4:33:37 PM	17	
2	36	4:33:39 PM	4:33:47 PM	8	
2	37	4:33:41 PM	4:34:09 PM	28	
2	38	4:34:08 PM	4:34:13 PM	5	
2	39	4:34:53 PM	4:35:11 PM	18	
2	40	4:35:12 PM	4:35:19 PM	7	
2	41	4:35:17 PM	4:35:20 PM	3	
2	42	4:35:29 PM	4:36:03 PM	34	
2	43	4:35:53 PM	4:36:12 PM	19	
2	44	4:36:47 PM	4:36:49 PM	2	
2	45	4:37:02 PM	4:37:16 PM	14	
2	46	4:37:09 PM	4:37:22 PM	13	
2	47	4:37:44 PM	4:38:12 PM	28	
2	48	4:37:55 PM	4:38:13 PM	18	
2	49	4:38:02 PM	4:38:16 PM	14	
2	50	4:38:03 PM	4:38:17 PM	14	
2	51	4:38:04 PM	4:38:18 PM	14	
2	52	4:38:06 PM	4:38:22 PM	16	
2	53	4:38:09 PM	4:38:24 PM	15	
2	54	4:39:04 PM	4:39:33 PM	29	
2	55	4:39:09 PM	4:39:36 PM	27	

Summary Information:

4:27:00 PM - 4:40:00 PM	EB Left	SB
Total Vehicle Count:	27	55
Delayed Vehicle Count:	27	55
Through Vehicle Count:	0	0
Average Stopped Time:	37.56	22.600
Maximum Stopped Time:	109	51
Min. Secs. for Delay:	0	0
Average Queue:	1.31	1.732
Queue Density:	2.39	2.683
Maximum Queue:	6	10
Delay in Vehicle Hour:	1.31	1.73
Total Delay:	1014	1243

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People Focused - Project Driven

Route 228 Mars West RR Bridge Expansion
SR 228 & Myoma
Intersection Stopped Delay Study
Counted by WRA

File Name : AM Stop Delay @ Myoma Rd
Site Code : 00000131
Start Date : 10/20/2016

Ln.	No.	Joined Queue	Released From Queue	Delay	
1	1	8:06:01 AM	8:06:08 AM	7	
1	2	8:06:35 AM	8:06:39 AM	4	
1	3	8:07:51 AM	8:07:53 AM	2	
1	4	8:09:11 AM	8:09:17 AM	6	
1	5	8:11:28 AM	8:11:30 AM	2	
1	6	8:11:29 AM	8:11:32 AM	3	
1	7	8:13:18 AM	8:13:21 AM	3	
1	8	8:17:11 AM	8:17:18 AM	7	
2	1	8:14:10 AM	8:14:35 AM	25	
2	2	8:14:12 AM	8:14:35 AM	23	
2	3	8:14:26 AM	8:14:58 AM	32	
2	4	8:14:53 AM	8:15:11 AM	18	
2	5	8:16:19 AM	8:17:01 AM	42	
2	6	8:16:50 AM	8:17:03 AM	13	

Summary Information:

8:06:00 AM - 8:18:00 AM	EB	SB
Total Vehicle Count:	8	6
Delayed Vehicle Count:	8	6
Through Vehicle Count:	0	0
Average Stopped Time:	4.25	25.500
Maximum Stopped Time:	7	42
Min. Secs. for Delay:	0	0
Average Queue:	0.05	0.879
Queue Density:	1.03	1.462
Maximum Queue:	2	3
Delay in Vehicle Hour:	0.05	0.88
Total Delay:	34	153

Whitman, Requardt & Associates, LLP

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People Focused - Project Driven

Route 228 Mars West RR Bridge Expansion
SR 228 & Myoma
Intersection Stopped Delay Study
Counted by WRA

File Name : PM Stop Delay @ Myoma Rd
Site Code : 00000444
Start Date : 10/20/2016

Ln.	No.	Joined Queue	Released From Queue	Delay	
1	1	4:46:01 PM	4:46:21 PM	20	
1	2	4:47:04 PM	4:47:07 PM	3	
1	3	4:47:28 PM	4:48:00 PM	32	
1	4	4:47:48 PM	4:48:20 PM	32	
1	5	4:48:28 PM	4:48:34 PM	6	
1	6	4:49:07 PM	4:49:21 PM	14	
1	7	4:51:29 PM	4:51:51 PM	22	
1	8	4:51:54 PM	4:52:00 PM	6	
1	9	4:52:30 PM	4:52:37 PM	7	
1	10	4:52:55 PM	4:52:58 PM	3	
2	1	4:46:14 PM	4:46:21 PM	7	
2	2	4:47:30 PM	4:48:20 PM	50	
2	3	4:53:22 PM	4:53:43 PM	21	

Summary Information:

4:46:00 PM - 4:54:00 PM	EB	SB
Total Vehicle Count:	10	3
Delayed Vehicle Count:	10	3
Through Vehicle Count:	0	0
Average Stopped Time:	14.50	26.000
Maximum Stopped Time:	32	50
Min. Secs. for Delay:	0	0
Average Queue:	0.35	0.171
Queue Density:	1.09	1.000
Maximum Queue:	2	1
Delay in Vehicle Hour:	0.35	0.17
Total Delay:	145	78

Appendix C3:

Queuing

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Signalized Queue Observation Worksheet

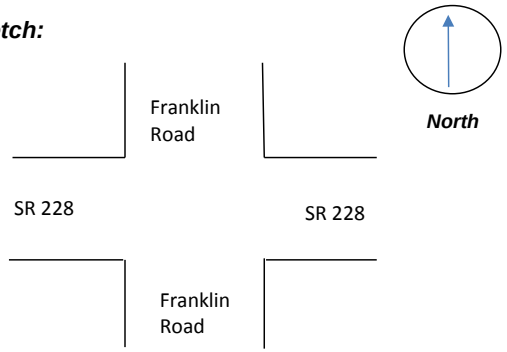
Project: Route 228 Mars West RR Bridge Expansion
Location: SR 228 @ Franklin Road
Date: 10/20/2016
Time Period: 7:30 AM
Compiled By: XW

Cycle	Approach	Northbound				Southbound				Eastbound				Westbound			
	Street Name	Franklin Road				Franklin Road				SR 228				SR 228			
	Lane (Left 1, Left 2, Thru 1, Thru 2..)	L	T	R		L	T	R		L	T	TR		L	T	TR	
1	*Comment:*	1	4	1		1	11	0		9	4	2		5	11	16	
2	*Comment:*	1	6	0		1	5	1		0	3	0		10	14	20	
3	*Comment:*	3	5	0		4	14	0		4	5	2		11	13	10	
4	*Comment:*	3	4	1		1	12	0		4	7	3		8	10	17	
5	*Comment:*	4	6	1		1	13	0		3	5	2		5	9	13	
6	*Comment:*	3	7	1		2	14	0		7	6	2		6	11	18	
7	*Comment:*	2	5	3		2	15	1		8	8	0		15	14	20	
8	*Comment:*	2	6	0		2	14	1		1	9	3		11	15	20	
9	*Comment:*	4	4	1		7	15	0		6	7	0		11	20	20	
10	*Comment:*	2	2	1		0	16	0		3	7	3		12	16	20	
11	*Comment:*	0	5	3		0	17	0		0	8	1		18	13	20	
12	*Comment:*	5	2	0		0	16	0		3	4	2		14	11	10	
13	*Comment:*	5	7	1		2	11	0		1	7	4		12	9	11	
14	*Comment:*	4	6	0		2	10	1		5	6	1		11	17	20	
15	*Comment:*																
Max Queue		**5**	**7**	**3**	**-**	**7**	**17**	**1**	**-**	**9**	**9**	**4**	**-**	**18**	**20**	**20**	**-**
Average Queue		**3**	**5**	**1**	**-**	**2**	**13**	**0**	**-**	**4**	**6**	**2**	**-**	**11**	**13**	**17**	**-**

Notes:

1 - Red number means more than 20 vehicles in queue.

Sketch:



Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Signalized Queue Observation Worksheet

Project: Route 228 Mars West RR Bridge Expansion
Location: SR 228 @ Franklin Road
Date: 10/25/2016
Time Period: 4:00 PM
Compiled By: XW

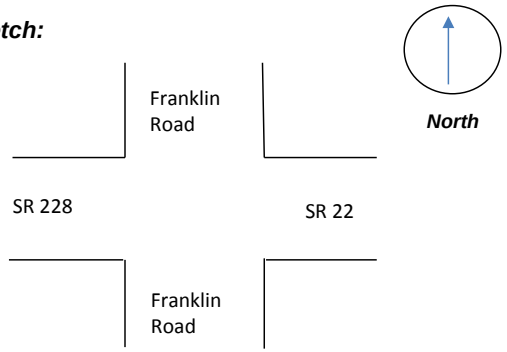
Cycle	Approach	Northbound				Southbound				Eastbound				Westbound			
	Street Name	Franklin Road				Franklin Road				SR 228				SR 228			
	Lane (Left 1, Left 2, Thru 1, Thru 2..)	L	T	R		L	T	R		L	T	TR		L	T	TR	
1	*Comment:*	2	7	3		2	5	4		6	20	20		4	20	20	
2	*Comment:*	5	9	7		3	7	0		4	20	8		6	18	20	
3	*Comment:*	4	16	1		3	4	0		6	20	5		3	14	12	
4	*Comment:*	5	13	2		5	7	0		8	18	14		3	15	20	
5	*Comment:*	2	3	0		3	7	0		10	20	20		4	8	20	
6	*Comment:*	4	10	4		3	7	0		9	20	20		0	16	18	
7	*Comment:*	3	14	0		6	4	0		11	20	12		8	12	20	
8	*Comment:*	3	5	4		5	2	0		7	20	6		3	18	20	
9	*Comment:*	8	12	3		6	3	0		12	20	7		3	13	20	
10	*Comment:*	2	13	5		4	2	0		5	20	6		6	14	20	
11	*Comment:*	4	20	3		7	5	0		7	20	10		3	18	20	
12	*Comment:*	1	16	6		7	7	0		8	18	3		5	19	20	
13	*Comment:*	3	10	1		5	10	0		6	20	6		6	20	20	
14	*Comment:*	2	12	0		0	7	0		8	20	6		0	20	20	
15	*Comment:*	3	13	2		3	11	0		10	14	5		6	15	18	
Max Queue		**8**	**20**	**7**	**-**	**7**	**11**	**4**	**-**	**12**	**20**	**20**	**-**	**8**	**20**	**20**	**-**
Average Queue		**3**	**12**	**3**	**-**	**4**	**6**	**0**	**-**	**8**	**19**	**10**	**-**	**4**	**16**	**19**	**-**

Notes:

1 - Red number means more than 20 vehicles in queue.

2 - Slightly spillback for EB reciving lane from 4:15 PM

Sketch:



Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Signalized Queue Observation Worksheet

Project: Route 228 Mars West RR Bridge Expansion
Location: SR 228 @ Seven Fields Blvd
Date: 10/20/2016
Time Period: 8:05 AM
Compiled By: XW

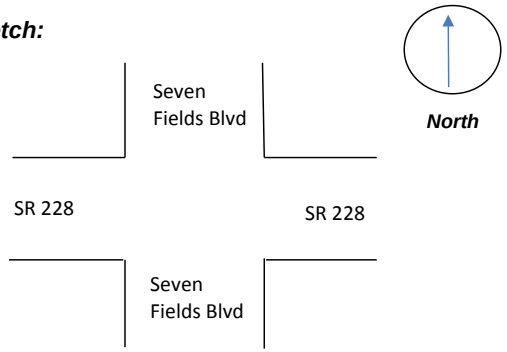
Cycle	Approach	Northbound				Southbound				Eastbound				Westbound			
	Street Name	Seven Fields Blvd				Seven Fields Blvd				SR 228				SR 228			
	Lane (Left 1, Left 2, Thru 1, Thru 2..)	L	T	R (C)		L	TR			L	T	R(C)		L	T	R	
1	*Comment:*	1	0	0		5	1			2	6	0		0	5	0	
2	*Comment:*	4	1	0		3	4			1	4	0		0	20	0	
3	*Comment:*	0	1	0		1	0			0	8	0		0	20	0	
4	*Comment:*	0	2	0		1	3			0	2	0		0	20	2	
5	*Comment:*	0	2	0		0	0			4	12	0		0	20	0	
6	*Comment:*	1	0	0		2	2			0	2	0		0	11	0	
7	*Comment:*	2	0	0		3	1			0	2	0		0	15	0	
8	*Comment:*	1	0	0		4	2			2	3	1		0	17	0	
9	*Comment:*	0	0	0		2	1			1	6	0		0	18	0	
10	*Comment:*	0	0	0		1	2			0	1	0		0	13	0	
11	*Comment:*	0	0	0		4	0			0	0	0		0	11	0	
12	*Comment:*																
13	*Comment:*																
14	*Comment:*																
15	*Comment:*																
Max Queue		**4**	**2**	**-**	**-**	**5**	**4**	**-**	**-**	**4**	**12**	**1**	**-**	**-**	**20**	**2**	**-**
Average Queue		**1**	**1**	**-**	**-**	**2**	**1**	**-**	**-**	**1**	**4**	**0**	**-**	**-**	**15**	**0**	**-**

Notes:

1 - Red number means more than 20 vehicles in queue.

2 - R(C) means Channelized Right Turn Lane, "yield" control.

Sketch:



Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Signalized Queue Observation Worksheet

Project: Route 228 Mars West RR Bridge Expansion
Location: SR 228 @ Seven Fields Blvd
Date: 10/25/2016
Time Period: 4:15:00 PM
Compiled By: XW

Cycle	Approach	Northbound				Southbound				Eastbound				Westbound			
	Street Name	Seven Fields Blvd				Seven Fields Blvd				SR 228				SR 228			
	Lane (Left 1, Left 2, Thru 1, Thru 2..)	L	T	R (C)		L	TR			L	T	R(C)		L	T	R	
1	*Comment:*	2	1	0		11	9			0	6	0		0	4	0	
2	*Comment:*	2	3	0		0	8			1	9	1		0	16	1	
3	*Comment:*	0	0	0		11	10			5	6	0		0	8	1	
4	*Comment:*	2	0	0		8	9			3	7	0		0	10	1	
5	*Comment:*	0	0	0		5	0			0	14	0		0	9	1	
6	*Comment:*	0	2	0		5	0			0	10	0		0	9	0	
7	*Comment:*	4	1	0		4	1			1	8	0		0	10	2	
8	*Comment:*	0	0	0		9	3			0	11	0		0	5	0	
9	*Comment:*	1	1	0		7	2			0	4	0		0	15	0	
10	*Comment:*	4	2	0		10	9			3	9	0		1	11	0	
11	*Comment:*																
12	*Comment:*																
13	*Comment:*																
14	*Comment:*																
15	*Comment:*																
Max Queue		**4**	**3**	**-**	**-**	**11**	**10**	**-**	**-**	**5**	**14**	**1**	**-**	**1**	**16**	**2**	**-**
Average Queue		**2**	**1**	**-**	**-**	**7**	**5**	**-**	**-**	**1**	**8**	**0**	**-**	**0**	**10**	**1**	**-**

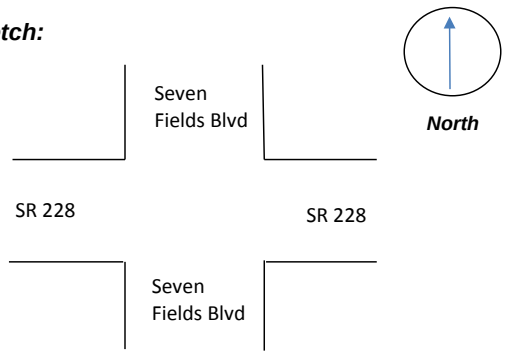
Notes:

1 - A vehicle is queued when it is at the stop bar or behind another queued vehicle, and traveling less than 7 mph

2 - EB: One oversize load truck with pilot car before the load cause little delay with a speed like 30 MPH.

3 - R(C) means Channelized Right Turn Lane, "yield" control.

Sketch:



Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Signalized Queue Observation Worksheet

Project: Route 228 Mars West RR Bridge Expansion
Location: SR 228 @ Adams Ridge Blvd
Date: 10/20/2016
Time Period: 8:30:00 AM
Compiled By: XW

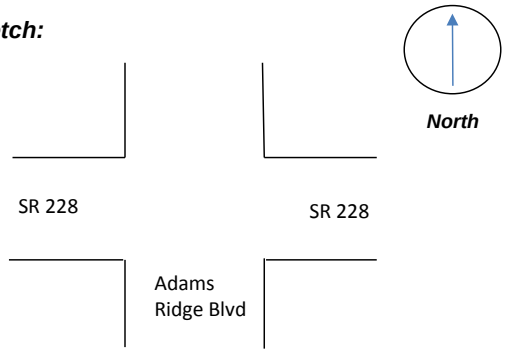
Cycle	Approach	Northbound				Southbound				Eastbound				Westbound			
	Street Name	Adams Ridge Blvd				Adams Ridge Blvd				SR 228				SR 228			
	Lane (Left 1, Left 2, Thru 1, Thru 2..)	L	R(C)							T	R(C)			L	T		
1	*Comment:*	10	0							1	0			0	2		
2	*Comment:*	9	0							1	0			1	1		
3	*Comment:*	12	0							2	0			0	1		
4	*Comment:*	10	0							3	0			0	1		
5	*Comment:*	6	1							4	0			3	15		
6	*Comment:*	10	2							3	0			0	0		
7	*Comment:*	6	0							2	0			2	6		
8	*Comment:*	5	0							1	0			0	3		
9	*Comment:*	10	1							2	0			1	5		
10	*Comment:*	6	0							6	0			0	16		
11	*Comment:*	8	0							5	0			1	6		
12	*Comment:*																
13	*Comment:*																
14	*Comment:*																
15	*Comment:*																
Max Queue		**12**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**6**	**-**	**-**	**-**	**3**	**16**	**-**	**-**
Average Queue		**8**	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**1**	**5**	**-**	**-**

Notes:

1 - A vehicle is queued when it is at the stop bar or behind another queued vehicle, and traveling less than 7 mph

2 - R(C) means Channelized Right Turn Lane, "yield" control.

Sketch:



Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Signalized Queue Observation Worksheet

Project: Route 228 Mars West RR Bridge Expansion
Location: SR 228 @ Adams Ridge Blvd
Date: 10/25/2016
Time Period: 4:45:00 PM
Compiled By: XW

Cycle	Approach	Northbound				Southbound				Eastbound				Westbound			
	Street Name	Adams Ridge Blvd				Adams Ridge Blvd				SR 228				SR 228			
	Lane (Left 1, Left 2, Thru 1, Thru 2..)	L	R(C)							T	R(C)			L	T		
1	Comment:	12	0							5	0			0	14		
2	Comment:	4	3							3	5			0	12		
3	Comment:	8	2							6	0			2	13		
4	Comment:	11	0							8	0			2	20		
5	Comment:	8	1							10	0			4	16		
6	Comment:	7	0							7	0			0	15		
7	Comment:	10	0							6	0			6	12		
8	Comment:	6	0							10	0			2	20		
9	Comment:	9	1							3	0			0	17		
10	Comment:	6	2							5	1			3	18		
11	Comment:																
12	Comment:																
13	Comment:																
14	Comment:																
15	Comment:																
Max Queue		**12**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**10**	**5**	**-**	**-**	**6**	**20**	**-**	**-**
Average Queue		**8**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**6**	**1**	**-**	**-**	**2**	**16**	**-**	**-**

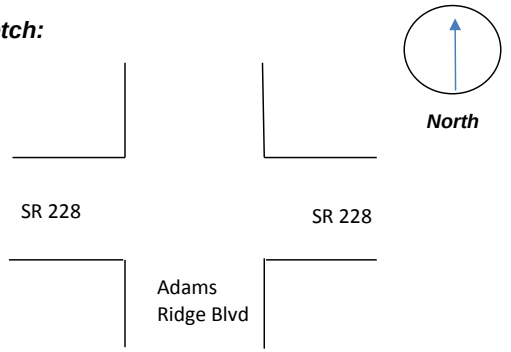
Notes:

1 - A vehicle is queued when it is at the stop bar or behind another queued vehicle, and traveling less than 7 mph

2 - Red number means more than 20 vehicles in queue.

3 - R(C) means Channelized Right Turn Lane, "yield" control.

Sketch:



Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Signalized Queue Observation Worksheet

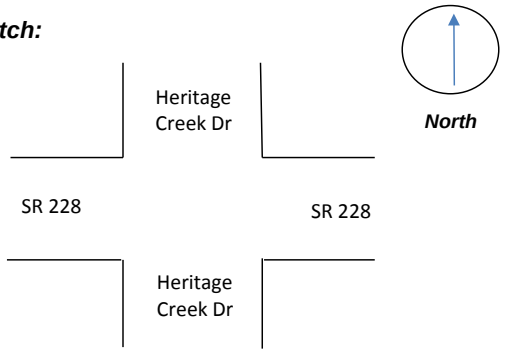
Project: Route 228 Mars West RR Bridge Expansion
Location: SR 228 @ Heritage Creek Dr
Time Period: 9:00:00 AM
Date: 10/20/2016
Compiled By: XW

Cycle	Approach	Northbound				Southbound				Eastbound				Westbound			
	Street Name	Heritage Creek Dr				Heritage Creek Dr				SR 228				SR 228			
	Lane (Left 1, Left 2, Thru 1, Thru 2..)	L	T	R		L	T	R		L	T	R		L	T	R	
1	*Comment:*	0	1	0		6	0	1		2	1	0		0	7	1	
2	*Comment:*	1	0	0		1	0	1		0	2	0		0	3	1	
3	*Comment:*	0	0	0		3	0	0		0	2	0		0	6	0	
4	*Comment:*	0	0	0		5	0	0		0	5	1		0	6	0	
5	*Comment:*	1	0	0		4	0	0		0	9	1		0	4	0	
6	*Comment:*	1	0	0		7	0	1		0	8	0		0	6	1	
7	*Comment:*	0	0	0		3	0	1		1	0	0		0	9	0	
8	*Comment:*	0	0	0		3	1	0		0	3	0		0	6	1	
9	*Comment:*	0	0	0		4	0	0		0	3	0		0	1	0	
10	*Comment:*	1	0	0		2	0	0		1	5	0		0	10	0	
11	*Comment:*	1	0	0		0	0	0		0	2	0		0	6	0	
12	*Comment:*	0	1	0		6	0	2		1	3	0		0	8	3	
13	*Comment:*																
14	*Comment:*																
15	*Comment:*																
Max Queue		**1**	**1**	**-**	**-**	**7**	**1**	**2**	**-**	**2**	**9**	**1**	**-**	**-**	**10**	**3**	**-**
Average Queue		**0**	**0**	**-**	**-**	**4**	**0**	**1**	**-**	**0**	**4**	**0**	**-**	**-**	**6**	**1**	**-**

Notes:

1 - A vehicle is queued when it is at the stop bar or behind another queued vehicle, and traveling less than 7 mph

Sketch:



Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Signalized Queue Observation Worksheet

Project: Route 228 Mars West RR Bridge Expansion
Location: SR 228 @ Heritage Creek Dr
Time Period: 5:15:00 PM
Date: 10/25/2016
Compiled By: XW

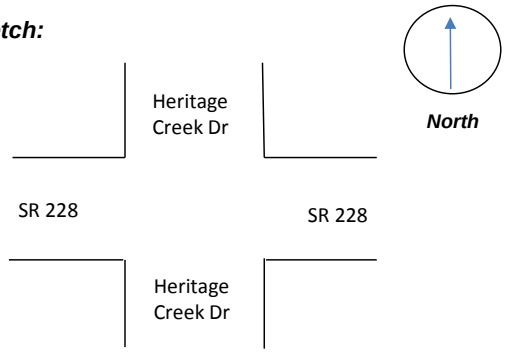
Cycle	Approach	Northbound				Southbound				Eastbound				Westbound			
	Street Name	Heritage Creek Dr				Heritage Creek Dr				SR 228				SR 228			
	Lane (Left 1, Left 2, Thru 1, Thru 2..)	L	T	R		L	T	R		L	T	R		L	T	R	
1	*Comment:*	2	2	0		8	0	0		0	8	0		0	20	0	
2	*Comment:*	0	0	0		6	0	1		0	6	1		0	14	0	
3	*Comment:*	1	1	0		5	0	1		1	8	0		0	11	2	
4	*Comment:*	0	0	0		13	1	0		2	10	0		0	9	1	
5	*Comment:*	2	0	0		12	0	0		0	14	0		0	15	0	
6	*Comment:*	0	0	0		7	0	0		2	15	0		1	12	0	
7	*Comment:*	0	0	0		8	0	0		1	9	0		0	12	1	
8	*Comment:*	1	0	0		6	0	2		2	12	0		0	5	0	
9	*Comment:*	2	1	0		8	0	0		1	8	0		0	7	0	
10	*Comment:*	0	0	0		10	1	0		3	13	0		0	3	1	
11	*Comment:*																
12	*Comment:*																
13	*Comment:*																
14	*Comment:*																
15	*Comment:*																
Max Queue		**2**	**2**	**-**	**-**	**13**	**1**	**2**	**-**	**3**	**15**	**1**	**-**	**1**	**20**	**2**	**-**
Average Queue		**1**	**0**	**-**	**-**	**8**	**0**	**0**	**-**	**1**	**10**	**0**	**-**	**0**	**11**	**1**	**-**

Notes:

1 - A vehicle is queued when it is at the stop bar or behind another queued vehicle, and traveling less than 7 mph

2 - Red number means more than 20 vehicles in queue.

Sketch:



Appendix C4:

Saturation Flow Rates

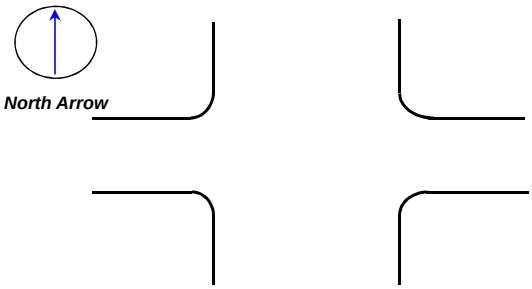
Intersection	Movement	Observed Saturation Flow Rate (veh/hr/ln)	Ideal Saturation Flow Rate (veh/hr/ln)
SR 228 @ Castle Creek Dr W	WB Thru AM Peak	1723	1784
SR 228 @ Castle Creek Dr W	WB Thru PM Peak	1656	1714
SR 228 @ Castle Creek Dr W	EB Thru PM Peak	1812	1830
SR 228 @ Castle Creek Dr E	WB Thru AM Peak	1981	2040
SR 228 @ Castle Creek Dr E	WB Thru PM Peak	1852	1908
SR 228 @ Seven Field Blvd	WB Thru AM Peak	1825	1825
SR 228 @ Seven Field Blvd	WB Thru PM Peak	1794	1794
SR 228 @ Heritage Creek Dr	EB Thru AM Peak	1483	1551
SR 228 @ Heritage Creek Dr	WB Thru AM Peak	1817	1808
SR 228 @ Heritage Creek Dr	EB Thru PM Peak	1589	1662
SR 228 @ Heritage Creek Dr	WB Thru PM Peak	1923	1914
AVERAGE		**1769**	**1803**

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Castle Creek Dr W
Agency	WRA	*Area Type*	_____CBD _____Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



Movements Allowed

_____Through

_____Right

_____Left

WB Thru Studied

Input Field Measurements

Veh. In Queue *	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T
1															
2															
3															
4	9.8			6.6			2.6			4.6			19.7		
5															
6															
7		X													
8	19.50			15.00			10.50			12.40			28.90		
9															
10															
11															
12															
	SF =	**1485**		**SF =**	**1714**		**SF =**	**1823**		**SF =**	**1846**		**SF =**	**1565**	

Veh. In Queue *	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T
1															
2															
3															
4	2.2			6.8			5.5								
5					X										
6															
7															
8	9.33			16.8			13.1								
9															
10															
11															
12															
	SF =	**2020**		**SF =**	**1440**		**SF =**	**1895**		**SF =**			**SF =**		

Veh. In Queue *	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			**SF =**			**SF =**			**SF =**			**SF =**		

AVERAGE ALL VEHICLES	**1723**	**AVERAGE CARS ONLY**	**1810**	**AVERAGE TRUCKS ONLY**	**1462**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

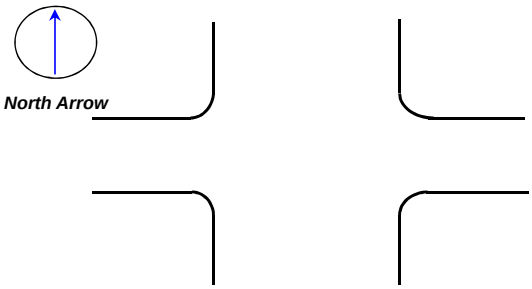
HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Castle Creek Dr W
Agency	WRA	*Area Type*	_____CBD _____Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



Movements Allowed

_____Through

_____Right

_____Left

WB Thru Studied

Input Field Measurements

Veh. In Queue *	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T
1															
2															
3															
4	9			4.7			2.6			3.5			7.6		
5															
6					X						X				
7															
8	19.10			18.10			10.50			15.80			14.90		
9															
10															
11															
12															
	SF =	**1426**		**SF =**	**1075**		**SF =**	**1823**		**SF =**	**1171**		**SF =**	**1973**	

Veh. In Queue *	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T
1															
2															
3								x							
4	6.5			7.62			9.37			6.6			8.95		
5															
6															
7															
8	12.73			15.68			18.78			15.23			16.95		
9															
10															
11															
12															
	SF =	**2311**		**SF =**	**1787**		**SF =**	**1530**		**SF =**	**1669**		**SF =**	**1800**	

Veh. In Queue *	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T	Time	HV	T
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			**SF =**			**SF =**			**SF =**			**SF =**		

AVERAGE ALL VEHICLES	**1656**	**AVERAGE CARS ONLY**	**1827**	**AVERAGE TRUCKS ONLY**	**1259**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

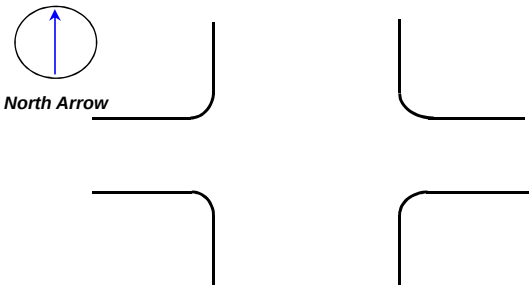
HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Castle Creek Dr W
Agency	WRA	*Area Type*	_____CBD _____Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



Movements Allowed

_____Through

_____Right

_____Left

EB Thru Studied

Input Field Measurements

	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4	5.4			7.12			8.55			6.8			8.6		
5															
6								X							
7											X				
8	12.70			14.00			18.46			17.23			15.80		
9															
10															
11															
12															
	SF =	**1973**		***SF =***	**2093**		***SF =***	**1453**		***SF =***	**1381**		***SF =***	**2000**	

	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4	7.5														
5															
6															
7															
8	14.8														
9															
10															
11															
12															
	SF =	**1973**		***SF =***			***SF =***			***SF =***			***SF =***		

	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			***SF =***			***SF =***			***SF =***			***SF =***		

AVERAGE ALL VEHICLES	**1812**	**AVERAGE CARS ONLY**	**2010**	**AVERAGE TRUCKS ONLY**	**1417**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

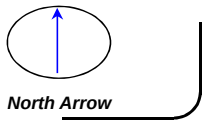
HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Castle Creek Dr E
Agency	WRA	*Area Type*	_____CBD _____Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



North Arrow

Movements Allowed

_____Through

_____Right

_____Left

WB Thru Studied

Input Field Measurements

	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1								x							
2															
3					x										
4	6.85			10.72			7.99			7.58			10.83		
5															
6															
7															
8	14.25			18.03			15.86			15.29			18.22		
9															
10															
11															
12															
	SF =	**1946**		***SF =***	**1970**		***SF =***	**1830**		***SF =***	**1868**		***SF =***	**1949**	

	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1		x													
2															
3		x													
4	11.42														
5															
6															
7															
8	17.62														
9															
10															
11															
12															
	SF =	**2323**		***SF =***			***SF =***			***SF =***			***SF =***		

	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			***SF =***			***SF =***			***SF =***			***SF =***		

AVERAGE ALL VEHICLES	**1981**	**AVERAGE CARS ONLY**	**1921**	**AVERAGE TRUCKS ONLY**	**2041**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

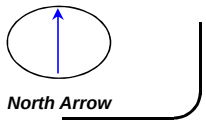
HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Castle Creek Dr E
Agency	WRA	*Area Type*	_____CBD _____Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



North Arrow

Movements Allowed

_____Through

_____Right

_____Left

WB Thru Studied

Input Field Measurements

	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4	8.79			7.59			6.96			7.85			8.32		
5															
6															
7															
8	16.80			16.50			14.96			14.93			16.10		
9															
10															
11															
12															
	SF =	**1798**		***SF =***	**1616**		***SF =***	**1800**		***SF =***	**2034**		***SF =***	**1851**	

	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2		x													
3															
4	10.46														
5															
6															
7															
8	17.62														
9															
10															
11															
12															
	SF =	**2011**		***SF =***			***SF =***			***SF =***			***SF =***		

	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			***SF =***			***SF =***			***SF =***			***SF =***		

AVERAGE ALL VEHICLES	**1852**	**AVERAGE CARS ONLY**	**1820**	**AVERAGE TRUCKS ONLY**	**2011**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

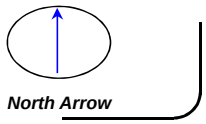
HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Seven Field Blvd
Agency	WRA	*Area Type*	_____CBD _____Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



North Arrow

Movements Allowed

_____Through

_____Right

_____Left

WB Thru Studied

Input Field Measurements

	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4	7.42			8.36			8.16			8.26			7.42		
5															
6															
7															
8	15.50			15.65			15.73			15.82			14.53		
9															
10															
11															
12															
	SF =	**1782**		***SF =***	**1975**		***SF =***	**1902**		***SF =***	**1905**		***SF =***	**2025**	

	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3					X										
4	7.66			10.12											
5															
6															
7															
8	17.5			18.48											
9															
10															
11															
12															
	SF =	**1463**		***SF =***	**1722**		***SF =***			***SF =***			***SF =***		

	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			***SF =***			***SF =***			***SF =***			***SF =***		

AVERAGE ALL VEHICLES	**1825**	**AVERAGE CARS ONLY**	**1842**	**AVERAGE TRUCKS ONLY**	**1722**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

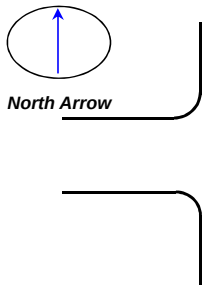
HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Seven Field Blvd
Agency	WRA	*Area Type*	_____ CBD _____ Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



Movements Allowed

_____ Through

_____ Right

_____ Left

WB Thru Studied

Input Field Measurements

	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4	8.43			6.93			7.96			9.09			7.75		
5		x													
6															
7															
8	17.08			14.15			16.05			17.35			15.45		
9															
10															
11															
12															
	SF =	**1665**		***SF =***	**1994**		***SF =***	**1780**		***SF =***	**1743**		***SF =***	**1870**	

	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1					X										
2															
3															
4	7.66			7.25											
5															
6															
7															
8	14.8			16.94											
9															
10															
11															
12															
	SF =	**2017**		***SF =***	**1486**		***SF =***			***SF =***			***SF =***		

	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			***SF =***			***SF =***			***SF =***			***SF =***		

AVERAGE ALL VEHICLES	**1794**	**AVERAGE CARS ONLY**	**1881**	**AVERAGE TRUCKS ONLY**	**1575**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

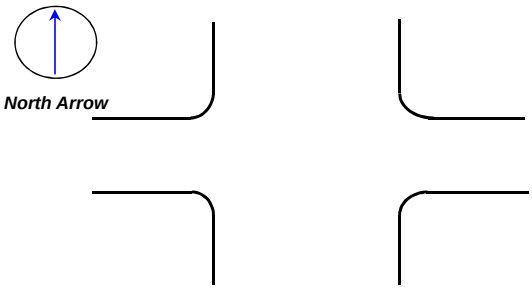
HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Heritage Creek Dr
Agency	WRA	*Area Type*	_____CBD _____Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



Movements Allowed

_____Through

_____Right

_____Left

EB Thru Studied

Input Field Measurements

	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4	11.3			8.9			5.9			15.84			13.21		
5		X													
6		X													
7															
8	25.70			19.45			16.47			25.13			22.80		
9															
10															
11															
12															
	SF =	**1000**		***SF =***	**1365**		***SF =***	**1362**		***SF =***	**1550**		***SF =***	**1502**	

	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3					x										
4	8.06			9.67			9			6.39			6.65		
5		x													
6															
7		x													
8	20.42			16.82			17.58			15.93			15.21		
9															
10															
11															
12															
	SF =	**1165**		***SF =***	**2014**		***SF =***	**1678**		***SF =***	**1509**		***SF =***	**1682**	

	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			***SF =***			***SF =***			***SF =***			***SF =***		

AVERAGE ALL VEHICLES	**1483**	**AVERAGE CARS ONLY**	**1521**	**AVERAGE TRUCKS ONLY**	**1393**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

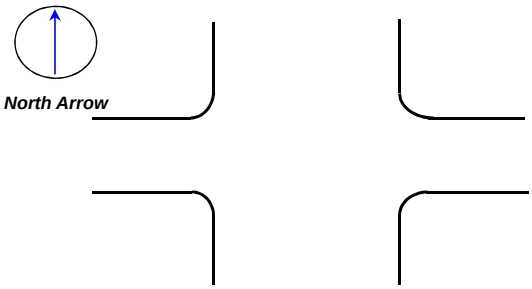
HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Heritage Creek Dr
Agency	WRA	*Area Type*	_____CBD _____Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



Movements Allowed

_____Through

_____Right

_____Left

WB Thru Studied

Input Field Measurements

	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4	6.4			5.8			5.8			7.8			6.13		
5															
6					X										
7															
8	14.30			17.50			12.32			14.80			14.29		
9															
10															
11															
12															
	SF =	**1823**		***SF =***	**1231**		***SF =***	**2209**		***SF =***	**2057**		***SF =***	**1765**	

	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			***SF =***			***SF =***			***SF =***			***SF =***		

	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			***SF =***			***SF =***			***SF =***			***SF =***		

AVERAGE ALL VEHICLES	**1817**	**AVERAGE CARS ONLY**	**1963**	**AVERAGE TRUCKS ONLY**	**1231**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

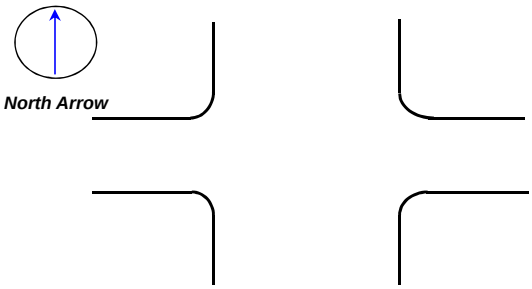
HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Heritage Creek Dr
Agency	WRA	*Area Type*	_____CBD _____Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



Movements Allowed

_____Through

_____Right

_____Left

EB Thru Studied

Input Field Measurements

	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2														x	
3															
4	7.4			8.7			6			8.1			11.93		
5															
6		x													
7															
8	19.70			17.60			15.10			17.18			22.05	x	
9															
10															
11															
12															
	SF =	**1171**		***SF =***	**1618**		***SF =***	**1582**		***SF =***	**1586**		***SF =***	**1423**	

	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4	8.23			8.41			8.03			6.34			9.61		
5															
6											x				
7		x													
8	20.98			16.13			14.77			16.63			16.9		
9															
10															
11															
12															
	SF =	**1129**		***SF =***	**1865**		***SF =***	**2136**		***SF =***	**1399**		***SF =***	**1975**	

	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			***SF =***			***SF =***			***SF =***			***SF =***		

AVERAGE ALL VEHICLES	**1589**	**AVERAGE CARS ONLY**	**1794**	**AVERAGE TRUCKS ONLY**	**1281**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

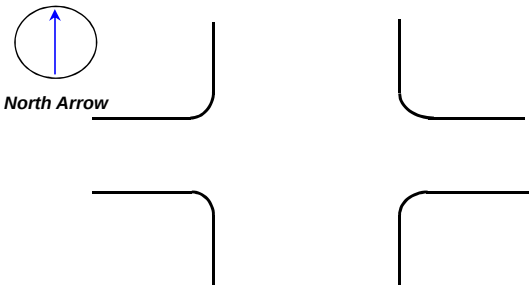
HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

FIELD SATURATION FLOW RATE WORKSHEET

General Information

Analyst		*Intersection*	SR 228 @ Heritage Creek Dr
Agency	WRA	*Area Type*	_____CBD _____Other
Date	10/20/2016	*Jurisdiction*	Cranberry Township
Time Period		*Year*	2016

Lane Movement Input



Movements Allowed

_____Through

_____Right

_____Left

WB Thru Studied

Input Field Measurements

	Cycle # 1			Cycle # 2			Cycle # 3			Cycle # 4			Cycle # 5		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4	7.2			6.3			6.3			7.31			6.23		
5															
6															
7															
8	13.80			13.00			14.60			14.27			14.92		
9															
10															
11															
12															
	SF =	**2182**		***SF =***	**2149**		***SF =***	**1735**		***SF =***	**2069**		***SF =***	**1657**	

	Cycle # 6			Cycle # 7			Cycle # 8			Cycle # 9			Cycle # 10		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4	6.87														
5															
6															
7															
8	15.13														
9															
10															
11															
12															
	SF =	**1743**		***SF =***			***SF =***			***SF =***			***SF =***		

	Cycle # 11			Cycle # 12			Cycle # 13			Cycle # 14			Cycle # 15		
*Veh. In Queue **	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*	*Time*	*HV*	*T*
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
	SF =			***SF =***			***SF =***			***SF =***			***SF =***		

AVERAGE ALL VEHICLES	**1923**	**AVERAGE CARS ONLY**	**1923**	**AVERAGE TRUCKS ONLY**	**N/A**

Glossary and Notes

** Typical field measurement conditions require a minimum of 8 vehicles in the queue, 15 total observations*

*** Source: Exhibit 31-51, Chapter 31, Highway Capacity Manual 2010*

HV = Heavy Vehicles
T = Turning Vehicles
P12 = Pedestrains blocked traffic for 12s
B15 = Bus blocked traffic for 15s

Appendix C5:

Lane Utilization

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

Lane Utilization Worksheet

Project: Route 228 Mars RR Bridge West Expansion
Location: SR 228 @ Franklin Road
Date: 1/6/2017
Compiled By: XW
Reviewed By: NRS

Intersection / Movement Data				# Exclusive Lanes	# of Observed Arrivals			Total Volume	Highest Single Lane Volume	Lane Utilization	Average Lane Utilization
ID #	Name	Movement	Peak	N_e	Left Lane	Middle Lane Thru	Right Lane Merge Thru	v_g	v_{g1}	f_{LU}	f_{LU}
225	SR 228 @ Franklin Road	EBT	AM	2	-	43	8	51	43	**0.59**	**0.64**
225	SR 228 @ Franklin Road	EBT	AM	2	-	56	14	70	56	**0.63**	
225	SR 228 @ Franklin Road	EBT	AM	2	-	45	18	63	45	**0.70**	
225	SR 228 @ Franklin Road	EBT	PM	2	-	68	22	90	68	**0.66**	**0.71**
225	SR 228 @ Franklin Road	EBT	PM	2	-	57	26	83	57	**0.73**	
225	SR 228 @ Franklin Road	EBT	PM	2	-	59	30	89	59	**0.75**	
225	SR 228 @ Franklin Road	EBT	SAT	2	-	39	11	50	39	**0.64**	**0.64**
225	SR 228 @ Franklin Road	EBT	SAT	2	-	64	14	78	64	**0.61**	
225	SR 228 @ Franklin Road	EBT	SAT	2	-	54	18	72	54	**0.67**	
-	---	---	--	-	-	-	-	0	0	**-**	**-**
-	---	---	--	-	-	-	-	0	0	**-**	**-**
-	---	---	--	-	-	-	-	0	0	**-**	**-**
-	---	---	--	-	-	-	-	0	0	**-**	**-**

SOURCES: (1) Equation 18-4, Chapter 18 of HCM 2010

Note - Right lane isn't exclusive lane it is a shared right-thru, however for this calculation it was assumed to be exclusive.

Appendix C6:

General Field Observations

ENGINEER'S FIELD REPORT

Date: 3/3/2017

Date of Site Visit: 10/20/2016
Site: Route 228
Time of Site Visit: 7 am to 6 pm
Weather: Warm & Sunny
Temperature Range: 70's

Work Order Number: 35004
Contract Number: #E03625
Project: Route 228 Mars RR Bridge West Expansion
Field Report Number: 01
Report By: Xin Wei and Lauren Weimer

1.1 Operational Observations

Field observations were recorded during field views on October 20th, 2016 for weekday.

General Observations

- Generally all intersections allow right turn on red along SR 228.

Node 225 – Route 228 & Franklin Rd

- Spillback in the eastbound direction in PM Peak because of the eastbound lane drop after the intersection. Vehicles in the inside eastbound through lane would lane would allow for eastbound outside lane to merge in front of them.
- Frequent heavy queue for the westbound Route 228 approach in AM and PM Peaks.
- Very low occurrences of pedestrian traffic at the intersection.

Node 230 – Route 228 & High Pointe Dr / Castle Creek Dr Ext

- Typically less than eight vehicles in a queue on all approaches.

Node 240 – Route 228 & Seven Fields Blvd

- During the PM peak, the southbound approach would have heavy queue that extended to the business driveways.
- Frequent westbound queue on Route 228 in AM and PM Peaks.

Node 245 – Route 228 & Adams Ridge Blvd

- Minor northbound queuing from Adams Ridge Blvd.
- Frequent queues on the westbound on Route 228 in AM and PM Peaks. Occasionally the queue from Seven Fields Blvd would spillback in the PM Peak.
- Observed vehicle tracking issues for the eastbound right turn. The curb shows signs of damages and tire marks.

Node 250 – Route 228 & Myoma Rd

- Vehicles appeared to be speeding along Route 228.

Node 255 – Route 228 & Heritage Creek Dr

- Frequent westbound queuing on Route 228 in AM and PM Peaks.
- Routinely observed queuing of eight cars in the southbound left turn from Heritage Creek Dr during the PM Peak.
- Uphill grade on EB and SB created larger start up loss time for trucks.

Node 265 – Route 228 & Beaver St Ext

- Specifically during the PM since there is no dedicated left turn lane, eastbound through vehicles use the shoulder to pass an eastbound left turning vehicle.

Appendix D

Synchro Traffic Analyses (Detailed Reports)

Contents:

- Calibration/Validation Data
- 2016 Base Year Conditions
- 2025 Opening Year (No-Build Scenario)
- 2045 Design Year (No-Build Scenario)
- 2045 Design Year (Build Scenario w/ Approved Growth)
- 2045 Design Year (Build Scenario w/ Supplemental Growth)
- Franklin Road QR Intersection Concept
- Seven Fields to Adams Ridge Reconfiguration Concept

Appendix D1:

Calibration/Validation Data

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Eastbound
Scenario: Weekday AM Peak, October 2016

Notes / Definitions / Abbreviations

* Units vary as indicated in tables below
* Summary Table 1 indicates feet, seconds
* Summary Table 2 indicates miles, minutes

* BLUE = Input Data via manual direct entry
* RED = Input Data via formula or worksheet reference updates
* BLACK = Data automatically calculated

NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)
RT_{DS} = "No Stop" Running Time @ Design Speed (from Previou
CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)
Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)
TT_{avg} = Average Field-measured Travel Time (from Previous No
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)
RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)
$Delay_S$ = Synchro Signal Delay (or other appropriate delay estimate)
CD_S = Synchro Signal Delay (Cumulative)
TT_S = Synchro-estimated Travel Time (from Previous Node)
CTT_S = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_S) / TT_{avg}
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

Specified Threshold for Synchro link-to-link travel times: 20%
Specified Threshold for Synchro end-to-end travel time: 10%

Intersection / Link Data		FIELD TRAVEL TIME DATA							SYNCHRO DATA								
		Travel Length (feet)		Speed (mph)	Running Time (sec @ DS)		Travel Time (sec)		Speed (mph)	Running Time (sec @ LS)		Synchro Delay (sec)		Travel Time (sec)		Synchro Error	
Node	NID	TL	CTL	DS	RT_{DS}	CRT_{DS}	TT_{avg}	CTT_{avg}	LS	RT_{LS}	CRT_{LS}	$Delay_S$	CD_S	TT_S	CTT_S	%Δ	FIX/OK
from Turnaround (#220)	220	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	-
to Franklin Rd (#225)	225	1,658	1,658	48	24	24	30	30	48	24	24	36	36	57	57	-90%	FIX
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	2,630	4,288	51	35	59	56	86	51	35	59	25	61	59	116	-5%	OK
to High Pointe Dr / Castle Creek Dr (#235)	235	1,969	6,257	56	24	83	33	119	56	24	83	10	71	33	149	1%	OK
to Seven Fields Blvd (#240)	240	775	7,032	54	10	93	14	133	54	10	92	4	75	14	163	-1%	OK
to Adams Ridge Blvd (#245)	245	681	7,712	47	10	103	17	149	47	10	102	7	82	17	179	-1%	OK
to Myoma Rd (#250)	250	1,813	9,525	50	25	128	31	180	50	25	127	7	89	30	210	2%	OK
to Heritage Creek Dr (#255)	255	3,074	12,599	56	37	165	49	230	56	37	164	8	98	44	254	11%	OK
to Scharberry Ln (#260)	260	2,447	15,045	53	31	196	38	267	50	33	198	5	103	38	291	0%	OK
to Beaver St Ext (#265)	265	253	15,298	53	3	199	4	271	50	3	201	1	104	4	296	-16%	OK
Corridor Average		**15,298**		**-**	**199**		**271**		**-**	**201**		**104**		**296**		**-9%**	**OK**

Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Eastbound
Scenario: Weekday AM Peak, October 2016

Notes / Definitions / Abbreviations

* Units vary as indicated in tables below
* Summary Table 1 indicates feet, seconds
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* RED = Input Data via formula or worksheet reference updates
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CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)
RT_{DS} = "No Stop" Running Time @ Design Speed (from Previou
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Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)
TT_{avg} = Average Field-measured Travel Time (from Previous No
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)
RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)
$Delay_S$ = Synchro Signal Delay (or other appropriate delay estimate)
CD_S = Synchro Signal Delay (Cumulative)
TT_S = Synchro-estimated Travel Time (from Previous Node)
CTT_S = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = $(TT_{avg} - TT_S) / TT_{avg}$
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

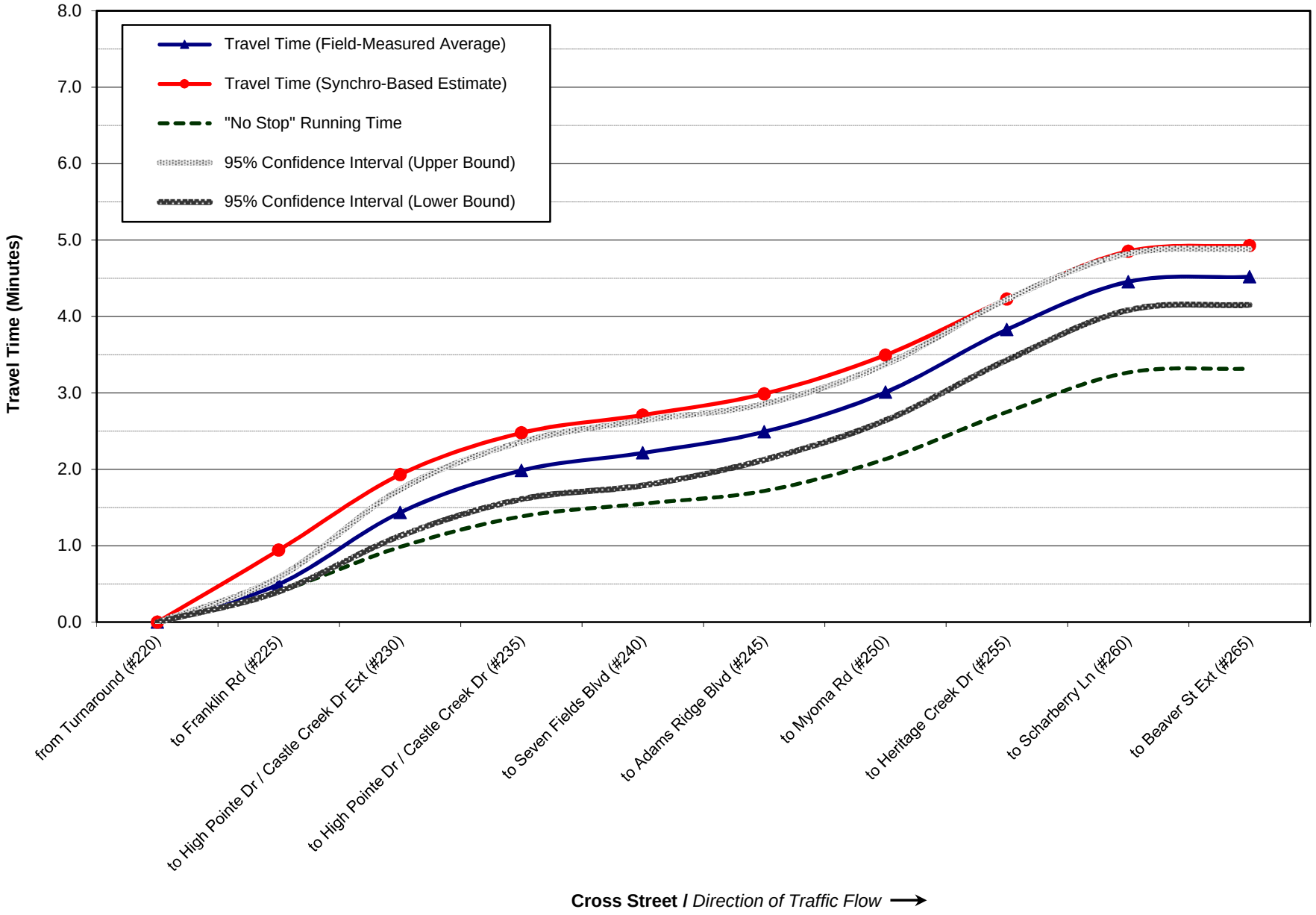
Specified Threshold for Synchro link-to-link travel times:	**20%**
Specified Threshold for Synchro end-to-end travel time:	**10%**

Intersection / Link Data		FIELD TRAVEL TIME DATA							SYNCHRO DATA								
		Travel Length (mile)		Speed (mph)	Running Time (min @ DS)		Travel Time (min)		Speed (mph)	Running Time (min @ LS)		Synchro Delay (min)		Travel Time (min)		Synchro Error	
Node	**NID**	**TL**	**CTL**	**DS**	**RT_{DS}**	**CRT_{DS}**	**TT_{avg}**	**CTT_{avg}**	**LS**	**RT_{LS}**	**CRT_{LS}**	**$Delay_S$**	**CD_S**	**TT_S**	**CTT_S**	**%Δ**	**FIX/OK**
from Turnaround (#220)	220	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-
to Franklin Rd (#225)	225	0.3	0.3	48	0.4	0.0	0.5	0.5	48	0.4	0.4	0.6	0.6	0.9	0.9	-90%	FIX
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.5	0.8	51	0.6	0.0	0.9	1.4	51	0.6	1.0	0.4	1.0	1.0	1.9	-5%	OK
to High Pointe Dr / Castle Creek Dr (#235)	235	0.4	1.2	56	0.4	0.0	0.6	2.0	56	0.4	1.4	0.2	1.2	0.5	2.5	1%	OK
to Seven Fields Blvd (#240)	240	0.1	1.3	54	0.2	0.0	0.2	2.2	54	0.2	1.5	0.1	1.3	0.2	2.7	-1%	OK
to Adams Ridge Blvd (#245)	245	0.1	1.5	47	0.2	0.0	0.3	2.5	47	0.2	1.7	0.1	1.4	0.3	3.0	-1%	OK
to Myoma Rd (#250)	250	0.3	1.8	50	0.4	0.0	0.5	3.0	50	0.4	2.1	0.1	1.5	0.5	3.5	2%	OK
to Heritage Creek Dr (#255)	255	0.6	2.4	56	0.6	0.0	0.8	3.8	56	0.6	2.7	0.1	1.6	0.7	4.2	11%	OK
to Scharberry Ln (#260)	260	0.5	2.8	53	0.5	0.0	0.6	4.5	50	0.6	3.3	0.1	1.7	0.6	4.9	0%	OK
to Beaver St Ext (#265)	265	0.0	2.9	53	0.1	0.0	0.1	4.5	50	0.1	3.4	0.0	1.7	0.1	4.9	-16%	OK
Corridor Average		**2.9**		**-**	**0.0**		**4.5**		**-**	**3.4**		**1.7**		**4.9**		**-9%**	**OK**

Route 228 Mars RR Bridge West Expansion (ECMS E03625)

Cranberry Township/ Seven Fields Borough/ Adams Township

Raw Travel Time Data for: 2016 Weekday Peaks by Run / AM Peak Eastbound



Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Westbound
Scenario: Weekday AM Peak, October 2016

Notes / Definitions / Abbreviations

* Units vary as indicated in tables below

* Summary Table 1 indicates feet, seconds

* Summary Table 2 indicates miles, minutes

* BLUE = Input Data via manual direct entry

* RED = Input Data via formula or worksheet reference updates

* BLACK = Data automatically calculated

NID = Node ID Number

TL = Travel Distance (from Previous Node)

CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previou

CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}

CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous No

CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)

CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

$Delay_S$ = Synchro Signal Delay (or other appropriate delay estimate)

CD_S = Synchro Signal Delay (Cumulative)

TT_S = Synchro-estimated Travel Time (from Previous Node)

CTT_S = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_S) / TT_{avg}

FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

Specified Threshold for Synchro link-to-link travel times: **20%**

Specified Threshold for Synchro end-to-end travel time: **10%**

Intersection / Link Data		FIELD TRAVEL TIME DATA							SYNCHRO DATA								
		Travel Length (feet)		Speed (mph)	Running Time (sec @ DS)		Travel Time (sec)		Speed (mph)	Running Time (sec @ LS)		Synchro Delay (sec)		Travel Time (sec)		Synchro Error	
Node	NID	TL	CTL	DS	RT_{DS}	CRT_{DS}	TT_{avg}	CTT_{avg}	LS	RT_{LS}	CRT_{LS}	$Delay_S$	CD_S	TT_S	CTT_S	%Δ	FIX/OK
from Turnaround (#270)	270	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	-
to Beaver St Ext (#265)	265	1,006	1,006	56	12	12	14	14	50	14	14	6	6	20	20	-42%	FIX
to Scharberry Ln (#260)	260	253	1,259	56	3	15	4	18	50	3	17	1	7	4	24	-24%	FIX
to Heritage Creek Dr (#255)	255	2,452	3,711	55	30	45	41	58	50	33	51	12	19	45	69	-11%	OK
to Myoma Rd (#250)	250	3,085	6,796	59	36	81	50	108	50	42	93	8	27	50	119	0%	OK
to Adams Ridge Blvd (#245)	245	1,816	8,612	53	23	104	67	175	50	25	117	17	43	41	161	39%	FIX
to Seven Fields Blvd (#240)	240	680	9,291	45	10	114	20	196	40	12	129	10	53	21	182	-4%	OK
to High Pointe Dr / Castle Creek Dr (#235)	235	775	10,066	45	12	126	17	213	40	13	142	8	61	21	203	-25%	FIX
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	1,957	12,023	45	30	156	58	270	40	33	176	15	76	48	251	17%	OK
to Franklin Rd (#225)	225	2,629	14,652	45	40	196	64	335	45	40	215	33	108	72	324	-12%	OK
Corridor Average		**14,652**		**-**	**196**		**335**		**-**	**215**		**108**		**324**		**3%**	**OK**

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2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Westbound
Scenario: Weekday AM Peak, October 2016

Notes / Definitions / Abbreviations

* Units vary as indicated in tables below
* Summary Table 1 indicates feet, seconds
* Summary Table 2 indicates miles, minutes

* BLUE = Input Data via manual direct entry
* RED = Input Data via formula or worksheet reference updates
* BLACK = Data automatically calculated

NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)
RT_{DS} = "No Stop" Running Time @ Design Speed (from Previou
CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)
Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)
TT_{avg} = Average Field-measured Travel Time (from Previous No
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)
RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)
$Delay_S$ = Synchro Signal Delay (or other appropriate delay estimate)
CD_S = Synchro Signal Delay (Cumulative)
TT_S = Synchro-estimated Travel Time (from Previous Node)
CTT_S = Synchro-estimated Travel Time (Cumulative)
%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_S) / TT_{avg}
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

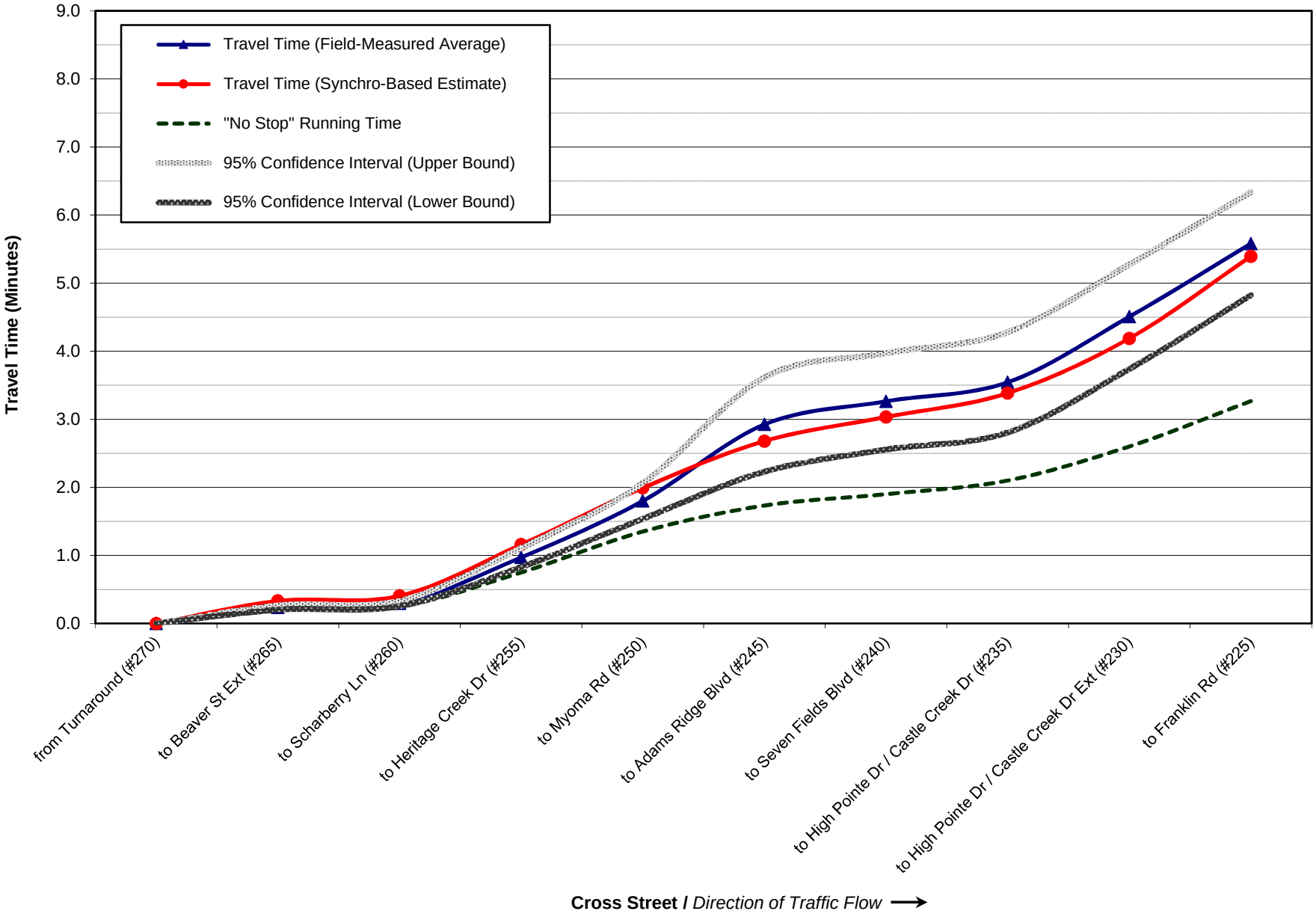
Specified Threshold for Synchro link-to-link travel times: **20%**
Specified Threshold for Synchro end-to-end travel time: **10%**

Intersection / Link Data		FIELD TRAVEL TIME DATA							SYNCHRO DATA								
		Travel Length (mile)		Speed (mph)	Running Time (min @ DS)		Travel Time (min)		Speed (mph)	Running Time (min @ LS)		Synchro Delay (min)		Travel Time (min)		Synchro Error	
Node	**NID**	**TL**	**CTL**	**DS**	**RT_{DS}**	**CRT_{DS}**	**TT_{avg}**	**CTT_{avg}**	**LS**	**RT_{LS}**	**CRT_{LS}**	**$Delay_S$**	**CD_S**	**TT_S**	**CTT_S**	**%Δ**	**FIX/OK**
from Turnaround (#270)	270	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-
to Beaver St Ext (#265)	265	0.2	0.2	56	0.2	0.0	0.2	0.2	50	0.2	0.2	0.1	0.1	0.3	0.3	-42%	FIX
to Scharberry Ln (#260)	260	0.0	0.2	56	0.1	0.0	0.1	0.3	50	0.1	0.3	0.0	0.1	0.1	0.4	-24%	FIX
to Heritage Creek Dr (#255)	255	0.5	0.7	55	0.5	0.0	0.7	1.0	50	0.6	0.8	0.2	0.3	0.8	1.2	-11%	OK
to Myoma Rd (#250)	250	0.6	1.3	59	0.6	0.0	0.8	1.8	50	0.7	1.5	0.1	0.4	0.8	2.0	0%	OK
to Adams Ridge Blvd (#245)	245	0.3	1.6	53	0.4	0.0	1.1	2.9	50	0.4	2.0	0.3	0.7	0.7	2.7	39%	FIX
to Seven Fields Blvd (#240)	240	0.1	1.8	45	0.2	0.0	0.3	3.3	40	0.2	2.2	0.2	0.9	0.4	3.0	-4%	OK
to High Pointe Dr / Castle Creek Dr (#235)	235	0.1	1.9	45	0.2	0.0	0.3	3.5	40	0.2	2.4	0.1	1.0	0.4	3.4	-25%	FIX
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.4	2.3	45	0.5	0.0	1.0	4.5	40	0.6	2.9	0.2	1.3	0.8	4.2	17%	OK
to Franklin Rd (#225)	225	0.5	2.8	45	0.7	0.0	1.1	5.6	45	0.7	3.6	0.5	1.8	1.2	5.4	-12%	OK
Corridor Average		**2.8**		**-**	**0.0**		**5.6**		**-**	**3.6**		**1.8**		**5.4**		**3%**	**OK**

Route 228 Mars RR Bridge West Expansion (ECMS E03625)

Cranberry Township/ Seven Fields Borough/ Adams Township

Raw Travel Time Data for: 2016 Weekday Peaks by Run / AM Peak Westbound



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SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Eastbound
Scenario: Weekday PM Peak, October 2016

Notes / Definitions / Abbreviations

* Units vary as indicated in tables below
* Summary Table 1 indicates feet, seconds
* Summary Table 2 indicates miles, minutes

* BLUE = Input Data via manual direct entry
* RED = Input Data via formula or worksheet reference updates
* BLACK = Data automatically calculated

NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

$Delay_S$ = Synchro Signal Delay (or other appropriate delay estimate)
CD_S = Synchro Signal Delay (Cumulative)

TT_S = Synchro-estimated Travel Time (from Previous Node)
CTT_S = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_S) / TT_{avg}
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

Specified Threshold for Synchro link-to-link travel times: **20%**
Specified Threshold for Synchro end-to-end travel time: **10%**

Intersection / Link Data		FIELD TRAVEL TIME DATA									SYNCHRO DATA								
		Travel Length (feet)		Speed (mph)	Running Time (sec @ DS)		Travel Delay (sec)		Travel Time (sec)		Speed (mph)	Running Time (sec @ LS)		Synchro Delay (sec)		Travel Time (sec)		Synchro Error	
Node	NID	TL	CTL	DS	RT_{DS}	CRT_{DS}	Delay	CD	TT_{avg}	CTT_{avg}	LS	RT_{LS}	CRT_{LS}	$Delay_S$	CD_S	TT_S	CTT_S	%Δ	FIX/OK
from Turnaround (#220)	220	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-	-
to Franklin Rd (#225)	225	1,681	1,681	48	24	24	50	50	73	73	40	29	29	50	50	79	79	-7%	OK
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	2,616	4,297	51	35	59	71	121	107	180	40	45	73	54	104	99	177	7%	OK
to High Pointe Dr / Castle Creek Dr (#235)	235	1,974	6,271	56	24	83	35	156	59	239	40	34	107	15	119	49	226	17%	OK
to Seven Fields Blvd (#240)	240	776	7,047	54	10	93	19	175	29	268	40	13	120	13	132	26	252	12%	OK
to Adams Ridge Blvd (#245)	245	680	7,727	47	10	103	3	179	13	281	40	12	132	10	142	22	273	-64%	FIX
to Myoma Rd (#250)	250	1,813	9,540	50	25	128	5	183	30	311	50	25	156	8	150	33	306	-11%	OK
to Heritage Creek Dr (#255)	255	3,072	12,611	56	37	165	50	234	88	399	50	42	198	19	169	61	367	30%	FIX
to Scharberry Ln (#260)	260	2,438	15,049	53	31	196	59	293	90	489	50	33	232	41	210	74	441	18%	OK
to Beaver St Ext (#265)	265	253	15,303	53	3	199	7	300	10	499	50	3	235	7	216	10	451	1%	OK
Corridor Average		**15,303**		**-**	**199**		**300**		**499**		**-**	**235**		**216**		**451**		**10%**	**OK**

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SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Eastbound
Scenario: Weekday PM Peak, October 2016

Notes / Definitions / Abbreviations

* Units vary as indicated in tables below
* Summary Table 1 indicates feet, seconds
* Summary Table 2 indicates miles, minutes

* BLUE = Input Data via manual direct entry
* RED = Input Data via formula or worksheet reference updates
* BLACK = Data automatically calculated

NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

$Delay_S$ = Synchro Signal Delay (or other appropriate delay estimate)
CD_S = Synchro Signal Delay (Cumulative)

TT_S = Synchro-estimated Travel Time (from Previous Node)
CTT_S = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_S) / TT_{avg}
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

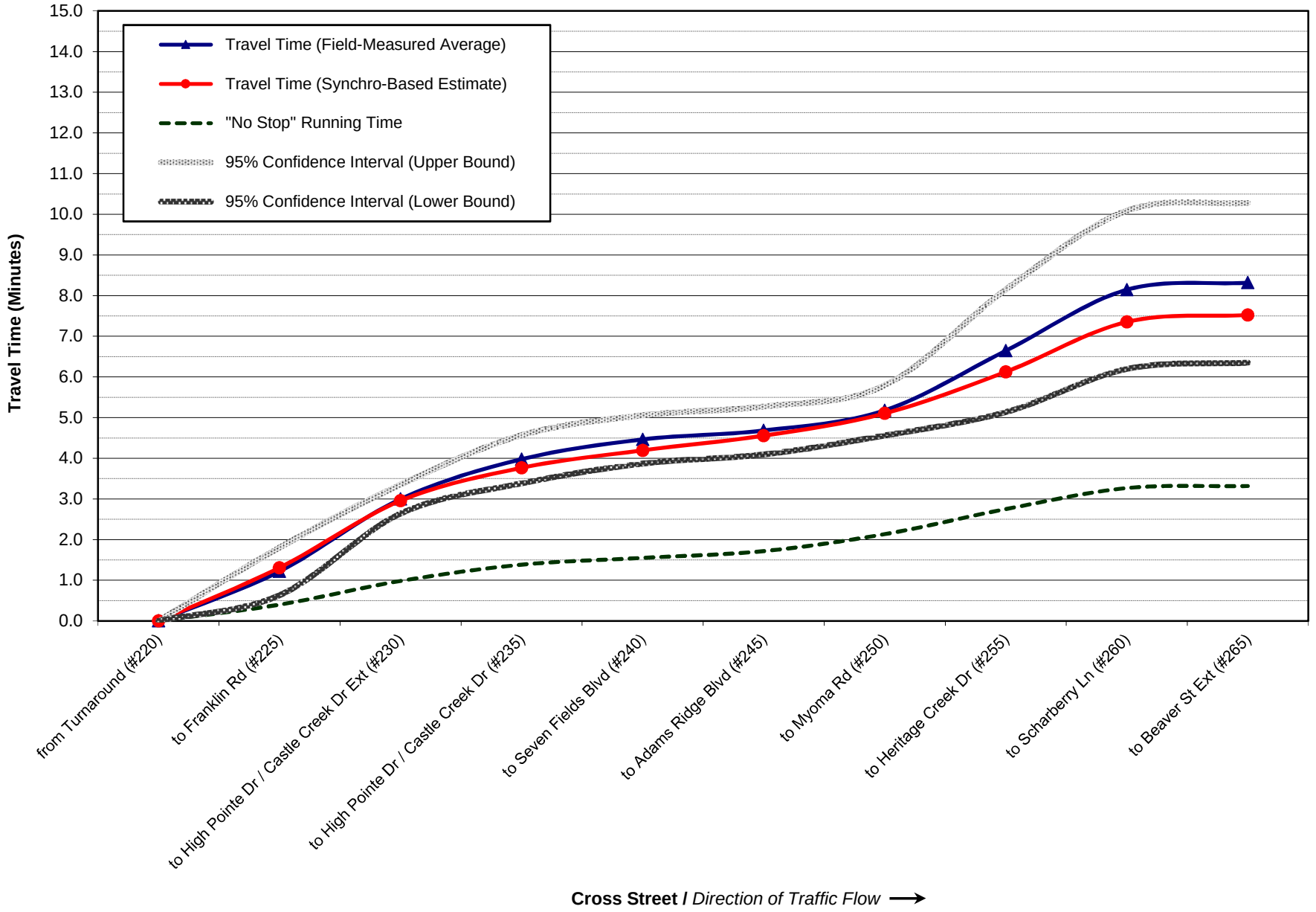
Specified Threshold for Synchro link-to-link travel times: **20%**
Specified Threshold for Synchro end-to-end travel time: **10%**

Intersection / Link Data		FIELD TRAVEL TIME DATA									SYNCHRO DATA								
		Travel Length (mile)		Speed (mph)	Running Time (min @ DS)		Travel Delay (min)		Travel Time (min)		Speed (mph)	Running Time (min @ LS)		Synchro Delay (min)		Travel Time (min)		Synchro Error	
Node	NID	TL	CTL	DS	RT_{DS}	CRT_{DS}	Delay	CD	TT_{avg}	CTT_{avg}	LS	RT_{LS}	CRT_{LS}	$Delay_S$	CD_S	TT_S	CTT_S	%Δ	FIX/OK
from Turnaround (#220)	220	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-
to Franklin Rd (#225)	225	0.3	0.3	48	0.4	0.0	0.8	0.8	1.2	1.2	40	0.5	0.5	0.8	0.8	1.3	1.3	-7%	OK
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.5	0.8	51	0.6	0.0	1.2	2.0	1.8	3.0	40	0.7	1.2	0.9	1.7	1.6	3.0	7%	OK
to High Pointe Dr / Castle Creek Dr (#235)	235	0.4	1.2	56	0.4	0.0	0.6	2.6	1.0	4.0	40	0.6	1.8	0.2	2.0	0.8	3.8	17%	OK
to Seven Fields Blvd (#240)	240	0.1	1.3	54	0.2	0.0	0.3	2.9	0.5	4.5	40	0.2	2.0	0.2	2.2	0.4	4.2	12%	OK
to Adams Ridge Blvd (#245)	245	0.1	1.5	47	0.2	0.0	0.1	3.0	0.2	4.7	40	0.2	2.2	0.2	2.4	0.4	4.6	-64%	FIX
to Myoma Rd (#250)	250	0.3	1.8	50	0.4	0.0	0.1	3.1	0.5	5.2	50	0.4	2.6	0.1	2.5	0.5	5.1	-11%	OK
to Heritage Creek Dr (#255)	255	0.6	2.4	56	0.6	0.0	0.8	3.9	1.5	6.6	50	0.7	3.3	0.3	2.8	1.0	6.1	30%	FIX
to Scharberry Ln (#260)	260	0.5	2.9	53	0.5	0.0	1.0	4.9	1.5	8.1	50	0.6	3.9	0.7	3.5	1.2	7.4	18%	OK
to Beaver St Ext (#265)	265	0.0	2.9	53	0.1	0.0	0.1	5.0	0.2	8.3	50	0.1	3.9	0.1	3.6	0.2	7.5	1%	OK
Corridor Average		**2.9**		**-**	**0.0**		**5.0**		**8.3**		**-**	**3.9**		**3.6**		**7.5**		**10%**	**OK**

Route 228 Mars RR Bridge West Expansion (ECMS E03625)

Cranberry Township/ Seven Fields Borough/ Adams Township

Raw Travel Time Data for: 2016 Weekday Peaks by Run / PM Peak Eastbound



Whitman, Requardt & Associates, LLP
2009 Mackenzie Way, Suite 240, Cranberry Township, PA 16066

SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Westbound
Scenario: Weekday PM Peak, October 2016

Notes / Definitions / Abbreviations

* Units vary as indicated in tables below
* Summary Table 1 indicates feet, seconds
* Summary Table 2 indicates miles, minutes

* BLUE = Input Data via manual direct entry
* RED = Input Data via formula or worksheet reference updates
* BLACK = Data automatically calculated

NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

$Delay_S$ = Synchro Signal Delay (or other appropriate delay estimate)
CD_S = Synchro Signal Delay (Cumulative)

TT_S = Synchro-estimated Travel Time (from Previous Node)
CTT_S = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_S) / TT_{avg}
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

Specified Threshold for Synchro link-to-link travel times: **20%**
Specified Threshold for Synchro end-to-end travel time: **10%**

Intersection / Link Data		FIELD TRAVEL TIME DATA									SYNCHRO DATA								
		Travel Length (feet)		Speed (mph)	Running Time (sec @ DS)		Travel Delay (sec)		Travel Time (sec)		Speed (mph)	Running Time (sec @ LS)		Synchro Delay (sec)		Travel Time (sec)		Synchro Error	
Node	NID	TL	CTL	DS	RT_{DS}	CRT_{DS}	Delay	CD	TT_{avg}	CTT_{avg}	LS	RT_{LS}	CRT_{LS}	$Delay_S$	CD_S	TT_S	CTT_S	%Δ	FIX/OK
from Turnaround (#100)	100	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-	-
to Beaver St Ext (#265)	265	1,006	1,006	56	12	12	4	4	17	17	50	14	14	4	4	18	18	-3%	OK
to Scharberry Ln (#260)	260	253	1,259	56	3	15	1	5	4	21	50	3	17	1	5	4	22	-10%	OK
to Heritage Creek Dr (#255)	255	2,446	3,705	55	30	45	31	37	61	82	50	33	51	22	27	54	76	12%	OK
to Myoma Rd (#250)	250	3,078	6,783	59	36	81	14	51	50	132	50	42	92	11	38	51	127	-4%	OK
to Adams Ridge Blvd (#245)	245	1,813	8,596	53	23	104	26	77	49	181	50	25	117	14	52	38	165	24%	FIX
to Seven Fields Blvd (#240)	240	680	9,276	45	10	114	3	80	14	195	40	12	129	10	62	21	186	-49%	FIX
to High Pointe Dr / Castle Creek Dr (#235)	235	775	10,051	45	12	126	1	82	13	209	41	13	142	6	68	19	205	-43%	FIX
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	1,964	12,015	45	30	156	30	112	59	268	46	29	171	17	85	45	250	24%	FIX
to Franklin Rd (#225)	225	2,633	14,648	45	40	196	27	139	67	335	40	45	216	49	133	91	342	-36%	FIX
Corridor Average		**14,648**		**-**	**196**		**139**		**335**		**-**	**216**		**133**		**342**		**-2%**	**OK**

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SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Westbound
Scenario: Weekday PM Peak, October 2016

Notes / Definitions / Abbreviations

* Units vary as indicated in tables below
* Summary Table 1 indicates feet, seconds
* Summary Table 2 indicates miles, minutes

* BLUE = Input Data via manual direct entry
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* BLACK = Data automatically calculated

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TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

$Delay_S$ = Synchro Signal Delay (or other appropriate delay estimate)
CD_S = Synchro Signal Delay (Cumulative)

TT_S = Synchro-estimated Travel Time (from Previous Node)
CTT_S = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_S) / TT_{avg}
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

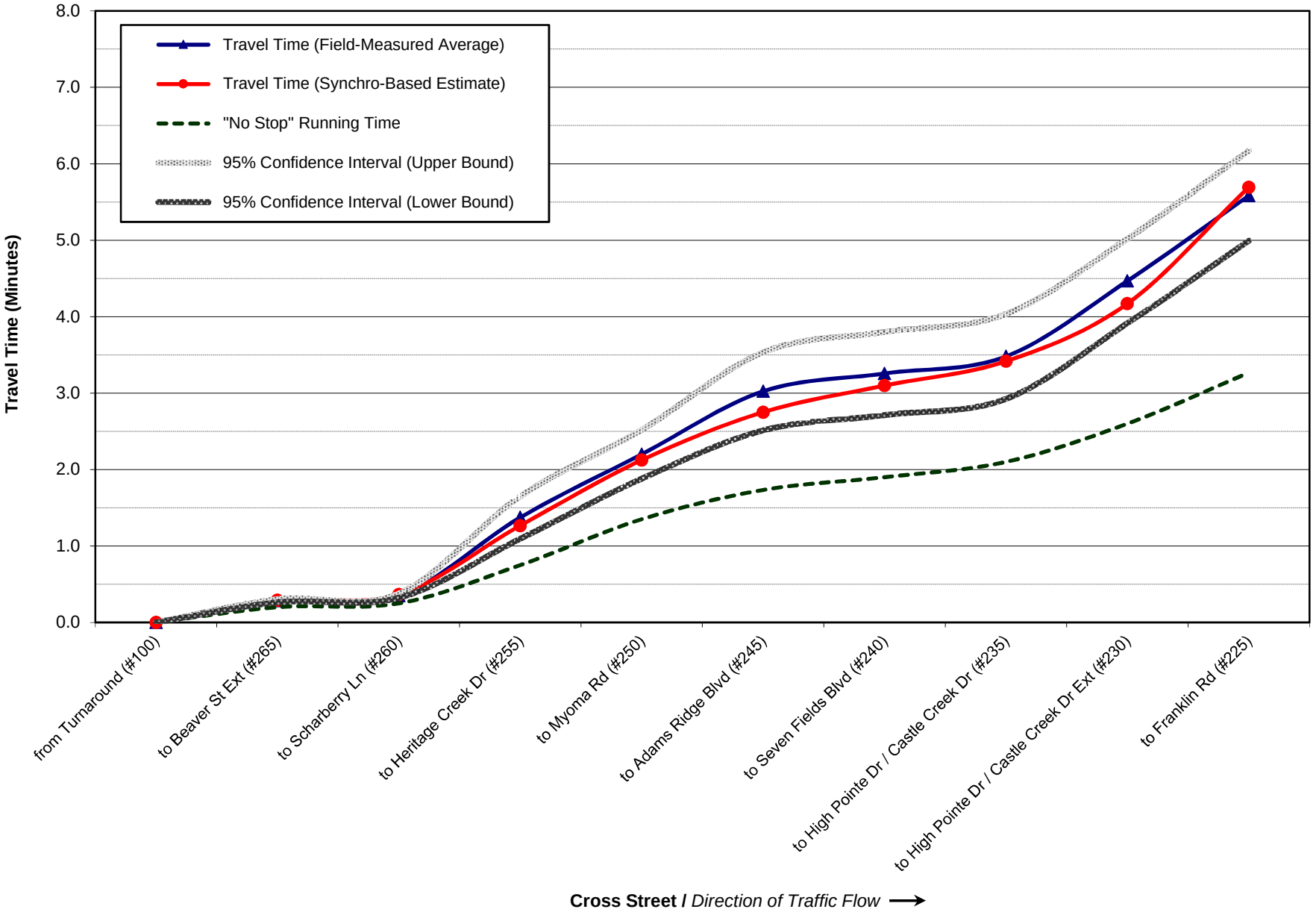
Specified Threshold for Synchro link-to-link travel times: **20%**
Specified Threshold for Synchro end-to-end travel time: **10%**

Intersection / Link Data		FIELD TRAVEL TIME DATA									SYNCHRO DATA								
		Travel Length (mile)		Speed (mph)	Running Time (min @ DS)		Travel Delay (min)		Travel Time (min)		Speed (mph)	Running Time (min @ LS)		Synchro Delay (min)		Travel Time (min)		Synchro Error	
Node	NID	TL	CTL	DS	RT_{DS}	CRT_{DS}	Delay	CD	TT_{avg}	CTT_{avg}	LS	RT_{LS}	CRT_{LS}	$Delay_S$	CD_S	TT_S	CTT_S	%Δ	FIX/OK
from Turnaround (#100)	100	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-
to Beaver St Ext (#265)	265	0.2	0.2	56	0.2	0.0	0.1	0.1	0.3	0.3	50	0.2	0.2	0.1	0.1	0.3	0.3	-3%	OK
to Scharberry Ln (#260)	260	0.0	0.2	56	0.1	0.0	0.0	0.1	0.1	0.4	50	0.1	0.3	0.0	0.1	0.1	0.4	-10%	OK
to Heritage Creek Dr (#255)	255	0.5	0.7	55	0.5	0.0	0.5	0.6	1.0	1.4	50	0.6	0.8	0.4	0.4	0.9	1.3	12%	OK
to Myoma Rd (#250)	250	0.6	1.3	59	0.6	0.0	0.2	0.9	0.8	2.2	50	0.7	1.5	0.2	0.6	0.9	2.1	-4%	OK
to Adams Ridge Blvd (#245)	245	0.3	1.6	53	0.4	0.0	0.4	1.3	0.8	3.0	50	0.4	2.0	0.2	0.9	0.6	2.8	24%	FIX
to Seven Fields Blvd (#240)	240	0.1	1.8	45	0.2	0.0	0.1	1.3	0.2	3.3	40	0.2	2.1	0.2	1.0	0.3	3.1	-49%	FIX
to High Pointe Dr / Castle Creek Dr (#235)	235	0.1	1.9	45	0.2	0.0	0.0	1.4	0.2	3.5	41	0.2	2.4	0.1	1.1	0.3	3.4	-43%	FIX
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.4	2.3	45	0.5	0.0	0.5	1.9	1.0	4.5	46	0.5	2.8	0.3	1.4	0.8	4.2	24%	FIX
to Franklin Rd (#225)	225	0.5	2.8	45	0.7	0.0	0.5	2.3	1.1	5.6	40	0.7	3.6	0.8	2.2	1.5	5.7	-36%	FIX
Corridor Average		**2.8**		**-**	**0.0**		**2.3**		**5.6**		**-**	**3.6**		**2.2**		**5.7**		**-2%**	**OK**

Route 228 Mars RR Bridge West Expansion (ECMS E03625)

Cranberry Township/ Seven Fields Borough/ Adams Township

Raw Travel Time Data for: 2016 Weekday Peaks by Run / PM Peak Westbound



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SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Eastbound
Scenario: Weekend SAT Peak, October 2016

Notes / Definitions / Abbreviations

* Units vary as indicated in tables below
* Summary Table 1 indicates feet, seconds
* Summary Table 2 indicates miles, minutes

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* RED = Input Data via formula or worksheet reference updates
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NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

$Delay_S$ = Synchro Signal Delay (or other appropriate delay estimate)
CD_S = Synchro Signal Delay (Cumulative)

TT_S = Synchro-estimated Travel Time (from Previous Node)
CTT_S = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_S) / TT_{avg}
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

Specified Threshold for Synchro link-to-link travel times: **20%**
Specified Threshold for Synchro end-to-end travel time: **10%**

Intersection / Link Data		FIELD TRAVEL TIME DATA									SYNCHRO DATA								
		Travel Length (feet)		Speed (mph)	Running Time (sec @ DS)		Travel Delay (sec)		Travel Time (sec)		Speed (mph)	Running Time (sec @ LS)		Synchro Delay (sec)		Travel Time (sec)		Synchro Error	
Node	NID	TL	CTL	DS	RT_{DS}	CRT_{DS}	Delay	CD	TT_{avg}	CTT_{avg}	LS	RT_{LS}	CRT_{LS}	$Delay_S$	CD_S	TT_S	CTT_S	%Δ	FIX/OK
from Turnaround (#100)	100	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-	-
to Franklin Rd (#225)	225	1,658	1,658	48	24	24	9	9	33	33	40	28	28	18	18	46	46	-41%	FIX
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	2,631	4,289	51	35	59	23	32	58	91	43	42	70	11	29	53	99	9%	OK
to High Pointe Dr / Castle Creek Dr (#235)	235	1,969	6,258	56	24	83	22	54	46	136	44	31	100	7	36	38	137	18%	OK
to Seven Fields Blvd (#240)	240	775	7,033	54	10	93	8	62	18	154	40	13	114	8	44	21	158	-21%	FIX
to Adams Ridge Blvd (#245)	245	680	7,714	47	10	103	7	69	17	171	40	12	125	8	52	19	178	-14%	OK
to Myoma Rd (#250)	250	1,813	9,527	50	25	128	8	77	33	204	50	25	150	6	58	31	208	8%	OK
to Heritage Creek Dr (#255)	255	3,073	12,599	56	37	165	11	88	48	252	53	40	190	7	65	46	254	5%	OK
to Scharberry Ln (#260)	260	2,447	15,047	53	31	196	10	98	41	294	50	33	223	5	70	39	293	6%	OK
to Beaver St Ext (#265)	265	253	15,300	53	3	199	2	100	5	298	50	3	226	1	71	5	297	3%	OK
Corridor Average		**15,300**		**-**	**199**		**100**		**298**		**-**	**226**		**71**		**297**		**0%**	**OK**

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SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Eastbound
Scenario: Weekend SAT Peak, October 2016

Notes / Definitions / Abbreviations

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TT_{avg} = Average Field-measured Travel Time (from Previous Node)
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LS = Link Speed (as coded in Synchro Model)

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CD_S = Synchro Signal Delay (Cumulative)

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CTT_S = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_S) / TT_{avg}
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

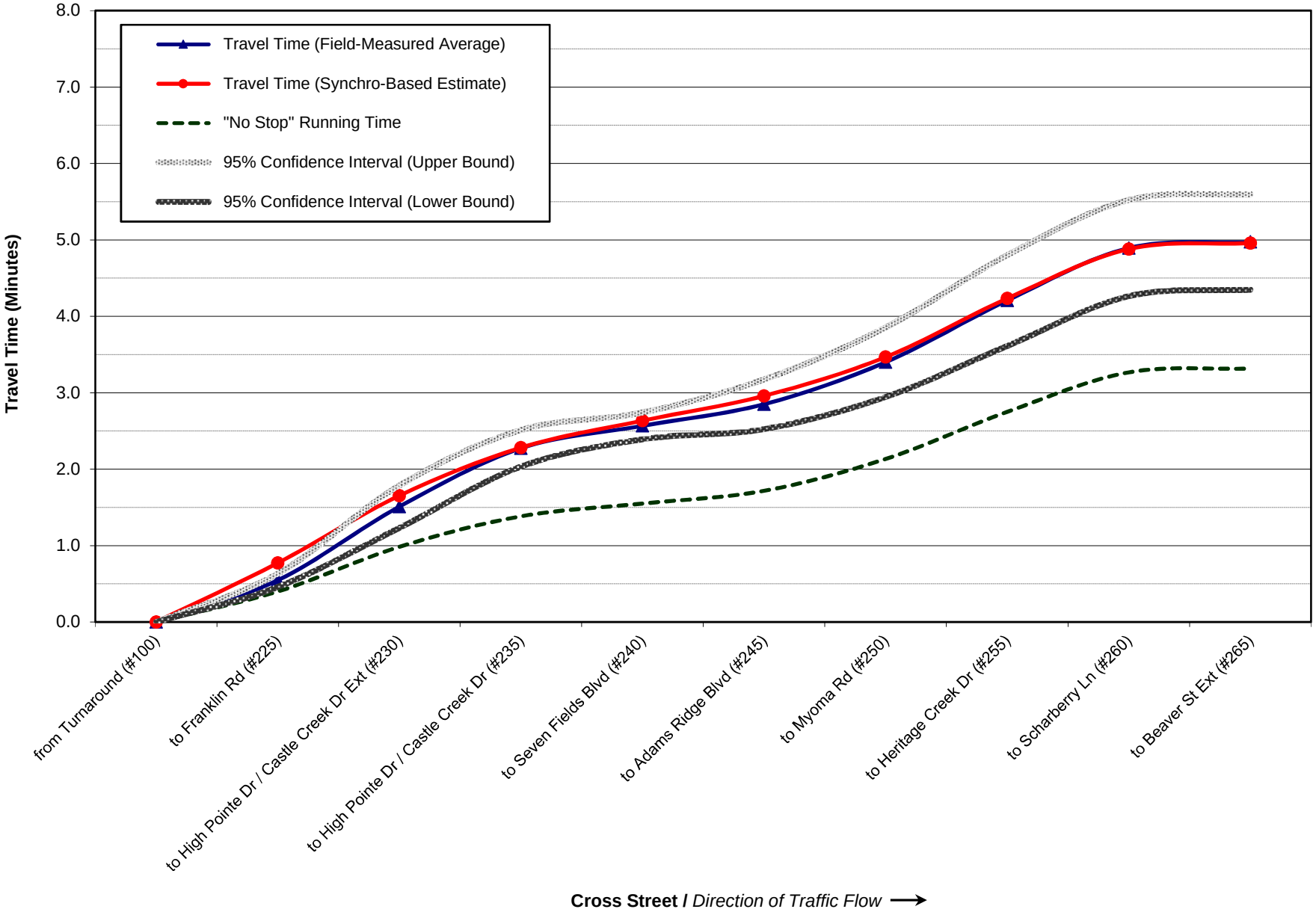
Specified Threshold for Synchro link-to-link travel times: **20%**
Specified Threshold for Synchro end-to-end travel time: **10%**

Intersection / Link Data		FIELD TRAVEL TIME DATA									SYNCHRO DATA								
		Travel Length (mile)		Speed (mph)	Running Time (min @ DS)		Travel Delay (min)		Travel Time (min)		Speed (mph)	Running Time (min @ LS)		Synchro Delay (min)		Travel Time (min)		Synchro Error	
Node	NID	TL	CTL	DS	RT_{DS}	CRT_{DS}	Delay	CD	TT_{avg}	CTT_{avg}	LS	RT_{LS}	CRT_{LS}	$Delay_S$	CD_S	TT_S	CTT_S	%Δ	FIX/OK
from Turnaround (#100)	100	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-
to Franklin Rd (#225)	225	0.3	0.3	48	0.4	0.0	0.2	0.2	0.5	0.5	40	0.5	0.5	0.3	0.3	0.8	0.8	-41%	FIX
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.5	0.8	51	0.6	0.0	0.4	0.5	1.0	1.5	43	0.7	1.2	0.2	0.5	0.9	1.7	9%	OK
to High Pointe Dr / Castle Creek Dr (#235)	235	0.4	1.2	56	0.4	0.0	0.4	0.9	0.8	2.3	44	0.5	1.7	0.1	0.6	0.6	2.3	18%	OK
to Seven Fields Blvd (#240)	240	0.1	1.3	54	0.2	0.0	0.1	1.0	0.3	2.6	40	0.2	1.9	0.1	0.7	0.4	2.6	-21%	FIX
to Adams Ridge Blvd (#245)	245	0.1	1.5	47	0.2	0.0	0.1	1.1	0.3	2.9	40	0.2	2.1	0.1	0.9	0.3	3.0	-14%	OK
to Myoma Rd (#250)	250	0.3	1.8	50	0.4	0.0	0.1	1.3	0.6	3.4	50	0.4	2.5	0.1	1.0	0.5	3.5	8%	OK
to Heritage Creek Dr (#255)	255	0.6	2.4	56	0.6	0.0	0.2	1.5	0.8	4.2	53	0.7	3.2	0.1	1.1	0.8	4.2	5%	OK
to Scharberry Ln (#260)	260	0.5	2.8	53	0.5	0.0	0.2	1.6	0.7	4.9	50	0.6	3.7	0.1	1.2	0.6	4.9	6%	OK
to Beaver St Ext (#265)	265	0.0	2.9	53	0.1	0.0	0.0	1.7	0.1	5.0	50	0.1	3.8	0.0	1.2	0.1	5.0	3%	OK
Corridor Average		**2.9**		**-**	**0.0**		**1.7**		**5.0**		**-**	**3.8**		**1.2**		**5.0**		**0%**	**OK**

Route 228 Mars RR Bridge West Expansion (ECMS E03625)

Cranberry Township/ Seven Fields Borough/ Adams Township

Raw Travel Time Data for: 2016 Weekday Peaks by Run / SAT Peak Eastbound



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SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228 Cranberry Township
Direction Westbound
Scenario: Weekend SAT Peak, October 2016

Notes / Definitions / Abbreviations

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CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

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TT_S = Synchro-estimated Travel Time (from Previous Node)
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Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

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Specified Threshold for Synchro end-to-end travel time: **10%**

Intersection / Link Data		FIELD TRAVEL TIME DATA									SYNCHRO DATA								
		Travel Length (feet)		Speed (mph)	Running Time (sec @ DS)		Travel Delay (sec)		Travel Time (sec)		Speed (mph)	Running Time (sec @ LS)		Synchro Delay (sec)		Travel Time (sec)		Synchro Error	
Node	NID	TL	CTL	DS	RT_{DS}	CRT_{DS}	Delay	CD	TT_{avg}	CTT_{avg}	LS	RT_{LS}	CRT_{LS}	$Delay_S$	CD_S	TT_S	CTT_S	%Δ	FIX/OK
from Turnaround (#270)	270	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-	-
to Beaver St Ext (#265)	265	1,006	1,006	56	12	12	2	2	14	14	56	12	12	6	6	18	18	-28%	FIX
to Scharberry Ln (#260)	260	253	1,259	56	3	15	1	2	4	18	51	3	16	1	7	4	22	-14%	OK
to Heritage Creek Dr (#255)	255	2,449	3,707	55	30	45	4	6	34	52	52	32	48	12	19	41	63	-20%	OK
to Myoma Rd (#250)	250	3,085	6,793	59	36	81	8	14	44	96	52	40	88	10	29	44	107	0%	OK
to Adams Ridge Blvd (#245)	245	1,815	8,607	53	23	104	22	36	45	141	44	28	116	15	44	37	144	17%	OK
to Seven Fields Blvd (#240)	240	683	9,290	45	10	114	12	48	23	163	40	12	128	9	52	19	164	14%	OK
to High Pointe Dr / Castle Creek Dr (#235)	235	775	10,065	45	12	126	2	50	14	177	40	13	141	6	58	19	183	-38%	FIX
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	1,956	12,021	45	30	156	16	66	46	223	40	33	174	14	72	47	230	-1%	OK
to Franklin Rd (#225)	225	2,633	14,654	45	40	196	25	91	65	288	45	40	214	30	102	68	298	-5%	OK
Corridor Average		**14,654**		**-**	**196**		**91**		**288**		**-**	**214**		**102**		**298**		**-3%**	**OK**

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SR 228 Widening

Travel Time Summary (Synchro Calibration Check)

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Direction Westbound
Scenario: Weekend SAT Peak, October 2016

Notes / Definitions / Abbreviations

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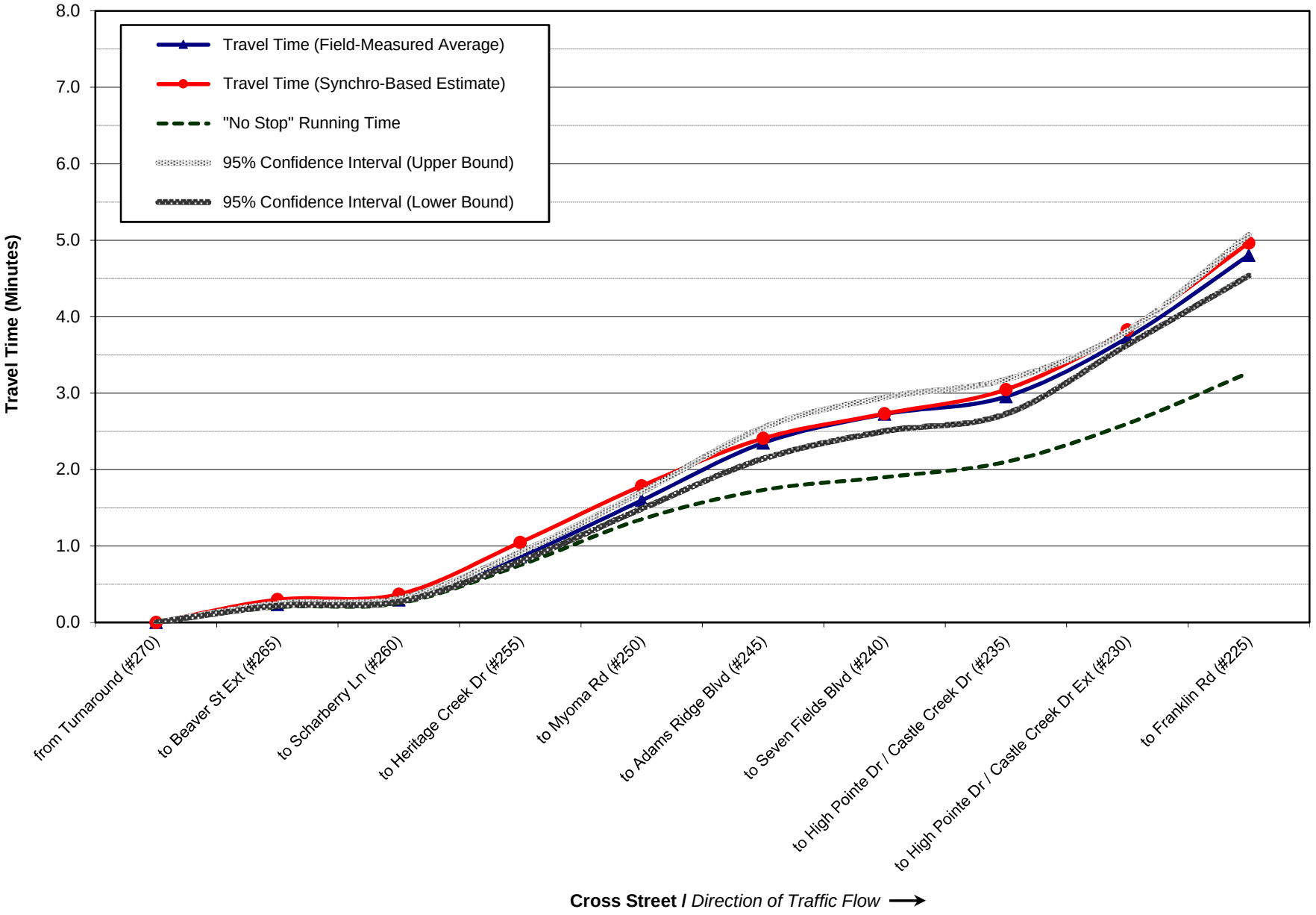
Intersection / Link Data		FIELD TRAVEL TIME DATA									SYNCHRO DATA								
		Travel Length (mile)		Speed (mph)	Running Time (min @ DS)		Travel Delay (min)		Travel Time (min)		Speed (mph)	Running Time (min @ LS)		Synchro Delay (min)		Travel Time (min)		Synchro Error	
Node	NID	TL	CTL	DS	RT_{DS}	CRT_{DS}	Delay	CD	TT_{avg}	CTT_{avg}	LS	RT_{LS}	CRT_{LS}	$Delay_S$	CD_S	TT_S	CTT_S	%Δ	FIX/OK
from Turnaround (#270)	270	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-
to Beaver St Ext (#265)	265	0.2	0.2	56	0.2	0.0	0.0	0.0	0.2	0.2	56	0.2	0.2	0.1	0.1	0.3	0.3	-28%	FIX
to Scharberry Ln (#260)	260	0.0	0.2	56	0.1	0.0	0.0	0.0	0.1	0.3	51	0.1	0.3	0.0	0.1	0.1	0.4	-14%	OK
to Heritage Creek Dr (#255)	255	0.5	0.7	55	0.5	0.0	0.1	0.1	0.6	0.9	52	0.5	0.8	0.2	0.3	0.7	1.0	-20%	OK
to Myoma Rd (#250)	250	0.6	1.3	59	0.6	0.0	0.1	0.2	0.7	1.6	52	0.7	1.5	0.2	0.5	0.7	1.8	0%	OK
to Adams Ridge Blvd (#245)	245	0.3	1.6	53	0.4	0.0	0.4	0.6	0.8	2.3	44	0.5	1.9	0.2	0.7	0.6	2.4	17%	OK
to Seven Fields Blvd (#240)	240	0.1	1.8	45	0.2	0.0	0.2	0.8	0.4	2.7	40	0.2	2.1	0.1	0.9	0.3	2.7	14%	OK
to High Pointe Dr / Castle Creek Dr (#235)	235	0.1	1.9	45	0.2	0.0	0.0	0.8	0.2	3.0	40	0.2	2.4	0.1	1.0	0.3	3.0	-38%	FIX
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.4	2.3	45	0.5	0.0	0.3	1.1	0.8	3.7	40	0.6	2.9	0.2	1.2	0.8	3.8	-1%	OK
to Franklin Rd (#225)	225	0.5	2.8	45	0.7	0.0	0.4	1.5	1.1	4.8	45	0.7	3.6	0.5	1.7	1.1	5.0	-5%	OK
Corridor Average		**2.8**		**-**	**0.0**		**1.5**		**4.8**		**-**	**3.6**		**#REF!**		**5.0**		**-3%**	**OK**

Route 228 Mars RR Bridge West Expansion (ECMS E03625)

Cranberry Township/ Seven Fields Borough/ Adams Township

Raw Travel Time Data for: 2016 Weekday Peaks by Run / SAT Peak Westbound

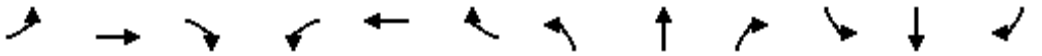


Appendix D2:

2016 Base Year Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	705	60	205	1000	40	80	125	65	65	335	60
Future Volume (vph)	85	705	60	205	1000	40	80	125	65	65	335	60
Ideal Flow (vphpl)	2100	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0		3.0	3.0		6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	1.00	*0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1818	3473		1692	3299		1591	1707	1349	1671	1775	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.19	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	1818	3473		1692	3299		324	1707	1349	1144	1775	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	88	727	62	211	1031	41	82	129	67	67	345	62
RTOR Reduction (vph)	0	4	0	0	2	0	0	0	44	0	0	36
Lane Group Flow (vph)	88	785	0	211	1070	0	82	129	23	67	345	26
Heavy Vehicles (%)	7%	11%	7%	4%	6%	8%	8%	6%	14%	6%	5%	3%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6		5	2		7	4	5	3	8	1
Permitted Phases							4		4	8		8
Actuated Green, G (s)	24.0	62.8		17.0	55.8		40.6	32.9	49.9	37.8	31.5	55.5
Effective Green, g (s)	27.0	65.8		20.0	58.8		42.6	33.9	49.9	41.8	32.5	61.5
Actuated g/C Ratio	0.19	0.45		0.14	0.41		0.29	0.23	0.34	0.29	0.22	0.42
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0		2.0	5.0		2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	338	1576		233	1337		171	399	464	359	397	652
v/s Ratio Prot	0.05	c0.23		c0.12	c0.32		c0.03	0.08	0.01	0.01	c0.19	0.01
v/s Ratio Perm							0.11		0.01	0.04		0.01
v/c Ratio	0.26	0.50		0.91	0.80		0.48	0.32	0.05	0.19	0.87	0.04
Uniform Delay, d1	50.5	27.9		61.6	37.9		40.0	46.0	31.7	38.3	54.2	24.5
Progression Factor	0.78	0.74		1.10	0.94		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.1		23.2	3.1		0.8	0.2	0.0	0.1	17.4	0.0
Delay (s)	39.8	21.7		91.0	38.6		40.7	46.2	31.7	38.4	71.6	24.5
Level of Service	D	C		F	D		D	D	C	D	E	C
Approach Delay (s)		23.5			47.2			41.1			60.7	
Approach LOS		C			D			D			E	

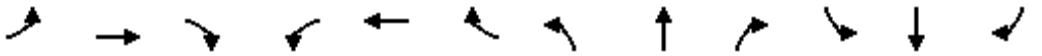
Intersection Summary			
HCM 2000 Control Delay	41.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	675	150	100	1105	0	85	10	35	5	15	25
Future Volume (vph)	10	675	150	100	1105	0	85	10	35	5	15	25
Ideal Flow (vphpl)	1900	1900	1900	1714	1714	1714	1950	1950	1950	1950	1950	1950
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1642	1729	1493	1588	1609		1790	1544		1908	2008	1707
Flt Permitted	0.20	1.00	1.00	0.32	1.00		0.75	1.00		0.73	1.00	1.00
Satd. Flow (perm)	345	1729	1493	530	1609		1409	1544		1460	2008	1707
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	696	155	103	1139	0	88	10	36	5	15	26
RTOR Reduction (vph)	0	0	35	0	0	0	0	32	0	0	0	23
Lane Group Flow (vph)	10	696	120	103	1139	0	88	14	0	5	15	3
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	11%	11%	7%	2%	6%	0%	4%	13%	9%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	105.2	105.2	105.2	117.2	117.2		13.8	13.8		13.8	13.8	13.8
Effective Green, g (s)	108.5	108.5	108.5	120.1	120.5		16.0	16.0		16.0	16.0	16.0
Actuated g/C Ratio	0.75	0.75	0.75	0.83	0.83		0.11	0.11		0.11	0.11	0.11
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	258	1293	1117	496	1337		155	170		161	221	188
v/s Ratio Prot		0.40		0.01	c0.71			0.01			0.01	
v/s Ratio Perm	0.03		0.08	0.16			c0.06			0.00		0.00
v/c Ratio	0.04	0.54	0.11	0.21	0.85		0.57	0.08		0.03	0.07	0.02
Uniform Delay, d1	4.7	7.7	5.0	4.5	7.1		61.2	57.9		57.6	57.8	57.5
Progression Factor	1.63	3.27	5.87	1.24	0.76		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	1.5	0.2	0.1	4.6		4.7	0.2		0.1	0.1	0.0
Delay (s)	8.0	26.6	29.5	5.7	10.0		65.9	58.1		57.7	57.9	57.5
Level of Service	A	C	C	A	A		E	E		E	E	E
Approach Delay (s)		26.9			9.6			63.2			57.7	
Approach LOS		C			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	640	20	30	1105	25	50	20	35	10	5	50
Future Volume (vph)	20	640	20	30	1105	25	50	20	35	10	5	50
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1557	1624	1460	1663	1717	1533	1616	1520		1747	1839	1464
Flt Permitted	0.16	1.00	1.00	0.37	1.00	1.00	0.75	1.00		0.70	1.00	1.00
Satd. Flow (perm)	262	1624	1460	644	1717	1533	1283	1520		1282	1839	1464
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	660	21	31	1139	26	52	21	36	10	5	52
RTOR Reduction (vph)	0	0	4	0	0	5	0	33	0	0	0	48
Lane Group Flow (vph)	21	660	17	31	1139	21	52	24	0	10	5	4
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	10%	11%	5%	3%	5%	0%	6%	10%	3%	0%	0%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	117.4	113.9	113.9	117.6	114.0	114.0	9.5	9.5		9.5	9.5	9.5
Effective Green, g (s)	121.4	115.9	115.9	121.6	116.0	116.0	11.5	11.5		11.5	11.5	11.5
Actuated g/C Ratio	0.84	0.80	0.80	0.84	0.80	0.80	0.08	0.08		0.08	0.08	0.08
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	268	1298	1166	579	1373	1226	101	120		101	145	116
v/s Ratio Prot	c0.00	0.41		0.00	c0.66			0.02			0.00	
v/s Ratio Perm	0.06		0.01	0.04		0.01	c0.04			0.01		0.00
v/c Ratio	0.08	0.51	0.01	0.05	0.83	0.02	0.51	0.20		0.10	0.03	0.04
Uniform Delay, d1	9.6	4.9	3.0	2.5	8.6	2.9	64.1	62.4		61.9	61.6	61.6
Progression Factor	0.13	0.09	1.00	0.87	0.31	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	1.2	0.0	0.0	3.9	0.0	4.4	0.8		0.4	0.1	0.1
Delay (s)	1.4	1.7	3.0	2.2	6.6	3.0	68.4	63.3		62.4	61.7	61.8
Level of Service	A	A	A	A	A	A	E	E		E	E	E
Approach Delay (s)		1.7			6.4			65.7			61.8	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group

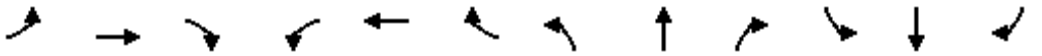
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	585	10	0	1020	95	25	5	5	30	5	115
Future Volume (vph)	90	585	10	0	1020	95	25	5	5	30	5	115
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0		3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1585	1594	1517		1734	1460	1631	1785	1011	1508	1394	
Flt Permitted	0.16	1.00	1.00		1.00	1.00	0.35	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	273	1594	1517		1734	1460	599	1785	1011	1198	1394	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	93	603	10	0	1052	98	26	5	5	31	5	119
RTOR Reduction (vph)	0	0	2	0	0	23	0	0	5	0	110	0
Lane Group Flow (vph)	93	603	8	0	1052	75	26	5	0	31	14	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	7%	12%	0%	0%	5%	6%	4%	0%	50%	13%	0%	7%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	123.2	123.2	123.2		107.5	107.5	9.8	9.8	9.8	9.8	9.8	
Effective Green, g (s)	126.1	126.1	123.2		110.4	110.4	11.5	11.5	9.8	11.5	11.5	
Actuated g/C Ratio	0.87	0.87	0.85		0.76	0.76	0.08	0.08	0.07	0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	5.0	6.0	6.0		6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	351	1386	1288		1320	1111	47	141	68	95	110	
v/s Ratio Prot	0.02	c0.38			c0.61			0.00			0.01	
v/s Ratio Perm	0.21		0.01			0.05	c0.04		0.00	0.03		
v/c Ratio	0.26	0.44	0.01		0.80	0.07	0.55	0.04	0.00	0.33	0.13	
Uniform Delay, d1	11.4	2.0	1.6		10.5	4.4	64.3	61.6	63.1	63.1	62.1	
Progression Factor	0.46	0.21	1.00		0.55	0.69	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.9	0.0		3.8	0.1	13.3	0.1	0.0	2.0	0.5	
Delay (s)	6.0	1.3	1.7		9.6	3.1	77.6	61.7	63.1	65.1	62.6	
Level of Service	A	A	A		A	A	E	E	E	E	E	
Approach Delay (s)		1.9			9.0			73.4			63.1	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	560	60	50	755	360	195
Future Volume (vph)	560	60	50	755	360	195
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1608	1227	1504	1686	1828	1685
Flt Permitted	1.00	1.00	0.34	1.00	0.95	1.00
Satd. Flow (perm)	1608	1227	536	1686	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	577	62	52	778	371	201
RTOR Reduction (vph)	0	18	0	0	0	74
Lane Group Flow (vph)	577	44	52	778	371	127
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	11%	14%	15%	8%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	85.8	85.8	97.6	97.6	34.4	34.4
Effective Green, g (s)	88.8	85.8	99.6	100.6	36.4	34.4
Actuated g/C Ratio	0.61	0.59	0.69	0.69	0.25	0.24
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	984	726	413	1169	458	399
v/s Ratio Prot	0.36		0.01	c0.46	c0.20	
v/s Ratio Perm		0.04	0.08			0.08
v/c Ratio	0.59	0.06	0.13	0.67	0.81	0.32
Uniform Delay, d1	17.0	12.5	17.2	12.6	51.0	45.6
Progression Factor	0.42	0.63	0.45	1.08	1.00	1.00
Incremental Delay, d2	2.4	0.1	0.1	2.4	10.2	0.3
Delay (s)	9.6	8.1	7.8	16.0	61.2	46.0
Level of Service	A	A	A	B	E	D
Approach Delay (s)	9.4			15.5	55.8	
Approach LOS	A			B	E	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03
c Critical Lane Group

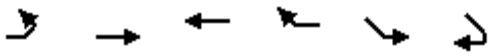


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	625	35	25	765	200	5	0	0	165	15	30
Future Volume (vph)	40	625	35	25	765	200	5	0	0	165	15	30
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0			5.0	5.0	4.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95			0.95	1.00	1.00
Satd. Flow (prot)	1637	1598	1494	1626	1760	1538	1298			1582	1749	1443
Flt Permitted	0.23	1.00	1.00	0.32	1.00	1.00	0.75			0.76	1.00	1.00
Satd. Flow (perm)	397	1598	1494	551	1760	1538	1021			1261	1749	1443
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	665	37	27	814	213	5	0	0	176	16	32
RTOR Reduction (vph)	0	0	12	0	0	37	0	0	0	0	0	25
Lane Group Flow (vph)	43	665	25	27	814	176	5	0	0	176	16	7
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	10%	0%	8%	5%	0%	25%	0%	100%	5%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm		pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	100.5	96.5	96.5	98.5	95.5	95.5	25.5			25.5	25.5	29.5
Effective Green, g (s)	104.7	98.6	98.6	102.7	97.6	97.6	26.5			26.5	26.5	33.7
Actuated g/C Ratio	0.72	0.68	0.68	0.71	0.67	0.67	0.18			0.18	0.18	0.23
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0			6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	338	1086	1015	428	1184	1035	186			230	319	335
v/s Ratio Prot	c0.01	0.42		0.00	c0.46						0.01	0.00
v/s Ratio Perm	0.09		0.02	0.04		0.11	0.00			c0.14		0.00
v/c Ratio	0.13	0.61	0.02	0.06	0.69	0.17	0.03			0.77	0.05	0.02
Uniform Delay, d1	10.4	12.7	7.6	7.9	14.4	8.8	48.7			56.3	48.9	42.9
Progression Factor	0.77	0.78	4.57	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.2	2.3	0.0	0.1	3.3	0.4	0.1			14.0	0.1	0.0
Delay (s)	8.1	12.2	34.6	8.0	17.7	9.1	48.7			70.3	48.9	43.0
Level of Service	A	B	C	A	B	A	D			E	D	D
Approach Delay (s)		13.1			15.7			48.7			64.9	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	75	670	760	35	10	45
Future Volume (Veh/h)	75	670	760	35	10	45
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	728	826	38	11	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	864				1737	845
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	864				1737	845
tC, single (s)	4.1				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.4
p0 queue free %	90				87	86
cM capacity (veh/h)	783				87	355

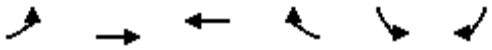
Direction, Lane #	EB 1	EB 2	WB 1	SE 1
Volume Total	82	728	864	60
Volume Left	82	0	0	11
Volume Right	0	0	38	49
cSH	783	1700	1700	227
Volume to Capacity	0.10	0.43	0.51	0.26
Queue Length 95th (ft)	9	0	0	26
Control Delay (s)	10.1	0.0	0.0	26.5
Lane LOS	B			D
Approach Delay (s)	1.0		0.0	26.5
Approach LOS				D

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	785	5	0	990	0	0
Future Volume (Veh/h)	785	5	0	990	0	0
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	818	5	0	1031	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			823		1852	820
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			823		1852	820
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			785		83	378

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	823	1031	0
Volume Left	0	0	0
Volume Right	5	0	0
cSH	1700	1700	1700
Volume to Capacity	0.48	0.61	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	85	700	860	0	0	130
Future Volume (Veh/h)	85	700	860	0	0	130
Sign Control		Free	Free		Stop	
Grade		0%	-5%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	88	722	887	0	0	134
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	887				1785	887
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	887				1785	887
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				100	61
cM capacity (veh/h)	772				80	344

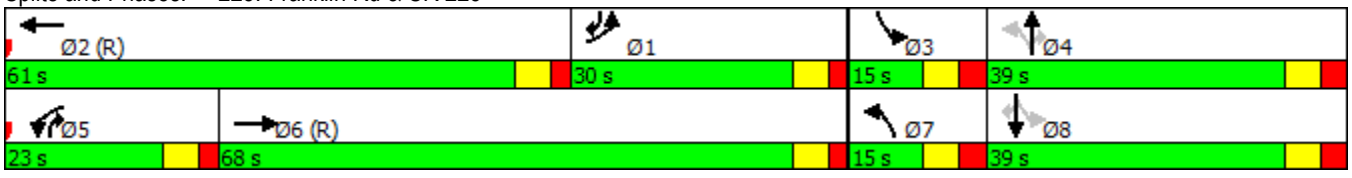
Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	88	722	887	134
Volume Left	88	0	0	0
Volume Right	0	0	0	134
cSH	772	1700	1700	344
Volume to Capacity	0.11	0.42	0.52	0.39
Queue Length 95th (ft)	10	0	0	45
Control Delay (s)	10.3	0.0	0.0	21.9
Lane LOS	B			C
Approach Delay (s)	1.1		0.0	21.9
Approach LOS				C

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	85	705	205	1000	80	125	65	65	335	60
Future Volume (vph)	85	705	205	1000	80	125	65	65	335	60
Turn Type	Prot	NA	Prot	NA	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	5	2	7	4	5	3	8	1
Permitted Phases					4		4	8		8
Detector Phase	1	6	5	2	7	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	21.0	12.0	21.0	12.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	30.0	68.0	23.0	61.0	15.0	39.0	23.0	15.0	39.0	30.0
Total Split (%)	20.7%	46.9%	15.9%	42.1%	10.3%	26.9%	15.9%	10.3%	26.9%	20.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	2.0	3.0	3.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-1.0	-1.0	0.0	-2.0	-1.0	-3.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	6.0	6.0	6.0	5.0	6.0	3.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?					Yes					
Recall Mode	None	C-Max	None	C-Max	None	None	None	None	None	None
Act Effct Green (s)	27.0	67.2	20.0	60.2	41.1	33.9	56.9	41.4	31.0	61.0
Actuated g/C Ratio	0.19	0.46	0.14	0.42	0.28	0.23	0.39	0.29	0.21	0.42
v/c Ratio	0.26	0.49	0.91	0.78	0.49	0.32	0.11	0.19	0.91	0.09
Control Delay	41.6	21.2	93.6	37.9	45.4	49.3	0.4	35.2	83.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	21.2	93.6	37.9	45.4	49.3	0.4	35.2	83.5	0.2
LOS	D	C	F	D	D	D	A	D	F	A
Approach Delay		23.2		47.1		36.4			65.8	
Approach LOS		C		D		D			E	

Intersection Summary	
Cycle Length: 145	
Actuated Cycle Length: 145	
Offset: 109 (75%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 41.9	Intersection LOS: D
Intersection Capacity Utilization 71.9%	ICU Level of Service C
Analysis Period (min) 15	
Description: Signal Permit No. TS-152-10	
Date Issued: 6-4-99	

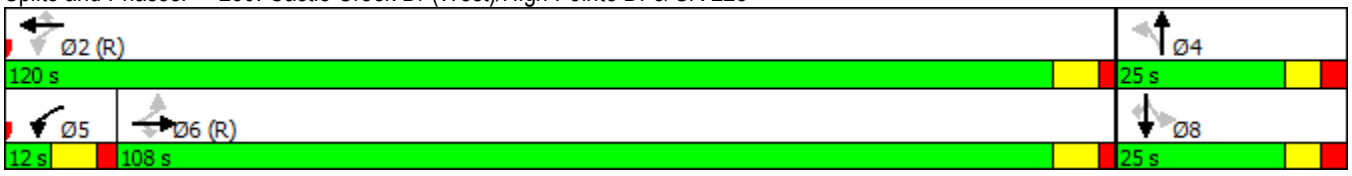
Splits and Phases: 225: Franklin Rd & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	10	675	150	100	1105	85	10	5	15	25
Future Volume (vph)	10	675	150	100	1105	85	10	5	15	25
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	Perm
Protected Phases		6		5	2		4		8	
Permitted Phases	6		6	2		4		8		8
Detector Phase	6	6	6	5	2	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	4.0	10.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	18.0	18.0	18.0	12.0	18.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	108.0	108.0	108.0	12.0	120.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	74.5%	74.5%	74.5%	8.3%	82.8%	17.2%	17.2%	17.2%	17.2%	17.2%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.3	-3.3	-3.3	-2.9	-3.3	-2.2	-2.2	-2.2	-2.2	-2.2
Total Lost Time (s)	3.7	3.7	3.7	4.1	3.7	4.8	4.8	4.8	4.8	4.8
Lead/Lag	Lag	Lag	Lag	Lead						
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	None	None	None	None	None
Act Effct Green (s)	108.5	108.5	108.5	120.1	120.5	16.0	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.75	0.75	0.75	0.83	0.83	0.11	0.11	0.11	0.11	0.11
v/c Ratio	0.04	0.54	0.13	0.21	0.85	0.56	0.23	0.03	0.07	0.10
Control Delay	9.7	29.0	7.5	3.9	11.7	74.6	24.7	55.4	56.3	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	29.0	7.5	3.9	11.7	74.6	24.7	55.4	56.3	0.8
LOS	A	C	A	A	B	E	C	E	E	A
Approach Delay		24.9			11.1		57.4		24.8	
Approach LOS		C			B		E		C	

Intersection Summary	
Cycle Length: 145	
Actuated Cycle Length: 145	
Offset: 39 (27%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 19.3	Intersection LOS: B
Intersection Capacity Utilization 94.7%	ICU Level of Service F
Analysis Period (min) 15	
Description: Signal Permit No. TS-113-10	
Date Issued: 3/24/95	
Date Revised: 9/17/02	

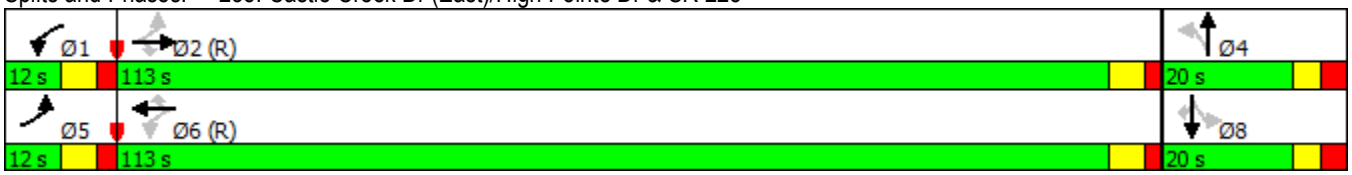
Splits and Phases: 230: Castle Creek Dr (West)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	20	640	20	30	1105	25	50	20	10	5	50
Future Volume (vph)	20	640	20	30	1105	25	50	20	10	5	50
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			4		8	
Permitted Phases	2		2	6		6	4		8		8
Detector Phase	5	2		1	6		4	4	8	8	8
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	17.0	17.0	12.0	17.0	17.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	113.0	113.0	12.0	113.0	113.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	8.3%	77.9%	77.9%	8.3%	77.9%	77.9%	13.8%	13.8%	13.8%	13.8%	13.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?											
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	124.2	120.3	120.3	124.3	120.3	120.3	12.7	12.7	12.6	12.6	12.6
Actuated g/C Ratio	0.86	0.83	0.83	0.86	0.83	0.83	0.09	0.09	0.09	0.09	0.09
v/c Ratio	0.07	0.49	0.02	0.05	0.80	0.02	0.46	0.34	0.09	0.03	0.28
Control Delay	0.7	1.6	0.0	1.8	7.0	0.1	75.3	33.4	60.7	58.8	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.7	1.6	0.0	1.8	7.0	0.1	75.3	33.4	60.7	58.8	11.0
LOS	A	A	A	A	A	A	E	C	E	E	B
Approach Delay		1.6			6.7			53.4		22.0	
Approach LOS		A			A			D		C	

Intersection Summary	
Cycle Length: 145	
Actuated Cycle Length: 145	
Offset: 48 (33%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 7.9	Intersection LOS: A
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	
Description: Signal Permit No. TS-080-10	

Splits and Phases: 235: Castle Creek Dr (East)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	Ø5
Lane Configurations											
Traffic Volume (vph)	90	585	10	1020	95	25	5	5	30	5	
Future Volume (vph)	90	585	10	1020	95	25	5	5	30	5	
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		2			4			8	5
Permitted Phases	6		6		2	4		4	8		
Detector Phase	1	6	6	2	2	4	4	4	8	8	
Switch Phase											
Minimum Initial (s)	5.0	15.0	15.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	22.0	22.0	22.0	22.0	12.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	24.0	108.0	108.0	96.0	96.0	25.0	25.0	25.0	25.0	25.0	12.0
Total Split (%)	16.6%	74.5%	74.5%	66.2%	66.2%	17.2%	17.2%	17.2%	17.2%	17.2%	8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	2.0
Lost Time Adjust (s)	-2.9	-2.9	0.0	-2.9	-2.9	-1.7	-1.7	0.0	-1.7	-1.7	
Total Lost Time (s)	3.1	3.1	6.0	3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lead/Lag	Lead	Lag	Lag	Lag	Lag						Lead
Lead-Lag Optimize?											
Recall Mode	Min	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	126.1	126.1	123.2	110.3	110.3	11.5	11.5	9.8	11.5	11.5	
Actuated g/C Ratio	0.87	0.87	0.85	0.76	0.76	0.08	0.08	0.07	0.08	0.08	
v/c Ratio	0.26	0.44	0.01	0.80	0.09	0.55	0.04	0.03	0.33	0.56	
Control Delay	2.4	1.4	0.0	11.1	0.7	102.9	59.4	0.4	70.7	21.3	
Queue Delay	0.0	0.1	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	2.4	1.4	0.0	12.0	0.7	102.9	59.4	0.4	70.7	21.3	
LOS	A	A	A	B	A	F	E	A	E	C	
Approach Delay		1.5		11.0			82.6			31.2	
Approach LOS		A		B			F			C	

Intersection Summary

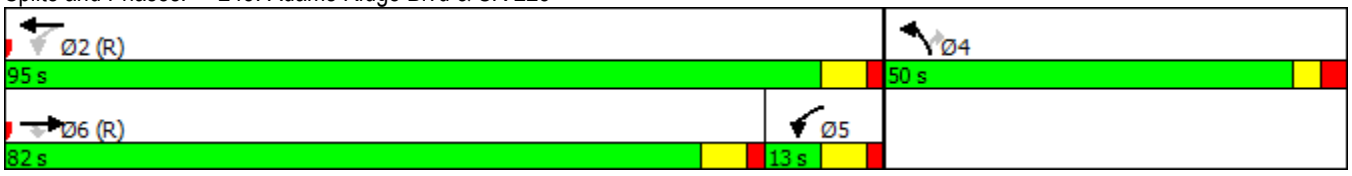
Cycle Length: 145
Actuated Cycle Length: 145
Offset: 65 (45%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 10.5 — Intersection LOS: B
Intersection Capacity Utilization 80.5% — ICU Level of Service D
Analysis Period (min) 15
Description: Signal Permit No. TS-221-10
Date Issued: 12-15-07

Splits and Phases: 240: Seven Fields Blvd & SR 228

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	560	60	50	755	360	195
Future Volume (vph)	560	60	50	755	360	195
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Detector Phase	6		5	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	12.0	12.0
Total Split (s)	82.0	82.0	13.0	95.0	50.0	50.0
Total Split (%)	56.6%	56.6%	9.0%	65.5%	34.5%	34.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	-3.0	0.0	-2.0	-3.0	-2.0	0.0
Total Lost Time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	90.2	87.2	99.6	100.6	36.4	34.4
Actuated g/C Ratio	0.62	0.60	0.69	0.69	0.25	0.24
v/c Ratio	0.58	0.08	0.12	0.67	0.81	0.42
Control Delay	10.3	4.2	4.9	18.1	64.5	25.0
Queue Delay	0.3	0.0	0.0	0.2	0.0	0.0
Total Delay	10.5	4.2	4.9	18.3	64.5	25.0
LOS	B	A	A	B	E	C
Approach Delay	9.9			17.5	50.6	
Approach LOS	A			B	D	

Intersection Summary	
Cycle Length: 145	
Actuated Cycle Length: 145	
Offset: 73 (50%), Referenced to phase 2:WBTL and 6:EBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 24.4	Intersection LOS: C
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	
Description: Signal Permit No. TS-120-10	
Date Issued: 8-29-96	
Date Revised: 9-19-03	

Splits and Phases: 245: Adams Ridge Blvd & SR 228



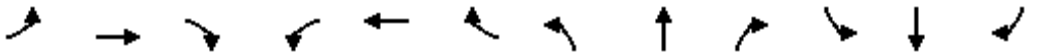
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	40	625	35	25	765	200	5	165	15	30
Future Volume (vph)	40	625	35	25	765	200	5	165	15	30
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	Perm	NA	pm+ov
Protected Phases	1	6		5	2				8	1
Permitted Phases	6		6	2		2	4	8		8
Detector Phase	1	6		5	2		4	8	8	8
Switch Phase										
Minimum Initial (s)	4.0	12.0	12.0	4.0	12.0	12.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	20.0	20.0	12.0	20.0	20.0	11.0	11.0	11.0	12.0
Total Split (s)	12.0	91.0	91.0	12.0	91.0	91.0	42.0	42.0	42.0	12.0
Total Split (%)	8.3%	62.8%	62.8%	8.3%	62.8%	62.8%	29.0%	29.0%	29.0%	8.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	2.0
Lost Time Adjust (s)	-2.1	-2.1	-2.1	-2.1	-2.1	-2.1	-1.0	-1.0	-1.0	-2.1
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	4.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				Lead
Lead-Lag Optimize?										
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	105.7	101.4	101.4	104.7	99.0	99.0	26.5	26.5	26.5	36.2
Actuated g/C Ratio	0.73	0.70	0.70	0.72	0.68	0.68	0.18	0.18	0.18	0.25
v/c Ratio	0.12	0.60	0.03	0.06	0.68	0.20	0.03	0.77	0.05	0.08
Control Delay	5.3	13.1	0.3	6.4	19.5	5.5	44.2	76.5	45.3	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.3	13.1	0.3	6.4	19.5	5.5	44.2	76.5	45.3	11.1
LOS	A	B	A	A	B	A	D	E	D	B
Approach Delay		12.0			16.3				64.9	
Approach LOS		B			B				E	

Intersection Summary	
Cycle Length: 145	
Actuated Cycle Length: 145	
Offset: 135 (93%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 20.2	Intersection LOS: C
Intersection Capacity Utilization 67.0%	ICU Level of Service C
Analysis Period (min) 15	
Description: Signal Permit No. TS-185-10	
Date Issued: 2-26-2003	
Date Revised: 3-10-2008	

Splits and Phases: 255: Heritage Creek Dr & SR 228

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	1015	65	115	940	70	120	330	175	65	150	55
Future Volume (vph)	270	1015	65	115	940	70	120	330	175	65	150	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0		3.0	3.0		6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	1.00	*0.71		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1742	2559		1725	3389		1508	1587	1362	1554	1668	1418
Flt Permitted	0.95	1.00		0.95	1.00		0.49	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	1742	2559		1725	3389		772	1587	1362	232	1668	1418
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	278	1046	67	119	969	72	124	340	180	67	155	57
RTOR Reduction (vph)	0	2	0	0	4	0	0	0	87	0	0	32
Lane Group Flow (vph)	278	1111	0	119	1037	0	124	340	93	67	155	25
Heavy Vehicles (%)	1%	2%	0%	2%	3%	0%	2%	2%	1%	2%	0%	0%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6		5	2		7	4	5	3	8	1
Permitted Phases							4		4	8		8
Actuated Green, G (s)	37.0	84.9		13.9	61.8		36.0	27.0	40.9	34.4	26.2	63.2
Effective Green, g (s)	40.0	87.9		16.9	64.8		38.0	28.0	40.9	38.4	27.2	69.2
Actuated g/C Ratio	0.25	0.55		0.11	0.40		0.24	0.18	0.26	0.24	0.17	0.43
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0		2.0	5.0		2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	435	1405		182	1372		229	277	348	139	283	613
v/s Ratio Prot	0.16	c0.43		0.07	c0.31		c0.03	c0.21	0.02	0.03	0.09	0.01
v/s Ratio Perm							0.09		0.05	0.08		0.01
v/c Ratio	0.64	0.79		0.65	0.76		0.54	1.23	0.27	0.48	0.55	0.04
Uniform Delay, d1	53.6	28.7		68.7	40.8		51.4	66.0	47.6	50.2	60.8	26.2
Progression Factor	1.00	1.00		0.93	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	4.6		4.5	2.8		1.4	130.0	0.2	1.0	1.2	0.0
Delay (s)	56.6	33.3		68.6	39.9		52.8	196.0	47.7	51.1	61.9	26.2
Level of Service	E	C		E	D		D	F	D	D	E	C
Approach Delay (s)		38.0			42.8			127.0			52.0	
Approach LOS		D			D			F			D	

Intersection Summary			
HCM 2000 Control Delay	57.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1065	150	55	870	0	185	45	80	0	25	30
Future Volume (vph)	40	1065	150	55	870	0	185	45	80	0	25	30
Ideal Flow (vphpl)	1650	1650	1650	1714	1714	1714	1650	1650	1650	1650	1650	1650
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8			4.8	4.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.90			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1583	1634	1373	1588	1656		1560	1468			1700	1445
Flt Permitted	0.27	1.00	1.00	0.10	1.00		0.74	1.00			1.00	1.00
Satd. Flow (perm)	450	1634	1373	168	1656		1215	1468			1700	1445
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	1098	155	57	897	0	191	46	82	0	26	31
RTOR Reduction (vph)	0	0	22	0	0	0	0	41	0	0	0	26
Lane Group Flow (vph)	41	1098	133	57	897	0	191	87	0	0	26	5
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	0%	2%	1%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	109.7	109.7	109.7	120.7	120.7		25.3	25.3			25.3	25.3
Effective Green, g (s)	113.0	113.0	113.0	123.6	124.0		27.5	27.5			27.5	27.5
Actuated g/C Ratio	0.71	0.71	0.71	0.77	0.78		0.17	0.17			0.17	0.17
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0			7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	317	1154	969	191	1283		208	252			292	248
v/s Ratio Prot		c0.67		0.01	c0.54			0.06			0.02	
v/s Ratio Perm	0.09		0.10	0.22			c0.16					0.00
v/c Ratio	0.13	0.95	0.14	0.30	0.70		0.92	0.35			0.09	0.02
Uniform Delay, d1	7.6	21.0	7.6	23.8	8.8		65.1	58.3			55.7	55.1
Progression Factor	0.82	0.98	0.68	1.24	0.80		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.6	13.1	0.2	0.7	2.6		39.9	0.8			0.1	0.0
Delay (s)	6.8	33.8	5.4	30.3	9.7		105.1	59.2			55.8	55.1
Level of Service	A	C	A	C	A		F	E			E	E
Approach Delay (s)		29.6			10.9			86.6			55.4	
Approach LOS		C			B			F			E	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	1065	25	55	870	20	15	30	110	40	30	40
Future Volume (vph)	105	1065	25	55	870	20	15	30	110	40	30	40
Ideal Flow (vphpl)	1803	1803	1803	1908	1908	1908	1650	1650	1650	1650	1650	1650
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	1768	1533	1777	1852	1622	1568	1427		1599	1683	1395
Flt Permitted	0.24	1.00	1.00	0.17	1.00	1.00	0.74	1.00		0.31	1.00	1.00
Satd. Flow (perm)	437	1768	1533	309	1852	1622	1216	1427		528	1683	1395
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	108	1098	26	57	897	21	15	31	113	41	31	41
RTOR Reduction (vph)	0	0	6	0	0	5	0	85	0	0	0	37
Lane Group Flow (vph)	108	1098	20	57	897	16	15	59	0	41	31	4
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	129.4	123.0	123.0	126.4	121.5	121.5	14.1	14.1		14.1	14.1	14.1
Effective Green, g (s)	133.4	125.0	125.0	130.4	123.5	123.5	16.1	16.1		16.1	16.1	16.1
Actuated g/C Ratio	0.83	0.78	0.78	0.82	0.77	0.77	0.10	0.10		0.10	0.10	0.10
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	431	1381	1197	315	1429	1251	122	143		53	169	140
v/s Ratio Prot	c0.01	c0.62		0.01	0.48			0.04			0.02	
v/s Ratio Perm	0.20		0.01	0.14		0.01	0.01			c0.08		0.00
v/c Ratio	0.25	0.80	0.02	0.18	0.63	0.01	0.12	0.42		0.77	0.18	0.03
Uniform Delay, d1	6.7	10.1	3.9	11.4	8.1	4.2	65.5	67.5		70.2	65.9	64.9
Progression Factor	1.35	0.70	1.00	0.35	0.24	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	2.3	0.0	0.2	1.7	0.0	0.5	2.0		49.7	0.5	0.1
Delay (s)	9.2	9.4	3.9	4.2	3.7	4.2	66.0	69.5		119.9	66.5	65.0
Level of Service	A	A	A	A	A	A	E	E		F	E	E
Approach Delay (s)		9.3			3.7			69.2			85.3	
Approach LOS		A			A			E			F	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group

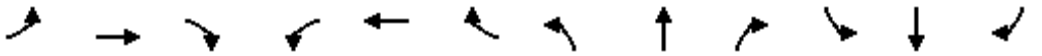
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	995	105	15	775	150	35	20	15	180	25	135
Future Volume (vph)	115	995	105	15	775	150	35	20	15	180	25	135
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1671	1758	1510	1671	1794	1540	1687	1776	1510	1696	1513	
Flt Permitted	0.24	1.00	1.00	0.16	1.00	1.00	0.45	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	421	1758	1510	281	1794	1540	793	1776	1510	1327	1513	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	1026	108	15	799	155	36	21	15	186	26	139
RTOR Reduction (vph)	0	0	18	0	0	46	0	0	12	0	114	0
Lane Group Flow (vph)	119	1026	90	15	799	109	36	21	3	186	51	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	120.0	112.9	112.9	110.6	108.2	108.2	26.7	26.7	26.7	26.7	26.7	
Effective Green, g (s)	124.2	115.8	112.9	116.4	111.1	111.1	28.4	28.4	26.7	28.4	28.4	
Actuated g/C Ratio	0.78	0.72	0.71	0.73	0.69	0.69	0.18	0.18	0.17	0.18	0.18	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	404	1272	1065	250	1245	1069	140	315	251	235	268	
v/s Ratio Prot	c0.02	c0.58		0.00	0.45			0.01			0.03	
v/s Ratio Perm	0.21		0.06	0.04		0.07	0.05		0.00	c0.14		
v/c Ratio	0.29	0.81	0.08	0.06	0.64	0.10	0.26	0.07	0.01	0.79	0.19	
Uniform Delay, d1	10.2	14.7	7.4	14.3	13.5	8.0	56.7	54.8	55.6	63.0	56.0	
Progression Factor	0.92	0.67	0.77	0.66	1.29	1.47	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	3.6	0.1	0.1	2.1	0.2	1.0	0.1	0.0	16.5	0.3	
Delay (s)	9.6	13.5	5.8	9.5	19.6	12.0	57.7	54.9	55.6	79.4	56.3	
Level of Service	A	B	A	A	B	B	E	D	E	E	E	
Approach Delay (s)		12.4			18.2			56.4			68.6	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	815	375	175	740	200	145
Future Volume (vph)	815	375	175	740	200	145
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1750	1398	1730	1768	1810	1685
Flt Permitted	1.00	1.00	0.24	1.00	0.95	1.00
Satd. Flow (perm)	1750	1398	435	1768	1810	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	840	387	180	763	206	149
RTOR Reduction (vph)	0	79	0	0	0	84
Lane Group Flow (vph)	840	308	180	763	206	65
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	2%	0%	0%	3%	2%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	110.0	110.0	125.0	125.0	22.0	22.0
Effective Green, g (s)	113.0	110.0	127.0	128.0	24.0	22.0
Actuated g/C Ratio	0.71	0.69	0.79	0.80	0.15	0.14
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	1235	961	426	1414	271	231
v/s Ratio Prot	c0.48		0.03	c0.43	c0.11	
v/s Ratio Perm		0.22	0.31			0.04
v/c Ratio	0.68	0.32	0.42	0.54	0.76	0.28
Uniform Delay, d1	13.3	10.0	21.4	5.6	65.2	61.9
Progression Factor	0.92	1.19	2.15	2.23	1.00	1.00
Incremental Delay, d2	2.0	0.6	0.5	1.2	11.4	0.5
Delay (s)	14.1	12.5	46.6	13.7	76.6	62.4
Level of Service	B	B	D	B	E	E
Approach Delay (s)	13.6			20.0	70.6	
Approach LOS	B			C	E	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03
c Critical Lane Group

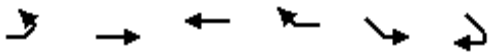


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	810	30	30	800	195	50	25	15	275	15	40
Future Volume (vph)	50	810	30	30	800	195	50	25	15	275	15	40
Ideal Flow (vphpl)	1662	1662	1662	1914	1914	1914	1662	1662	1662	1662	1662	1662
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1509	1589	1377	1864	1923	1633	1496	1574	1338	1516	1612	1343
Flt Permitted	0.16	1.00	1.00	0.16	1.00	1.00	0.75	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	260	1589	1377	308	1923	1633	1176	1574	1338	1181	1612	1343
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	862	32	32	851	207	53	27	16	293	16	43
RTOR Reduction (vph)	0	0	13	0	0	37	0	0	11	0	0	30
Lane Group Flow (vph)	53	862	19	32	851	170	53	27	5	293	16	13
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	99.2	95.2	95.2	99.2	95.2	95.2	40.8	40.8	44.8	40.8	40.8	44.8
Effective Green, g (s)	103.4	97.3	97.3	103.4	97.3	97.3	41.8	41.8	49.0	41.8	41.8	49.0
Actuated g/C Ratio	0.65	0.61	0.61	0.65	0.61	0.61	0.26	0.26	0.31	0.26	0.26	0.31
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	215	966	837	258	1169	993	307	411	409	308	421	411
v/s Ratio Prot	c0.01	c0.54		0.00	0.44			0.02	0.00		0.01	0.00
v/s Ratio Perm	0.15		0.01	0.08		0.10	0.05		0.00	c0.25		0.01
v/c Ratio	0.25	0.89	0.02	0.12	0.73	0.17	0.17	0.07	0.01	0.95	0.04	0.03
Uniform Delay, d1	19.5	26.9	12.5	19.3	22.0	13.7	45.7	44.4	38.6	58.1	44.1	38.9
Progression Factor	0.54	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	10.3	0.0	0.2	4.0	0.4	0.3	0.1	0.0	38.3	0.0	0.0
Delay (s)	10.9	27.8	12.5	19.5	26.0	14.1	46.0	44.5	38.7	96.4	44.1	38.9
Level of Service	B	C	B	B	C	B	D	D	D	F	D	D
Approach Delay (s)		26.3			23.6			44.3			87.0	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	90	870	860	25	15	55
Future Volume (Veh/h)	90	870	860	25	15	55
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	946	935	27	16	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	962				2090	948
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	962				2090	948
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	86				66	81
cM capacity (veh/h)	724				47	313

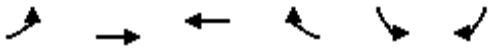
Direction, Lane #	EB 1	EB 2	WB 1	SE 1
Volume Total	98	946	962	76
Volume Left	98	0	0	16
Volume Right	0	0	27	60
cSH	724	1700	1700	143
Volume to Capacity	0.14	0.56	0.57	0.53
Queue Length 95th (ft)	12	0	0	65
Control Delay (s)	10.8	0.0	0.0	55.7
Lane LOS	B			F
Approach Delay (s)	1.0		0.0	55.7
Approach LOS				F

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1095	5	0	1025	0	25
Future Volume (Veh/h)	1095	5	0	1025	0	25
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1141	5	0	1068	0	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1146		2212	1144
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1146		2212	1144
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	89
cM capacity (veh/h)			617		49	246

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1146	1068	26
Volume Left	0	0	0
Volume Right	5	0	26
cSH	1700	1700	246
Volume to Capacity	0.67	0.63	0.11
Queue Length 95th (ft)	0	0	9
Control Delay (s)	0.0	0.0	21.4
Lane LOS			C
Approach Delay (s)	0.0	0.0	21.4
Approach LOS			C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	260	860	890	5	0	135
Future Volume (Veh/h)	260	860	890	5	0	135
Sign Control		Free	Free		Stop	
Grade		0%	-5%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	268	887	918	5	0	139
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	923				2344	920
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	923				2344	920
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	64				100	58
cM capacity (veh/h)	748				26	331

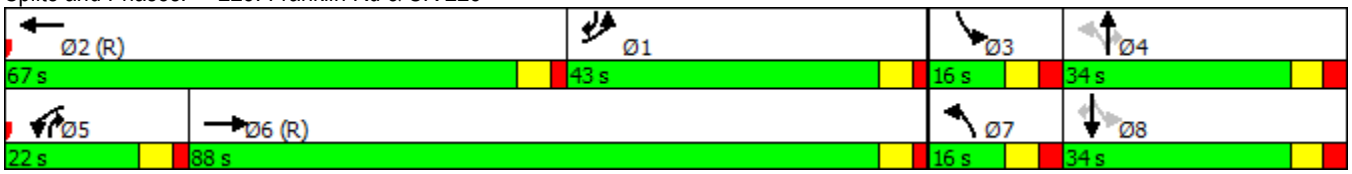
Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	268	887	923	139
Volume Left	268	0	0	0
Volume Right	0	0	5	139
cSH	748	1700	1700	331
Volume to Capacity	0.36	0.52	0.54	0.42
Queue Length 95th (ft)	41	0	0	50
Control Delay (s)	12.5	0.0	0.0	23.5
Lane LOS	B			C
Approach Delay (s)	2.9		0.0	23.5
Approach LOS				C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	270	1015	115	940	120	330	175	65	150	55
Future Volume (vph)	270	1015	115	940	120	330	175	65	150	55
Turn Type	Prot	NA	Prot	NA	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	5	2	7	4	5	3	8	1
Permitted Phases					4		4	8		8
Detector Phase	1	6	5	2	7	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	21.0	12.0	21.0	12.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	43.0	88.0	22.0	67.0	16.0	34.0	22.0	16.0	34.0	43.0
Total Split (%)	26.9%	55.0%	13.8%	41.9%	10.0%	21.3%	13.8%	10.0%	21.3%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	2.0	3.0	3.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-1.0	-1.0	0.0	-2.0	-1.0	-3.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	6.0	6.0	6.0	5.0	6.0	3.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	C-Max	None	C-Max	None	None	None	None	None	None
Act Effct Green (s)	40.0	87.9	16.9	64.8	38.0	28.0	47.9	38.4	27.2	70.2
Actuated g/C Ratio	0.25	0.55	0.11	0.40	0.24	0.18	0.30	0.24	0.17	0.44
v/c Ratio	0.64	0.79	0.65	0.76	0.54	1.23	0.37	0.48	0.55	0.08
Control Delay	61.3	34.5	76.3	40.2	57.3	182.4	17.6	55.4	68.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.3	34.5	76.3	40.2	57.3	182.4	17.6	55.4	68.6	0.2
LOS	E	C	E	D	E	F	B	E	E	A
Approach Delay		39.9		43.9		112.2			51.5	
Approach LOS		D		D		F			D	

Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 3 (2%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.23	
Intersection Signal Delay: 55.6	Intersection LOS: E
Intersection Capacity Utilization 82.6%	ICU Level of Service E
Analysis Period (min) 15	
Description: Signal Permit No. TS-152-10	
Date Issued: 6-4-99	

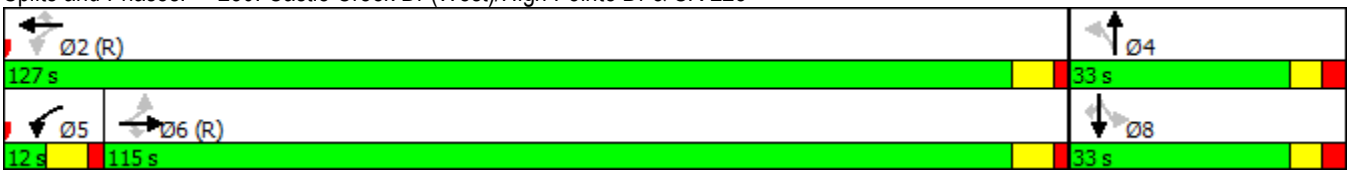
Splits and Phases: 225: Franklin Rd & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	40	1065	150	55	870	185	45	25	30
Future Volume (vph)	40	1065	150	55	870	185	45	25	30
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	NA	Perm
Protected Phases		6		5	2		4	8	
Permitted Phases	6		6	2		4			8
Detector Phase	6	6	6	5	2	4	4	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	4.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	18.0	18.0	18.0	12.0	18.0	13.0	13.0	13.0	13.0
Total Split (s)	115.0	115.0	115.0	12.0	127.0	33.0	33.0	33.0	33.0
Total Split (%)	71.9%	71.9%	71.9%	7.5%	79.4%	20.6%	20.6%	20.6%	20.6%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.3	-3.3	-3.3	-2.9	-3.3	-2.2	-2.2	-2.2	-2.2
Total Lost Time (s)	3.7	3.7	3.7	4.1	3.7	4.8	4.8	4.8	4.8
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	114.4	114.4	114.4	123.6	124.0	27.5	27.5	27.5	27.5
Actuated g/C Ratio	0.72	0.72	0.72	0.77	0.78	0.17	0.17	0.17	0.17
v/c Ratio	0.13	0.94	0.15	0.28	0.70	0.91	0.44	0.09	0.10
Control Delay	7.5	33.0	3.1	8.4	10.2	107.8	41.0	56.2	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	33.0	3.1	8.4	10.2	107.8	41.0	56.2	0.6
LOS	A	C	A	A	B	F	D	E	A
Approach Delay		28.6			10.1		81.0	26.0	
Approach LOS		C			B		F	C	

Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 13 (8%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 28.2	Intersection LOS: C
Intersection Capacity Utilization 90.3%	ICU Level of Service E
Analysis Period (min) 15	
Description: Signal Permit No. TS-113-10	
Date Issued: 3/24/95	
Date Revised: 9/17/02	

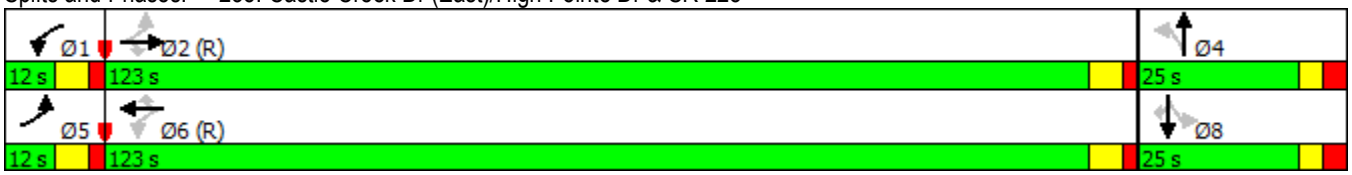
Splits and Phases: 230: Castle Creek Dr (West)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	105	1065	25	55	870	20	15	30	40	30	40
Future Volume (vph)	105	1065	25	55	870	20	15	30	40	30	40
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			4		8	
Permitted Phases	2		2	6		6	4		8		8
Detector Phase	5	2		1	6		4	4	8	8	8
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	17.0	17.0	12.0	17.0	17.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	123.0	123.0	12.0	123.0	123.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	7.5%	76.9%	76.9%	7.5%	76.9%	76.9%	15.6%	15.6%	15.6%	15.6%	15.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?											
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	133.0	126.2	126.2	131.6	123.5	123.5	16.1	16.1	16.1	16.1	16.1
Actuated g/C Ratio	0.83	0.79	0.79	0.82	0.77	0.77	0.10	0.10	0.10	0.10	0.10
v/c Ratio	0.25	0.79	0.02	0.17	0.63	0.02	0.12	0.63	0.77	0.18	0.21
Control Delay	3.9	10.8	0.3	1.8	3.9	0.1	65.0	37.6	138.5	66.0	8.1
Queue Delay	0.0	0.4	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	3.9	11.2	0.3	1.8	4.0	0.1	65.0	37.7	138.5	66.0	8.1
LOS	A	B	A	A	A	A	E	D	F	E	A
Approach Delay		10.3			3.8			40.3		71.3	
Approach LOS		B			A			D		E	

Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 25 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 90.4%	ICU Level of Service E
Analysis Period (min) 15	
Description: Signal Permit No. TS-080-10	

Splits and Phases: 235: Castle Creek Dr (East)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	115	995	105	15	775	150	35	20	15	180	25
Future Volume (vph)	115	995	105	15	775	150	35	20	15	180	25
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	1	6		5	2			4			8
Permitted Phases	6		6	2		2	4		4	8	
Detector Phase	1	6	6	5	2	2	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	22.0	22.0	12.0	22.0	22.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	109.0	109.0	12.0	109.0	109.0	39.0	39.0	39.0	39.0	39.0
Total Split (%)	7.5%	68.1%	68.1%	7.5%	68.1%	68.1%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.9	-2.9	0.0	-2.9	-2.9	-2.9	-1.7	-1.7	0.0	-1.7	-1.7
Total Lost Time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?											
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	123.3	119.4	116.5	119.8	111.1	111.1	28.4	28.4	26.7	28.4	28.4
Actuated g/C Ratio	0.77	0.75	0.73	0.75	0.69	0.69	0.18	0.18	0.17	0.18	0.18
v/c Ratio	0.30	0.78	0.10	0.05	0.64	0.14	0.26	0.07	0.05	0.79	0.43
Control Delay	5.8	14.0	3.3	3.7	21.3	2.4	59.1	52.3	0.3	85.5	15.6
Queue Delay	0.0	0.8	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	14.8	3.3	3.7	21.8	2.4	59.1	52.3	0.3	85.5	15.6
LOS	A	B	A	A	C	A	E	D	A	F	B
Approach Delay		13.0			18.4			44.9			52.7
Approach LOS		B			B			D			D

Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 39 (24%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 21.1	Intersection LOS: C
Intersection Capacity Utilization 88.2%	ICU Level of Service E
Analysis Period (min) 15	
Description: Signal Permit No. TS-221-10	
Date Issued: 12-15-07	

Splits and Phases: 240: Seven Fields Blvd & SR 228

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	815	375	175	740	200	145
Future Volume (vph)	815	375	175	740	200	145
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Detector Phase	6		5	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	12.0	12.0
Total Split (s)	113.0	113.0	15.0	128.0	32.0	32.0
Total Split (%)	70.6%	70.6%	9.4%	80.0%	20.0%	20.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	-3.0	0.0	-2.0	-3.0	-2.0	0.0
Total Lost Time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	113.0	110.0	127.0	128.0	24.0	22.0
Actuated g/C Ratio	0.71	0.69	0.79	0.80	0.15	0.14
v/c Ratio	0.68	0.37	0.42	0.54	0.76	0.47
Control Delay	15.2	5.0	18.3	15.1	82.9	27.9
Queue Delay	1.5	0.4	0.0	0.3	0.0	0.0
Total Delay	16.7	5.3	18.3	15.4	82.9	27.9
LOS	B	A	B	B	F	C
Approach Delay	13.1			16.0	59.8	
Approach LOS	B			B	E	

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 21 (13%), Referenced to phase 2:WBTL and 6:EBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 20.7 — Intersection LOS: C
Intersection Capacity Utilization 77.9% — ICU Level of Service D
Analysis Period (min) 15
Description: Signal Permit No. TS-120-10
Date Issued: 8-29-96
Date Revised: 9-19-03

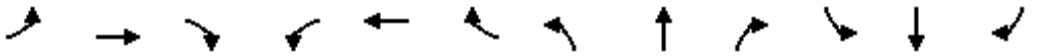
Splits and Phases: 245: Adams Ridge Blvd & SR 228

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	810	30	30	800	195	50	25	15	275	15	40
Future Volume (vph)	50	810	30	30	800	195	50	25	15	275	15	40
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6		5	2		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	4.0	12.0	12.0	4.0	12.0	12.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	20.0	20.0	12.0	20.0	20.0	11.0	11.0	12.0	11.0	11.0	12.0
Total Split (s)	12.0	100.0	100.0	12.0	100.0	100.0	48.0	48.0	12.0	48.0	48.0	12.0
Total Split (%)	7.5%	62.5%	62.5%	7.5%	62.5%	62.5%	30.0%	30.0%	7.5%	30.0%	30.0%	7.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0	5.0	3.0	3.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	2.0	3.0	3.0	2.0
Lost Time Adjust (s)	-2.1	-2.1	-2.1	-2.1	-2.1	-2.1	-1.0	-1.0	-2.1	-1.0	-1.0	-2.1
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag			Lead			Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	104.4	98.7	98.7	104.4	98.7	98.7	41.8	41.8	51.5	41.8	41.8	51.5
Actuated g/C Ratio	0.65	0.62	0.62	0.65	0.62	0.62	0.26	0.26	0.32	0.26	0.26	0.32
v/c Ratio	0.23	0.88	0.04	0.12	0.72	0.20	0.17	0.07	0.04	0.95	0.04	0.09
Control Delay	6.9	27.9	0.1	9.9	26.5	8.2	46.9	44.3	5.3	97.5	43.7	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	27.9	0.1	9.9	26.5	8.2	46.9	44.3	5.3	97.5	43.7	9.6
LOS	A	C	A	A	C	A	D	D	A	F	D	A
Approach Delay		25.8			22.5			39.2			84.3	
Approach LOS		C			C			D			F	

Intersection Summary

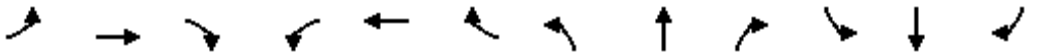
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 92 (58%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 33.2 — Intersection LOS: C
Intersection Capacity Utilization 81.8% — ICU Level of Service D
Analysis Period (min) 15
Description: Signal Permit No. TS-185-10
Date Issued: 2-26-2003
Date Revised: 3-10-2008

Splits and Phases: 255: Heritage Creek Dr & SR 228



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	780	80	95	1085	85	80	125	100	115	135	100
Future Volume (vph)	95	780	80	95	1085	85	80	125	100	115	135	100
Ideal Flow (vphpl)	1900	1900	1900	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0		3.0	3.0		6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	1.00	*0.64		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1760	2297		1670	3234		1631	1700	1431	1664	1752	1474
Flt Permitted	0.95	1.00		0.95	1.00		0.48	1.00	1.00	0.50	1.00	1.00
Satd. Flow (perm)	1760	2297		1670	3234		818	1700	1431	871	1752	1474
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	98	804	82	98	1119	88	82	129	103	119	139	103
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	83	0	0	73
Lane Group Flow (vph)	98	883	0	98	1203	0	82	129	20	119	139	30
Heavy Vehicles (%)	0%	2%	0%	0%	2%	4%	0%	1%	2%	1%	1%	2%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6		5	2		7	4	5	3	8	1
Permitted Phases							4		4	8		8
Actuated Green, G (s)	22.0	85.6		14.0	77.6		24.0	15.5	29.5	24.8	15.9	37.9
Effective Green, g (s)	25.0	88.6		17.0	80.6		26.0	16.5	29.5	28.8	16.9	43.9
Actuated g/C Ratio	0.17	0.59		0.11	0.54		0.17	0.11	0.20	0.19	0.11	0.29
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	5.5	8.0		5.5	8.0		2.0	2.0	5.5	2.0	2.0	5.5
Lane Grp Cap (vph)	293	1356		189	1737		193	187	281	224	197	431
v/s Ratio Prot	0.06	c0.38		0.06	c0.37		0.03	0.08	0.01	c0.04	c0.08	0.01
v/s Ratio Perm							0.05		0.01	0.06		0.01
v/c Ratio	0.33	0.65		0.52	0.69		0.42	0.69	0.07	0.53	0.71	0.07
Uniform Delay, d1	55.2	20.4		62.6	25.6		54.0	64.3	49.1	52.8	64.2	38.3
Progression Factor	0.75	0.58		1.10	0.82		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	2.3		3.6	1.5		0.6	8.2	0.3	1.2	9.0	0.2
Delay (s)	43.0	14.0		72.8	22.4		54.6	72.5	49.4	54.0	73.2	38.5
Level of Service	D	B		E	C		D	E	D	D	E	D
Approach Delay (s)		16.9			26.2			60.2			57.0	
Approach LOS		B			C			E			E	

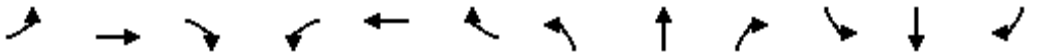
Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	825	125	50	1065	0	140	10	55	0	5	35
Future Volume (vph)	45	825	125	50	1065	0	140	10	55	0	5	35
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8			4.8	4.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1696	1803	1486	1704	1759		1704	1549			1857	1533
Flt Permitted	0.20	1.00	1.00	0.24	1.00		0.75	1.00			1.00	1.00
Satd. Flow (perm)	358	1803	1486	426	1759		1354	1549			1857	1533
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	851	129	52	1098	0	144	10	57	0	5	36
RTOR Reduction (vph)	0	0	24	0	0	0	0	49	0	0	0	31
Lane Group Flow (vph)	46	851	105	52	1098	0	144	18	0	0	5	5
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	2%	1%	2%	0%	2%	0%	1%	0%	0%	0%	0%	3%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	107.1	107.1	107.1	118.2	118.2		17.8	17.8			17.8	17.8
Effective Green, g (s)	110.4	110.4	110.4	121.1	121.5		20.0	20.0			20.0	20.0
Actuated g/C Ratio	0.74	0.74	0.74	0.81	0.81		0.13	0.13			0.13	0.13
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0			7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	263	1327	1093	403	1424		180	206			247	204
v/s Ratio Prot		0.47		0.01	c0.62			0.01			0.00	
v/s Ratio Perm	0.13		0.07	0.10			c0.11					0.00
v/c Ratio	0.17	0.64	0.10	0.13	0.77		0.80	0.09			0.02	0.02
Uniform Delay, d1	6.0	9.9	5.6	7.6	7.2		63.1	57.0			56.5	56.5
Progression Factor	0.20	0.31	0.12	1.35	0.89		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.2	1.9	0.1	0.1	3.0		21.9	0.2			0.0	0.0
Delay (s)	2.4	5.0	0.8	10.3	9.4		84.9	57.2			56.5	56.6
Level of Service	A	A	A	B	A		F	E			E	E
Approach Delay (s)		4.4			9.5			76.1			56.6	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	830	15	25	1060	10	15	25	30	5	15	40
Future Volume (vph)	45	830	15	25	1060	10	15	25	30	5	15	40
Ideal Flow (vphpl)	1803	1803	1803	1900	1900	1900	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	1785	1533	1805	1863	1615	1713	1631		1747	1839	1490
Flt Permitted	0.19	1.00	1.00	0.29	1.00	1.00	0.75	1.00		0.67	1.00	1.00
Satd. Flow (perm)	334	1785	1533	554	1863	1615	1348	1631		1235	1839	1490
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	856	15	26	1093	10	15	26	31	5	15	41
RTOR Reduction (vph)	0	0	3	0	0	2	0	29	0	0	0	39
Lane Group Flow (vph)	46	856	12	26	1093	8	15	28	0	5	15	2
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	126.2	121.3	121.3	123.6	120.0	120.0	7.1	7.1		7.1	7.1	7.1
Effective Green, g (s)	130.2	123.3	123.3	127.6	122.0	122.0	9.1	9.1		9.1	9.1	9.1
Actuated g/C Ratio	0.87	0.82	0.82	0.85	0.81	0.81	0.06	0.06		0.06	0.06	0.06
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	353	1467	1260	517	1515	1313	81	98		74	111	90
v/s Ratio Prot	c0.01	0.48		0.00	c0.59			c0.02			0.01	
v/s Ratio Perm	0.11		0.01	0.04		0.01	0.01			0.00		0.00
v/c Ratio	0.13	0.58	0.01	0.05	0.72	0.01	0.19	0.28		0.07	0.14	0.03
Uniform Delay, d1	7.4	4.6	2.4	2.9	6.3	2.6	66.9	67.3		66.4	66.7	66.3
Progression Factor	0.93	0.55	1.00	0.44	0.24	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	1.4	0.0	0.0	2.2	0.0	1.1	1.6		0.4	0.6	0.1
Delay (s)	7.0	3.9	2.4	1.3	3.7	2.6	68.0	68.9		66.8	67.3	66.4
Level of Service	A	A	A	A	A	A	E	E		E	E	E
Approach Delay (s)		4.0			3.7			68.7			66.7	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	695	80	10	920	170	60	30	15	140	20	115
Future Volume (vph)	90	695	80	10	920	170	60	30	15	140	20	115
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	1750	1517	1730	1785	1548	1696	1785	1517	1687	1517	
Flt Permitted	0.18	1.00	1.00	0.33	1.00	1.00	0.47	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	323	1750	1517	598	1785	1548	838	1785	1517	1309	1517	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	93	716	82	10	948	175	62	31	15	144	21	119
RTOR Reduction (vph)	0	0	18	0	0	48	0	0	13	0	102	0
Lane Group Flow (vph)	93	716	64	10	948	127	62	31	2	144	38	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	115.8	109.4	109.4	107.8	105.4	105.4	20.2	20.2	20.2	20.2	20.2	
Effective Green, g (s)	120.7	112.3	109.4	113.6	108.3	108.3	21.9	21.9	20.2	21.9	21.9	
Actuated g/C Ratio	0.80	0.75	0.73	0.76	0.72	0.72	0.15	0.15	0.13	0.15	0.15	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	342	1310	1106	492	1288	1117	122	260	204	191	221	
v/s Ratio Prot	c0.02	0.41		0.00	c0.53			0.02			0.03	
v/s Ratio Perm	0.20		0.04	0.01		0.08	0.07		0.00	c0.11		
v/c Ratio	0.27	0.55	0.06	0.02	0.74	0.11	0.51	0.12	0.01	0.75	0.17	
Uniform Delay, d1	11.7	8.0	5.7	5.5	12.4	6.3	59.1	55.7	56.2	61.5	56.1	
Progression Factor	0.56	0.37	0.21	0.41	1.04	1.34	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	1.4	0.1	0.0	2.8	0.2	3.3	0.2	0.0	15.5	0.4	
Delay (s)	6.9	4.4	1.3	2.3	15.7	8.6	62.4	55.9	56.3	76.9	56.5	
Level of Service	A	A	A	A	B	A	E	E	E	E	E	
Approach Delay (s)		4.3			14.5			59.7			66.9	
Approach LOS		A			B			E			E	

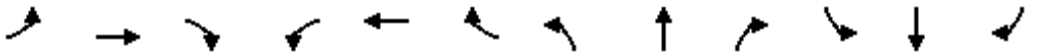
Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	635	215	120	855	245	100
Future Volume (vph)	635	215	120	855	245	100
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1767	1385	1713	1785	1828	1685
Flt Permitted	1.00	1.00	0.33	1.00	0.95	1.00
Satd. Flow (perm)	1767	1385	597	1785	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	655	222	124	881	253	103
RTOR Reduction (vph)	0	65	0	0	0	49
Lane Group Flow (vph)	655	157	124	881	253	54
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	1%	1%	1%	2%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	101.4	101.4	114.4	114.4	22.6	22.6
Effective Green, g (s)	104.4	101.4	116.4	117.4	24.6	22.6
Actuated g/C Ratio	0.70	0.68	0.78	0.78	0.16	0.15
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	1229	936	522	1397	299	253
v/s Ratio Prot	0.37		0.01	c0.49	c0.14	
v/s Ratio Perm		0.11	0.17			0.03
v/c Ratio	0.53	0.17	0.24	0.63	0.85	0.21
Uniform Delay, d1	11.0	8.9	12.4	7.0	60.9	55.9
Progression Factor	0.97	1.77	1.21	1.96	1.00	1.00
Incremental Delay, d2	1.4	0.3	0.2	1.7	19.0	0.3
Delay (s)	12.1	16.1	15.1	15.4	79.9	56.2
Level of Service	B	B	B	B	E	E
Approach Delay (s)	13.1			15.3	73.0	
Approach LOS	B			B	E	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03

c Critical Lane Group

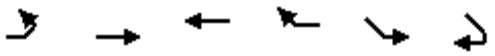


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	615	30	30	910	95	25	10	5	115	10	35
Future Volume (vph)	40	615	30	30	910	95	25	10	5	115	10	35
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1637	1723	1465	1688	1812	1538	1591	1708	1452	1645	1749	1443
Flt Permitted	0.19	1.00	1.00	0.36	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	327	1723	1465	633	1812	1538	1257	1708	1452	1299	1749	1443
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	654	32	32	968	101	27	11	5	122	11	37
RTOR Reduction (vph)	0	0	8	0	0	20	0	0	4	0	0	30
Lane Group Flow (vph)	43	654	24	32	968	81	27	11	1	122	11	7
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	2%	4%	2%	0%	2%	0%	0%	1%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	114.3	109.1	109.1	111.5	107.7	107.7	17.1	17.1	20.9	17.1	17.1	22.3
Effective Green, g (s)	118.5	111.2	111.2	115.7	109.8	109.8	18.1	18.1	25.1	18.1	18.1	26.5
Actuated g/C Ratio	0.79	0.74	0.74	0.77	0.73	0.73	0.12	0.12	0.17	0.12	0.12	0.18
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	322	1277	1086	529	1326	1125	151	206	242	156	211	254
v/s Ratio Prot	c0.01	0.38		0.00	c0.53			0.01	0.00		0.01	0.00
v/s Ratio Perm	0.10		0.02	0.04		0.05	0.02		0.00	c0.09		0.00
v/c Ratio	0.13	0.51	0.02	0.06	0.73	0.07	0.18	0.05	0.00	0.78	0.05	0.03
Uniform Delay, d1	10.2	8.1	5.1	4.9	11.6	5.7	59.3	58.4	52.0	64.0	58.4	51.1
Progression Factor	0.58	0.64	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	1.3	0.0	0.0	3.6	0.1	0.6	0.1	0.0	22.0	0.1	0.0
Delay (s)	6.0	6.5	5.1	4.9	15.1	5.8	59.8	58.5	52.0	86.1	58.5	51.1
Level of Service	A	A	A	A	B	A	E	E	D	F	E	D
Approach Delay (s)		6.4			14.0			58.6			76.7	
Approach LOS		A			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	50	685	930	40	10	45
Future Volume (Veh/h)	50	685	930	40	10	45
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	745	1011	43	11	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1054				1886	1032
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1054				1886	1032
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				85	83
cM capacity (veh/h)	668				72	283

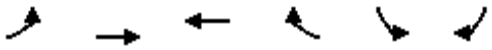
Direction, Lane #	EB 1	EB 2	WB 1	SE 1
Volume Total	54	745	1054	60
Volume Left	54	0	0	11
Volume Right	0	0	43	49
cSH	668	1700	1700	184
Volume to Capacity	0.08	0.44	0.62	0.33
Queue Length 95th (ft)	7	0	0	33
Control Delay (s)	10.9	0.0	0.0	33.7
Lane LOS	B			D
Approach Delay (s)	0.7		0.0	33.7
Approach LOS				D

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	730	5	5	1035	0	10
Future Volume (Veh/h)	730	5	5	1035	0	10
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	760	5	5	1078	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			765		1850	762
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			765		1850	762
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		100	97
cM capacity (veh/h)			857		82	392

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	765	1083	10
Volume Left	0	5	0
Volume Right	5	0	10
cSH	1700	857	392
Volume to Capacity	0.45	0.01	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	14.4
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	14.4
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	105	635	925	0	0	115
Future Volume (Veh/h)	105	635	925	0	0	115
Sign Control		Free	Free		Stop	
Grade		0%	-5%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	108	655	954	0	0	119
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	954				1825	954
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	954				1825	954
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				100	62
cM capacity (veh/h)	724				73	317

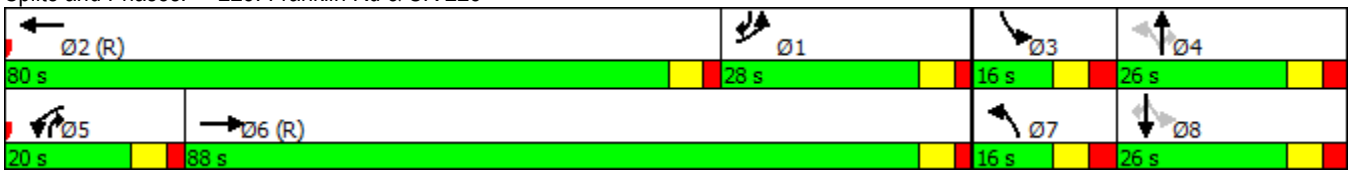
Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	108	655	954	119
Volume Left	108	0	0	0
Volume Right	0	0	0	119
cSH	724	1700	1700	317
Volume to Capacity	0.15	0.39	0.56	0.38
Queue Length 95th (ft)	13	0	0	42
Control Delay (s)	10.8	0.0	0.0	23.1
Lane LOS	B			C
Approach Delay (s)	1.5		0.0	23.1
Approach LOS				C

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	95	780	95	1085	80	125	100	115	135	100
Future Volume (vph)	95	780	95	1085	80	125	100	115	135	100
Turn Type	Prot	NA	Prot	NA	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	5	2	7	4	5	3	8	1
Permitted Phases					4		4	8		8
Detector Phase	1	6	5	2	7	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	25.0	13.0	25.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	28.0	88.0	20.0	80.0	16.0	26.0	20.0	16.0	26.0	28.0
Total Split (%)	18.7%	58.7%	13.3%	53.3%	10.7%	17.3%	13.3%	10.7%	17.3%	18.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	2.0	3.0	3.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-1.0	-1.0	0.0	-2.0	-1.0	-3.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	6.0	6.0	6.0	5.0	6.0	3.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?					Yes					
Recall Mode	None	C-Max	None	C-Max	None	None	None	None	None	None
Act Effct Green (s)	25.0	88.6	17.0	80.6	26.0	16.5	36.5	28.8	16.9	44.9
Actuated g/C Ratio	0.17	0.59	0.11	0.54	0.17	0.11	0.24	0.19	0.11	0.30
v/c Ratio	0.33	0.65	0.52	0.69	0.42	0.69	0.24	0.53	0.71	0.20
Control Delay	44.8	14.6	76.2	23.0	54.8	82.8	6.5	57.6	83.1	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	14.6	76.2	23.0	54.8	82.8	6.5	57.6	83.1	4.0
LOS	D	B	E	C	D	F	A	E	F	A
Approach Delay		17.6		27.0		50.4			52.1	
Approach LOS		B		C		D			D	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 127 (85%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 29.4	Intersection LOS: C
Intersection Capacity Utilization 69.2%	ICU Level of Service C
Analysis Period (min) 15	
Description: Signal Permit No. TS-152-10	
Date Issued: 6-4-99	

Splits and Phases: 225: Franklin Rd & SR 228

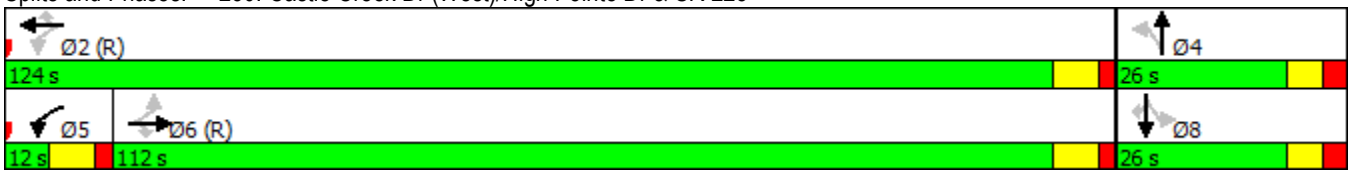


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	45	825	125	50	1065	140	10	5	35
Future Volume (vph)	45	825	125	50	1065	140	10	5	35
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	NA	Perm
Protected Phases		6		5	2		4	8	
Permitted Phases	6		6	2		4			8
Detector Phase	6	6	6	5	2	4	4	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	18.0	18.0	18.0	12.0	18.0	13.0	13.0	13.0	13.0
Total Split (s)	112.0	112.0	112.0	12.0	124.0	26.0	26.0	26.0	26.0
Total Split (%)	74.7%	74.7%	74.7%	8.0%	82.7%	17.3%	17.3%	17.3%	17.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.3	-3.3	-3.3	-2.9	-3.3	-2.2	-2.2	-2.2	-2.2
Total Lost Time (s)	3.7	3.7	3.7	4.1	3.7	4.8	4.8	4.8	4.8
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	111.8	111.8	111.8	121.1	121.5	20.0	20.0	20.0	20.0
Actuated g/C Ratio	0.75	0.75	0.75	0.81	0.81	0.13	0.13	0.13	0.13
v/c Ratio	0.17	0.63	0.11	0.13	0.77	0.80	0.26	0.02	0.13
Control Delay	2.6	5.1	0.4	4.7	10.2	92.5	19.9	55.8	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.6	5.1	0.4	4.7	10.2	92.5	19.9	55.8	1.0
LOS	A	A	A	A	B	F	B	E	A
Approach Delay		4.4			10.0		69.5	7.7	
Approach LOS		A			A		E	A	

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 32 (21%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 12.8 — Intersection LOS: B
Intersection Capacity Utilization 82.7% — ICU Level of Service E
Analysis Period (min) 15
Description: Signal Permit No. TS-113-10
Date Issued: 3/24/95
Date Revised: 9/17/02

Splits and Phases: 230: Castle Creek Dr (West)/High Pointe Dr & SR 228

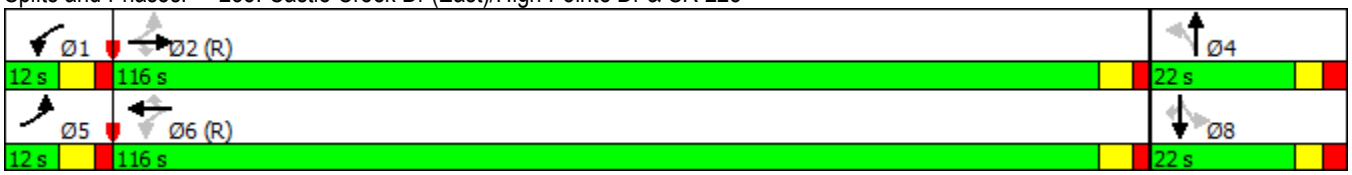


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	45	830	15	25	1060	10	15	25	5	15	40
Future Volume (vph)	45	830	15	25	1060	10	15	25	5	15	40
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			4		8	
Permitted Phases	2		2	6		6	4		8		8
Detector Phase	5	2		1	6		4	4	8	8	8
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	17.0	17.0	12.0	17.0	17.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	116.0	116.0	12.0	116.0	116.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	8.0%	77.3%	77.3%	8.0%	77.3%	77.3%	14.7%	14.7%	14.7%	14.7%	14.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?											
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	131.9	127.7	127.7	130.6	125.2	125.2	10.2	10.2	10.2	10.2	10.2
Actuated g/C Ratio	0.88	0.85	0.85	0.87	0.83	0.83	0.07	0.07	0.07	0.07	0.07
v/c Ratio	0.13	0.56	0.01	0.05	0.70	0.01	0.16	0.41	0.06	0.12	0.25
Control Delay	1.9	4.1	0.0	0.8	3.8	0.0	68.4	43.2	64.8	66.1	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	4.1	0.0	0.8	3.9	0.0	68.4	43.2	64.8	66.1	8.6
LOS	A	A	A	A	A	A	E	D	E	E	A
Approach Delay		3.9			3.8			48.4		27.3	
Approach LOS		A			A			D		C	

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 42 (28%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 6.0 — Intersection LOS: A
Intersection Capacity Utilization 74.1% — ICU Level of Service D
Analysis Period (min) 15
Description: Signal Permit No. TS-080-10

Splits and Phases: 235: Castle Creek Dr (East)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	90	695	80	10	920	170	60	30	15	140	20
Future Volume (vph)	90	695	80	10	920	170	60	30	15	140	20
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	1	6		5	2			4			8
Permitted Phases	6		6	2		2	4		4	8	
Detector Phase	1	6	6	5	2	2	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	22.0	22.0	12.0	22.0	22.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	108.0	108.0	12.0	108.0	108.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	8.0%	72.0%	72.0%	8.0%	72.0%	72.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.9	-2.9	0.0	-2.9	-2.9	-2.9	-1.7	-1.7	0.0	-1.7	-1.7
Total Lost Time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?											
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	119.5	115.9	113.0	116.9	108.3	108.3	21.9	21.9	20.2	21.9	21.9
Actuated g/C Ratio	0.80	0.77	0.75	0.78	0.72	0.72	0.15	0.15	0.13	0.15	0.15
v/c Ratio	0.27	0.53	0.07	0.02	0.74	0.15	0.51	0.12	0.06	0.75	0.43
Control Delay	3.6	4.3	0.6	1.5	17.1	1.6	72.8	54.8	0.4	84.9	17.2
Queue Delay	0.0	0.1	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.6	4.4	0.6	1.5	17.9	1.6	72.8	54.8	0.4	84.9	17.2
LOS	A	A	A	A	B	A	E	D	A	F	B
Approach Delay		4.0			15.2			57.6			51.5
Approach LOS		A			B			E			D

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 50 (33%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 17.3	Intersection LOS: B
Intersection Capacity Utilization 83.1%	ICU Level of Service E
Analysis Period (min) 15	
Description: Signal Permit No. TS-221-10	
Date Issued: 12-15-07	

Splits and Phases: 240: Seven Fields Blvd & SR 228

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	635	215	120	855	245	100
Future Volume (vph)	635	215	120	855	245	100
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Detector Phase	6		5	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	12.0	12.0
Total Split (s)	107.0	107.0	13.0	120.0	30.0	30.0
Total Split (%)	71.3%	71.3%	8.7%	80.0%	20.0%	20.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	-3.0	0.0	-2.0	-3.0	-2.0	0.0
Total Lost Time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	104.4	101.4	116.4	117.4	24.6	22.6
Actuated g/C Ratio	0.70	0.68	0.78	0.78	0.16	0.15
v/c Ratio	0.53	0.22	0.24	0.63	0.85	0.34
Control Delay	12.6	3.3	7.1	16.4	85.2	29.4
Queue Delay	0.3	0.0	0.0	0.4	0.0	0.0
Total Delay	13.0	3.3	7.1	16.8	85.2	29.4
LOS	B	A	A	B	F	C
Approach Delay	10.5			15.6	69.1	
Approach LOS	B			B	E	

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 40 (27%), Referenced to phase 2:WBTL and 6:EBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 22.1 — Intersection LOS: C
Intersection Capacity Utilization 68.4% — ICU Level of Service C
Analysis Period (min) 15
Description: Signal Permit No. TS-120-10
Date Issued: 8-29-96
Date Revised: 9-19-03

Splits and Phases: 245: Adams Ridge Blvd & SR 228

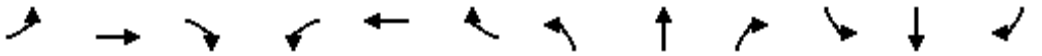
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	615	30	30	910	95	25	10	5	115	10	35
Future Volume (vph)	40	615	30	30	910	95	25	10	5	115	10	35
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6		5	2		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	4.0	12.0	12.0	4.0	12.0	12.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	20.0	20.0	12.0	20.0	20.0	11.0	11.0	12.0	11.0	11.0	12.0
Total Split (s)	14.0	111.0	111.0	14.0	111.0	111.0	25.0	25.0	14.0	25.0	25.0	14.0
Total Split (%)	9.3%	74.0%	74.0%	9.3%	74.0%	74.0%	16.7%	16.7%	9.3%	16.7%	16.7%	9.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0	5.0	3.0	3.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	2.0	3.0	3.0	2.0
Lost Time Adjust (s)	-2.1	-2.1	-2.1	-2.1	-2.1	-2.1	-1.0	-1.0	-2.1	-1.0	-1.0	-2.1
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag			Lead			Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	119.2	114.0	114.0	117.8	111.2	111.2	18.1	18.1	26.2	18.1	18.1	29.0
Actuated g/C Ratio	0.79	0.76	0.76	0.79	0.74	0.74	0.12	0.12	0.17	0.12	0.12	0.19
v/c Ratio	0.13	0.50	0.03	0.06	0.72	0.09	0.18	0.05	0.02	0.78	0.05	0.12
Control Delay	2.5	6.6	0.1	3.3	16.0	2.5	61.1	57.7	0.2	94.6	57.6	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.5	6.6	0.1	3.3	16.0	2.5	61.1	57.7	0.2	94.6	57.6	14.1
LOS	A	A	A	A	B	A	E	E	A	F	E	B
Approach Delay		6.1			14.4			53.2			74.7	
Approach LOS		A			B			D			E	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 108 (72%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 17.3	Intersection LOS: B
Intersection Capacity Utilization 72.1%	ICU Level of Service C
Analysis Period (min) 15	
Description: Signal Permit No. TS-185-10	
Date Issued: 2-26-2003	
Date Revised: 3-10-2008	

Splits and Phases: 255: Heritage Creek Dr & SR 228

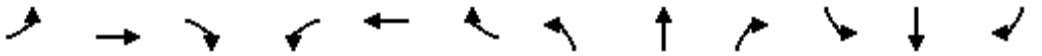
Appendix D3:

2025 Opening Year (No-Build Scenario)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	835	65	250	1155	45	125	140	85	75	365	75
Future Volume (vph)	100	835	65	250	1155	45	125	140	85	75	365	75
Ideal Flow (vphpl)	2100	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0		6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1818	3505	1627	1692	3300		1591	1707	1349	1671	1775	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.14	1.00	1.00	0.60	1.00	1.00
Satd. Flow (perm)	1818	3505	1627	1692	3300		238	1707	1349	1056	1775	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	103	861	67	258	1191	46	129	144	88	77	376	77
RTOR Reduction (vph)	0	0	34	0	2	0	0	0	58	0	0	44
Lane Group Flow (vph)	103	861	33	258	1235	0	129	144	30	77	376	33
Heavy Vehicles (%)	7%	11%	7%	4%	6%	8%	8%	6%	14%	6%	5%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6				4		4	8		8
Actuated Green, G (s)	24.0	62.6	70.6	17.0	55.6		39.9	31.9	48.9	38.9	31.4	55.4
Effective Green, g (s)	27.0	65.6	70.6	20.0	58.6		41.9	32.9	48.9	42.9	32.4	61.4
Actuated g/C Ratio	0.19	0.45	0.49	0.14	0.40		0.29	0.23	0.34	0.30	0.22	0.42
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0		7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0		2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	338	1585	792	233	1333		152	387	454	352	396	651
v/s Ratio Prot	0.06	c0.25	0.00	c0.15	c0.37		c0.05	0.08	0.01	0.01	c0.21	0.01
v/s Ratio Perm			0.02				0.19		0.01	0.05		0.01
v/c Ratio	0.30	0.54	0.04	1.11	0.93		0.85	0.37	0.07	0.22	0.95	0.05
Uniform Delay, d1	50.9	28.8	19.5	62.5	41.2		42.5	47.3	32.6	37.7	55.5	24.6
Progression Factor	0.82	0.77	0.37	1.06	0.93		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	1.3	0.0	68.3	5.2		32.1	0.2	0.0	0.1	31.8	0.0
Delay (s)	42.4	23.6	7.2	134.7	43.5		74.6	47.5	32.6	37.8	87.3	24.7
Level of Service	D	C	A	F	D		E	D	C	D	F	C
Approach Delay (s)		24.4			59.2			53.6			71.0	
Approach LOS		C			E			D			E	

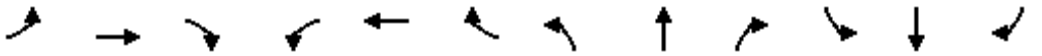
Intersection Summary			
HCM 2000 Control Delay	50.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	815	165	105	1295	0	95	10	40	5	15	30
Future Volume (vph)	15	815	165	105	1295	0	95	10	40	5	15	30
Ideal Flow (vphpl)	1900	1900	1900	1714	1714	1714	1950	1950	1950	1950	1950	1950
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1642	1729	1493	1588	1609		1790	1539		1908	2008	1707
Flt Permitted	0.10	1.00	1.00	0.25	1.00		0.75	1.00		0.72	1.00	1.00
Satd. Flow (perm)	179	1729	1493	412	1609		1409	1539		1454	2008	1707
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	15	840	170	108	1335	0	98	10	41	5	15	31
RTOR Reduction (vph)	0	0	32	0	0	0	0	36	0	0	0	27
Lane Group Flow (vph)	15	840	138	108	1335	0	98	15	0	5	15	4
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	11%	11%	7%	2%	6%	0%	4%	13%	9%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	104.4	104.4	104.4	116.4	116.4		14.6	14.6		14.6	14.6	14.6
Effective Green, g (s)	107.7	107.7	107.7	119.3	119.7		16.8	16.8		16.8	16.8	16.8
Actuated g/C Ratio	0.74	0.74	0.74	0.82	0.83		0.12	0.12		0.12	0.12	0.12
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	132	1284	1108	403	1328		163	178		168	232	197
v/s Ratio Prot		0.49		0.01	c0.83			0.01			0.01	
v/s Ratio Perm	0.08		0.09	0.21			c0.07			0.00		0.00
v/c Ratio	0.11	0.65	0.12	0.27	1.01		0.60	0.08		0.03	0.06	0.02
Uniform Delay, d1	5.2	9.3	5.3	7.1	12.6		60.9	57.2		56.9	57.1	56.8
Progression Factor	2.16	3.24	4.69	1.29	0.80		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	2.3	0.2	0.2	17.5		6.1	0.2		0.1	0.1	0.0
Delay (s)	12.8	32.6	25.0	9.2	27.5		67.0	57.4		56.9	57.2	56.8
Level of Service	B	C	C	A	C		E	E		E	E	E
Approach Delay (s)		31.0			26.2			63.7			57.0	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

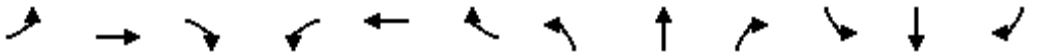
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	775	25	30	1295	25	50	20	35	10	5	55
Future Volume (vph)	25	775	25	30	1295	25	50	20	35	10	5	55
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1557	1624	1460	1663	1717	1533	1616	1520		1747	1839	1464
Flt Permitted	0.07	1.00	1.00	0.30	1.00	1.00	0.75	1.00		0.70	1.00	1.00
Satd. Flow (perm)	112	1624	1460	531	1717	1533	1283	1520		1282	1839	1464
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	26	799	26	31	1335	26	52	21	36	10	5	57
RTOR Reduction (vph)	0	0	5	0	0	5	0	33	0	0	0	52
Lane Group Flow (vph)	26	799	21	31	1335	21	52	24	0	10	5	5
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	10%	11%	5%	3%	5%	0%	6%	10%	3%	0%	0%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	117.4	113.8	113.8	117.4	113.8	113.8	9.6	9.6		9.6	9.6	9.6
Effective Green, g (s)	121.4	115.8	115.8	121.4	115.8	115.8	11.6	11.6		11.6	11.6	11.6
Actuated g/C Ratio	0.84	0.80	0.80	0.84	0.80	0.80	0.08	0.08		0.08	0.08	0.08
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	149	1296	1165	488	1371	1224	102	121		102	147	117
v/s Ratio Prot	c0.01	0.49		0.00	c0.78			0.02			0.00	
v/s Ratio Perm	0.14		0.01	0.05		0.01	c0.04			0.01		0.00
v/c Ratio	0.17	0.62	0.02	0.06	0.97	0.02	0.51	0.20		0.10	0.03	0.04
Uniform Delay, d1	25.6	5.8	3.0	3.3	13.2	3.0	64.0	62.3		61.8	61.5	61.6
Progression Factor	0.25	0.11	1.00	1.10	0.47	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	1.7	0.0	0.0	10.7	0.0	4.0	0.8		0.4	0.1	0.1
Delay (s)	6.8	2.4	3.0	3.7	17.0	3.0	67.9	63.2		62.3	61.6	61.7
Level of Service	A	A	A	A	B	A	E	E		E	E	E
Approach Delay (s)		2.5			16.4			65.4			61.8	
Approach LOS		A			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	710	10	0	1195	100	25	5	5	35	5	130
Future Volume (vph)	100	710	10	0	1195	100	25	5	5	35	5	130
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0		3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1585	1594	1517		1734	1460	1631	1785	1011	1508	1393	
Flt Permitted	0.06	1.00	1.00		1.00	1.00	0.33	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	105	1594	1517		1734	1460	572	1785	1011	1198	1393	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	103	732	10	0	1232	103	26	5	5	36	5	134
RTOR Reduction (vph)	0	0	2	0	0	27	0	0	5	0	123	0
Lane Group Flow (vph)	103	732	8	0	1232	76	26	5	0	36	16	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	7%	12%	0%	0%	5%	6%	4%	0%	50%	13%	0%	7%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	122.7	122.7	122.7		104.4	104.4	10.3	10.3	10.3	10.3	10.3	
Effective Green, g (s)	125.6	125.6	122.7		107.3	107.3	12.0	12.0	10.3	12.0	12.0	
Actuated g/C Ratio	0.87	0.87	0.85		0.74	0.74	0.08	0.08	0.07	0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	5.0	6.0	6.0		6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	246	1380	1283		1283	1080	47	147	71	99	115	
v/s Ratio Prot	0.04	c0.46			c0.71			0.00			0.01	
v/s Ratio Perm	0.32		0.01			0.05	c0.05		0.00	0.03		
v/c Ratio	0.42	0.53	0.01		0.96	0.07	0.55	0.03	0.01	0.36	0.14	
Uniform Delay, d1	32.4	2.4	1.7		16.9	5.2	63.9	61.2	62.6	62.9	61.7	
Progression Factor	2.38	0.40	1.00		0.72	0.94	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	1.2	0.0		12.1	0.1	13.3	0.1	0.0	2.3	0.6	
Delay (s)	78.9	2.2	1.7		24.3	4.9	77.3	61.3	62.6	65.2	62.3	
Level of Service	E	A	A		C	A	E	E	E	E	E	
Approach Delay (s)		11.5			22.8			73.0			62.9	
Approach LOS		B			C			E			E	

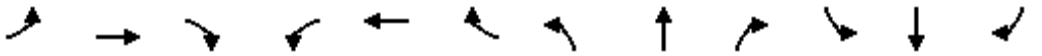
Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	680	70	55	885	410	225
Future Volume (vph)	680	70	55	885	410	225
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1608	1227	1504	1686	1828	1685
Flt Permitted	1.00	1.00	0.25	1.00	0.95	1.00
Satd. Flow (perm)	1608	1227	392	1686	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	701	72	57	912	423	232
RTOR Reduction (vph)	0	19	0	0	0	73
Lane Group Flow (vph)	701	53	57	912	423	159
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	11%	14%	15%	8%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	82.6	82.6	94.4	94.4	37.6	37.6
Effective Green, g (s)	85.6	82.6	96.4	97.4	39.6	37.6
Actuated g/C Ratio	0.59	0.57	0.66	0.67	0.27	0.26
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	949	698	312	1132	499	436
v/s Ratio Prot	0.44		0.01	c0.54	c0.23	
v/s Ratio Perm		0.04	0.11			0.09
v/c Ratio	0.74	0.08	0.18	0.81	0.85	0.37
Uniform Delay, d1	21.6	14.0	25.8	17.0	49.8	43.9
Progression Factor	0.58	0.91	0.45	0.99	1.00	1.00
Incremental Delay, d2	4.5	0.2	0.2	4.6	12.4	0.4
Delay (s)	17.0	13.0	11.8	21.4	62.3	44.3
Level of Service	B	B	B	C	E	D
Approach Delay (s)	16.6			20.9	55.9	
Approach LOS	B			C	E	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03

c Critical Lane Group

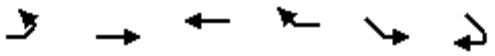


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	685	115	75	855	215	45	0	35	175	15	35
Future Volume (vph)	45	685	115	75	855	215	45	0	35	175	15	35
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0		4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00		0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)	1637	1598	1494	1626	1760	1538	1298		968	1582	1749	1443
Flt Permitted	0.18	1.00	1.00	0.27	1.00	1.00	0.75		1.00	0.76	1.00	1.00
Satd. Flow (perm)	307	1598	1494	460	1760	1538	1021		968	1261	1749	1443
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	48	729	122	80	910	229	48	0	37	186	16	37
RTOR Reduction (vph)	0	0	26	0	0	36	0	0	28	0	0	28
Lane Group Flow (vph)	48	729	96	80	910	193	48	0	9	186	16	9
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	10%	0%	8%	5%	0%	25%	0%	50%	5%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm		pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	97.5	93.5	93.5	99.5	94.5	94.5	26.5		31.5	26.5	26.5	30.5
Effective Green, g (s)	101.7	95.6	95.6	103.7	96.6	96.6	27.5		35.7	27.5	27.5	34.7
Actuated g/C Ratio	0.70	0.66	0.66	0.72	0.67	0.67	0.19		0.25	0.19	0.19	0.24
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0		7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	271	1053	985	386	1172	1024	193		238	239	331	345
v/s Ratio Prot	0.01	0.46		c0.01	c0.52				0.00		0.01	0.00
v/s Ratio Perm	0.12		0.06	0.14		0.13	0.05		0.01	c0.15		0.01
v/c Ratio	0.18	0.69	0.10	0.21	0.78	0.19	0.25		0.04	0.78	0.05	0.03
Uniform Delay, d1	13.8	15.5	9.0	9.7	16.7	9.2	50.0		41.6	55.9	48.0	42.2
Progression Factor	0.73	0.69	0.53	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	3.0	0.2	0.3	5.1	0.4	0.7		0.1	14.7	0.1	0.0
Delay (s)	10.4	13.6	4.9	9.9	21.8	9.6	50.6		41.7	70.5	48.1	42.2
Level of Service	B	B	A	A	C	A	D		D	E	D	D
Approach Delay (s)		12.3			18.7			46.7			64.7	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	85	810	890	40	15	50
Future Volume (Veh/h)	85	810	890	40	15	50
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	880	967	43	16	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1010				2052	988
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1010				2052	988
tC, single (s)	4.1				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.4
p0 queue free %	87				70	82
cM capacity (veh/h)	690				54	293

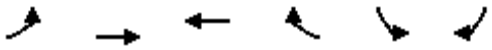
Direction, Lane #	EB 1	EB 2	WB 1	SE 1
Volume Total	92	880	1010	70
Volume Left	92	0	0	16
Volume Right	0	0	43	54
cSH	690	1700	1700	145
Volume to Capacity	0.13	0.52	0.59	0.48
Queue Length 95th (ft)	11	0	0	56
Control Delay (s)	11.0	0.0	0.0	51.1
Lane LOS	B			F
Approach Delay (s)	1.0		0.0	51.1
Approach LOS				F

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	890	5	0	1145	0	0
Future Volume (Veh/h)	890	5	0	1145	0	0
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	927	5	0	1193	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			932		2122	930
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			932		2122	930
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			714		56	327

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	932	1193	0
Volume Left	0	0	0
Volume Right	5	0	0
cSH	1700	1700	1700
Volume to Capacity	0.55	0.70	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

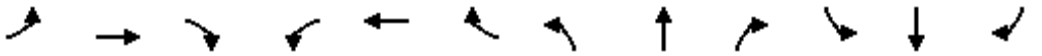
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	795	995	0	0	150
Future Volume (Veh/h)	95	795	995	0	0	150
Sign Control		Free	Free		Stop	
Grade		0%	-5%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	98	820	1026	0	0	155
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1026				2042	1026
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1026				2042	1026
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	86				100	46
cM capacity (veh/h)	685				54	286

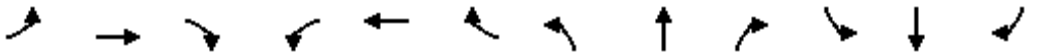
Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	98	820	1026	155
Volume Left	98	0	0	0
Volume Right	0	0	0	155
cSH	685	1700	1700	286
Volume to Capacity	0.14	0.48	0.60	0.54
Queue Length 95th (ft)	12	0	0	75
Control Delay (s)	11.1	0.0	0.0	31.5
Lane LOS	B			D
Approach Delay (s)	1.2		0.0	31.5
Approach LOS				D

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	315	1230	75	170	1150	80	180	360	210	75	165	75
Future Volume (vph)	315	1230	75	170	1150	80	180	360	210	75	165	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0		6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	1.00	*0.71	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1742	2579	1575	1725	3390		1508	1587	1362	1554	1668	1418
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.45	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	1742	2579	1575	1725	3390		721	1587	1362	230	1668	1418
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	325	1268	77	175	1186	82	186	371	216	77	170	77
RTOR Reduction (vph)	0	0	29	0	3	0	0	0	80	0	0	44
Lane Group Flow (vph)	325	1268	48	175	1265	0	186	371	136	77	170	33
Heavy Vehicles (%)	1%	2%	0%	2%	3%	0%	2%	2%	1%	2%	0%	0%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6				4		4	8		8
Actuated Green, G (s)	37.0	82.8	91.8	15.8	61.6		36.0	27.0	42.8	34.8	26.4	63.4
Effective Green, g (s)	40.0	85.8	91.8	18.8	64.6		38.0	28.0	42.8	38.8	27.4	69.4
Actuated g/C Ratio	0.25	0.54	0.57	0.12	0.40		0.24	0.18	0.27	0.24	0.17	0.43
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0		7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0		2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	435	1382	903	202	1368		220	277	364	141	285	615
v/s Ratio Prot	0.19	c0.49	0.00	0.10	c0.37		c0.05	c0.23	0.04	0.04	0.10	0.01
v/s Ratio Perm			0.03				0.15		0.06	0.10		0.01
v/c Ratio	0.75	0.92	0.05	0.87	0.92		0.85	1.34	0.37	0.55	0.60	0.05
Uniform Delay, d1	55.3	33.9	15.0	69.4	45.4		57.2	66.0	47.7	50.3	61.2	26.3
Progression Factor	1.00	1.00	1.00	0.95	1.06		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.9	11.1	0.0	15.9	6.3		23.8	175.1	0.2	2.3	2.2	0.0
Delay (s)	62.2	45.0	15.0	82.0	54.4		81.0	241.1	47.9	52.6	63.4	26.3
Level of Service	E	D	B	F	D		F	F	D	D	E	C
Approach Delay (s)		47.0			57.8			148.6			52.0	
Approach LOS		D			E			F			D	

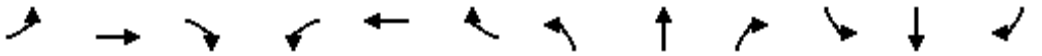
Intersection Summary			
HCM 2000 Control Delay	69.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1305	170	65	1115	0	210	45	90	0	25	35
Future Volume (vph)	40	1305	170	65	1115	0	210	45	90	0	25	35
Ideal Flow (vphpl)	1650	1650	1650	1714	1714	1714	1650	1650	1650	1650	1650	1650
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8			4.8	4.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.90			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1583	1634	1373	1588	1656		1560	1459			1700	1445
Flt Permitted	0.15	1.00	1.00	0.03	1.00		0.74	1.00			1.00	1.00
Satd. Flow (perm)	244	1634	1373	58	1656		1215	1459			1700	1445
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	1345	175	67	1149	0	216	46	93	0	26	36
RTOR Reduction (vph)	0	0	23	0	0	0	0	45	0	0	0	30
Lane Group Flow (vph)	41	1345	152	67	1149	0	216	94	0	0	26	6
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	0%	2%	1%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	108.0	108.0	108.0	120.0	120.0		26.0	26.0			26.0	26.0
Effective Green, g (s)	111.3	111.3	111.3	122.9	123.3		28.2	28.2			28.2	28.2
Actuated g/C Ratio	0.70	0.70	0.70	0.77	0.77		0.18	0.18			0.18	0.18
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0			7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	169	1136	955	120	1276		214	257			299	254
v/s Ratio Prot		c0.82		0.03	c0.69			0.06			0.02	
v/s Ratio Perm	0.17		0.11	0.40			c0.18					0.00
v/c Ratio	0.24	1.18	0.16	0.56	0.90		1.01	0.36			0.09	0.02
Uniform Delay, d1	8.9	24.4	8.3	48.3	13.8		65.9	58.0			55.1	54.5
Progression Factor	0.91	0.98	0.89	1.20	0.87		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.8	87.9	0.2	3.4	6.7		63.9	0.9			0.1	0.0
Delay (s)	9.9	111.8	7.6	61.3	18.7		129.8	58.9			55.3	54.6
Level of Service	A	F	A	E	B		F	E			E	D
Approach Delay (s)		97.5			21.1			102.1			54.9	
Approach LOS		F			C			F			D	

Intersection Summary			
HCM 2000 Control Delay	68.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	106.5%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

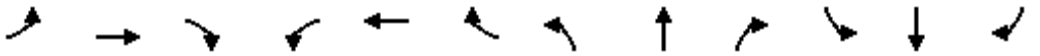
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	1310	25	60	1120	20	15	30	115	40	30	45
Future Volume (vph)	110	1310	25	60	1120	20	15	30	115	40	30	45
Ideal Flow (vphpl)	1803	1803	1803	1908	1908	1908	1650	1650	1650	1650	1650	1650
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	1768	1533	1777	1852	1622	1568	1425		1599	1683	1395
Flt Permitted	0.13	1.00	1.00	0.04	1.00	1.00	0.74	1.00		0.29	1.00	1.00
Satd. Flow (perm)	234	1768	1533	77	1852	1622	1216	1425		485	1683	1395
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	113	1351	26	62	1155	21	15	31	119	41	31	46
RTOR Reduction (vph)	0	0	6	0	0	5	0	89	0	0	0	41
Lane Group Flow (vph)	113	1351	20	62	1155	16	15	61	0	41	31	5
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	129.3	123.0	123.0	126.5	121.6	121.6	14.1	14.1		14.1	14.1	14.1
Effective Green, g (s)	133.3	125.0	125.0	130.5	123.6	123.6	16.1	16.1		16.1	16.1	16.1
Actuated g/C Ratio	0.83	0.78	0.78	0.82	0.77	0.77	0.10	0.10		0.10	0.10	0.10
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	271	1381	1197	136	1430	1252	122	143		48	169	140
v/s Ratio Prot	c0.02	c0.76		0.02	0.62			0.04			0.02	
v/s Ratio Perm	0.32		0.01	0.35		0.01	0.01			c0.08		0.00
v/c Ratio	0.42	0.98	0.02	0.46	0.81	0.01	0.12	0.43		0.85	0.18	0.03
Uniform Delay, d1	18.5	16.2	3.9	39.7	11.0	4.2	65.5	67.6		70.8	65.9	64.9
Progression Factor	1.48	0.62	1.00	1.58	0.34	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	3.8	0.0	1.5	3.1	0.0	0.5	2.0		76.9	0.5	0.1
Delay (s)	27.5	13.8	3.9	64.0	6.9	4.2	66.0	69.7		147.7	66.5	65.0
Level of Service	C	B	A	E	A	A	E	E		F	E	E
Approach Delay (s)		14.7			9.7			69.3			94.1	
Approach LOS		B			A			E			F	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.4%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	1225	110	15	1005	175	40	20	15	205	25	155
Future Volume (vph)	130	1225	110	15	1005	175	40	20	15	205	25	155
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1671	1758	1510	1671	1794	1540	1687	1776	1510	1696	1508	
Flt Permitted	0.11	1.00	1.00	0.04	1.00	1.00	0.42	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	198	1758	1510	64	1794	1540	741	1776	1510	1327	1508	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	1263	113	15	1036	180	41	21	15	211	26	160
RTOR Reduction (vph)	0	0	19	0	0	43	0	0	12	0	130	0
Lane Group Flow (vph)	134	1263	94	15	1036	137	41	21	3	211	57	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	117.7	110.8	110.8	108.7	106.3	106.3	28.8	28.8	28.8	28.8	28.8	
Effective Green, g (s)	122.1	113.7	110.8	114.5	109.2	109.2	30.5	30.5	28.8	30.5	30.5	
Actuated g/C Ratio	0.76	0.71	0.69	0.72	0.68	0.68	0.19	0.19	0.18	0.19	0.19	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	241	1249	1045	99	1224	1051	141	338	271	252	287	
v/s Ratio Prot	c0.03	c0.72		0.01	0.58			0.01			0.04	
v/s Ratio Perm	0.39		0.06	0.10		0.09	0.06		0.00	c0.16		
v/c Ratio	0.56	1.01	0.09	0.15	0.85	0.13	0.29	0.06	0.01	0.84	0.20	
Uniform Delay, d1	25.0	23.1	8.1	39.1	19.1	8.9	55.5	53.0	53.9	62.4	54.5	
Progression Factor	1.53	0.60	0.68	0.64	0.96	0.78	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	18.2	0.1	0.5	5.1	0.2	1.1	0.1	0.0	20.8	0.3	
Delay (s)	39.2	32.1	5.6	25.4	23.5	7.1	56.6	53.1	53.9	83.2	54.8	
Level of Service	D	C	A	C	C	A	E	D	D	F	D	
Approach Delay (s)		30.7			21.2			55.1			69.9	
Approach LOS		C			C			E			E	

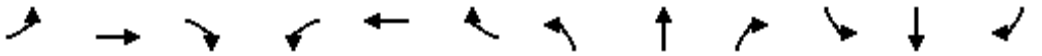
Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1020	425	215	965	230	175
Future Volume (vph)	1020	425	215	965	230	175
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1750	1398	1730	1768	1810	1685
Flt Permitted	1.00	1.00	0.13	1.00	0.95	1.00
Satd. Flow (perm)	1750	1398	230	1768	1810	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1052	438	222	995	237	180
RTOR Reduction (vph)	0	74	0	0	0	87
Lane Group Flow (vph)	1052	364	222	995	237	93
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	2%	0%	0%	3%	2%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	108.3	108.3	123.3	123.3	23.7	23.7
Effective Green, g (s)	111.3	108.3	125.3	126.3	25.7	23.7
Actuated g/C Ratio	0.70	0.68	0.78	0.79	0.16	0.15
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	1217	946	273	1395	290	249
v/s Ratio Prot	c0.60		0.05	c0.56	c0.13	
v/s Ratio Perm		0.26	0.58			0.06
v/c Ratio	0.86	0.39	0.81	0.71	0.82	0.37
Uniform Delay, d1	18.6	11.3	47.1	8.1	64.9	61.5
Progression Factor	0.81	1.08	1.30	1.59	1.00	1.00
Incremental Delay, d2	3.2	0.4	12.1	2.2	15.8	0.7
Delay (s)	18.1	12.6	73.3	15.1	80.7	62.1
Level of Service	B	B	E	B	F	E
Approach Delay (s)	16.5			25.7	72.7	
Approach LOS	B			C	E	

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03

c Critical Lane Group

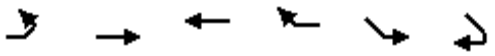


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	845	215	155	865	210	235	25	180	295	15	45
Future Volume (vph)	55	845	215	155	865	210	235	25	180	295	15	45
Ideal Flow (vphpl)	1662	1662	1662	1914	1914	1914	1662	1662	1662	1662	1662	1662
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1509	1589	1377	1864	1923	1633	1496	1574	1338	1516	1612	1343
Flt Permitted	0.12	1.00	1.00	0.12	1.00	1.00	0.75	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	186	1589	1377	238	1923	1633	1176	1574	1338	1181	1612	1343
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	59	899	229	165	920	223	250	27	191	314	16	48
RTOR Reduction (vph)	0	0	40	0	0	38	0	0	101	0	0	33
Lane Group Flow (vph)	59	899	189	165	920	185	250	27	90	314	16	15
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	97.0	93.0	93.0	99.0	94.0	94.0	42.0	42.0	47.0	42.0	42.0	46.0
Effective Green, g (s)	101.2	95.1	95.1	103.2	96.1	96.1	43.0	43.0	51.2	43.0	43.0	50.2
Actuated g/C Ratio	0.63	0.59	0.59	0.65	0.60	0.60	0.27	0.27	0.32	0.27	0.27	0.31
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	168	944	818	225	1155	980	316	423	428	317	433	421
v/s Ratio Prot	0.01	c0.57		c0.03	0.48			0.02	0.01		0.01	0.00
v/s Ratio Perm	0.21		0.14	0.44		0.11	0.21		0.06	c0.27		0.01
v/c Ratio	0.35	0.95	0.23	0.73	0.80	0.19	0.79	0.06	0.21	0.99	0.04	0.04
Uniform Delay, d1	24.3	30.3	15.3	26.6	24.5	14.4	54.3	43.5	39.7	58.3	43.2	38.1
Progression Factor	0.55	0.59	0.24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	14.4	0.4	11.7	5.7	0.4	12.7	0.1	0.2	47.8	0.0	0.0
Delay (s)	14.2	32.3	4.0	38.2	30.2	14.8	67.0	43.6	39.9	106.1	43.2	38.1
Level of Service	B	C	A	D	C	B	E	D	D	F	D	D
Approach Delay (s)		25.9			28.6			54.6			94.8	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	100	1095	1115	25	15	65
Future Volume (Veh/h)	100	1095	1115	25	15	65
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	1190	1212	27	16	71
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1239				2634	1226
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1239				2634	1226
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	81				18	67
cM capacity (veh/h)	569				20	216

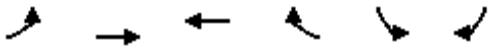
Direction, Lane #	EB 1	EB 2	WB 1	SE 1
Volume Total	109	1190	1239	87
Volume Left	109	0	0	16
Volume Right	0	0	27	71
cSH	569	1700	1700	76
Volume to Capacity	0.19	0.70	0.73	1.15
Queue Length 95th (ft)	18	0	0	161
Control Delay (s)	12.8	0.0	0.0	244.7
Lane LOS	B			F
Approach Delay (s)	1.1		0.0	244.7
Approach LOS				F

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1315	5	0	1230	0	25
Future Volume (Veh/h)	1315	5	0	1230	0	25
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1370	5	0	1281	0	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1375		2654	1372
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1375		2654	1372
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	86
cM capacity (veh/h)			505		26	180

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1375	1281	26
Volume Left	0	0	0
Volume Right	5	0	26
cSH	1700	1700	180
Volume to Capacity	0.81	0.75	0.14
Queue Length 95th (ft)	0	0	12
Control Delay (s)	0.0	0.0	28.3
Lane LOS			D
Approach Delay (s)	0.0	0.0	28.3
Approach LOS			D

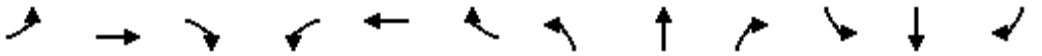
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	305	1035	1070	5	0	160
Future Volume (Veh/h)	305	1035	1070	5	0	160
Sign Control		Free	Free		Stop	
Grade		0%	-5%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	314	1067	1103	5	0	165
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1108				2800	1106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1108				2800	1106
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	51				100	36
cM capacity (veh/h)	638				10	259

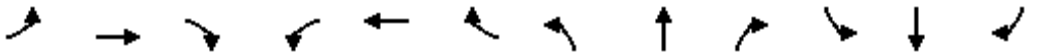
Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	314	1067	1108	165
Volume Left	314	0	0	0
Volume Right	0	0	5	165
cSH	638	1700	1700	259
Volume to Capacity	0.49	0.63	0.65	0.64
Queue Length 95th (ft)	68	0	0	99
Control Delay (s)	16.0	0.0	0.0	40.6
Lane LOS	C			E
Approach Delay (s)	3.6		0.0	40.6
Approach LOS				E

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	990	95	150	1325	95	140	140	130	130	150	130
Future Volume (vph)	120	990	95	150	1325	95	140	140	130	130	150	130
Ideal Flow (vphpl)	1900	1900	1900	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0		6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	1.00	*0.64	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1760	2325	1575	1670	3237		1631	1700	1431	1664	1752	1474
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.41	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1760	2325	1575	1670	3237		709	1700	1431	815	1752	1474
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	124	1021	98	155	1366	98	144	144	134	134	155	134
RTOR Reduction (vph)	0	0	35	0	3	0	0	0	97	0	0	82
Lane Group Flow (vph)	124	1021	63	155	1461	0	144	144	37	134	155	52
Heavy Vehicles (%)	0%	2%	0%	0%	2%	4%	0%	1%	2%	1%	1%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6				4		4	8		8
Actuated Green, G (s)	22.0	83.2	92.2	15.4	76.6		25.4	16.4	31.8	25.4	16.4	38.4
Effective Green, g (s)	25.0	86.2	92.2	18.4	79.6		27.4	17.4	31.8	29.4	17.4	44.4
Actuated g/C Ratio	0.17	0.57	0.61	0.12	0.53		0.18	0.12	0.21	0.20	0.12	0.30
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0		7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	5.5	8.0	2.0	5.5	8.0		2.0	2.0	5.5	2.0	2.0	5.5
Lane Grp Cap (vph)	293	1336	968	204	1717		190	197	303	222	203	436
v/s Ratio Prot	0.07	c0.44	0.00	0.09	c0.45		c0.05	0.08	0.01	0.04	c0.09	0.02
v/s Ratio Perm			0.04				0.09		0.01	0.07		0.02
v/c Ratio	0.42	0.76	0.06	0.76	0.85		0.76	0.73	0.12	0.60	0.76	0.12
Uniform Delay, d1	56.0	24.2	11.6	63.7	30.1		56.1	64.0	47.8	52.8	64.3	38.5
Progression Factor	0.81	0.65	0.29	1.02	0.92		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	4.1	0.0	7.2	2.1		14.2	11.3	0.4	3.2	14.2	0.3
Delay (s)	47.9	19.8	3.4	72.0	29.7		70.3	75.4	48.3	56.0	78.5	38.8
Level of Service	D	B	A	E	C		E	E	D	E	E	D
Approach Delay (s)		21.3			33.7			65.0			58.8	
Approach LOS		C			C			E			E	

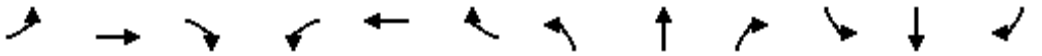
Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	1060	145	55	1340	0	165	10	60	0	5	40
Future Volume (vph)	45	1060	145	55	1340	0	165	10	60	0	5	40
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8			4.8	4.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1696	1803	1486	1704	1759		1704	1546			1857	1533
Flt Permitted	0.05	1.00	1.00	0.12	1.00		0.75	1.00			1.00	1.00
Satd. Flow (perm)	92	1803	1486	219	1759		1354	1546			1857	1533
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	1093	149	57	1381	0	170	10	62	0	5	41
RTOR Reduction (vph)	0	0	22	0	0	0	0	53	0	0	0	35
Lane Group Flow (vph)	46	1093	127	57	1381	0	170	19	0	0	5	6
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	2%	1%	2%	0%	2%	0%	1%	0%	0%	0%	0%	3%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	106.2	106.2	106.2	117.2	117.2		18.8	18.8			18.8	18.8
Effective Green, g (s)	109.5	109.5	109.5	120.1	120.5		21.0	21.0			21.0	21.0
Actuated g/C Ratio	0.73	0.73	0.73	0.80	0.80		0.14	0.14			0.14	0.14
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0			7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	67	1316	1084	243	1413		189	216			259	214
v/s Ratio Prot		0.61		0.01	c0.79			0.01			0.00	
v/s Ratio Perm	0.50		0.09	0.18			c0.13					0.00
v/c Ratio	0.69	0.83	0.12	0.23	0.98		0.90	0.09			0.02	0.03
Uniform Delay, d1	11.0	13.9	6.0	18.0	13.5		63.5	56.1			55.6	55.7
Progression Factor	0.58	0.65	0.06	1.33	0.85		1.00	1.00			1.00	1.00
Incremental Delay, d2	33.4	4.4	0.2	0.2	12.0		38.1	0.2			0.0	0.1
Delay (s)	39.8	13.4	0.5	24.2	23.5		101.6	56.3			55.7	55.7
Level of Service	D	B	A	C	C		F	E			E	E
Approach Delay (s)		12.9			23.5			88.1			55.7	
Approach LOS		B			C			F			E	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

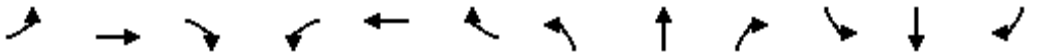
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	1070	15	25	1340	10	15	25	30	5	15	40
Future Volume (vph)	45	1070	15	25	1340	10	15	25	30	5	15	40
Ideal Flow (vphpl)	1803	1803	1803	1900	1900	1900	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	1785	1533	1805	1863	1615	1713	1631		1747	1839	1490
Flt Permitted	0.05	1.00	1.00	0.19	1.00	1.00	0.75	1.00		0.67	1.00	1.00
Satd. Flow (perm)	98	1785	1533	363	1863	1615	1348	1631		1235	1839	1490
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	1103	15	26	1381	10	15	26	31	5	15	41
RTOR Reduction (vph)	0	0	3	0	0	2	0	29	0	0	0	39
Lane Group Flow (vph)	46	1103	12	26	1381	8	15	28	0	5	15	2
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	126.6	121.3	121.3	123.2	119.6	119.6	7.1	7.1		7.1	7.1	7.1
Effective Green, g (s)	130.6	123.3	123.3	127.2	121.6	121.6	9.1	9.1		9.1	9.1	9.1
Actuated g/C Ratio	0.87	0.82	0.82	0.85	0.81	0.81	0.06	0.06		0.06	0.06	0.06
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	163	1467	1260	361	1510	1309	81	98		74	111	90
v/s Ratio Prot	c0.01	0.62		0.00	c0.74			c0.02			0.01	
v/s Ratio Perm	0.23		0.01	0.06		0.01	0.01			0.00		0.00
v/c Ratio	0.28	0.75	0.01	0.07	0.91	0.01	0.19	0.28		0.07	0.14	0.03
Uniform Delay, d1	32.9	6.2	2.4	6.4	10.4	2.7	66.9	67.3		66.4	66.7	66.3
Progression Factor	3.53	0.59	1.00	1.12	0.45	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	2.2	0.0	0.0	5.0	0.0	1.1	1.6		0.4	0.6	0.1
Delay (s)	116.9	5.8	2.4	7.3	9.7	2.7	68.0	68.9		66.8	67.3	66.4
Level of Service	F	A	A	A	A	A	E	E		E	E	E
Approach Delay (s)		10.2			9.6			68.7			66.7	
Approach LOS		B			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	915	85	10	1175	190	65	30	15	160	20	135
Future Volume (vph)	105	915	85	10	1175	190	65	30	15	160	20	135
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	1750	1517	1730	1785	1548	1696	1785	1517	1687	1511	
Flt Permitted	0.04	1.00	1.00	0.21	1.00	1.00	0.43	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	78	1750	1517	385	1785	1548	768	1785	1517	1309	1511	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	108	943	88	10	1211	196	67	31	15	165	21	139
RTOR Reduction (vph)	0	0	18	0	0	44	0	0	13	0	117	0
Lane Group Flow (vph)	108	943	70	10	1211	152	67	31	2	165	43	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	114.7	107.9	107.9	105.9	103.5	103.5	21.7	21.7	21.7	21.7	21.7	
Effective Green, g (s)	119.2	110.8	107.9	111.7	106.4	106.4	23.4	23.4	21.7	23.4	23.4	
Actuated g/C Ratio	0.79	0.74	0.72	0.74	0.71	0.71	0.16	0.16	0.14	0.16	0.16	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	164	1292	1091	334	1266	1098	119	278	219	204	235	
v/s Ratio Prot	c0.04	0.54		0.00	c0.68			0.02			0.03	
v/s Ratio Perm	0.48		0.05	0.02		0.10	0.09		0.00	c0.13		
v/c Ratio	0.66	0.73	0.06	0.03	0.96	0.14	0.56	0.11	0.01	0.81	0.18	
Uniform Delay, d1	44.9	11.1	6.2	9.2	19.7	7.0	58.6	54.4	54.9	61.1	55.0	
Progression Factor	1.41	0.51	0.68	0.61	0.85	0.80	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.4	2.5	0.1	0.0	10.5	0.1	6.0	0.2	0.0	20.5	0.4	
Delay (s)	70.0	8.2	4.3	5.6	27.3	5.8	64.5	54.5	55.0	81.6	55.4	
Level of Service	E	A	A	A	C	A	E	D	D	F	E	
Approach Delay (s)		13.8			24.1			60.5			68.7	
Approach LOS		B			C			E			E	

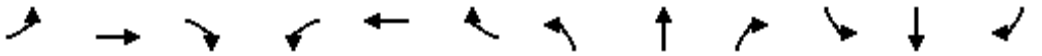
Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	840	250	140	1085	290	120
Future Volume (vph)	840	250	140	1085	290	120
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1767	1385	1713	1785	1828	1685
Flt Permitted	1.00	1.00	0.22	1.00	0.95	1.00
Satd. Flow (perm)	1767	1385	388	1785	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	866	258	144	1119	299	124
RTOR Reduction (vph)	0	59	0	0	0	50
Lane Group Flow (vph)	866	199	144	1119	299	74
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	1%	1%	1%	2%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	100.0	100.0	113.0	113.0	24.0	24.0
Effective Green, g (s)	103.0	100.0	115.0	116.0	26.0	24.0
Actuated g/C Ratio	0.69	0.67	0.77	0.77	0.17	0.16
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	1213	923	368	1380	316	269
v/s Ratio Prot	0.49		0.02	c0.63	c0.16	
v/s Ratio Perm		0.14	0.28			0.04
v/c Ratio	0.71	0.22	0.39	0.81	0.95	0.28
Uniform Delay, d1	14.4	9.7	24.2	10.3	61.3	55.4
Progression Factor	0.96	1.39	1.03	1.46	1.00	1.00
Incremental Delay, d2	2.5	0.4	0.4	3.3	36.3	0.4
Delay (s)	16.4	13.9	25.4	18.3	97.6	55.8
Level of Service	B	B	C	B	F	E
Approach Delay (s)	15.9			19.1	85.3	
Approach LOS	B			B	F	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03

c Critical Lane Group

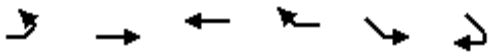


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	670	185	135	1025	105	155	10	115	125	10	40
Future Volume (vph)	45	670	185	135	1025	105	155	10	115	125	10	40
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1637	1723	1465	1688	1812	1538	1591	1708	1452	1645	1749	1443
Flt Permitted	0.13	1.00	1.00	0.30	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	216	1723	1465	535	1812	1538	1257	1708	1452	1299	1749	1443
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	48	713	197	144	1090	112	165	11	122	133	11	43
RTOR Reduction (vph)	0	0	46	0	0	20	0	0	98	0	0	35
Lane Group Flow (vph)	48	713	151	144	1090	92	165	11	24	133	11	8
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	2%	4%	2%	0%	2%	0%	0%	1%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	109.3	104.1	104.1	112.7	105.8	105.8	19.0	19.0	25.9	19.0	19.0	24.2
Effective Green, g (s)	113.5	106.2	106.2	116.9	107.9	107.9	20.0	20.0	30.1	20.0	20.0	28.4
Actuated g/C Ratio	0.76	0.71	0.71	0.78	0.72	0.72	0.13	0.13	0.20	0.13	0.13	0.19
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	232	1219	1037	486	1303	1106	167	227	291	173	233	273
v/s Ratio Prot	0.01	0.41		c0.02	c0.60			0.01	0.01		0.01	0.00
v/s Ratio Perm	0.15		0.10	0.21		0.06	c0.13		0.01	0.10		0.00
v/c Ratio	0.21	0.58	0.15	0.30	0.84	0.08	0.99	0.05	0.08	0.77	0.05	0.03
Uniform Delay, d1	17.1	10.9	7.1	6.7	14.8	6.3	64.9	56.7	48.7	62.8	56.7	49.6
Progression Factor	0.56	0.54	0.26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.6	0.2	0.3	6.5	0.1	65.5	0.1	0.1	18.4	0.1	0.0
Delay (s)	10.0	7.5	2.0	7.1	21.3	6.4	130.3	56.8	48.9	81.1	56.8	49.6
Level of Service	A	A	A	A	C	A	F	E	D	F	E	D
Approach Delay (s)		6.5			18.6			94.3			72.4	
Approach LOS		A			B			F			E	

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	60	900	1175	40	10	50
Future Volume (Veh/h)	60	900	1175	40	10	50
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	978	1277	43	11	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1320				2406	1298
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1320				2406	1298
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				66	73
cM capacity (veh/h)	530				32	197

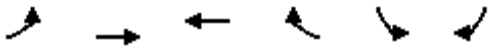
Direction, Lane #	EB 1	EB 2	WB 1	SE 1
Volume Total	65	978	1320	65
Volume Left	65	0	0	11
Volume Right	0	0	43	54
cSH	530	1700	1700	106
Volume to Capacity	0.12	0.58	0.78	0.61
Queue Length 95th (ft)	10	0	0	75
Control Delay (s)	12.7	0.0	0.0	82.1
Lane LOS	B			F
Approach Delay (s)	0.8		0.0	82.1
Approach LOS				F

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	905	5	5	1265	0	10
Future Volume (Veh/h)	905	5	5	1265	0	10
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	943	5	5	1318	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			948		2274	946
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			948		2274	946
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		100	97
cM capacity (veh/h)			732		45	307

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	948	1323	10
Volume Left	0	5	0
Volume Right	5	0	10
cSH	1700	732	307
Volume to Capacity	0.56	0.01	0.03
Queue Length 95th (ft)	0	1	3
Control Delay (s)	0.0	0.3	17.1
Lane LOS		A	C
Approach Delay (s)	0.0	0.3	17.1
Approach LOS			C

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		



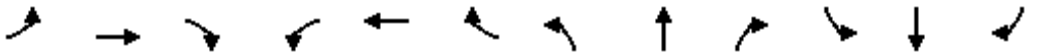
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	130	785	1130	0	0	140
Future Volume (Veh/h)	130	785	1130	0	0	140
Sign Control		Free	Free		Stop	
Grade		0%	-5%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	134	809	1165	0	0	144
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1165				2242	1165
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1165				2242	1165
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	78				100	40
cM capacity (veh/h)	603				37	239

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	134	809	1165	144
Volume Left	134	0	0	0
Volume Right	0	0	0	144
cSH	603	1700	1700	239
Volume to Capacity	0.22	0.48	0.69	0.60
Queue Length 95th (ft)	21	0	0	88
Control Delay (s)	12.7	0.0	0.0	40.6
Lane LOS	B			E
Approach Delay (s)	1.8		0.0	40.6
Approach LOS				E

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

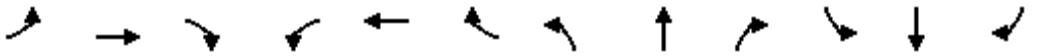
Appendix D4:

2045 Design Year (No-Build Scenario)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	960	75	285	1330	50	140	160	95	85	425	85
Future Volume (vph)	115	960	75	285	1330	50	140	160	95	85	425	85
Ideal Flow (vphpl)	2100	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0		6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1818	3505	1627	1692	3300		1591	1707	1349	1671	1775	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.12	1.00	1.00	0.56	1.00	1.00
Satd. Flow (perm)	1818	3505	1627	1692	3300		201	1707	1349	984	1775	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	990	77	294	1371	52	144	165	98	88	438	88
RTOR Reduction (vph)	0	0	40	0	2	0	0	0	65	0	0	50
Lane Group Flow (vph)	119	990	37	294	1421	0	144	165	33	88	438	38
Heavy Vehicles (%)	7%	11%	7%	4%	6%	8%	8%	6%	14%	6%	5%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6				4		4	8		8
Actuated Green, G (s)	24.0	62.0	70.0	17.0	55.0		40.4	32.4	49.4	39.6	32.0	56.0
Effective Green, g (s)	27.0	65.0	70.0	20.0	58.0		42.4	33.4	49.4	43.6	33.0	62.0
Actuated g/C Ratio	0.19	0.45	0.48	0.14	0.40		0.29	0.23	0.34	0.30	0.23	0.43
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0		7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0		2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	338	1571	785	233	1320		145	393	459	341	403	657
v/s Ratio Prot	0.07	c0.28	0.00	c0.17	c0.43		c0.06	0.10	0.01	0.02	c0.25	0.01
v/s Ratio Perm			0.02				0.23		0.02	0.06		0.01
v/c Ratio	0.35	0.63	0.05	1.26	1.08		0.99	0.42	0.07	0.26	1.09	0.06
Uniform Delay, d1	51.4	30.8	19.9	62.5	43.5		45.9	47.5	32.3	37.5	56.0	24.4
Progression Factor	0.79	0.74	0.39	1.03	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	1.9	0.0	121.1	36.1		72.3	0.3	0.0	0.1	70.2	0.0
Delay (s)	41.2	24.7	7.7	185.3	75.8		118.1	47.8	32.3	37.7	126.2	24.4
Level of Service	D	C	A	F	E		F	D	C	D	F	C
Approach Delay (s)		25.2			94.5			69.0			98.9	
Approach LOS		C			F			E			F	

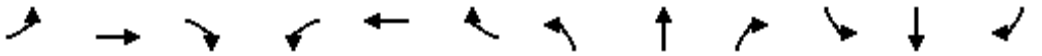
Intersection Summary			
HCM 2000 Control Delay	71.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	935	190	115	1495	0	110	10	40	5	15	30
Future Volume (vph)	15	935	190	115	1495	0	110	10	40	5	15	30
Ideal Flow (vphpl)	1900	1900	1900	1714	1714	1714	1950	1950	1950	1950	1950	1950
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1642	1729	1493	1588	1609		1790	1539		1908	2008	1707
Flt Permitted	0.04	1.00	1.00	0.19	1.00		0.75	1.00		0.72	1.00	1.00
Satd. Flow (perm)	65	1729	1493	312	1609		1409	1539		1454	2008	1707
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	15	964	196	119	1541	0	113	10	41	5	15	31
RTOR Reduction (vph)	0	0	33	0	0	0	0	36	0	0	0	27
Lane Group Flow (vph)	15	964	163	119	1541	0	113	15	0	5	15	4
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	11%	11%	7%	2%	6%	0%	4%	13%	9%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	103.6	103.6	103.6	115.6	115.6		15.4	15.4		15.4	15.4	15.4
Effective Green, g (s)	106.9	106.9	106.9	118.5	118.9		17.6	17.6		17.6	17.6	17.6
Actuated g/C Ratio	0.74	0.74	0.74	0.82	0.82		0.12	0.12		0.12	0.12	0.12
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	47	1274	1100	324	1319		171	186		176	243	207
v/s Ratio Prot		0.56		0.02	c0.96			0.01			0.01	
v/s Ratio Perm	0.23		0.11	0.28			c0.08			0.00		0.00
v/c Ratio	0.32	0.76	0.15	0.37	1.17		0.66	0.08		0.03	0.06	0.02
Uniform Delay, d1	6.5	11.3	5.6	11.4	13.0		60.8	56.5		56.2	56.4	56.1
Progression Factor	2.69	2.97	3.59	1.28	0.79		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.3	3.5	0.2	0.1	76.6		9.2	0.2		0.1	0.1	0.0
Delay (s)	31.9	37.1	20.4	14.7	86.9		70.1	56.7		56.2	56.5	56.1
Level of Service	C	D	C	B	F		E	E		E	E	E
Approach Delay (s)		34.3			81.7			65.9			56.2	
Approach LOS		C			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	62.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	118.8%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	890	25	35	1490	30	60	25	40	10	5	60
Future Volume (vph)	30	890	25	35	1490	30	60	25	40	10	5	60
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1557	1624	1460	1663	1717	1533	1616	1525		1747	1839	1465
Flt Permitted	0.04	1.00	1.00	0.24	1.00	1.00	0.75	1.00		0.66	1.00	1.00
Satd. Flow (perm)	58	1624	1460	416	1717	1533	1283	1525		1207	1839	1465
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	918	26	36	1536	31	62	26	41	10	5	62
RTOR Reduction (vph)	0	0	6	0	0	7	0	37	0	0	0	56
Lane Group Flow (vph)	31	918	20	36	1536	24	62	30	0	10	5	6
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	10%	11%	5%	3%	5%	0%	6%	10%	3%	0%	0%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	114.4	110.8	110.8	116.6	111.9	111.9	11.5	11.5		11.5	11.5	11.5
Effective Green, g (s)	118.4	112.8	112.8	120.6	113.9	113.9	13.5	13.5		13.5	13.5	13.5
Actuated g/C Ratio	0.82	0.78	0.78	0.83	0.79	0.79	0.09	0.09		0.09	0.09	0.09
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	105	1263	1135	403	1348	1204	119	141		112	171	136
v/s Ratio Prot	c0.01	0.57		0.00	c0.89			0.02			0.00	
v/s Ratio Perm	0.23		0.01	0.07		0.02	c0.05			0.01		0.00
v/c Ratio	0.30	0.73	0.02	0.09	1.14	0.02	0.52	0.21		0.09	0.03	0.04
Uniform Delay, d1	44.1	8.2	3.6	5.5	15.5	3.4	62.7	60.8		60.1	59.8	59.9
Progression Factor	2.03	0.23	1.00	1.21	0.57	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	2.5	0.0	0.0	63.7	0.0	4.1	0.8		0.3	0.1	0.1
Delay (s)	90.7	4.4	3.6	6.7	72.5	3.4	66.7	61.6		60.5	59.9	60.0
Level of Service	F	A	A	A	E	A	E	E		E	E	E
Approach Delay (s)		7.1			69.7			64.1			60.0	
Approach LOS		A			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	47.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.0%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group

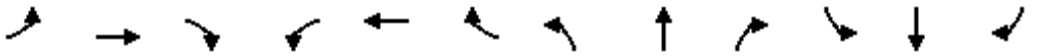
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	815	10	0	1380	110	30	5	5	35	5	145
Future Volume (vph)	115	815	10	0	1380	110	30	5	5	35	5	145
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0		3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1585	1594	1517		1734	1460	1631	1785	1011	1508	1394	
Flt Permitted	0.04	1.00	1.00		1.00	1.00	0.30	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	62	1594	1517		1734	1460	512	1785	1011	1198	1394	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	840	10	0	1423	113	31	5	5	36	5	149
RTOR Reduction (vph)	0	0	2	0	0	31	0	0	5	0	135	0
Lane Group Flow (vph)	119	840	8	0	1423	82	31	5	0	36	19	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	7%	12%	0%	0%	5%	6%	4%	0%	50%	13%	0%	7%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	121.3	121.3	121.3		102.1	102.1	11.7	11.7	11.7	11.7	11.7	
Effective Green, g (s)	124.2	124.2	121.3		105.0	105.0	13.4	13.4	11.7	13.4	13.4	
Actuated g/C Ratio	0.86	0.86	0.84		0.72	0.72	0.09	0.09	0.08	0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	5.0	6.0	6.0		6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	222	1365	1269		1255	1057	47	164	81	110	128	
v/s Ratio Prot	0.06	c0.53			c0.82			0.00			0.01	
v/s Ratio Perm	0.40		0.01			0.06	c0.06		0.00	0.03		
v/c Ratio	0.54	0.62	0.01		1.13	0.08	0.66	0.03	0.00	0.33	0.15	
Uniform Delay, d1	50.0	3.2	1.9		20.0	5.8	63.6	59.9	61.3	61.6	60.5	
Progression Factor	1.36	0.46	1.00		0.80	0.91	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.2	1.5	0.0		64.4	0.1	28.7	0.1	0.0	1.7	0.5	
Delay (s)	71.2	2.9	2.0		80.4	5.4	92.3	60.0	61.3	63.3	61.1	
Level of Service	E	A	A		F	A	F	E	E	E	E	
Approach Delay (s)		11.3			74.9			84.6			61.5	
Approach LOS		B			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	51.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	111.2%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	775	85	65	1020	475	255
Future Volume (vph)	775	85	65	1020	475	255
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1608	1227	1504	1686	1828	1685
Flt Permitted	1.00	1.00	0.17	1.00	0.95	1.00
Satd. Flow (perm)	1608	1227	266	1686	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	799	88	67	1052	490	263
RTOR Reduction (vph)	0	21	0	0	0	69
Lane Group Flow (vph)	799	67	67	1052	490	194
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	11%	14%	15%	8%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	79.0	79.0	90.8	90.8	41.2	41.2
Effective Green, g (s)	82.0	79.0	92.8	93.8	43.2	41.2
Actuated g/C Ratio	0.57	0.54	0.64	0.65	0.30	0.28
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	909	668	228	1090	544	478
v/s Ratio Prot	0.50		0.01	c0.62	c0.27	
v/s Ratio Perm		0.05	0.17			0.12
v/c Ratio	0.88	0.10	0.29	0.97	0.90	0.41
Uniform Delay, d1	27.2	15.9	37.8	24.1	48.8	42.0
Progression Factor	0.66	0.88	0.48	0.94	1.00	1.00
Incremental Delay, d2	9.9	0.2	0.4	14.3	18.0	0.4
Delay (s)	27.7	14.3	18.6	36.9	66.8	42.4
Level of Service	C	B	B	D	E	D
Approach Delay (s)	26.4			35.8	58.3	
Approach LOS	C			D	E	

Intersection Summary			
HCM 2000 Control Delay	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	91.0%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03
c Critical Lane Group

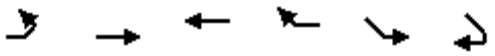


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	785	120	80	990	245	45	0	35	205	20	40
Future Volume (vph)	45	785	120	80	990	245	45	0	35	205	20	40
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0		4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00		0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)	1637	1598	1494	1626	1760	1538	1298		968	1582	1749	1443
Flt Permitted	0.08	1.00	1.00	0.20	1.00	1.00	0.74		1.00	0.76	1.00	1.00
Satd. Flow (perm)	141	1598	1494	337	1760	1538	1016		968	1261	1749	1443
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	48	835	128	85	1053	261	48	0	37	218	21	43
RTOR Reduction (vph)	0	0	27	0	0	37	0	0	27	0	0	32
Lane Group Flow (vph)	48	835	101	85	1053	224	48	0	10	218	21	11
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	10%	0%	8%	5%	0%	25%	0%	50%	5%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm		pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	94.7	90.7	90.7	96.7	91.7	91.7	29.3		34.3	29.3	29.3	33.3
Effective Green, g (s)	98.9	92.8	92.8	100.9	93.8	93.8	30.3		38.5	30.3	30.3	37.5
Actuated g/C Ratio	0.68	0.64	0.64	0.70	0.65	0.65	0.21		0.27	0.21	0.21	0.26
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0		7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	159	1022	956	297	1138	994	212		257	263	365	373
v/s Ratio Prot	0.01	0.52		c0.01	c0.60				0.00		0.01	0.00
v/s Ratio Perm	0.19		0.07	0.18		0.15	0.05		0.01	c0.17		0.01
v/c Ratio	0.30	0.82	0.11	0.29	0.93	0.22	0.23		0.04	0.83	0.06	0.03
Uniform Delay, d1	24.3	19.7	10.1	13.9	22.5	10.6	47.6		39.5	54.9	45.9	40.2
Progression Factor	0.74	0.68	0.51	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	5.0	0.2	0.5	13.9	0.5	0.5		0.1	18.9	0.1	0.0
Delay (s)	18.7	18.5	5.3	14.4	36.4	11.1	48.2		39.6	73.8	46.0	40.2
Level of Service	B	B	A	B	D	B	D		D	E	D	D
Approach Delay (s)		16.8			30.3			44.4			66.6	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	100	920	1025	50	10	65
Future Volume (Veh/h)	100	920	1025	50	10	65
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	1000	1114	54	11	71
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1168				2359	1141
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1168				2359	1141
tC, single (s)	4.1				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.4
p0 queue free %	82				66	70
cM capacity (veh/h)	602				32	239

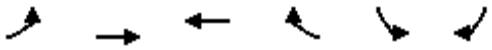
Direction, Lane #	EB 1	EB 2	WB 1	SE 1
Volume Total	109	1000	1168	82
Volume Left	109	0	0	11
Volume Right	0	0	54	71
cSH	602	1700	1700	129
Volume to Capacity	0.18	0.59	0.69	0.64
Queue Length 95th (ft)	16	0	0	84
Control Delay (s)	12.3	0.0	0.0	72.5
Lane LOS	B			F
Approach Delay (s)	1.2		0.0	72.5
Approach LOS				F

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1020	5	0	1315	0	0
Future Volume (Veh/h)	1020	5	0	1315	0	0
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1063	5	0	1370	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1068		2436	1066
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1068		2436	1066
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			634		35	273

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1068	1370	0
Volume Left	0	0	0
Volume Right	5	0	0
cSH	1700	1700	1700
Volume to Capacity	0.63	0.81	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		



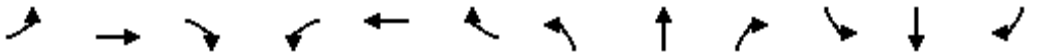
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	105	915	1155	0	0	165
Future Volume (Veh/h)	105	915	1155	0	0	165
Sign Control		Free	Free		Stop	
Grade		0%	-5%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	108	943	1191	0	0	170
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1191				2350	1191
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1191				2350	1191
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	82				100	26
cM capacity (veh/h)	593				33	229

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	108	943	1191	170
Volume Left	108	0	0	0
Volume Right	0	0	0	170
cSH	593	1700	1700	229
Volume to Capacity	0.18	0.55	0.70	0.74
Queue Length 95th (ft)	17	0	0	127
Control Delay (s)	12.4	0.0	0.0	55.3
Lane LOS	B			F
Approach Delay (s)	1.3		0.0	55.3
Approach LOS				F

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	360	1410	85	190	1320	95	200	420	245	85	195	85
Future Volume (vph)	360	1410	85	190	1320	95	200	420	245	85	195	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0		6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	1.00	*0.71	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1742	2579	1575	1725	3389		1508	1587	1362	1554	1668	1418
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.38	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	1742	2579	1575	1725	3389		607	1587	1362	229	1668	1418
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	371	1454	88	196	1361	98	206	433	253	88	201	88
RTOR Reduction (vph)	0	0	29	0	3	0	0	0	80	0	0	50
Lane Group Flow (vph)	371	1454	59	196	1456	0	206	433	173	88	201	38
Heavy Vehicles (%)	1%	2%	0%	2%	3%	0%	2%	2%	1%	2%	0%	0%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6				4		4	8		8
Actuated Green, G (s)	37.0	82.4	91.4	16.0	61.4		36.0	27.0	43.0	35.2	26.6	63.6
Effective Green, g (s)	40.0	85.4	91.4	19.0	64.4		38.0	28.0	43.0	39.2	27.6	69.6
Actuated g/C Ratio	0.25	0.53	0.57	0.12	0.40		0.24	0.18	0.27	0.25	0.17	0.43
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0		7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0		2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	435	1376	899	204	1364		200	277	366	143	287	616
v/s Ratio Prot	0.21	c0.56	0.00	0.11	c0.43		c0.06	c0.27	0.05	0.04	0.12	0.02
v/s Ratio Perm			0.03				0.18		0.08	0.11		0.01
v/c Ratio	0.85	1.06	0.07	0.96	1.07		1.03	1.56	0.47	0.62	0.70	0.06
Uniform Delay, d1	57.2	37.3	15.3	70.1	47.8		59.9	66.0	49.0	50.3	62.3	26.2
Progression Factor	1.00	1.00	1.00	0.96	1.08		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.9	40.8	0.0	11.1	32.1		71.7	270.3	0.4	5.4	6.2	0.0
Delay (s)	72.1	78.1	15.3	78.6	84.0		131.6	336.3	49.4	55.8	68.5	26.3
Level of Service	E	E	B	E	F		F	F	D	E	E	C
Approach Delay (s)		74.0			83.4			207.7			55.7	
Approach LOS		E			F			F			E	

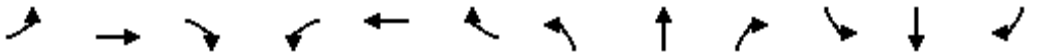
Intersection Summary			
HCM 2000 Control Delay	100.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	105.3%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1500	185	70	1280	0	245	50	95	0	30	40
Future Volume (vph)	50	1500	185	70	1280	0	245	50	95	0	30	40
Ideal Flow (vphpl)	1650	1650	1650	1714	1714	1714	1650	1650	1650	1650	1650	1650
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8			4.8	4.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.90			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1583	1634	1373	1588	1656		1560	1464			1700	1445
Flt Permitted	0.05	1.00	1.00	0.03	1.00		0.74	1.00			1.00	1.00
Satd. Flow (perm)	87	1634	1373	58	1656		1210	1464			1700	1445
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	1546	191	72	1320	0	253	52	98	0	31	41
RTOR Reduction (vph)	0	0	23	0	0	0	0	42	0	0	0	34
Lane Group Flow (vph)	52	1546	168	72	1320	0	253	108	0	0	31	7
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	0%	2%	1%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	108.0	108.0	108.0	120.0	120.0		26.0	26.0			26.0	26.0
Effective Green, g (s)	111.3	111.3	111.3	122.9	123.3		28.2	28.2			28.2	28.2
Actuated g/C Ratio	0.70	0.70	0.70	0.77	0.77		0.18	0.18			0.18	0.18
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0			7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	60	1136	955	120	1276		213	258			299	254
v/s Ratio Prot		c0.95		0.03	c0.80			0.07			0.02	
v/s Ratio Perm	0.60		0.12	0.43			c0.21					0.01
v/c Ratio	0.87	1.36	0.18	0.60	1.03		1.19	0.42			0.10	0.03
Uniform Delay, d1	18.7	24.4	8.4	50.1	18.4		65.9	58.6			55.3	54.6
Progression Factor	0.82	0.89	1.04	1.19	0.84		1.00	1.00			1.00	1.00
Incremental Delay, d2	37.5	164.3	0.1	3.2	25.7		121.6	1.1			0.2	0.0
Delay (s)	52.8	185.9	8.9	63.1	41.2		187.5	59.7			55.4	54.6
Level of Service	D	F	A	E	D		F	E			E	D
Approach Delay (s)		163.2			42.4			140.0			55.0	
Approach LOS		F			D			F			D	

Intersection Summary			
HCM 2000 Control Delay	112.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	120.5%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

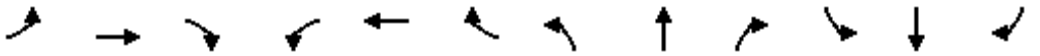
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	1500	30	65	1280	25	20	35	125	45	35	50
Future Volume (vph)	120	1500	30	65	1280	25	20	35	125	45	35	50
Ideal Flow (vphpl)	1803	1803	1803	1908	1908	1908	1650	1650	1650	1650	1650	1650
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	1768	1533	1777	1852	1622	1568	1429		1599	1683	1396
Flt Permitted	0.03	1.00	1.00	0.03	1.00	1.00	0.73	1.00		0.28	1.00	1.00
Satd. Flow (perm)	59	1768	1533	62	1852	1622	1211	1429		464	1683	1396
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	124	1546	31	67	1320	26	21	36	129	46	36	52
RTOR Reduction (vph)	0	0	7	0	0	6	0	83	0	0	0	46
Lane Group Flow (vph)	124	1546	24	67	1320	20	21	82	0	46	36	6
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	127.9	120.2	120.2	124.3	118.4	118.4	15.9	15.9		15.9	15.9	15.9
Effective Green, g (s)	131.9	122.2	122.2	128.3	120.4	120.4	17.9	17.9		17.9	17.9	17.9
Actuated g/C Ratio	0.82	0.76	0.76	0.80	0.75	0.75	0.11	0.11		0.11	0.11	0.11
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	148	1350	1170	134	1393	1220	135	159		51	188	156
v/s Ratio Prot	c0.05	c0.87		0.02	0.71			0.06			0.02	
v/s Ratio Perm	0.64		0.02	0.37		0.01	0.02			c0.10		0.00
v/c Ratio	0.84	1.15	0.02	0.50	0.95	0.02	0.16	0.52		0.90	0.19	0.04
Uniform Delay, d1	59.6	18.9	4.5	49.0	17.1	5.0	64.2	67.0		70.2	64.5	63.4
Progression Factor	1.02	0.62	4.27	1.21	0.38	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.9	66.3	0.0	1.2	7.2	0.0	0.5	2.8		89.8	0.5	0.1
Delay (s)	64.8	78.0	19.3	60.3	13.7	5.0	64.8	69.8		160.0	65.0	63.5
Level of Service	E	E	B	E	B	A	E	E		F	E	E
Approach Delay (s)		76.0			15.8			69.3			97.0	
Approach LOS		E			B			E			F	

Intersection Summary			
HCM 2000 Control Delay	51.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.9%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	1400	125	15	1150	195	45	25	15	220	30	175
Future Volume (vph)	145	1400	125	15	1150	195	45	25	15	220	30	175
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1671	1758	1510	1671	1794	1540	1687	1776	1510	1696	1511	
Flt Permitted	0.04	1.00	1.00	0.04	1.00	1.00	0.38	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	65	1758	1510	66	1794	1540	667	1776	1510	1321	1511	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	1443	129	15	1186	201	46	26	15	227	31	180
RTOR Reduction (vph)	0	0	19	0	0	44	0	0	12	0	125	0
Lane Group Flow (vph)	149	1443	110	15	1186	157	46	26	3	227	86	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	117.9	109.5	109.5	105.4	103.0	103.0	30.1	30.1	30.1	30.1	30.1	
Effective Green, g (s)	120.8	112.4	109.5	111.2	105.9	105.9	31.8	31.8	30.1	31.8	31.8	
Actuated g/C Ratio	0.75	0.70	0.68	0.70	0.66	0.66	0.20	0.20	0.19	0.20	0.20	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	167	1234	1033	99	1187	1019	132	352	284	262	300	
v/s Ratio Prot	c0.07	c0.82		0.01	0.66			0.01			0.06	
v/s Ratio Perm	0.61		0.07	0.10		0.10	0.07		0.00	c0.17		
v/c Ratio	0.89	1.17	0.11	0.15	1.00	0.15	0.35	0.07	0.01	0.87	0.29	
Uniform Delay, d1	59.5	23.8	8.6	40.2	27.0	10.2	55.2	52.1	52.8	62.0	54.5	
Progression Factor	1.33	0.54	0.69	0.71	0.91	0.74	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.9	77.1	0.0	0.4	18.9	0.2	1.6	0.1	0.0	24.6	0.5	
Delay (s)	85.0	90.1	6.0	28.9	43.5	7.7	56.8	52.2	52.8	86.6	55.0	
Level of Service	F	F	A	C	D	A	E	D	D	F	D	
Approach Delay (s)		83.3			38.2			54.7			71.4	
Approach LOS		F			D			D			E	

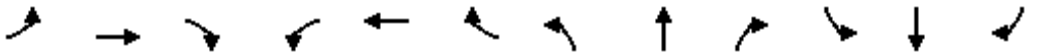
Intersection Summary			
HCM 2000 Control Delay	63.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	113.5%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1150	485	245	1095	265	195
Future Volume (vph)	1150	485	245	1095	265	195
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1750	1398	1730	1768	1810	1685
Flt Permitted	1.00	1.00	0.05	1.00	0.95	1.00
Satd. Flow (perm)	1750	1398	85	1768	1810	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1186	500	253	1129	273	201
RTOR Reduction (vph)	0	76	0	0	0	83
Lane Group Flow (vph)	1186	424	253	1129	273	118
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	2%	0%	0%	3%	2%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	106.9	106.9	121.9	121.9	25.1	25.1
Effective Green, g (s)	109.9	106.9	123.9	124.9	27.1	25.1
Actuated g/C Ratio	0.69	0.67	0.77	0.78	0.17	0.16
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	1202	934	168	1380	306	264
v/s Ratio Prot	0.68		c0.09	0.64	c0.15	
v/s Ratio Perm		0.30	c1.06			0.07
v/c Ratio	0.99	0.45	1.51	0.82	0.89	0.45
Uniform Delay, d1	24.3	12.6	63.3	10.7	65.0	61.1
Progression Factor	0.79	1.04	1.16	1.46	1.00	1.00
Incremental Delay, d2	5.3	0.1	244.3	3.2	26.0	0.9
Delay (s)	24.5	13.3	318.0	18.7	91.1	62.0
Level of Service	C	B	F	B	F	E
Approach Delay (s)	21.2			73.5	78.7	
Approach LOS	C			E	E	

Intersection Summary			
HCM 2000 Control Delay	49.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	104.4%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03

c Critical Lane Group

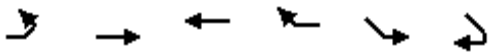


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	980	215	160	1005	240	240	30	180	340	20	55
Future Volume (vph)	65	980	215	160	1005	240	240	30	180	340	20	55
Ideal Flow (vphpl)	1662	1662	1662	1914	1914	1914	1662	1662	1662	1662	1662	1662
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1509	1589	1377	1864	1923	1633	1496	1574	1338	1516	1612	1343
Flt Permitted	0.04	1.00	1.00	0.04	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	67	1589	1377	83	1923	1633	1171	1574	1338	1175	1612	1343
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1043	229	170	1069	255	255	32	191	362	21	59
RTOR Reduction (vph)	0	0	34	0	0	38	0	0	73	0	0	40
Lane Group Flow (vph)	69	1043	195	170	1069	217	255	32	118	362	21	19
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	98.0	93.0	93.0	98.0	93.0	93.0	42.0	42.0	47.0	42.0	42.0	47.0
Effective Green, g (s)	102.2	95.1	95.1	102.2	95.1	95.1	43.0	43.0	51.2	43.0	43.0	51.2
Actuated g/C Ratio	0.64	0.59	0.59	0.64	0.59	0.59	0.27	0.27	0.32	0.27	0.27	0.32
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	106	944	818	132	1142	970	314	423	428	315	433	429
v/s Ratio Prot	0.03	0.66		c0.06	0.56			0.02	0.01		0.01	0.00
v/s Ratio Perm	0.39		0.14	c0.77		0.13	0.22		0.08	c0.31		0.01
v/c Ratio	0.65	1.10	0.24	1.29	0.94	0.22	0.81	0.08	0.28	1.15	0.05	0.04
Uniform Delay, d1	38.9	32.5	15.3	51.7	29.7	15.2	54.7	43.7	40.6	58.5	43.3	37.5
Progression Factor	1.49	0.57	0.28	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.7	55.4	0.3	174.8	15.1	0.5	14.7	0.1	0.4	97.5	0.0	0.0
Delay (s)	64.8	73.9	4.7	226.5	44.8	15.7	69.4	43.7	40.9	156.0	43.4	37.6
Level of Service	E	E	A	F	D	B	E	D	D	F	D	D
Approach Delay (s)		61.6			60.5			56.3			134.8	
Approach LOS		E			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	69.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	108.3%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	115	1235	1260	35	20	80
Future Volume (Veh/h)	115	1235	1260	35	20	80
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	1342	1370	38	22	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1408				2981	1389
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1408				2981	1389
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	75				0	50
cM capacity (veh/h)	491				11	173

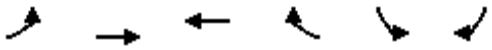
Direction, Lane #	EB 1	EB 2	WB 1	SE 1
Volume Total	125	1342	1408	109
Volume Left	125	0	0	22
Volume Right	0	0	38	87
cSH	491	1700	1700	42
Volume to Capacity	0.25	0.79	0.83	2.57
Queue Length 95th (ft)	25	0	0	295
Control Delay (s)	14.8	0.0	0.0	912.8
Lane LOS	B			F
Approach Delay (s)	1.3		0.0	912.8
Approach LOS				F

Intersection Summary			
Average Delay	34.0		
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1490	10	0	1405	0	30
Future Volume (Veh/h)	1490	10	0	1405	0	30
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1552	10	0	1464	0	31
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1562		3021	1557
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1562		3021	1557
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	78
cM capacity (veh/h)			429		15	140

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1562	1464	31
Volume Left	0	0	0
Volume Right	10	0	31
cSH	1700	1700	140
Volume to Capacity	0.92	0.86	0.22
Queue Length 95th (ft)	0	0	20
Control Delay (s)	0.0	0.0	37.8
Lane LOS			E
Approach Delay (s)	0.0	0.0	37.8
Approach LOS			E

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		



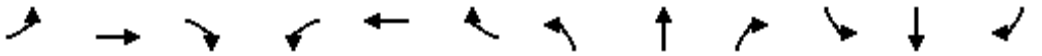
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	335	1185	1225	5	0	180
Future Volume (Veh/h)	335	1185	1225	5	0	180
Sign Control		Free	Free		Stop	
Grade		0%	-5%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	345	1222	1263	5	0	186
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1268				3178	1266
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1268				3178	1266
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	38				100	11
cM capacity (veh/h)	555				4	208

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	345	1222	1268	186
Volume Left	345	0	0	0
Volume Right	0	0	5	186
cSH	555	1700	1700	208
Volume to Capacity	0.62	0.72	0.75	0.89
Queue Length 95th (ft)	106	0	0	177
Control Delay (s)	21.6	0.0	0.0	84.7
Lane LOS	C			F
Approach Delay (s)	4.7		0.0	84.7
Approach LOS				F

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	1125	105	165	1515	110	155	160	150	155	175	145
Future Volume (vph)	135	1125	105	165	1515	110	155	160	150	155	175	145
Ideal Flow (vphpl)	1900	1900	1900	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0		6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	1.00	*0.64	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1760	2325	1575	1670	3237		1631	1700	1431	1664	1752	1474
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.35	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	1760	2325	1575	1670	3237		594	1700	1431	720	1752	1474
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	139	1160	108	170	1562	113	160	165	155	160	180	149
RTOR Reduction (vph)	0	0	35	0	3	0	0	0	91	0	0	81
Lane Group Flow (vph)	139	1160	73	170	1672	0	160	165	64	160	180	68
Heavy Vehicles (%)	0%	2%	0%	0%	2%	4%	0%	1%	2%	1%	1%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6				4		4	8		8
Actuated Green, G (s)	22.0	82.3	91.3	15.1	75.4		26.6	17.6	32.7	26.6	17.6	39.6
Effective Green, g (s)	25.0	85.3	91.3	18.1	78.4		28.6	18.6	32.7	30.6	18.6	45.6
Actuated g/C Ratio	0.17	0.57	0.61	0.12	0.52		0.19	0.12	0.22	0.20	0.12	0.30
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0		7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	5.5	8.0	2.0	5.5	8.0		2.0	2.0	5.5	2.0	2.0	5.5
Lane Grp Cap (vph)	293	1322	958	201	1691		182	210	311	216	217	448
v/s Ratio Prot	0.08	c0.50	0.00	0.10	c0.52		c0.06	0.10	0.02	0.05	0.10	0.03
v/s Ratio Perm			0.04				c0.11		0.02	0.10		0.02
v/c Ratio	0.47	0.88	0.08	0.85	0.99		0.88	0.79	0.21	0.74	0.83	0.15
Uniform Delay, d1	56.6	27.9	12.0	64.6	35.4		56.9	63.8	48.0	53.7	64.2	38.1
Progression Factor	0.72	0.71	0.14	0.99	0.94		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	7.8	0.0	3.6	4.4		33.9	16.2	0.8	11.3	21.3	0.4
Delay (s)	43.3	27.6	1.7	67.4	37.7		90.8	79.9	48.8	65.0	85.5	38.5
Level of Service	D	C	A	E	D		F	E	D	E	F	D
Approach Delay (s)		27.2			40.4			73.5			64.5	
Approach LOS		C			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	42.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	1210	165	65	1540	0	180	10	70	0	5	45
Future Volume (vph)	55	1210	165	65	1540	0	180	10	70	0	5	45
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8			4.8	4.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1696	1803	1486	1704	1759		1704	1541			1857	1533
Flt Permitted	0.04	1.00	1.00	0.04	1.00		0.75	1.00			1.00	1.00
Satd. Flow (perm)	65	1803	1486	79	1759		1354	1541			1857	1533
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	1247	170	67	1588	0	186	10	72	0	5	46
RTOR Reduction (vph)	0	0	22	0	0	0	0	62	0	0	0	39
Lane Group Flow (vph)	57	1247	148	67	1588	0	186	20	0	0	5	7
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	2%	1%	2%	0%	2%	0%	1%	0%	0%	0%	0%	3%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	106.0	106.0	106.0	117.0	117.0		19.0	19.0			19.0	19.0
Effective Green, g (s)	109.3	109.3	109.3	119.9	120.3		21.2	21.2			21.2	21.2
Actuated g/C Ratio	0.73	0.73	0.73	0.80	0.80		0.14	0.14			0.14	0.14
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0			7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	47	1313	1082	137	1410		191	217			262	216
v/s Ratio Prot		0.69		0.02	c0.90			0.01			0.00	
v/s Ratio Perm	c0.87		0.10	0.37			c0.14					0.00
v/c Ratio	1.21	0.95	0.14	0.49	1.13		0.97	0.09			0.02	0.03
Uniform Delay, d1	20.4	17.9	6.1	36.7	14.9		64.1	56.0			55.4	55.5
Progression Factor	0.57	0.58	0.06	1.33	0.80		1.00	1.00			1.00	1.00
Incremental Delay, d2	166.5	10.1	0.1	0.7	59.5		57.1	0.2			0.0	0.1
Delay (s)	178.1	20.5	0.5	49.4	71.3		121.2	56.2			55.5	55.6
Level of Service	F	C	A	D	E		F	E			E	E
Approach Delay (s)		24.3			70.4			101.3			55.6	
Approach LOS		C			E			F			E	

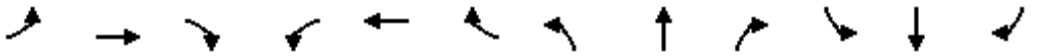
Intersection Summary			
HCM 2000 Control Delay	52.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	111.4%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1220	20	30	1535	10	20	30	35	5	15	45
Future Volume (vph)	50	1220	20	30	1535	10	20	30	35	5	15	45
Ideal Flow (vphpl)	1803	1803	1803	1900	1900	1900	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	1785	1533	1805	1863	1615	1713	1633		1747	1839	1491
Flt Permitted	0.03	1.00	1.00	0.12	1.00	1.00	0.75	1.00		0.61	1.00	1.00
Satd. Flow (perm)	59	1785	1533	233	1863	1615	1348	1633		1124	1839	1491
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	1258	21	31	1582	10	21	31	36	5	15	46
RTOR Reduction (vph)	0	0	4	0	0	2	0	30	0	0	0	43
Lane Group Flow (vph)	52	1258	17	31	1582	8	21	37	0	5	15	3
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	126.0	120.5	120.5	122.2	118.6	118.6	7.9	7.9		7.9	7.9	7.9
Effective Green, g (s)	130.0	122.5	122.5	126.2	120.6	120.6	9.9	9.9		9.9	9.9	9.9
Actuated g/C Ratio	0.87	0.82	0.82	0.84	0.80	0.80	0.07	0.07		0.07	0.07	0.07
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	133	1457	1251	254	1497	1298	88	107		74	121	98
v/s Ratio Prot	c0.02	0.70		0.00	c0.85			c0.02			0.01	
v/s Ratio Perm	0.32		0.01	0.10		0.00	0.02			0.00		0.00
v/c Ratio	0.39	0.86	0.01	0.12	1.06	0.01	0.24	0.35		0.07	0.12	0.03
Uniform Delay, d1	49.6	8.5	2.5	13.9	14.7	2.9	66.5	67.0		65.7	66.0	65.6
Progression Factor	1.23	0.69	1.00	1.13	0.53	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	3.2	0.0	0.0	27.4	0.0	1.4	2.0		0.4	0.5	0.1
Delay (s)	61.8	9.0	2.6	15.8	35.2	2.9	67.9	68.9		66.1	66.4	65.7
Level of Service	E	A	A	B	D	A	E	E		E	E	E
Approach Delay (s)		11.0			34.6			68.7			65.9	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	1040	95	10	1350	210	75	35	15	175	25	155
Future Volume (vph)	120	1040	95	10	1350	210	75	35	15	175	25	155
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	1750	1517	1730	1785	1548	1696	1785	1517	1687	1514	
Flt Permitted	0.04	1.00	1.00	0.14	1.00	1.00	0.37	1.00	1.00	0.73	1.00	
Satd. Flow (perm)	64	1750	1517	263	1785	1548	661	1785	1517	1303	1514	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	124	1072	98	10	1392	216	77	36	15	180	26	160
RTOR Reduction (vph)	0	0	19	0	0	42	0	0	13	0	112	0
Lane Group Flow (vph)	124	1072	79	10	1392	174	77	36	2	180	74	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	113.7	107.1	107.1	105.3	102.9	102.9	22.5	22.5	22.5	22.5	22.5	
Effective Green, g (s)	118.4	110.0	107.1	111.1	105.8	105.8	24.2	24.2	22.5	24.2	24.2	
Actuated g/C Ratio	0.79	0.73	0.71	0.74	0.71	0.71	0.16	0.16	0.15	0.16	0.16	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	151	1283	1083	246	1259	1091	106	287	227	210	244	
v/s Ratio Prot	c0.05	0.61		0.00	c0.78			0.02			0.05	
v/s Ratio Perm	0.59		0.05	0.03		0.11	0.12		0.00	c0.14		
v/c Ratio	0.82	0.84	0.07	0.04	1.11	0.16	0.73	0.13	0.01	0.86	0.31	
Uniform Delay, d1	55.1	13.8	6.5	14.1	22.1	7.3	59.8	53.8	54.3	61.2	55.5	
Progression Factor	1.31	0.51	0.62	0.87	0.88	0.91	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.6	3.7	0.1	0.0	51.9	0.1	21.8	0.2	0.0	27.4	0.7	
Delay (s)	89.6	10.7	4.1	12.3	71.4	6.8	81.5	54.0	54.3	88.6	56.2	
Level of Service	F	B	A	B	E	A	F	D	D	F	E	
Approach Delay (s)		17.8			62.4			70.6			72.1	
Approach LOS		B			E			E			E	

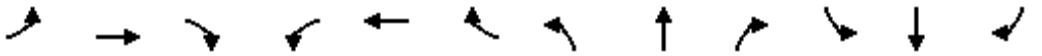
Intersection Summary			
HCM 2000 Control Delay	46.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	111.7%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	945	285	160	1235	330	140
Future Volume (vph)	945	285	160	1235	330	140
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1767	1385	1713	1785	1828	1685
Flt Permitted	1.00	1.00	0.16	1.00	0.95	1.00
Satd. Flow (perm)	1767	1385	289	1785	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	974	294	165	1273	340	144
RTOR Reduction (vph)	0	59	0	0	0	51
Lane Group Flow (vph)	974	235	165	1273	340	93
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	1%	1%	1%	2%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	100.0	100.0	113.0	113.0	24.0	24.0
Effective Green, g (s)	103.0	100.0	115.0	116.0	26.0	24.0
Actuated g/C Ratio	0.69	0.67	0.77	0.77	0.17	0.16
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	1213	923	297	1380	316	269
v/s Ratio Prot	0.55		0.03	c0.71	c0.19	
v/s Ratio Perm		0.17	0.40			0.06
v/c Ratio	0.80	0.25	0.56	0.92	1.08	0.34
Uniform Delay, d1	16.4	10.0	35.4	13.4	62.0	56.0
Progression Factor	0.88	1.18	1.17	1.39	1.00	1.00
Incremental Delay, d2	3.3	0.4	1.0	6.0	72.3	0.6
Delay (s)	17.8	12.2	42.5	24.8	134.3	56.6
Level of Service	B	B	D	C	F	E
Approach Delay (s)	16.5			26.8	111.2	
Approach LOS	B			C	F	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03

c Critical Lane Group

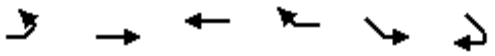


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	775	190	140	1190	115	155	10	115	140	10	50
Future Volume (vph)	55	775	190	140	1190	115	155	10	115	140	10	50
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1637	1723	1465	1688	1812	1538	1591	1708	1452	1645	1749	1443
Flt Permitted	0.04	1.00	1.00	0.24	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	65	1723	1465	433	1812	1538	1257	1708	1452	1299	1749	1443
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	59	824	202	149	1266	122	165	11	122	149	11	53
RTOR Reduction (vph)	0	0	41	0	0	21	0	0	97	0	0	43
Lane Group Flow (vph)	59	824	161	149	1266	101	165	11	25	149	11	10
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	2%	4%	2%	0%	2%	0%	0%	1%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	1	6		5	2			4	5		8	1
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	109.4	104.0	104.0	112.6	105.6	105.6	19.0	19.0	26.0	19.0	19.0	24.4
Effective Green, g (s)	113.6	106.1	106.1	116.8	107.7	107.7	20.0	20.0	30.2	20.0	20.0	28.6
Actuated g/C Ratio	0.76	0.71	0.71	0.78	0.72	0.72	0.13	0.13	0.20	0.13	0.13	0.19
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	127	1218	1036	413	1301	1104	167	227	292	173	233	275
v/s Ratio Prot	c0.02	0.48		0.02	c0.70			0.01	0.01		0.01	0.00
v/s Ratio Perm	0.33		0.11	0.26		0.07	c0.13		0.01	0.11		0.01
v/c Ratio	0.46	0.68	0.16	0.36	0.97	0.09	0.99	0.05	0.08	0.86	0.05	0.04
Uniform Delay, d1	37.4	12.3	7.2	9.0	19.8	6.4	64.9	56.7	48.7	63.6	56.7	49.5
Progression Factor	1.80	0.55	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	2.1	0.2	0.5	19.3	0.2	65.5	0.1	0.1	32.8	0.1	0.1
Delay (s)	69.1	8.9	2.0	9.5	39.1	6.6	130.3	56.8	48.8	96.5	56.8	49.5
Level of Service	E	A	A	A	D	A	F	E	D	F	E	D
Approach Delay (s)		10.9			33.6			94.2			82.8	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	34.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	65	1020	1340	55	10	60
Future Volume (Veh/h)	65	1020	1340	55	10	60
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	1109	1457	60	11	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1517				2738	1487
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1517				2738	1487
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				42	57
cM capacity (veh/h)	446				19	153

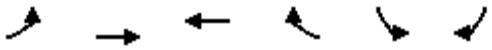
Direction, Lane #	EB 1	EB 2	WB 1	SE 1
Volume Total	71	1109	1517	76
Volume Left	71	0	0	11
Volume Right	0	0	60	65
cSH	446	1700	1700	76
Volume to Capacity	0.16	0.65	0.89	1.00
Queue Length 95th (ft)	14	0	0	134
Control Delay (s)	14.6	0.0	0.0	199.8
Lane LOS	B			F
Approach Delay (s)	0.9		0.0	199.8
Approach LOS				F

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1025	5	5	1445	0	10
Future Volume (Veh/h)	1025	5	5	1445	0	10
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1068	5	5	1505	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1073		2586	1070
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1073		2586	1070
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		100	96
cM capacity (veh/h)			657		28	259

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1073	1510	10
Volume Left	0	5	0
Volume Right	5	0	10
cSH	1700	657	259
Volume to Capacity	0.63	0.01	0.04
Queue Length 95th (ft)	0	1	3
Control Delay (s)	0.0	0.7	19.5
Lane LOS		A	C
Approach Delay (s)	0.0	0.7	19.5
Approach LOS			C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		



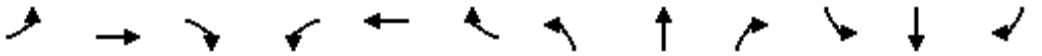
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	135	900	1295	0	0	155
Future Volume (Veh/h)	135	900	1295	0	0	155
Sign Control		Free	Free		Stop	
Grade		0%	-5%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	139	928	1335	0	0	160
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1335				2541	1335
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1335				2541	1335
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	73				100	16
cM capacity (veh/h)	520				22	190

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	139	928	1335	160
Volume Left	139	0	0	0
Volume Right	0	0	0	160
cSH	520	1700	1700	190
Volume to Capacity	0.27	0.55	0.79	0.84
Queue Length 95th (ft)	27	0	0	153
Control Delay (s)	14.4	0.0	0.0	80.6
Lane LOS	B			F
Approach Delay (s)	1.9		0.0	80.6
Approach LOS				F

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

Appendix D5:

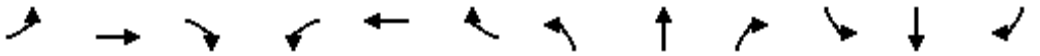
2045 Design Year (Build Scenario w/ Approved Growth)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	960	75	285	1330	50	140	160	95	85	425	85
Future Volume (vph)	115	960	75	285	1330	50	140	160	95	85	425	85
Ideal Flow (vphpl)	2100	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	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	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	3527	3505	1627	3283	3321	1458	1591	3243	1349	1671	1775	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.12	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	3527	3505	1627	3283	3321	1458	206	3243	1349	1139	1775	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	990	77	294	1371	52	144	165	98	88	438	88
RTOR Reduction (vph)	0	0	42	0	0	28	0	0	59	0	0	58
Lane Group Flow (vph)	119	990	35	294	1371	24	144	165	39	88	438	30
Heavy Vehicles (%)	7%	11%	7%	4%	6%	8%	8%	6%	14%	6%	5%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6			2	4		4	8		8
Actuated Green, G (s)	6.0	56.4	64.4	17.3	67.7	67.7	48.3	40.3	57.6	42.3	37.3	43.3
Effective Green, g (s)	9.0	59.4	64.4	20.3	70.7	67.7	50.3	41.3	57.6	46.3	38.3	49.3
Actuated g/C Ratio	0.06	0.41	0.44	0.14	0.49	0.47	0.35	0.28	0.40	0.32	0.26	0.34
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	218	1435	722	459	1619	680	157	923	535	389	468	522
v/s Ratio Prot	0.03	c0.28	0.00	0.09	c0.41		c0.06	0.05	0.01	0.01	0.25	0.00
v/s Ratio Perm			0.02			0.02	c0.26		0.02	0.06		0.02
v/c Ratio	0.55	0.69	0.05	0.64	0.85	0.04	0.92	0.18	0.07	0.23	0.94	0.06
Uniform Delay, d1	66.0	35.2	22.9	58.9	32.4	21.0	39.2	39.1	27.1	35.5	52.2	32.2
Progression Factor	0.85	0.77	0.55	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	2.6	0.0	2.3	5.7	0.1	47.0	0.0	0.0	0.1	25.9	0.0
Delay (s)	58.9	29.8	12.6	61.2	38.1	21.1	86.2	39.1	27.1	35.6	78.0	32.3
Level of Service	E	C	B	E	D	C	F	D	C	D	E	C
Approach Delay (s)		31.6			41.5			52.9			65.4	
Approach LOS		C			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

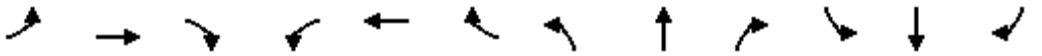
Description: Signal Permit No. TS-152-10
Date Issued: 6-4-99
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	935	190	115	1495	0	110	10	40	5	15	30
Future Volume (vph)	15	935	190	115	1495	0	110	10	40	5	15	30
Ideal Flow (vphpl)	1900	1900	1900	1714	1714	1714	1950	1950	1950	1950	1950	1950
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1642	3285	1493	1588	3057		1790	1552		1908	2008	1707
Flt Permitted	0.16	1.00	1.00	0.24	1.00		0.75	1.00		0.72	1.00	1.00
Satd. Flow (perm)	279	3285	1493	394	3057		1409	1552		1454	2008	1707
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	15	964	196	119	1541	0	113	10	41	5	15	31
RTOR Reduction (vph)	0	0	69	0	0	0	0	35	0	0	0	27
Lane Group Flow (vph)	15	964	127	119	1541	0	113	16	0	5	15	4
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	11%	11%	7%	2%	6%	0%	4%	13%	9%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4			8		8
Actuated Green, G (s)	68.1	68.1	68.1	82.3	82.3		13.7	13.7		13.7	13.7	13.7
Effective Green, g (s)	71.4	71.4	71.4	85.2	85.6		15.9	15.9		15.9	15.9	15.9
Actuated g/C Ratio	0.65	0.65	0.65	0.77	0.78		0.14	0.14		0.14	0.14	0.14
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	181	2132	969	414	2378		203	224		210	290	246
v/s Ratio Prot		0.29		0.03	c0.50			0.01			0.01	
v/s Ratio Perm	0.05		0.09	0.20			c0.08			0.00		0.00
v/c Ratio	0.08	0.45	0.13	0.29	0.65		0.56	0.07		0.02	0.05	0.02
Uniform Delay, d1	7.2	9.6	7.4	4.5	5.5		43.8	40.7		40.4	40.6	40.4
Progression Factor	1.00	1.00	1.00	1.68	2.75		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	0.7	0.3	0.3	1.1		3.3	0.1		0.0	0.1	0.0
Delay (s)	8.1	10.3	7.7	7.8	16.1		47.1	40.8		40.4	40.6	40.4
Level of Service	A	B	A	A	B		D	D		D	D	D
Approach Delay (s)		9.8			15.5			45.1			40.5	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

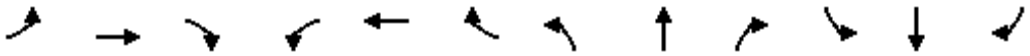
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	890	25	35	1490	30	60	25	40	10	5	60
Future Volume (vph)	30	890	25	35	1490	30	60	25	40	10	5	60
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1557	3078		1663	3256		1616	1535		1747	1839	1481
Flt Permitted	0.12	1.00		0.28	1.00		0.75	1.00		0.71	1.00	1.00
Satd. Flow (perm)	199	3078		484	3256		1283	1535		1312	1839	1481
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	918	26	36	1536	31	62	26	41	10	5	62
RTOR Reduction (vph)	0	1	0	0	1	0	0	37	0	0	0	56
Lane Group Flow (vph)	31	943	0	36	1566	0	62	30	0	10	5	6
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	10%	11%	5%	3%	5%	0%	6%	10%	3%	0%	0%	4%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		8
Actuated Green, G (s)	82.7	79.0		82.9	79.1		9.2	9.2		9.2	9.2	9.2
Effective Green, g (s)	86.7	81.0		86.9	81.1		11.2	11.2		11.2	11.2	11.2
Actuated g/C Ratio	0.79	0.74		0.79	0.74		0.10	0.10		0.10	0.10	0.10
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	227	2266		444	2400		130	156		133	187	150
v/s Ratio Prot	c0.01	0.31		0.00	c0.48			0.02			0.00	
v/s Ratio Perm	0.10			0.06			c0.05			0.01		0.00
v/c Ratio	0.14	0.42		0.08	0.65		0.48	0.19		0.08	0.03	0.04
Uniform Delay, d1	4.6	5.5		2.7	7.3		46.6	45.3		44.7	44.5	44.6
Progression Factor	0.25	0.18		0.54	0.27		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	0.5		0.1	1.1		2.7	0.6		0.2	0.1	0.1
Delay (s)	1.4	1.5		1.5	3.1		49.4	45.9		45.0	44.5	44.7
Level of Service	A	A		A	A		D	D		D	D	D
Approach Delay (s)		1.5			3.1			47.6			44.7	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group



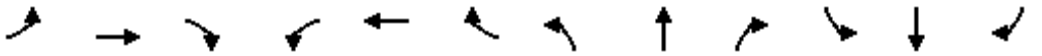
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	815	10	0	1380	110	30	5	5	35	5	145
Future Volume (vph)	115	815	10	0	1380	110	30	5	5	35	5	145
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0		3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1585	3028	1517		3295	1460	1631	1785	1011	1508	1412	
Flt Permitted	0.13	1.00	1.00		1.00	1.00	0.37	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	221	3028	1517		3295	1460	627	1785	1011	1198	1412	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	840	10	0	1423	113	31	5	5	36	5	149
RTOR Reduction (vph)	0	0	2	0	0	34	0	0	5	0	134	0
Lane Group Flow (vph)	119	840	8	0	1423	79	31	5	0	36	20	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	7%	12%	0%	0%	5%	6%	4%	0%	50%	13%	0%	7%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	88.6	88.6	88.6		74.0	74.0	9.4	9.4	9.4	9.4	9.4	
Effective Green, g (s)	91.5	91.5	88.6		76.9	76.9	11.1	11.1	9.4	11.1	11.1	
Actuated g/C Ratio	0.83	0.83	0.81		0.70	0.70	0.10	0.10	0.09	0.10	0.10	
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	5.0	6.0	6.0		6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	326	2518	1221		2303	1020	63	180	86	120	142	
v/s Ratio Prot	c0.04	0.28			c0.43			0.00			0.01	
v/s Ratio Perm	0.27		0.01			0.05	c0.05		0.00	0.03		
v/c Ratio	0.37	0.33	0.01		0.62	0.08	0.49	0.03	0.00	0.30	0.14	
Uniform Delay, d1	5.8	2.2	2.1		8.8	5.3	46.8	44.6	46.0	45.8	45.1	
Progression Factor	6.36	0.43	1.00		0.88	0.89	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.3	0.0		1.0	0.1	5.9	0.1	0.0	1.4	0.5	
Delay (s)	38.0	1.3	2.1		8.7	4.8	52.7	44.6	46.0	47.3	45.6	
Level of Service	D	A	A		A	A	D	D	D	D	D	
Approach Delay (s)		5.8			8.4			50.9			45.9	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	775	85	65	1020	475	255
Future Volume (vph)	775	85	65	1020	475	255
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3055	1226	1504	3204	1828	1685
Flt Permitted	1.00	1.00	0.23	1.00	0.95	1.00
Satd. Flow (perm)	3055	1226	368	3204	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	799	88	67	1052	490	263
RTOR Reduction (vph)	0	49	0	0	0	99
Lane Group Flow (vph)	799	39	67	1052	490	164
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	11%	14%	15%	8%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	48.8	48.8	61.9	61.9	35.1	35.1
Effective Green, g (s)	51.8	48.8	63.9	64.9	37.1	35.1
Actuated g/C Ratio	0.47	0.44	0.58	0.59	0.34	0.32
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	1438	543	297	1890	616	537
v/s Ratio Prot	0.26		0.02	c0.33	c0.27	
v/s Ratio Perm		0.03	0.11			0.10
v/c Ratio	0.56	0.07	0.23	0.56	0.80	0.30
Uniform Delay, d1	20.9	17.6	11.9	13.8	33.0	28.2
Progression Factor	0.62	0.30	0.32	0.22	1.00	1.00
Incremental Delay, d2	1.5	0.2	0.4	1.1	6.8	0.2
Delay (s)	14.5	5.5	4.1	4.1	39.8	28.5
Level of Service	B	A	A	A	D	C
Approach Delay (s)	13.6			4.1	35.9	
Approach LOS	B			A	D	

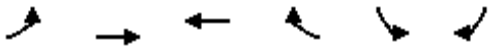
Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

Description: Signal Permit No. TS-120-10
Date Issued: 8-29-96
Date Revised: 9-19-03
c Critical Lane Group



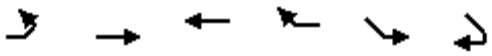
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	785	120	80	990	245	45	0	35	205	20	40
Future Volume (vph)	45	785	120	80	990	245	45	0	35	205	20	40
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	3.9	4.9	4.9	4.9	5.0		4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00		0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)	1637	3036	1494	1626	3344	1538	1298		968	3070	1749	1443
Flt Permitted	0.20	1.00	1.00	0.28	1.00	1.00	0.93		1.00	0.95	1.00	1.00
Satd. Flow (perm)	351	3036	1494	476	3344	1538	1271		968	3070	1749	1443
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	48	835	128	85	1053	261	48	0	37	218	21	43
RTOR Reduction (vph)	0	0	47	0	0	112	0	0	32	0	0	34
Lane Group Flow (vph)	48	835	81	85	1053	149	48	0	5	218	21	9
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	10%	0%	8%	5%	0%	25%	0%	50%	5%	0%	3%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt		pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases	6		6	2		2	4		4			8
Actuated Green, G (s)	65.7	60.2	65.8	66.7	60.7	60.7	8.9		9.3	14.5	12.2	17.7
Effective Green, g (s)	69.9	62.3	70.0	70.9	62.8	62.8	10.9		13.5	15.5	13.2	21.9
Actuated g/C Ratio	0.64	0.57	0.64	0.64	0.57	0.57	0.10		0.12	0.14	0.12	0.20
Clearance Time (s)	7.0	7.0	6.0	7.0	7.0	7.0	6.0		7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	3.0	3.0	4.8	4.8	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	311	1719	950	391	1909	878	127		118	432	209	287
v/s Ratio Prot	0.01	0.27	0.01	c0.02	c0.31		0.02		0.00	c0.07	0.01	0.00
v/s Ratio Perm	0.09		0.05	0.12		0.10	c0.01		0.00			0.00
v/c Ratio	0.15	0.49	0.09	0.22	0.55	0.17	0.38		0.04	0.50	0.10	0.03
Uniform Delay, d1	8.8	14.3	7.7	8.0	14.8	11.2	46.4		42.5	43.7	43.1	35.5
Progression Factor	0.62	0.43	0.01	0.20	0.58	1.04	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9	0.0	0.2	0.9	0.3	1.9		0.1	0.9	0.2	0.0
Delay (s)	5.7	7.1	0.1	1.9	9.5	12.0	48.2		42.7	44.6	43.3	35.5
Level of Service	A	A	A	A	A	B	D		D	D	D	D
Approach Delay (s)		6.1			9.5			45.8			43.1	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			
Date Revised: 3-10-2008			
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	105	915	1155	0	5	165
Future Volume (vph)	105	915	1155	0	5	165
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	9	12	12	12	12	12
Grade (%)		0%	-5%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	1.00		0.87	
Flt Protected	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1542	3086	3251		1549	
Flt Permitted	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1542	3086	3251		1549	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	108	943	1191	0	5	170
RTOR Reduction (vph)	0	0	0	0	145	0
Lane Group Flow (vph)	108	943	1191	0	30	0
Heavy Vehicles (%)	0%	11%	8%	0%	0%	1%
Turn Type	Prot	NA	NA		Prot	
Protected Phases	1	6	2		8	
Permitted Phases						
Actuated Green, G (s)	12.5	82.0	63.5		16.0	
Effective Green, g (s)	12.5	82.0	63.5		16.0	
Actuated g/C Ratio	0.11	0.75	0.58		0.15	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	175	2300	1876		225	
v/s Ratio Prot	c0.07	0.31	c0.37		c0.02	
v/s Ratio Perm						
v/c Ratio	0.62	0.41	0.63		0.13	
Uniform Delay, d1	46.5	5.1	15.5		41.0	
Progression Factor	1.20	0.29	1.00		1.00	
Incremental Delay, d2	5.8	0.5	1.7		1.2	
Delay (s)	61.8	2.0	17.2		42.2	
Level of Service	E	A	B		D	
Approach Delay (s)		8.1	17.2		42.2	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	100	920	1025	50	10	65
Future Volume (Veh/h)	100	920	1025	50	10	65
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	1000	1114	54	11	71
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1168				1832	557
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1168				1832	557
tC, single (s)	4.1				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.4
p0 queue free %	82				81	85
cM capacity (veh/h)	600				57	461

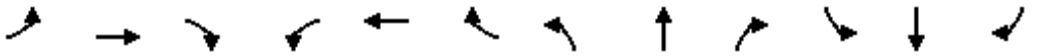
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SE 1	SE 2
Volume Total	109	500	500	557	557	54	11	71
Volume Left	109	0	0	0	0	0	11	0
Volume Right	0	0	0	0	0	54	0	71
cSH	600	1700	1700	1700	1700	1700	57	461
Volume to Capacity	0.18	0.29	0.29	0.33	0.33	0.03	0.19	0.15
Queue Length 95th (ft)	16	0	0	0	0	0	16	13
Control Delay (s)	12.3	0.0	0.0	0.0	0.0	0.0	83.3	14.2
Lane LOS	B						F	B
Approach Delay (s)	1.2			0.0			23.5	
Approach LOS							C	

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	49.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1020	5	0	1315	0	0
Future Volume (Veh/h)	1020	5	0	1315	0	0
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1063	5	0	1370	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				201		
pX, platoon unblocked					0.76	
vC, conflicting volume			1068		1750	357
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1068		1347	357
tC, single (s)			4.2		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			620		110	645

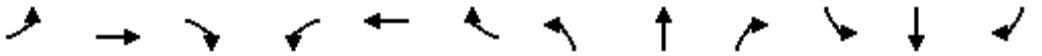
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	425	425	218	685	685	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	5	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.25	0.25	0.13	0.40	0.40	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	360	1410	85	190	1320	95	200	420	245	85	195	85
Future Volume (vph)	360	1410	85	190	1320	95	200	420	245	85	195	85
Ideal Flow (vphpl)	2100	2100	2100	1900	1900	1900	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	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	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	3736	3814	1740	3347	3417	1575	1508	3015	1362	1554	1668	1418
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.28	1.00	1.00	0.50	1.00	1.00
Satd. Flow (perm)	3736	3814	1740	3347	3417	1575	441	3015	1362	818	1668	1418
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	371	1454	88	196	1361	98	206	433	253	88	201	88
RTOR Reduction (vph)	0	0	29	0	0	52	0	0	80	0	0	63
Lane Group Flow (vph)	371	1454	59	196	1361	46	206	433	173	88	201	25
Heavy Vehicles (%)	1%	2%	0%	2%	3%	0%	2%	2%	1%	2%	0%	0%
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6			2	4		4	8		8
Actuated Green, G (s)	15.0	72.9	89.4	13.0	70.9	70.9	45.1	33.1	46.1	26.6	21.6	36.6
Effective Green, g (s)	18.0	75.9	89.4	16.0	73.9	70.9	46.1	34.1	46.1	30.6	22.6	42.6
Actuated g/C Ratio	0.12	0.51	0.60	0.11	0.49	0.47	0.31	0.23	0.31	0.20	0.15	0.28
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	448	1929	1037	357	1683	744	260	685	418	201	251	402
v/s Ratio Prot	0.10	c0.38	0.01	0.06	c0.40		c0.09	0.14	0.04	0.02	0.12	0.01
v/s Ratio Perm			0.03			0.03	c0.15		0.09	0.07		0.01
v/c Ratio	0.83	0.75	0.06	0.55	0.81	0.06	0.79	0.63	0.41	0.44	0.80	0.06
Uniform Delay, d1	64.5	29.6	12.7	63.6	32.1	21.5	42.8	52.3	41.2	50.4	61.5	39.1
Progression Factor	0.66	0.36	0.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.4	2.1	0.0	0.9	4.3	0.2	14.2	1.4	0.2	0.6	15.7	0.1
Delay (s)	51.8	12.8	0.2	64.5	36.4	21.6	57.0	53.7	41.5	50.9	77.2	39.2
Level of Service	D	B	A	E	D	C	E	D	D	D	E	D
Approach Delay (s)		19.8			38.8			51.0			62.2	
Approach LOS		B			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1500	185	70	1280	0	245	50	95	0	30	40
Future Volume (vph)	50	1500	185	70	1280	0	245	50	95	0	30	40
Ideal Flow (vphpl)	1900	1900	1900	1714	1714	1714	1803	1803	1803	1803	1803	1803
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8			4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.90			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1823	3575	1581	1588	3146		1704	1610			1857	1579
Flt Permitted	0.19	1.00	1.00	0.07	1.00		0.74	1.00			1.00	1.00
Satd. Flow (perm)	358	3575	1581	116	3146		1322	1610			1857	1579
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	1546	191	72	1320	0	253	52	98	0	31	41
RTOR Reduction (vph)	0	0	81	0	0	0	0	60	0	0	0	31
Lane Group Flow (vph)	52	1546	110	72	1320	0	253	90	0	0	31	10
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	0%	2%	1%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4			8		8
Actuated Green, G (s)	65.9	65.9	65.9	78.9	78.9		27.1	27.1			27.1	27.1
Effective Green, g (s)	69.2	69.2	69.2	81.8	82.2		29.3	29.3			29.3	29.3
Actuated g/C Ratio	0.58	0.58	0.58	0.68	0.69		0.24	0.24			0.24	0.24
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0			7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	206	2061	911	188	2155		322	393			453	385
v/s Ratio Prot		c0.43		0.03	c0.42			0.06			0.02	
v/s Ratio Perm	0.15		0.07	0.23			c0.19					0.01
v/c Ratio	0.25	0.75	0.12	0.38	0.61		0.79	0.23			0.07	0.03
Uniform Delay, d1	12.6	18.9	11.6	16.5	10.3		42.4	36.3			34.9	34.5
Progression Factor	1.00	1.00	1.00	1.38	2.31		1.00	1.00			1.00	1.00
Incremental Delay, d2	2.9	2.6	0.3	1.1	1.1		11.9	0.3			0.1	0.0
Delay (s)	15.5	21.5	11.8	23.8	24.8		54.3	36.6			34.9	34.5
Level of Service	B	C	B	C	C		D	D			C	C
Approach Delay (s)		20.3			24.7			47.7			34.7	
Approach LOS		C			C			D			C	

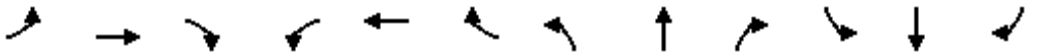
Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	1500	30	65	1280	25	20	35	125	45	35	50
Future Volume (vph)	120	1500	30	65	1280	25	20	35	125	45	35	50
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	3350		1679	3318		1713	1573		1747	1839	1540
Flt Permitted	0.15	1.00		0.12	1.00		0.73	1.00		0.33	1.00	1.00
Satd. Flow (perm)	278	3350		210	3318		1323	1573		600	1839	1540
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	124	1546	31	67	1320	26	21	36	129	46	36	52
RTOR Reduction (vph)	0	1	0	0	1	0	0	114	0	0	0	46
Lane Group Flow (vph)	124	1576	0	67	1345	0	21	51	0	46	36	6
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		8
Actuated Green, G (s)	92.6	85.1		88.4	83.0		11.5	11.5		11.5	11.5	11.5
Effective Green, g (s)	96.6	87.1		92.4	85.0		13.5	13.5		13.5	13.5	13.5
Actuated g/C Ratio	0.80	0.73		0.77	0.71		0.11	0.11		0.11	0.11	0.11
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	337	2431		252	2350		148	176		67	206	173
v/s Ratio Prot	c0.03	c0.47		0.02	0.41			0.03			0.02	
v/s Ratio Perm	0.27			0.19			0.02			c0.08		0.00
v/c Ratio	0.37	0.65		0.27	0.57		0.14	0.29		0.69	0.17	0.03
Uniform Delay, d1	5.2	8.5		6.0	8.6		48.0	48.8		51.2	48.2	47.4
Progression Factor	2.18	0.54		0.81	0.22		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.0		0.5	0.9		0.4	0.9		25.3	0.4	0.1
Delay (s)	11.8	5.6		5.3	2.8		48.5	49.7		76.6	48.6	47.5
Level of Service	B	A		A	A		D	D		E	D	D
Approach Delay (s)		6.0			2.9			49.6			57.8	
Approach LOS		A			A			D			E	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group



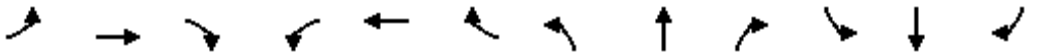
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	1400	125	15	1150	195	45	25	15	220	30	175
Future Volume (vph)	145	1400	125	15	1150	195	45	25	15	220	30	175
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1679	3358	1517	1680	3426	1548	1696	1785	1517	1704	1532	
Flt Permitted	0.15	1.00	1.00	0.13	1.00	1.00	0.44	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	273	3358	1517	222	3426	1548	788	1785	1517	1328	1532	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	1443	129	15	1186	201	46	26	15	227	31	180
RTOR Reduction (vph)	0	0	31	0	0	82	0	0	12	0	139	0
Lane Group Flow (vph)	149	1443	98	15	1186	119	46	26	3	227	72	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	82.4	74.0	74.0	70.6	68.1	68.1	25.5	25.5	25.5	25.5	25.5	
Effective Green, g (s)	85.4	76.9	74.0	76.4	71.0	71.0	27.2	27.2	25.5	27.2	27.2	
Actuated g/C Ratio	0.71	0.64	0.62	0.64	0.59	0.59	0.23	0.23	0.21	0.23	0.23	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	326	2151	935	206	2027	915	178	404	322	301	347	
v/s Ratio Prot	c0.04	c0.43		0.00	0.35			0.01			0.05	
v/s Ratio Perm	0.28		0.06	0.04		0.08	0.06		0.00	c0.17		
v/c Ratio	0.46	0.67	0.10	0.07	0.59	0.13	0.26	0.06	0.01	0.75	0.21	
Uniform Delay, d1	9.8	13.6	9.4	10.2	15.3	10.8	38.1	36.4	37.3	43.3	37.6	
Progression Factor	1.91	0.45	0.66	0.51	0.53	0.31	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	1.3	0.2	0.1	1.1	0.3	0.8	0.1	0.0	10.2	0.3	
Delay (s)	19.6	7.4	6.4	5.3	9.2	3.7	38.9	36.5	37.3	53.5	37.9	
Level of Service	B	A	A	A	A	A	D	D	D	D	D	
Approach Delay (s)		8.4			8.3			37.9			46.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1150	485	245	1095	265	195
Future Volume (vph)	1150	485	245	1095	265	195
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3325	1398	1730	3359	1810	1685
Flt Permitted	1.00	1.00	0.14	1.00	0.95	1.00
Satd. Flow (perm)	3325	1398	252	3359	1810	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1186	500	253	1129	273	201
RTOR Reduction (vph)	0	236	0	0	0	119
Lane Group Flow (vph)	1186	264	253	1129	273	82
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	2%	0%	0%	3%	2%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	63.3	63.3	84.4	84.4	22.6	22.6
Effective Green, g (s)	66.3	63.3	86.4	87.4	24.6	22.6
Actuated g/C Ratio	0.55	0.53	0.72	0.73	0.21	0.19
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	1837	737	379	2446	371	317
v/s Ratio Prot	0.36		c0.09	0.34	c0.15	
v/s Ratio Perm		0.19	c0.39			0.05
v/c Ratio	0.65	0.36	0.67	0.46	0.74	0.26
Uniform Delay, d1	18.7	16.5	14.4	6.7	44.7	41.6
Progression Factor	0.53	0.24	2.78	0.67	1.00	1.00
Incremental Delay, d2	1.4	1.1	3.8	0.5	7.0	0.3
Delay (s)	11.2	5.0	43.7	5.0	51.7	41.9
Level of Service	B	A	D	A	D	D
Approach Delay (s)	9.4			12.1	47.5	
Approach LOS	A			B	D	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03
c Critical Lane Group

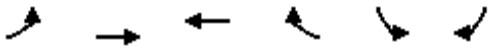


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	980	215	160	1005	240	240	30	180	340	20	55
Future Volume (vph)	65	980	215	160	1005	240	240	30	180	340	20	55
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	3.9	4.9	4.9	3.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1637	3275	1494	1756	3442	1547	1623	1708	1452	3191	1749	1457
Flt Permitted	0.17	1.00	1.00	0.16	1.00	1.00	0.57	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	294	3275	1494	289	3442	1547	971	1708	1452	3191	1749	1457
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1043	229	170	1069	255	255	32	191	362	21	59
RTOR Reduction (vph)	0	0	76	0	0	86	0	0	72	0	0	49
Lane Group Flow (vph)	69	1043	153	170	1069	169	255	32	119	362	21	10
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2	4		4			8
Actuated Green, G (s)	60.5	54.4	76.1	65.3	56.8	75.3	34.3	12.6	21.1	18.5	9.4	15.5
Effective Green, g (s)	64.7	56.5	80.3	69.5	58.9	79.5	36.3	13.6	25.3	19.5	10.4	19.7
Actuated g/C Ratio	0.54	0.47	0.67	0.58	0.49	0.66	0.30	0.11	0.21	0.16	0.09	0.16
Clearance Time (s)	7.0	7.0	6.0	7.0	7.0	6.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	3.0	3.0	4.8	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	250	1541	999	296	1689	1024	417	193	306	518	151	239
v/s Ratio Prot	0.02	c0.32	0.03	c0.05	0.31	0.03	c0.12	0.02	0.03	c0.11	0.01	0.00
v/s Ratio Perm	0.13		0.07	0.28		0.08	c0.07		0.05			0.00
v/c Ratio	0.28	0.68	0.15	0.57	0.63	0.16	0.61	0.17	0.39	0.70	0.14	0.04
Uniform Delay, d1	15.4	24.7	7.3	15.8	22.6	7.7	34.7	48.1	40.7	47.5	50.7	42.2
Progression Factor	0.64	0.46	0.01	1.93	0.25	0.47	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	2.0	0.1	1.9	1.3	0.1	2.7	0.4	0.8	4.1	0.4	0.1
Delay (s)	10.3	13.3	0.1	32.4	6.9	3.6	37.3	48.5	41.5	51.6	51.1	42.3
Level of Service	B	B	A	C	A	A	D	D	D	D	D	D
Approach Delay (s)		10.9			9.3			39.8			50.3	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

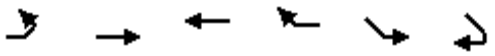
Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	335	1185	1225	5	0	180
Future Volume (vph)	335	1185	1225	5	0	180
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	9	12	12	12	12	12
Grade (%)		0%	-5%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	1.00		0.86	
Flt Protected	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1542	3359	3441		1560	
Flt Permitted	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1542	3359	3441		1560	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	345	1222	1263	5	0	186
RTOR Reduction (vph)	0	0	0	0	163	0
Lane Group Flow (vph)	345	1222	1268	0	23	0
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Turn Type	Prot	NA	NA		Prot	
Protected Phases	1	6	2		8	
Permitted Phases						
Actuated Green, G (s)	30.4	93.0	56.6		15.0	
Effective Green, g (s)	30.4	93.0	56.6		15.0	
Actuated g/C Ratio	0.25	0.78	0.47		0.12	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	390	2603	1623		195	
v/s Ratio Prot	c0.22	0.36	c0.37		c0.01	
v/s Ratio Perm						
v/c Ratio	0.88	0.47	0.78		0.12	
Uniform Delay, d1	43.1	4.8	26.5		46.6	
Progression Factor	0.84	0.52	1.00		1.00	
Incremental Delay, d2	17.0	0.5	3.8		1.2	
Delay (s)	53.4	3.0	30.3		47.9	
Level of Service	D	A	C		D	
Approach Delay (s)		14.1	30.3		47.9	
Approach LOS		B	C		D	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	115	1235	1260	35	20	80
Future Volume (Veh/h)	115	1235	1260	35	20	80
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	1342	1370	38	22	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1408				2291	685
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1408				2291	685
tC, single (s)	4.1				7.0	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	75				0	77
cM capacity (veh/h)	491				22	386

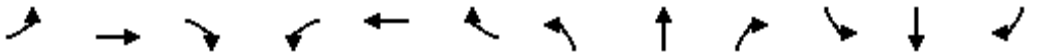
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SE 1	SE 2
Volume Total	125	671	671	685	685	38	22	87
Volume Left	125	0	0	0	0	0	22	0
Volume Right	0	0	0	0	0	38	0	87
cSH	491	1700	1700	1700	1700	1700	22	386
Volume to Capacity	0.25	0.39	0.39	0.40	0.40	0.02	1.01	0.23
Queue Length 95th (ft)	25	0	0	0	0	0	72	21
Control Delay (s)	14.8	0.0	0.0	0.0	0.0	0.0	446.4	17.0
Lane LOS	B						F	C
Approach Delay (s)	1.3			0.0			103.7	
Approach LOS							F	

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1490	10	0	1405	0	30
Future Volume (Veh/h)	1490	10	0	1405	0	30
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1552	10	0	1464	0	31
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				201		
pX, platoon unblocked					0.69	
vC, conflicting volume			1562		2289	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1562		1969	522
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	94
cM capacity (veh/h)			429		39	504

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	621	621	320	732	732	31
Volume Left	0	0	0	0	0	0
Volume Right	0	0	10	0	0	31
cSH	1700	1700	1700	1700	1700	504
Volume to Capacity	0.37	0.37	0.19	0.43	0.43	0.06
Queue Length 95th (ft)	0	0	0	0	0	5
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	12.6
Lane LOS						B
Approach Delay (s)	0.0			0.0		12.6
Approach LOS						B

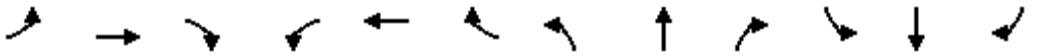
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	1125	105	165	1515	110	155	160	150	155	175	145
Future Volume (vph)	135	1125	105	165	1515	110	155	160	150	155	175	145
Ideal Flow (vphpl)	2100	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	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	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	3774	3814	1740	3414	3451	1514	1719	3403	1508	1753	1846	1554
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.28	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	3774	3814	1740	3414	3451	1514	515	3403	1508	1195	1846	1554
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	139	1160	108	170	1562	113	160	165	155	160	180	149
RTOR Reduction (vph)	0	0	42	0	0	46	0	0	87	0	0	92
Lane Group Flow (vph)	139	1160	66	170	1562	67	160	165	68	160	180	57
Heavy Vehicles (%)	0%	2%	0%	0%	2%	4%	0%	1%	2%	1%	1%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6			2	4		4	8		8
Actuated Green, G (s)	7.0	80.1	91.1	15.3	88.4	88.4	32.6	21.6	36.9	24.6	17.6	24.6
Effective Green, g (s)	10.0	83.1	91.1	18.3	91.4	88.4	34.6	22.6	36.9	28.6	18.6	30.6
Actuated g/C Ratio	0.07	0.55	0.61	0.12	0.61	0.59	0.23	0.15	0.25	0.19	0.12	0.20
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	5.5	8.0	2.0	5.5	8.0	8.0	2.0	2.0	5.5	2.0	2.0	5.5
Lane Grp Cap (vph)	251	2112	1056	416	2102	892	215	512	370	261	228	317
v/s Ratio Prot	0.04	c0.30	0.00	0.05	c0.45		c0.06	0.05	0.02	0.04	0.10	0.01
v/s Ratio Perm			0.03			0.04	c0.11		0.03	0.08		0.02
v/c Ratio	0.55	0.55	0.06	0.41	0.74	0.07	0.74	0.32	0.18	0.61	0.79	0.18
Uniform Delay, d1	67.8	21.4	12.0	60.9	20.9	13.2	49.6	56.9	44.6	54.2	63.8	49.3
Progression Factor	0.82	0.48	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.9	0.0	1.6	2.4	0.2	11.5	0.1	0.6	3.0	15.3	0.7
Delay (s)	60.0	11.2	1.1	62.5	23.3	13.4	61.1	57.0	45.2	57.2	79.1	50.0
Level of Service	E	B	A	E	C	B	E	E	D	E	E	D
Approach Delay (s)		15.3			26.3			54.6			63.1	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

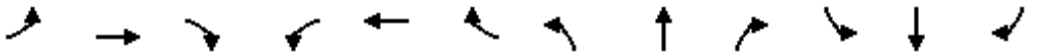
Description: Signal Permit No. TS-152-10
Date Issued: 6-4-99
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	1210	165	65	1540	0	180	10	70	0	5	45
Future Volume (vph)	55	1210	165	65	1540	0	180	10	70	0	5	45
Ideal Flow (vphpl)	1900	1900	1900	1714	1714	1714	1803	1803	1803	1803	1803	1803
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8			4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1787	3610	1566	1620	3177		1704	1555			1857	1533
Flt Permitted	0.14	1.00	1.00	0.14	1.00		0.75	1.00			1.00	1.00
Satd. Flow (perm)	254	3610	1566	233	3177		1354	1555			1857	1533
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	1247	170	67	1588	0	186	10	72	0	5	46
RTOR Reduction (vph)	0	0	71	0	0	0	0	57	0	0	0	37
Lane Group Flow (vph)	57	1247	99	67	1588	0	186	25	0	0	5	9
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	2%	1%	2%	0%	2%	0%	1%	0%	0%	0%	0%	3%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4			8		8
Actuated Green, G (s)	55.1	55.1	55.1	67.8	67.8		18.2	18.2			18.2	18.2
Effective Green, g (s)	58.4	58.4	58.4	70.7	71.1		20.4	20.4			20.4	20.4
Actuated g/C Ratio	0.58	0.58	0.58	0.71	0.71		0.20	0.20			0.20	0.20
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0			7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	148	2108	914	284	2258		276	317			378	312
v/s Ratio Prot		0.35		0.02	c0.50			0.02			0.00	
v/s Ratio Perm	0.22		0.06	0.15			c0.14					0.01
v/c Ratio	0.39	0.59	0.11	0.24	0.70		0.67	0.08			0.01	0.03
Uniform Delay, d1	11.2	13.2	9.2	8.1	8.4		36.7	32.2			31.8	31.9
Progression Factor	1.00	1.00	1.00	0.35	0.58		1.00	1.00			1.00	1.00
Incremental Delay, d2	7.4	1.2	0.2	0.3	1.5		6.4	0.1			0.0	0.0
Delay (s)	18.6	14.4	9.5	3.2	6.3		43.1	32.3			31.8	31.9
Level of Service	B	B	A	A	A		D	C			C	C
Approach Delay (s)		14.0			6.2			39.8			31.9	
Approach LOS		B			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

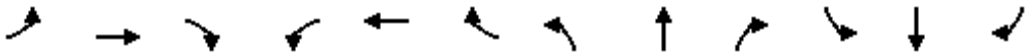
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1220	20	30	1535	10	20	30	35	5	15	45
Future Volume (vph)	50	1220	20	30	1535	10	20	30	35	5	15	45
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	3384		1713	3356		1713	1644		1747	1839	1509
Flt Permitted	0.11	1.00		0.19	1.00		0.75	1.00		0.71	1.00	1.00
Satd. Flow (perm)	201	3384		335	3356		1348	1644		1312	1839	1509
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	1258	21	31	1582	10	21	31	36	5	15	46
RTOR Reduction (vph)	0	1	0	0	0	0	0	33	0	0	0	42
Lane Group Flow (vph)	52	1278	0	31	1592	0	21	34	0	5	15	4
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		8
Actuated Green, G (s)	76.6	71.6		73.8	70.2		6.8	6.8		6.8	6.8	6.8
Effective Green, g (s)	80.6	73.6		77.8	72.2		8.8	8.8		8.8	8.8	8.8
Actuated g/C Ratio	0.81	0.74		0.78	0.72		0.09	0.09		0.09	0.09	0.09
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	267	2490		337	2423		118	144		115	161	132
v/s Ratio Prot	c0.01	0.38		0.01	c0.47			c0.02			0.01	
v/s Ratio Perm	0.14			0.07			0.02			0.00		0.00
v/c Ratio	0.19	0.51		0.09	0.66		0.18	0.24		0.04	0.09	0.03
Uniform Delay, d1	4.8	5.6		3.1	7.4		42.2	42.5		41.7	41.9	41.7
Progression Factor	1.16	1.64		1.04	0.61		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	0.6		0.1	1.1		0.7	0.9		0.2	0.3	0.1
Delay (s)	5.9	9.8		3.3	5.5		43.0	43.3		41.9	42.2	41.8
Level of Service	A	A		A	A		D	D		D	D	D
Approach Delay (s)		9.7			5.5			43.2			41.9	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group

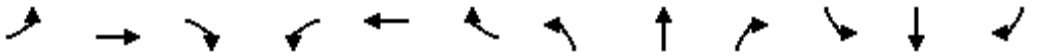


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	1040	95	10	1350	210	75	35	15	175	25	155
Future Volume (vph)	120	1040	95	10	1350	210	75	35	15	175	25	155
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3325	1517	1730	3392	1548	1696	1785	1517	1687	1529	
Flt Permitted	0.11	1.00	1.00	0.24	1.00	1.00	0.48	1.00	1.00	0.73	1.00	
Satd. Flow (perm)	184	3325	1517	437	3392	1548	860	1785	1517	1303	1529	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	124	1072	98	10	1392	216	77	36	15	180	26	160
RTOR Reduction (vph)	0	0	37	0	0	89	0	0	12	0	128	0
Lane Group Flow (vph)	124	1072	61	10	1392	127	77	36	3	180	58	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	69.8	62.6	62.6	57.1	55.9	55.9	18.2	18.2	18.2	18.2	18.2	
Effective Green, g (s)	72.7	65.5	62.6	62.9	58.8	58.8	19.9	19.9	18.2	19.9	19.9	
Actuated g/C Ratio	0.73	0.66	0.63	0.63	0.59	0.59	0.20	0.20	0.18	0.20	0.20	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	293	2177	949	327	1994	910	171	355	276	259	304	
v/s Ratio Prot	c0.05	0.32		0.00	c0.41			0.02			0.04	
v/s Ratio Perm	0.26		0.04	0.02		0.08	0.09		0.00	c0.14		
v/c Ratio	0.42	0.49	0.06	0.03	0.70	0.14	0.45	0.10	0.01	0.69	0.19	
Uniform Delay, d1	10.3	8.8	7.3	7.1	14.4	9.2	35.2	32.7	33.5	37.2	33.3	
Progression Factor	3.60	0.14	0.00	1.09	1.09	1.21	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.7	0.1	0.0	1.7	0.3	1.9	0.1	0.0	7.8	0.3	
Delay (s)	38.1	1.9	0.1	7.8	17.4	11.4	37.1	32.9	33.5	45.1	33.6	
Level of Service	D	A	A	A	B	B	D	C	C	D	C	
Approach Delay (s)		5.2			16.5			35.5			39.3	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

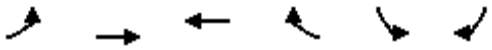
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	945	285	160	1235	330	140
Future Volume (vph)	945	285	160	1235	330	140
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3358	1384	1713	3392	1828	1685
Flt Permitted	1.00	1.00	0.18	1.00	0.95	1.00
Satd. Flow (perm)	3358	1384	330	3392	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	974	294	165	1273	340	144
RTOR Reduction (vph)	0	154	0	0	0	84
Lane Group Flow (vph)	974	140	165	1273	340	60
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	1%	1%	1%	2%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Actuated Green, G (s)	47.6	47.6	63.6	63.6	23.4	23.4
Effective Green, g (s)	50.6	47.6	65.6	66.6	25.4	23.4
Actuated g/C Ratio	0.51	0.48	0.66	0.67	0.25	0.23
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	2.5
Lane Grp Cap (vph)	1699	658	368	2259	464	394
v/s Ratio Prot	0.29		0.05	c0.38	c0.19	
v/s Ratio Perm		0.10	0.24			0.04
v/c Ratio	0.57	0.21	0.45	0.56	0.73	0.15
Uniform Delay, d1	17.2	15.3	9.6	8.9	34.2	30.4
Progression Factor	0.45	0.28	2.05	1.29	1.00	1.00
Incremental Delay, d2	1.3	0.7	0.7	0.8	5.6	0.1
Delay (s)	9.1	4.9	20.5	12.4	39.8	30.5
Level of Service	A	A	C	B	D	C
Approach Delay (s)	8.1			13.3	37.0	
Approach LOS	A			B	D	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			
Date Revised: 9-19-03			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	775	190	140	1190	115	155	10	115	140	10	50
Future Volume (vph)	55	775	190	140	1190	115	155	10	115	140	10	50
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1637	3275	1465	1688	3442	1538	1591	1708	1452	3191	1749	1443
Flt Permitted	0.14	1.00	1.00	0.26	1.00	1.00	0.56	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	234	3275	1465	462	3442	1538	932	1708	1452	3191	1749	1443
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	59	824	202	149	1266	122	165	11	122	149	11	53
RTOR Reduction (vph)	0	0	98	0	0	56	0	0	97	0	0	45
Lane Group Flow (vph)	59	824	104	149	1266	66	165	11	25	149	11	8
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	2%	4%	2%	0%	2%	0%	0%	1%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6		5	2		7	4	5	3	8	1
Permitted Phases	6		6	2		2	4		4			8
Actuated Green, G (s)	55.1	49.5	49.5	59.9	51.9	51.9	18.8	7.9	15.9	8.6	5.6	11.2
Effective Green, g (s)	59.3	51.6	51.6	64.1	54.0	54.0	20.8	8.9	20.1	9.6	6.6	15.4
Actuated g/C Ratio	0.59	0.52	0.52	0.64	0.54	0.54	0.21	0.09	0.20	0.10	0.07	0.15
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	246	1689	755	419	1858	830	272	152	291	306	115	222
v/s Ratio Prot	0.02	0.25		c0.04	c0.37		c0.07	0.01	0.01	0.05	0.01	0.00
v/s Ratio Perm	0.12		0.07	0.19		0.04	c0.05		0.01			0.00
v/c Ratio	0.24	0.49	0.14	0.36	0.68	0.08	0.61	0.07	0.08	0.49	0.10	0.04
Uniform Delay, d1	10.9	15.7	12.6	8.2	16.7	11.1	35.0	41.8	32.5	42.9	43.9	36.0
Progression Factor	0.50	0.31	0.24	0.45	0.35	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.9	0.3	0.4	1.5	0.1	3.8	0.2	0.1	1.2	0.4	0.1
Delay (s)	5.9	5.8	3.4	4.0	7.4	3.8	38.8	42.0	32.6	44.1	44.3	36.1
Level of Service	A	A	A	A	A	A	D	D	C	D	D	D
Approach Delay (s)		5.4			6.7			36.4			42.1	
Approach LOS		A			A			D			D	

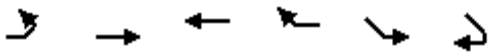
Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			
Date Revised: 3-10-2008			
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	135	900	1295	0	5	155
Future Volume (vph)	135	900	1295	0	5	155
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	9	12	12	12	12	12
Grade (%)		0%	-5%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	1.00		0.87	
Flt Protected	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1526	3392	3442		1565	
Flt Permitted	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1526	3392	3442		1565	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	139	928	1335	0	5	160
RTOR Reduction (vph)	0	0	0	0	134	0
Lane Group Flow (vph)	139	928	1335	0	31	0
Heavy Vehicles (%)	1%	1%	2%	0%	0%	0%
Turn Type	Prot	NA	NA		Prot	
Protected Phases	1	6	2		8	
Permitted Phases						
Actuated Green, G (s)	13.4	72.0	52.6		16.0	
Effective Green, g (s)	13.4	72.0	52.6		16.0	
Actuated g/C Ratio	0.13	0.72	0.53		0.16	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	204	2442	1810		250	
v/s Ratio Prot	c0.09	0.27	c0.39		c0.02	
v/s Ratio Perm						
v/c Ratio	0.68	0.38	0.74		0.12	
Uniform Delay, d1	41.3	5.4	18.4		36.0	
Progression Factor	0.89	0.30	1.00		1.00	
Incremental Delay, d2	8.2	0.4	2.7		1.0	
Delay (s)	45.0	2.0	21.1		37.0	
Level of Service	D	A	C		D	
Approach Delay (s)		7.6	21.1		37.0	
Approach LOS		A	C		D	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	65	1020	1340	55	10	60
Future Volume (Veh/h)	65	1020	1340	55	10	60
Sign Control		Free	Free		Stop	
Grade		0%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	1109	1457	60	11	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1517				2154	728
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1517				2154	728
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				69	82
cM capacity (veh/h)	446				35	366

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SE 1	SE 2
Volume Total	71	554	554	728	728	60	11	65
Volume Left	71	0	0	0	0	0	11	0
Volume Right	0	0	0	0	0	60	0	65
cSH	446	1700	1700	1700	1700	1700	35	366
Volume to Capacity	0.16	0.33	0.33	0.43	0.43	0.04	0.31	0.18
Queue Length 95th (ft)	14	0	0	0	0	0	25	16
Control Delay (s)	14.6	0.0	0.0	0.0	0.0	0.0	147.5	17.0
Lane LOS	B						F	C
Approach Delay (s)	0.9			0.0			35.9	
Approach LOS							E	

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

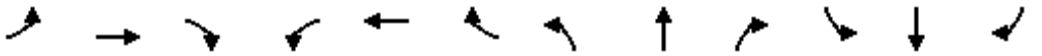
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1025	5	5	1445	0	10
Future Volume (Veh/h)	1025	5	5	1445	0	10
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1068	5	5	1505	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				201		
pX, platoon unblocked					0.70	
vC, conflicting volume			1073		1833	358
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1073		1324	358
tC, single (s)			4.1		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		100	98
cM capacity (veh/h)			657		104	615

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	427	427	219	507	1003	10
Volume Left	0	0	0	5	0	0
Volume Right	0	0	5	0	0	10
cSH	1700	1700	1700	657	1700	615
Volume to Capacity	0.25	0.25	0.13	0.01	0.59	0.02
Queue Length 95th (ft)	0	0	0	1	0	1
Control Delay (s)	0.0	0.0	0.0	0.2	0.0	10.9
Lane LOS				A		B
Approach Delay (s)	0.0			0.1		10.9
Approach LOS						B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

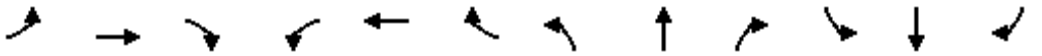
Appendix D6:

2045 Design Year (Build Scenario w/ Supplemental Growth)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	1150	85	330	1430	70	180	215	140	120	505	100
Future Volume (vph)	145	1150	85	330	1430	70	180	215	140	120	505	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	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	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	3191	3171	1472	3283	3321	1458	1591	3243	1349	1671	1775	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.09	1.00	1.00	0.61	1.00	1.00
Satd. Flow (perm)	3191	3171	1472	3283	3321	1458	156	3243	1349	1078	1775	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	1186	88	340	1474	72	186	222	144	124	521	103
RTOR Reduction (vph)	0	0	44	0	0	39	0	0	69	0	0	67
Lane Group Flow (vph)	149	1186	44	340	1474	33	186	222	75	124	521	36
Heavy Vehicles (%)	7%	11%	7%	4%	6%	8%	8%	6%	14%	6%	5%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6			2	4		4	8		8
Actuated Green, G (s)	6.0	52.6	60.6	19.4	66.0	66.0	50.0	42.0	61.4	44.0	39.0	45.0
Effective Green, g (s)	9.0	55.6	60.6	22.4	69.0	66.0	52.0	43.0	61.4	48.0	40.0	51.0
Actuated g/C Ratio	0.06	0.38	0.42	0.15	0.48	0.46	0.36	0.30	0.42	0.33	0.28	0.35
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	198	1215	615	507	1580	663	145	961	571	385	489	540
v/s Ratio Prot	0.05	c0.37	0.00	0.10	c0.44		c0.08	0.07	0.02	0.02	0.29	0.00
v/s Ratio Perm			0.03			0.02	c0.38		0.04	0.09		0.02
v/c Ratio	0.75	0.98	0.07	0.67	0.93	0.05	1.28	0.23	0.13	0.32	1.07	0.07
Uniform Delay, d1	66.9	44.0	25.3	57.8	35.8	22.0	39.5	38.5	25.5	35.1	52.5	31.2
Progression Factor	0.88	0.82	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.6	20.4	0.0	2.7	11.5	0.1	169.5	0.0	0.0	0.2	59.2	0.1
Delay (s)	73.5	56.7	17.7	60.6	47.3	22.2	209.0	38.6	25.6	35.2	111.7	31.3
Level of Service	E	E	B	E	D	C	F	D	C	D	F	C
Approach Delay (s)		56.1			48.7			92.6			88.0	
Approach LOS		E			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	62.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	1160	190	115	1645	45	110	30	40	20	20	45
Future Volume (vph)	60	1160	190	115	1645	45	110	30	40	20	20	45
Ideal Flow (vphpl)	1650	1650	1650	1714	1714	1714	1650	1650	1650	1650	1650	1650
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1426	2853	1296	1588	3049		1515	1359		1615	1700	1445
Flt Permitted	0.12	1.00	1.00	0.17	1.00		0.74	1.00		0.71	1.00	1.00
Satd. Flow (perm)	179	2853	1296	279	3049		1186	1359		1207	1700	1445
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	62	1196	196	119	1696	46	113	31	41	21	21	46
RTOR Reduction (vph)	0	0	71	0	2	0	0	35	0	0	0	39
Lane Group Flow (vph)	62	1196	125	119	1740	0	113	37	0	21	21	7
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	11%	11%	7%	2%	6%	0%	4%	13%	9%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4			8		8
Actuated Green, G (s)	67.1	67.1	67.1	81.4	81.4		14.6	14.6		14.6	14.6	14.6
Effective Green, g (s)	70.4	70.4	70.4	84.3	84.7		16.8	16.8		16.8	16.8	16.8
Actuated g/C Ratio	0.64	0.64	0.64	0.77	0.77		0.15	0.15		0.15	0.15	0.15
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	114	1825	829	335	2347		181	207		184	259	220
v/s Ratio Prot		0.42		0.03	c0.57			0.03			0.01	
v/s Ratio Perm	0.35		0.10	0.24			c0.10			0.02		0.00
v/c Ratio	0.54	0.66	0.15	0.36	0.74		0.62	0.18		0.11	0.08	0.03
Uniform Delay, d1	10.9	12.3	7.9	6.3	6.8		43.6	40.6		40.2	40.0	39.7
Progression Factor	1.00	1.00	1.00	1.13	0.51		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	17.4	1.9	0.4	0.5	1.7		6.6	0.4		0.3	0.1	0.1
Delay (s)	28.3	14.1	8.3	7.7	5.1		50.2	41.0		40.5	40.1	39.7
Level of Service	C	B	A	A	A		D	D		D	D	D
Approach Delay (s)		13.9			5.3			46.6			40.0	
Approach LOS		B			A			D			D	

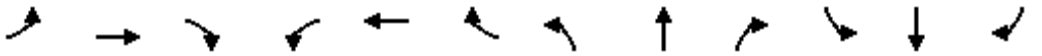
Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1120	25	35	1680	40	60	30	40	15	5	65
Future Volume (vph)	40	1120	25	35	1680	40	60	30	40	15	5	65
Ideal Flow (vphpl)	1803	1803	1803	1908	1908	1908	1650	1650	1650	1650	1650	1650
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1557	3080		1760	3444		1479	1411		1599	1683	1355
Flt Permitted	0.09	1.00		0.21	1.00		0.75	1.00		0.70	1.00	1.00
Satd. Flow (perm)	141	3080		381	3444		1174	1411		1185	1683	1355
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	1155	26	36	1732	41	62	31	41	15	5	67
RTOR Reduction (vph)	0	1	0	0	1	0	0	37	0	0	0	60
Lane Group Flow (vph)	41	1180	0	36	1772	0	62	35	0	15	5	7
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	10%	11%	5%	3%	5%	0%	6%	10%	3%	0%	0%	4%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		8
Actuated Green, G (s)	82.6	78.7		82.2	78.5		9.6	9.6		9.6	9.6	9.6
Effective Green, g (s)	86.6	80.7		86.2	80.5		11.6	11.6		11.6	11.6	11.6
Actuated g/C Ratio	0.79	0.73		0.78	0.73		0.11	0.11		0.11	0.11	0.11
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	186	2259		370	2520		123	148		124	177	142
v/s Ratio Prot	c0.01	0.38		0.01	c0.51			0.03			0.00	
v/s Ratio Perm	0.16			0.07			c0.05			0.01		0.01
v/c Ratio	0.22	0.52		0.10	0.70		0.50	0.24		0.12	0.03	0.05
Uniform Delay, d1	6.9	6.3		3.3	8.1		46.5	45.1		44.6	44.1	44.2
Progression Factor	2.14	1.62		0.17	0.57		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.7		0.1	1.2		3.2	0.8		0.4	0.1	0.1
Delay (s)	15.3	10.9		0.6	5.9		49.7	46.0		45.0	44.2	44.4
Level of Service	B	B		A	A		D	D		D	D	D
Approach Delay (s)		11.0			5.8			47.7			44.5	
Approach LOS		B			A			D			D	

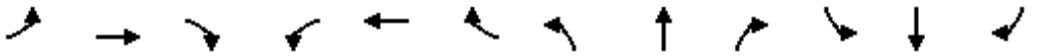
Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	1045	10	0	1575	110	30	5	5	35	5	150
Future Volume (vph)	115	1045	10	0	1575	110	30	5	5	35	5	150
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0		3.1	3.1	4.3	4.3	6.0	4.3	4.3	6.0
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1577	3013	1510		3279	1453	1622	1776	1006	1501	1785	1391
Flt Permitted	0.10	1.00	1.00		1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	160	3013	1510		3279	1453	1288	1776	1006	1192	1785	1391
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	1077	10	0	1624	113	31	5	5	36	5	155
RTOR Reduction (vph)	0	0	2	0	0	34	0	0	5	0	0	142
Lane Group Flow (vph)	119	1077	8	0	1624	79	31	5	0	36	5	13
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	7%	12%	0%	0%	5%	6%	4%	0%	50%	13%	0%	7%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	89.0	89.0	89.0		74.4	74.4	9.0	9.0	9.0	9.0	9.0	9.0
Effective Green, g (s)	91.9	91.9	89.0		77.3	77.3	10.7	10.7	9.0	10.7	10.7	9.0
Actuated g/C Ratio	0.84	0.84	0.81		0.70	0.70	0.10	0.10	0.08	0.10	0.10	0.08
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	5.0	6.0	6.0		6.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	281	2517	1221		2304	1021	125	172	82	115	173	113
v/s Ratio Prot	0.04	c0.36			c0.50			0.00			0.00	
v/s Ratio Perm	0.31		0.01			0.05	0.02		0.00	c0.03		0.01
v/c Ratio	0.42	0.43	0.01		0.70	0.08	0.25	0.03	0.00	0.31	0.03	0.11
Uniform Delay, d1	9.1	2.3	2.0		9.6	5.1	45.9	44.9	46.4	46.2	44.9	46.8
Progression Factor	2.20	0.89	1.00		0.80	0.78	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.5	0.0		1.1	0.1	1.0	0.1	0.0	1.6	0.1	0.4
Delay (s)	21.9	2.5	2.0		8.8	4.1	47.0	45.0	46.4	47.8	45.0	47.2
Level of Service	C	A	A		A	A	D	D	D	D	D	D
Approach Delay (s)		4.4			8.5			46.7			47.3	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			

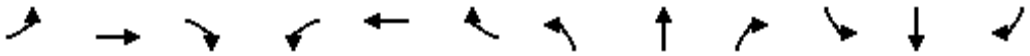


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	915	85	65	1170	140	490	25	255	45	10	30
Future Volume (vph)	90	915	85	65	1170	140	490	25	255	45	10	30
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	10	12	12	12	15	12	16	12	12	12
Grade (%)		2%			-2%			4%			0%	
Total Lost time (s)	7.0	4.0	7.0	5.0	4.0		3.0	6.0	6.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3055	1227	1504	3171		1828	1749	1685	1679	1567	
Flt Permitted	0.16	1.00	1.00	0.20	1.00		0.55	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	281	3055	1227	314	3171		1060	1749	1685	1309	1567	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	93	943	88	67	1206	144	505	26	263	46	10	31
RTOR Reduction (vph)	0	0	45	0	7	0	0	0	129	0	29	0
Lane Group Flow (vph)	93	943	43	67	1343	0	505	26	134	46	12	0
Confl. Peds. (#/hr)			1									
Heavy Vehicles (%)	2%	11%	14%	15%	8%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		6		5	2		7	4			8	
Permitted Phases	6		6	2			4		4	8		
Actuated Green, G (s)	54.0	54.0	54.0	65.8	65.8		31.2	31.2	31.2	8.2	8.2	
Effective Green, g (s)	54.0	57.0	54.0	67.8	68.8		33.2	31.2	31.2	8.2	8.2	
Actuated g/C Ratio	0.49	0.52	0.49	0.62	0.63		0.30	0.28	0.28	0.07	0.07	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		5.0	6.0	6.0	5.0	5.0	
Vehicle Extension (s)	6.3	6.3	6.3	3.0	6.3		3.0	2.5	2.5	3.0	3.0	
Lane Grp Cap (vph)	137	1583	602	267	1983		466	496	477	97	116	
v/s Ratio Prot		0.31		0.02	c0.42		c0.21	0.01			0.01	
v/s Ratio Perm	0.33		0.04	0.14			c0.12		0.08	0.04		
v/c Ratio	0.68	0.60	0.07	0.25	0.68		1.08	0.05	0.28	0.47	0.11	
Uniform Delay, d1	21.4	18.5	14.8	10.8	13.4		36.8	28.7	30.7	48.8	47.5	
Progression Factor	1.03	1.06	15.34	0.80	0.51		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	22.3	1.5	0.2	0.3	1.3		66.1	0.0	0.2	3.6	0.4	
Delay (s)	44.3	21.1	226.8	9.0	8.2		103.0	28.7	30.9	52.5	47.9	
Level of Service	D	C	F	A	A		F	C	C	D	D	
Approach Delay (s)		39.1			8.2			76.7			50.3	
Approach LOS		D			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	35.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03

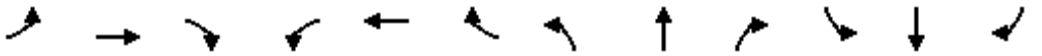
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	985	60	165	1145	50	175	50	110	10	40	65
Future Volume (vph)	100	985	60	165	1145	50	175	50	110	10	40	65
Ideal Flow (vphpl)	2100	2100	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			-2%			0%			0%	
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1975	3643		1696	3234	1447	1679	1586		1713	1562	
Flt Permitted	0.16	1.00		0.17	1.00	1.00	0.36	1.00		0.65	1.00	
Satd. Flow (perm)	327	3643		295	3234	1447	640	1586		1177	1562	
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92
Adj. Flow (vph)	109	1071	62	170	1245	54	180	52	113	11	41	71
RTOR Reduction (vph)	0	3	0	0	0	23	0	78	0	0	61	0
Lane Group Flow (vph)	109	1130	0	170	1245	31	180	87	0	11	51	0
Heavy Vehicles (%)	1%	9%	2%	2%	7%	7%	2%	2%	2%	0%	0%	7%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	67.5	60.2		73.3	63.1	63.1	23.6	23.6		9.2	9.2	
Effective Green, g (s)	67.5	60.2		73.3	63.1	63.1	23.6	23.6		9.2	9.2	
Actuated g/C Ratio	0.61	0.55		0.67	0.57	0.57	0.21	0.21		0.08	0.08	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	310	1993		326	1855	830	226	340		98	130	
v/s Ratio Prot	0.02	0.31		c0.05	c0.39		c0.07	0.06			0.03	
v/s Ratio Perm	0.19			0.30		0.02	c0.10			0.01		
v/c Ratio	0.35	0.57		0.52	0.67	0.04	0.80	0.26		0.11	0.39	
Uniform Delay, d1	10.6	16.3		10.2	16.3	10.2	38.8	35.9		46.6	47.7	
Progression Factor	1.44	0.98		2.28	0.37	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.0		1.2	1.6	0.1	17.4	0.4		0.5	1.9	
Delay (s)	15.8	17.1		24.5	7.7	10.3	56.3	36.3		47.1	49.7	
Level of Service	B	B		C	A	B	E	D		D	D	
Approach Delay (s)		17.0			9.7			46.7			49.4	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

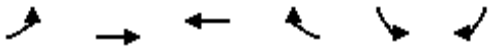


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	980	120	80	1275	245	45	0	35	205	20	40
Future Volume (vph)	45	980	120	80	1275	245	45	0	35	205	20	40
Ideal Flow (vphpl)	1662	1662	1662	1914	1914	1914	1662	1662	1662	1662	1662	1662
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	3.9	4.9	4.9	4.9	5.0		4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00		0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)	1509	2799	1377	1726	3550	1633	1197		892	2830	1612	1330
Flt Permitted	0.12	1.00	1.00	0.20	1.00	1.00	0.93		1.00	0.95	1.00	1.00
Satd. Flow (perm)	185	2799	1377	366	3550	1633	1172		892	2830	1612	1330
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	48	1043	128	85	1356	261	48	0	37	218	21	43
RTOR Reduction (vph)	0	0	47	0	0	113	0	0	32	0	0	34
Lane Group Flow (vph)	48	1043	81	85	1356	148	48	0	5	218	21	9
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	10%	0%	8%	5%	0%	25%	0%	50%	5%	0%	3%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt		pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases	6		6	2		2	4		4			8
Actuated Green, G (s)	65.4	59.8	65.4	66.2	60.2	60.2	8.9		9.3	14.9	12.6	18.2
Effective Green, g (s)	69.6	61.9	69.6	70.4	62.3	62.3	10.9		13.5	15.9	13.6	22.4
Actuated g/C Ratio	0.63	0.56	0.63	0.64	0.57	0.57	0.10		0.12	0.14	0.12	0.20
Clearance Time (s)	7.0	7.0	6.0	7.0	7.0	7.0	6.0		7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	3.0	3.0	4.8	4.8	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	1575	871	334	2010	924	117		109	409	199	270
v/s Ratio Prot	0.02	0.37	0.01	c0.02	c0.38		0.02		0.00	c0.08	0.01	0.00
v/s Ratio Perm	0.13		0.05	0.14		0.09	c0.02		0.00			0.00
v/c Ratio	0.23	0.66	0.09	0.25	0.67	0.16	0.41		0.04	0.53	0.11	0.03
Uniform Delay, d1	11.3	16.8	7.9	9.0	16.7	11.4	46.5		42.5	43.6	42.8	35.1
Progression Factor	0.42	0.68	4.04	0.28	0.41	0.31	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	1.9	0.0	0.3	1.3	0.3	2.3		0.2	1.3	0.2	0.0
Delay (s)	5.2	13.3	31.9	2.8	8.2	3.8	48.8		42.7	44.9	43.0	35.2
Level of Service	A	B	C	A	A	A	D		D	D	D	D
Approach Delay (s)		14.9			7.3			46.2			43.3	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	105	1110	1440	0	5	165
Future Volume (vph)	105	1110	1440	0	5	165
Ideal Flow (vphpl)	2100	2100	1900	1900	1803	1803
Grade (%)		0%	-5%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	1.00		0.87	
Flt Protected	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1995	3595	3426		1549	
Flt Permitted	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1995	3595	3426		1549	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	108	1144	1485	0	5	170
RTOR Reduction (vph)	0	0	0	0	145	0
Lane Group Flow (vph)	108	1144	1485	0	30	0
Heavy Vehicles (%)	0%	11%	8%	0%	0%	1%
Turn Type	Prot	NA	NA		Prot	
Protected Phases	1	6	2		8	
Permitted Phases						
Actuated Green, G (s)	11.3	82.0	64.7		16.0	
Effective Green, g (s)	11.3	82.0	64.7		16.0	
Actuated g/C Ratio	0.10	0.75	0.59		0.15	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	204	2679	2015		225	
v/s Ratio Prot	0.05	c0.32	c0.43		c0.02	
v/s Ratio Perm						
v/c Ratio	0.53	0.43	0.74		0.13	
Uniform Delay, d1	46.8	5.2	16.5		41.0	
Progression Factor	1.14	0.44	1.00		1.00	
Incremental Delay, d2	2.0	0.4	2.5		1.2	
Delay (s)	55.3	2.7	18.9		42.2	
Level of Service	E	A	B		D	
Approach Delay (s)		7.3	18.9		42.2	
Approach LOS		A	B		D	

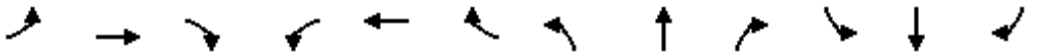
Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1215	5	0	1600	0	0
Future Volume (Veh/h)	1215	5	0	1600	0	0
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1266	5	0	1667	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				429		
pX, platoon unblocked					0.68	
vC, conflicting volume			1271		2102	636
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1271		1673	636
tC, single (s)			4.2		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			516		60	426

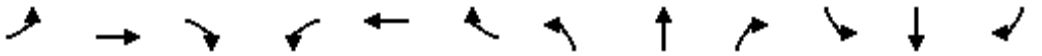
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	844	427	834	834	0
Volume Left	0	0	0	0	0
Volume Right	0	5	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.50	0.25	0.49	0.49	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		0.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	415	1545	120	250	1495	120	230	495	285	120	265	105
Future Volume (vph)	415	1545	120	250	1495	120	230	495	285	120	265	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	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	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	3380	3451	1575	3347	3417	1575	1685	3370	1523	1736	1864	1585
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.17	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	3380	3451	1575	3347	3417	1575	296	3370	1523	633	1864	1585
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	428	1593	124	258	1541	124	237	510	294	124	273	108
RTOR Reduction (vph)	0	0	38	0	0	69	0	0	109	0	0	76
Lane Group Flow (vph)	428	1593	86	258	1541	55	237	510	185	124	273	32
Heavy Vehicles (%)	1%	2%	0%	2%	3%	0%	2%	2%	1%	2%	0%	0%
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6			2	4		4	8		8
Actuated Green, G (s)	13.0	59.0	70.0	7.0	53.0	53.0	34.0	23.0	30.0	22.0	17.0	30.0
Effective Green, g (s)	16.0	62.0	70.0	10.0	56.0	53.0	36.0	24.0	30.0	26.0	18.0	36.0
Actuated g/C Ratio	0.13	0.52	0.58	0.08	0.47	0.44	0.30	0.20	0.25	0.22	0.15	0.30
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	450	1783	918	278	1594	695	227	674	380	201	279	475
v/s Ratio Prot	0.13	c0.46	0.01	0.08	c0.45		c0.10	0.15	0.03	0.04	0.15	0.01
v/s Ratio Perm			0.05			0.03	c0.21		0.09	0.10		0.01
v/c Ratio	0.95	0.89	0.09	0.93	0.97	0.08	1.04	0.76	0.49	0.62	0.98	0.07
Uniform Delay, d1	51.6	26.0	11.0	54.6	31.1	19.4	37.0	45.2	38.4	39.9	50.8	30.0
Progression Factor	1.00	1.00	1.00	1.18	0.86	1.87	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.2	7.3	0.0	27.3	12.5	0.2	71.7	4.3	0.4	3.9	47.2	0.1
Delay (s)	81.8	33.4	11.0	91.7	39.3	36.5	108.7	49.6	38.8	43.8	98.0	30.1
Level of Service	F	C	B	F	D	D	F	D	D	D	F	C
Approach Delay (s)		41.7			46.2			60.0			70.2	
Approach LOS		D			D			E			E	

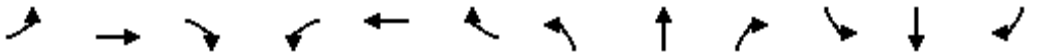
Intersection Summary			
HCM 2000 Control Delay	49.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	1690	185	70	1495	20	245	60	95	50	55	90
Future Volume (vph)	70	1690	185	70	1495	20	245	60	95	50	55	90
Ideal Flow (vphpl)	1650	1650	1650	1714	1714	1714	1650	1650	1650	1650	1650	1650
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	3104	1373	1588	3141		1560	1485		1615	1700	1445
Flt Permitted	0.12	1.00	1.00	0.06	1.00		0.72	1.00		0.57	1.00	1.00
Satd. Flow (perm)	205	3104	1373	94	3141		1182	1485		975	1700	1445
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	1742	191	72	1541	21	253	62	98	52	57	93
RTOR Reduction (vph)	0	0	84	0	1	0	0	50	0	0	0	69
Lane Group Flow (vph)	72	1742	107	72	1561	0	253	110	0	52	57	24
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	0%	2%	1%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4			8		8
Actuated Green, G (s)	64.2	64.2	64.2	77.2	77.2		28.8	28.8		28.8	28.8	28.8
Effective Green, g (s)	67.5	67.5	67.5	80.1	80.5		31.0	31.0		31.0	31.0	31.0
Actuated g/C Ratio	0.56	0.56	0.56	0.67	0.67		0.26	0.26		0.26	0.26	0.26
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	115	1746	772	173	2107		305	383		251	439	373
v/s Ratio Prot		c0.56		0.03	c0.50			0.07			0.03	
v/s Ratio Perm	0.35		0.08	0.25			c0.21			0.05		0.02
v/c Ratio	0.63	1.00	0.14	0.42	0.74		0.83	0.29		0.21	0.13	0.06
Uniform Delay, d1	17.7	26.2	12.5	22.2	12.9		42.0	35.7		34.9	34.1	33.6
Progression Factor	1.55	1.63	4.31	1.54	2.20		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.2	15.3	0.2	1.2	1.8		16.8	0.4		0.4	0.1	0.1
Delay (s)	40.7	58.0	54.0	35.3	30.3		58.8	36.1		35.3	34.3	33.6
Level of Service	D	E	D	D	C		E	D		D	C	C
Approach Delay (s)		57.0			30.5			50.0			34.2	
Approach LOS		E			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	45.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

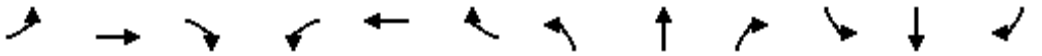
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	1735	30	65	1505	30	20	40	125	55	40	60
Future Volume (vph)	125	1735	30	65	1505	30	20	40	125	55	40	60
Ideal Flow (vphpl)	1803	1803	1803	1908	1908	1908	1650	1650	1650	1650	1650	1650
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	3351		1777	3511		1568	1446		1599	1683	1410
Flt Permitted	0.10	1.00		0.07	1.00		0.73	1.00		0.36	1.00	1.00
Satd. Flow (perm)	177	3351		139	3511		1205	1446		611	1683	1410
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	129	1789	31	67	1552	31	21	41	129	57	41	62
RTOR Reduction (vph)	0	1	0	0	1	0	0	104	0	0	0	54
Lane Group Flow (vph)	129	1819	0	67	1582	0	21	66	0	57	41	8
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		8
Actuated Green, G (s)	91.6	82.7		85.2	79.5		13.6	13.6		13.6	13.6	13.6
Effective Green, g (s)	95.6	84.7		89.2	81.5		15.6	15.6		15.6	15.6	15.6
Actuated g/C Ratio	0.80	0.71		0.74	0.68		0.13	0.13		0.13	0.13	0.13
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	280	2365		208	2384		156	187		79	218	183
v/s Ratio Prot	c0.04	c0.54		0.02	0.45			0.05			0.02	
v/s Ratio Perm	0.32			0.22			0.02			c0.09		0.01
v/c Ratio	0.46	0.77		0.32	0.66		0.13	0.35		0.72	0.19	0.04
Uniform Delay, d1	10.6	11.4		10.4	11.2		46.2	47.6		50.1	46.6	45.7
Progression Factor	3.41	0.21		2.45	1.12		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.1		0.7	1.1		0.4	1.1		27.5	0.4	0.1
Delay (s)	36.6	3.4		26.3	13.6		46.6	48.7		77.6	47.0	45.8
Level of Service	D	A		C	B		D	D		E	D	D
Approach Delay (s)		5.6			14.2			48.5			57.4	
Approach LOS		A			B			D			E	

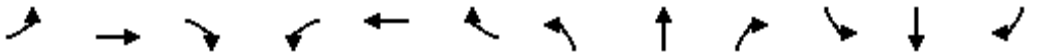
Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1640	125	15	1375	195	45	25	15	220	30	180
Future Volume (vph)	150	1640	125	15	1375	195	45	25	15	220	30	180
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1671	3341	1510	1671	3409	1540	1687	1776	1510	1696	1785	1480
Flt Permitted	0.10	1.00	1.00	0.08	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	169	3341	1510	149	3409	1540	1309	1776	1510	1321	1785	1480
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	155	1691	129	15	1418	201	46	26	15	227	31	186
RTOR Reduction (vph)	0	0	30	0	0	84	0	0	12	0	0	149
Lane Group Flow (vph)	155	1691	99	15	1418	117	46	26	3	227	31	37
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	84.2	75.7	75.7	69.2	66.7	66.7	23.8	23.8	23.8	23.8	23.8	23.8
Effective Green, g (s)	87.1	78.6	75.7	75.0	69.6	69.6	25.5	25.5	23.8	25.5	25.5	23.8
Actuated g/C Ratio	0.73	0.65	0.63	0.62	0.58	0.58	0.21	0.21	0.20	0.21	0.21	0.20
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	302	2188	952	161	1977	893	278	377	299	280	379	293
v/s Ratio Prot	c0.06	c0.51		0.00	0.42			0.01			0.02	
v/s Ratio Perm	0.31		0.07	0.05		0.08	0.04		0.00	c0.17		0.02
v/c Ratio	0.51	0.77	0.10	0.09	0.72	0.13	0.17	0.07	0.01	0.81	0.08	0.13
Uniform Delay, d1	14.9	14.5	8.7	12.1	18.1	11.5	38.6	37.8	38.6	45.0	37.9	39.5
Progression Factor	1.18	1.73	2.32	1.27	1.01	1.86	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.8	0.1	0.2	1.8	0.2	0.3	0.1	0.0	16.1	0.1	0.2
Delay (s)	18.6	26.9	20.4	15.5	20.0	21.6	38.8	37.8	38.6	61.1	38.0	39.7
Level of Service	B	C	C	B	C	C	D	D	D	E	D	D
Approach Delay (s)		25.8			20.2			38.5			50.5	
Approach LOS		C			C			D			D	

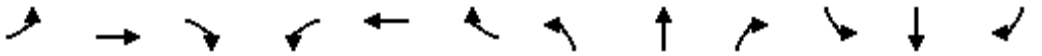
Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	1330	500	245	1235	65	270	10	195	130	25	85
Future Volume (vph)	45	1330	500	245	1235	65	270	10	195	130	25	85
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	10	12	12	12	15	12	16	12	12	12
Grade (%)		2%			-2%			4%			0%	
Total Lost time (s)	7.0	4.0	7.0	5.0	4.0		4.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3325	1396	1730	3336		1810	1732	1685	1679	1563	
Flt Permitted	0.20	1.00	1.00	0.07	1.00		0.52	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	351	3325	1396	120	3336		998	1732	1685	1328	1563	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	1371	515	253	1273	67	278	10	201	134	26	88
RTOR Reduction (vph)	0	0	285	0	3	0	0	0	148	0	77	0
Lane Group Flow (vph)	46	1371	230	253	1337	0	278	10	53	134	37	0
Confl. Peds. (#/hr)			1									
Heavy Vehicles (%)	2%	2%	0%	0%	3%	2%	2%	2%	1%	2%	2%	2%
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		6		5	2		7	4			8	
Permitted Phases	6		6	2			4		4	8		
Actuated Green, G (s)	53.5	53.5	53.5	75.4	75.4		31.6	31.6	31.6	15.6	15.6	
Effective Green, g (s)	53.5	56.5	53.5	77.4	78.4		33.6	31.6	31.6	15.6	15.6	
Actuated g/C Ratio	0.45	0.47	0.45	0.65	0.65		0.28	0.26	0.26	0.13	0.13	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	6.3	6.3	6.3	3.0	6.3		2.5	2.5	2.5	6.3	6.3	
Lane Grp Cap (vph)	156	1565	622	304	2179		360	456	443	172	203	
v/s Ratio Prot		c0.41		c0.12	0.40		c0.08	0.01			0.02	
v/s Ratio Perm	0.13		0.16	0.42			c0.14		0.03	0.10		
v/c Ratio	0.29	0.88	0.37	0.83	0.61		0.77	0.02	0.12	0.78	0.18	
Uniform Delay, d1	21.2	28.6	22.1	36.0	12.0		38.1	32.7	33.6	50.5	46.5	
Progression Factor	0.64	0.84	1.95	1.76	0.32		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.2	5.0	1.1	11.1	0.8		9.5	0.0	0.1	24.6	1.3	
Delay (s)	16.6	29.0	44.1	74.4	4.6		47.6	32.8	33.7	75.2	47.9	
Level of Service	B	C	D	E	A		D	C	C	E	D	
Approach Delay (s)		32.7			15.7			41.6			62.6	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

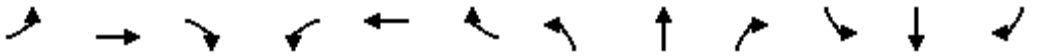
Date Revised: 9-19-03
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	1410	70	170	1315	35	150	40	100	20	50	80
Future Volume (vph)	115	1410	70	170	1315	35	150	40	100	20	50	80
Ideal Flow (vphpl)	2100	2100	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			-2%			0%			0%	
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.89		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1995	3885		1696	3392	1548	1679	1578		1543	1582	
Flt Permitted	0.10	1.00		0.06	1.00	1.00	0.31	1.00		0.67	1.00	
Satd. Flow (perm)	201	3885		112	3392	1548	543	1578		1081	1582	
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92
Adj. Flow (vph)	125	1533	72	175	1429	38	155	41	103	22	52	87
RTOR Reduction (vph)	0	3	0	0	0	18	0	79	0	0	52	0
Lane Group Flow (vph)	125	1602	0	175	1429	20	155	65	0	22	87	0
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%	2%	2%	2%	11%	2%	4%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	67.5	59.9		75.7	64.0	64.0	28.4	28.4		10.9	10.9	
Effective Green, g (s)	67.5	59.9		75.7	64.0	64.0	28.4	28.4		10.9	10.9	
Actuated g/C Ratio	0.56	0.50		0.63	0.53	0.53	0.24	0.24		0.09	0.09	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	226	1939		225	1809	825	237	373		98	143	
v/s Ratio Prot	0.03	c0.41		c0.08	c0.42		c0.06	0.04			0.06	
v/s Ratio Perm	0.27			0.42		0.01	c0.09			0.02		
v/c Ratio	0.55	0.83		0.78	0.79	0.02	0.65	0.18		0.22	0.61	
Uniform Delay, d1	17.4	25.6		33.7	22.6	13.2	38.9	36.5		50.6	52.5	
Progression Factor	1.58	1.50		1.73	0.45	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	2.5		11.7	2.7	0.0	6.3	0.2		1.2	7.2	
Delay (s)	29.3	40.8		69.9	12.8	13.3	45.3	36.7		51.8	59.7	
Level of Service	C	D		E	B	B	D	D		D	E	
Approach Delay (s)		40.0			18.9			41.1			58.6	
Approach LOS		D			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

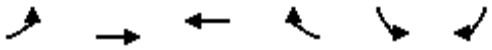


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	1275	215	160	1230	240	240	30	180	340	20	55
Future Volume (vph)	65	1275	215	160	1230	240	240	30	180	340	20	55
Ideal Flow (vphpl)	1662	1662	1662	1914	1914	1914	1662	1662	1662	1662	1662	1662
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	3.9	4.9	4.9	3.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1509	3018	1377	1864	3654	1642	1496	1574	1338	2942	1612	1343
Flt Permitted	0.09	1.00	1.00	0.07	1.00	1.00	0.57	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	149	3018	1377	135	3654	1642	904	1574	1338	2942	1612	1343
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1356	229	170	1309	255	255	32	191	362	21	59
RTOR Reduction (vph)	0	0	77	0	0	86	0	0	72	0	0	49
Lane Group Flow (vph)	69	1356	152	170	1309	169	255	32	119	362	21	10
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2	4		4			8
Actuated Green, G (s)	59.4	53.3	75.6	65.0	56.1	75.3	34.9	12.6	21.5	19.2	9.5	15.6
Effective Green, g (s)	63.6	55.4	79.8	69.2	58.2	79.5	36.9	13.6	25.7	20.2	10.5	19.8
Actuated g/C Ratio	0.53	0.46	0.66	0.58	0.49	0.66	0.31	0.11	0.21	0.17	0.09	0.17
Clearance Time (s)	7.0	7.0	6.0	7.0	7.0	6.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	3.0	3.0	4.8	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	171	1393	915	236	1772	1087	392	178	286	495	141	221
v/s Ratio Prot	0.03	c0.45	0.03	c0.07	0.36	0.03	c0.13	0.02	0.04	c0.12	0.01	0.00
v/s Ratio Perm	0.18		0.08	0.35		0.08	c0.07		0.05			0.00
v/c Ratio	0.40	0.97	0.17	0.72	0.74	0.16	0.65	0.18	0.42	0.73	0.15	0.04
Uniform Delay, d1	18.8	31.6	7.6	28.2	24.8	7.6	34.7	48.2	40.7	47.3	50.6	42.1
Progression Factor	0.80	1.24	10.87	1.12	0.71	6.42	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	13.3	0.1	4.7	1.2	0.0	3.8	0.5	1.0	5.5	0.5	0.1
Delay (s)	16.0	52.5	82.4	36.4	18.8	48.9	38.6	48.6	41.7	52.8	51.1	42.2
Level of Service	B	D	F	D	B	D	D	D	D	D	D	D
Approach Delay (s)		55.1			24.9			40.5			51.3	
Approach LOS		E			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	335	1480	1450	0	20	180
Future Volume (vph)	335	1480	1450	0	20	180
Ideal Flow (vphpl)	2100	2100	1900	1900	1803	1803
Grade (%)		0%	-5%		0%	
Total Lost time (s)	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	1.00		0.88	
Flt Protected	0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1995	3912	3628		1576	
Flt Permitted	0.95	1.00	1.00		0.99	
Satd. Flow (perm)	1995	3912	3628		1576	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	345	1526	1495	0	21	186
RTOR Reduction (vph)	0	0	0	0	162	0
Lane Group Flow (vph)	345	1526	1495	0	45	0
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Turn Type	Prot	NA	NA		Prot	
Protected Phases	1	6	2		8	
Permitted Phases						
Actuated Green, G (s)	15.2	44.3	25.1		7.7	
Effective Green, g (s)	15.2	44.3	25.1		7.7	
Actuated g/C Ratio	0.25	0.74	0.42		0.13	
Clearance Time (s)	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	505	2888	1517		202	
v/s Ratio Prot	c0.17	0.39	c0.41		c0.03	
v/s Ratio Perm						
v/c Ratio	0.68	0.53	0.99		0.22	
Uniform Delay, d1	20.2	3.4	17.3		23.5	
Progression Factor	1.23	0.96	1.00		1.00	
Incremental Delay, d2	2.0	0.4	19.9		0.6	
Delay (s)	27.0	3.6	37.2		24.0	
Level of Service	C	A	D		C	
Approach Delay (s)		7.9	37.2		24.0	
Approach LOS		A	D		C	

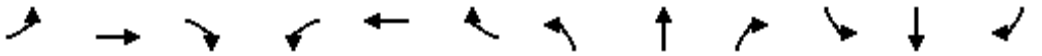
Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1785	10	0	1630	0	30
Future Volume (Veh/h)	1785	10	0	1630	0	30
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1859	10	0	1698	0	31
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				429		
pX, platoon unblocked					0.59	
vC, conflicting volume			1869		2713	934
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1869		2517	934
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	89
cM capacity (veh/h)			327		14	271

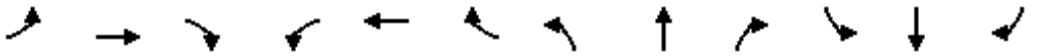
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1239	630	849	849	31
Volume Left	0	0	0	0	0
Volume Right	0	10	0	0	31
cSH	1700	1700	1700	1700	271
Volume to Capacity	0.73	0.37	0.50	0.50	0.11
Queue Length 95th (ft)	0	0	0	0	10
Control Delay (s)	0.0	0.0	0.0	0.0	20.0
Lane LOS					C
Approach Delay (s)	0.0		0.0		20.0
Approach LOS					C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	1285	140	220	1680	155	180	220	190	225	235	185
Future Volume (vph)	175	1285	140	220	1680	155	180	220	190	225	235	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	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	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	3414	3451	1575	3414	3451	1514	1719	3403	1508	1753	1846	1554
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.17	1.00	1.00	0.61	1.00	1.00
Satd. Flow (perm)	3414	3451	1575	3414	3451	1514	307	3403	1508	1126	1846	1554
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	180	1325	144	227	1732	160	186	227	196	232	242	191
RTOR Reduction (vph)	0	0	56	0	0	53	0	0	84	0	0	90
Lane Group Flow (vph)	180	1325	88	227	1732	107	186	227	112	232	242	101
Heavy Vehicles (%)	0%	2%	0%	0%	2%	4%	0%	1%	2%	1%	1%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6			2	4		4	8		8
Actuated Green, G (s)	7.1	75.4	86.4	17.6	85.9	85.9	35.0	24.0	41.6	27.0	20.0	27.1
Effective Green, g (s)	10.1	78.4	86.4	20.6	88.9	85.9	37.0	25.0	41.6	31.0	21.0	33.1
Actuated g/C Ratio	0.07	0.52	0.58	0.14	0.59	0.57	0.25	0.17	0.28	0.21	0.14	0.22
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	5.5	8.0	2.0	5.5	8.0	8.0	2.0	2.0	5.5	2.0	2.0	5.5
Lane Grp Cap (vph)	229	1803	907	468	2045	867	188	567	418	270	258	342
v/s Ratio Prot	0.05	c0.38	0.01	0.07	c0.50		c0.08	0.07	0.03	0.05	0.13	0.02
v/s Ratio Perm			0.05			0.07	c0.16		0.04	0.13		0.04
v/c Ratio	0.79	0.73	0.10	0.49	0.85	0.12	0.99	0.40	0.27	0.86	0.94	0.29
Uniform Delay, d1	68.9	27.7	14.3	59.8	25.0	14.7	51.1	55.8	42.3	55.7	63.9	48.7
Progression Factor	0.84	0.62	0.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.1	2.6	0.0	1.9	4.6	0.3	61.8	0.2	0.9	22.0	38.7	1.2
Delay (s)	76.0	19.8	2.0	61.7	29.6	15.0	112.9	56.0	43.2	77.7	102.5	49.9
Level of Service	E	B	A	E	C	B	F	E	D	E	F	D
Approach Delay (s)		24.3			31.9			69.2			78.8	
Approach LOS		C			C			E			E	

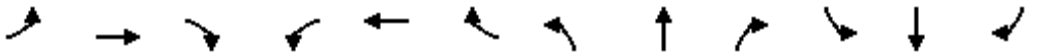
Intersection Summary			
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	1460	165	65	1785	20	180	20	70	20	15	65
Future Volume (vph)	75	1460	165	65	1785	20	180	20	70	20	15	65
Ideal Flow (vphpl)	1650	1650	1650	1714	1714	1714	1650	1650	1650	1650	1650	1650
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7		4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1552	3135	1360	1620	3172		1560	1450		1615	1700	1402
Flt Permitted	0.08	1.00	1.00	0.08	1.00		0.75	1.00		0.70	1.00	1.00
Satd. Flow (perm)	131	3135	1360	132	3172		1228	1450		1184	1700	1402
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	1505	170	67	1840	21	186	21	72	21	15	67
RTOR Reduction (vph)	0	0	72	0	1	0	0	57	0	0	0	53
Lane Group Flow (vph)	77	1505	98	67	1860	0	186	36	0	21	15	14
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	2%	1%	2%	0%	2%	0%	1%	0%	0%	0%	0%	3%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4			8		8
Actuated Green, G (s)	54.3	54.3	54.3	67.0	67.0		19.0	19.0		19.0	19.0	19.0
Effective Green, g (s)	57.6	57.6	57.6	69.9	70.3		21.2	21.2		21.2	21.2	21.2
Actuated g/C Ratio	0.58	0.58	0.58	0.70	0.70		0.21	0.21		0.21	0.21	0.21
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	75	1805	783	220	2229		260	307		251	360	297
v/s Ratio Prot		0.48		0.03	c0.59			0.03			0.01	
v/s Ratio Perm	c0.59		0.07	0.19			c0.15			0.02		0.01
v/c Ratio	1.03	0.83	0.13	0.30	0.83		0.72	0.12		0.08	0.04	0.05
Uniform Delay, d1	21.2	17.3	9.7	12.1	10.7		36.6	31.8		31.6	31.3	31.4
Progression Factor	1.00	1.00	1.00	0.94	0.89		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	111.5	4.7	0.3	0.6	2.8		9.0	0.2		0.1	0.0	0.1
Delay (s)	132.7	22.0	10.0	11.9	12.3		45.6	32.0		31.8	31.4	31.4
Level of Service	F	C	B	B	B		D	C		C	C	C
Approach Delay (s)		25.7			12.3			41.1			31.5	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

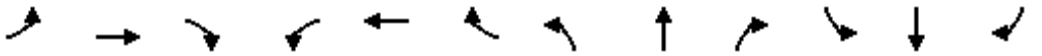
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	1490	20	30	1795	15	20	30	35	10	20	50
Future Volume (vph)	55	1490	20	30	1795	15	20	30	35	10	20	50
Ideal Flow (vphpl)	1803	1803	1803	1908	1908	1908	1650	1650	1650	1650	1650	1650
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	3385		1813	3550		1568	1505		1599	1683	1381
Flt Permitted	0.07	1.00		0.13	1.00		0.74	1.00		0.71	1.00	1.00
Satd. Flow (perm)	123	3385		240	3550		1227	1505		1201	1683	1381
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	1536	21	31	1851	15	21	31	36	10	21	52
RTOR Reduction (vph)	0	1	0	0	1	0	0	33	0	0	0	47
Lane Group Flow (vph)	57	1556	0	31	1865	0	21	34	0	10	21	5
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		8
Actuated Green, G (s)	76.6	71.4		73.4	69.8		7.0	7.0		7.0	7.0	7.0
Effective Green, g (s)	80.6	73.4		77.4	71.8		9.0	9.0		9.0	9.0	9.0
Actuated g/C Ratio	0.81	0.73		0.77	0.72		0.09	0.09		0.09	0.09	0.09
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	213	2484		273	2548		110	135		108	151	124
v/s Ratio Prot	c0.02	0.46		0.01	c0.53			c0.02			0.01	
v/s Ratio Perm	0.20			0.08			0.02			0.01		0.00
v/c Ratio	0.27	0.63		0.11	0.73		0.19	0.25		0.09	0.14	0.04
Uniform Delay, d1	8.7	6.5		4.1	8.4		42.1	42.4		41.8	41.9	41.5
Progression Factor	4.79	0.50		1.71	1.25		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.7		0.1	1.2		0.8	1.0		0.4	0.4	0.1
Delay (s)	42.0	4.0		7.2	11.6		43.0	43.4		42.1	42.4	41.7
Level of Service	D	A		A	B		D	D		D	D	D
Approach Delay (s)		5.3			11.5			43.3			41.9	
Approach LOS		A			B			D			D	

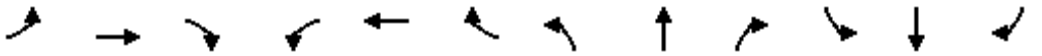
Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-080-10			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	1310	95	10	1610	210	75	35	15	175	25	160
Future Volume (vph)	125	1310	95	10	1610	210	75	35	15	175	25	160
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1654	3308	1510	1721	3375	1540	1687	1776	1510	1679	1785	1479
Flt Permitted	0.06	1.00	1.00	0.16	1.00	1.00	0.74	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	113	3308	1510	287	3375	1540	1315	1776	1510	1297	1785	1479
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	129	1351	98	10	1660	216	77	36	15	180	26	165
RTOR Reduction (vph)	0	0	37	0	0	90	0	0	12	0	0	135
Lane Group Flow (vph)	129	1351	61	10	1660	126	77	36	3	180	26	30
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	69.7	62.5	62.5	56.8	55.6	55.6	18.3	18.3	18.3	18.3	18.3	18.3
Effective Green, g (s)	72.6	65.4	62.5	62.6	58.5	58.5	20.0	20.0	18.3	20.0	20.0	18.3
Actuated g/C Ratio	0.73	0.65	0.62	0.63	0.58	0.58	0.20	0.20	0.18	0.20	0.20	0.18
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	251	2163	943	238	1974	900	263	355	276	259	357	270
v/s Ratio Prot	c0.06	0.41		0.00	c0.49			0.02			0.01	
v/s Ratio Perm	0.32		0.04	0.02		0.08	0.06		0.00	c0.14		0.02
v/c Ratio	0.51	0.62	0.06	0.04	0.84	0.14	0.29	0.10	0.01	0.69	0.07	0.11
Uniform Delay, d1	19.3	10.1	7.3	7.8	16.9	9.4	34.0	32.7	33.4	37.2	32.5	34.1
Progression Factor	1.74	0.44	0.13	0.74	0.67	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	1.1	0.1	0.0	3.0	0.2	0.6	0.1	0.0	7.8	0.1	0.2
Delay (s)	35.0	5.5	1.1	5.9	14.3	3.3	34.6	32.8	33.4	45.0	32.6	34.3
Level of Service	D	A	A	A	B	A	C	C	C	D	C	C
Approach Delay (s)		7.7			13.0			34.0			39.4	
Approach LOS		A			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-221-10			
Date Issued: 12-15-07			
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	1165	290	160	1445	70	335	10	140	70	15	45
Future Volume (vph)	45	1165	290	160	1445	70	335	10	140	70	15	45
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	10	12	12	12	15	12	16	12	12	12
Grade (%)		2%			-2%			4%			0%	
Total Lost time (s)	7.0	4.0	7.0	5.0	4.0		3.0	6.0	6.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3055	1226	1504	3190		1828	1749	1685	1679	1568	
Flt Permitted	0.14	1.00	1.00	0.11	1.00		0.56	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	242	3055	1226	174	3190		1074	1749	1685	1328	1568	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	1201	299	165	1490	72	345	10	144	72	15	46
RTOR Reduction (vph)	0	0	160	0	3	0	0	0	110	0	42	0
Lane Group Flow (vph)	46	1201	139	165	1559	0	345	10	34	72	19	0
Confl. Peds. (#/hr)			1									
Heavy Vehicles (%)	2%	11%	14%	15%	8%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		6		5	2		7	4			8	
Permitted Phases	6		6	2			4		4	8		
Actuated Green, G (s)	46.4	46.4	46.4	63.5	63.5		23.5	23.5	23.5	9.5	9.5	
Effective Green, g (s)	46.4	49.4	46.4	65.5	66.5		25.5	23.5	23.5	9.5	9.5	
Actuated g/C Ratio	0.46	0.49	0.46	0.66	0.66		0.26	0.24	0.24	0.10	0.10	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		5.0	6.0	6.0	5.0	5.0	
Vehicle Extension (s)	6.3	6.3	6.3	3.0	6.3		3.0	2.5	2.5	3.0	3.0	
Lane Grp Cap (vph)	112	1509	568	274	2121		364	411	395	126	148	
v/s Ratio Prot		c0.39		0.07	c0.49		c0.11	0.01			0.01	
v/s Ratio Perm	0.19		0.11	0.32			c0.13		0.02	0.05		
v/c Ratio	0.41	0.80	0.24	0.60	0.74		0.95	0.02	0.09	0.57	0.13	
Uniform Delay, d1	17.7	21.1	16.2	13.9	11.0		35.4	29.4	29.9	43.3	41.5	
Progression Factor	0.50	0.63	0.48	0.90	1.21		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.9	3.7	0.8	1.8	1.1		33.5	0.0	0.1	6.1	0.4	
Delay (s)	17.7	17.0	8.6	14.4	14.4		68.9	29.4	29.9	49.4	41.9	
Level of Service	B	B	A	B	B		E	C	C	D	D	
Approach Delay (s)		15.4			14.4			56.9			46.0	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

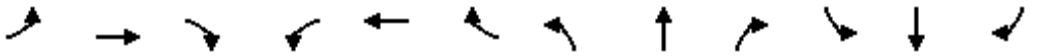
Date Revised: 9-19-03

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	1135	90	240	1400	55	220	70	145	10	75	60
Future Volume (vph)	65	1135	90	240	1400	55	220	70	145	10	75	60
Ideal Flow (vphpl)	2100	2100	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			-2%			0%			0%	
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1975	3638		1696	3234	1447	1679	1589		1713	1627	
Flt Permitted	0.09	1.00		0.10	1.00	1.00	0.36	1.00		0.62	1.00	
Satd. Flow (perm)	180	3638		171	3234	1447	645	1589		1118	1627	
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92
Adj. Flow (vph)	71	1234	93	247	1522	60	227	72	149	11	77	65
RTOR Reduction (vph)	0	5	0	0	0	26	0	79	0	0	32	0
Lane Group Flow (vph)	71	1322	0	247	1522	34	227	142	0	11	110	0
Heavy Vehicles (%)	1%	9%	2%	2%	7%	7%	2%	2%	2%	0%	0%	7%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	49.5	46.3		65.7	56.5	56.5	24.3	24.3		11.7	11.7	
Effective Green, g (s)	49.5	46.3		65.7	56.5	56.5	24.3	24.3		11.7	11.7	
Actuated g/C Ratio	0.50	0.46		0.66	0.56	0.56	0.24	0.24		0.12	0.12	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	146	1684		316	1827	817	235	386		130	190	
v/s Ratio Prot	0.02	0.36		c0.10	c0.47		c0.07	0.09			0.07	
v/s Ratio Perm	0.22			0.41		0.02	c0.16			0.01		
v/c Ratio	0.49	0.78		0.78	0.83	0.04	0.97	0.37		0.08	0.58	
Uniform Delay, d1	37.0	22.6		29.3	17.9	9.7	36.3	31.5		39.4	41.8	
Progression Factor	1.29	0.92		0.72	0.35	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	2.7		8.1	3.1	0.1	48.7	0.6		0.3	4.4	
Delay (s)	49.7	23.5		29.1	9.4	9.8	85.0	32.1		39.7	46.3	
Level of Service	D	C		C	A	A	F	C		D	D	
Approach Delay (s)		24.8			12.1			58.9			45.8	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

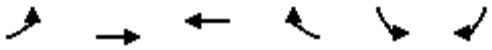


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	1065	190	140	1485	115	155	10	115	140	10	50
Future Volume (vph)	55	1065	190	140	1485	115	155	10	115	140	10	50
Ideal Flow (vphpl)	1662	1662	1662	1914	1914	1914	1662	1662	1662	1662	1662	1662
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	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	1.00	1.00
Satd. Flow (prot)	1509	3018	1350	1792	3654	1633	1466	1574	1338	2942	1612	1330
Flt Permitted	0.08	1.00	1.00	0.15	1.00	1.00	0.56	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	124	3018	1350	285	3654	1633	869	1574	1338	2942	1612	1330
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	59	1133	202	149	1580	122	165	11	122	149	11	53
RTOR Reduction (vph)	0	0	98	0	0	57	0	0	87	0	0	45
Lane Group Flow (vph)	59	1133	104	149	1580	65	165	11	35	149	11	8
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	2%	4%	2%	0%	2%	0%	0%	1%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6		5	2		7	4	5	3	8	1
Permitted Phases	6		6	2		2	4		4			8
Actuated Green, G (s)	55.0	49.3	49.3	59.2	51.4	51.4	19.2	8.2	16.0	8.7	5.9	11.6
Effective Green, g (s)	59.2	51.4	51.4	63.4	53.5	53.5	21.2	9.2	20.2	9.7	6.9	15.8
Actuated g/C Ratio	0.59	0.51	0.51	0.63	0.54	0.54	0.21	0.09	0.20	0.10	0.07	0.16
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	181	1551	693	329	1954	873	255	144	270	285	111	210
v/s Ratio Prot	0.03	0.38		c0.04	c0.43		c0.08	0.01	0.01	0.05	0.01	0.00
v/s Ratio Perm	0.17		0.08	0.24		0.04	c0.06		0.01			0.00
v/c Ratio	0.33	0.73	0.15	0.45	0.81	0.07	0.65	0.08	0.13	0.52	0.10	0.04
Uniform Delay, d1	15.2	18.9	12.8	10.6	19.1	11.3	35.0	41.5	32.7	42.9	43.6	35.7
Progression Factor	1.63	1.16	1.87	1.76	0.21	0.08	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	2.1	0.3	0.6	2.3	0.1	5.6	0.2	0.2	1.7	0.4	0.1
Delay (s)	25.5	24.0	24.3	19.3	6.3	1.0	40.6	41.7	32.9	44.7	44.0	35.8
Level of Service	C	C	C	B	A	A	D	D	C	D	D	D
Approach Delay (s)		24.1			7.0			37.5			42.4	
Approach LOS		C			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-185-10			
Date Issued: 2-26-2003			

Date Revised: 3-10-2008

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	135	1190	1590	0	5	155
Future Volume (vph)	135	1190	1590	0	5	155
Ideal Flow (vphpl)	2100	2100	1900	1900	1803	1803
Grade (%)		0%	-5%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	1.00		0.87	
Flt Protected	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1975	3950	3628		1565	
Flt Permitted	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1975	3950	3628		1565	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	139	1227	1639	0	5	160
RTOR Reduction (vph)	0	0	0	0	134	0
Lane Group Flow (vph)	139	1227	1639	0	31	0
Heavy Vehicles (%)	1%	1%	2%	0%	0%	0%
Turn Type	Prot	NA	NA		Prot	
Protected Phases	1	6	2		8	
Permitted Phases						
Actuated Green, G (s)	12.1	72.0	53.9		16.0	
Effective Green, g (s)	12.1	72.0	53.9		16.0	
Actuated g/C Ratio	0.12	0.72	0.54		0.16	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	238	2844	1955		250	
v/s Ratio Prot	c0.07	0.31	c0.45		c0.02	
v/s Ratio Perm						
v/c Ratio	0.58	0.43	0.84		0.12	
Uniform Delay, d1	41.6	5.7	19.4		36.0	
Progression Factor	1.04	0.44	1.00		1.00	
Incremental Delay, d2	2.7	0.4	4.5		1.0	
Delay (s)	45.9	2.9	23.9		37.0	
Level of Service	D	A	C		D	
Approach Delay (s)		7.2	23.9		37.0	
Approach LOS		A	C		D	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1315	5	5	1740	0	10
Future Volume (Veh/h)	1315	5	5	1740	0	10
Sign Control	Free			Free	Stop	
Grade	0%			-5%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1370	5	5	1813	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				429		
pX, platoon unblocked					0.60	
vC, conflicting volume			1375		2289	688
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1375		1819	688
tC, single (s)			4.1		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		100	97
cM capacity (veh/h)			505		42	371

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	913	462	609	1209	10
Volume Left	0	0	5	0	0
Volume Right	0	5	0	0	10
cSH	1700	1700	505	1700	371
Volume to Capacity	0.54	0.27	0.01	0.71	0.03
Queue Length 95th (ft)	0	0	1	0	2
Control Delay (s)	0.0	0.0	0.3	0.0	15.0
Lane LOS			A		B
Approach Delay (s)	0.0		0.1		15.0
Approach LOS					B

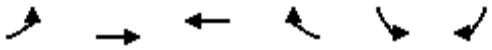
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

Appendix D7:

Franklin Road QR Intersection Concept

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	475	40	245	0	0	250
Future Volume (vph)	475	40	245	0	0	250
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Grade (%)	0%		0%			-3%
Total Lost time (s)	6.0	6.0	6.0			6.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1679	1502	1768			1794
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1679	1502	1768			1794
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	490	41	253	0	0	258
RTOR Reduction (vph)	0	22	0	0	0	0
Lane Group Flow (vph)	490	19	253	0	0	258
Turn Type	Prot	Perm	NA			NA
Protected Phases	2		4			4
Permitted Phases		2				
Actuated Green, G (s)	26.0	26.0	17.0			17.0
Effective Green, g (s)	26.0	26.0	17.0			17.0
Actuated g/C Ratio	0.47	0.47	0.31			0.31
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	793	710	546			554
v/s Ratio Prot	c0.29		0.14			c0.14
v/s Ratio Perm		0.01				
v/c Ratio	0.62	0.03	0.46			0.47
Uniform Delay, d1	10.8	7.7	15.3			15.3
Progression Factor	0.94	0.82	0.40			1.00
Incremental Delay, d2	2.9	0.1	2.4			2.8
Delay (s)	13.1	6.4	8.6			18.1
Level of Service	B	A	A			B
Approach Delay (s)	12.6		8.6			18.1
Approach LOS	B		A			B

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	145	1410	1460	370	0	0
Future Volume (vph)	145	1410	1460	370	0	0
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Grade (%)		-2%	5%		0%	
Total Lost time (s)	6.0	6.0	6.0			
Lane Util. Factor	0.97	0.95	0.95			
Frt	1.00	1.00	0.97			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	3290	3392	3175			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	3290	3392	3175			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	1454	1505	381	0	0
RTOR Reduction (vph)	0	0	13	0	0	0
Lane Group Flow (vph)	149	1454	1873	0	0	0
Turn Type	Prot	NA	NA			
Protected Phases	1	6	2			
Permitted Phases						
Actuated Green, G (s)	10.3	110.0	87.7			
Effective Green, g (s)	10.3	110.0	87.7			
Actuated g/C Ratio	0.09	1.00	0.80			
Clearance Time (s)	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	308	3392	2531			
v/s Ratio Prot	0.05	c0.43	c0.59			
v/s Ratio Perm						
v/c Ratio	0.48	0.43	0.74			
Uniform Delay, d1	47.3	0.0	5.5			
Progression Factor	0.84	1.00	0.37			
Incremental Delay, d2	1.1	0.3	1.4			
Delay (s)	40.8	0.3	3.4			
Level of Service	D	A	A			
Approach Delay (s)		4.1	3.4		0.0	
Approach LOS		A	A		A	

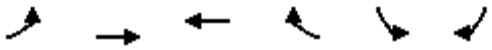
Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1295	85	0	1430	30	180	215	140	120	505	100
Future Volume (vph)	0	1295	85	0	1430	30	180	215	140	120	505	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)		3.0	7.0		3.0		6.0	6.0	6.0	5.0	6.0	
Lane Util. Factor		0.91	1.00		0.95		1.00	1.00	1.00	1.00	0.95	
Frt		1.00	0.85		1.00		1.00	1.00	0.85	1.00	0.98	
Flt Protected		1.00	1.00		1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4556	1472		3309		1591	1707	1349	1671	3300	
Flt Permitted		1.00	1.00		1.00		0.16	1.00	1.00	0.58	1.00	
Satd. Flow (perm)		4556	1472		3309		271	1707	1349	1024	3300	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1335	88	0	1474	31	186	222	144	124	521	103
RTOR Reduction (vph)	0	0	34	0	1	0	0	0	75	0	16	0
Lane Group Flow (vph)	0	1335	54	0	1504	0	186	222	69	124	608	0
Heavy Vehicles (%)	7%	11%	7%	4%	6%	8%	8%	6%	14%	6%	5%	3%
Turn Type		NA	pm+ov		NA		pm+pt	NA	custom	pm+pt	NA	
Protected Phases		6	7		2		7	4	5	3	8	
Permitted Phases			6				4		4	8		
Actuated Green, G (s)		57.9	66.9		57.9		36.1	27.1	27.1	28.1	23.1	
Effective Green, g (s)		60.9	66.9		60.9		38.1	28.1	27.1	32.1	24.1	
Actuated g/C Ratio		0.55	0.61		0.55		0.35	0.26	0.25	0.29	0.22	
Clearance Time (s)		6.0	7.0		6.0		7.0	7.0	6.0	7.0	7.0	
Vehicle Extension (s)		5.0	2.0		5.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		2522	895		1831		213	436	332	339	723	
v/s Ratio Prot		0.29	0.00		c0.45		c0.08	c0.13		0.02	0.18	
v/s Ratio Perm			0.03				c0.22		0.05	0.08		
v/c Ratio		0.53	0.06		0.82		0.87	0.51	0.21	0.37	0.84	
Uniform Delay, d1		15.5	8.8		20.1		28.4	35.0	32.9	29.8	41.1	
Progression Factor		1.00	1.00		0.53		1.00	1.00	1.00	1.04	1.06	
Incremental Delay, d2		0.8	0.0		2.8		29.4	0.3	0.1	0.2	7.1	
Delay (s)		16.3	8.8		13.4		57.9	35.4	33.0	31.2	50.9	
Level of Service		B	A		B		E	D	C	C	D	
Approach Delay (s)		15.8			13.4			42.3			47.6	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	365	380	615	0	0	490
Future Volume (vph)	365	380	615	0	0	490
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Grade (%)	0%		0%			-3%
Total Lost time (s)	6.0	6.0	6.0			6.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1679	1502	1768			1794
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1679	1502	1768			1794
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	376	392	634	0	0	505
RTOR Reduction (vph)	0	134	0	0	0	0
Lane Group Flow (vph)	376	258	634	0	0	505
Turn Type	Prot	Perm	NA			NA
Protected Phases	2		4			4
Permitted Phases		2				
Actuated Green, G (s)	19.0	19.0	29.0			29.0
Effective Green, g (s)	19.0	19.0	29.0			29.0
Actuated g/C Ratio	0.32	0.32	0.48			0.48
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	531	475	854			867
v/s Ratio Prot	c0.22		c0.36			0.28
v/s Ratio Perm		0.17				
v/c Ratio	0.71	0.54	0.74			0.58
Uniform Delay, d1	18.1	16.9	12.5			11.1
Progression Factor	0.88	0.74	2.10			1.00
Incremental Delay, d2	6.4	3.6	3.6			2.9
Delay (s)	22.4	16.2	29.8			14.0
Level of Service	C	B	C			B
Approach Delay (s)	19.2		29.8			14.0
Approach LOS	B		C			B

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	415	1950	1615	330	0	0
Future Volume (vph)	415	1950	1615	330	0	0
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Grade (%)		-2%	5%		0%	
Total Lost time (s)	6.0	6.0	6.0			
Lane Util. Factor	0.97	0.95	0.95			
Frt	1.00	1.00	0.97			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	3290	3392	3191			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	3290	3392	3191			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	428	2010	1665	340	0	0
RTOR Reduction (vph)	0	0	9	0	0	0
Lane Group Flow (vph)	428	2010	1996	0	0	0
Turn Type	Prot	NA	NA			
Protected Phases	1	6	2			
Permitted Phases						
Actuated Green, G (s)	21.2	120.0	86.8			
Effective Green, g (s)	21.2	120.0	86.8			
Actuated g/C Ratio	0.18	1.00	0.72			
Clearance Time (s)	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	581	3392	2308			
v/s Ratio Prot	0.13	c0.59	c0.63			
v/s Ratio Perm						
v/c Ratio	0.74	0.59	0.87			
Uniform Delay, d1	46.8	0.0	12.3			
Progression Factor	0.68	1.00	0.57			
Incremental Delay, d2	3.1	0.5	3.5			
Delay (s)	34.8	0.5	10.4			
Level of Service	C	A	B			
Approach Delay (s)		6.5	10.4		0.0	
Approach LOS		A	B		A	

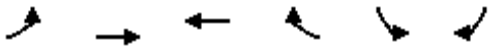
Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1960	120	0	1495	40	230	495	285	120	515	105
Future Volume (vph)	0	1960	120	0	1495	40	230	495	285	120	515	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)		3.0	7.0		3.0		6.0	6.0	7.0	5.0	6.0	
Lane Util. Factor		0.91	1.00		0.95		1.00	1.00	1.00	1.00	0.95	
Frt		1.00	0.85		1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected		1.00	1.00		1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4958	1575		3407		1685	1774	1523	1736	3452	
Flt Permitted		1.00	1.00		1.00		0.16	1.00	1.00	0.18	1.00	
Satd. Flow (perm)		4958	1575		3407		287	1774	1523	336	3452	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	2021	124	0	1541	41	237	510	294	124	531	108
RTOR Reduction (vph)	0	0	25	0	1	0	0	0	64	0	14	0
Lane Group Flow (vph)	0	2021	99	0	1581	0	237	510	230	124	625	0
Heavy Vehicles (%)	1%	2%	0%	2%	3%	0%	2%	2%	1%	2%	0%	0%
Turn Type		NA	pm+ov		NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		6	7		2		7	4		3	8	
Permitted Phases			6				4		4	8		
Actuated Green, G (s)		58.8	72.3		58.8		48.2	36.2	36.2	32.7	27.7	
Effective Green, g (s)		61.8	72.3		61.8		49.2	37.2	36.2	36.7	28.7	
Actuated g/C Ratio		0.51	0.60		0.51		0.41	0.31	0.30	0.31	0.24	
Clearance Time (s)		6.0	7.0		6.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		5.0	2.0		5.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		2553	948		1754		286	549	459	184	825	
v/s Ratio Prot		0.41	0.01		c0.46		c0.10	c0.29		0.04	0.18	
v/s Ratio Perm			0.05				0.24		0.15	0.17		
v/c Ratio		0.79	0.10		0.90		0.83	0.93	0.50	0.67	0.76	
Uniform Delay, d1		23.8	10.1		26.3		27.0	40.1	34.5	32.8	42.4	
Progression Factor		1.00	1.00		0.44		1.00	1.00	1.00	1.20	1.13	
Incremental Delay, d2		2.6	0.0		4.1		16.9	21.8	0.3	5.8	2.8	
Delay (s)		26.4	10.1		15.6		43.9	61.9	34.8	45.2	50.8	
Level of Service		C	B		B		D	E	C	D	D	
Approach Delay (s)		25.5			15.6			50.2			49.9	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			

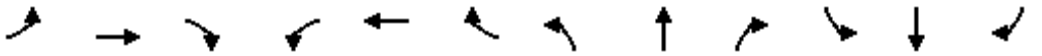
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	320	175	275	0	0	325
Future Volume (vph)	320	175	275	0	0	325
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Grade (%)	0%		0%			-3%
Total Lost time (s)	6.0	6.0	6.0			6.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1679	1502	1768			1794
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1679	1502	1768			1794
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	330	180	284	0	0	335
RTOR Reduction (vph)	0	108	0	0	0	0
Lane Group Flow (vph)	330	72	284	0	0	335
Turn Type	Prot	Perm	NA			NA
Protected Phases	2		4			4
Permitted Phases		2				
Actuated Green, G (s)	20.0	20.0	18.0			18.0
Effective Green, g (s)	20.0	20.0	18.0			18.0
Actuated g/C Ratio	0.40	0.40	0.36			0.36
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	671	600	636			645
v/s Ratio Prot	c0.20		0.16			c0.19
v/s Ratio Perm		0.05				
v/c Ratio	0.49	0.12	0.45			0.52
Uniform Delay, d1	11.2	9.5	12.2			12.6
Progression Factor	1.21	3.03	0.31			1.00
Incremental Delay, d2	2.0	0.3	1.3			3.0
Delay (s)	15.5	28.9	5.1			15.6
Level of Service	B	C	A			B
Approach Delay (s)	20.3		5.1			15.6
Approach LOS	C		A			B

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	175	1700	1735	320	0	0
Future Volume (vph)	175	1700	1735	320	0	0
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Grade (%)		-2%	5%		0%	
Total Lost time (s)	6.0	6.0	6.0			
Lane Util. Factor	0.97	0.95	0.95			
Frt	1.00	1.00	0.98			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	3290	3392	3198			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	3290	3392	3198			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	180	1753	1789	330	0	0
RTOR Reduction (vph)	0	0	10	0	0	0
Lane Group Flow (vph)	180	1753	2109	0	0	0
Turn Type	Prot	NA	NA			
Protected Phases	1	6	2			
Permitted Phases						
Actuated Green, G (s)	10.8	100.0	77.2			
Effective Green, g (s)	10.8	100.0	77.2			
Actuated g/C Ratio	0.11	1.00	0.77			
Clearance Time (s)	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	355	3392	2468			
v/s Ratio Prot	0.05	c0.52	c0.66			
v/s Ratio Perm						
v/c Ratio	0.51	0.52	0.85			
Uniform Delay, d1	42.1	0.0	7.6			
Progression Factor	0.86	1.00	0.21			
Incremental Delay, d2	1.0	0.5	2.5			
Delay (s)	37.2	0.5	4.1			
Level of Service	D	A	A			
Approach Delay (s)		3.9	4.1		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

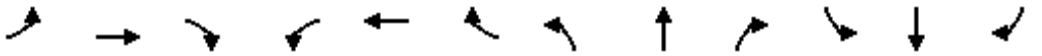


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1460	140	0	1680	55	180	220	190	225	235	185
Future Volume (vph)	0	1460	140	0	1680	55	180	220	190	225	235	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)		3.0	7.0		3.0		6.0	6.0	6.0	5.0	6.0	
Lane Util. Factor		0.91	1.00		0.95		1.00	1.00	1.00	1.00	0.95	
Frt		1.00	0.85		1.00		1.00	1.00	0.85	1.00	0.93	
Flt Protected		1.00	1.00		1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4958	1575		3432		1719	1791	1508	1753	3261	
Flt Permitted		1.00	1.00		1.00		0.30	1.00	1.00	0.38	1.00	
Satd. Flow (perm)		4958	1575		3432		537	1791	1508	707	3261	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1505	144	0	1732	57	186	227	196	232	242	191
RTOR Reduction (vph)	0	0	50	0	2	0	0	0	93	0	37	0
Lane Group Flow (vph)	0	1505	94	0	1787	0	186	227	103	232	396	0
Heavy Vehicles (%)	0%	2%	0%	0%	2%	4%	0%	1%	2%	1%	1%	2%
Turn Type		NA	pm+ov		NA		pm+pt	NA	custom	pm+pt	NA	
Protected Phases		6	7		2		7	4	5	3	8	
Permitted Phases			6				4		4	8		
Actuated Green, G (s)		57.6	65.6		57.6		22.4	14.4	14.4	22.4	14.4	
Effective Green, g (s)		60.6	65.6		60.6		24.4	15.4	14.4	26.4	15.4	
Actuated g/C Ratio		0.61	0.66		0.61		0.24	0.15	0.14	0.26	0.15	
Clearance Time (s)		6.0	7.0		6.0		7.0	7.0	6.0	7.0	7.0	
Vehicle Extension (s)		8.0	2.0		8.0		2.0	2.0	5.5	2.0	2.0	
Lane Grp Cap (vph)		3004	1033		2079		237	275	217	291	502	
v/s Ratio Prot		0.30	0.01		c0.52		0.07	0.13		c0.08	0.12	
v/s Ratio Perm			0.05				0.12		0.07	c0.13		
v/c Ratio		0.50	0.09		0.86		0.78	0.83	0.47	0.80	0.79	
Uniform Delay, d1		11.1	6.3		16.2		32.4	41.0	39.3	32.1	40.7	
Progression Factor		1.00	1.00		0.36		1.00	1.00	1.00	1.01	1.01	
Incremental Delay, d2		0.6	0.0		2.5		14.5	17.2	4.0	11.7	6.6	
Delay (s)		11.7	6.3		8.4		46.9	58.2	43.3	44.3	47.7	
Level of Service		B	A		A		D	E	D	D	D	
Approach Delay (s)		11.3			8.4			49.9			46.5	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			

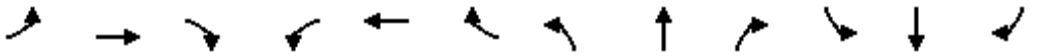
Appendix D8:

Seven Fields to Adams Ridge Reconfiguration Concept



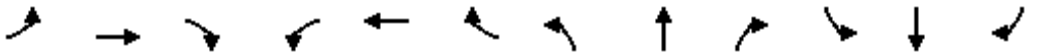
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Volume (vph)	0	1160	10	0	1605	110	0	0	5	0	0	150
Future Volume (vph)	0	1160	10	0	1605	110	0	0	5	0	0	150
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)		3.1	6.0		3.1	3.1			6.0			6.0
Lane Util. Factor		0.95	1.00		0.95	1.00			1.00			1.00
Frpb, ped/bikes		1.00	0.98		1.00	0.98			0.99			0.99
Flpb, ped/bikes		1.00	1.00		1.00	1.00			1.00			1.00
Frt		1.00	0.85		1.00	0.85			0.86			0.86
Flt Protected		1.00	1.00		1.00	1.00			1.00			1.00
Satd. Flow (prot)		3341	1473		3409	1503			1514			1506
Flt Permitted		1.00	1.00		1.00	1.00			1.00			1.00
Satd. Flow (perm)		3341	1473		3409	1503			1514			1506
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1196	10	0	1655	113	0	0	5	0	0	155
RTOR Reduction (vph)	0	0	1	0	0	10	0	0	1	0	0	21
Lane Group Flow (vph)	0	1196	9	0	1655	103	0	0	4	0	0	134
Confl. Peds. (#/hr)	8		8	8		8	8		8	8		8
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type		NA	Perm		NA	Perm			Perm			Perm
Protected Phases		6			2							
Permitted Phases			6			2			6			2
Actuated Green, G (s)		94.8	94.8		94.8	94.8			94.8			94.8
Effective Green, g (s)		97.7	94.8		97.7	97.7			94.8			94.8
Actuated g/C Ratio		0.89	0.86		0.89	0.89			0.86			0.86
Clearance Time (s)		6.0	6.0		6.0	6.0			6.0			6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0			3.0
Lane Grp Cap (vph)		2967	1269		3027	1334			1304			1297
v/s Ratio Prot		0.36			c0.49							
v/s Ratio Perm			0.01			0.07			0.00			0.09
v/c Ratio		0.40	0.01		0.55	0.08			0.00			0.10
Uniform Delay, d1		1.1	1.1		1.3	0.7			1.1			1.2
Progression Factor		0.28	0.39		0.31	0.33			1.00			1.00
Incremental Delay, d2		0.4	0.0		0.4	0.1			0.0			0.2
Delay (s)		0.7	0.4		0.8	0.3			1.1			1.3
Level of Service		A	A		A	A			A			A
Approach Delay (s)		0.7			0.8			1.1			1.3	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	0.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	6.1
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



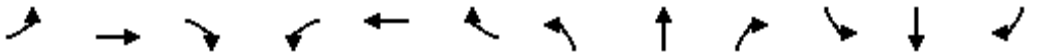
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	880	85	65	1170	140	520	30	255	80	15	30
Future Volume (vph)	205	880	85	65	1170	140	520	30	255	80	15	30
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	10	12	12	12	15	12	16	12	12	12
Grade (%)		2%			-2%			4%			0%	
Total Lost time (s)	5.5	4.0	7.0	5.0	4.0		4.0	6.0		5.5	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.87		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3325	1398	1730	3309		3512	1513		3258	1589	
Flt Permitted	0.11	1.00	1.00	0.18	1.00		0.48	1.00		0.71	1.00	
Satd. Flow (perm)	194	3325	1398	333	3309		1761	1513		2449	1589	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	211	907	88	67	1206	144	536	31	263	82	15	31
RTOR Reduction (vph)	0	0	40	0	8	0	0	228	0	0	29	0
Lane Group Flow (vph)	211	907	48	67	1342	0	536	66	0	82	17	0
Confl. Peds. (#/hr)			1									
Heavy Vehicles (%)	2%	2%	0%	0%	3%	2%	2%	2%	1%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	61.2	59.7	59.7	50.0	50.0		23.6	14.5		9.2	5.6	
Effective Green, g (s)	61.2	62.7	59.7	52.0	53.0		25.6	14.5		9.2	5.6	
Actuated g/C Ratio	0.56	0.57	0.54	0.47	0.48		0.23	0.13		0.08	0.05	
Clearance Time (s)	5.5	7.0	7.0	7.0	7.0		6.0	6.0		5.5	6.0	
Vehicle Extension (s)	3.0	6.3	6.3	3.0	6.3		2.5	2.5		3.0	6.3	
Lane Grp Cap (vph)	346	1895	758	267	1594		632	199		231	80	
v/s Ratio Prot	c0.10	0.27		0.02	c0.41		c0.11	0.04		0.01	0.01	
v/s Ratio Perm	0.24		0.03	0.10			c0.09			0.02		
v/c Ratio	0.61	0.48	0.06	0.25	0.84		0.85	0.33		0.35	0.21	
Uniform Delay, d1	30.5	14.0	11.9	17.6	24.8		38.6	43.3		47.4	50.1	
Progression Factor	0.65	0.33	1.00	0.45	0.53		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	0.8	0.2	0.3	4.0		10.1	0.7		0.9	3.9	
Delay (s)	22.5	5.4	12.1	8.2	17.3		48.8	44.1		48.3	54.0	
Level of Service	C	A	B	A	B		D	D		D	D	
Approach Delay (s)		8.9			16.8			47.1			50.4	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			



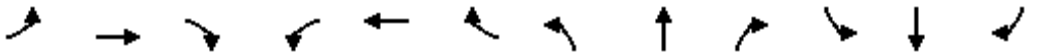
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1790	125	0	1435	195	0	0	15	0	0	180
Future Volume (vph)	0	1790	125	0	1435	195	0	0	15	0	0	180
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)		3.1	6.0		3.1	3.1			6.0			6.0
Lane Util. Factor		0.95	1.00		0.95	1.00			1.00			1.00
Frpb, ped/bikes		1.00	0.98		1.00	0.98			0.99			0.99
Flpb, ped/bikes		1.00	1.00		1.00	1.00			1.00			1.00
Frt		1.00	0.85		1.00	0.85			0.86			0.86
Flt Protected		1.00	1.00		1.00	1.00			1.00			1.00
Satd. Flow (prot)		3341	1473		3409	1503			1514			1506
Flt Permitted		1.00	1.00		1.00	1.00			1.00			1.00
Satd. Flow (perm)		3341	1473		3409	1503			1514			1506
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1845	129	0	1479	201	0	0	15	0	0	186
RTOR Reduction (vph)	0	0	8	0	0	18	0	0	2	0	0	24
Lane Group Flow (vph)	0	1845	121	0	1479	183	0	0	13	0	0	162
Confl. Peds. (#/hr)	8		8	8		8	8		8	8		8
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type		NA	Perm		NA	Perm			Perm			Perm
Protected Phases		6			2							
Permitted Phases			6			2			6			2
Actuated Green, G (s)		104.8	104.8		104.8	104.8			104.8			104.8
Effective Green, g (s)		107.7	104.8		107.7	107.7			104.8			104.8
Actuated g/C Ratio		0.90	0.87		0.90	0.90			0.87			0.87
Clearance Time (s)		6.0	6.0		6.0	6.0			6.0			6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0			3.0
Lane Grp Cap (vph)		2998	1286		3059	1348			1322			1315
v/s Ratio Prot		c0.55			0.43							
v/s Ratio Perm			0.08			0.12			0.01			0.11
v/c Ratio		0.62	0.09		0.48	0.14			0.01			0.12
Uniform Delay, d1		1.4	1.0		1.1	0.7			1.0			1.1
Progression Factor		0.63	1.27		0.32	0.52			1.00			1.00
Incremental Delay, d2		0.6	0.1		0.3	0.1			0.0			0.2
Delay (s)		1.5	1.4		0.7	0.5			1.0			1.3
Level of Service		A	A		A	A			A			A
Approach Delay (s)		1.5			0.7			1.0			1.3	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	1.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.1
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



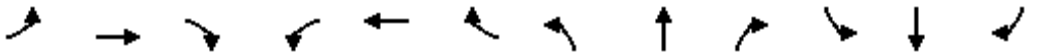
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	1330	500	260	1220	65	315	35	195	350	25	115
Future Volume (vph)	195	1330	500	260	1220	65	315	35	195	350	25	115
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	10	12	12	12	15	12	16	12	12	12
Grade (%)		2%			-2%			4%			0%	
Total Lost time (s)	5.5	4.0	7.0	5.0	4.0		4.0	6.0		5.5	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.87		1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3325	1398	1730	3335		3512	1525		3258	1550	
Flt Permitted	0.14	1.00	1.00	0.10	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	246	3325	1398	185	3335		3512	1525		3258	1550	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	201	1371	515	268	1258	67	325	36	201	361	26	119
RTOR Reduction (vph)	0	0	105	0	3	0	0	168	0	0	111	0
Lane Group Flow (vph)	201	1371	410	268	1322	0	325	69	0	361	34	0
Confl. Peds. (#/hr)			1									
Heavy Vehicles (%)	2%	2%	0%	0%	3%	2%	2%	2%	1%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2								
Actuated Green, G (s)	56.0	54.5	54.5	55.0	55.0		15.4	8.4		16.0	8.5	
Effective Green, g (s)	56.0	57.5	54.5	57.0	58.0		17.4	8.4		16.0	8.5	
Actuated g/C Ratio	0.47	0.48	0.45	0.48	0.48		0.14	0.07		0.13	0.07	
Clearance Time (s)	5.5	7.0	7.0	7.0	7.0		6.0	6.0		5.5	6.0	
Vehicle Extension (s)	3.0	6.3	6.3	3.0	6.3		2.5	2.5		3.0	6.3	
Lane Grp Cap (vph)	310	1593	634	314	1611		509	106		434	109	
v/s Ratio Prot	0.09	c0.41		0.12	c0.40		0.09	c0.05		c0.11	0.02	
v/s Ratio Perm	0.21		0.29	0.28								
v/c Ratio	0.65	0.86	0.65	0.85	0.82		0.64	0.65		0.83	0.32	
Uniform Delay, d1	34.9	27.7	25.3	33.3	26.5		48.3	54.4		50.7	53.0	
Progression Factor	0.70	0.58	0.46	1.17	0.42		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	5.5	4.4	12.6	2.9		2.3	11.4		12.8	5.0	
Delay (s)	28.6	21.5	15.9	51.6	14.1		50.6	65.8		63.5	58.0	
Level of Service	C	C	B	D	B		D	E		E	E	
Approach Delay (s)		20.8			20.4			57.0			61.9	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1435	95	0	1685	210	0	0	15	0	0	160
Future Volume (vph)	0	1435	95	0	1685	210	0	0	15	0	0	160
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)		3.1	6.0		3.1	3.1			6.0			6.0
Lane Util. Factor		0.95	1.00		0.95	1.00			1.00			1.00
Frpb, ped/bikes		1.00	0.98		1.00	0.98			0.99			0.99
Flpb, ped/bikes		1.00	1.00		1.00	1.00			1.00			1.00
Frt		1.00	0.85		1.00	0.85			0.86			0.86
Flt Protected		1.00	1.00		1.00	1.00			1.00			1.00
Satd. Flow (prot)		3341	1472		3409	1502			1514			1506
Flt Permitted		1.00	1.00		1.00	1.00			1.00			1.00
Satd. Flow (perm)		3341	1472		3409	1502			1514			1506
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1479	98	0	1737	216	0	0	15	0	0	165
RTOR Reduction (vph)	0	0	9	0	0	20	0	0	2	0	0	25
Lane Group Flow (vph)	0	1479	89	0	1737	196	0	0	13	0	0	140
Confl. Peds. (#/hr)	8		8	8		8	8		8	8		8
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type		NA	Perm		NA	Perm			Perm			Perm
Protected Phases		6			2							
Permitted Phases			6			2			6			2
Actuated Green, G (s)		84.8	84.8		84.8	84.8			84.8			84.8
Effective Green, g (s)		87.7	84.8		87.7	87.7			84.8			84.8
Actuated g/C Ratio		0.88	0.85		0.88	0.88			0.85			0.85
Clearance Time (s)		6.0	6.0		6.0	6.0			6.0			6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0			3.0
Lane Grp Cap (vph)		2930	1248		2989	1317			1283			1277
v/s Ratio Prot		0.44			c0.51							
v/s Ratio Perm			0.06			0.13			0.01			0.09
v/c Ratio		0.50	0.07		0.58	0.15			0.01			0.11
Uniform Delay, d1		1.4	1.2		1.5	0.9			1.2			1.3
Progression Factor		0.10	0.00		0.41	0.23			1.00			1.00
Incremental Delay, d2		0.5	0.1		0.3	0.1			0.0			0.2
Delay (s)		0.6	0.1		1.0	0.3			1.2			1.4
Level of Service		A	A		A	A			A			A
Approach Delay (s)		0.6			0.9			1.2			1.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	0.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.1
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	990	290	170	1435	70	410	45	140	245	40	45
Future Volume (vph)	170	990	290	170	1435	70	410	45	140	245	40	45
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	10	12	12	12	15	12	16	12	12	12
Grade (%)		2%			-2%			4%			0%	
Total Lost time (s)	5.5	4.0	7.0	5.0	4.0		4.0	6.0		5.5	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.89		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3325	1398	1730	3337		3512	1547		3258	1627	
Flt Permitted	0.09	1.00	1.00	0.16	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	166	3325	1398	293	3337		3512	1547		3258	1627	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	175	1021	299	175	1479	72	423	46	144	253	41	46
RTOR Reduction (vph)	0	0	98	0	3	0	0	110	0	0	41	0
Lane Group Flow (vph)	175	1021	201	175	1548	0	423	80	0	253	46	0
Confl. Peds. (#/hr)			1									
Heavy Vehicles (%)	2%	2%	0%	0%	3%	2%	2%	2%	1%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2								
Actuated Green, G (s)	53.5	42.2	42.2	54.0	43.2		15.4	10.0		11.5	5.6	
Effective Green, g (s)	53.5	45.2	42.2	58.0	46.2		17.4	10.0		11.5	5.6	
Actuated g/C Ratio	0.54	0.45	0.42	0.58	0.46		0.17	0.10		0.12	0.06	
Clearance Time (s)	5.5	7.0	7.0	7.0	7.0		6.0	6.0		5.5	6.0	
Vehicle Extension (s)	3.0	6.3	6.3	3.0	6.3		2.5	2.5		3.0	6.3	
Lane Grp Cap (vph)	257	1502	589	353	1541		611	154		374	91	
v/s Ratio Prot	c0.08	0.31		0.06	c0.46		c0.12	c0.05		0.08	0.03	
v/s Ratio Perm	0.29		0.14	0.22								
v/c Ratio	0.68	0.68	0.34	0.50	1.00		0.69	0.52		0.68	0.51	
Uniform Delay, d1	39.0	21.7	19.5	26.9	26.9		38.8	42.7		42.5	45.9	
Progression Factor	0.84	0.43	0.35	0.78	0.59		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.5	2.2	1.4	0.5	17.1		3.1	2.4		4.8	13.0	
Delay (s)	39.4	11.6	8.2	21.6	33.0		41.9	45.1		47.3	58.9	
Level of Service	D	B	A	C	C		D	D		D	E	
Approach Delay (s)		14.2			31.9			42.9			50.2	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Appendix E

Synchro Traffic Analyses (Level-of-Service Summaries)

Contents:

- 2016 Base Year Conditions
- 2025 Opening Year (No-Build Scenario)
- 2045 Design Year (No-Build Scenario)
- 2045 Design Year (Build Scenarios)
- Franklin Road QR Intersection Concept
- Seven Fields to Adams Ridge Reconfiguration Concept

Appendix E1:

2016 Base Year Conditions

Node # / Intersection / Approach		2016 Base Year Conditions Delay (sec/veh) and LOS																	
		2016 Base AM Peak					2016 Base PM Peak					2016 Base SAT Peak							
225	**SR 228 @ Franklin Rd**																		
	Overall Intersection	**41.7**	**D**	**AM by Movement**			**57.2**	**E**	**PM by Movement**			**30.4**	**C**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	23.5	C	L	39.6	D	38.0	D	L	56.6	E	16.9	B	L	43.0	D			
				T	21.7	C			T	33.3	C			T	14.0	B			
				R	21.7	C			R	33.3	C			R	14.0	B			
	SR 228 **(WB)**	47.2	D	L	91.0	F	42.8	D	L	68.6	E	26.2	C	L	72.8	E			
				T	38.6	D			T	39.9	D			T	22.4	C			
				R	38.6	D			R	39.9	D			R	22.4	C			
	Franklin Rd **(NB)**	41.1	D	L	41.1	D	127.0	F	L	52.8	D	60.2	E	L	54.6	D			
				T	46.6	D			T	196.0	F			T	72.5	E			
				R	32.2	C			R	47.7	D			R	49.4	D			
	Franklin Rd **(SB)**	60.7	E	L	38.8	D	52.0	D	L	51.1	D	57.0	E	L	54.0	D			
				T	68.5	E			T	61.9	E			T	73.2	E			
				R	24.9	C			R	26.2	C			R	38.5	D			
230	**SR 228 @ Castle Creek Dr (West) and High Pointe Dr (West)**																		
	Overall Intersection	**20.3**	**C**	**AM by Movement**			**30.3**	**C**	**PM by Movement**			**13.9**	**B**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	26.9	C	L	8.0	A	29.6	C	L	6.8	A	4.4	A	L	2.4	A			
				T	26.6	C			T	33.8	C			T	5.0	A			
				R	29.5	C			R	5.4	A			R	0.8	A			
	SR 228 **(WB)**	9.6	A	L	5.7	A	10.9	B	L	30.3	C	9.5	A	L	10.3	B			
				T	10.0	B			T	9.7	A			T	9.4	A			
				R	10.0	B			R	9.7	A			R	9.4	A			
	Castle Creek Dr (West) **(NB)**	63.2	E	L	65.9	E	86.6	F	L	105.1	F	76.1	E	L	84.9	F			
				T	58.1	E			T	59.2	E			T	57.2	E			
				R	58.1	E			R	59.2	E			R	57.2	E			
	High Pointe Dr (West) **(SB)**	57.7	E	L	57.7	E	55.4	E	L	55.8	E	56.6	E	L	56.5	E			
				T	57.9	E			T	55.8	E			T	56.5	E			
				R	57.5	E			R	55.1	E			R	56.6	E			
235	**SR 228 @ Castle Creek Dr (East) and High Pointe Dr (East)**																		
	Overall Intersection	**9.7**	**A**	**AM by Movement**			**14.4**	**B**	**PM by Movement**			**7.7**	**A**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	1.7	A	L	1.4	A	9.3	A	L	9.2	A	4.0	A	L	7.0	A			
				T	1.7	A			T	9.4	A			T	3.9	A			
				R	3.0	A			R	3.9	A			R	2.4	A			
	SR 228 **(WB)**	6.4	A	L	2.2	A	3.7	A	L	4.2	A	3.7	A	L	1.3	A			
				T	6.6	A			T	3.7	A			T	3.7	A			
				R	3.0	A			R	4.2	A			R	2.6	A			
	Castle Creek Dr (East) **(NB)**	65.7	E	L	68.4	E	69.2	E	L	66.0	E	68.7	E	L	68.0	E			
				T	63.3	E			T	69.5	E			T	68.9	E			
				R	63.3	E			R	69.5	E			R	68.9	E			
	High Pointe Dr (East) **(SB)**	61.8	E	L	62.4	E	85.3	F	L	119.9	F	66.7	E	L	66.8	E			
				T	61.7	E			T	66.5	E			T	67.3	E			
				R	61.8	E			R	65.0	E			R	66.4	E			

Node # / Intersection / Approach		2016 Base Year Conditions Delay (sec/veh) and LOS																	
		2016 Base AM Peak						2016 Base PM Peak						2016 Base SAT Peak					
240	**SR 228 @ Seven Fields Blvd and Adams Ridge Shoppes**																		
	Overall Intersection	**11.8**	**B**	**AM by Movement**				**23.2**	**C**	**PM by Movement**				**18.9**	**B**	**SAT by Movement**			
By Approach / By Movement	SR 228 **(EB)**	1.9	A	L	6.0	A		12.4	B	L	9.6	A		4.3	A	L	6.9	A	
				T	1.3	A				T	13.5	B				T	4.4	A	
				R	1.7	A				R	5.8	A				R	1.3	A	
	SR 228 **(WB)**	9.0	A	L	9.6	A		18.2	B	L	9.5	A		14.5	B	L	2.3	A	
				T	9.6	A				T	19.6	B				T	15.7	B	
				R	3.1	A				R	12.0	B				R	8.6	A	
	Adams Ridge Shoppes **(NB)**	73.4	E	L	77.6	E		56.4	E	L	57.7	E		59.7	E	L	62.4	E	
				T	61.7	E				T	54.9	D				T	55.9	E	
				R	63.1	E				R	55.6	E				R	56.3	E	
	Seven Fields Blvd **(SB)**	63.1	E	L	65.1	E		68.6	E	L	79.4	E		66.9	E	L	76.9	E	
				T	62.6	E				T	56.3	E				T	56.5	E	
				R	62.6	E				R	56.3	E				R	56.5	E	
245	**SR 228 @ Adams Ridge Blvd**																		
	Overall Intersection	**24.9**	**C**	**AM by Movement**				**24.0**	**C**	**PM by Movement**				**23.7**	**C**	**SAT by Movement**			
By Approach / By Movement	SR 228 **(EB)**	9.4	A	-				13.6	B	-				13.1	B	-			
				T	9.6	A				T	14.1	B				T	12.1	B	
				R	8.1	A				R	12.5	B				R	16.1	B	
	SR 228 **(WB)**	15.5	B	L	7.8	A		20.0	C	L	46.6	D		15.3	B	L	15.1	B	
				T	16.0	B				T	13.7	B				T	15.4	B	
				-						-						-			
	Adams Ridge Blvd **(NB)**	55.8	E	L	61.2	E		70.6	E	L	76.6	E		73.0	E	L	79.9	E	
				-						-						-			
				R	46.0	D				R	62.4	E				R	56.2	E	
250	**SR 228 @ Myoma Rd ***																		
	Overall Intersection	**1.4**	**A**	**AM by Movement**				**2.5**	**A**	**PM by Movement**						**SAT by Movement**			
By Approach / By Movement	SR 228 **(EB)**	1.0	A	L				1.0	A	L				0.7	A	L			
				T						T						T			
				-						-						-			
	SR 228 **(WB)**	free		-				free		-				free		-			
				T	free					T	free					T	free		
				R	free					R	free					R	free		
	Myoma Rd **(SB)**	26.5	D	L				55.7	F	L				33.7	D	L			
				-						-						-			
				R						R						R			

Node # / Intersection / Approach		2016 Base Year Conditions Delay (sec/veh) and LOS																		
		2016 Base AM Peak					2016 Base PM Peak					2016 Base SAT Peak								
255	**SR 228 @ Heritage Creek Dr**																			
	Overall Intersection	**20.2**	**C**	**AM by Movement**			**34.4**	**C**	**PM by Movement**			**17.4**	**B**	**SAT by Movement**						
By Approach / By Movement	SR 228 **(EB)**	13.1	B	L	8.1	A	26.3	C	L	10.9	B	6.4	A	L	6.0	A				
				T	12.2	B			T	27.8	C			T	6.5	A				
				R	34.6	C			R	12.5	B			R	5.1	A				
	SR 228 **(WB)**	15.7	B	L	8.0	A	23.6	C	L	19.5	B	14.0	B	L	4.9	A				
				T	17.7	B			T	26.0	C			T	15.1	B				
				R	9.1	A			R	14.1	B			R	5.8	A				
	Heritage Creek Dr **(NB)**	48.7	D	L	48.7	D	44.3	D	L	46.0	D	58.6	E	L	59.8	E				
				T	48.7	D			T	44.5	D			T	58.5	E				
				R	48.7	D			R	38.7	D			R	52.0	D				
	Heritage Creek Dr **(SB)**	64.9	E	L	70.3	E	87.0	F	L	96.4	F	76.7	E	L	86.1	F				
				T	48.9	D			T	44.1	D			T	58.5	E				
				R	43.0	D			R	38.9	D			R	51.1	D				
260	**SR 228 @ Scharberry Ln ***																			
	Overall Intersection	**0.0**	**A**	**AM by Movement**			**0.2**	**A**	**PM by Movement**					**SAT by Movement**						
By Approach / By Movement	SR 228 **(EB)**	free		-			free		-			free		-						
				T	free				T	free				T	free					
				R	free				R	free				R	free					
	SR 228 **(WB)**	free		-			free		-			free		-						
				T	free				T	free				T	free					
				-					-					-						
	Scharberry Ln **(NB)**	0.0	A	-			21.4	C	-			14.4	B	-						
				-					-					-						
				R	0.0	A			R	21.4	C			R	14.4	B				
265	**SR 228 @ Beaver St Ext ***																			
	Overall Intersection	**2.1**	**A**	**AM by Movement**			**3.0**	**A**	**PM by Movement**					**SAT by Movement**						
By Approach / By Movement	SR 228 **(EB)**	1.1	A	L			2.9	A	L			1.5	A	L	1.5	A				
				T					T					T						
				-					-					-						
	SR 228 **(WB)**	free		-			free		-			free		-						
				T	free				T	free				T	free					
				R	free				R	free				R	free					
	Beaver St Ext **(SB)**	21.9	C	-			23.5	C	-			23.1	C	-						
				-					-					-						
				R	21.9	C			R	23.5	C			R	23.1	C				

* Unsignalized Intersection

Appendix E2:

2025 Opening Year (No-Build Scenario)

Node # / Intersection / Approach		2025 Opening Year / No-Build Scenarios Delay (sec/veh) and LOS																	
		2025 No-Build AM Peak						2025 No-Build PM Peak						2025 No-Build SAT Peak					
225	**SR 228 @ Franklin Rd**																		
	Overall Intersection	**50.0**	**D**	**AM by Movement**				**69.7**	**E**	**PM by Movement**				**36.0**	**D**	**SAT by Movement**			
By Approach / By Movement	SR 228 **(EB)**	24.4	C	L	42.4	D		47.0	D	L	52.7	D		21.3	C	L	47.9	D	
				T	23.6	C				T	21.2	C				T	19.8	B	
				R	7.2	A				R	0.5	A				R	3.4	A	
	SR 228 **(WB)**	59.2	E	L	134.7	F		57.8	E	L	64.5	E		33.7	C	L	72.0	E	
				T	43.5	D				T	29.9	C				T	29.7	C	
				R	43.5	D				R	20.3	C				R	29.7	C	
	Franklin Rd **(NB)**	53.6	D	L	74.6	E		148.6	F	L	50.7	D		65.0	E	L	70.3	E	
				T	47.6	D				T	54.1	D				T	75.4	E	
				R	32.6	C				R	42.6	D				R	48.3	D	
	Franklin Rd **(SB)**	71.0	E	L	37.8	D		52.0	D	L	52.2	D		58.8	E	L	56.0	E	
				T	87.3	F				T	73.5	E				T	78.5	E	
				R	24.7	C				R	40.6	D				R	38.8	D	
230	**SR 228 @ Castle Creek Dr (West) and High Pointe Dr (West)**																		
	Overall Intersection	**30.7**	**C**	**AM by Movement**				**68.1**	**E**	**PM by Movement**				**24.7**	**C**	**SAT by Movement**			
By Approach / By Movement	SR 228 **(EB)**	31.0	C	L	12.8	B		97.5	F	L	11.7	B		12.9	B	L	39.8	D	
				T	32.6	C				T	16.9	B				T	13.4	B	
				R	25.0	C				R	10.6	B				R	0.5	A	
	SR 228 **(WB)**	26.2	C	L	9.2	A		21.1	C	L	19.5	B		23.5	C	L	24.2	C	
				T	27.5	C				T	20.6	C				T	23.5	C	
				R	0.0	A				R	0.0	A				R	0.0	A	
	Castle Creek Dr (West) **(NB)**	63.7	E	L	67.0	E		102.1	F	L	51.9	D		88.1	F	L	101.6	F	
				T	57.4	E				T	38.2	D				T	56.3	E	
				R	57.4	E				R	38.2	D				R	56.3	E	
	High Pointe Dr (West) **(SB)**	57.0	E	L	56.9	E		54.9	D	L	0.0	A		55.7	E	L	0.0	A	
				T	57.2	E				T	36.8	D				T	55.7	E	
				R	56.8	E				R	36.4	D				R	55.7	E	
235	**SR 228 @ Castle Creek Dr (East) and High Pointe Dr (East)**																		
	Overall Intersection	**15.1**	**B**	**AM by Movement**				**18.8**	**B**	**PM by Movement**				**12.7**	**B**	**SAT by Movement**			
By Approach / By Movement	SR 228 **(EB)**	2.5	A	L	6.8	A		14.7	B	L	3.9	A		10.5	B	L	7.8	A	
				T	2.4	A				T	5.4	A				T	5.8	A	
				R	3.0	A				R	5.4	A				R	2.4	A	
	SR 228 **(WB)**	16.4	B	L	3.7	A		9.7	A	L	2.3	A		9.6	A	L	7.3	A	
				T	17.0	B				T	2.5	A				T	9.7	A	
				R	3.0	A				R	2.5	A				R	2.7	A	
	Castle Creek Dr (East) **(NB)**	65.4	E	L	67.9	E		69.3	E	L	49.0	D		68.7	E	L	68.0	E	
				T	63.2	E				T	50.3	D				T	68.9	E	
				R	63.2	E				R	50.3	D				R	68.9	E	
	High Pointe Dr (East) **(SB)**	61.8	E	L	62.3	E		94.1	F	L	64.2	E		66.7	E	L	66.8	E	
				T	61.6	E				T	49.3	D				T	67.3	E	
				R	61.7	E				R	48.3	D				R	66.4	E	

Node # / Intersection / Approach		2025 Opening Year / No-Build Scenarios Delay (sec/veh) and LOS																
		2025 No-Build AM Peak					2025 No-Build PM Peak					2025 No-Build SAT Peak						
240	**SR 228 @ Seven Fields Blvd and Adams Ridge Shoppes**																	
	Overall Intersection	**22.5**	**C**	**AM by Movement**			**32.5**	**C**	**PM by Movement**			**26.4**	**C**	**SAT by Movement**				
By Approach / By Movement	SR 228 **(EB)**	11.5	B	L	78.8	E	30.7	C	L	6.8	A	13.8	B	L	70.0	E		
				T	2.2	A			T	4.8	A			T	8.2	A		
				R	1.7	A			R	2.5	A			R	4.3	A		
	SR 228 **(WB)**	22.8	C	L	0.0	A	21.2	C	L	5.4	A	24.1	C	L	5.6	A		
				T	24.3	C			T	9.8	A			T	27.3	C		
				R	4.9	A			R	4.6	A			R	5.8	A		
	Adams Ridge Shoppes **(NB)**	73.0	E	L	77.3	E	55.1	E	L	39.4	D	60.5	E	L	64.5	E		
				T	61.3	E			T	37.4	D			T	54.5	D		
				R	62.6	E			R	38.3	D			R	55.0	E		
	Seven Fields Blvd **(SB)**	62.9	E	L	65.2	E	69.9	E	L	53.2	D	68.7	E	L	81.6	F		
				T	62.3	E			T	38.7	D			T	55.4	E		
				R	62.3	E			R	38.7	D			R	55.4	E		
245	**SR 228 @ Adams Ridge Blvd**																	
	Overall Intersection	**29.1**	**C**	**AM by Movement**			**27.6**	**C**	**PM by Movement**			**27.8**	**C**	**SAT by Movement**				
By Approach / By Movement	SR 228 **(EB)**	16.7	B	-			16.5	B	-			15.9	B	-				
				T	17.1	B			T	8.8	A			T	16.4	B		
				R	13.2	B			R	4.0	A			R	13.9	B		
	SR 228 **(WB)**	20.9	C	L	11.8	B	25.7	C	L	28.8	C	19.1	B	L	25.4	C		
				T	21.4	C			T	4.9	A			T	18.3	B		
				-					-					-				
	Adams Ridge Blvd **(NB)**	55.9	E	L	62.3	E	72.7	E	L	51.3	D	85.3	F	L	97.6	F		
				-					-					-				
				R	44.3	D			R	42.9	D			R	55.8	E		
250	**SR 228 @ Myoma Rd ***																	
	Overall Intersection	**2.2**	**A**	**AM by Movement**			**8.6**	**A**	**PM by Movement**			**2.5**	**A**	**SAT by Movement**				
By Approach / By Movement	SR 228 **(EB)**	1.0	A	L			1.1	A	L			0.8	A	L				
				T					T					T				
				-					-					-				
	SR 228 **(WB)**	free		-			free		-			free		-				
				T	free				T	free				T	free			
				R	free				R	free				R	free			
	Myoma Rd **(SB)**	51.1	F	L			244.7	F	L			82.1	F	L				
				-					-					-				
				R					R					R				

Node # / Intersection / Approach		2025 Opening Year / No-Build Scenarios Delay (sec/veh) and LOS																		
		2025 No-Build AM Peak					2025 No-Build PM Peak					2025 No-Build SAT Peak								
255	**SR 228 @ Heritage Creek Dr**																			
	Overall Intersection	**21.8**	**C**	**AM by Movement**			**38.8**	**D**	**PM by Movement**			**26.1**	**C**	**SAT by Movement**						
By Approach / By Movement	SR 228 **(EB)**	12.3	B	L	10.4	B	25.9	C	L	8.8	A	6.5	A	L	10.0	B				
				T	13.6	B			T	11.8	B			T	7.5	A				
				R	4.9	A			R	1.7	A			R	2.0	A				
	SR 228 **(WB)**	18.7	B	L	9.9	A	28.6	C	L	14.3	B	18.6	B	L	7.1	A				
				T	21.8	C			T	21.4	C			T	21.3	C				
				R	9.6	A			R	7.6	A			R	6.4	A				
	Heritage Creek Dr **(NB)**	46.7	D	L	50.6	D	54.6	D	L	37.7	D	94.3	F	L	130.3	F				
				T	0.0	A			T	48.1	D			T	56.8	E				
				R	41.7	D			R	41.2	D			R	48.9	D				
	Heritage Creek Dr **(SB)**	64.7	E	L	70.5	E	94.8	F	L	51.3	D	72.4	E	L	81.1	F				
				T	48.1	D			T	51.8	D			T	56.8	E				
				R	42.2	D			R	43.2	D			R	49.6	D				
260	**SR 228 @ Scharberry Ln ***																			
	Overall Intersection	**0.0**	**A**	**AM by Movement**			**0.3**	**A**	**PM by Movement**			**0.3**	**A**	**SAT by Movement**						
By Approach / By Movement	SR 228 **(EB)**	free		-			free		-			free		-						
				T	free				T	free				T	free					
				R	free				R	free				R	free					
	SR 228 **(WB)**	free		-			free		-			free		-						
				T	free				T	free				T	free					
				-					-					-						
	Scharberry Ln **(NB)**	0.0	A	-			28.3	D	-			17.1	C	-						
				-					-					-						
				R	0.0	A			R	28.3	D			R	17.1	C				
265	**SR 228 @ Beaver St Ext ***																			
	Overall Intersection	**2.8**	**A**	**AM by Movement**			**4.4**	**A**	**PM by Movement**			**3.4**	**A**	**SAT by Movement**						
By Approach / By Movement	SR 228 **(EB)**	1.2	A	L			3.6	A	L			1.8	A	L						
				T					T					T						
				-					-					-						
	SR 228 **(WB)**	free		-			free		-			free		-						
				T	free				T	free				T	free					
				R	free				R	free				R	free					
	Beaver St Ext **(SB)**	31.2	D	-			40.6	E	-			40.6	E	-						
				-					-					-						
				R	31.2	D			R	40.6	E			R	40.6	E				

* Unsignalized Intersection

Appendix E3:

2045 Design Year (No-Build Scenario)

Node # / Intersection / Approach		2045 Design Year / No-Build Scenarios Delay (sec/veh) and LOS																			
		2045 No-Build AM Peak							2045 No-Build PM Peak							2045 No-Build SAT Peak					
225	**SR 228 @ Franklin Rd**																				
	Overall Intersection	**71.6**	**E**	**AM by Movement**					**100.4**	**F**	**PM by Movement**					**42.5**	**D**	**SAT by Movement**			
By Approach / By Movement	SR 228 **(EB)**	25.2	C	L	41.2	D			74.0	E	L	72.1	E			27.2	C	L	43.3	D	
				T	24.7	C					T	78.1	E					T	27.6	C	
				R	7.7	A					R	15.3	B					R	1.7	A	
	SR 228 **(WB)**	94.5	F	L	185.4	F			83.4	F	L	78.6	E			40.4	D	L	67.4	E	
				T	75.7	E					T	84.0	F					T	37.7	D	
				R	75.7	E					R	84.0	F					R	37.7	D	
	Franklin Rd **(NB)**	69.0	E	L	118.1	F			207.7	F	L	131.6	F			73.5	E	L	90.8	F	
				T	47.8	D					T	336.3	F					T	79.9	E	
				R	32.3	C					R	49.4	D					R	48.8	D	
	Franklin Rd **(SB)**	98.9	F	L	37.7	D			55.7	E	L	55.8	E			64.5	E	L	65.0	E	
				T	126.2	F					T	68.5	E					T	85.5	F	
				R	24.4	C					R	26.3	C					R	38.5	D	
230	**SR 228 @ Castle Creek Dr (West) and High Pointe Dr (West)**																				
	Overall Intersection	**62.1**	**E**	**AM by Movement**					**112.5**	**F**	**PM by Movement**					**52.9**	**D**	**SAT by Movement**			
By Approach / By Movement	SR 228 **(EB)**	34.8	C	L	31.9	C			163.2	F	L	52.8	D			24.3	C	L	178.1	F	
				T	37.1	D					T	185.9	F					T	20.5	C	
				R	20.4	C					R	8.9	A					R	0.5	A	
	SR 228 **(WB)**	81.7	F	L	14.7	B			42.4	D	L	63.1	E			70.4	E	L	49.4	D	
				T	86.9	F					T	41.2	D					T	71.3	E	
				R	0.0	A					R	0.0	A					R	0.0	A	
	Castle Creek Dr (West) **(NB)**	65.9	E	L	70.1	E			140.0	F	L	187.5	F			101.3	F	L	121.2	F	
				T	56.7	E					T	59.7	E					T	56.2	E	
				R	56.7	E					R	59.7	E					R	56.2	E	
	High Pointe Dr (West) **(SB)**	56.2	E	L	56.2	E			55.0	E	L	0.0	A			55.6	E	L	0.0	A	
				T	56.5	E					T	55.4	E					T	55.5	E	
				R	56.1	E					R	54.6	D					R	55.6	E	
235	**SR 228 @ Castle Creek Dr (East) and High Pointe Dr (East)**																				
	Overall Intersection	**47.3**	**D**	**AM by Movement**					**51.6**	**D**	**PM by Movement**					**26.1**	**C**	**SAT by Movement**			
By Approach / By Movement	SR 228 **(EB)**	7.1	A	L	90.7	F			76.0	E	L	78.0	E			11.0	B	L	61.8	E	
				T	4.4	A					T	78.4	E					T	9.0	A	
				R	3.6	A					R	19.3	B					R	2.6	A	
	SR 228 **(WB)**	69.7	E	L	6.7	A			15.8	B	L	60.3	E			34.6	C	L	15.8	B	
				T	72.5	E					T	13.7	B					T	35.2	D	
				R	3.4	A					R	5.0	A					R	2.9	A	
	Castle Creek Dr (East) **(NB)**	64.1	E	L	66.7	E			69.3	E	L	64.8	E			68.7	E	L	67.9	E	
				T	61.6	E					T	69.8	E					T	68.9	E	
				R	61.6	E					R	69.8	E					R	68.9	E	
	High Pointe Dr (East) **(SB)**	60.0	E	L	60.5	E			97.0	F	L	160.0	F			65.9	E	L	66.1	E	
				T	59.9	E					T	65.0	E					T	66.4	E	
				R	60.0	E					R	63.5	E					R	65.7	E	

Node # / Intersection / Approach		2045 Design Year / No-Build Scenarios Delay (sec/veh) and LOS																	
		2045 No-Build AM Peak					2045 No-Build PM Peak					2045 No-Build SAT Peak							
240	**SR 228 @ Seven Fields Blvd and Adams Ridge Shoppes**																		
	Overall Intersection	**51.6**	**D**	**AM by Movement**			**63.9**	**E**	**PM by Movement**			**46.8**	**D**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	11.3	B	L	70.9	E	83.3	F	L	85.0	F	17.8	B	L	89.6	F			
				T	3.0	A			T	90.1	F			T	10.7	B			
				R	2.0	A			R	6.0	A			R	4.1	A			
	SR 228 **(WB)**	74.9	E	L	0.0	A	38.2	D	L	28.9	C	62.4	E	L	12.3	B			
				T	80.4	F			T	43.5	D			T	71.4	E			
				R	5.4	A			R	7.7	A			R	6.8	A			
	Adams Ridge Shoppes **(NB)**	84.6	F	L	92.3	F	54.7	D	L	56.8	E	70.6	E	L	81.5	F			
				T	60.0	E			T	52.2	D			T	54.0	D			
				R	61.3	E			R	52.8	D			R	54.3	D			
	Seven Fields Blvd **(SB)**	61.5	E	L	63.3	E	71.4	E	L	86.6	F	72.1	E	L	88.6	F			
				T	61.1	E			T	55.0	E			T	56.2	E			
				R	61.1	E			R	55.0	E			R	56.2	E			
245	**SR 228 @ Adams Ridge Blvd**																		
	Overall Intersection	**38.9**	**D**	**AM by Movement**			**49.3**	**D**	**PM by Movement**			**35.5**	**D**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	26.4	C	-			21.2	C	-			16.5	B	-					
				T	27.7	C			T	24.5	C			T	17.8	B			
				R	14.3	B			R	13.3	B			R	12.2	B			
	SR 228 **(WB)**	35.8	D	L	18.6	B	73.5	E	L	318.0	F	26.8	C	L	42.5	D			
				T	36.9	D			T	18.7	B			T	24.8	C			
				-					-					-					
	Adams Ridge Blvd **(NB)**	58.3	E	L	66.8	E	78.7	E	L	91.1	F	111.2	F	L	134.3	F			
				-					-					-					
				R	42.4	D			R	62.0	E			R	56.6	E			
250	**SR 228 @ Myoma Rd ***																		
	Overall Intersection	**3.1**	**A**	**AM by Movement**			**34.0**	**D**	**PM by Movement**			**5.9**	**A**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	1.2	A	L			1.3	A	L			0.9	A	L					
				T					T					T					
				-					-					-					
	SR 228 **(WB)**	free		-			free		-			free		-					
				T	free				T	free				T	free				
				R	free				R	free				R	free				
	Myoma Rd **(SB)**	72.5	F	L			912.8	F	L			199.8	F	L					
				-					-					-					
				R					R					R					

Node # / Intersection / Approach		2045 Design Year / No-Build Scenarios Delay (sec/veh) and LOS																	
		2045 No-Build AM Peak					2045 No-Build PM Peak					2045 No-Build SAT Peak							
255	**SR 228 @ Heritage Creek Dr**																		
	Overall Intersection	**29.5**	**C**	**AM by Movement**			**69.1**	**E**	**PM by Movement**			**34.9**	**C**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	16.8	B	L	18.7	B	61.6	E	L	64.8	E	10.9	B	L	69.1	E			
				T	18.5	B			T	73.9	E			T	8.9	A			
				R	5.3	A			R	4.7	A			R	2.0	A			
	SR 228 **(WB)**	30.3	C	L	14.4	B	60.5	E	L	226.5	F	33.6	C	L	9.5	A			
				T	36.4	D			T	44.8	D			T	39.1	D			
				R	11.1	B			R	15.7	B			R	6.6	A			
	Heritage Creek Dr **(NB)**	44.4	D	L	48.2	D	56.3	E	L	69.4	E	94.2	F	L	130.3	F			
				T	0.0	A			T	43.7	D			T	56.8	E			
				R	39.6	D			R	40.9	D			R	48.8	D			
	Heritage Creek Dr **(SB)**	66.6	E	L	73.8	E	134.8	F	L	156.0	F	82.8	F	L	96.5	F			
				T	46.0	D			T	43.4	D			T	56.8	E			
				R	40.2	D			R	37.6	D			R	49.5	D			
260	**SR 228 @ Scharberry Ln ***																		
	Overall Intersection	**0.0**	**A**	**AM by Movement**			**0.4**	**A**	**PM by Movement**			**0.5**	**A**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	free		-			free		-			free		-					
				T	free				T	free				T	free				
				R	free				R	free				R	free				
	SR 228 **(WB)**	free		-			free		-			free		-					
				T	free				T	free				T	free				
				-					-					-					
	Scharberry Ln **(NB)**	0.0	A	-			37.8	E	-			19.5	C	-					
				-					-					-					
				R	0.0	A			R	37.8	E			R	19.5	C			
265	**SR 228 @ Beaver St Ext ***																		
	Overall Intersection	**4.5**	**A**	**AM by Movement**			**7.7**	**A**	**PM by Movement**			**5.8**	**A**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	1.3	A	L			4.7	A	L			1.9	A	L					
				T					T					T					
				-					-					-					
	SR 228 **(WB)**	free		-			free		-			free		-					
				T	free				T	free				T	free				
				R	free				R	free				R	free				
	Beaver St Ext **(SB)**	53.3	F	-			84.7	F	-			80.6	F	-					
				-					-					-					
				R	53.3	F			R	84.7	F			R	80.6	F			

* Unsignalized Intersection

Appendix E4:

2045 Design Year (Build Scenarios)

Node # / Interesection / Peak / Approach		2045 Design Year / Build Scenarios Delay (sec/veh) and LOS																	
		2045 No-Build w/ Approved Growth					2045 Build w/ Approved Growth					2045 Build w/ Supplemental Growth							
225	**SR 228 @ Franklin Rd**																		
AM	**Overall Intersection**	**71.6**	**E**	**AM by Movement**			**43.3**	**D**	**AM by Movement**			**62.6**	**E**	**AM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	25.2	C	L	41.2	D	31.6	C	L	58.9	E	56.1	E	L	73.5	E			
				T	24.7	C			T	29.8	C			T	56.7	E			
				R	7.7	A			R	12.6	B			R	17.7	B			
	SR 228 **(WB)**	94.5	F	L	185.4	F	41.5	D	L	61.2	E	48.7	D	L	60.6	E			
				T	75.7	E			T	38.1	D			T	47.3	D			
				R	75.7	E			R	21.1	C			R	22.2	C			
	Franklin Rd **(NB)**	69.0	E	L	118.1	F	52.9	D	L	86.2	F	92.6	F	L	209.0	F			
				T	47.8	D			T	39.1	D			T	38.6	D			
				R	32.3	C			R	27.1	C			R	25.6	C			
	Franklin Rd **(SB)**	98.9	F	L	37.7	D	65.4	E	L	35.6	D	88.0	F	L	35.2	D			
				T	126.2	F			T	78.0	E			T	111.7	F			
				R	24.4	C			R	32.3	C			R	31.3	C			
PM	**Overall Intersection**	**100.4**	**F**	**PM by Movement**			**35.4**	**D**	**PM by Movement**			**49.2**	**D**	**PM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	74.0	E	L	72.1	E	19.8	B	L	51.8	D	41.7	D	L	81.8	F			
				T	78.1	E			T	12.8	B			T	33.4	C			
				R	15.3	B			R	0.2	A			R	11.0	B			
	SR 228 **(WB)**	83.4	F	L	78.6	E	38.8	D	L	64.5	E	46.1	D	L	91.7	F			
				T	84.0	F			T	36.4	D			T	39.2	D			
				R	84.0	F			R	21.6	C			R	36.5	D			
	Franklin Rd **(NB)**	207.7	F	L	131.6	F	51.0	D	L	57.0	E	60.0	E	L	108.7	F			
				T	336.3	F			T	53.7	D			T	49.6	D			
				R	49.4	D			R	41.5	D			R	38.8	D			
	Franklin Rd **(SB)**	55.7	E	L	55.8	E	62.2	E	L	50.9	D	70.2	E	L	43.8	D			
				T	68.5	E			T	77.2	E			T	98.0	F			
				R	26.3	C			R	39.2	D			R	30.1	C			
SAT	**Overall Intersection**	**42.5**	**D**	**SAT by Movement**			**30.1**	**C**	**SAT by Movement**			**40.1**	**D**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	27.2	C	L	43.3	D	15.3	B	L	60.0	E	24.3	C	L	76.0	E			
				T	27.6	C			T	11.2	B			T	19.8	B			
				R	1.7	A			R	1.1	A			R	2.0	A			
	SR 228 **(WB)**	40.4	D	L	67.4	E	26.3	C	L	62.5	E	31.9	C	L	61.7	E			
				T	37.7	D			T	23.3	C			T	29.6	C			
				R	37.7	D			R	13.4	B			R	15.0	B			
	Franklin Rd **(NB)**	73.5	E	L	90.8	F	54.6	D	L	61.1	E	69.2	E	L	112.9	F			
				T	79.9	E			T	57.0	E			T	56.0	E			
				R	48.8	D			R	45.2	D			R	43.2	D			
	Franklin Rd **(SB)**	64.5	E	L	65.0	E	63.1	E	L	57.2	E	78.8	E	L	77.7	E			
				T	85.5	F			T	79.1	E			T	102.5	F			
				R	38.5	D			R	50.0	D			R	49.9	D			

Node # / Interesection / Peak / Approach		2045 Design Year / Build Scenarios Delay (sec/veh) and LOS																	
		2045 No-Build w/ Approved Growth					2045 Build w/ Approved Growth					2045 Build w/ Supplemental Growth							
230	**SR 228 @ Castle Creek Dr (West) and High Pointe Dr (West)**																		
AM	**Overall Intersection**	**62.1**	**E**	**AM by Movement**			**15.3**	**B**	**AM by Movement**			**11.8**	**B**	**AM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	34.8	C	L	31.9	C	9.8	A	L	8.1	A	13.9	B	L	28.3	C			
				T	37.1	D			T	10.3	B			T	14.1	B			
				R	20.4	C			R	7.7	A			R	8.3	A			
	SR 228 **(WB)**	81.7	F	L	14.7	B	15.5	B	L	7.8	A	5.3	A	L	7.7	A			
				T	86.9	F			T	16.1	B			T	5.1	A			
				R	0.0	A			R	16.1	B			R	50.2	D			
	Castle Creek Dr (West) **(NB)**	65.9	E	L	70.1	E	45.1	D	L	47.1	D	46.6	D	L	50.2	D			
				T	56.7	E			T	40.8	D			T	41.0	D			
				R	56.7	E			R	40.8	D			R	41.0	D			
	High Pointe Dr (West) **(SB)**	56.2	E	L	56.2	E	40.5	D	L	40.4	D	40.0	D	L	40.5	D			
				T	56.5	E			T	40.6	D			T	40.1	D			
				R	56.1	E			R	40.4	D			R	39.7	D			
PM	**Overall Intersection**	**112.5**	**F**	**PM by Movement**			**25.3**	**C**	**PM by Movement**			**45.1**	**D**	**PM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	163.2	F	L	52.8	D	20.3	C	L	15.5	B	57.0	E	L	40.7	D			
				T	185.9	F			T	21.5	C			T	58.0	E			
				R	8.9	A			R	11.8	B			R	54.0	D			
	SR 228 **(WB)**	42.4	D	L	63.1	E	24.7	C	L	23.9	C	30.5	C	L	35.3	D			
				T	41.2	D			T	24.8	C			T	30.3	C			
				R	0.0	A			R	24.8	C			R	30.3	C			
	Castle Creek Dr (West) **(NB)**	140.0	F	L	187.5	F	47.7	D	L	54.3	D	50.0	D	L	58.8	E			
				T	59.7	E			T	36.6	D			T	36.1	D			
				R	59.7	E			R	36.6	D			R	36.1	D			
	High Pointe Dr (West) **(SB)**	55.0	E	L	0.0	A	34.7	C	L	34.9	C	34.2	C	L	35.3	D			
				T	55.4	E			T	34.9	C			T	34.3	C			
				R	54.6	D			R	34.5	C			R	33.6	C			
SAT	**Overall Intersection**	**52.9**	**D**	**SAT by Movement**			**12.5**	**B**	**SAT by Movement**			**20.6**	**C**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	24.3	C	L	178.1	F	14.0	B	L	18.6	B	25.7	C	L	132.7	F			
				T	20.5	C			T	14.4	B			T	22.0	C			
				R	0.5	A			R	9.5	A			R	10.0	B			
	SR 228 **(WB)**	70.4	E	L	49.4	D	6.2	A	L	3.2	A	12.3	B	L	11.9	B			
				T	71.3	E			T	6.3	A			T	12.4	B			
				R	0.0	A			R	6.3	A			R	12.4	B			
	Castle Creek Dr (West) **(NB)**	101.3	F	L	121.2	F	39.8	D	L	43.1	D	41.1	D	L	45.6	D			
				T	56.2	E			T	32.3	C			T	32.0	C			
				R	56.2	E			R	32.3	C			R	32.0	C			
	High Pointe Dr (West) **(SB)**	55.6	E	L	0.0	A	31.9	C	L	31.8	C	31.5	C	L	31.8	C			
				T	55.5	E			T	31.8	C			T	31.4	C			
				R	55.6	E			R	31.9	C			R	31.4	C			

Node # / Interesection / Peak / Approach		2045 Design Year / Build Scenarios Delay (sec/veh) and LOS																	
		2045 No-Build w/ Approved Growth					2045 Build w/ Approved Growth					2045 Build w/ Supplemental Growth							
235	**SR 228 @ Castle Creek Dr (East) and High Pointe Dr (East)**																		
AM	**Overall Intersection**	**47.3**	**D**	**AM by Movement**			**5.7**	**A**	**AM by Movement**			**10.5**	**B**	**AM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	7.1	A	L	90.7	F	1.5	A	L	1.4	A	11.0	B	L	15.3	B			
				T	4.4	A			T	1.5	A			T	10.9	B			
				R	3.6	A			R	1.5	A			R	10.9	B			
	SR 228 **(WB)**	69.7	E	L	6.7	A	3.1	A	L	1.5	A	5.8	A	L	0.6	A			
				T	72.5	E			T	3.1	A			T	5.9	A			
				R	3.4	A			R	3.1	A			R	5.9	A			
	Castle Creek Dr (East) **(NB)**	64.1	E	L	66.7	E	47.6	D	L	49.4	D	47.7	D	L	49.7	D			
				T	61.6	E			T	45.9	D			T	46.0	D			
				R	61.6	E			R	45.9	D			R	46.0	D			
	High Pointe Dr (East) **(SB)**	60.0	E	L	60.5	E	44.7	D	L	45.0	D	44.5	D	L	45.0	D			
				T	59.9	E			T	44.5	D			T	44.2	D			
				R	60.0	E			R	44.7	D			R	44.4	D			
PM	**Overall Intersection**	**51.6**	**D**	**PM by Movement**			**9.1**	**A**	**PM by Movement**			**13.3**	**B**	**PM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	76.0	E	L	78.0	E	6.0	A	L	11.8	B	5.6	A	L	35.9	D			
				T	78.4	E			T	5.6	A			T	3.4	A			
				R	19.3	B			R	5.6	A			R	3.4	A			
	SR 228 **(WB)**	15.8	B	L	60.3	E	2.9	A	L	5.5	A	14.2	B	L	26.3	C			
				T	13.7	B			T	2.8	A			T	13.6	B			
				R	5.0	A			R	2.8	A			R	13.6	B			
	Castle Creek Dr (East) **(NB)**	69.3	E	L	64.8	E	49.6	D	L	48.5	D	48.5	D	L	46.6	D			
				T	69.8	E			T	49.7	D			T	48.7	D			
				R	69.8	E			R	49.7	D			R	48.7	D			
	High Pointe Dr (East) **(SB)**	97.0	F	L	160.0	F	57.8	E	L	76.6	E	57.4	E	L	77.6	E			
				T	65.0	E			T	48.6	D			T	47.0	D			
				R	63.5	E			R	47.5	D			R	45.8	D			
SAT	**Overall Intersection**	**26.1**	**C**	**SAT by Movement**			**9.1**	**A**	**SAT by Movement**			**10.3**	**B**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	11.0	B	L	61.8	E	9.7	A	L	5.9	A	5.3	A	L	42.0	D			
				T	9.0	A			T	9.8	A			T	4.0	A			
				R	2.6	A			R	9.8	A			R	4.0	A			
	SR 228 **(WB)**	34.6	C	L	15.8	B	5.5	A	L	3.3	A	11.5	B	L	7.2	A			
				T	35.2	D			T	5.5	A			T	11.6	B			
				R	2.9	A			R	5.5	A			R	11.6	B			
	Castle Creek Dr (East) **(NB)**	68.7	E	L	67.9	E	43.2	D	L	43.0	D	43.3	D	L	43.0	D			
				T	68.9	E			T	43.3	D			T	43.4	D			
				R	68.9	E			R	43.3	D			R	43.4	D			
	High Pointe Dr (East) **(SB)**	65.9	E	L	66.1	E	41.9	D	L	41.9	D	41.9	D	L	42.1	D			
				T	66.4	E			T	42.2	D			T	42.4	D			
				R	65.7	E			R	41.8	D			R	41.7	D			

Node # / Interesection / Peak / Approach		2045 Design Year / Build Scenarios Delay (sec/veh) and LOS																		
		2045 No-Build w/ Approved Growth					2045 Build w/ Approved Growth					2045 Build w/ Supplemental Growth								
240	**SR 228 @ Seven Fields Blvd and Adams Ridge Shoppes**																			
AM	**Overall Intersection**	**51.6**	**D**	**AM by Movement**			**10.7**	**B**	**AM by Movement**			**9.8**	**A**	**AM by Movement**						
By Approach / By Movement	SR 228 **(EB)**	11.3	B	L	70.9	E	5.8	A	L	38.0	D	4.4	A	L	21.9	C				
				T	3.0	A			T	1.3	A			T	2.5	A				
				R	2.0	A			R	2.1	A			R	2.0	A				
	SR 228 **(WB)**	74.9	E	L	0.0	A	8.4	A	L	8.7	A	8.5	A	L	8.8	A				
				T	80.4	F			T	8.7	A			T	8.8	A				
				R	5.4	A			R	4.8	A			R	4.1	A				
	Adams Ridge Shoppes **(NB)**	84.6	F	L	92.3	F	50.9	D	L	52.7	D	46.7	D	L	47.0	D				
				T	60.0	E			T	44.6	D			T	45.0	D				
				R	61.3	E			R	46.0	D			R	46.4	D				
	Seven Fields Blvd **(SB)**	61.5	E	L	63.3	E	45.9	D	L	47.3	D	47.3	D	L	47.8	D				
				T	61.1	E			T	45.6	D			T	45.0	D				
				R	61.1	E			R	45.6	D			R	47.2	D				
PM	**Overall Intersection**	**63.9**	**E**	**PM by Movement**			**13.6**	**B**	**PM by Movement**			**26.5**	**C**	**PM by Movement**						
By Approach / By Movement	SR 228 **(EB)**	83.3	F	L	85.0	F	8.5	A	L	19.7	B	25.8	C	L	18.6	B				
				T	90.1	F			T	7.5	A			T	26.9	C				
				R	6.0	A			R	6.5	A			R	20.4	C				
	SR 228 **(WB)**	38.2	D	L	28.9	C	8.3	A	L	5.3	A	20.2	C	L	15.5	B				
				T	43.5	D			T	9.2	A			T	20.0	C				
				R	7.7	A			R	3.7	A			R	21.6	C				
	Adams Ridge Shoppes **(NB)**	54.7	D	L	56.8	E	37.9	D	L	38.9	D	38.5	D	L	38.8	D				
				T	52.2	D			T	36.5	D			T	37.8	D				
				R	52.8	D			R	37.3	D			R	38.6	D				
	Seven Fields Blvd **(SB)**	71.4	E	L	86.6	F	46.0	D	L	53.5	D	50.5	D	L	61.1	E				
				T	55.0	E			T	37.9	D			T	38.0	D				
				R	55.0	E			R	37.9	D			R	39.7	D				
SAT	**Overall Intersection**	**46.8**	**D**	**SAT by Movement**			**15.4**	**B**	**SAT by Movement**			**14.0**	**B**	**SAT by Movement**						
By Approach / By Movement	SR 228 **(EB)**	17.8	B	L	89.6	F	5.2	A	L	38.1	D	7.7	A	L	35.0	D				
				T	10.7	B			T	1.9	A			T	5.5	A				
				R	4.1	A			R	0.1	A			R	1.1	A				
	SR 228 **(WB)**	62.4	E	L	12.3	B	16.5	B	L	7.8	A	12.9	B	L	6.0	A				
				T	71.4	E			T	17.4	B			T	14.1	B				
				R	6.8	A			R	11.4	B			R	3.6	A				
	Adams Ridge Shoppes **(NB)**	70.6	E	L	81.5	F	35.5	D	L	37.1	D	34.0	C	L	34.6	C				
				T	54.0	D			T	32.9	C			T	32.8	C				
				R	54.3	D			R	33.5	C			R	33.4	C				
	Seven Fields Blvd **(SB)**	72.1	E	L	88.6	F	39.3	D	L	45.1	D	39.4	D	L	45.0	D				
				T	56.2	E			T	33.6	C			T	32.6	C				
				R	56.2	E			R	33.6	C			R	34.3	C				

Node # / Interesection / Peak / Approach		2045 Design Year / Build Scenarios Delay (sec/veh) and LOS																	
		2045 No-Build w/ Approved Growth					2045 Build w/ Approved Growth					2045 Build w/ Supplemental Growth							
245	**SR 228 @ Adams Ridge Blvd**																		
AM	**Overall Intersection**	**38.9**	**D**	**AM by Movement**			**15.8**	**B**	**AM by Movement**			**35.3**	**D**	**AM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	C		-			13.6	B	-			39.1	D	L	44.3	D			
				T	27.7	C			T	14.5	B			T	21.1	C			
				R	14.3	B			R	5.5	A			R	226.8	F			
	SR 228 **(WB)**	D		L	18.6	B	4.1	A	L	4.1	A	8.2	A	L	9.0	A			
				T	36.9	D			T	4.1	A			T	8.2	A			
				-					-					R	8.2	A			
	Adams Ridge Blvd **(NB)**	E		L	66.8	E	35.9	D	L	39.8	D	76.7	E	L	103.0	F			
				-					-					T	28.7	C			
				R	42.4	D			R	28.5	C			R	30.9	C			
	Future 4th Leg **(SB)**	-		-			-		-			50.3	D	L	52.5	D			
				-					-					T	47.9	D			
				-					-					R	47.9	D			
PM	**Overall Intersection**	**49.3**	**D**	**PM by Movement**			**15.6**	**B**	**PM by Movement**			**29.1**	**C**	**PM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	21.2	C	-			9.4	A	-			32.7	C	L	16.6	B			
				T	24.5	C			T	11.2	B			T	29.0	C			
				R	13.3	B			R	5.0	A			R	44.1	D			
	SR 228 **(WB)**	73.5	E	L	318.0	F	12.1	B	L	43.7	D	15.7	B	L	74.4	E			
				T	18.7	B			T	5.0	A			T	4.6	A			
				-					-					R	4.6	A			
	Adams Ridge Blvd **(NB)**	78.7	E	L	91.1	F	47.5	D	L	51.7	D	41.6	D	L	47.6	D			
				-					-					T	32.8	C			
				R	62.0	E			R	41.9	D			R	33.7	C			
	Future 4th Leg **(SB)**	-		-			-		-			62.6	E	L	75.2	E			
				-					-					T	47.9	D			
				-					-					R	47.9	D			
SAT	**Overall Intersection**	**35.5**	**D**	**SAT by Movement**			**14.8**	**B**	**SAT by Movement**			**21.3**	**C**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	16.5	B	-			8.1	A	-			15.4	B	L	17.7	B			
				T	17.8	B			T	9.1	A			T	17.0	B			
				R	12.2	B			R	4.9	A			R	8.6	A			
	SR 228 **(WB)**	26.8	C	L	42.5	D	13.3	B	L	20.5	C	14.4	B	L	14.4	B			
				T	24.8	C			T	12.4	B			T	14.4	B			
				-					-					R	14.4	B			
	Adams Ridge Blvd **(NB)**	111.2	F	L	134.3	F	37.0	D	L	39.8	D	56.9	E	L	68.9	E			
				-					-					T	29.4	C			
				R	56.6	E			R	30.5	C			R	29.9	C			
	Future 4th Leg **(SB)**	-		-			-		-			46.0	D	L	49.4	D			
				-					-					T	41.9	D			
				-					-					R	41.9	D			

Node # / Interesection / Peak / Approach		2045 Design Year / Build Scenarios Delay (sec/veh) and LOS																
		2045 No-Build w/ Approved Growth					2045 Build w/ Approved Growth					2045 Build w/ Supplemental Growth						
250	**SR 228 @ Myoma Rd ***																	
AM	**Overall Intersection**	**3.1**	**A**	**AM by Movement**			**1.4**	**A**	**AM by Movement**			**18.5**	**B**	**AM by Movement**				
By Approach / By Movement	SR 228 **(EB)**	1.2	A	L			1.2	A	L			15.8	B	L	15.8	B		
				T					T					T	17.1	B		
				-					-					R	17.1	B		
	SR 228 **(WB)**	free		-			free		-			9.7	A	L	24.5	C		
				T	free				T	free				T	7.7	A		
				R	free				R	free				R	10.3	B		
	Future 4th Leg **(NB)**	-		-			-		-			46.7	D	L	56.3	E		
				-					-					T	36.3	D		
				-					-					R	36.3	D		
	Myoma Rd **(SB)**	72.5	F	L			23.5	C	L			49.4	D	L	47.1	D		
				-					-					T	49.7	D		
				R					R					R	49.7	D		
PM	**Overall Intersection**	**34.0**	**D**	**PM by Movement**			**4.6**	**A**	**PM by Movement**			**32.1**	**C**	**PM by Movement**				
By Approach / By Movement	SR 228 **(EB)**	1.3	A	L			1.3	A	L			40.0	D	L	29.3	C		
				T					T					T	40.8	D		
				-					-					R	40.8	D		
	SR 228 **(WB)**	free		-			free		-			18.9	B	L	69.9	E		
				T	free				T	free				T	12.8	B		
				R	free				R	free				R	13.3	B		
	Future 4th Leg **(NB)**	-		-			-		-			41.1	D	L	45.3	D		
				-					-					T	36.7	D		
				-					-					R	36.7	D		
	Myoma Rd **(SB)**	912.8	F	L			103.7	F	L			58.6	E	L	51.8	D		
				-					-					T	59.7	E		
				R					R					R	59.7	E		
SAT	**Overall Intersection**	**5.9**	**A**	**SAT by Movement**			**1.4**	**A**	**SAT by Movement**			**24.2**	**C**	**SAT by Movement**				
By Approach / By Movement	SR 228 **(EB)**	0.9	A	L			0.9	A	L			24.8	C	L	49.7	D		
				T					T					T	23.5	C		
				-					-					R	23.5	C		
	SR 228 **(WB)**	free		-			free		-			12.1	B	L	29.1	C		
				T	free				T	free				T	9.4	A		
				R	free				R	free				R	9.8	A		
	Future 4th Leg **(NB)**	-		-			-		-			58.9	E	L	85.0	F		
				-					-					T	32.1	C		
				-					-					R	32.1	C		
	Myoma Rd **(SB)**	199.8	F	L			35.9	E	L			45.8	D	L	39.7	D		
				-					-					T	46.3	D		
				R					R					R	46.3	D		

Node # / Interesection / Peak / Approach		2045 Design Year / Build Scenarios Delay (sec/veh) and LOS																	
		2045 No-Build w/ Approved Growth					2045 Build w/ Approved Growth					2045 Build w/ Supplemental Growth							
255	**SR 228 @ Heritage Creek Dr**																		
AM	**Overall Intersection**	**29.5**	**C**	**AM by Movement**			**12.8**	**B**	**AM by Movement**			**14.2**	**B**	**AM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	16.8	B	L	18.7	B	6.1	A	L	5.7	A	14.9	B	L	5.2	A			
				T	18.5	B			T	7.1	A			T	13.3	B			
				R	5.3	A			R	0.1	A			R	31.9	C			
	SR 228 **(WB)**	30.3	C	L	14.4	B	9.5	A	L	1.9	A	7.3	A	L	2.8	A			
				T	36.4	D			T	9.5	A			T	8.2	A			
				R	11.1	B			R	12.0	B			R	3.8	A			
	Heritage Creek Dr **(NB)**	44.4	D	L	48.2	D	45.8	D	L	48.2	D	46.2	D	L	48.8	D			
				T	0.0	A			T	42.7	D			T	42.7	D			
				R	39.6	D			R	42.7	D			R	42.7	D			
	Heritage Creek Dr **(SB)**	66.6	E	L	73.8	E	43.1	D	L	44.6	D	43.3	D	L	44.9	D			
				T	46.0	D			T	43.3	D			T	43.0	D			
				R	40.2	D			R	35.5	D			R	35.2	D			
PM	**Overall Intersection**	**69.1**	**E**	**PM by Movement**			**18.6**	**B**	**PM by Movement**			**41.0**	**D**	**PM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	61.6	E	L	64.8	E	10.9	B	L	10.3	B	55.1	E	L	16.0	B			
				T	73.9	E			T	13.3	B			T	52.5	D			
				R	4.7	A			R	0.1	A			R	82.4	F			
	SR 228 **(WB)**	60.5	E	L	226.5	F	9.3	A	L	32.4	C	24.9	C	L	36.4	D			
				T	44.8	D			T	6.9	A			T	18.8	B			
				R	15.7	B			R	3.6	A			R	48.9	D			
	Heritage Creek Dr **(NB)**	56.3	E	L	69.4	E	39.8	D	L	37.3	D	40.5	D	L	38.6	D			
				T	43.7	D			T	48.5	D			T	48.6	D			
				R	40.9	D			R	41.5	D			R	41.7	D			
	Heritage Creek Dr **(SB)**	134.8	F	L	156.0	F	50.3	D	L	51.6	D	51.3	D	L	52.8	D			
				T	43.4	D			T	51.1	D			T	51.1	D			
				R	37.6	D			R	42.3	D			R	42.2	D			
SAT	**Overall Intersection**	**34.9**	**C**	**SAT by Movement**			**11.5**	**B**	**SAT by Movement**			**17.7**	**B**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	10.9	B	L	69.1	E	5.4	A	L	5.9	A	24.1	C	L	25.5	C			
				T	8.9	A			T	5.8	A			T	24.0	C			
				R	2.0	A			R	3.4	A			R	24.3	C			
	SR 228 **(WB)**	33.6	C	L	9.5	A	6.7	A	L	4.0	A	7.0	A	L	19.3	B			
				T	39.1	D			T	7.4	A			T	6.3	A			
				R	6.6	A			R	3.8	A			R	1.0	A			
	Heritage Creek Dr **(NB)**	94.2	F	L	130.3	F	36.4	D	L	38.8	D	37.5	D	L	40.6	D			
				T	56.8	E			T	42.0	D			T	41.7	D			
				R	48.8	D			R	32.6	C			R	32.9	C			
	Heritage Creek Dr **(SB)**	82.8	F	L	96.5	F	42.1	D	L	44.1	D	42.4	D	L	44.7	D			
				T	56.8	E			T	44.3	D			T	44.0	D			
				R	49.5	D			R	36.1	D			R	35.8	D			

Node # / Interesection / Peak / Approach		2045 Design Year / Build Scenarios Delay (sec/veh) and LOS														
		2045 No-Build w/ Approved Growth					2045 Build w/ Approved Growth					2045 Build w/ Supplemental Growth				
260	**SR 228 @ Scharberry Ln ***															
AM	**Overall Intersection**	**0.0**	**A**	**AM by Movement**			**0.0**	**A**	**AM by Movement**			**0.0**	**A**	**AM by Movement**		
By Approach / By Movement	SR 228 **(EB)**	free		-			free		-			free		-		
				T	free				T	free				T	free	
				R	free				R	free				R	free	
	SR 228 **(WB)**	free		-			free		-			free		-		
				T	free				T	free				T	free	
				-					-					-		
	Scharberry Ln **(NB)**	0.0	A	-			0.0	A	-			0.0	A	-		
				-					-					-		
				R	0.0	A			R	0.0	A			R	0.0	A
PM	**Overall Intersection**	**0.4**	**A**	**PM by Movement**			**0.1**	**A**	**PM by Movement**			**0.2**	**A**	**PM by Movement**		
By Approach / By Movement	SR 228 **(EB)**	free		-			free		-			free		-		
				T	free				T	free				T	free	
				R	free				R	free				R	free	
	SR 228 **(WB)**	free		-			free		-			free		-		
				T	free				T	free				T	free	
				-					-					-		
	Scharberry Ln **(NB)**	37.8	**E**	-			12.6	B	-			20.0	C	-		
				-					-					-		
				R	37.8	**E**			R	12.6	B			R	20.0	C
SAT	**Overall Intersection**	**0.5**	**A**	**SAT by Movement**			**0.1**	**A**	**SAT by Movement**			**0.1**	**A**	**SAT by Movement**		
By Approach / By Movement	SR 228 **(EB)**	free		-			free		-			free		-		
				T	free				T	free				T	free	
				R	free				R	free				R	free	
	SR 228 **(WB)**	free		-			0.1	A	-			0.1	A	-		
				T	free				T	0.1	A			T	0.1	A
				-					-					-		
	Scharberry Ln **(NB)**	19.5	C	-			10.9	B	-			15.0	C	-		
				-					-					-		
				R	19.5	C			R	10.9	B			R	15.0	C

Node # / Interesection / Peak / Approach		2045 Design Year / Build Scenarios Delay (sec/veh) and LOS																
		2045 No-Build w/ Approved Growth					2045 Build w/ Approved Growth					2045 Build w/ Supplemental Growth						
265	**SR 228 @ Beaver St Ext ***																	
AM	**Overall Intersection**	**0.4**	**A**	**AM by Movement**			**15.1**	**B**	**AM by Movement**			**15.3**	**B**	**AM by Movement**				
By Approach / By Movement	SR 228 **(EB)**	1.3	A	L			8.1	A	L	61.8	E	7.3	A	L	55.3	E		
				T					T	2.0	A			T	2.7	A		
				-					-					-				
	SR 228 **(WB)**	free		-			17.2	B	-			18.9	B	-				
				T	free				T	17.2	B			T	18.9	B		
				R	free				R	17.2	B			R	18.9	B		
	Beaver St Ext **(SB)**	53.3	F	-			42.2	D	L	42.2	D	42.2	D	L	42.2	D		
				-					-					-				
				R	53.3	F			R	42.2	D			R	42.2	D		
PM	**Overall Intersection**	**7.7**	**A**	**PM by Movement**			**23.0**	**C**	**PM by Movement**			**21.1**	**C**	**PM by Movement**				
By Approach / By Movement	SR 228 **(EB)**	4.7	A	L			14.1	B	L	53.4	D	7.9	A	L	27.0	C		
				T					T	3.0	A			T	3.6	A		
				-					-					-				
	SR 228 **(WB)**	free		-			30.3	C	-			37.2	D	-				
				T	free				T	30.3	C			T	37.2	D		
				R	free				R	30.3	C			R	37.2	D		
	Beaver St Ext **(SB)**	84.7	F	-			47.9	D	L	47.9	D	24.0	C	L	24.0	C		
				-					-					-				
				R	84.7	F			R	47.9	D			R	24.0	C		
SAT	**Overall Intersection**	**5.8**	**A**	**SAT by Movement**			**16.5**	**B**	**SAT by Movement**			**17.4**	**B**	**SAT by Movement**				
By Approach / By Movement	SR 228 **(EB)**	1.9	A	L			7.6	A	L	45.0	D	7.2	A	L	45.9	D		
				T					T	2.0	A			T	2.9	A		
				-					-					-				
	SR 228 **(WB)**	free		-			21.1	C	-			23.9	C	-				
				T	free				T	21.1	C			T	23.9	C		
				R	free				R	21.1	C			R	23.9	C		
	Beaver St Ext **(SB)**	80.6	F	-			37.0	D	L	37.0	D	37.0	D	L	37.0	D		
				-					-					-				
				R	80.6	F			R	37.0	D			R	37.0	D		

* Unsignalized No-Build Conditions; LOS methods vary (unsignalized vs. signalized) for Build Alternatives

Appendix E5:

Franklin Road QR Intersection Concept

Node # / Interesection / Peak / Approach		2045 Design Year / Franklin Road QR Intersection Concept Delay (sec/veh) and LOS																
		2045 Basic Build w/ Approved Growth					2045 Basic Build w/ Supplemental Growth					2045 QR Intersection w/ Supplemental Growth						
225	**SR 228 @ Franklin Rd**																	
AM	**Overall Intersection**	**43.3**	**D**	**AM by Movement**			**62.6**	**E**	**AM by Movement**			**24.1**	**C**	**AM by Movement**				
By Approach / By Movement	SR 228 **(EB)**	31.6	C	L	58.9	E	56.1	E	L	73.5	E	15.8	B	L	-			
				T	29.8	C			T	56.7	E			T	16.3	B		
				R	12.6	B			R	17.7	B			R	8.8	A		
	SR 228 **(WB)**	41.5	D	L	61.2	E	48.7	D	L	60.6	E	13.4	B	L	-			
				T	38.1	D			T	47.3	D			T	13.4	B		
				R	21.1	C			R	22.2	C			R	13.4	B		
	Franklin Rd **(NB)**	52.9	D	L	86.2	F	92.6	F	L	209.0	F	42.3	D	L	57.9	E		
				T	39.1	D			T	38.6	D			T	35.4	D		
				R	27.1	C			R	25.6	C			R	33.0	C		
	Franklin Rd **(SB)**	65.4	E	L	35.6	D	88.0	F	L	35.2	D	47.6	D	L	31.2	C		
				T	78.0	E			T	111.7	F			T	50.9	D		
				R	32.3	C			R	31.3	C			R	50.9	D		
PM	**Overall Intersection**	**35.4**	**D**	**PM by Movement**			**49.2**	**D**	**PM by Movement**			**30.7**	**C**	**PM by Movement**				
By Approach / By Movement	SR 228 **(EB)**	19.8	B	L	51.8	D	41.7	D	L	81.8	F	25.5	C	L	-			
				T	12.8	B			T	33.4	C			T	26.4	C		
				R	0.2	A			R	11.0	B			R	10.1	B		
	SR 228 **(WB)**	38.8	D	L	64.5	E	46.1	D	L	91.7	F	15.6	B	L	-			
				T	36.4	D			T	39.2	D			T	15.6	B		
				R	21.6	C			R	36.5	D			R	15.6	B		
	Franklin Rd **(NB)**	51.0	D	L	57.0	E	60.0	E	L	108.7	F	50.2	D	L	43.9	D		
				T	53.7	D			T	49.6	D			T	61.9	E		
				R	41.5	D			R	38.8	D			R	34.8	C		
	Franklin Rd **(SB)**	62.2	E	L	50.9	D	70.2	E	L	43.8	D	49.9	D	L	45.2	D		
				T	77.2	E			T	98.0	F			T	50.8	D		
				R	39.2	D			R	30.1	C			R	50.8	D		
SAT	**Overall Intersection**	**30.1**	**C**	**SAT by Movement**			**40.1**	**D**	**SAT by Movement**			**20.1**	**C**	**SAT by Movement**				
By Approach / By Movement	SR 228 **(EB)**	15.3	B	L	60.0	E	24.3	C	L	76.0	E	11.3	B	L	-			
				T	11.2	B			T	19.8	B			T	11.7	B		
				R	1.1	A			R	2.0	A			R	6.3	A		
	SR 228 **(WB)**	26.3	C	L	62.5	E	31.9	C	L	61.7	E	8.4	A	L	-			
				T	23.3	C			T	29.6	C			T	8.4	A		
				R	13.4	B			R	15.0	B			R	8.4	A		
	Franklin Rd **(NB)**	54.6	D	L	61.1	E	69.2	E	L	112.9	F	49.9	D	L	46.9	D		
				T	57.0	E			T	56.0	E			T	58.2	E		
				R	45.2	D			R	43.2	D			R	42.3	D		
	Franklin Rd **(SB)**	63.1	E	L	57.2	E	78.8	E	L	77.7	E	46.5	D	L	44.3	D		
				T	79.1	E			T	102.5	F			T	47.7	D		
				R	50.0	D			R	49.9	D			R	47.7	D		

Node # / Interesection / Peak / Approach		2045 Design Year / Franklin Road QR Intersection Concept Delay (sec/veh) and LOS																		
		2045 Basic Build w/ Approved Growth						2045 Basic Build w/ Supplemental Growth						2045 QR Intersection w/ Supplemental Growth						
---	Quadrant Road at Franklin Road																			
AM	Overall Intersection			AM by Movement						AM by Movement				13.0	B	AM by Movement				
By Approach / By Movement	Quadrant Rd (WB)			-						-				12.6	B	L	13.1	B		
				-						-						-				
				-						-						R	6.4	A		
	Franklin Rd (NB)			-						-				8.6	A	-				
				-						-						T	8.6	A		
				-						-						-				
	Franklin Rd (SB)			-						-				18.1	B	-				
				-						-						T	18.1	B		
				-						-						-				
PM	Overall Intersection			PM by Movement						PM by Movement				21.3	C	PM by Movement				
By Approach / By Movement	Quadrant Rd (WB)			-						-				19.2	B	L	22.4	C		
				-						-						-				
				-						-						R	16.2	B		
	Franklin Rd (NB)			-						-				29.8	C	-				
				-						-						T	29.8	C		
				-						-						-				
	Franklin Rd (SB)			-						-				14.0	B	-				
				-						-						T	14.0	B		
				-						-						-				
SAT	Overall Intersection			SAT by Movement						SAT by Movement				15.0	B	SAT by Movement				
By Approach / By Movement	Quadrant Rd (WB)			-						-				20.3	C	L	15.5	B		
				-						-						-				
				-						-						R	28.9	C		
	Franklin Rd (NB)			-						-				5.1	A	-				
				-						-						T	5.1	A		
				-						-						-				
	Franklin Rd (SB)			-						-				15.6	B	-				
				-						-						T	15.6	B		
				-						-						-				

Node # / Interesection / Peak / Approach		2045 Design Year / Franklin Road QR Intersection Concept Delay (sec/veh) and LOS																		
		2045 Basic Build w/ Approved Growth						2045 Basic Build w/ Supplemental Growth						2045 QR Intersection w/ Supplemental Growth						
---	Quadrant Road at SR 228																			
AM	Overall Intersection			AM by Movement						AM by Movement				3.7	A	AM by Movement				
By Approach / By Movement	SR 228 **(EB)**			-						-				4.1	A	L	40.8	D		
				-						-						T	0.3	A		
				-						-						-				
	SR 228 **(WB)**			-						-				3.4	A	-				
				-						-						T	3.4	A		
				-						-						R	3.4	A		
PM	Overall Intersection			PM by Movement						PM by Movement				8.3	A	PM by Movement				
By Approach / By Movement	SR 228 **(EB)**			-						-				6.5	A	L	34.8	C		
				-						-						T	0.5	A		
				-						-						-				
	SR 228 **(WB)**			-						-				10.4	B	-				
				-						-						T	10.4	B		
				-						-						R	10.4	B		
SAT	Overall Intersection			SAT by Movement						SAT by Movement				4.0	A	SAT by Movement				
By Approach / By Movement	SR 228 **(EB)**			-						-				3.9	A	L	37.2	D		
				-						-						T	0.5	A		
				-						-						-				
	SR 228 **(WB)**			-						-				4.1	A	-				
				-						-						T	4.1	A		
				-						-						R	4.1	A		

Appendix E6:

Seven Fields to Adams Ridge Reconfiguration Concept

Node # / Interesection / Peak / Approach		2045 Design Year / Seven Fields to Adams Ridge Reconfiguration Concept Delay (sec/veh) and LOS																
		2045 Basic Build w/ Approved Growth					2045 Basic Build w/ Supplemental Growth					2045 Reconfiguration w/ Supplemental Growth						
240	**SR 228 @ Seven Fields Blvd and Adams Ridge Shoppes**																	
AM	**Overall Intersection**	**10.7**	**B**	**AM by Movement**			**9.8**	**A**	**AM by Movement**			**0.8**	**A**	**AM by Movement**				
By Approach / By Movement	SR 228 **(EB)**	5.8	A	L	38.0	D	4.4	A	L	21.9	C	0.7	A	-				
				T	1.3	A			T	2.5	A			T	0.7	A		
				R	2.1	A			R	2.0	A			R	0.4	A		
	SR 228 **(WB)**	8.4	A	L	8.7	A	8.5	A	L	8.8	A	0.8	A	-				
				T	8.7	A			T	8.8	A			T	0.8	A		
				R	4.8	A			R	4.1	A			R	0.3	A		
	Adams Ridge Shoppes **(NB)**	50.9	D	L	52.7	D	46.7	D	L	47.0	D	1.1	A	-				
				T	44.6	D			T	45.0	D			-				
				R	46.0	D			R	46.4	D			R	1.1	A		
	Seven Fields Blvd **(SB)**	45.9	D	L	47.3	D	47.3	D	L	47.8	D	1.3	A	-				
				T	45.6	D			T	45.0	D			-				
				R	45.6	D			R	47.2	D			R	1.3	A		
PM	**Overall Intersection**	**13.6**	**B**	**PM by Movement**			**26.5**	**C**	**PM by Movement**			**1.1**	**A**	**PM by Movement**				
By Approach / By Movement	SR 228 **(EB)**	8.5	A	L	19.7	B	25.8	C	L	18.6	B	1.5	A	-				
				T	7.5	A			T	26.9	C			T	1.5	A		
				R	6.5	A			R	20.4	C			R	1.4	A		
	SR 228 **(WB)**	8.3	A	L	5.3	A	20.2	C	L	15.5	B	0.7	A	-				
				T	9.2	A			T	20.0	C			T	0.7	A		
				R	3.7	A			R	21.6	C			R	0.5	A		
	Adams Ridge Shoppes **(NB)**	37.9	D	L	38.9	D	38.5	D	L	38.8	D	1.0	A	-				
				T	36.5	D			T	37.8	D			-				
				R	37.3	D			R	38.6	D			R	1.0	A		
	Seven Fields Blvd **(SB)**	46.0	D	L	53.5	D	50.5	D	L	61.1	E	1.3	A	-				
				T	37.9	D			T	38.0	D			-				
				R	37.9	D			R	39.7	D			R	1.3	A		
SAT	**Overall Intersection**	**15.4**	**B**	**SAT by Movement**			**14.0**	**B**	**SAT by Movement**			**0.8**	**A**	**SAT by Movement**				
By Approach / By Movement	SR 228 **(EB)**	5.2	A	L	38.1	D	7.7	A	L	35.0	D	0.6	A	-				
				T	1.9	A			T	5.5	A			T	0.6	A		
				R	0.1	A			R	1.1	A			R	0.1	A		
	SR 228 **(WB)**	16.5	B	L	7.8	A	12.9	B	L	6.0	A	0.9	A	-				
				T	17.4	B			T	14.1	B			T	1.0	A		
				R	11.4	B			R	3.6	A			R	0.3	A		
	Adams Ridge Shoppes **(NB)**	35.5	D	L	37.1	D	34.0	C	L	34.6	C	1.2	A	-				
				T	32.9	C			T	32.8	C			-				
				R	33.5	C			R	33.4	C			R	1.2	A		
	Seven Fields Blvd **(SB)**	39.3	D	L	45.1	D	39.4	D	L	45.0	D	1.4	A	-				
				T	33.6	C			T	32.6	C			-				
				R	33.6	C			R	34.3	C			R	1.4	A		

Node # / Interesection / Peak / Approach		2045 Design Year / Seven Fields to Adams Ridge Reconfiguration Concept Delay (sec/veh) and LOS																	
		2045 Basic Build w/ Approved Growth					2045 Basic Build w/ Supplemental Growth					2045 Reconfiguration w/ Supplemental Growth							
245	**SR 228 @ Adams Ridge Blvd**																		
AM	**Overall Intersection**	**15.8**	**B**	**AM by Movement**			**35.3**	**D**	**AM by Movement**			**22.4**	**C**	**AM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	13.6	B	L	0.0	A	39.1	D	L	44.3	D	8.9	A	L	22.5	C			
				T	14.5	B			T	21.1	C			T	5.4	A			
				R	5.5	A			R	226.8	F			R	12.1	B			
	SR 228 **(WB)**	4.1	A	L	4.1	A	8.2	A	L	9.0	A	16.8	B	L	8.2	A			
				T	4.1	A			T	8.2	A			T	17.3	B			
				R	0.0	A			R	8.2	A			R	17.3	B			
	Adams Ridge Blvd **(NB)**	35.9	D	L	39.8	D	76.7	E	L	103.0	F	47.1	D	L	48.8	D			
				T	0.0	A			T	28.7	C			T	44.1	D			
				R	28.5	C			R	30.9	C			R	44.1	D			
	Future 4th Leg **(SB)**			L			50.3	D	L	52.5	D	50.4	D	L	48.3	D			
				T					T	47.9	D			T	54.0	D			
				R					R	47.9	D			R	54.0	D			
PM	**Overall Intersection**	**15.6**	**B**	**PM by Movement**			**29.1**	**C**	**PM by Movement**			**29.3**	**C**	**PM by Movement**					
By Approach / By Movement	SR 228 **(EB)**	9.4	A	L	0.0	A	32.7	C	L	16.6	B	20.8	C	L	28.6	C			
				T	11.2	B			T	29.0	C			T	21.5	C			
				R	5.0	A			R	44.1	D			R	15.9	B			
	SR 228 **(WB)**	12.1	B	L	43.7	D	15.7	B	L	74.4	E	20.4	C	L	51.6	D			
				T	5.0	A			T	4.6	A			T	14.1	B			
				R	0.0	A			R	4.6	A			R	14.1	B			
	Adams Ridge Blvd **(NB)**	47.5	D	L	51.7	D	41.6	D	L	47.6	D	57.0	E	L	50.6	D			
				T	0.0	A			T	32.8	C			T	65.8	E			
				R	41.9	D			R	33.7	C			R	65.8	E			
	Future 4th Leg **(SB)**			L			62.6	E	L	75.2	E	61.9	E	L	63.5	E			
				T					T	47.9	D			T	58.0	E			
				R					R	47.9	D			R	58.0	E			
SAT	**Overall Intersection**	**14.8**	**B**	**SAT by Movement**			**21.3**	**C**	**SAT by Movement**			**28.7**	**C**	**SAT by Movement**					
By Approach / By Movement	SR 228 **(EB)**	8.1	A	L	0.0	A	15.4	B	L	17.7	B	14.2	B	L	39.4	D			
				T	9.1	A			T	17.0	B			T	11.6	B			
				R	4.9	A			R	8.6	A			R	8.2	A			
	SR 228 **(WB)**	13.3	B	L	20.5	C	14.4	B	L	14.4	B	31.9	C	L	21.6	C			
				T	12.4	B			T	14.4	B			T	33.0	C			
				R	0.0	A			R	14.4	B			R	33.0	C			
	Adams Ridge Blvd **(NB)**	37.0	D	L	39.8	D	56.9	E	L	68.9	E	42.9	D	L	41.9	D			
				T	0.0	A			T	29.4	C			T	45.1	D			
				R	30.5	C			R	29.9	C			R	45.1	D			
	Future 4th Leg **(SB)**			L			46.0	D	L	49.4	D	50.2	D	L	47.3	D			
				T					T	41.9	D			T	58.9	E			
				R					R	41.9	D			R	58.9	E			

Appendix F

Synchro Traffic Analyses (Queuing Summaries)

Contents:

- 2016 Base Year Queuing
- 2025 Opening Year Queuing
- 2045 Design Year Queuing

Appendix F1:

2016 Base Year Queuing

SR 228 Mars RR Bridge West Expansion
AM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	
225: Franklin Rd & SR 228	SR 228 Eastbound	Left	85	73	107	700
		Through	705	148	174	-
		Right	60	0	0	-
	SR 228 Westbound	Left	205	199	m#266	300
		Through	1000	419	541	-
		Right	40	0	0	-
	Franklin Rd Northbound	Left	80	55	97	300
		Through	125	103	167	-
		Right	65	0	1	450
	Franklin Rd Southbound	Left	65	44	81	250
		Through	335	315	#480	-
		Right	60	0	0	300
230: Castle Creek Dr (West)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	10	4	m9	140
		Through	675	662	794	-
		Right	150	31	80	200
	SR 228 Westbound	Left	100	20	m30	225
		Through	1105	350	461	-
		Right	0	0	0	175
	Castle Creek Dr (West) Northbound	Left	85	80	137	200
		Through	10	9	48	-
		Right	35	0	0	-
	High Pointe Dr Southbound	Left	5	4	18	100
		Through	15	13	35	-
		Right	25	0	0	100
235: Castle Creek Dr (East)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	20	0	m1	175
		Through	640	22	37	-
		Right	20	0	m0	75
	SR 228 Westbound	Left	30	1	m6	125
		Through	1105	97	268	-
		Right	25	0	m0	150
	Castle Creek Dr (East) Northbound	Left	50	47	93	165
		Through	20	19	64	-
		Right	35	0	0	-
	High Pointe Dr Southbound	Left	10	9	28	105
		Through	5	4	18	-
		Right	50	0	28	110
240: Seven Fields Blvd & SR 228	SR 228 Eastbound	Left	90	1	8	125
		Through	585	28	43	-
		Right	10	0	m0	-
	SR 228 Westbound	Left	0	0	0	150
		Through	1020	349	764	-
		Right	95	2	m8	325
	Seven Fields Blvd Northbound	Left	25	24	58	115
		Through	5	5	18	-
		Right	5	0	0	-
	Seven Fields Blvd Southbound	Left	30	28	62	165
		Through	5	5	68	-
		Right	115	0	0	-

SR 228 Mars RR Bridge West Expansion
AM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Revised Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	
245: Adams Ridge Blvd & SR 228	SR 228 Eastbound	Left	0	0	0	-
		Through	560	75	229	-
		Right	60	0	13	-
	SR 228 Westbound	Left	50	12	m17	325
		Through	755	601	889	-
		Right	0	0	0	-
	Adams Ridge Blvd Northbound	Left	360	331	416	-
		Through	0	0	0	-
		Right	195	81	144	-
		Left				-
		Through				-
		Right				-
255: Heritage Creek Dr & SR 228	SR 228 Eastbound	Left	40	7	m15	150
		Through	625	333	680	-
		Right	35	0	m2	150
	SR 228 Westbound	Left	25	6	18	225
		Through	765	447	732	-
		Right	200	32	78	150
	Heritage Creek Dr Northbound	Left	5	4	15	150
		Through	0	0	0	-
		Right	0	0	0	150
	Heritage Creek Dr Southbound	Left	165	160	231	235
		Through	15	13	32	-
		Right	30	0	25	100

SR 228 Mars RR Bridge West Expansion
PM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	
225: Franklin Rd & SR 228	SR 228 Eastbound	Left	270	262	368	700
		Through	1015	657	804	-
		Right	65	0	0	-
	SR 228 Westbound	Left	115	121	m172	300
		Through	940	496	592	-
		Right	70	0	0	-
	Franklin Rd Northbound	Left	120	103	166	300
		Through	330	~436	#644	-
		Right	175	48	119	450
	Franklin Rd Southbound	Left	65	53	97	250
		Through	150	150	230	-
		Right	55	0	0	300
230: Castle Creek Dr (West)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	40	9	m16	140
		Through	1065	430	#1398	-
		Right	150	5	m30	200
	SR 228 Westbound	Left	55	10	m30	225
		Through	870	198	369	-
		Right	0	0	0	175
	Castle Creek Dr (West) Northbound	Left	185	198	#351	200
		Through	45	73	144	-
		Right	80	0	0	-
	High Pointe Dr Southbound	Left	0	0	0	100
		Through	25	23	53	-
		Right	30	0	0	100
235: Castle Creek Dr (East)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	105	22	m28	175
		Through	1065	336	m361	-
		Right	25	0	m0	75
	SR 228 Westbound	Left	55	3	m7	125
		Through	870	97	146	-
		Right	20	0	m0	150
	Castle Creek Dr (East) Northbound	Left	15	14	39	165
		Through	30	49	126	-
		Right	110	0	0	-
	High Pointe Dr Southbound	Left	40	42	#103	105
		Through	30	30	64	-
		Right	40	0	20	110
240: Seven Fields Blvd & SR 228	SR 228 Eastbound	Left	115	23	m32	125
		Through	995	205	939	-
		Right	105	5	m11	-
	SR 228 Westbound	Left	15	3	m6	150
		Through	775	797	973	-
		Right	150	12	22	325
	Seven Fields Blvd Northbound	Left	35	33	69	115
		Through	20	18	44	-
		Right	15	0	0	-
	Seven Fields Blvd Southbound	Left	180	187	272	165
		Through	25	23	92	-
		Right	135	0	0	-

SR 228 Mars RR Bridge West Expansion
PM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Revised Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	
245: Adams Ridge Blvd & SR 228	SR 228 Eastbound	Left	0	0	0	-
		Through	815	435	387	-
		Right	375	48	98	-
	SR 228 Westbound	Left	175	53	m75	325
		Through	740	632	829	-
		Right	0	0	0	-
	Adams Ridge Blvd Northbound	Left	200	208	297	-
		Through	0	0	0	-
		Right	145	49	121	-
		Left				-
		Through				-
		Right				-
255: Heritage Creek Dr & SR 228	SR 228 Eastbound	Left	50	8	m15	150
		Through	810	767	#1104	-
		Right	30	0	m0	150
	SR 228 Westbound	Left	30	11	23	225
		Through	800	625	802	-
		Right	195	50	91	150
	Heritage Creek Dr Northbound	Left	50	43	83	150
		Through	25	21	49	-
		Right	15	0	10	150
	Heritage Creek Dr Southbound	Left	275	300	#488	235
		Through	15	12	33	-
		Right	40	0	30	100

SR 228 Mars RR Bridge West Expansion
SAT Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	
225: Franklin Rd & SR 228	SR 228 Eastbound	Left	95	88	149	700
		Through	780	192	221	-
		Right	80	0	0	-
	SR 228 Westbound	Left	95	92	m124	300
		Through	1085	351	570	-
		Right	85	0	0	-
	Franklin Rd Northbound	Left	80	66	115	300
		Through	125	123	194	-
		Right	100	0	38	450
	Franklin Rd Southbound	Left	115	98	156	250
		Through	135	133	207	-
		Right	100	0	28	300
230: Castle Creek Dr (West)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	45	3	m4	140
		Through	825	227	261	-
		Right	125	1	m1	200
	SR 228 Westbound	Left	50	12	m18	225
		Through	1065	315	427	-
		Right	0	0	0	175
	Castle Creek Dr (West) Northbound	Left	140	138	#246	200
		Through	10	9	56	-
		Right	55	0	0	-
	High Pointe Dr Southbound	Left	0	0	0	100
		Through	5	4	18	-
		Right	35	0	0	100
235: Castle Creek Dr (East)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	45	5	m6	175
		Through	830	127	182	-
		Right	15	0	m0	75
	SR 228 Westbound	Left	25	1	m2	125
		Through	1060	107	215	-
		Right	10	0	m0	150
	Castle Creek Dr (East) Northbound	Left	15	14	38	165
		Through	25	25	71	-
		Right	30	0	0	-
	High Pointe Dr Southbound	Left	5	5	19	105
		Through	15	14	38	-
		Right	40	0	17	110
240: Seven Fields Blvd & SR 228	SR 228 Eastbound	Left	90	8	15	125
		Through	695	60	85	-
		Right	80	0	7	-
	SR 228 Westbound	Left	10	1	m2	150
		Through	920	863	873	-
		Right	170	12	m22	325
	Seven Fields Blvd Northbound	Left	60	56	107	115
		Through	30	26	58	-
		Right	15	0	0	-
	Seven Fields Blvd Southbound	Left	140	136	214	165
		Through	20	18	83	-
		Right	115	0	0	-

SR 228 Mars RR Bridge West Expansion
SAT Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Revised Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	
245: Adams Ridge Blvd & SR 228	SR 228 Eastbound	Left	0	0	0	-
		Through	635	262	302	-
		Right	215	10	47	-
	SR 228 Westbound	Left	120	36	m42	325
		Through	855	690	888	-
		Right	0	0	0	-
	Adams Ridge Blvd Northbound	Left	245	241	#374	-
		Through	0	0	0	-
		Right	100	39	98	-
		Left				-
		Through				-
		Right				-
255: Heritage Creek Dr & SR 228	SR 228 Eastbound	Left	40	3	m8	150
		Through	615	353	436	-
		Right	30	0	m1	150
	SR 228 Westbound	Left	30	5	12	225
		Through	910	537	732	-
		Right	95	7	26	150
	Heritage Creek Dr Northbound	Left	25	24	56	150
		Through	10	10	30	-
		Right	5	0	0	150
	Heritage Creek Dr Southbound	Left	115	116	#210	235
		Through	10	10	30	-
		Right	35	0	31	100

Appendix F2:

2025 Opening Year Queuing

SR 228 Mars RR Bridge West Expansion
Opening Year AM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	NB Models		Build Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
225: Franklin Rd & SR 228	SR 228 Eastbound	Left	100	86	143	49	80	700
		Through	835	172	201	173	432	-
		Right	65	1	9	1	9	-
	SR 228 Westbound	Left	250	~276	m#294	120	162	300
		Through	1155	570	m573	450	565	-
		Right	45	0	0	0	0	-
	Franklin Rd Northbound	Left	125	89	#187	86	#152	300
		Through	140	116	184	54	82	-
		Right	85	0	17	0	14	450
	Franklin Rd Southbound	Left	75	50	91	49	84	250
		Through	365	351	#549	340	455	-
		Right	75	0	6	0	7	300
230: Castle Creek Dr (West)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	15	9	m21	3	14	140
		Through	815	812	953	131	198	-
		Right	165	76	118	0	26	200
	SR 228 Westbound	Left	105	21	m26	23	59	225
		Through	1295	~474	m#1528	353	503	-
		Right	0	0	0	0	0	175
	Castle Creek Dr (West) Northbound	Left	95	89	150	65	114	200
		Through	10	9	50	6	40	-
		Right	40	0	0	0	0	-
	High Pointe Dr Southbound	Left	5	4	18	3	14	100
		Through	15	13	35	9	27	-
		Right	30	0	0	0	0	100
235: Castle Creek Dr (East)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	25	0	m2	0	m1	175
		Through	775	25	67	4	12	-
		Right	25	0	m0	0	0	75
	SR 228 Westbound	Left	30	3	m5	2	m4	125
		Through	1295	~241	m#1471	72	87	-
		Right	25	0	m0	0	0	150
	Castle Creek Dr (East) Northbound	Left	50	47	93	35	72	165
		Through	20	19	64	14	51	-
		Right	35	0	0	0	0	-
	High Pointe Dr Southbound	Left	10	9	28	7	23	105
		Through	5	4	18	3	14	-
		Right	55	0	34	0	16	110
240: Seven Fields Blvd & SR 228	SR 228 Eastbound	Left	100	43	101	6	25	125
		Through	710	30	121	23	36	-
		Right	10	0	m0	0	m0	-
	SR 228 Westbound	Left	0	0	0	0	0	150
		Through	1195	538	#1554	200	243	-
		Right	100	2	m4	3	10	325
	Seven Fields Blvd Northbound	Left	25	24	58	18	46	115
		Through	5	4	18	3	14	-
		Right	5	0	0	0	0	-
	Seven Fields Blvd Southbound	Left	35	33	69	24	55	165
		Through	5	4	71	3	60	-
		Right	130	0	0	0	0	-

SR 228 Mars RR Bridge West Expansion
Opening Year AM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Revised Models		Optimized Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
245: Adams Ridge Blvd & SR 228	SR 228 Eastbound	Left	0	0	0	0	0	-
		Through	680	174	500	117	143	-
		Right	70	4	23	0	10	-
	SR 228 Westbound	Left	55	14	m15	10	22	325
		Through	885	806	1044	85	108	-
		Right	0	0	0	0	0	-
	Adams Ridge Blvd Northbound	Left	410	376	486	271	341	-
		Through	0	0	0	0	0	-
		Right	225	104	177	44	96	-
		Left						-
		Through						-
		Right						-
255: Heritage Creek Dr & SR 228	SR 228 Eastbound	Left	45	8	m15	4	12	150
		Through	685	394	686	40	65	-
		Right	115	4	m13	0	0	150
	SR 228 Westbound	Left	75	18	43	17	36	225
		Through	855	571	937	191	270	-
		Right	215	40	92	0	37	150
	Heritage Creek Dr Northbound	Left	45	39	74	28	59	150
		Through	0	0	0	0	0	-
		Right	35	0	0	0	0	150
	Heritage Creek Dr Southbound	Left	175	169	241	64	97	235
		Through	15	13	32	10	31	-
		Right	35	0	26	0	0	100

SR 228 Mars RR Bridge West Expansion
Opening Year PM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	NB Models		Build Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
225: Franklin Rd & SR 228	SR 228 Eastbound	Left	315	316	437	161	217	700
		Through	1230	842	#1077	212	#1083	-
		Right	75	4	26	1	2	-
	SR 228 Westbound	Left	170	184	m209	85	123	300
		Through	1150	678	m#762	456	588	-
		Right	80	0	0	0	0	-
	Franklin Rd Northbound	Left	180	162	#298	146	209	300
		Through	360	~503	#716	172	215	-
		Right	210	86	169	71	131	450
	Franklin Rd Southbound	Left	75	61	108	55	93	250
		Through	165	166	251	162	237	-
		Right	75	0	10	0	0	300
230: Castle Creek Dr (West)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	40	10	m16	14	40	140
		Through	1305	~1664	m#1936	343	502	-
		Right	170	17	m33	0	35	200
	SR 228 Westbound	Left	65	39	m56	27	66	225
		Through	1115	460	463	421	567	-
		Right	0	0	0	0	0	175
	Castle Creek Dr (West) Northbound	Left	210	~232	#414	156	224	200
		Through	45	79	153	33	82	-
		Right	90	0	0	0	0	-
	High Pointe Dr Southbound	Left	0	0	0	0	0	100
		Through	25	23	53	16	37	-
		Right	35	0	0	0	0	100
235: Castle Creek Dr (East)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	110	23	m24	1	m15	175
		Through	1310	~447	m355	395	14	-
		Right	25	0	m0	0	0	75
	SR 228 Westbound	Left	60	16	m34	2	8	125
		Through	1120	158	321	31	59	-
		Right	20	0	m0	0	0	150
	Castle Creek Dr (East) Northbound	Left	15	14	39	11	31	165
		Through	30	50	128	22	84	-
		Right	115	0	0	0	0	-
	High Pointe Dr Southbound	Left	40	43	#109	31	69	105
		Through	30	30	64	22	51	-
		Right	45	0	26	0	9	110
240: Seven Fields Blvd & SR 228	SR 228 Eastbound	Left	130	24	m28	10	45	125
		Through	1225	430	m#1581	51	121	-
		Right	110	6	m7	1	7	-
	SR 228 Westbound	Left	15	3	m4	2	m6	150
		Through	1005	989	1208	198	233	-
		Right	175	14	m24	6	11	325
	Seven Fields Blvd Northbound	Left	40	37	76	26	55	115
		Through	20	18	44	13	32	-
		Right	15	0	0	0	0	-
	Seven Fields Blvd Southbound	Left	205	212	#321	153	220	165
		Through	25	22	95	16	71	-
		Right	155	0	0	0	0	-

SR 228 Mars RR Bridge West Expansion
Opening Year PM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Revised Models		Optimized Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
245: Adams Ridge Blvd & SR 228	SR 228 Eastbound	Left	0	0	0	0	0	-
		Through	1020	653	m448	137	197	-
		Right	425	70	m88	1	7	-
	SR 228 Westbound	Left	215	94	m#160	38	125	325
		Through	965	788	948	88	110	-
		Right	0	0	0	0	0	-
	Adams Ridge Blvd Northbound	Left	230	239	#347	173	244	-
		Through	0	0	0	0	0	-
		Right	175	73	158	20	79	-
		Left						-
		Through						-
		Right						-
255: Heritage Creek Dr & SR 228	SR 228 Eastbound	Left	55	9	m14	7	m20	150
		Through	845	831	#1178	166	113	-
		Right	215	2	m14	3	0	150
	SR 228 Westbound	Left	155	59	#107	51	96	225
		Through	865	722	929	251	353	-
		Right	210	57	102	0	25	150
	Heritage Creek Dr Northbound	Left	235	245	#386	159	222	150
		Through	25	21	49	19	48	-
		Right	180	30	95	62	134	150
	Heritage Creek Dr Southbound	Left	295	330	#538	119	161	235
		Through	15	12	33	12	33	-
		Right	45	0	31	0	5	100

SR 228 Mars RR Bridge West Expansion
Opening Year SAT Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	NB Models		Build Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
225: Franklin Rd & SR 228	SR 228 Eastbound	Left	100	86	143	62	97	700
		Through	835	172	201	594	779	-
		Right	65	1	9	3	8	-
	SR 228 Westbound	Left	250	~276	m#294	73	108	300
		Through	1155	570	m570	429	532	-
		Right	45	0	0	0	15	-
	Franklin Rd Northbound	Left	125	89	#187	118	181	300
		Through	140	116	184	66	101	-
		Right	85	0	17	13	62	450
	Franklin Rd Southbound	Left	75	50	91	108	167	250
		Through	365	351	#549	148	225	-
		Right	75	0	6	12	58	300
230: Castle Creek Dr (West)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	15	9	m21	13	43	140
		Through	815	813	953	206	308	-
		Right	165	80	118	0	29	200
	SR 228 Westbound	Left	105	22	m26	0	m14	225
		Through	1295	~1326	m#1528	125	137	-
		Right	0	0	0	0	0	175
	Castle Creek Dr (West) Northbound	Left	95	89	152	100	160	200
		Through	10	8	50	5	39	-
		Right	40	0	0	0	0	-
	High Pointe Dr Southbound	Left	5	4	18	0	0	100
		Through	15	13	35	3	12	-
		Right	30	0	0	0	0	100
235: Castle Creek Dr (East)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	25	0	m2	0	m0	175
		Through	775	25	67	237	412	-
		Right	25	0	m0	0	0	75
	SR 228 Westbound	Left	30	3	m5	3	m5	125
		Through	1295	~241	m#1471	120	132	-
		Right	25	0	m0	0	0	150
	Castle Creek Dr (East) Northbound	Left	50	47	93	9	28	165
		Through	20	19	64	16	53	-
		Right	35	0	0	0	0	-
	High Pointe Dr Southbound	Left	10	9	28	3	14	105
		Through	5	4	18	9	28	-
		Right	55	0	34	0	0	110
240: Seven Fields Blvd & SR 228	SR 228 Eastbound	Left	100	44	101	5	0	125
		Through	710	30	121	8	14	-
		Right	10	0	m0	0	0	-
	SR 228 Westbound	Left	0	0	0	2	m4	150
		Through	1195	538	#1554	317	436	-
		Right	100	2	m4	8	22	325
	Seven Fields Blvd Northbound	Left	25	24	58	37	74	115
		Through	5	4	18	16	39	-
		Right	5	0	0	0	0	-
	Seven Fields Blvd Southbound	Left	35	33	69	98	158	165
		Through	5	4	71	11	62	-
		Right	130	0	0	0	0	-

SR 228 Mars RR Bridge West Expansion
Opening Year SAT Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Revised Models		Optimized Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
245: Adams Ridge Blvd & SR 228	SR 228 Eastbound	Left	0	0	0	0	0	-
		Through	680	181	500	105	78	-
		Right	70	4	23	2	2	-
	SR 228 Westbound	Left	55	14	m15	25	m91	325
		Through	885	806	1044	116	266	-
		Right	0	0	0	0	0	-
	Adams Ridge Blvd Northbound	Left	410	376	486	176	243	-
		Through	0	0	0	0	0	-
		Right	225	104	177	8	50	-
		Left						-
		Through						-
		Right						-
255: Heritage Creek Dr & SR 228	SR 228 Eastbound	Left	45	8	m15	2	m4	150
		Through	685	392	686	165	23	-
		Right	115	4	m13	15	0	150
	SR 228 Westbound	Left	75	18	43	29	55	225
		Through	855	571	937	230	322	-
		Right	215	40	92	0	6	150
	Heritage Creek Dr Northbound	Left	45	39	74	92	#152	150
		Through	0	0	0	7	24	-
		Right	35	0	0	0	44	150
	Heritage Creek Dr Southbound	Left	175	169	241	41	71	235
		Through	15	13	32	7	24	-
		Right	35	0	26	0	0	100

Appendix F3:

2045 Design Year Queuing

SR 228 Mars RR Bridge West Expansion
Future Year AM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	NB Models		Build Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
225: Franklin Rd & SR 228	SR 228 Eastbound	Left	115	100	154	57	91	700
		Through	960	184	210	417	524	-
		Right	75	1	11	1	12	-
	SR 228 Westbound	Left	285	~347	m#293	137	181	300
		Through	1330	~783	m578	597	706	-
		Right	50	0	0	0	0	-
	Franklin Rd Northbound	Left	140	100	#241	92	#211	300
		Through	160	134	209	61	92	-
		Right	95	0	24	0	20	450
	Franklin Rd Southbound	Left	85	58	102	54	94	250
		Through	425	~462	#680	400	#596	-
		Right	85	0	12	0	14	300
230: Castle Creek Dr (West)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	15	12	m15	4	14	140
		Through	935	945	1090	166	237	-
		Right	190	89	120	0	28	200
	SR 228 Westbound	Left	115	25	m25	29	m59	225
		Through	1495	~1739	m#1481	470	595	-
		Right	0	0	0	0	0	175
	Castle Creek Dr (West) Northbound	Left	110	102	170	75	129	200
		Through	10	8	50	6	40	-
		Right	40	0	0	0	0	-
	High Pointe Dr Southbound	Left	5	4	18	3	14	100
		Through	15	13	35	9	27	-
		Right	30	0	0	0	0	100
235: Castle Creek Dr (East)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	30	1	m9	0	m1	175
		Through	890	27	189	4	12	-
		Right	25	0	m0	0	0	75
	SR 228 Westbound	Left	35	5	m5	2	m4	125
		Through	1490	~1723	m#1449	77	93	-
		Right	30	0	m0	0	0	150
	Castle Creek Dr (East) Northbound	Left	60	56	107	41	82	165
		Through	25	23	72	17	58	-
		Right	40	0	0	0	0	-
	High Pointe Dr Southbound	Left	10	9	28	6	23	105
		Through	5	4	18	3	14	-
		Right	60	0	41	0	21	110
240: Seven Fields Blvd & SR 228	SR 228 Eastbound	Left	115	82	m121	12	58	125
		Through	815	77	125	26	42	-
		Right	10	0	m0	0	m0	-
	SR 228 Westbound	Left	0	0	0	0	0	150
		Through	1380	~1561	m#1855	238	284	-
		Right	110	2	m2	2	m9	325
	Seven Fields Blvd Northbound	Left	30	29	66	21	52	115
		Through	5	4	18	3	14	-
		Right	5	0	0	0	0	-
	Seven Fields Blvd Southbound	Left	35	32	68	24	55	165
		Through	5	4	73	3	63	-
		Right	145	0	0	0	0	-

SR 228 Mars RR Bridge West Expansion
Future Year AM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Revised Models		Optimized Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
245: Adams Ridge Blvd & SR 228	SR 228 Eastbound	Left	0	0	0	0	0	-
		Through	775	286	#969	133	160	-
		Right	85	10	m22	1	13	-
	SR 228 Westbound	Left	65	16	m15	12	m25	325
		Through	1020	1052	m#1269	102	125	-
		Right	0	0	0	0	0	-
	Adams Ridge Blvd Northbound	Left	475	432	#615	308	385	-
		Through	0	0	0	0	0	-
		Right	255	126	212	60	114	-
		Left						-
		Through						-
		Right						-
255: Heritage Creek Dr & SR 228	SR 228 Eastbound	Left	45	8	m13	4	m11	150
		Through	785	484	#986	52	78	-
		Right	120	6	m12	0	0	150
	SR 228 Westbound	Left	80	22	45	18	40	225
		Through	990	860	#1302	242	339	-
		Right	245	57	113	0	40	150
	Heritage Creek Dr Northbound	Left	45	38	74	27	57	150
		Through	0	0	0	0	0	-
		Right	35	0	0	0	0	150
	Heritage Creek Dr Southbound	Left	205	197	285	75	110	235
		Through	20	16	39	14	37	-
		Right	40	0	28	0	0	100

SR 228 Mars RR Bridge West Expansion
Future Year PM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	NB Models		Build Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
225: Franklin Rd & SR 228	SR 228 Eastbound	Left	360	373	#545	186	#260	700
		Through	1410	~1173	#1361	140	155	-
		Right	85	8	32	1	m0	-
	SR 228 Westbound	Left	190	211	m204	95	135	300
		Through	1320	~887	m#809	590	726	-
		Right	95	0	0	0	0	-
	Franklin Rd Northbound	Left	200	~189	#381	160	#247	300
		Through	420	~638	#861	200	253	-
		Right	245	122	215	98	169	450
	Franklin Rd Southbound	Left	85	71	121	62	105	250
		Through	195	200	296	191	278	-
		Right	85	0	16	0	0	300
230: Castle Creek Dr (West)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	50	18	m24	20	54	140
		Through	1500	~2108	m#2013	469	632	-
		Right	185	32	m22	0	36	200
	SR 228 Westbound	Left	70	44	m51	29	m62	225
		Through	1280	~1469	m#1638	513	644	-
		Right	0	0	0	0	0	175
	Castle Creek Dr (West) Northbound	Left	245	~317	#504	182	267	200
		Through	50	94	172	43	95	-
		Right	95	0	0	0	0	-
	High Pointe Dr Southbound	Left	0	0	0	0	0	100
		Through	30	28	61	18	42	-
		Right	40	0	6	0	0	100
235: Castle Creek Dr (East)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	120	96	m69	1	m20	175
		Through	1500	~1919	m356	12	433	-
		Right	30	0	m0	0	0	75
	SR 228 Westbound	Left	65	32	m38	3	m8	125
		Through	1280	313	m345	37	67	-
		Right	25	0	m0	0	0	150
	Castle Creek Dr (East) Northbound	Left	20	20	49	15	38	165
		Through	35	71	157	26	91	-
		Right	125	0	0	0	0	-
	High Pointe Dr Southbound	Left	45	47	#127	35	75	105
		Through	35	34	73	26	56	-
		Right	50	0	34	0	15	110
240: Seven Fields Blvd & SR 228	SR 228 Eastbound	Left	145	~129	m#110	12	m97	125
		Through	1400	~1722	m#1534	65	227	-
		Right	125	7	m7	1	m34	-
	SR 228 Westbound	Left	15	3	m4	2	m5	150
		Through	1150	1292	#1556	223	260	-
		Right	195	17	m24	5	9	325
	Seven Fields Blvd Northbound	Left	45	41	85	29	60	115
		Through	25	22	51	16	37	-
		Right	15	0	0	0	0	-
	Seven Fields Blvd Southbound	Left	220	227	#364	165	236	165
		Through	30	47	132	19	78	-
		Right	175	0	0	0	0	-

SR 228 Mars RR Bridge West Expansion
Future Year PM Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Revised Models		Optimized Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
245: Adams Ridge Blvd & SR 228	SR 228 Eastbound	Left	0	0	0	0	0	-
		Through	1150	1014	m421	153	305	-
		Right	485	104	m87	7	5	-
	SR 228 Westbound	Left	245	~309	m#378	97	194	325
		Through	1095	1000	m1168	94	118	-
		Right	0	0	0	0	0	-
	Adams Ridge Blvd Northbound	Left	265	281	#441	199	277	-
		Through	0	0	0	0	0	-
		Right	195	98	189	36	100	-
		Left						-
		Through						-
		Right						-
255: Heritage Creek Dr & SR 228	SR 228 Eastbound	Left	65	31	m43	10	m20	150
		Through	980	~1235	m#1311	213	127	-
		Right	215	6	m15	0	0	150
	SR 228 Westbound	Left	160	~173	#338	55	99	225
		Through	1005	985	#1345	322	432	-
		Right	240	74	124	0	25	150
	Heritage Creek Dr Northbound	Left	240	251	#400	159	227	150
		Through	30	25	55	23	54	-
		Right	180	62	134	62	135	150
	Heritage Creek Dr Southbound	Left	340	~442	#653	137	184	235
		Through	20	16	41	15	40	-
		Right	55	0	34	0	14	100

SR 228 Mars RR Bridge West Expansion
Future Year SAT Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	NB Models		Build Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
225: Franklin Rd & SR 228	SR 228 Eastbound	Left	135	127	201	70	107	700
		Through	1125	324	417	135	151	-
		Right	105	2	4	1	3	-
	SR 228 Westbound	Left	165	166	m152	80	117	300
		Through	1515	~885	m757	564	668	-
		Right	110	0	0	0	23	-
	Franklin Rd Northbound	Left	155	133	#207	130	#214	300
		Through	160	157	#261	75	113	-
		Right	150	29	92	27	82	450
	Franklin Rd Southbound	Left	155	132	#220	128	197	250
		Through	175	173	#288	172	#258	-
		Right	145	18	61	21	71	300
230: Castle Creek Dr (West)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	55	~65	m#84	19	67	140
		Through	1210	1239	#1482	259	372	-
		Right	165	0	m1	0	31	200
	SR 228 Westbound	Left	65	17	m20	8	m11	225
		Through	1540	~1790	m#1708	134	145	-
		Right	0	0	0	0	0	175
	Castle Creek Dr (West) Northbound	Left	180	184	#346	109	176	200
		Through	10	9	61	5	41	-
		Right	70	0	0	0	0	-
	High Pointe Dr Southbound	Left	0	0	0	0	0	100
		Through	5	4	18	3	12	-
		Right	45	0	9	0	0	100
235: Castle Creek Dr (East)/High Pointe Dr & SR 228	SR 228 Eastbound	Left	50	15	m21	0	m5	175
		Through	1220	314	m409	384	510	-
		Right	20	0	m0	0	0	75
	SR 228 Westbound	Left	30	4	m4	3	m5	125
		Through	1535	~1699	m#1568	127	138	-
		Right	10	0	m0	0	0	150
	Castle Creek Dr (East) Northbound	Left	20	20	48	13	35	165
		Through	30	33	83	19	58	-
		Right	35	0	0	0	0	-
	High Pointe Dr Southbound	Left	5	5	19	3	14	105
		Through	15	14	38	9	28	-
		Right	45	0	24	0	2	110
240: Seven Fields Blvd & SR 228	SR 228 Eastbound	Left	120	81	m#116	29	0	125
		Through	1040	151	555	10	15	-
		Right	95	5	m6	0	0	-
	SR 228 Westbound	Left	10	1	m2	2	m3	150
		Through	1350	~1560	m#1714	390	507	-
		Right	210	18	m23	7	17	325
	Seven Fields Blvd Northbound	Left	75	72	#155	43	86	115
		Through	35	30	65	19	44	-
		Right	15	0	0	0	0	-
	Seven Fields Blvd Southbound	Left	175	172	#299	106	172	165
		Through	25	45	126	13	68	-
		Right	155	0	0	0	0	-

SR 228 Mars RR Bridge West Expansion
Future Year SAT Peak Queuing Comparisons

Intersection	Direction	Movement	Volume (veh per hour)	Base Revised Models		Optimized Models		Available Storage (ft)
				Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)	
245: Adams Ridge Blvd & SR 228	SR 228 Eastbound	Left	0	0	0	0	0	-
		Through	945	656	550	65	168	-
		Right	285	40	m65	1	12	-
	SR 228 Westbound	Left	160	33	m34	48	m124	325
		Through	1235	1214	m1367	195	343	-
		Right	0	0	0	0	0	-
	Adams Ridge Blvd Northbound	Left	330	~368	#571	199	268	-
		Through	0	0	0	0	0	-
		Right	140	73	146	17	60	-
		Left						-
		Through						-
		Right						-
255: Heritage Creek Dr & SR 228	SR 228 Eastbound	Left	55	12	m34	2	m5	150
		Through	775	366	426	70	30	-
		Right	190	1	m7	0	1	150
	SR 228 Westbound	Left	140	27	42	29	57	225
		Through	1190	1095	#1536	290	404	-
		Right	115	13	33	0	10	150
	Heritage Creek Dr Northbound	Left	155	164	#321	92	#159	150
		Through	10	10	30	7	24	-
		Right	115	0	55	0	44	150
	Heritage Creek Dr Southbound	Left	140	145	#275	46	78	235
		Through	10	10	30	7	24	-
		Right	50	0	38	0	2	100

Appendix G

Traffic Engineering and Design Documentation

Contents:

- Turn Lane Warrant and Length Analysis Summary
- Traffic Signal Warrant Analyses

Appendix G1:

Turn Lane Warrants and Length Analysis Summary

Turn Lane Warrant and Length Analysis Summary for 2045 Build Condition

Movement	Turn Lane Storage Lengths (ft) per PennDOT Publication 46				Existing Storage (ft)	Suggested Design (ft)
	AM	PM	SAT	Calculated Max		
SR 228 @ Franklin Rd						
EB Left	275	600	325	**600**	700	**350 / 700***
EB Right	225	225	250	**250**	n/a	**250**
WB Left	525	400	275	**525**	300	**300 / 300***
WB Right	175	250	250	**250**	n/a	**250**
SR 228 @ Castle Creek Dr West						
EB Left	150	175	175	**175**	140	**175**
EB Right	400	350	325	**400**	200	**200 - 400****
WB Left	250	225	175	**250**	225	**250**
WB Right	turn lane not warranted			**0**	175	**n/a**
SR 228 @ Castle Creek Dr East						
EB Left	150	250	175	**250**	175	**250**
EB Right	turn lane not warranted			**0**	75	**n/a**
WB Left	150	175	150	**175**	125	**175**
WB Right	turn lane not warranted			**0**	150	**n/a**
SR 228 @ Seven Field Blvd						
EB Left	250	275	250	**275**	125	**275**
EB Right	n/a	275	225	**275**	channelized 100	**channelized 100 - 275****
WB Left	n/a	150	n/a	**150**	150	**150**
WB Right	250	350	400	**400**	325	**400**
SR 228 @ Adams Ridge Blvd						
EB Right	250	675	450	**675**	channelized 250	**channelized 250 - 500****
WB Left	225	425	325	**425**	325	**425**
SR 228 @ Myoma Rd						
EB Left	250	175	75	**250**	n/a	**250**
WB Right	150	not warranted	150	**150**	n/a	**150**
SR 228 @ Heritage Creek Dr						
EB Left	175	175	200	**200**	150	**200**
EB Right	250	400	350	**400**	150	**400**
WB Left	225	325	325	**325**	225	**325**
WB Right	425	425	250	**425**	150	**425**
SR 228 @ Beaver St Ext						
EB Left	75	325	175	**325**	n/a	**350**
WB Right	turn lane not warranted			**0**	n/a	**n/a**

* Double left turn lanes suggested; values shown separately for the inside/outside left turn lanes.

** Range considers possible limitations due to field conditions or geometric design.

Appendix G2:

Traffic Signal Warrant Analyses

Traffic Signal Warrant Analysis Workbook

STUDY AND ANALYSIS INFORMATION

Municipality:	Adams Township	**Analysis Date:**	1/2/2018
County:	Butler County	**Conducted By:**	XW/CDR
PennDOT Engineering District:	10	**Agency/Company Name:**	PennDOT CO

Analysis Information

Data Collection Date:	10/11/2016
Day of the Week:	Tuesday

Is the intersection in a built-up area of an isolated community of <10,000 population? No

Major Street Information

Major Street Name and Route Number:	Mars Rd (SR 228)
Major Street Approach #1 Direction:	E-Bound
Major Street Approach #2 Direction:	W-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach:	2	**LANE(S)**
Speed Limit or 85th Percentile Speed on the Major Street:	45	**MPH**

Minor Street Information

Minor Street Name and Route Number:	Myoma Rd
Minor Street Approach #1 Direction:	S-Bound
Minor Street Approach #2 Direction:	N/A

Number of Lanes for Moving Traffic on Each Minor Street Approach:	1	**LANE(S)**

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	**No**	**N/A**
Warrant 2, Four-Hour Vehicular Volume	**Yes**	**No**
Warrant 3, Peak Hour	**Yes**	**No**
Warrant 4, Pedestrian Volume	**No**	**N/A**
Warrant 5, School Crossing	**No**	**N/A**
Warrant 6, Coordinated Signal System	**No**	**N/A**
Warrant 7, Crash Experience	**Yes**	**No**
Warrant 8, Roadway Network	**Yes**	**Yes**
Warrant 9, Intersection Near a Grade Crossing	**No**	**N/A**
Warrant PA-1, ADT Volume Warrant	**Yes**	**Yes**
Warrant PA-2, Midblock and Trail Crossings	**No**	**N/A**

MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Total Number of Unique Hours Met On Figure 4C-2
2

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Hourly Vehicular Volume			
Hour Interval Beginning At	**Major Street Combined Vehicles Per Hour (VPH)**	**Highest Minor Street Approach Vehicles Per Hour (VPH)**	**Hour Met?**
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	0	0	
5:30 AM	0	0	
5:45 AM	0	0	
6:00 AM	0	0	
6:15 AM	382	11	
6:30 AM	799	21	
6:45 AM	1190	33	
7:00 AM	1625	54	
7:15 AM	1647	57	
7:30 AM	1609	59	
7:45 AM	1636	53	
8:00 AM	1567	46	
8:15 AM	1163	32	
8:30 AM	784	20	
8:45 AM	366	14	
9:00 AM	0	0	
9:15 AM	0	0	
9:30 AM	0	0	
9:45 AM	0	0	
10:00 AM	0	0	
10:15 AM	0	0	
10:30 AM	0	0	
10:45 AM	0	0	
11:00 AM	0	0	
11:15 AM	0	0	
11:30 AM	0	0	
11:45 AM	0	0	

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 PM	0	0	
12:15 PM	0	0	
12:30 PM	0	0	
12:45 PM	0	0	
1:00 PM	0	0	
1:15 PM	0	0	
1:30 PM	0	0	
1:45 PM	0	0	
2:00 PM	0	0	
2:15 PM	0	0	
2:30 PM	0	0	
2:45 PM	0	0	
3:00 PM	0	0	
3:15 PM	476	19	
3:30 PM	939	33	
3:45 PM	1427	62	Met
4:00 PM	1957	82	Met
4:15 PM	1967	73	Met
4:30 PM	1986	84	Met
4:45 PM	1965	69	Met
5:00 PM	1909	73	Met
5:15 PM	1423	63	Met
5:30 PM	941	38	
5:45 PM	474	24	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	No

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*	
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	Yes
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	No
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	Yes
**If applicable, attach all supporting calculations and documentation.*	

Total Number of Unique Hours Met On Figure 4C-4
1

Hourly Vehicular Volume			
Hour Interval Beginning At	**Major Street Combined Vehicles Per Hour (VPH)**	**Highest Minor Street Approach Vehicles Per Hour (VPH)**	**Hour Met?**
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	0	0	
5:30 AM	0	0	
5:45 AM	0	0	
6:00 AM	0	0	
6:15 AM	382	11	
6:30 AM	799	21	
6:45 AM	1190	33	
7:00 AM	1625	54	
7:15 AM	1647	57	
7:30 AM	1609	59	
7:45 AM	1636	53	
8:00 AM	1567	46	

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
8:15 AM	1163	32	

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
8:30 AM	784	20	
8:45 AM	366	14	
9:00 AM	0	0	
9:15 AM	0	0	
9:30 AM	0	0	
9:45 AM	0	0	
10:00 AM	0	0	
10:15 AM	0	0	
10:30 AM	0	0	
10:45 AM	0	0	
11:00 AM	0	0	
11:15 AM	0	0	
11:30 AM	0	0	
11:45 AM	0	0	
12:00 PM	0	0	
12:15 PM	0	0	
12:30 PM	0	0	
12:45 PM	0	0	
1:00 PM	0	0	
1:15 PM	0	0	
1:30 PM	0	0	
1:45 PM	0	0	
2:00 PM	0	0	
2:15 PM	0	0	
2:30 PM	0	0	
2:45 PM	0	0	
3:00 PM	0	0	
3:15 PM	476	19	
3:30 PM	939	33	
3:45 PM	1427	62	
4:00 PM	1957	82	Met
4:15 PM	1967	73	
4:30 PM	1986	84	Met
4:45 PM	1965	69	
5:00 PM	1909	73	
5:15 PM	1423	63	
5:30 PM	941	38	
5:45 PM	474	24	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 7, CRASH EXPERIENCE

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Has adequate trial of alternatives with satisfactory observance and enforcement failed to reduce the crash frequency? N/A

Five or more reportable and/or non-reportable crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period during the most recent 3 years of available crash data.* No

**If applicable, attach a summary of the crash data analysis used for this criterion.*

For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition A in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection. **No**

For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection. **No**

The volume of pedestrian traffic is not less than 80% of the requirements specified in Warrant 4, the Pedestrian Volume warrant.* No

**If applicable, attach all supporting calculations and documentation.*

MUTCD WARRANT 8, ROADWAY NETWORK*

Is the major street classified as an Urban Extension, Principal Arterial, or Minor Arterial that is a reasonable connection between two Principal Arterials and/or Urban Extensions as shown on the official Functional Classification Map? Yes

Does the intersection have a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1,2, and 3 during an average weekday? No

Does the intersection have a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday)? Yes

Is the major street part of the street or highway system that serves as the principal roadway network for through traffic flow? Yes

Does the major street include rural or suburban highways outside, entering, or traversing a city? No

Does the major street appear as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study? Yes

**Refer to Section 4.3 of PennDOT Publication 46 (Traffic Engineering Manual) for additional Department documentation requirements to justify the installation of a signal under Warrant 8. Attach all supplementary documentation and calculations, especially those relating to traffic volume projections and subsequent Warrant analyses.*

WARRANT PA-1, ADT VOLUME WARRANT

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Estimated ADT of Major Street (Both Approaches)*: 26200 vpd

**If applicable, attach all supporting calculations and documentation.*

Estimated ADT of Higher-Volume Minor Street (One Direction Only)*: 2575 vpd

**If applicable, attach all supporting calculations and documentation.*

Condition A - ADT Volume Warrant					
Number of lanes for moving traffic on each approach		Estimated ADT*			
		Major Street (Both Approaches)		Higher-Volume Minor Street Approach (One Direction Only)	
Major Street	Minor Street	100%	70%	100%	70%
1	1	10,000	7,000	3,000	2,100
2 or More	1	12,000	8,400	3,000	2,100
2 or More	2 or More	12,000	8,400	4,000	2,800
1	2 or More	10,000	7,000	4,000	2,800

Condition B - ADT Volume Warrant					
Number of lanes for moving traffic on each approach		Estimated ADT*			
		Major Street (Both Approaches)		Higher-Volume Minor Street Approach (One Direction Only)	
Major Street	Minor Street	100%	70%	100%	70%
1	1	15,000	10,500	1,500	1,050
2 or More	1	18,000	12,600	1,500	1,050
2 or More	2 or More	18,000	12,600	2,000	1,400
1	2 or More	15,000	10,500	2,000	1,400

Condition A Met?	**Yes**
Condition B Met?	**Yes**

Traffic Signal Warrant Analysis Workbook

STUDY AND ANALYSIS INFORMATION

Municipality:	Adams Township	**Analysis Date:**	1/2/2018
County:	Butler County	**Conducted By:**	XW/CDR
PennDOT Engineering District:	10	**Agency/Company Name:**	PennDOT CO

Analysis Information

Data Collection Date:	10/11/2016
Day of the Week:	Tuesday

Is the intersection in a built-up area of an isolated community of <10,000 population? No

Major Street Information

Major Street Name and Route Number:	Mars Rd (SR 228)
Major Street Approach #1 Direction:	E-Bound
Major Street Approach #2 Direction:	W-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach:	2	**LANE(S)**
Speed Limit or 85th Percentile Speed on the Major Street:	45	**MPH**

Minor Street Information

Minor Street Name and Route Number:	Beaver St Ext
Minor Street Approach #1 Direction:	S-Bound
Minor Street Approach #2 Direction:	N/A

Number of Lanes for Moving Traffic on Each Minor Street Approach:	1	**LANE(S)**

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	**No**	**N/A**
Warrant 2, Four-Hour Vehicular Volume	**Yes**	**Yes**
Warrant 3, Peak Hour	**Yes**	**No**
Warrant 4, Pedestrian Volume	**No**	**N/A**
Warrant 5, School Crossing	**No**	**N/A**
Warrant 6, Coordinated Signal System	**No**	**N/A**
Warrant 7, Crash Experience	**Yes**	**No**
Warrant 8, Roadway Network	**Yes**	**Yes**
Warrant 9, Intersection Near a Grade Crossing	**No**	**N/A**
Warrant PA-1, ADT Volume Warrant	**Yes**	**Yes**
Warrant PA-2, Midblock and Trail Crossings	**No**	**N/A**

MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Total Number of Unique Hours Met On Figure 4C-2
4

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Hourly Vehicular Volume			
Hour Interval Beginning At	**Major Street Combined Vehicles Per Hour (VPH)**	**Highest Minor Street Approach Vehicles Per Hour (VPH)**	**Hour Met?**
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	0	0	
5:30 AM	0	0	
5:45 AM	0	0	
6:00 AM	0	0	
6:15 AM	379	25	
6:30 AM	828	60	
6:45 AM	1254	92	Met
7:00 AM	1701	127	Met
7:15 AM	1752	132	Met
7:30 AM	1707	111	Met
7:45 AM	1678	104	Met
8:00 AM	1636	103	Met
8:15 AM	1206	73	Met
8:30 AM	802	59	
8:45 AM	405	34	
9:00 AM	0	0	
9:15 AM	0	0	
9:30 AM	0	0	
9:45 AM	0	0	
10:00 AM	0	0	
10:15 AM	0	0	
10:30 AM	0	0	
10:45 AM	0	0	
11:00 AM	0	0	
11:15 AM	0	0	
11:30 AM	0	0	
11:45 AM	0	0	

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 PM	0	0	
12:15 PM	0	0	
12:30 PM	0	0	
12:45 PM	0	0	
1:00 PM	0	0	
1:15 PM	0	0	
1:30 PM	0	0	
1:45 PM	0	0	
2:00 PM	0	0	
2:15 PM	0	0	
2:30 PM	0	0	
2:45 PM	0	0	
3:00 PM	0	0	
3:15 PM	491	32	
3:30 PM	1030	58	
3:45 PM	1521	96	Met
4:00 PM	2062	138	Met
4:15 PM	2125	139	Met
4:30 PM	2103	145	Met
4:45 PM	2137	143	Met
5:00 PM	2086	128	Met
5:15 PM	1532	95	Met
5:30 PM	1015	63	Met
5:45 PM	490	27	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	No

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*	
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	Yes
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	Yes
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	No
**If applicable, attach all supporting calculations and documentation.*	

Total Number of Unique Hours Met On Figure 4C-4
4

Hourly Vehicular Volume			
Hour Interval Beginning At	**Major Street Combined Vehicles Per Hour (VPH)**	**Highest Minor Street Approach Vehicles Per Hour (VPH)**	**Hour Met?**
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	0	0	
5:30 AM	0	0	
5:45 AM	0	0	
6:00 AM	0	0	
6:15 AM	379	25	
6:30 AM	828	60	
6:45 AM	1254	92	Met
7:00 AM	1701	127	Met
7:15 AM	1752	132	Met
7:30 AM	1707	111	Met
7:45 AM	1678	104	Met
8:00 AM	1636	103	Met

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
8:15 AM	1206	73	Met

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
8:30 AM	802	59	
8:45 AM	405	34	
9:00 AM	0	0	
9:15 AM	0	0	
9:30 AM	0	0	
9:45 AM	0	0	
10:00 AM	0	0	
10:15 AM	0	0	
10:30 AM	0	0	
10:45 AM	0	0	
11:00 AM	0	0	
11:15 AM	0	0	
11:30 AM	0	0	
11:45 AM	0	0	
12:00 PM	0	0	
12:15 PM	0	0	
12:30 PM	0	0	
12:45 PM	0	0	
1:00 PM	0	0	
1:15 PM	0	0	
1:30 PM	0	0	
1:45 PM	0	0	
2:00 PM	0	0	
2:15 PM	0	0	
2:30 PM	0	0	
2:45 PM	0	0	
3:00 PM	0	0	
3:15 PM	491	32	
3:30 PM	1030	58	
3:45 PM	1521	96	Met
4:00 PM	2062	138	Met
4:15 PM	2125	139	Met
4:30 PM	2103	145	Met
4:45 PM	2137	143	Met
5:00 PM	2086	128	Met
5:15 PM	1532	95	Met
5:30 PM	1015	63	
5:45 PM	490	27	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 7, CRASH EXPERIENCE

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Has adequate trial of alternatives with satisfactory observance and enforcement failed to reduce the crash frequency? N/A

Five or more reportable and/or non-reportable crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period during the most recent 3 years of available crash data.* No

**If applicable, attach a summary of the crash data analysis used for this criterion.*

For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition A in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection. **No**

For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection. **No**

The volume of pedestrian traffic is not less than 80% of the requirements specified in Warrant 4, the Pedestrian Volume warrant.* No

**If applicable, attach all supporting calculations and documentation.*

MUTCD WARRANT 8, ROADWAY NETWORK*

Is the major street classified as an Urban Extension, Principal Arterial, or Minor Arterial that is a reasonable connection between two Principal Arterials and/or Urban Extensions as shown on the official Functional Classification Map? Yes

Does the intersection have a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1,2, and 3 during an average weekday? Yes

Does the intersection have a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday)? Yes

Is the major street part of the street or highway system that serves as the principal roadway network for through traffic flow? Yes

Does the major street include rural or suburban highways outside, entering, or traversing a city? No

Does the major street appear as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study? Yes

**Refer to Section 4.3 of PennDOT Publication 46 (Traffic Engineering Manual) for additional Department documentation requirements to justify the installation of a signal under Warrant 8. Attach all supplementary documentation and calculations, especially those relating to traffic volume projections and subsequent Warrant analyses.*

WARRANT PA-1, ADT VOLUME WARRANT

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Estimated ADT of Major Street (Both Approaches)*: 28500 vpd

**If applicable, attach all supporting calculations and documentation.*

Estimated ADT of Higher-Volume Minor Street (One Direction Only)*: 3970 vpd

**If applicable, attach all supporting calculations and documentation.*

Condition A - ADT Volume Warrant

Number of lanes for moving traffic on each approach		Estimated ADT*			
		Major Street (Both Approaches)		Higher-Volume Minor Street Approach (One Direction Only)	
Major Street	**Minor Street**	**100%**	**70%**	**100%**	**70%**
1	**1**	10,000	7,000	3,000	2,100
2 or More	**1**	12,000	8,400	3,000	2,100
2 or More	**2 or More**	12,000	8,400	4,000	2,800
1	**2 or More**	10,000	7,000	4,000	2,800

Condition B - ADT Volume Warrant

Number of lanes for moving traffic on each approach		Estimated ADT*			
		Major Street (Both Approaches)		Higher-Volume Minor Street Approach (One Direction Only)	
Major Street	**Minor Street**	**100%**	**70%**	**100%**	**70%**
1	**1**	15,000	10,500	1,500	1,050
2 or More	**1**	18,000	12,600	1,500	1,050
2 or More	**2 or More**	18,000	12,600	2,000	1,400
1	**2 or More**	15,000	10,500	2,000	1,400

Condition A Met?	**Yes**
Condition B Met?	**Yes**

Appendix H

Bicycle and Pedestrian Checklists

Contents:

Appendix H1:

Bicycle and Pedestrian Checklist (DM-1X)

Planning and Programming Checklist

Project **Route 228 Mars RR Bridge West Expansion**
SR **0228** Segment **0030 to 0100** Offset
Team Members **Whitman, Requardt & Associates, LLP (WRA)**
Date **December 12, 2017**

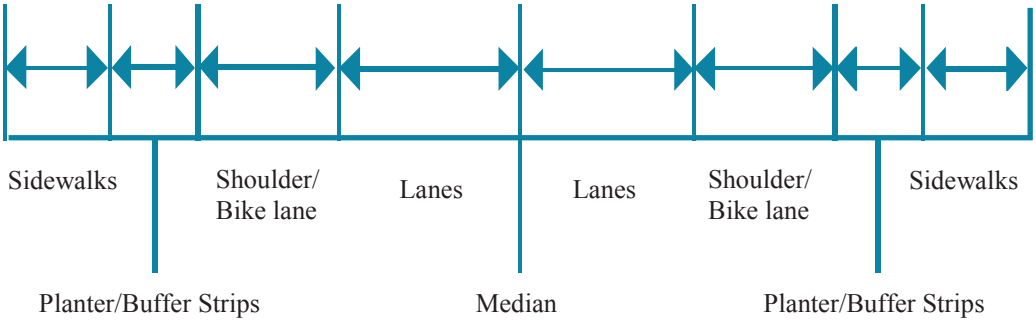
Item	Considerations	Check	Comments
1. Consistency with Bicycle/Pedestrian Planning Documents	Is the transportation facility included in or related to bicycle and pedestrian facilities identified in a master plan? • MPO/RPO bike/ped plan. • Local planning documents. • BicyclePA Routes. • Statewide Bicycle and Pedestrian Master Plan.	**Yes**	Municipal coordination with Cranberry Twp and Adams Twp revealed preferences to encourage bike/ped usage along parallel routes (e.g. Mars-Crider Rd) in lieu of this section of the Rt 228 corridor. Cranberry Twp Bicyclists/Pedestrian Connection Plan highlights Franklin Rd from Rt 228 to Peters Rd as a sidewalk network gap. Seven Fields Comp Plan prioritizes formal pedestrian connectivity across Rt 228.
	Will the transportation facility provide continuity and linkages with existing or proposed bicycle/pedestrian facilities?	**Pending Design**	Limited missing link connections pertaining to isolated neighborhoods may be investigated throughout design.
	Is the transportation facility included in or related to a regional/local recreational plan? • Rails-to-Trails. • Greenways. • Local, State, National Parks.	**No**	Seven Fields Municipal Park (located south of corridor on Castle Creek Dr) is included in Butler County Comprehensive Recreation, Parks, and Open Space Plan.
2. Existing and Future Usage	Do bicycle/pedestrian groups regularly use the transportation facility? • Bike clubs. • Bicycle commuters. • Hiking, walking, or running clubs. • Skateboarding or rollerblading groups. • Bicycle touring groups. • General tourism/sightseeing.	**Limited**	Mojo Weekly Running Club leaves from Mojo Running shop on Castle Creek Drive. Some local activity observed crossing Rt 228, particularly in Seven Fields Borough due to residential, retail and office land uses on opposite sides of the corridor.
	Does the existing transportation facility provide the only convenient transportation connection/linkage between land uses in the local area or region?	**No**	Rt 228 is a principal arterial highway and the main corridor for through-travel and local development access throughout the study area; however, local traffic can also utilize parallel routes and side-road connections.
	Could the transportation facility have favorable or unfavorable impacts upon the bike tourism/economy of an area/ region? Consider: • Local businesses • Chamber of Commerce • Tourism Promotion Agencies.	**No**	
	Are there physical or perceived impediments to bicycle or pedestrian use of the transportation facility?	**Yes**	Rt 228 volumes, speed, and truck traffic present obstacles. Municipal preferences emphasize usage of parallel routes.
	Is there a higher than normal incidence of bicycle/pedestrian crashes in the area?	**No**	
3. Safety	Is the transportation facility in a high-density land use area that has pedestrian/ bike/motor vehicle traffic?	**No**	Rt 228 is primarily a commercial and mixed use corridor through the project area, but with auto-centric and heavy commuter travel usage.

Item	Considerations	Check	Comments
3. Safety (continued)	Is there a high amount of crossing activity at intersections? • Midblock • Night crossing activity • Adequate lighting.	**No**	Minimal pedestrian volumes observed during intersection TMC's throughout the study corridor.
	Would the transportation facility (and all users) benefit from widened or improved shoulders or improved markings (shoulders, crosswalks)?	**Pending Design**	Could facilitate limited missing link connections or activities crossing Rt 228.
4. Community and Land Use	Is the transportation facility in a city, town, or village?	**Yes**	Heavy commercial and mixed use corridor, particularly in Cranberry Twp and Seven Fields Boro.
	Is the transportation facility within/near a community or neighborhood?	**Yes**	Residential areas are located north and south of the corridor via side-street connections.
	Is the transportation facility the "main street" in a community or town?	**No**	Heavy commercial and mixed use corridor and principal arterial.
	Could bicycle or pedestrian usage impact economic development?	**No**	
	Are sidewalks needed in the area? • Presence of worn paths along the facility. • Adjacent land uses generate pedestrian traffic. • Possible linkages/continuity with other pedestrian facilities.	**Pending Design**	Limited missing link connections pertaining to isolated neighborhoods may be investigated throughout design. Residential, office, and retail land uses are located along both sides of the corridor.
	Is the transportation facility a link between complimentary land uses? • Residential and commercial. • Residential and business.	**Yes**	
	Is the transportation facility in close proximity to hospitals, elderly care facilities, or the residences or businesses of persons with disabilities?	**Limited**	Some elderly care facilities (e.g. along Seven Fields Blvd) and numerous residential areas located off the corridor; but nothing with pedestrian access along the corridor.
	Is the transportation facility within or near educational buildings?	**Yes**	Cardinal Wuerl North Catholic Schools; but nothing with pedestrian access along the corridor.
	Is the transportation facility in close proximity to transit stops or multi-modal centers (including airports, rail stations, intercity bus terminals, and water ports)?	**No**	
5. Transit	Is the transportation facility on a transit route?	**No**	
	Is the transportation facility near park-and-ride lots?	**Limited**	Nearest Park-n-Ride lot is located 1 mile west near the Rt 19 / Rt 228 intersection.
	Are there existing or proposed bicycle racks, shelters or parking available? Are there bike racks on buses?	**No**	
6. Traffic Calming	Is the community considering traffic calming as a possible solution to speeding and cut-through traffic?	**No**	

Scoping Checklist

Project **Route 228 Mars RR Bridge West Expansion**
SR **228** Segment **0030 to 0100** Offset
Team Members **Whitman, Requardt & Associates, LLP (WRA)**
Date **December 12, 2017**

Right-of-Way Needs Diagram



Element	Number Required	Width Required	Total Width
Sidewalks	-	-	-
Buffer Strips	-	-	-
Shoulders	2	10'	20'
Lanes	4	11'	44'
Median	1	16'	16'
Total Right-of-Way Required	-	-	80'

Pedestrian Facilities

Item	Considerations	Check	Comments
1. Sidewalks	Appropriate width: • 1.5 m - 2.1 m (5' - 7') for residential, commercial, and industrial. • 2.5 m (8') minimum for high use areas/CBD. • 2.1 m (7') width for bridges. • 0.6 m (2') shy distance for vertical barriers. • 1.2 m - 2.1 m (5' - 7') barrier separating traffic from pedestrians on bridges.	**Pending Design**	Limited missing link connections may be investigated throughout design. Side-walks are not otherwise proposed along either side of the Rt 228 corridor.

Item	Considerations	Check	Comments
Sidewalks (cont'd)	Applicability of planter or buffer strips.	**Pending Design**	
	Connectivity with other pedestrian facilities.	**Pending Design**	
	Proximity to transit bike/ped generators: • Transit stops. • Schools. • Park & rides. • Nursing homes. • Offices. • Business environments. • Athletic fields. • Recreation facilities.	**Yes**	
	Observe pedestrian patterns for special needs such as: • Midblock crossings. • Islands and refuges. • Night crossing activity.	**n/a**	
	ADA needs and concerns.	**Pending Design**	Per design requirements as applicable..
2. Signalized Intersections	Crosswalks provided and marked.	**Pending Design**	Anticipated at all signalized intersections.
	Intersection bike/ped crash history reviewed.	**Yes**	No notable trends.
	Is there a dedicated pedestrian phase, if so how long?	**Pending Design**	Anticipate concurrent phasing at signals.
	Crossing distance is minimized.	**Pending Design**	Anticipated w/ revised intersection design.
	Ped heads and ped pushbuttons provided.	**Pending Design**	Anticipated at all signalized intersections.
	ADA needs and concerns.	Retirement homes *	* No anticipated activity along Rt 228 corridor; limited needs pending for activities across Rt 228.
		Schools *	
		Medical facilities *	
3. Traffic Calming	Is the community considering traffic calming as a means to curb speeding and cut-through traffic?	**No**	

Bicycle Facilities

Item	Considerations	Check	Comments
1. Bikelanes/Paved Shoulders	Appropriate width of bike lane: • 1.5 m (5') adjacent to curb • 1.8 m (6') standard.	**n/a**	No Bike lanes anticipated.
	Connectivity with other facilities. • Bike lanes • Shared use trails • Trail heads/parking areas.	**n/a**	
	Maximize width of shoulders and provide appropriate markings as per *AASHTO Green Book*.	**n/a**	10' paved shoulders proposed.
	3 m (10') vertical clearance from fixed obstructions (excluding road signs).	**Pending Design**	
	Angle and smoothness of railroad crossings. Avoid angles of incidence of < 70° or re-design.	**n/a**	No railroad crossings, bridge pinch points, or parking anticipated.
	Bridge accesses provided/pinch points avoided.		
	Parking parallel or angled.		
2. Signalized intersections	Inventory existing bicycle facilities.	**n/a**	No existing facilities along Rt 228 corridor.
	Intersection bike/ped crash history reviewed.	**Yes**	No notable trends.
	Crossing distance is minimized.	**Pending Design**	Anticipated w/ revised intersection design.
	Considerations for bikes making turns.	**Pending Design**	
	Bike detection.	**Pending Design**	
	Elevated push buttons.		
3. Traffic Calming	Is the community considering traffic calming as a means to curb speeding and cut-through traffic?	**No**	

Final Design Checklist

Project_____
SR_____ Segment_____ Offset_____
Team Members_____
_____ Date_____

Pedestrian Facilities

Item	Considerations	Check	Comments
1. Sidewalks and Signalized Intersections	Crosswalks are at least 3 m (10') wide.		
	Crosswalks are prominently marked using at least 6" line.		
	Pedestrian signals are provided.		
	Pushbuttons are provided and accessible.		
	Minimize crossing distance.		
	Maximize pedestrian visibility at crossings.		
	Coordination of turn phases with walk/don't walk signs.		
	Proper lighting type and placement.		
2. ADA Requirements	Pushbuttons accessible.		
	Pushbuttons height 1.0 m - 1.1 m (3.5' - 4.0').		
	Large pushbuttons used.		
	1.5 m (5') recommended passage (sidewalks).		
	5% maximum grade recommended (sidewalks).		
	2% cross-slope maximum.		
	Textured curb cuts.		
	2 curb cuts per corner at intersections.		
	Curb cuts flush with street surface 0.6 cm (1/4" tolerance).		
	Running slope of new curb cuts 1 in 12 max.		
	Longer signal cycles.		
	Audible crossing signals.		
	Level landings on perpendicular curb ramps.		
	Proper head/shoulder clearance for visually impaired.		
	Coordinate utilities with ADA requirements.		
	Proper lighting.		
	Analyze landscaping growth potential for future obstructions.		
	Any conflicts with minimal distance that should be included in the project.		
	Coordinate and minimize signage conflicts.		

Item	Considerations	Check	Comments
3. Traffic Calming	Consider traffic calming as a means to improve pedestrian and general traffic safety.		

Bicycle Facilities

Item	Considerations	Check	Comments
1. Bikelanes/Bikeways	Bicycle safe grates, RC-45M, Sheet 8 of 20.		
	Manhole covers flush with roadway surface.		
	Inlets flush with roadway surface.		
	Rumble strips type and placement.		
	Driveway aprons.		
	Conflicts eliminated with: • Turns at intersections. • Through movements. • Bicycle and pedestrian conflicts. • Parked cars, angled vs. parallel. • Driveway aprons.		
2. Signage	3 m (10') vertical clearance from signs and structures.		
	"Share the Road Signs."		
	"Wrong Way Signs."		
	Lane stenciling.		
	Bike lane designation signs.		
	No parking signs.		
	Bike lane striped.		
	Transition from bike lane to bikeway.		
	Consistent width on roadways, bridges, and intersections.		
	Overlap bike lane/shoulder stripe over pavement joints.		
	Meet or exceed AASHTO criteria.		
3. Traffic calming	Consider traffic calming as a means to improve pedestrian and general traffic safety.		

Appendix H2:

Pedestrian Accommodation at Intersections Checklist (TE-672)

TE-672 (9-10)

PEDESTRIAN ACCOMMODATION AT INTERSECTIONS CHECKLIST

PLEASE TYPE OR PRINT ALL INFORMATION IN BLUE OR BLACK INK

pennsylvania
DEPARTMENT OF TRANSPORTATION
www.dot.state.pa.us

As specified in the MUTCD, Section 4E, an engineering study shall be conducted to determine the need for pedestrian accommodation at signalized intersections and the related design and operational features. Based on the engineering study and engineering judgment, proper documentation shall be made at all new signalized intersections and modifications to existing signalized intersections. This documentation shall be provided with guidance from this checklist.

When pedestrian accommodations will not be provided at an intersection, signalized or not, proper justification must be documented. Below is a checklist of information that may be relevant in the determination of pedestrian needs and warranted accommodations at an intersection. Not all of the information below is required to make a determination. This form can be used to summarize the needs and accommodations of a corridor or a single intersection.

Intersection Background Information

DATE	DISTRICT	COUNTY
10/25/2017	10-0	Butler

MUNICIPALITY	INTERSECTION
Cranberry Township	SR 0228 @ Franklin Rd

SUBMITTED BY	STREET ADDRESS
Whitman, Requardt & Associates, LLP (WRA)	2009 Mackenzie Way, Suite 240

CITY	STATE	ZIP	TELEPHONE NUMBER
Cranberry Township	PA	16066	724-779-7940

Project Overview

Provide a Project Description and Scope of the Project.
Document existing/future traffic conditions to analyze traffic operations for preliminary design and provide recommendations

Bike/Ped Checklist Completed. ☒ Yes ☐ No

Existing Facility Description

Yes	No		
☒	☐	Are pedestrian facilities present (i.e., sidewalks, curb ramps, crosswalks, pedestrian signals, etc.)?	Crosswalks, push buttons, and pedestrian signals are present for all quadrants.
☒	☐	Are there descriptions of each quadrant of the existing intersection (photos are strongly recommended)?	Multiple historic studies
☒	☐	Are near-by land uses documented?	
☒	☐	Are pedestrian facilities near the intersection (i.e., sidewalks, bus stops, trails, etc.)?	Sidewalk located about 250 feet south of intersection
☐	☒	Is there current evidence of pedestrians using the intersection (worn paths, observed activity)?	
☒	☐	Were special accommodations made in the past for pedestrians at the intersection?	
☐	☒	Are restrictions for pedestrians present? (No Ped signs, limited crossings)	
☐	☒	Is this a defined walking route or safe route to school route?	
☐ TBD	☐	Are physical restrictions or right-of-way restrictions present?	
☐ TBD	☐	If pedestrian signals are present, is proper traffic signal timing designated for pedestrians at the intersection?	Will be revised with proposed design

Proposed Facility Description

Yes	No		
☐	☒	Will the proposed improvements generate new or additional pedestrian traffic?	
☐ TBD	☐	Does the proposed facility introduce possible additional restrictions for pedestrians?	
☒	☐	Are new or existing pedestrian signals proposed at the intersection?	Anticipate full signal replacements with widening project.
☐ TBD	☐	Are sidewalks proposed as part of the project?	
☐ TBD	☐	Are detailed descriptions of changes to each quadrant documented?	
☐	☒	Do near-by land uses change as part of the project?	
☐ TBD	☐	Are additional pedestrian facilities proposed for the intersection?	

Outreach Efforts

Has contact and discussion concerning pedestrian accommodations at the intersection been made with the following?

Yes	No	
☒	☐	Municipality (s)
☐	☐	Transit Organization (s)
☐	☐	School District (s)
☐	☐	Public Meeting (s)
☐	☐	Emergency Services
☐	☐	Advocacy Groups
☒	☐	Other (s) PennDOT RSA Document existing/future traffic conditions to analyze traffic operations

Intersection Details

(The information below may be useful in the determination of pedestrian needs and warranted accommodations at uncontrolled intersections. Not all of the information is required to make a determination. The minor roadway information may also be needed in some situations.)

Roadway classification: Urban - Other principal arterial

Roadway Typology: Regional Arterial

Speed Limit (MPH): 40 mph (Rt 228), 35 mph (Franklin Rd)

Design Speed: 45 mph (Rt 228)

ADT: 26,217 (Rt 228); 6,635 (Franklin Rd)

Percentage of Trucks: 7% (AM), 2% (PM), 1.6% (SAT)

Travel lanes: 2 th,1lt (Rt 228); 1rt,1 th,1 lt (Franklin)

Is there a sight distance deficiency? ☐ Yes ☒ No

If yes, explain. _____

Sidewalk: ☐ Yes ☒ No Shoulders: ☒ Yes ☐ No Curb: ☐ Yes ☒ No

Is parking permitted on the roadway? ☐ Yes ☒ No

Municipal recommendation: _____

Pedestrian generators? Gas station, animal Hospital, offices; Hotel and school on Franklin Rd

Distance to next available crossing: 1658' (0.3 miles) @ Cranberry Woods Dr/Kristoffer Dr

Was a crash analysis completed? ☒ Yes ☐ No

Are there pedestrian crashes? ☒ Yes ☐ No

Has a pedestrian gap analysis been performed at the location? ☐ Yes ☒ No

ftp://ftp.dot.state.pa.us/transfer/Traffic Signals/Unsignalized Intersection Ped Calcs from HCS.xlsx

Are there other geometric concerns? If yes, explain: _____

Pedestrian Traffic Signals (if applicable)

Yes	No	
☒	☐	Is there proper pedestrian timing established at the intersection? Anticipate updates as applicable during design.
☐	☒	Is an all-pedestrian phase recommended in the study? Recent count data indicates minimal Pedestrian activity at this intersection
☐	☒	Are the crosswalks in alignment with curb ramps? No existing curb ramps
☐ TBD	☐	Are pedestrian signals visible from the proposed crosswalk/curb ramp locations?
☐	☒	Are countdown pedestrian signals present?
☐ TBD	☐	Has the need for Accessible Pedestrian Signals (APS) been determined from the study? Not anticipated
☐ TBD	☐	Are pushbuttons proposed to be within the current ADA criteria?
☐ TBD	☐	Are all pushbutton locations accessible to all pedestrians?
☐ TBD	☐	Do all features satisfy applicable state and federal requirements?

Recommendations/Justification
Pedestrian accommodations are recommended at this intersection. Sidewalk connections along Franklin Rd may be necessary. A hotel and school on Franklin Road have the potential to create pedestrian traffic crossing Rt 228.

District Traffic Engineer Approval	Assistant District Executive Approval
District Traffic Engineer Date	District ADE of Design, Maintenance or Services Date

TE-672 (9-10)

PEDESTRIAN ACCOMMODATION AT INTERSECTIONS CHECKLIST

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Intersection Background Information

DATE	DISTRICT	COUNTY
10/25/2017	10-0	Butler

MUNICIPALITY	INTERSECTION
Seven Fields Borough	SR 0228 @ Castle Creek Dr W & High Pointe Dr W

SUBMITTED BY	STREET ADDRESS
Whitman, Requardt & Associates, LLP (WRA)	2009 Mackenzie Way, Suite 240

CITY	STATE	ZIP	TELEPHONE NUMBER
Cranberry Township	PA	16066	724-779-7940

Project Overview

Provide a Project Description and Scope of the Project.
Document existing/future traffic conditions to analyze traffic operations for preliminary design and provide recommendations

Bike/Ped Checklist Completed. ☒ Yes ☐ No

Existing Facility Description

Yes	No		
☒	☐	Are pedestrian facilities present (i.e., sidewalks, curb ramps, crosswalks, pedestrian signals, etc.)?	Crosswalks for NE to NW quadrant crossing and for SE to SW quadrant crossing. Pushbuttons and pedestrian signals at all quadrants.
☒	☐	Are there descriptions of each quadrant of the existing intersection (photos are strongly recommended)?	Multiple historic studies
☒	☐	Are near-by land uses documented?	
☒	☐	Are pedestrian facilities near the intersection (i.e., sidewalks, bus stops, trails, etc.)?	Sidewalks on Castle Creek Dr and High Pointe Dr
☐	☒	Is there current evidence of pedestrians using the intersection (worn paths, observed activity)?	
☒	☐	Were special accommodations made in the past for pedestrians at the intersection?	
☐	☒	Are restrictions for pedestrians present? (No Ped signs, limited crossings)	
☐	☒	Is this a defined walking route or safe route to school route?	
☐ TBD	☐	Are physical restrictions or right-of-way restrictions present?	
☐ TBD	☐	If pedestrian signals are present, is proper traffic signal timing designated for pedestrians at the intersection?	Will be revised with proposed design

Proposed Facility Description

Yes	No	
☐	☒	Will the proposed improvements generate new or additional pedestrian traffic?
☐ TBD	☐	Does the proposed facility introduce possible additional restrictions for pedestrians?
☒	☐	Are new or existing pedestrian signals proposed at the intersection? Anticipate full signal replacements with widening project.
☐ TBD	☐	Are sidewalks proposed as part of the project?
☐ TBD	☐	Are detailed descriptions of changes to each quadrant documented?
☐	☒	Do near-by land uses change as part of the project?
☐ TBD	☐	Are additional pedestrian facilities proposed for the intersection?

Outreach Efforts

Has contact and discussion concerning pedestrian accommodations at the intersection been made with the following?

Yes	No	
☒	☐	Municipality (s)
☐	☐	Transit Organization (s)
☐	☐	School District (s)
☐	☐	Public Meeting (s)
☐	☐	Emergency Services
☐	☐	Advocacy Groups
☒	☐	Other (s) **PennDOT RSA**

Intersection Details

(The information below may be useful in the determination of pedestrian needs and warranted accommodations at uncontrolled intersections. Not all of the information is required to make a determination. The minor roadway information may also be needed in some situations.)

Roadway classification: Urban - Other principal arterial

Roadway Typology: Regional Arterial

Speed Limit (MPH): 40 mph (Rt 228), 25 mph (High Pointe & Castle Creek)

Design Speed: 40-45 mph (Rt 228)

ADT: 22,387 (Rt 228)

Percentage of Trucks: 6.9% (AM), 2.1% (PM), 1.8% (SAT)

Travel lanes: 1rt,1 th,1 lt (Rt 228); 1 th/rt,1 lt (Castle Creek); 1 rt,1 th,1 lt (High Pointe)

Is there a sight distance deficiency? ☐ Yes ☒ No

If yes, explain.

Sidewalk: ☒ Yes ☐ No Castle Creek & High Pointe only

Shoulders: ☒ Yes ☐ No SR 228 only

Curb: ☒ Yes ☐ No Low curb on Castle Creek & High Pointe

Is parking permitted on the roadway? ☐ Yes ☒ No

Municipal recommendation:

Pedestrian generators? Gas station, restaurants, pediatrician office, shops; Residential neighborhood on Castle Creek Dr

Distance to next available crossing: 1980' (0.4 miles) @ Castle Creek Dr East/High Pointe Dr East

Was a crash analysis completed? ☒ Yes ☐ No

Are there pedestrian crashes? ☐ Yes ☒ No

Has a pedestrian gap analysis been performed at the location? ☐ Yes ☒ No

ftp://ftp.dot.state.pa.us/transfer/Traffic Signals/Unsignalized Intersection Ped Calcs from HCS.xlsx

Are there other geometric concerns? If yes, explain:

Pedestrian Traffic Signals (if applicable)

Yes	No	
☒	☐	Is there proper pedestrian timing established at the intersection? Anticipate updates as applicable during design.
☐	☒	Is an all-pedestrian phase recommended in the study? Recent count data indicates minimal Pedestrian activity at this intersection
☐	☒	Are the crosswalks in alignment with curb ramps? No existing curb ramps
☐ TBD	☐	Are pedestrian signals visible from the proposed crosswalk/curb ramp locations?
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☐ TBD	☐	Are pushbuttons proposed to be within the current ADA criteria?
☐ TBD	☐	Are all pushbutton locations accessible to all pedestrians?
☐ TBD	☐	Do all features satisfy applicable state and federal requirements?

Recommendations/Justification
Pedestrian accommodations are recommended at this intersection.
Residential neighborhood on Castle Creek Drive has the potential to create pedestrian traffic crossing Castle Creek Dr
and Rt 228. Future development of vacant High Pointe Dr land may increase pedestrian traffic.

District Traffic Engineer Approval	Assistant District Executive Approval
District Traffic Engineer Date	District ADE of Design, Maintenance or Services Date

TE-672 (9-10)

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10/25/2017	10-0	Butler

MUNICIPALITY	INTERSECTION
Seven Fields Borough	SR 0228 @ Castle Creek Dr E & High Pointe Dr E

SUBMITTED BY	STREET ADDRESS
Whitman, Requardt & Associates, LLP (WRA)	2009 Mackenzie Way, Suite 240

CITY	STATE	ZIP	TELEPHONE NUMBER
Cranberry Township	PA	16066	724-779-7940

Project Overview

Provide a Project Description and Scope of the Project.
Document existing/future traffic conditions to analyze traffic operations for preliminary design and provide recommendations

Bike/Ped Checklist Completed. ☒ Yes ☐ No

Existing Facility Description

Yes	No		
☒	☐	Are pedestrian facilities present (i.e., sidewalks, curb ramps, crosswalks, pedestrian signals, etc.)?	Crosswalks for NE to NW quadrant crossing and for SE to SW quadrant crossing. Pushbuttons and pedestrian signals at all quadrants.
☒	☐	Are there descriptions of each quadrant of the existing intersection (photos are strongly recommended)?	Multiple historic studies
☒	☐	Are near-by land uses documented?	
☒	☐	Are pedestrian facilities near the intersection (i.e., sidewalks, bus stops, trails, etc.)?	Sidewalks on Castle Creek Dr and High Pointe Dr
☐	☒	Is there current evidence of pedestrians using the intersection (worn paths, observed activity)?	
☒	☐	Were special accommodations made in the past for pedestrians at the intersection?	
☐	☒	Are restrictions for pedestrians present? (No Ped signs, limited crossings)	
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Proposed Facility Description

Yes	No	
☐	☒	Will the proposed improvements generate new or additional pedestrian traffic?
☐ TBD	☐	Does the proposed facility introduce possible additional restrictions for pedestrians?
☒	☐	Are new or existing pedestrian signals proposed at the intersection? Anticipate full signal replacements with widening project.
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Outreach Efforts

Has contact and discussion concerning pedestrian accommodations at the intersection been made with the following?

Yes	No	
☒	☐	Municipality (s)
☐	☐	Transit Organization (s)
☐	☐	School District (s)
☐	☐	Public Meeting (s)
☐	☐	Emergency Services
☐	☐	Advocacy Groups
☒	☐	Other (s) **PennDOT RSA**

Intersection Details

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Design Speed: 40 mph (Rt 228)

ADT: 22,387 (SR 228)

Percentage of Trucks: 6.9% (AM), 1.9% (PM), 1.5% (SAT)

Travel lanes: 1rt,1th,1lt (Rt 228); 1 th/rt,1 lt (Castle Creek); 1rt,1th,1lt (High Pointe)

Is there a sight distance deficiency? ☐ Yes ☒ No

If yes, explain.

Sidewalk: ☒ Yes ☐ No
Castle Creek & High Pointe only

Shoulders: ☒ Yes ☐ No
SR 228 only

Curb: ☒ Yes ☐ No
Curb on Castle Creek & High Pointe

Is parking permitted on the roadway? ☐ Yes ☒ No

Municipal recommendation:

Pedestrian generators? Gas station, Bank, Municipal building, schools/daycare centers, residential neighborhood

Distance to next available crossing: 771' (0.1 miles) @ Seven Fields Blvd

Was a crash analysis completed? ☒ Yes ☐ No

Are there pedestrian crashes? ☐ Yes ☒ No

Has a pedestrian gap analysis been performed at the location? ☐ Yes ☒ No

ftp://ftp.dot.state.pa.us/transfer/Traffic Signals/Unsignalized Intersection Ped Calcs from HCS.xlsx

Are there other geometric concerns? If yes, explain:

Pedestrian Traffic Signals (if applicable)

Yes	No	
☒	☐	Is there proper pedestrian timing established at the intersection? Anticipate updates as required with design.
☐ TBD	☒	Is an all-pedestrian phase recommended in the study? Recent count data indicates minimal Pedestrian activity at this intersection
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☐ TBD	☐	Are pedestrian signals visible from the proposed crosswalk/curb ramp locations?
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☐ TBD	☐	Are pushbuttons proposed to be within the current ADA criteria?
☐ TBD	☐	Are all pushbutton locations accessible to all pedestrians?
☐ TBD	☐	Do all features satisfy applicable state and federal requirements?

Recommendations/Justification
Pedestrian accommodations are recommended at this intersection.
Residential neighborhood on Castle Creek Drive and schools/daycare centers at the intersection have the
potential to create pedestrian traffic crossing Castle Creek Dr. There is also a weekly running club that leaves from
the intersection and may create pedestrian traffic crossing Route 228.

District Traffic Engineer Approval	Assistant District Executive Approval
District Traffic Engineer Date	District ADE of Design, Maintenance or Services Date

TE-672 (9-10)

PEDESTRIAN ACCOMMODATION AT INTERSECTIONS CHECKLIST

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Intersection Background Information

DATE	DISTRICT	COUNTY
10/25/2017	10-0	Butler

MUNICIPALITY	INTERSECTION
Seven Fields Borough	SR 0228 @ Seven Fields Blvd & Adams Shoppes

SUBMITTED BY	STREET ADDRESS
Whitman, Requardt & Associates, LLP (WRA)	2009 Mackenzie Way, Suite 240

CITY	STATE	ZIP	TELEPHONE NUMBER
Cranberry Township	PA	16066	724-779-7940

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Provide a Project Description and Scope of the Project.
Document existing/future traffic conditions to analyze traffic operations for preliminary design and provide recommendations

Bike/Ped Checklist Completed. ☒ Yes ☐ No

Existing Facility Description

Yes	No		
☒	☐	Are pedestrian facilities present (i.e., sidewalks, curb ramps, crosswalks, pedestrian signals, etc.)?	Crosswalks for NE to NW quadrant crossing and for SE to SW quadrant crossing. Pushbuttons and pedestrian signals at all quadrants.
☒	☐	Are there descriptions of each quadrant of the existing intersection (photos are strongly recommended)?	Multiple historic studies
☒	☐	Are near-by land uses documented?	
☒	☐	Are pedestrian facilities near the intersection (i.e., sidewalks, bus stops, trails, etc.)?	Sidewalk on Seven Fields Blvd, sidewalk (75' long) to Adams Shoppes parking lot
☐	☒	Is there current evidence of pedestrians using the intersection (worn paths, observed activity)?	
☒	☐	Were special accommodations made in the past for pedestrians at the intersection?	
☐	☒	Are restrictions for pedestrians present? (No Ped signs, limited crossings)	
☐	☒	Is this a defined walking route or safe route to school route?	
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Proposed Facility Description

Yes	No	
☐	☒	Will the proposed improvements generate new or additional pedestrian traffic?
☐ TBD	☐	Does the proposed facility introduce possible additional restrictions for pedestrians?
☒	☐	Are new or existing pedestrian signals proposed at the intersection? Anticipate full signal replacements with widening project.
☐ TBD	☐	Are sidewalks proposed as part of the project?
☐ TBD	☐	Are detailed descriptions of changes to each quadrant documented?
☐	☒	Do near-by land uses change as part of the project?
☐ TBD	☐	Are additional pedestrian facilities proposed for the intersection?

Outreach Efforts

Has contact and discussion concerning pedestrian accommodations at the intersection been made with the following?

Yes	No	
☒	☐	Municipality (s)
☐	☐	Transit Organization (s)
☐	☐	School District (s)
☐	☐	Public Meeting (s)
☐	☐	Emergency Services
☐	☐	Advocacy Groups
☒	☐	Other (s) **PennDOT RSA**

Intersection Details

(The information below may be useful in the determination of pedestrian needs and warranted accommodations at uncontrolled intersections. Not all of the information is required to make a determination. The minor roadway information may also be needed in some situations.)

Roadway classification: Urban - Other principal arterial

Roadway Typology: Regional Arterial

Speed Limit (MPH): 40 mph (Rt 228)

Design Speed: 40 mph (Rt 228)

ADT: 22,837 (Rt 228)

Percentage of Trucks: 7.5% (AM), 1.8% (PM), 1.5% (SAT)

Travel lanes: 1rt,1th,1lt (Rt 228); 1rt,1th,1lt (Adams Shoppes); 1 th, 1 lt (Seven Fields Blvd)

Is there a sight distance deficiency? ☐ Yes ☒ No

If yes, explain.

Sidewalk: ☒ Yes ☐ No Seven Fields Blvd & Adams Shoppes only

Shoulders: ☒ Yes ☐ No SR 228 only

Curb: ☒ Yes ☐ No Seven Fields Blvd & Adams Shoppes only

Is parking permitted on the roadway? ☐ Yes ☒ No

Municipal recommendation:

Pedestrian generators? Restaurants, pharmacy, banks, supermarket; Residential area off Seven Fields Blvd

Distance to next available crossing: 771' (0.1 miles) @ Castle Creek Dr East/High Pointe Dr East

Was a crash analysis completed? ☒ Yes ☐ No

Are there pedestrian crashes? ☒ Yes ☐ No

Has a pedestrian gap analysis been performed at the location? ☐ Yes ☐ No

ftp://ftp.dot.state.pa.us/transfer/Traffic Signals/Unsignalized Intersection Ped Calcs from HCS.xlsx

Are there other geometric concerns? If yes, explain:

Pedestrian Traffic Signals (if applicable)

Yes	No	
☒	☐	Is there proper pedestrian timing established at the intersection? Anticipate updates as required for design.
☐	☒	Is an all-pedestrian phase recommended in the study? Recent count data indicates minimal Pedestrian activity at this intersection
☐	☒	Are the crosswalks in alignment with curb ramps?
☐ TBD	☐	Are pedestrian signals visible from the proposed crosswalk/curb ramp locations?
☐	☒	Are countdown pedestrian signals present?
☐ TBD	☐	Has the need for Accessible Pedestrian Signals (APS) been determined from the study? Not anticipated.
☐ TBD	☐	Are pushbuttons proposed to be within the current ADA criteria?
☐ TBD	☐	Are all pushbutton locations accessible to all pedestrians?
☐ TBD	☐	Do all features satisfy applicable state and federal requirements?

Recommendations/Justification
Pedestrian accommodations are recommended at this intersection.
Residential neighborhood and office building off of Seven Fields Blvd and proximity of retail/restaurants
have the potential to create pedestrian traffic crossing Rt 228.

District Traffic Engineer Approval	Assistant District Executive Approval
District Traffic Engineer Date	District ADE of Design, Maintenance or Services Date

TE-672 (9-10)

PEDESTRIAN ACCOMMODATION AT INTERSECTIONS CHECKLIST

PLEASE TYPE OR PRINT ALL INFORMATION IN BLUE OR BLACK INK

pennsylvania
DEPARTMENT OF TRANSPORTATION
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As specified in the MUTCD, Section 4E, an engineering study shall be conducted to determine the need for pedestrian accommodation at signalized intersections and the related design and operational features. Based on the engineering study and engineering judgment, proper documentation shall be made at all new signalized intersections and modifications to existing signalized intersections. This documentation shall be provided with guidance from this checklist.

When pedestrian accommodations will not be provided at an intersection, signalized or not, proper justification must be documented. Below is a checklist of information that may be relevant in the determination of pedestrian needs and warranted accommodations at an intersection. Not all of the information below is required to make a determination. This form can be used to summarize the needs and accommodations of a corridor or a single intersection.

Intersection Background Information

DATE	DISTRICT	COUNTY
10/25/2017	10-0	Butler

MUNICIPALITY	INTERSECTION
Mars Borough	SR 0228 @ Adams Ridge Blvd

SUBMITTED BY	STREET ADDRESS
Whitman, Requardt & Associates, LLP (WRA)	2009 Mackenzie Way, Suite 240

CITY	STATE	ZIP	TELEPHONE NUMBER
Cranberry Township	PA	16066	724-779-7940

Project Overview

Provide a Project Description and Scope of the Project.
Document existing/future traffic conditions to analyze traffic operations for preliminary design and provide recommendations

Bike/Ped Checklist Completed. ☒ Yes ☐ No

Existing Facility Description

Yes	No		
☐	☒	Are pedestrian facilities present (i.e., sidewalks, curb ramps, crosswalks, pedestrian signals, etc.)?	
☒	☐	Are there descriptions of each quadrant of the existing intersection (photos are strongly recommended)?	Multiple historic studies
☒	☐	Are near-by land uses documented?	
☐	☒	Are pedestrian facilities near the intersection (i.e., sidewalks, bus stops, trails, etc.)?	
☐	☒	Is there current evidence of pedestrians using the intersection (worn paths, observed activity)?	
☐	☒	Were special accommodations made in the past for pedestrians at the intersection?	
☒	☐	Are restrictions for pedestrians present? (No Ped signs, limited crossings)	NO PED CROSSING signs for all quadrants
☐	☒	Is this a defined walking route or safe route to school route?	
☐ TBD	☐	Are physical restrictions or right-of-way restrictions present?	
☐ TBD	☐	If pedestrian signals are present, is proper traffic signal timing designated for pedestrians at the intersection?	Will be revised with proposed design

Proposed Facility Description

Yes	No		
☐	☒	Will the proposed improvements generate new or additional pedestrian traffic?	
☐ TBD	☐	Does the proposed facility introduce possible additional restrictions for pedestrians?	
☐ TBD	☐	Are new or existing pedestrian signals proposed at the intersection?	Pending design alternatives and possible new crossing of Rt 228, or in coordination with future development access.
☐ TBD	☐	Are sidewalks proposed as part of the project?	
☐ TBD	☐	Are detailed descriptions of changes to each quadrant documented?	
☐	☒	Do near-by land uses change as part of the project?	
☐ TBD	☐	Are additional pedestrian facilities proposed for the intersection?	

Outreach Efforts

Has contact and discussion concerning pedestrian accommodations at the intersection been made with the following?

Yes	No	
☒	☐	Municipality (s)
☐	☐	Transit Organization (s)
☐	☐	School District (s)
☐	☐	Public Meeting (s)
☐	☐	Emergency Services
☐	☐	Advocacy Groups
☒	☐	Other (s) **PennDOT RSA**

Intersection Details

(The information below may be useful in the determination of pedestrian needs and warranted accommodations at uncontrolled intersections. Not all of the information is required to make a determination. The minor roadway information may also be needed in some situations.)

Roadway classification: Urban - Other principal arterial

Roadway Typology: Regional Arterial

Speed Limit (MPH): 40 mph (Rt 228 E), 50 mph (Rt 228 W), 25 mph (Adams Ridge)

Design Speed: 40-45 mph (Rt 228)

ADT: 22,387 (Rt 228)

Percentage of Trucks: 7% (AM), 1.9% (PM), 1.5% (SAT)

Travel lanes: 1 th,1 rt (Rt 228 E); 1 th, 1 lt (Rt 228 W); 1 lt,1 rt (Adams Ridge Blvd)

Is there a sight distance deficiency? ☐ Yes ☒ No

If yes, explain.

Sidewalk: ☐ Yes ☒ No Shoulders: ☒ Yes ☐ No SR 228 only Curb: ☒ Yes ☐ No

Is parking permitted on the roadway? ☐ Yes ☒ No

Municipal recommendation:

Pedestrian generators? Restaurants, shops, retirement home, residential area

Distance to next available crossing: 667' (0.1 miles) @ Seven Fields Blvd

Was a crash analysis completed? ☒ Yes ☐ No

Are there pedestrian crashes? ☐ Yes ☒ No

Has a pedestrian gap analysis been performed at the location? ☐ Yes ☒ No

ftp://ftp.dot.state.pa.us/transfer/Traffic Signals/Unsignalized Intersection Ped Calcs from HCS.xlsx

Are there other geometric concerns? If yes, explain:

Pedestrian Traffic Signals (if applicable)

Yes	No	
☐ TBD	☐	Is there proper pedestrian timing established at the intersection?
☐	☒	Is an all-pedestrian phase recommended in the study? Recent count data indicates minimal Pedestrian activity at this intersection
☐	☒	Are the crosswalks in alignment with curb ramps? No existing curb ramps
☐ TBD	☐	Are pedestrian signals visible from the proposed crosswalk/curb ramp locations?
☐	☒	Are countdown pedestrian signals present?
☐ TBD	☐	Has the need for Accessible Pedestrian Signals (APS) been determined from the study? Not anticipated
☐ TBD	☐	Are pushbuttons proposed to be within the current ADA criteria?
☐ TBD	☐	Are all pushbutton locations accessible to all pedestrians?
☐ TBD	☐	Do all features satisfy applicable state and federal requirements?

Recommendations/Justification
Pedestrian accommodation may be considered at this intersection pending final design configuration.
Residential neighborhood and assisted living community on Adams Ridge Blvd may create pedestrian traffic crossing
Adams Ridge Blvd. Undeveloped land across from Adams Ridge Blvd is currently unlikely to create pedestrian traffic
crossing Rt 228, but future land development may add a fourth leg to the intersection and may introduce pedestrian crossing.

District Traffic Engineer Approval	Assistant District Executive Approval
District Traffic Engineer Date	District ADE of Design, Maintenance or Services Date

TE-672 (9-10)

PEDESTRIAN ACCOMMODATION AT INTERSECTIONS CHECKLIST

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pennsylvania
DEPARTMENT OF TRANSPORTATION
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As specified in the MUTCD, Section 4E, an engineering study shall be conducted to determine the need for pedestrian accommodation at signalized intersections and the related design and operational features. Based on the engineering study and engineering judgment, proper documentation shall be made at all new signalized intersections and modifications to existing signalized intersections. This documentation shall be provided with guidance from this checklist.

When pedestrian accommodations will not be provided at an intersection, signalized or not, proper justification must be documented. Below is a checklist of information that may be relevant in the determination of pedestrian needs and warranted accommodations at an intersection. Not all of the information below is required to make a determination. This form can be used to summarize the needs and accommodations of a corridor or a single intersection.

Intersection Background Information

DATE	DISTRICT	COUNTY
10/25/2017	10-0	Butler

MUNICIPALITY	INTERSECTION
Mars Borough	SR 0228 @ Myoma Rd

SUBMITTED BY	STREET ADDRESS
Whitman, Requardt & Associates, LLP (WRA)	2009 Mackenzie Way, Suite 240

CITY	STATE	ZIP	TELEPHONE NUMBER
Cranberry Township	PA	16066	724-779-7940

Project Overview

Provide a Project Description and Scope of the Project. Document existing/future traffic conditions to analyze traffic operations for preliminary design and provide recommendations

Bike/Ped Checklist Completed. ☒ Yes ☐ No

Existing Facility Description

Yes	No		
☐	☒	Are pedestrian facilities present (i.e., sidewalks, curb ramps, crosswalks, pedestrian signals, etc.)?	
☒	☐	Are there descriptions of each quadrant of the existing intersection (photos are strongly recommended)?	Multiple historic studies
☒	☐	Are near-by land uses documented?	
☐	☒	Are pedestrian facilities near the intersection (i.e., sidewalks, bus stops, trails, etc.)?	
☐	☒	Is there current evidence of pedestrians using the intersection (worn paths, observed activity)?	
☐	☒	Were special accommodations made in the past for pedestrians at the intersection?	
☒	☐	Are restrictions for pedestrians present? (No Ped signs, limited crossings)	Unsignalized intersection with no existing sidewalk or crosswalks
☐	☒	Is this a defined walking route or safe route to school route?	
☐ TBD	☐	Are physical restrictions or right-of-way restrictions present?	
☐ N/A	☐	If pedestrian signals are present, is proper traffic signal timing designated for pedestrians at the intersection?	Unsignalized location.

Proposed Facility Description

Yes	No		
☐	☒	Will the proposed improvements generate new or additional pedestrian traffic?	
☐ TBD	☐	Does the proposed facility introduce possible additional restrictions for pedestrians?	
☐ TBD	☐	Are new or existing pedestrian signals proposed at the intersection?	Preliminary analysis indicates signal warrants not met.
☐ TBD	☐	Are sidewalks proposed as part of the project?	
☐ TBD	☐	Are detailed descriptions of changes to each quadrant documented?	
☐	☒	Do near-by land uses change as part of the project?	
☐ TBD	☐	Are additional pedestrian facilities proposed for the intersection?	

Outreach Efforts

Has contact and discussion concerning pedestrian accommodations at the intersection been made with the following?

Yes	No	
☒	☐	Municipality (s)
☐	☐	Transit Organization (s)
☐	☐	School District (s)
☐	☐	Public Meeting (s)
☐	☐	Emergency Services
☐	☐	Advocacy Groups
☒	☐	Other (s) **PennDOT RSA**

Intersection Details

(The information below may be useful in the determination of pedestrian needs and warranted accommodations at uncontrolled intersections. Not all of the information is required to make a determination. The minor roadway information may also be needed in some situations.)

Roadway classification: Urban - Other principal arterial

Roadway Typology: Regional Arterial

Speed Limit (MPH): 50 mph (Rt 228)

Design Speed: 45 mph

ADT: 22,387 (Rt 228)

Percentage of Trucks: 7.6% (AM), 2.1% (PM), 1.5% (SAT)

Travel lanes: 1 th (Rt 228); 1 th (Myoma Rd)

Is there a sight distance deficiency? ☐ Yes ☒ No

If yes, explain.

Sidewalk: ☐ Yes ☒ No Shoulders: ☒ Yes ☐ No SR 228 only Curb: ☐ Yes ☒ No

Is parking permitted on the roadway? ☐ Yes ☒ No

Municipal recommendation:

Pedestrian generators? Church

Distance to next available crossing: 2,485' (0.5 miles) @ Adams Ridge Rd

Was a crash analysis completed? ☒ Yes ☐ No

Are there pedestrian crashes? ☐ Yes ☒ No

Has a pedestrian gap analysis been performed at the location? ☐ Yes ☒ No

ftp://ftp.dot.state.pa.us/transfer/Traffic Signals/Unsignalized Intersection Ped Calcs from HCS.xlsx

Are there other geometric concerns? If yes, explain:

Pedestrian Traffic Signals (if applicable)

Yes	No	
☐ N/A	☐	Is there proper pedestrian timing established at the intersection?
☐	☒	Is an all-pedestrian phase recommended in the study?
☐ N/A	☐	Are the crosswalks in alignment with curb ramps? No existing curb ramps/crosswalks
☐ TBD	☐	Are pedestrian signals visible from the proposed crosswalk/curb ramp locations?
☐	☒	Are countdown pedestrian signals present?
☐ TBD	☐	Has the need for Accessible Pedestrian Signals (APS) been determined from the study? Not anticipated
☐ TBD	☐	Are pushbuttons proposed to be within the current ADA criteria?
☐ TBD	☐	Are all pushbutton locations accessible to all pedestrians?
☐ TBD	☐	Do all features satisfy applicable state and federal requirements?

Recommendations/Justification
Pedestrian accommodations may not be required at this location due to no existing facilities or generators.
Vacant land south of Myoma Rd currently does not generate or attract pedestrian traffic, but future development
proposal may generate a fourth leg to the existing intersection and introduce pedestrian traffic.
Future pedestrian accommodations in this case would more appropriately be tied to future development plans
separate from the Route 228 project.

District Traffic Engineer Approval	Assistant District Executive Approval
District Traffic Engineer Date	District ADE of Design, Maintenance or Services Date

TE-672 (9-10)

PEDESTRIAN ACCOMMODATION AT INTERSECTIONS CHECKLIST

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pennsylvania
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As specified in the MUTCD, Section 4E, an engineering study shall be conducted to determine the need for pedestrian accommodation at signalized intersections and the related design and operational features. Based on the engineering study and engineering judgment, proper documentation shall be made at all new signalized intersections and modifications to existing signalized intersections. This documentation shall be provided with guidance from this checklist.

When pedestrian accommodations will not be provided at an intersection, signalized or not, proper justification must be documented. Below is a checklist of information that may be relevant in the determination of pedestrian needs and warranted accommodations at an intersection. Not all of the information below is required to make a determination. This form can be used to summarize the needs and accommodations of a corridor or a single intersection.

Intersection Background Information

DATE	DISTRICT	COUNTY
10/25/2017	10-0	Butler

MUNICIPALITY	INTERSECTION
Mars Borough	SR 0228 @ Heritage Creek Dr

SUBMITTED BY	STREET ADDRESS
Whitman, Requardt & Associates, LLP (WRA)	2009 Mackenzie Way, Suite 240

CITY	STATE	ZIP	TELEPHONE NUMBER
Cranberry Township	PA	16066	724-779-7940

Project Overview

Provide a Project Description and Scope of the Project.
Document existing/future traffic conditions to analyze traffic operations for preliminary design and provide recommendations

Bike/Ped Checklist Completed. ☑ Yes ☐ No

Existing Facility Description

Yes	No		
☑	☐	Are pedestrian facilities present (i.e., sidewalks, curb ramps, crosswalks, pedestrian signals, etc.)?	Crosswalks and pushbuttons for NW to NE, NW to SW, SW to SE crossings.
☑	☐	Are there descriptions of each quadrant of the existing intersection (photos are strongly recommended)?	Multiple historic studies
☑	☐	Are near-by land uses documented?	
☐	☑	Are pedestrian facilities near the intersection (i.e., sidewalks, bus stops, trails, etc.)?	
☐	☑	Is there current evidence of pedestrians using the intersection (worn paths, observed activity)?	
☑	☐	Were special accommodations made in the past for pedestrians at the intersection?	
☑	☐	Are restrictions for pedestrians present? (No Ped signs, limited crossings)	NO PED CROSSING sign for NE to SE crossing.
☐	☑	Is this a defined walking route or safe route to school route?	
☐ TBD	☐	Are physical restrictions or right-of-way restrictions present?	
☐ TBD	☐	If pedestrian signals are present, is proper traffic signal timing designated for pedestrians at the intersection?	Will be revised with proposed design

Proposed Facility Description

Yes	No		
☐	☑	Will the proposed improvements generate new or additional pedestrian traffic?	
☐ TBD	☐	Does the proposed facility introduce possible additional restrictions for pedestrians?	
☑	☐	Are new or existing pedestrian signals proposed at the intersection?	Anticipate full signal replacements with the widening project
☐ TBD	☐	Are sidewalks proposed as part of the project?	
☐ TBD	☐	Are detailed descriptions of changes to each quadrant documented?	
☐	☑	Do near-by land uses change as part of the project?	
☐ TBD	☐	Are additional pedestrian facilities proposed for the intersection?	

Outreach Efforts

Has contact and discussion concerning pedestrian accommodations at the intersection been made with the following?

Yes	No	
☑	☐	Municipality (s)
☐	☐	Transit Organization (s)
☐	☐	School District (s)
☐	☐	Public Meeting (s)
☐	☐	Emergency Services
☐	☐	Advocacy Groups
☑	☐	Other (s) **PennDOT RSA**

Intersection Details

(The information below may be useful in the determination of pedestrian needs and warranted accommodations at uncontrolled intersections. Not all of the information is required to make a determination. The minor roadway information may also be needed in some situations.)

Roadway classification: Urban - Other principal arterial

Roadway Typology: Regional Arterial

Speed Limit (MPH): 50mph (Rt 228), 35mph (Heritage Creek)

Design Speed: 45 mph (Rt 228)

ADT: 22,387 (Rt 228), 3,824 (Heritage Creek Dr)

Percentage of Trucks: 7.5% (AM), 1.7% (PM), 1.6% (SAT)

Travel lanes: 1rt, 1th, 1lt (all approaches)

Is there a sight distance deficiency? ☐ Yes ☐ No TBD

If yes, explain. Ongoing design may adjust horizontal curvature along Rt 228, which may affect/improve sight-lines crossing Rt 228 due to changes in the substantial existing superelevation throughout the curve today.

Sidewalk: ☐ Yes ☒ No Shoulders: ☒ Yes ☐ No Curb: ☒ Yes ☐ No

Is parking permitted on the roadway? ☐ Yes ☒ No

Municipal recommendation:

Pedestrian generators? Bank, restaurants, retirement home; Residential area off of Heritage Creek Dr

Distance to next available crossing: 3,085' (0.6 miles) @ Myoma Rd

Was a crash analysis completed? ☒ Yes ☐ No

Are there pedestrian crashes? ☐ Yes ☒ No

Has a pedestrian gap analysis been performed at the location? ☐ Yes ☒ No

ftp://ftp.dot.state.pa.us/transfer/Traffic Signals/Unsignalized Intersection Ped Calcs from HCS.xlsx

Are there other geometric concerns? If yes, explain:

Pedestrian Traffic Signals (if applicable)

Yes	No	
☐ TBD	☐	Is there proper pedestrian timing established at the intersection?
☐	☒	Is an all-pedestrian phase recommended in the study? Recent count data indicates minimal Pedestrian activity at this intersection
☐	☒	Are the crosswalks in alignment with curb ramps? No existing curb ramps
☐ TBD	☐	Are pedestrian signals visible from the proposed crosswalk/curb ramp locations?
☐	☒	Are countdown pedestrian signals present?
☐ TBD	☐	Has the need for Accessible Pedestrian Signals (APS) been determined from the study? Not anticipated
☐ TBD	☐	Are pushbuttons proposed to be within the current ADA criteria?
☐ TBD	☐	Are all pushbutton locations accessible to all pedestrians?
☐ TBD	☐	Do all features satisfy applicable state and federal requirements?

Recommendations/Justification
Pedestrian accommodations are recommended at this intersection. Sidewalks connections to existing development may be considered. The nearby residential and developments areas have the potential to generate pedestrian traffic.

District Traffic Engineer Approval	Assistant District Executive Approval
District Traffic Engineer Date	District ADE of Design, Maintenance or Services Date

TE-672 (9-10)

PEDESTRIAN ACCOMMODATION AT INTERSECTIONS CHECKLIST

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Intersection Background Information

DATE	DISTRICT	COUNTY
10/25/2017	10-0	Butler

MUNICIPALITY	INTERSECTION
Mars Borough	SR 0228 @ Beaver St Ext

SUBMITTED BY	STREET ADDRESS
Whitman, Requardt & Associates, LLP (WRA)	2009 Mackenzie Way, Suite 240

CITY	STATE	ZIP	TELEPHONE NUMBER
Cranberry Township	PA	16066	724-779-7940

Project Overview

Provide a Project Description and Scope of the Project.
Document existing/future traffic conditions to analyze traffic operations for preliminary design and provide recommendations

Bike/Ped Checklist Completed. ☒ Yes ☐ No

Existing Facility Description

Yes	No		
☐	☒	Are pedestrian facilities present (i.e., sidewalks, curb ramps, crosswalks, pedestrian signals, etc.)?	
☒	☐	Are there descriptions of each quadrant of the existing intersection (photos are strongly recommended)?	Multiple historic studies
☒	☐	Are near-by land uses documented?	
☐	☒	Are pedestrian facilities near the intersection (i.e., sidewalks, bus stops, trails, etc.)?	
☐	☒	Is there current evidence of pedestrians using the intersection (worn paths, observed activity)?	
☐	☒	Were special accommodations made in the past for pedestrians at the intersection?	Existing location unsignalized and generally isolated
☒	☐	Are restrictions for pedestrians present? (No Ped signs, limited crossings)	Unsignalized with no existing crosswalks
☐	☒	Is this a defined walking route or safe route to school route?	
☐ TBD	☐	Are physical restrictions or right-of-way restrictions present?	
☐ TBD	☐	If pedestrian signals are present, is proper traffic signal timing designated for pedestrians at the intersection?	Will be revised with proposed design

Proposed Facility Description

Yes	No		
☐	☒	Will the proposed improvements generate new or additional pedestrian traffic?	
☐ TBD	☐	Does the proposed facility introduce possible additional restrictions for pedestrians?	
☐ TBD	☐	Are new or existing pedestrian signals proposed at the intersection?	Preliminary analysis indicates signal warrants are met at this location; current design options propose a new signal with potential alternate options for a jughandle or roundabout installation.
☐ TBD	☐	Are sidewalks proposed as part of the project?	
☐ TBD	☐	Are detailed descriptions of changes to each quadrant documented?	
☐	☒	Do near-by land uses change as part of the project?	
☐ TBD	☐	Are additional pedestrian facilities proposed for the intersection?	

Outreach Efforts

Has contact and discussion concerning pedestrian accommodations at the intersection been made with the following?

Yes	No	
☒	☐	Municipality (s)
☐	☐	Transit Organization (s)
☐	☐	School District (s)
☐	☐	Public Meeting (s)
☐	☐	Emergency Services
☐	☐	Advocacy Groups
☒	☐	Other (s) **PennDOT RSA**

Intersection Details

(The information below may be useful in the determination of pedestrian needs and warranted accommodations at uncontrolled intersections. Not all of the information is required to make a determination. The minor roadway information may also be needed in some situations.)

Roadway classification: Urban - Other principal arterial

Roadway Typology: Regional Arterial

Speed Limit (MPH): 50 mph (Rt 228), 35 mph (Beaver)

Design Speed: 45 mph (Rt 228)

ADT: 16,710 (Rt 228)

Percentage of Trucks: 8.3% (AM), 1.7% (PM), 1.6% (SAT)

Travel lanes: 1 through lane (all approaches)

Is there a sight distance deficiency? ☐ Yes ☒ No

If yes, explain.

Sidewalk: ☐ Yes ☒ No Shoulders: ☒ Yes ☐ No SR 228 only Curb: ☐ Yes ☒ No

Is parking permitted on the roadway? ☐ Yes ☒ No

Municipal recommendation:

Pedestrian generators? None

Distance to next available crossing: 2,670' (0.5 miles) @ Heritage Creek Dr

Was a crash analysis completed? ☒ Yes ☐ No

Are there pedestrian crashes? ☐ Yes ☒ No

Has a pedestrian gap analysis been performed at the location? ☐ Yes ☒ No

ftp://ftp.dot.state.pa.us/transfer/Traffic Signals/Unsignalized Intersection Ped Calcs from HCS.xlsx

Are there other geometric concerns? If yes, explain:

Pedestrian Traffic Signals (if applicable)

Yes	No	
☐ N/A	☐	Is there proper pedestrian timing established at the intersection?
☐ TBD	☐	Is an all-pedestrian phase recommended in the study? Recent count data indicates minimal Pedestrian activity at this intersection
☐ N/A	☐	Are the crosswalks in alignment with curb ramps? No existing curb ramps or crosswalks
☐ TBD	☐	Are pedestrian signals visible from the proposed crosswalk/curb ramp locations?
☐	☒	Are countdown pedestrian signals present?
☐ TBD	☐	Has the need for Accessible Pedestrian Signals (APS) been determined from the study? Not anticipated
☐ TBD	☐	Are pushbuttons proposed to be within the current ADA criteria?
☐ TBD	☐	Are all pushbutton locations accessible to all pedestrians?
☐ TBD	☐	Do all features satisfy applicable state and federal requirements?

Recommendations/Justification
Pedestrian accommodations may not be required at this location due to no existing facilities and minimal generators.
The intersection is relatively isolated and does not provide access to pedestrian-related businesses or to any
proposed pedestrian facilities along Route 228. Current design options, however, are still in development
with preliminary analysis indicating that traffic signal warrants have been met. Alternate design options
may include jughandle or roundabout installations.

District Traffic Engineer Approval	Assistant District Executive Approval
District Traffic Engineer Date	District ADE of Design, Maintenance or Services Date

Appendix I

Existing Sign Inventory

Contents:

- Existing Sign Inventory (Location Maps)
- Existing Sign Inventory (Log Sheets)

Appendix I1:

Existing Sign Inventory (Location Maps)

:led Map

description for your map.

Legend

- Family Eyecare North
- Feature 1
- Hilton Garden Inn Pittsburgh/Cra
- Mojo Running & Multisport of Pitt
- Seven Fields Dental Care
- St Kilian Parish
- Venango Path

Mars Rd
228 Mars Criders Rd
Franklin Rd
St Kilian Dr
Castle Creek Dr
Saxony Dr
700 ft

led Map

description for your map.

Legend

- Family Eyecare North
- Feature 1
- Hilton Garden Inn Pittsburgh/Cra
- Mojo Running & Multisport of Pitt
- Seven Fields Dental Care
- St Kilian Parish
- Venango Path

Sycamore Dr
High Pointe Dr
Mars Rd
Castle Creek Dr
Northpointe Cir
Stoney Creek Ct
Mosside Loop
Brookside Ln
Brook Side Ct
Garden Dr

gle earth

600 ft

:led Map

description for your map.

Legend

- Family Eyecare North
- Feature 1
- Hilton Garden Inn Pittsburgh/Cra
- Mojo Running & Multisport of Pitt
- Seven Fields Dental Care
- St Killian Parish
- Venango Path

Highpointe Dr
Seven Fields Blvd
Castle Creek Dr
Brookside Ln
Garden Dr
228
Pennsylvania-228
Adams Ridge Blvd
dams Shoppes
le earth
400 ft

:led Map

:description for your map.

Legend

- Family Eyecare North
- Feature 1
- Hilton Garden Inn Pittsburgh/Cra
- Mojo Running & Multisport of Pitt
- Seven Fields Dental Care
- St Kilian Parish
- Venango Path

166 165 164 163 162 161 160 159 158

228

Pennsylvania 228

150 151 152 153 154 155 156 157

Ridge Blvd

le earth

400 ft

:led Map

description for your map.

Legend

- Family Eyecare North
- Feature 1
- Hilton Garden Inn Pittsburgh/Cra
- Mojo Running & Multisport of Pitt
- Seven Fields Dental Care
- St Killian Parish
- Venango Path

earth

:led Map

description for your map.

Legend

- Family Eyecare North
- Feature 1
- Hilton Garden Inn Pittsburgh/Cra
- Mojo Running & Multisport of Pitt
- Seven Fields Dental Care
- St Kilian Parish
- Venango Path

E Vanderbilt Dr
Princeton Dr
Gettysburg Dr
Strasburg Dr
Braddock Ct
Heritage Creek Dr S
Mars Rd
Scharberry Ln
Quincy Dr
228
700 ft
le earth

led Map

description for your map.

Legend

- Family Eyecare North
- Feature 1
- Hilton Garden Inn Pittsburgh/Cra
- Mojo Running & Multisport of Pitt
- Seven Fields Dental Care
- St Kilian Parish
- Venango Path

Norton Dr
Anderson Ave
Beaver St Exd
Forsythe Rd
Schultz Rd
Horseshoe Dr
Boggs Ave
Spring St
Warrendale R
228
300
301
302
303
304
305
312
313
314
315
900 ft
earth

Appendix I2:

Existing Sign Inventory (Log Sheets)

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *05/16/17*

Location / Notes: *Franklin Rd to Castle Creek Dr (West)*

Sign Number: W4-2R/ W16-2-O	*Sketch / Photo:* 
Picture Number: 1	
Date Installed: 5/16/06 - R	
Sign Type: Type - B (Double Post)	
Location: SR 0228 East - Right Side	*Description:* Pavement Width Transition - Right Lane Ends/500 Feet/SR 3021 40/20

Sign Number: R 5-1	*Sketch / Photo:* 
Picture Number: 5	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East - Right Side	*Description:* (2) Do Not Enter

Sign Number: R12-1	*Sketch / Photo:* 
Picture Number: 2	
Date Installed: 10/27/14-RI	
Sign Type: Type-B (Single Post)	
Location: Franklin Rd- South Right Side	*Description:* Weight Limit 10 Tons/ SR 228 30/ SR 228 20

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 6	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East - Right Side	*Description:* (2) No Left Turn

Sign Number: R 4-1	*Sketch / Photo:* 
Picture Number: 3	
Date Installed: 07/01/15	
Sign Type: Type-B (Single Post)	
Location: Franklin Rd- South Right Side	*Description:* Do Not Pass

Sign Number: R 4-1	*Sketch / Photo:* 
Picture Number: 7	
Date Installed:	
Sign Type: Type - B (Double Post)	
Location: SR 0228 East - Right Side	*Description:* Do Not Pass

Sign Number: R3-30AA	*Sketch / Photo:* 
Picture Number: 4	
Date Installed:	
Sign Type: Type - B (Double Post)	
Location: Franklin Rd- North Left Side	*Description:* Lane Use Control

Sign Number: R 2-1	*Sketch / Photo:* 
Picture Number: 8	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East - Right Side	*Description:* Speed Limit 40

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *05/16/17*

Location / Notes: *Franklin Rd to Castle Creek Dr (West)*

Sign Number: W11-103	*Sketch / Photo:* 
Picture Number: 9	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Hidden Driveway

Sign Number:	*Sketch / Photo:*  
Picture Number: 13	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* SR 228 40/ SR 228 31

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 10	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Left Side	*Description:* No Left Turn

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 14	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: St Kilian Drive- Left Side	*Description:* No Left Turn

Sign Number: R 3-4/ R 4-7	*Sketch / Photo:*  
Picture Number: 11	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East - Left Side	*Description:* No U-turn/ Median Stay Right/ Yellow Diamond

Sign Number: R 5-1/R 6-1L/ R 6-1	*Sketch / Photo:* 
Picture Number: 15	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: St Kilian Drive- Left Side	*Description:* Do Not Enter/ (2) One Way/ one left/one right

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 12	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* No Left Turn

Sign Number: R 5-1	*Sketch / Photo:* 
Picture Number: 16	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: St Kilian Drive- Right Side	*Description:* Do Not Enter

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *05/16/17*

Location / Notes: *Franklin Rd to Castle Creek Dr (West)*

Sign Number:	*Sketch / Photo:*
Picture Number: 17	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Seven Fields Boro/ Hunting is prohibited by ordinance/ No Soliciting without a permit

Sign Number: R3-30ACA	*Sketch / Photo:*
Picture Number: 21	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: SR 0228 East- Right Side	*Description:* Lane Use Control

Sign Number:	*Sketch / Photo:*
Picture Number: 18	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Brake Retarders Prohibited

Sign Number: n/a	*Sketch / Photo:*
Picture Number: 22	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228- East/ Right Side	*Description:* Post- No Sign

Sign Number: I40-1/I14-1	*Sketch / Photo:*
Picture Number: 19	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: SR 0228 East- Right Side	*Description:* Adopt A Highway/Shipton's Martial Arts Academy/Keep PA Beautiful

Sign Number: R10-6AR	*Sketch / Photo:*
Picture Number: 23	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 228- West/ Right Side	*Description:* Stop Here On Red

Sign Number: R 2-1	*Sketch / Photo:*
Picture Number: 20	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Speed Limit 40

Sign Number: R 2-5B	*Sketch / Photo:*
Picture Number: 24	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Reduced Speed 40 Ahead

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *05/16/17*

Location / Notes: *Franklin Rd to Castle Creek Dr (West)*

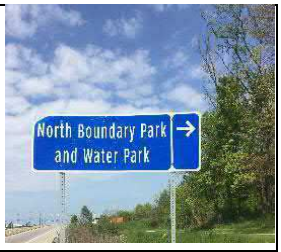
Sign Number: R 2-1	*Sketch / Photo:* 
Picture Number: 25	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* Speed Limit 40

Sign Number:	*Sketch / Photo:* 
Picture Number: 29	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* Rebecca Lane

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 26	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* (2) No Left Hand Turns

Sign Number: R 1-1/ R 3-7-1R	*Sketch / Photo:* 
Picture Number: 30	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* STOP/ All Traffic Must Turn Right

Sign Number:	*Sketch / Photo:* 
Picture Number: 27	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* Lions International- Cranberry Twp. Lions Club Northpark Lounge Deck House 2nd & 4th Tuesday 8:30

Sign Number:	*Sketch / Photo:* 
Picture Number: 31	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: SR 0228 West-Right Side	*Description:* North Boundary Park and Water Park

Sign Number: R 3-7	*Sketch / Photo:* 
Picture Number: 28	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* Right Lane Must Turn Right

Sign Number: W2-1	*Sketch / Photo:* 
Picture Number: 32	
Date Installed: 8/8/03 RI	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* Cross Road Intersection

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *05/16/17*

Location / Notes: *Franklin Rd to Castle Creek Dr (West)*

Sign Number:	*Sketch / Photo:* 
Picture Number: 33	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Rotary Interational/ Cranberry Sunrise Club PGH Marriott North Friday 7:30 AM/ Cranberry Rotary Club YMCA Tuesday 12:00 Noon

Sign Number: R 12-1	*Sketch / Photo:* 
Picture Number: 37	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Franklin Road North- Right Side	*Description:* Weight Limit 10 Tons/ SR 228 30/ SR228 40/

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 34	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Left Side (Parking Lot)	*Description:* No Left Turn

Sign Number: R3-30ACA	*Sketch / Photo:* 
Picture Number: 38	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: SR 0228 South- Right Side	*Description:* Lane Use Control

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 35	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West Parking Lot Right Side	*Description:* No Left Turn

Sign Number: R 8-3	*Sketch / Photo:* 
Picture Number: 39	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* No Parking

Sign Number: R 8-3	*Sketch / Photo:* 
Picture Number: 36	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right side	*Description:* No Parking

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *06/09/17*

Location / Notes: *Castle Creek Dr (West) to Castle Creek Dr (East)*

Sign Number: R3-8	*Sketch / Photo:* 
Picture Number: 50	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Castle Creek Drive South- Right Side	*Description:* Lane Use Control

Sign Number: I40-1	*Sketch / Photo:* 
Picture Number: 54	
Date Installed: 07/21/14	
Sign Type: Type-B (Single Post)	
Location: Mars Road East- Right Side	*Description:* Adopt A Highway Liter Control Next Two Miles/ Kampas Orthodontics PC

Sign Number: R10-6a	*Sketch / Photo:* 
Picture Number: 51	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Castle Creek Drive South- Right Side	*Description:* Stop Here On Red

Sign Number: R3-2	*Sketch / Photo:* 
Picture Number: 55	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: North Pointe Circle South- Left Side	*Description:* No left Turn

Sign Number: AR-730	*Sketch / Photo:* 
Picture Number: 52	
Date Installed: 01/11/17	
Sign Type: Type-B (Single Post)	
Location: Mars Road East- Right Side	*Description:* Do Not Pass

Sign Number: R1-1/ R 3-7-1R	*Sketch / Photo:* 
Picture Number: 56	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: North Pointe Circle North- Right Side	*Description:* Stop/ All Traffic Must Turn Right

Sign Number: R2-1	*Sketch / Photo:* 
Picture Number: 53	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Mars Road East- Right Side	*Description:* Speed Limit 40

Sign Number: W3-3	*Sketch / Photo:* 
Picture Number: 57	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: Mars Road East- Right Side	*Description:* Signal Ahead

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *06/09/17*

Location / Notes: *Castle Creek Dr (West) to Castle Creek Dr (East)*

Sign Number: R3-7L	*Sketch / Photo:* 
Picture Number: 58	
Date Installed: 7-27-10 RI	
Sign Type: Type-B (Single Post)	
Location: Mars Road East- Right Side	*Description:* Left Lane Must Turn Left

Sign Number: R2-1	*Sketch / Photo:* 
Picture Number: 62	
Date Installed: 4-12-13 RI	
Sign Type: Type-B (Single Post)	
Location: Mars Road West- Right Side	*Description:* Speed Limit 40

Sign Number: R3-7L/R3-7R	*Sketch / Photo:* 
Picture Number: 59	
Date Installed: 7-16-10 RI (For Bot	
Sign Type: Type-B (Single Post)	
Location: Mars Road East- Right Side	*Description:* Left Lane Must Turn Left/ Right Lane Must Turn Right

Sign Number: R3-2	*Sketch / Photo:* 
Picture Number: 63	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Mars Road West- Right Side	*Description:* No Leftt Turn

Sign Number: R3-7L/ R3-7R	*Sketch / Photo:* 
Picture Number: 60	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: High Pointe Drive South East- Right Side	*Description:* Left Lane Must Turn Left/ Right Lane Must Turn Right

Sign Number: R3-2	*Sketch / Photo:* 
Picture Number: 64	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Mars Road West- Right Side	*Description:* No Leftt Turn

Sign Number: R10-6a	*Sketch / Photo:* 
Picture Number: 61	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: High Pointe Drive South East- Right Side	*Description:* Stop Here on Red

Sign Number: I40-1/ I44-1	*Sketch / Photo:* 
Picture Number: 65	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: Mars Road West- Right Side	*Description:* Adopt A Highway/PennDOT Thanks/ 2 SR 228 40 and 50

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *06/09/17*

Location / Notes: *Castle Creek Dr (West) to Castle Creek Dr (East)*

Sign Number:	Sketch / Photo:
R3-30ACA	
Picture Number: 66	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: Mars Road West-Right Side	Description: Lane Use Control

Sign Number:	Sketch / Photo:
Picture Number:	
Date Installed:	
Sign Type:	
Location:	Description:

Sign Number:	Sketch / Photo:
R3-30ACA	
Picture Number: 67	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: Mars Road West-Right Side	Description: Lane Use Control

Sign Number:	Sketch / Photo:
Picture Number:	
Date Installed:	
Sign Type:	
Location:	Description:

Sign Number:	Sketch / Photo:
Picture Number:	
Date Installed:	
Sign Type:	
Location:	Description:

Sign Number:	Sketch / Photo:
Picture Number:	
Date Installed:	
Sign Type:	
Location:	Description:

Sign Number:	Sketch / Photo:
Picture Number:	
Date Installed:	
Sign Type:	
Location:	Description:

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *06/09/17*

Location / Notes: *Castle Creek (East) to Adams Ridge Blvd*

Sign Number: R3-7L	*Sketch / Photo:* 
Picture Number: 100	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Castle Creek Drive North- Right Side	*Description:* Left Lane Must Turn Left

Sign Number: R3-30ACA	*Sketch / Photo:* 
Picture Number: 104	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: SR 0228 East- Right Side	*Description:* Lane Use Control

Sign Number: R10-6a	*Sketch / Photo:* 
Picture Number: 101	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Castle Creek North- Right Side	*Description:* Stop Here On Red

Sign Number:	*Sketch / Photo:* 
Picture Number: 105	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Adams Twp/ Borough of Seven Fields

Sign Number: R2-1	*Sketch / Photo:* 
Picture Number: 102	
Date Installed: 01/14/11	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Speed Limit 40

Sign Number: R1-2	*Sketch / Photo:* 
Picture Number: 106	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Seven Fields Blvd South- Right Side	*Description:* Yield

Sign Number: R3-30ACA	*Sketch / Photo:* 
Picture Number: 103	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: SR 02228 East- Right Side	*Description:* Lane Use Control/ (2) SR 228 50 and 60

Sign Number: R 4-7	*Sketch / Photo:* 
Picture Number: 107	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Seven Fields Blvd North- Left Side Median	*Description:* Median Keep Right/ Yellow Diamond

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *06/09/17*

Location / Notes: *Castle Creek (East) to Adams Ridge Blvd*

Sign Number: R1-2	*Sketch / Photo:* 
Picture Number: 108	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Yield

Sign Number: R1-2	*Sketch / Photo:* 
Picture Number: 112	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Adams Ridge Blvd South- Right Side	*Description:* Yield

Sign Number: W 9-5	*Sketch / Photo:* 
Picture Number: 109	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Neighborhood Crime Watch

Sign Number: R 2-1	*Sketch / Photo:* 
Picture Number: 113	
Date Installed: 01/14/11	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Speed Limit 40

Sign Number: R 2-1	*Sketch / Photo:* 
Picture Number: 110	
Date Installed: 01/14/11	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Speed Limit 40

Sign Number: R3-7R	*Sketch / Photo:* 
Picture Number: 114	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Right Lane Must Turn Right

Sign Number: n/a	*Sketch / Photo:* 
Picture Number: 111	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* NO SIGN/ Right lane must turn right??

Sign Number: R3-30ACA	*Sketch / Photo:* 
Picture Number: 115	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: SR 0228 West- Right Side	*Description:* Lane Use Control

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *06/09/17*

Location / Notes: *Castle Creek (East) to Adams Ridge Blvd*

Sign Number: R3-30ACA	*Sketch / Photo:* 
Picture Number: 116	
Date Installed:	
Sign Type: Double Post	
Location: SR 0228 West- Right Side	*Description:* Lane Use Control

Sign Number: R3-7L/R3-7R	*Sketch / Photo:* 
Picture Number: 120	
Date Installed: 07/16/10	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West0 Right Side	*Description:* Left Lane Must Turn Left/ Right Lane Must Turn Right

Sign Number: R10-6A	*Sketch / Photo:* 
Picture Number: 117	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Seven Fields Blvd South- Right Side	*Description:* Stop Here On Red

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

Sign Number: R 2-1	*Sketch / Photo:* 
Picture Number: 118	
Date Installed: 01/14/11	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Speed Limit 40

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

Sign Number: R3-7L/R3-7R	*Sketch / Photo:* 
Picture Number: 119	
Date Installed: 7-27-10 RI	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Left Lane Must Turn Left/ Right Lane Must Turn Right

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *06/20/17*

Location / Notes: *Adams Ridge Blvd to Myoma Rd*

Sign Number: R10-6a	*Sketch / Photo:* 
Picture Number: 150	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Adams Ridge Blvd-Median Right Side	*Description:* Stop Here on Red

Sign Number: R3-2	*Sketch / Photo:* 
Picture Number: 154	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East-Right Side	*Description:* No Left Turn

Sign Number: R1-2	*Sketch / Photo:* 
Picture Number: 151	
Date Installed:	
Sign Type: Structure Mounted	
Location: Adams Ridge Blvd-Median Right Side	*Description:* Yield

Sign Number: R1-1	*Sketch / Photo:* 
Picture Number: 155	
Date Installed: 10/17/2003 RI	
Sign Type: Type-B (Single Post)	
Location: No Name Road-North Right Side	*Description:* STOP

Sign Number: R2-1	*Sketch / Photo:* 
Picture Number: 152	
Date Installed: 1-18-11 I	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East-Right Side	*Description:* Speed Limit 50

Sign Number: W2-2L	*Sketch / Photo:* 
Picture Number: 156	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East-Right Side	*Description:* Side Road L Intersection Myoma Road/

Sign Number: R 4-107	*Sketch / Photo:* 
Picture Number: 153	
Date Installed: 12-02-03 RI	
Sign Type: Type-B (Single Post)	
Location: Sr 0228 East-Right Side	*Description:* Keep Off Shoulder

Sign Number:	*Sketch / Photo:* 
Picture Number: 157	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228- East-Right Side	*Description:* SR Marker 228 70 and 60

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *06/20/17*

Location / Notes: *Adams Ridge Blvd to Myoma Rd*

Sign Number: R1-1	*Sketch / Photo:* 
Picture Number: 158	
Date Installed: 5-12-03 RI	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* STOP w/ Reflector

Sign Number: R1-1 /R 3-2	*Sketch / Photo:* 
Picture Number: 162	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* No Left Turn/ STOP/ Exit Only

Sign Number:	*Sketch / Photo:* 
Picture Number: 159	
Date Installed:	
Sign Type: Post	
Location: SR 0228 West-Right Side	*Description:* Street Sign- Myoma Road

Sign Number: W3-3	*Sketch / Photo:* 
Picture Number: 163	
Date Installed:	
Sign Type: Post w/ Foundation	
Location: SR 0228 West-Right Side	*Description:* Signal Ahead/ Solar Powered Flashing

Sign Number: R 2-1	*Sketch / Photo:* 
Picture Number: 160	
Date Installed: 1-18-11 I	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* Speed Limit 50

Sign Number: R 3-7L	*Sketch / Photo:* 
Picture Number: 164	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* Left Lane Must Turn Left

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 161	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* No Left Turn/ Exit Only

Sign Number: R 3-7L	*Sketch / Photo:* 
Picture Number: 165	
Date Installed: 01/08/08	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* Left Lane Must Turn Left

WRA SIGN INVENTORY LOG

Project # / Title:	*35004 - SR 0228 Widening*	**Date:**	*06/20/17*
Location / Notes:	*Adams Ridge Blvd to Myoma Rd*		

Sign Number: R 3-7L	*Sketch / Photo:* 
Picture Number: 166	
Date Installed: 01/08/08 RI	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* Left Lane Must Turn Left

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

Sign Number:	*Sketch / Photo:*
Picture Number:	
Date Installed:	
Sign Type:	
Location:	*Description:*

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *06/20/17*

Location / Notes: *Myoma Rd to Heritage Creek Dr*

Sign Number: R2-1	*Sketch / Photo:* 
Picture Number: 200	
Date Installed: 7-8-99 I	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East-Right Side	*Description:* Speed Limit 50

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 204	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East-Right Side	*Description:* (2) No Left Turn

Sign Number: M 1-1/ M 1-1	*Sketch / Photo:* 
Picture Number: 201	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East-Right Side	*Description:* SR Marker 228 80 and 70

Sign Number: R3-3-ACA	*Sketch / Photo:* 
Picture Number: 205	
Date Installed:	
Sign Type: Double Post	
Location: SR 228 East-Right Side	*Description:* Lane Use Control

Sign Number: R2-1	*Sketch / Photo:* 
Picture Number: 202	
Date Installed: 07/15/99	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East-Right Side	*Description:* Speed Limit 50

Sign Number: R3-30ACA	*Sketch / Photo:* 
Picture Number: 206	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: SR 0228 East-Right Side	*Description:* Lane Use Control

Sign Number: W3-3	*Sketch / Photo:* 
Picture Number: 203	
Date Installed:	
Sign Type: Post w/ Foundation	
Location: SR 0228 East-Right Side	*Description:* Electric Flashing Signal Ahead w/ Meter and Foundation

Sign Number: R10-6A	*Sketch / Photo:* 
Picture Number: 207	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	*Description:* Stop Here on Red

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *06/20/17*

Location / Notes: *Myoma Rd to Heritage Creek Dr*

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 208	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* No Left Turn

Sign Number:	*Sketch / Photo:* 
Picture Number: 212	
Date Installed:	
Sign Type: Post	
Location: Fox Trop Drive North- Right Side	*Description:* Street Sign- Fox Trot Drive

Sign Number: R 1-1/R3-2	*Sketch / Photo:* 
Picture Number: 209	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* No Left Turn/ STOP

Sign Number: R 1-1	*Sketch / Photo:* 
Picture Number: 213	
Date Installed: 10/17/03	
Sign Type: Type-B (Single Post)	
Location: Fox Trot Drive South- Right Side	*Description:* STOP

Sign Number: R2-1	*Sketch / Photo:* 
Picture Number: 210	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Speed Limit 50

Sign Number: W2-2R	*Sketch / Photo:* 
Picture Number: 214	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Intersection Side Road- Myoma Road

Sign Number: W8-5	*Sketch / Photo:* 
Picture Number: 211	
Date Installed: 01/10/16	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Slippery When Wet

Sign Number: R 4-107	*Sketch / Photo:* 
Picture Number: 215	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Keep Off Shoulder

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *08/24/17*

Location / Notes: *Heritage Creek Dr to Beaver St Ext.*

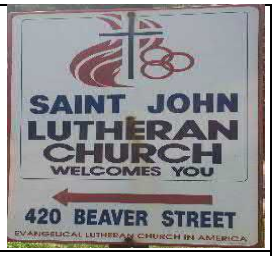
Sign Number: R3-30ACA	*Sketch / Photo:* 
Picture Number: 250	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: Heritage Creek Drive North- Right Side	*Description:* Lane Use Control

Sign Number: W2-7R	*Sketch / Photo:* 
Picture Number: 254	
Date Installed: 4/30/12 M	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Offset Side Roads Right Signs/ Beaver Street/ Scharberry Lane

Sign Number: R 2-1	*Sketch / Photo:*  
Picture Number: 251	
Date Installed: 4-2-13 RI	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Speed Limit 50/ SR 228 90 and 80

Sign Number: W60	*Sketch / Photo:* 
Picture Number: 255	
Date Installed: 04/30/12 I	
Sign Type: Type-B (Double Post)	
Location: SR 0228 East- Right Side	*Description:* Watch For Stopped Vehicles

Sign Number:	*Sketch / Photo:* 
Picture Number: 252	
Date Installed: 6/7/10 1/11/07 R	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Adopt A Highway (Missing)/ Mars Kiwanis Club/ PennDOT 10 year

Sign Number:	*Sketch / Photo:* 
Picture Number: 256	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* St. John Lutheran Church

Sign Number: S3-1	*Sketch / Photo:* 
Picture Number: 253	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* School Bus Stop Ahead

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 257	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Left Side	*Description:* No Left Turn

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *08/24/17*

Location / Notes: *Heritage Creek Dr to Beaver St Ext.*

Sign Number:	*Sketch / Photo:*
Picture Number: 258	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Street Sign- Scharberry Lane

Sign Number: R 3-2	*Sketch / Photo:*
Picture Number: 262	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* No Left Turn

Sign Number: R 3-2/ AR 703	*Sketch / Photo:*
Picture Number: 259	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Scharberry Lane North- Right Side	*Description:* No Left Turn

Sign Number: I 40-1	*Sketch / Photo:*
Picture Number: 263	
Date Installed: 07/14/2014 K.D.S	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Adopt A Highway/ Kampas Orthodontist PC

Sign Number: R 1-1	*Sketch / Photo:*
Picture Number: 260	
Date Installed: 09/13/02 RI	
Sign Type: Type-B (Single Post)	
Location: Scharberry Lane North- Right Side	*Description:* STOP

Sign Number: W 3-3	*Sketch / Photo:*
Picture Number: 264	
Date Installed:	
Sign Type: Pole w/ Foundation	
Location: SR 0228 West- Right Side	*Description:* Flashing Lights/ Signal Ahead

Sign Number: R 2-1	*Sketch / Photo:*
Picture Number: 261	
Date Installed: 01/18/2011 I	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Speed Limit 50

Sign Number: R 2-1	*Sketch / Photo:*
Picture Number: 265	
Date Installed: 04/02/2013 RI	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West- Right Side	*Description:* Speed Limit 50

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *08/24/17*

Location / Notes: *Heritage Creek Dr to Beaver St Ext.*

Sign Number:	Sketch / Photo:
R3-30ACA	
Picture Number: 266	
Date Installed: 07/17/2011 Fix	
Sign Type: Type-B (Double Post)	
Location: SR 0228 West-Right Side	Description: Lane Use Control

Sign Number:	Sketch / Photo:
Picture Number:	
Date Installed:	
Sign Type:	
Location:	Description:

Sign Number:	Sketch / Photo:
R3-30ACA	
Picture Number: 267	
Date Installed:	
Sign Type: Type-B (Double Post)	
Location: SR 0228 West-Right Side	Description: Lane Use Control

Sign Number:	Sketch / Photo:
Picture Number:	
Date Installed:	
Sign Type:	
Location:	Description:

Sign Number:	Sketch / Photo:
R9-3A	
Picture Number: 268	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	Description: No Pedestrian Crossing

Sign Number:	Sketch / Photo:
Picture Number:	
Date Installed:	
Sign Type:	
Location:	Description:

Sign Number:	Sketch / Photo:
Picture Number: 269	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 West-Right Side	Description: SR 3017 4

Sign Number:	Sketch / Photo:
Picture Number:	
Date Installed:	
Sign Type:	
Location:	Description:

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *08/24/17*

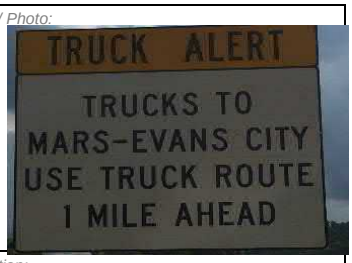
Location / Notes: *Beaver St Ext. to Pittsburgh St*

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 300	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* No Left Turn

Sign Number: W 3-3	*Sketch / Photo:* 
Picture Number: 304	
Date Installed:	
Sign Type: Post w/ Foundation	
Location: Sr 0228 East- Right Side	*Description:* Overhead M.A./ Flashing Lights/ Signal Ahead

Sign Number: R 2-1	*Sketch / Photo:* 
Picture Number: 301	
Date Installed: 04/12/2013 RI	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Speed Limit 50

Sign Number: D1-2a	*Sketch / Photo:* 
Picture Number: 305	
Date Installed: 04/16/2012 RI	
Sign Type: Type-B (Double Post)	
Location: SR 0228 East- Right Side	*Description:* Direction/ PA Route 8 5/ Mars 1

Sign Number: R 14-1	*Sketch / Photo:* 
Picture Number: 302	
Date Installed: 9/16/2016 L.S.D I	
Sign Type: Type-B (Double Post)	
Location: SR 0228 East- Right Side	*Description:* Truck Alert/ Trucks to Mars- Evans City Use Truck Route 1 Mile Ahead

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 306	
Date Installed: 7/9/2014 R	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* No Left Turn

Sign Number: R 2-1	*Sketch / Photo:* 
Picture Number: 303	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Sr 0228 East- Right Side	*Description:* Speed Limit 50

Sign Number:	*Sketch / Photo:* 
Picture Number: 307	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Sr 0228 East- Right Side	*Description:* Rotary International/ Treesdale C.C. Wednesday 12:15

WRA SIGN INVENTORY LOG

Project # / Title: *35004 - SR 0228 Widening* **Date:** *08/24/17*

Location / Notes: *Beaver St Ext. to Pittsburgh St*

Sign Number: R 14-1	*Sketch / Photo:* 
Picture Number: 308	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Sr 0228 East- Right Side	*Description:* Truck Alert/ Truck Route

Sign Number: R 3-2	*Sketch / Photo:* 
Picture Number: 312	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: No Name Street North- Right Side	*Description:* No Left Turn

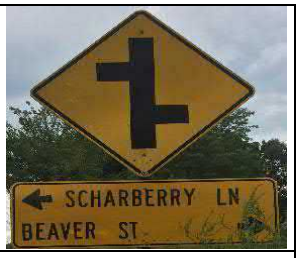
Sign Number:	*Sketch / Photo:* 
Picture Number: 309	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Woodland Valley Church

Sign Number: R 1-1/ R 3-2	*Sketch / Photo:* 
Picture Number: 313	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: No Name Street- South right Side	*Description:* No Left Turn/ STOP

Sign Number:	*Sketch / Photo:* 
Picture Number: 310	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Mars Presbyterian Church

Sign Number: R 2-1	*Sketch / Photo:* 
Picture Number: 314	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: Sr 0228 West- Right Side	*Description:* Speed Limit 50

Sign Number: R 3-7L	*Sketch / Photo:* 
Picture Number: 311	
Date Installed:	
Sign Type: Type-B (Single Post)	
Location: SR 0228 East- Right Side	*Description:* Left Lane Must Turn Left

Sign Number: W2-7R	*Sketch / Photo:* 
Picture Number: 315	
Date Installed: 01/18/11 I	
Sign Type: Type-B (Single Post)	
Location: Sr 0228 West- Right Side	*Description:* Offsite Side Roads Right Signs- Scharberry Lane/ Beaver Street