final report

August 11, 2022

Traffic Impact Study

Smyrna Village
8912 Smyrna Parkway
Louisville, KY

Prepared for

Louisville Metro Planning Commission
Kentucky Transportation Cabinet

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INTRODUCTION

The development plan for 8912 Smyrna Parkway in Louisville, KY shows an apartment community with 192 units. **Figure 1** displays a map of the site. Access to the development will be from the Smyrna Parkway frontage road. The purpose of this study is to examine the traffic impacts of the development upon the adjacent highway system. For this study, the impact area was defined to be the intersections of Smyrna Parkway with Manslick Road, the frontage road (KY 6320) and the ramps to I 265.

Figure 1. Site Map

EXISTING CONDITIONS

Smyrna Parkway is a Metro maintained road with an estimated 2022 ADT of 18,000 vehicles per day between the I 265 and Manslick Road (KY 2845), as estimated from a 2020 Kentucky Transportation Cabinet count at station D41. The road is a four-lane highway with eleven-foot lanes, a 20-foot median, and a ten-foot shoulder. The speed limit is 35 mph. There are no sidewalks. The intersections with the I 265 ramps and Manslick Road are controlled with a traffic signal. The intersection with the frontage road is controlled with a stop sign on the frontage road. Each of the intersections have dedicated left turn lanes. The northbound approach at Manslick Road has a dedicated right turn lane.

The frontage road (KY 6320) is maintained by the Kentucky Transportation Cabinet with an estimated 2022 ADT of 100 vehicles per day as provided by the Kentucky Transportation Cabinet at station 124. The road is a two-lane highway with eleven-foot lanes (provided by the Kentucky Transportation Cabinet). The speed limit is 35 mph. There are no sidewalks.

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Peak hour traffic counts for the intersections were obtained on Thursday, May 26, 2022. The a.m. peak hour occurred between 8:00 and 9:00 a.m. The p.m. peak occurred between 4:45 and 5:45 p.m. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes.

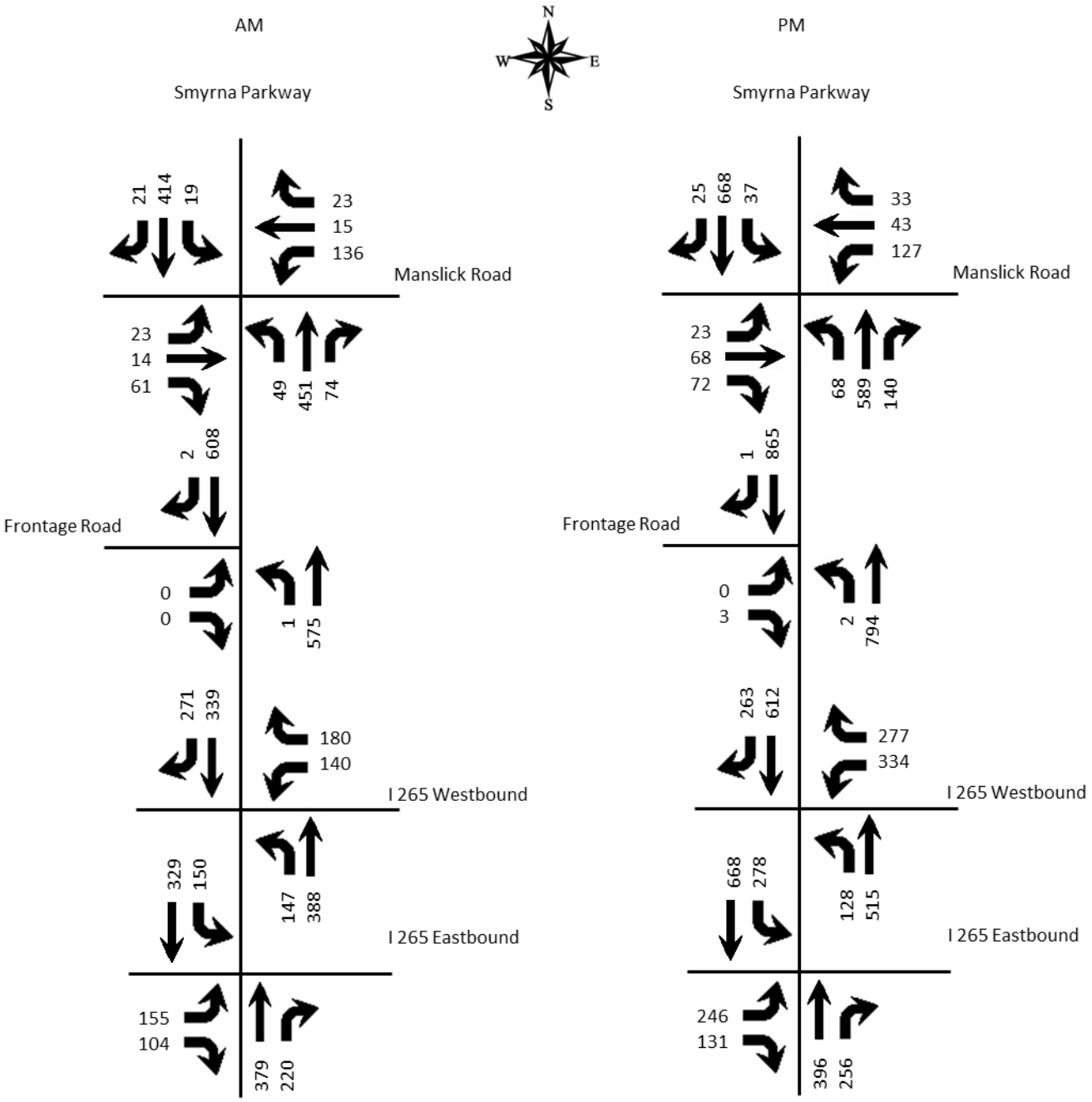

Figure 2. Existing Peak Hour Volumes

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FUTURE CONDITIONS

The project completion date is 2024. An annual growth rate of 1.0 percent was applied to all volumes. This is based upon a review of historical traffic counts at stations D41 and 402. **Figure 3** displays the 2024 No Build peak hour volumes.

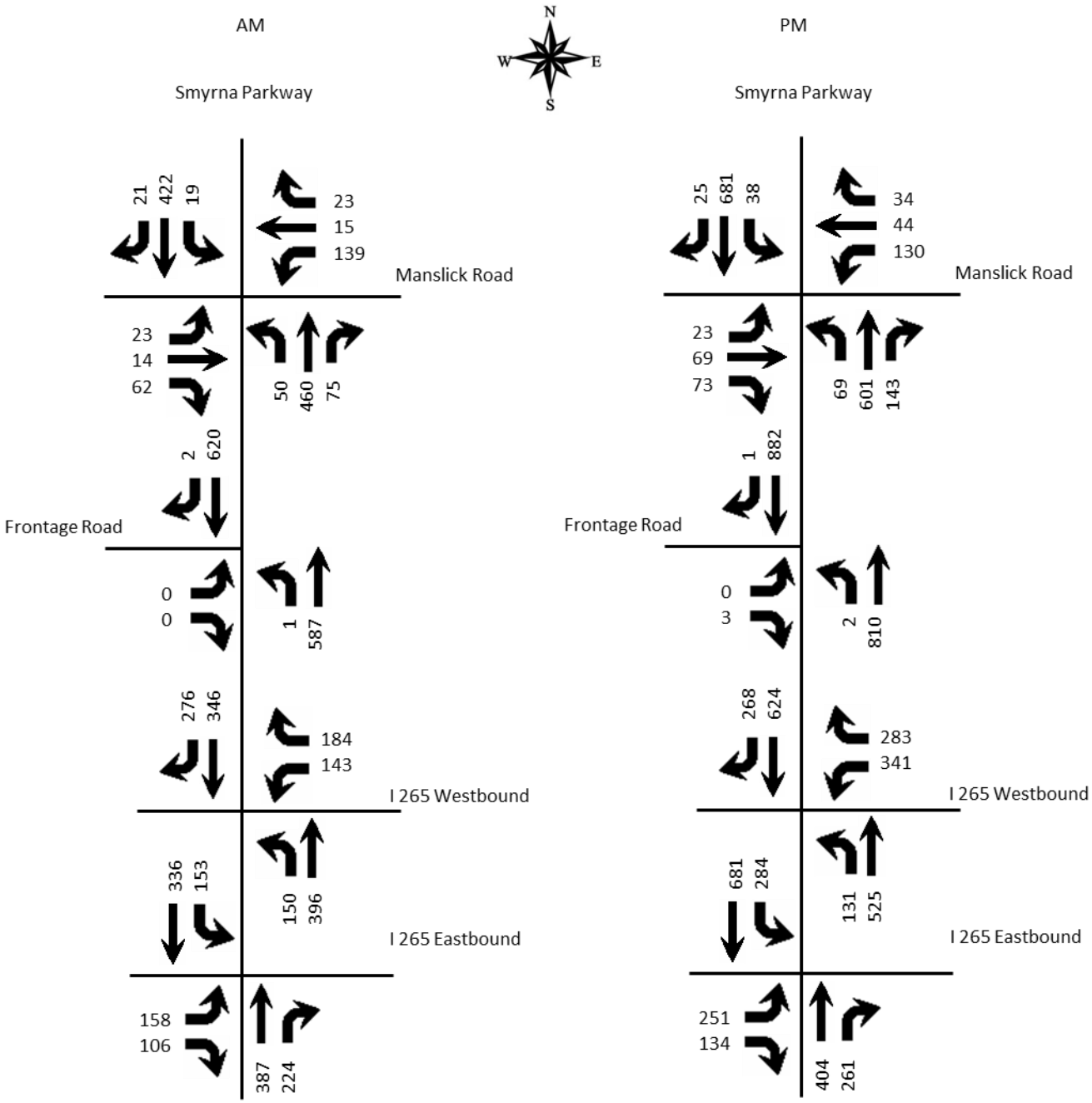

Figure 3. No Build Peak Hour Volumes

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TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 11th Edition contains trip generation rates for a wide range of developments. The land uses of "Multifamily Housing (Low Rise) 220" was reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. The trips were assigned to the highway network with the percentages shown in **Figure 4**. **Figure 5** shows the trips generated by this development and distributed throughout the road network during the peak hours. **Figure 6** displays the individual turning movements for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

	A.M. Peak Hour			P.M. Peak Hour		
Land Use	Trips	In	Out	Trips	In	Out
Multifamily Housing Low-Rise (192 units)	82	20	62	103	65	38

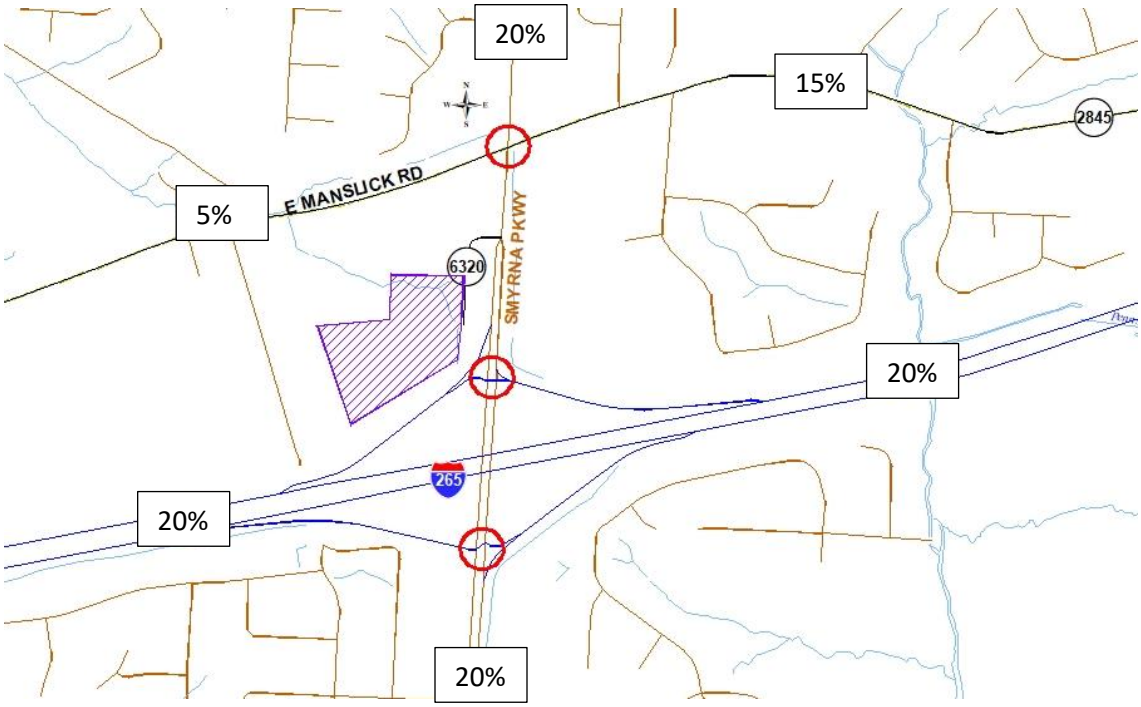

Figure 4. Trip Distribution Percentages

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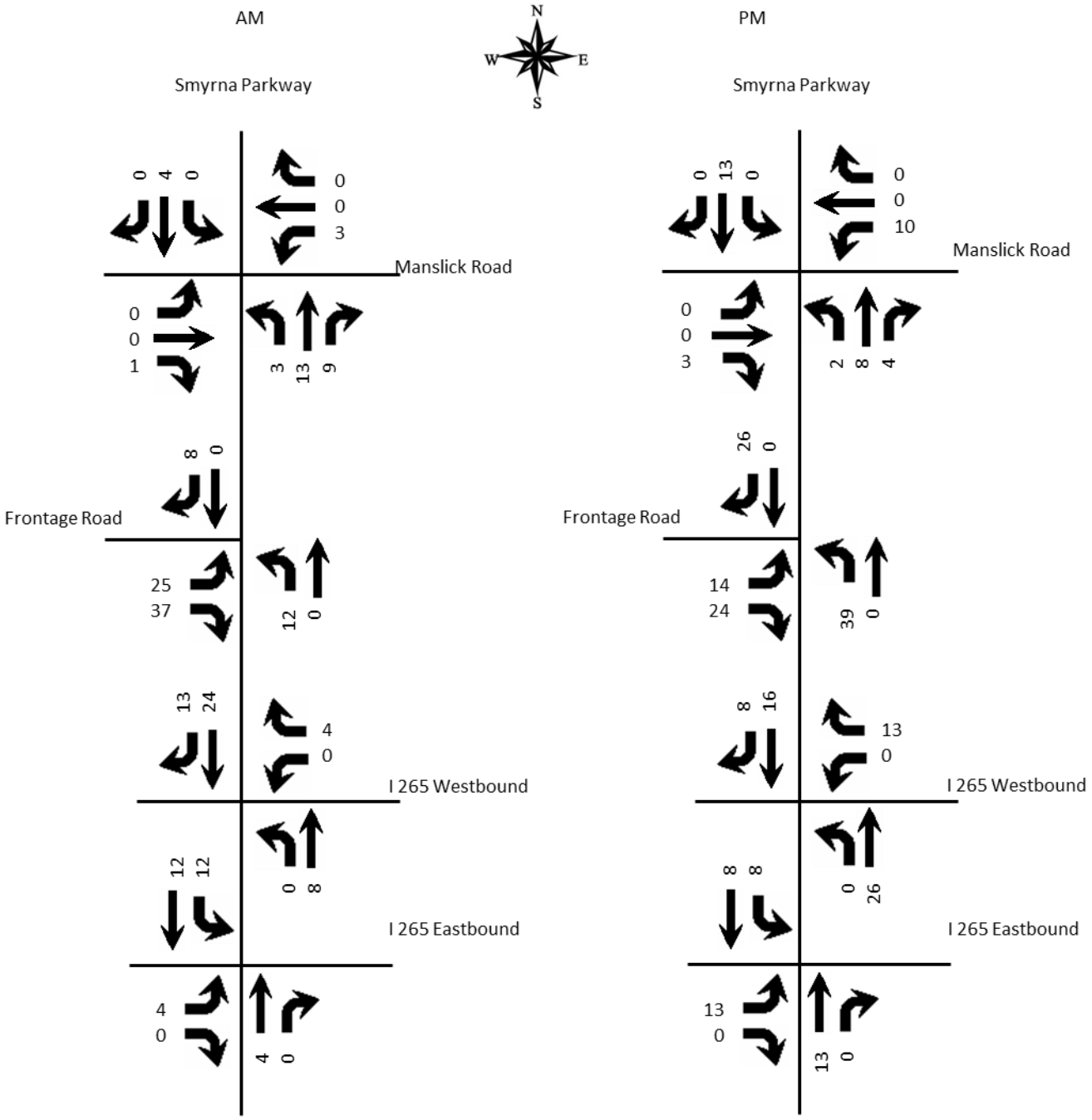

Figure 5. Peak Hour Trips Generated by Site

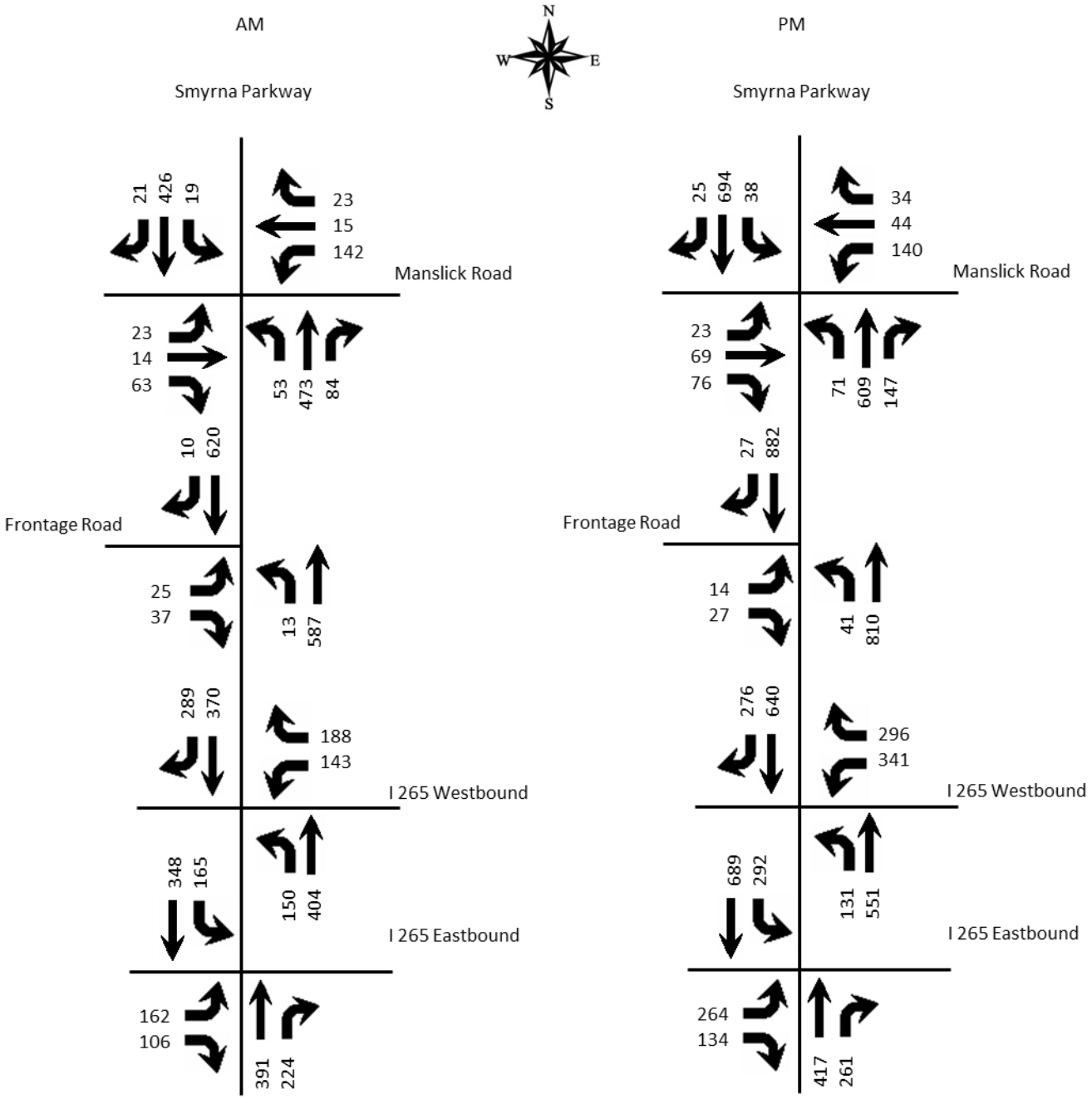

Figure 6. Build Peak Hour Volumes

ANALYSIS

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service". Level of Service is a ranking scale from A through F, "A" is the best operating condition and "F" is the worst.

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Level of Service results depend upon the facility that is analyzed. In this case, the Level of Service is based upon the total delay experienced at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the Highway Capacity Manual, 7th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets (version 2022) software. The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

	A.M.			P.M.		
Approach	2022 Existing	2024 No Build	2024 Build	2022 Existing	2024 No Build	2024 Build
Smyrna Parkway at I 265 Eastbound	**B 13.0**	**B 13.1**	**B 13.1**	**B 15.5**	**B 15.8**	**B 16.4**
I 265 Ramp Eastbound	C 22.4	C 22.6	C 22.6	C 29.3	C 29.9	C 30.6
Smyrna Parkway Northbound	B 13.9	B 14.0	B 14.1	B 17.6	B 17.8	B 18.5
Smyrna Parkway Southbound	A 6.6	A 6.7	A 6.8	A 8.6	A 8.8	A 9.1
Smyrna Parkway at I 265 Westbound	**B 13.0**	**B 13.1**	**B 13.2**	**B 17.3**	**B 17.6**	**B 17.9**
I 265 Ramp Westbound	C 22.6	C 22.9	C 23.0	C 27.2	C 27.7	C 28.9
Smyrna Parkway Northbound	A 6.4	A 6.4	A 6.5	A 8.9	A 9.1	A 9.1
Smyrna Parkway Southbound	B 13.9	B 13.9	B 14.0	B 16.8	B 17.0	B 17.0
Smyrna Parkway at Frontage Road						
Frontage Road Eastbound	0	0	B 13.9	B 11.5	B 11.5	C 15.6
Smyrna Parkway Northbound (left)	A 9.0	A 9.0	A 9.1	A 9.7	A 9.8	B 10.2
Smyrna Parkway at Manslick Road	**B 16.7**	**B 16.9**	**B 17.0**	**B 19.8**	**C 20.2**	**C 21.1**
Manslick Road Eastbound	B 19.7	B 19.9	B 20.0	C 29.1	C 29.8	C 30.6
Manslick Road Westbound	C 22.9	C 23.3	C 23.6	C 33.1	C 34.1	D 35.6
Smyrna Parkway Northbound	B 15.1	B 15.2	B 15.3	B 15.7	B 16.0	B 16.8
Smyrna Parkway Southbound	B 15.7	B 15.9	B 16.0	B 18.7	B 19.1	B 19.9

Key: Level of Service, Delay in seconds per vehicle

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The frontage road intersection was evaluated for turn lanes using the Kentucky Transportation Cabinet Highway Design Guidance Manual dated July, 2020. The Kentucky Transportation Cabinet policy requires analysis of 2034. An annual growth rate of 1.0 percent was applied for the 2034 No Build volumes shown in **Figure 7**. The site volumes were added for the 2034 Build volumes in **Figure 8.** Using the volumes in Figure 8, a right turn lane will not be required.

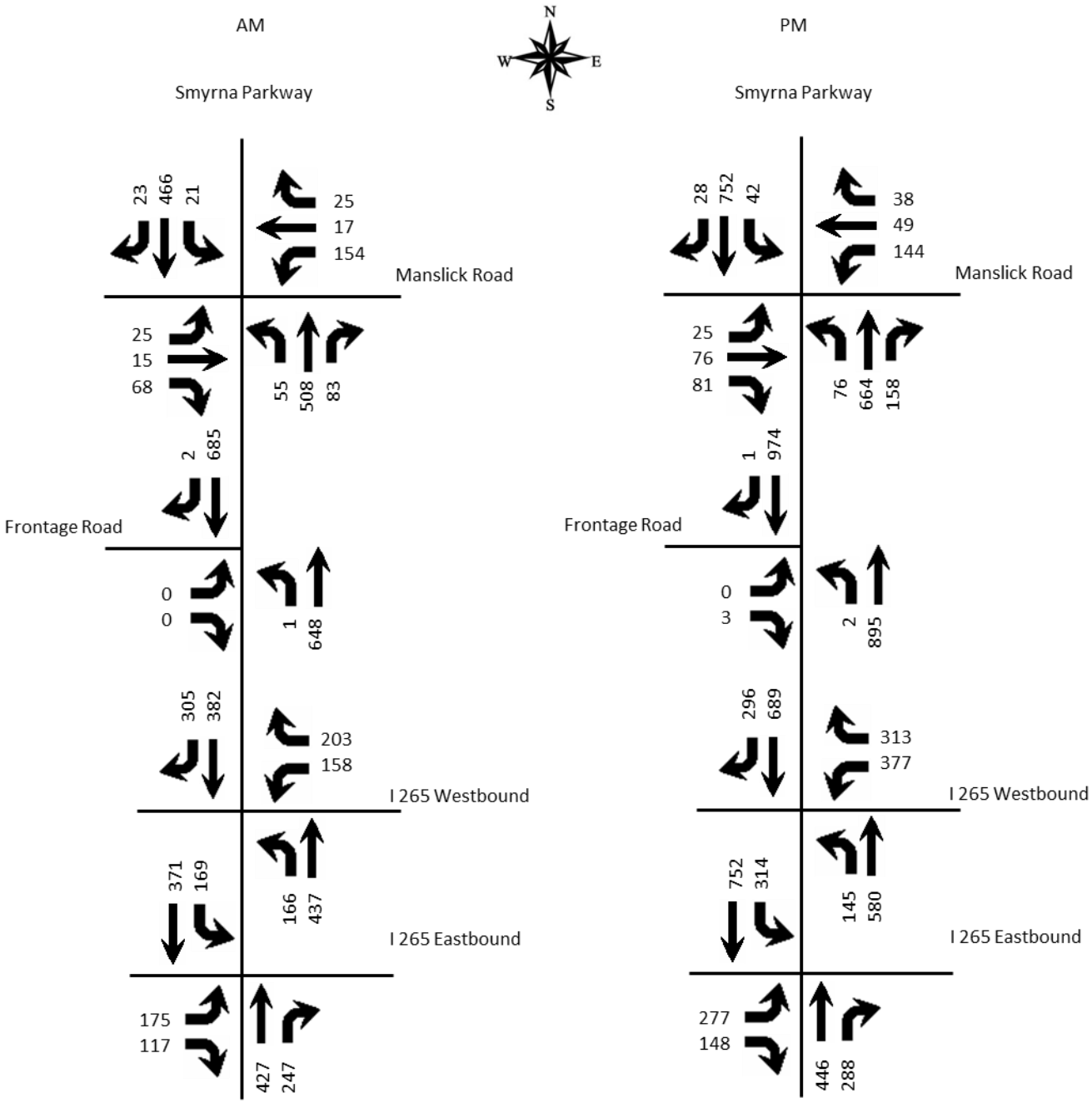

Figure 7. 2034 No Build Peak Hour Volumes

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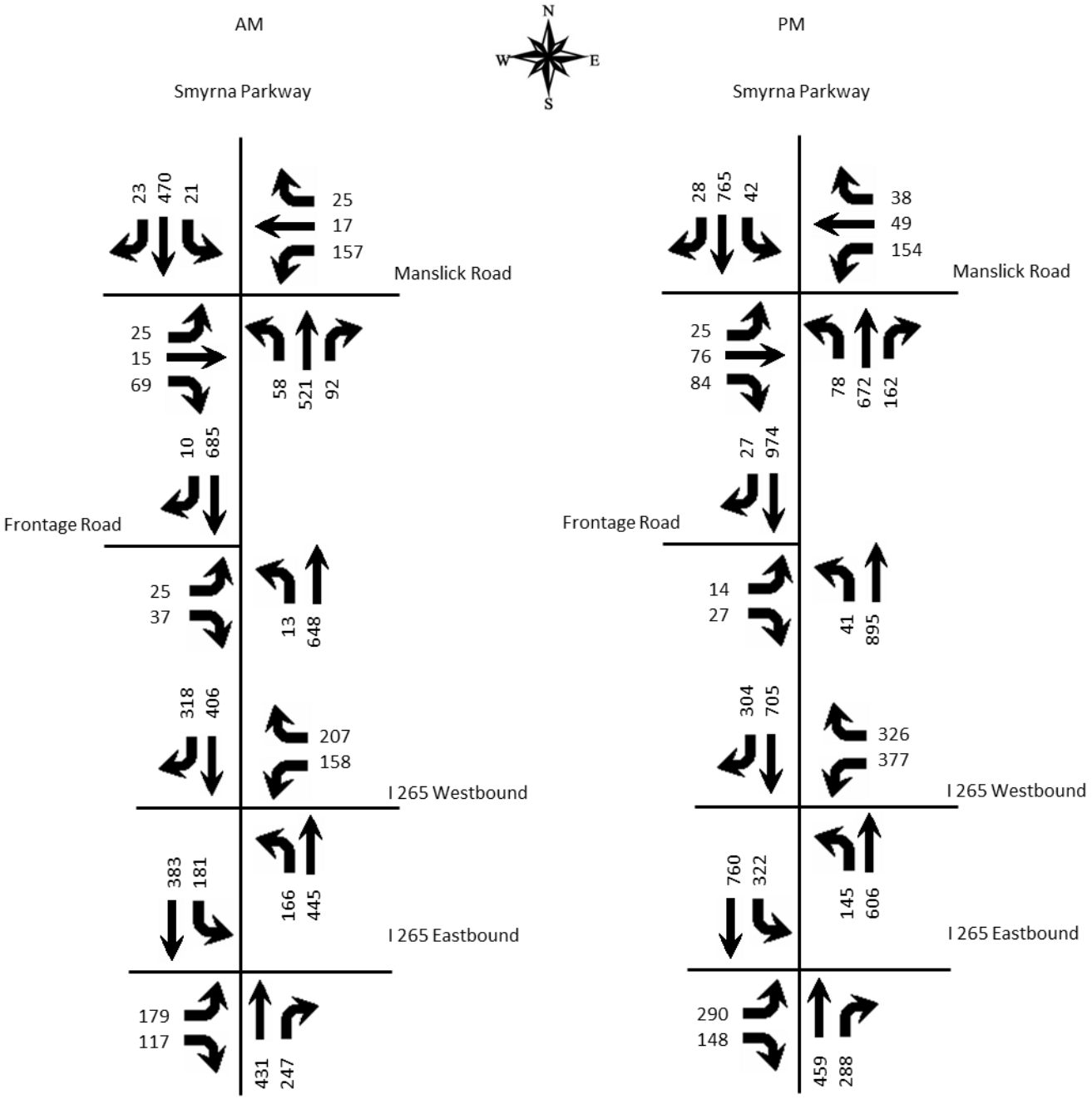

Figure 8. 2034 Build Peak Hour Volumes

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Table 3. 2034 Peak Hour Level of Service

Approach	A.M.			P.M.		
	2022 Existing	2034 No Build	2034 Build	2022 Existing	2034 No Build	2034 Build
Smyrna Parkway at I 265 Eastbound	**B 13.0**	**B 13.6**	**B 13.7**	**B 15.5**	**B 17.4**	**B 17.9**
I 265 Ramp Eastbound	C 22.4	C 23.9	C 24.0	C 29.3	C 33.6	C 33.6
Smyrna Parkway Northbound	B 13.9	B 14.3	B 14.6	B 17.6	B 19.4	B 19.9
Smyrna Parkway Southbound	A 6.6	A 7.0	A 7.1	A 8.6	A 9.6	A 9.9
Smyrna Parkway at I 265 Westbound	**B 13.0**	**B 13.8**	**B 13.9**	**B 17.3**	**B 19.5**	**C 20.1**
I 265 Ramp Westbound	C 22.6	C 24.6	C 24.8	C 27.2	C 31.6	C 33.5
Smyrna Parkway Northbound	A 6.4	A 6.8	A 6.9	A 8.9	B 10.1	B 10.1
Smyrna Parkway Southbound	B 13.9	B 14.4	B 14.5	B 16.8	B 18.3	B 18.3
Smyrna Parkway at Frontage Road						
Frontage Road Eastbound	0	0	B 14.8	B 11.5	B 12.0	C 16.8
Smyrna Parkway Northbound (left)	A 9.0	A 9.3	A 9.4	A 9.7	B 10.2	B 10.7
Smyrna Parkway at Manslick Road	**B 16.7**	**B 18.0**	**B 18.1**	**B 19.8**	**C 23.4**	**C 24.7**
Manslick Road Eastbound	B 19.7	C 21.5	C 21.6	C 29.1	C 34.0	C 34.8
Manslick Road Westbound	C 22.9	C 25.7	C 26.0	C 33.1	D 39.7	D 41.4
Smyrna Parkway Northbound	B 15.1	B 16.1	B 16.1	B 15.7	B 17.7	B 18.8
Smyrna Parkway Southbound	B 15.7	B 16.7	B 16.9	B 18.7	C 22.8	C 24.3

Key: Level of Service, Delay in seconds per vehicle

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2024 and 2034, there will be a manageable impact to the existing highway network, with Levels of Service remaining within acceptable limits. The delays experienced in the area will increase within acceptable limits. No improvements are required.

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APPENDIX

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Traffic Counts

Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
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Louisville KY (Smyrna Pkway)

Site 4 of 4
Smyrna Pkwy (South)
Smyrna Pkwy (North)
I-265 Gene Snyder Fwy W/Bound Off-Ramp
I-265 Gene Snyder Fwy W/Bound On-Ramp

Date
Thursday, May 26, 2022

Weather
Mostly Cloudy
70°F

Lat/Long
38.116817°, -85.643636°

0700 - 0900 (Weekday 2h Session) (05-26-2022)
All vehicles

	Northbound				Southbound				Eastbound				Westbound				
	Smyrna Pkwy (South)				Smyrna Pkwy (North)				I-265 Gene Snyder Fwy W/Bound Off-Ramp				I-265 Gene Snyder Fwy W/Bound On-Ramp				
TIME	Thru 4.1	Right 4.2	U-Turn 4.3	App Total	Left 4.4	Thru 4.5	U-Turn 4.6	App Total	Left 4.7	Thru 4.8	Right 4.9	App Total					Int Total
0700 - 0715	88	65	0	153	46	32	0	78	42	0	18	60					291
0715 - 0730	122	72	0	194	41	42	0	83	51	0	19	70					347
0730 - 0745	93	69	0	162	53	65	0	118	38	0	16	54					334
0745 - 0800	76	47	0	123	42	75	0	117	39	0	26	65					305
Hourly Total	379	253	0	**632**	182	214	0	**396**	170	0	79	**249**					**1277**
0800 - 0815	76	62	0	138	36	76	0	112	37	0	30	67					317
0815 - 0830	74	54	0	128	32	84	0	116	44	0	16	60					304
0830 - 0845	113	57	0	170	49	95	0	144	33	0	26	59					373
0845 - 0900	116	47	0	163	33	74	0	107	41	0	32	73					343
Hourly Total	379	220	0	**599**	150	329	0	**479**	155	0	104	**259**					**1337**
Grand Total	758	473	0	**1231**	332	543	0	**875**	325	0	183	**508**					**2614**
Approach %	61.58	38.42	0.00	-	37.94	62.06	0.00	-	63.98	0.00	36.02	-					
Intersection %	29.00	18.09	0.00	47.09	12.70	20.77	0.00	33.47	12.43	0.00	7.00	19.43					
PHF	0.82	0.89	0.00	**0.88**	0.77	0.87	0.00	**0.83**	0.88	0.00	0.81	**0.89**					**0.90**

1600 - 1800 (Weekday 2h Session) (05-26-2022)
All vehicles

	Northbound				Southbound				Eastbound				Westbound				
	Smyrna Pkwy (South)				Smyrna Pkwy (North)				I-265 Gene Snyder Fwy W/Bound Off-Ramp				I-265 Gene Snyder Fwy W/Bound On-Ramp				
TIME	Thru 4.1	Right 4.2	U-Turn 4.3	App Total	Left 4.4	Thru 4.5	U-Turn 4.6	App Total	Left 4.7	Thru 4.8	Right 4.9	App Total					Int Total
1600 - 1615	100	44	0	144	69	138	0	207	58	0	34	92					443
1615 - 1630	87	53	0	140	59	141	0	200	58	0	33	91					431
1630 - 1645	79	45	0	124	81	159	0	240	52	0	34	86					450
1645 - 1700	99	57	0	156	72	162	0	234	47	0	32	79					469
Hourly Total	365	199	0	**564**	281	600	0	**881**	215	0	133	**348**					**1793**
1700 - 1715	104	80	0	184	75	194	0	269	56	0	33	89					542
1715 - 1730	104	65	0	169	66	161	0	227	76	0	25	101					497
1730 - 1745	89	54	0	143	65	151	0	216	67	0	41	108					467
1745 - 1800	82	43	0	125	57	145	0	202	52	0	23	75					402
Hourly Total	379	242	0	**621**	263	651	0	**914**	251	0	122	**373**					**1908**
Grand Total	744	441	0	**1185**	544	1251	0	**1795**	466	0	255	**721**					**3701**
Approach %	62.78	37.22	0.00	-	30.31	69.69	0.00	-	64.63	0.00	35.37	-					
Intersection %	20.10	11.92	0.00	32.02	14.70	33.80	0.00	48.50	12.59	0.00	6.89	19.48					
PHF	0.95	0.80	0.00	**0.89**	0.93	0.86	0.00	**0.88**	0.81	0.00	0.80	**0.87**					**0.91**

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Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
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Louisville KY (Smyrna Pkway)

Site 3 of 4
Smyrna Pkwy (South)
Smyrna Pkwy (North)
I-265 Gene Snyder Fwy W/Bound On-Ramp
I-265 Gene Snyder Fwy W/Bound Off-Ramp

Date
Thursday, May 26, 2022

Lat/Long
38.119579°, -85.643504°

Weather
Mostly Cloudy
70°F

0700 - 0900 (Weekday 2h Session) (05-26-2022)
All vehicles

	Northbound				Southbound				Eastbound				Westbound				
	Smyrna Pkwy (South)				Smyrna Pkwy (North)				I-265 Gene Snyder Fwy W/Bound On-Ramp				I-265 Gene Snyder Fwy W/Bound Off-Ramp				
TIME	Left 3.1	Thru 3.2	U-Turn 3.3	App Total	Thru 3.4	Right 3.5	U-Turn 3.6	App Total					Left 3.7	Thru 3.8	Right 3.9	App Total	Int Total
0700 - 0715	45	85	0	130	70	78	0	148					8	0	42	50	328
0715 - 0730	54	120	0	174	63	74	0	137					19	0	52	71	382
0730 - 0745	35	95	0	130	93	75	0	168					25	0	27	52	350
0745 - 0800	30	85	0	115	86	69	0	155					32	0	29	61	331
Hourly Total	164	385	0	**549**	312	296	0	**608**					84	0	150	**234**	**1391**
0800 - 0815	32	79	1	112	76	86	0	162					35	0	42	77	351
0815 - 0830	29	88	0	117	79	74	0	153					37	0	56	93	363
0830 - 0845	37	111	0	148	109	67	0	176					36	0	43	79	403
0845 - 0900	48	110	0	158	75	44	0	119					32	0	39	71	348
Hourly Total	146	388	1	**535**	339	271	0	**610**					140	0	180	**320**	**1465**
Grand Total	310	773	1	**1084**	651	567	0	**1218**					224	0	330	**554**	**2856**
Approach %	28.60	71.31	0.09	-	53.45	46.55	0.00	-					40.43	0.00	59.57	-	
Intersection %	10.85	27.07	0.04	37.96	22.79	19.85	0.00	42.65					7.84	0.00	11.55	19.40	
PHF	0.76	0.87	0.25	**0.85**	0.78	0.79	0.00	**0.87**					0.95	0.00	0.80	**0.86**	**0.91**

1600 - 1800 (Weekday 2h Session) (05-26-2022)
All vehicles

	Northbound				Southbound				Eastbound				Westbound				
	Smyrna Pkwy (South)				Smyrna Pkwy (North)				I-265 Gene Snyder Fwy W/Bound On-Ramp				I-265 Gene Snyder Fwy W/Bound Off-Ramp				
TIME	Left 3.1	Thru 3.2	U-Turn 3.3	App Total	Thru 3.4	Right 3.5	U-Turn 3.6	App Total					Left 3.7	Thru 3.8	Right 3.9	App Total	Int Total
1600 - 1615	28	130	0	158	148	73	0	221					58	0	72	130	509
1615 - 1630	29	115	0	144	143	71	0	214					58	0	54	112	470
1630 - 1645	25	106	0	131	172	72	0	244					67	0	53	120	495
1645 - 1700	29	117	0	146	159	75	0	234					75	0	58	133	513
Hourly Total	111	468	0	**579**	622	291	0	**913**					258	0	237	**495**	**1987**
1700 - 1715	34	127	0	161	175	60	0	235					95	0	72	167	563
1715 - 1730	32	149	0	181	144	58	0	202					83	0	78	161	544
1730 - 1745	33	122	0	155	134	70	0	204					81	1	69	151	510
1745 - 1800	28	105	0	133	135	59	0	194					67	0	74	141	468
Hourly Total	127	503	0	**630**	588	247	0	**835**					326	1	293	**620**	**2085**
Grand Total	238	971	0	**1209**	1210	538	0	**1748**					584	1	530	**1115**	**4072**
Approach %	19.69	80.31	0.00	-	69.22	30.78	0.00	-					52.38	0.09	47.53	-	
Intersection %	5.84	23.85	0.00	29.69	29.72	13.21	0.00	42.93					14.34	0.02	13.02	27.38	
PHF	0.94	0.86	0.00	**0.89**	0.87	0.88	0.00	**0.93**					0.88	0.25	0.89	**0.92**	**0.95**

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Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
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Louisville KY (Smyrna Pkway)

Site 2 of 4
Smyrna Pkwy (South)
Smyrna Pkwy (North)
KY-6320
Driveway

Date
Thursday, May 26, 2022

Lat/Long
38.121475°, -85.643282°

Weather
Mostly Cloudy
70°F

0700 - 0900 (Weekday 2h Session) (05-26-2022)
All vehicles

	Northbound					Southbound					Eastbound					Westbound					
	Smyrna Pkwy (South)					Smyrna Pkwy (North)					KY-6320					Driveway					
TIME	Left 2.1	Thru 2.2	Right 2.3	U-Turn 2.4	App Total	Left 2.5	Thru 2.6	Right 2.7	U-Turn 2.8	App Total	Left 2.9	Thru 2.10	Right 2.11	U-Turn 2.12	App Total	Left 2.13	Thru 2.14	Right 2.15	U-Turn 2.16	App Total	Int Total
0700 - 0715	0	126	0	0	126	0	145	0	0	145	1	0	0	0	1	0	0	0	0	0	272
0715 - 0730	0	171	0	0	171	0	137	0	0	137	0	0	0	0	0	0	0	0	0	0	308
0730 - 0745	1	122	0	0	123	0	172	0	0	172	0	0	0	0	0	0	0	0	0	0	295
0745 - 0800	0	108	0	0	108	0	154	0	0	154	0	0	1	0	1	0	0	0	0	0	263
Hourly Total	1	527	0	0	**528**	0	608	0	0	**608**	1	0	1	0	**2**	0	0	0	0	**0**	**1138**
0800 - 0815	0	125	0	0	125	0	162	0	0	162	0	0	0	0	0	0	0	0	0	0	287
0815 - 0830	0	144	0	0	144	0	149	0	0	149	0	0	0	0	0	0	0	0	0	0	293
0830 - 0845	0	157	0	0	157	0	179	0	0	179	0	0	0	0	0	0	0	0	0	0	336
0845 - 0900	1	149	0	0	150	0	118	2	0	120	0	0	0	0	0	0	0	0	0	0	270
Hourly Total	1	575	0	0	**576**	0	608	2	0	**610**	0	0	0	0	**0**	0	0	0	0	**0**	**1186**
Grand Total	2	1102	0	0	**1104**	0	1216	2	0	**1218**	1	0	1	0	**2**	0	0	0	0	**0**	**2324**
Approach %	0.18	99.82	0.00	0.00	-	0.00	99.84	0.16	0.00	-	50.00	0.00	50.00	0.00	-	0.00	0.00	0.00	0.00	-	
Intersection %	0.09	47.42	0.00	0.00	47.50	0.00	52.32	0.09	0.00	52.41	0.04	0.00	0.04	0.00	0.09	0.00	0.00	0.00	0.00	0.00	
PHF	0.25	0.92	0.00	0.00	**0.92**	0.00	0.85	0.25	0.00	**0.85**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	**0.88**

1600 - 1800 (Weekday 2h Session) (05-26-2022)
All vehicles

	Northbound					Southbound					Eastbound					Westbound					
	Smyrna Pkwy (South)					Smyrna Pkwy (North)					KY-6320					Driveway					
TIME	Left 2.1	Thru 2.2	Right 2.3	U-Turn 2.4	App Total	Left 2.5	Thru 2.6	Right 2.7	U-Turn 2.8	App Total	Left 2.9	Thru 2.10	Right 2.11	U-Turn 2.12	App Total	Left 2.13	Thru 2.14	Right 2.15	U-Turn 2.16	App Total	Int Total
1600 - 1615	1	203	0	0	204	0	224	0	0	224	0	0	5	0	5	0	0	0	0	0	433
1615 - 1630	1	168	0	1	170	0	214	0	0	214	0	0	1	0	1	0	0	0	0	0	385
1630 - 1645	1	154	0	0	155	0	246	1	0	247	1	0	0	0	1	0	0	0	0	0	403
1645 - 1700	0	178	0	0	178	0	224	0	0	224	0	0	1	0	1	0	0	0	0	0	403
Hourly Total	3	703	0	1	**707**	0	908	1	0	**909**	1	0	7	0	**8**	0	0	0	0	**0**	**1624**
1700 - 1715	1	197	0	0	198	0	235	1	0	236	0	0	1	0	1	0	0	0	0	0	435
1715 - 1730	0	228	0	0	228	0	204	0	1	205	0	0	1	0	1	0	0	0	0	0	434
1730 - 1745	1	191	0	0	192	0	202	0	0	202	0	0	0	0	0	0	0	0	0	0	394
1745 - 1800	1	176	0	0	177	0	190	2	0	192	0	0	0	0	0	0	0	0	0	0	369
Hourly Total	3	792	0	0	**795**	0	831	3	1	**835**	0	0	2	0	**2**	0	0	0	0	**0**	**1632**
Grand Total	6	1495	0	1	**1502**	0	1739	4	1	**1744**	1	0	9	0	**10**	0	0	0	0	**0**	**3256**
Approach %	0.40	99.53	0.00	0.07	-	0.00	99.71	0.23	0.06	-	10.00	0.00	90.00	0.00	-	0.00	0.00	0.00	0.00	-	
Intersection %	0.18	45.92	0.00	0.03	46.13	0.00	53.41	0.12	0.03	53.56	0.03	0.00	0.28	0.00	0.31	0.00	0.00	0.00	0.00	0.00	
PHF	0.50	0.83	0.00	0.00	**0.83**	0.00	0.92	0.50	0.25	**0.92**	0.25	0.00	0.75	0.00	**1.00**	0.00	0.00	0.00	0.00	**0.00**	**0.96**

Received August 17, 2022 Planning & Design Services 22-DDP-0033

Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
www.marrtraffic.com

Louisville KY (Smyrna Pkway)

Site 1 of 4
Smyrna Pkwy (South)
Smyrna Pkwy (North)
E Manslick Rd (West)
E Manslick Rd (East)

Date
Thursday, May 26, 2022

Lat/Long
38.122886°, -85.643116°

Weather
Mostly Cloudy
70°F

0700 - 0900 (Weekday 2h Session) (05-26-2022)
All vehicles

	Northbound					Southbound					Eastbound					Westbound					
	Smyrna Pkwy (South)					Smyrna Pkwy (North)					E Manslick Rd (West)					E Manslick Rd (East)					
TIME	Left 1.1	Thru 1.2	Right 1.3	U-Turn 1.4	App Total	Left 1.5	Thru 1.6	Right 1.7	U-Turn 1.8	App Total	Left 1.9	Thru 1.10	Right 1.11	U-Turn 1.12	App Total	Left 1.13	Thru 1.14	Right 1.15	U-Turn 1.16	App Total	Int Total
0700 - 0715	8	105	15	0	128	3	103	4	0	110	5	4	10	0	19	31	7	6	0	44	301
0715 - 0730	9	149	14	0	172	2	88	3	0	93	5	5	12	0	22	38	0	7	0	45	332
0730 - 0745	2	99	19	0	120	2	118	6	0	126	5	3	17	0	25	36	5	6	0	47	318
0745 - 0800	4	91	13	0	108	1	98	3	0	102	5	6	15	0	26	42	11	8	0	61	297
Hourly Total	23	444	61	0	**528**	8	407	16	0	**431**	20	18	54	0	**92**	147	23	27	0	**197**	**1248**
0800 - 0815	4	98	23	0	125	4	105	4	0	113	8	3	17	0	28	41	7	4	0	52	318
0815 - 0830	11	116	16	0	143	1	98	5	0	104	8	3	16	0	27	36	2	9	0	47	321
0830 - 0845	21	119	17	0	157	6	120	4	0	130	2	5	19	0	26	39	2	3	0	44	357
0845 - 0900	13	118	18	0	149	8	91	8	0	107	5	3	9	0	17	20	4	7	0	31	304
Hourly Total	49	451	74	0	**574**	19	414	21	0	**454**	23	14	61	0	**98**	136	15	23	0	**174**	**1300**
Grand Total	72	895	135	0	**1102**	27	821	37	0	**885**	43	32	115	0	**190**	283	38	50	0	**371**	**2548**
Approach %	6.53	81.22	12.25	0.00	-	3.05	92.77	4.18	0.00	-	22.63	16.84	60.53	0.00	-	76.28	10.24	13.48	0.00	-	
Intersection %	2.83	35.13	5.30	0.00	43.25	1.06	32.22	1.45	0.00	34.73	1.69	1.26	4.51	0.00	7.46	11.11	1.49	1.96	0.00	14.56	
PHF	0.58	0.95	0.80	0.00	**0.91**	0.59	0.86	0.66	0.00	**0.87**	0.72	0.70	0.80	0.00	**0.88**	0.83	0.54	0.64	0.00	**0.84**	**0.91**

1600 - 1800 (Weekday 2h Session) (05-26-2022)
All vehicles

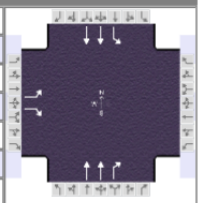
	Northbound					Southbound					Eastbound					Westbound					
	Smyrna Pkwy (South)					Smyrna Pkwy (North)					E Manslick Rd (West)					E Manslick Rd (East)					
TIME	Left 1.1	Thru 1.2	Right 1.3	U-Turn 1.4	App Total	Left 1.5	Thru 1.6	Right 1.7	U-Turn 1.8	App Total	Left 1.9	Thru 1.10	Right 1.11	U-Turn 1.12	App Total	Left 1.13	Thru 1.14	Right 1.15	U-Turn 1.16	App Total	Int Total
1600 - 1615	20	147	37	0	204	4	185	5	0	194	3	14	11	0	28	28	7	7	0	42	468
1615 - 1630	16	126	25	0	167	4	163	8	0	175	7	16	21	0	44	31	8	8	0	47	433
1630 - 1645	11	119	24	0	154	7	184	5	0	196	4	11	19	0	34	44	1	5	0	50	434
1645 - 1700	14	133	32	0	179	9	167	3	0	179	7	22	16	0	45	41	10	11	0	62	465
Hourly Total	61	525	118	0	**704**	24	699	21	0	**744**	21	63	67	0	**151**	144	26	31	0	**201**	**1800**
1700 - 1715	18	142	37	0	197	10	184	6	0	200	9	17	23	0	49	29	11	11	0	51	497
1715 - 1730	23	170	37	0	230	10	157	6	0	173	4	18	21	0	43	26	10	7	0	43	489
1730 - 1745	13	144	34	0	191	8	160	10	0	178	3	11	12	0	26	31	12	4	0	47	442
1745 - 1800	17	130	29	0	176	5	138	3	0	146	7	10	17	0	34	37	5	6	0	48	404
Hourly Total	71	586	137	0	**794**	33	639	25	0	**697**	23	56	73	0	**152**	123	38	28	0	**189**	**1832**
Grand Total	132	1111	255	0	**1498**	57	1338	46	0	**1441**	44	119	140	0	**303**	267	64	59	0	**390**	**3632**
Approach %	8.81	74.17	17.02	0.00	-	3.96	92.85	3.19	0.00	-	14.52	39.27	46.20	0.00	-	68.46	16.41	15.13	0.00	-	
Intersection %	3.63	30.59	7.02	0.00	41.24	1.57	36.84	1.27	0.00	39.68	1.21	3.28	3.85	0.00	8.34	7.35	1.76	1.62	0.00	10.74	
PHF	0.74	0.87	0.95	0.00	**0.87**	0.93	0.91	0.63	0.00	**0.91**	0.64	0.77	0.78	0.00	**0.83**	0.77	0.90	0.75	0.00	**0.82**	**0.95**

Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Reports

HCS Signalized Intersection Results Summary

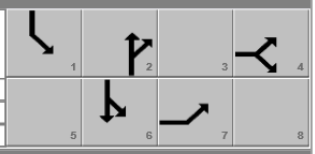
General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Smyrna Parkway	Analysis Year	2022	Analysis Period	1> 8:00
Intersection	I 265 EB	File Name	AM 22.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	155		104					379	220	150	329	

Signal Information			
Cycle, s	50.6	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	5.4	16.3	8.1	0.0	0.0	0.0	
Yellow	3.5	4.0	4.0	0.0	0.0	0.0	
Red	2.9	3.1	3.3	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		15.4				23.4	11.8	35.2
Change Period, (*Y+R c*), s		7.3				7.1	6.4	7.1
Max Allow Headway (*MAH*), s		5.2				5.1	4.6	5.1
Queue Clearance Time (*g s*), s		6.6				8.2	4.8	4.8
Green Extension Time (*g e*), s		1.6				8.1	0.6	8.1
Phase Call Probability		0.98				1.00	0.90	1.00
Max Out Probability		0.00				0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	172		116					421	244	165	362	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753		1485					1781	1598	1767	1654	
Queue Service Time (*g s*), s	4.6		3.6					4.6	6.2	2.8	2.8	
Cycle Queue Clearance Time (*g c*), s	4.6		3.6					4.6	6.2	2.8	2.8	
Green Ratio (*g/C*)	0.16		0.16					0.32	0.32	0.47	0.56	
Capacity (*c*), veh/h	281		238					1147	515	554	1837	
Volume-to-Capacity Ratio (*X*)	0.614		0.486					0.367	0.475	0.298	0.197	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	3.4		2.2					2.8	3.6	1.5	1.2	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.00		0.00					0.00	0.00	0.14	0.00	
Uniform Delay (*d 1*), s/veh	19.8		19.4					13.2	13.7	8.4	5.6	
Incremental Delay (*d 2*), s/veh	3.1		2.2					0.3	1.0	0.3	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	22.9		21.6					13.5	14.7	8.7	5.7	
Level of Service (LOS)	C		C					B	B	A	A	
Approach Delay, s/veh / LOS	22.4		C	0.0			13.9		B	6.6		A
Intersection Delay, s/veh / LOS	13.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.38	A	1.64	B
Bicycle LOS Score / LOS		F			1.04	A	0.93	A

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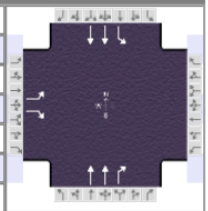
Received August 17, 2022 Planning & Design Services 22-DDP-0033

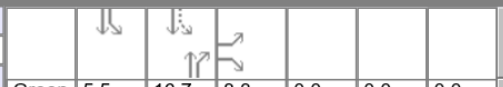
HCS Signalized Intersection Results Summary

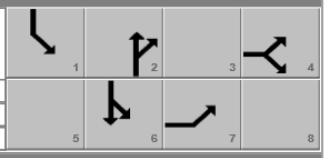
General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Smyrna Parkway	Analysis Year	2024 No Build	Analysis Period	1> 8:00
Intersection	I 265 EB	File Name	AM 24 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	158		106					387	224	153	336	

Signal Information			
Cycle, s	51.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On





Green	5.5	16.7	8.3	0.0	0.0	0.0	
Yellow	3.5	4.0	4.0	0.0	0.0	0.0	
Red	2.9	3.1	3.3	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		15.6				23.8	11.9	35.7
Change Period, (*Y+R c*), s		7.3				7.1	6.4	7.1
Max Allow Headway (*MAH*), s		5.2				5.1	4.6	5.1
Queue Clearance Time (*g s*), s		6.8				8.4	4.9	4.9
Green Extension Time (*g e*), s		1.6				8.3	0.6	8.3
Phase Call Probability		0.98				1.00	0.91	1.00
Max Out Probability		0.00				0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	176		118					430	249	168	370	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753		1485					1781	1598	1767	1654	
Queue Service Time (*g s*), s	4.8		3.7					4.7	6.4	2.9	2.9	
Cycle Queue Clearance Time (*g c*), s	4.8		3.7					4.7	6.4	2.9	2.9	
Green Ratio (*g/C*)	0.16		0.16					0.33	0.33	0.47	0.56	
Capacity (*c*), veh/h	284		240					1161	521	551	1843	
Volume-to-Capacity Ratio (*X*)	0.618		0.490					0.370	0.478	0.305	0.201	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	3.5		2.3					2.9	3.7	1.6	1.2	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.00		0.00					0.00	0.00	0.15	0.00	
Uniform Delay (*d 1*), s/veh	20.0		19.6					13.2	13.8	8.4	5.7	
Incremental Delay (*d 2*), s/veh	3.1		2.2					0.3	1.0	0.4	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	23.1		21.8					13.5	14.8	8.8	5.7	
Level of Service (LOS)	C		C					B	B	A	A	
Approach Delay, s/veh / LOS	22.6		C	0.0			14.0		B	6.7		A
Intersection Delay, s/veh / LOS	13.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.38	A	1.64	B
Bicycle LOS Score / LOS		F			1.05	A	0.94	A

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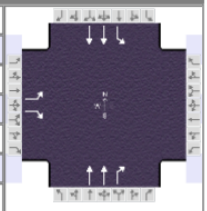
Received August 17, 2022 Planning & Design Services 22-DDP-0033

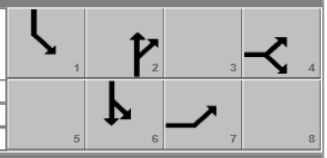
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Smyrna Parkway	Analysis Year	2024 Build	Analysis Period	1> 8:00
Intersection	I 265 EB	File Name	AM 24 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	162		106					391	224	165	348	

Signal Information					EB			WB			NB			SB		
Cycle, s	51.6	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	5.5	16.8		8.5	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	4.0		4.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	3.1		3.3	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		15.8				23.9	11.9	35.8
Change Period, (*Y+R c*), s		7.3				7.1	6.4	7.1
Max Allow Headway (*MAH*), s		5.2				5.1	4.6	5.1
Queue Clearance Time (*g s*), s		6.9				8.4	5.0	4.9
Green Extension Time (*g e*), s		1.7				8.4	0.7	8.4
Phase Call Probability		0.99				1.00	0.92	1.00
Max Out Probability		0.00				0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	180		118					434	249	176	371	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753		1485					1781	1598	1767	1654	
Queue Service Time (*g s*), s	4.9		3.7					4.8	6.4	3.0	2.9	
Cycle Queue Clearance Time (*g c*), s	4.9		3.7					4.8	6.4	3.0	2.9	
Green Ratio (*g/C*)	0.16		0.16					0.33	0.33	0.47	0.56	
Capacity (*c*), veh/h	288		244					1160	521	549	1841	
Volume-to-Capacity Ratio (*X*)	0.624		0.482					0.374	0.478	0.320	0.201	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	3.7		2.3					3.0	3.7	1.7	1.2	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.00		0.00					0.00	0.00	0.15	0.00	
Uniform Delay (*d 1*), s/veh	20.1		19.6					13.4	13.9	8.6	5.7	
Incremental Delay (*d 2*), s/veh	3.1		2.1					0.3	1.0	0.4	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	23.2		21.7					13.7	14.9	8.9	5.8	
Level of Service (LOS)	C		C					B	B	A	A	
Approach Delay, s/veh / LOS	22.6		C	0.0			14.1		B	6.8		A
Intersection Delay, s/veh / LOS	13.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.38	A	1.64	B
Bicycle LOS Score / LOS		F			1.05	A	0.96	A

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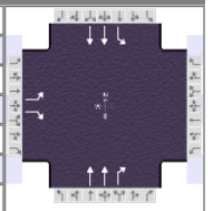
Received August 17, 2022 Planning & Design Services 22-DDP-0033

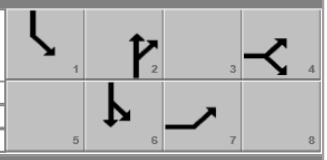
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Smyrna Parkway	Analysis Year	2034 No Build	Analysis Period	1> 8:00
Intersection	I 265 EB	File Name	AM 34 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	175		117					427	247	169	371	

Signal Information					EB			WB			NB			SB		
Cycle, s	55.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	5.7	19.0		9.4	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	4.0		4.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	3.1		3.3	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		16.7				26.1	12.1	38.2
Change Period, (*Y+R c*), s		7.3				7.1	6.4	7.1
Max Allow Headway (*MAH*), s		5.2				5.1	4.6	5.1
Queue Clearance Time (*g s*), s		7.7				9.5	5.3	5.4
Green Extension Time (*g e*), s		1.8				9.6	0.7	9.6
Phase Call Probability		0.99				1.00	0.94	1.00
Max Out Probability		0.00				0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	194		130					474	274	186	408	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753		1485					1781	1598	1767	1654	
Queue Service Time (*g s*), s	5.7		4.4					5.5	7.5	3.3	3.4	
Cycle Queue Clearance Time (*g c*), s	5.7		4.4					5.5	7.5	3.3	3.4	
Green Ratio (*g/C*)	0.17		0.17					0.35	0.35	0.49	0.57	
Capacity (*c*), veh/h	301		255					1233	553	539	1873	
Volume-to-Capacity Ratio (*X*)	0.645		0.509					0.385	0.496	0.345	0.218	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	4.2		2.7					3.5	4.4	1.9	1.5	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.00		0.00					0.00	0.00	0.17	0.00	
Uniform Delay (*d 1*), s/veh	21.2		20.7					13.6	14.2	8.7	5.9	
Incremental Delay (*d 2*), s/veh	3.3		2.2					0.3	1.0	0.4	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	24.5		22.9					13.8	15.2	9.2	6.0	
Level of Service (LOS)	C		C					B	B	A	A	
Approach Delay, s/veh / LOS	23.9		C	0.0			14.3		B	7.0		A
Intersection Delay, s/veh / LOS	13.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.38	A	1.64	B
Bicycle LOS Score / LOS		F			1.11	A	0.98	A

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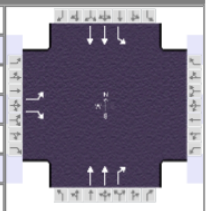
Received August 17, 2022 Planning & Design Services 22-DDP-0033

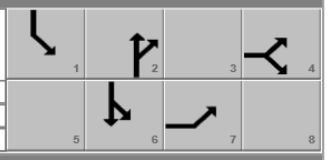
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Smyrna Parkway	Analysis Year	2034 Build	Analysis Period	1> 8:00
Intersection	I 265 EB	File Name	AM 34 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	179		117					431	247	181	383	

Signal Information					EB			WB			NB			SB		
Cycle, s	55.6	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	5.9	19.2		9.7	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	4.0		4.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	3.1		3.3	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		17.0				26.3	12.3	38.7
Change Period, (*Y+R c*), s		7.3				7.1	6.4	7.1
Max Allow Headway (*MAH*), s		5.2				5.1	4.6	5.1
Queue Clearance Time (*g s*), s		7.9				9.6	5.5	5.4
Green Extension Time (*g e*), s		1.8				9.6	0.8	9.7
Phase Call Probability		0.99				1.00	0.95	1.00
Max Out Probability		0.00				0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	199		130					479	274	193	409	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753		1485					1781	1598	1767	1654	
Queue Service Time (*g s*), s	5.9		4.4					5.7	7.6	3.5	3.4	
Cycle Queue Clearance Time (*g c*), s	5.9		4.4					5.7	7.6	3.5	3.4	
Green Ratio (*g/C*)	0.17		0.17					0.35	0.35	0.49	0.57	
Capacity (*c*), veh/h	305		258					1230	552	541	1876	
Volume-to-Capacity Ratio (*X*)	0.652		0.503					0.389	0.497	0.358	0.218	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	4.4		2.8					3.6	4.5	2.0	1.5	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.00		0.00					0.00	0.00	0.19	0.00	
Uniform Delay (*d 1*), s/veh	21.4		20.8					13.8	14.4	8.8	5.9	
Incremental Delay (*d 2*), s/veh	3.3		2.2					0.3	1.0	0.5	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	24.8		23.0					14.1	15.4	9.3	6.0	
Level of Service (LOS)	C		C					B	B	A	A	
Approach Delay, s/veh / LOS	24.0	C		0.0			14.6	B		7.1	A	
Intersection Delay, s/veh / LOS	13.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.38	A	1.64	B
Bicycle LOS Score / LOS		F			1.11	A	1.00	A

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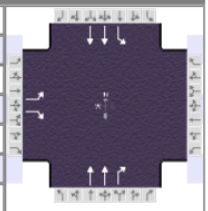
Received August 17, 2022 Planning & Design Services 22-DDP-0033

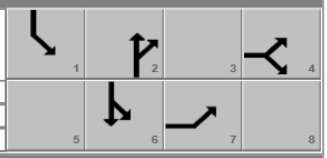
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2022	Analysis Period	1> 4:45
Intersection	I 265 EB	File Name	PM 22.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	246		131					396	256	278	668	

Signal Information					EB			WB			NB			SB		
Cycle, s	70.7	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	10.1	25.3		14.5	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	4.0		4.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	3.1		3.3	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		21.8				32.4	16.5	48.9
Change Period, (*Y+R c*), s		7.3				7.1	6.4	7.1
Max Allow Headway (*MAH*), s		5.2				5.1	4.6	5.1
Queue Clearance Time (*g s*), s		12.2				11.7	8.9	10.2
Green Extension Time (*g e*), s		2.2				13.5	1.2	13.8
Phase Call Probability		1.00				1.00	1.00	1.00
Max Out Probability		0.02				0.01	0.01	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	270		144					435	281	304	730	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753		1485					1781	1598	1767	1654	
Queue Service Time (*g s*), s	10.2		6.0					6.3	9.7	6.9	8.2	
Cycle Queue Clearance Time (*g c*), s	10.2		6.0					6.3	9.7	6.9	8.2	
Green Ratio (*g/C*)	0.21		0.21					0.36	0.36	0.53	0.59	
Capacity (*c*), veh/h	360		305					1273	571	609	1955	
Volume-to-Capacity Ratio (*X*)	0.751		0.472					0.342	0.493	0.498	0.373	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	7.1		3.8					4.3	5.8	4.1	4.1	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.00		0.00					0.00	0.00	0.38	0.00	
Uniform Delay (*d 1*), s/veh	26.4		24.7					16.6	17.7	10.2	7.6	
Incremental Delay (*d 2*), s/veh	4.5		1.6					0.2	0.9	0.6	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	30.9		26.4					16.9	18.7	10.8	7.7	
Level of Service (LOS)	C		C					B	B	B	A	
Approach Delay, s/veh / LOS	29.3		C	0.0			17.6		B	8.6		A
Intersection Delay, s/veh / LOS	15.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.39	A	1.64	B
Bicycle LOS Score / LOS		F			1.08	A	1.35	A

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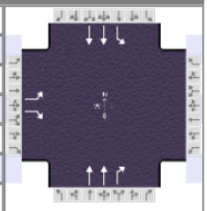
Received August 17, 2022 Planning & Design Services 22-DDP-0033

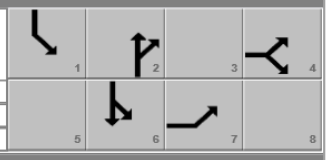
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2024 No Build	Analysis Period	1> 4:45
Intersection	I 265 EB	File Name	PM 24 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	251		134					404	261	284	681	

Signal Information					EB			WB			NB			SB		
Cycle, s	72.3	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	10.4	26.1		15.0	0.0		0.0	0.0		0.0	0.0	
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	4.0		4.0	0.0		0.0	0.0		0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	3.1		3.3	0.0		0.0	0.0		0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		22.3				33.2	16.8	50.0
Change Period, (*Y+R c*), s		7.3				7.1	6.4	7.1
Max Allow Headway (*MAH*), s		5.2				5.1	4.6	5.1
Queue Clearance Time (*g s*), s		12.7				12.1	9.2	10.5
Green Extension Time (*g e*), s		2.3				13.9	1.2	14.3
Phase Call Probability		1.00				1.00	1.00	1.00
Max Out Probability		0.03				0.02	0.01	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	276		147					444	287	310	744	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753		1485					1781	1598	1767	1654	
Queue Service Time (*g s*), s	10.7		6.3					6.6	10.1	7.2	8.5	
Cycle Queue Clearance Time (*g c*), s	10.7		6.3					6.6	10.1	7.2	8.5	
Green Ratio (*g/C*)	0.21		0.21					0.36	0.36	0.53	0.59	
Capacity (*c*), veh/h	364		308					1285	576	609	1963	
Volume-to-Capacity Ratio (*X*)	0.759		0.478					0.345	0.498	0.510	0.379	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	7.4		4.0					4.5	6.0	4.2	4.2	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.00		0.00					0.00	0.00	0.39	0.00	
Uniform Delay (*d 1*), s/veh	27.0		25.2					16.9	18.0	10.3	7.7	
Incremental Delay (*d 2*), s/veh	4.6		1.6					0.2	0.9	0.6	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	31.6		26.9					17.1	19.0	10.9	7.8	
Level of Service (LOS)	C		C					B	B	B	A	
Approach Delay, s/veh / LOS	29.9		C	0.0			17.8		B	8.8		A
Intersection Delay, s/veh / LOS	15.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.39	A	1.64	B
Bicycle LOS Score / LOS		F			1.09	A	1.36	A

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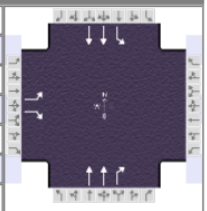
Received August 17, 2022 Planning & Design Services 22-DDP-0033

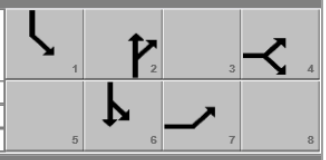
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2024 Build	Analysis Period	1> 4:45
Intersection	I 265 EB	File Name	PM 24 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	264		134					417	261	292	689	

Signal Information					EB			WB			NB			SB		
Cycle, s	74.5	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	10.9	26.8		15.9	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	4.0		4.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	3.1		3.3	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		23.2				33.9	17.3	51.2
Change Period, (*Y+R c*), s		7.3				7.1	6.4	7.1
Max Allow Headway (*MAH*), s		5.2				5.1	4.6	5.1
Queue Clearance Time (*g s*), s		13.6				12.4	9.7	11.0
Green Extension Time (*g e*), s		2.3				14.3	1.3	14.7
Phase Call Probability		1.00				1.00	1.00	1.00
Max Out Probability		0.04				0.02	0.01	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	290		147					458	287	320	754	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753		1485					1781	1598	1767	1654	
Queue Service Time (*g s*), s	11.6		6.5					7.0	10.4	7.7	9.0	
Cycle Queue Clearance Time (*g c*), s	11.6		6.5					7.0	10.4	7.7	9.0	
Green Ratio (*g/C*)	0.21		0.21					0.36	0.36	0.53	0.59	
Capacity (*c*), veh/h	375		318					1281	575	603	1960	
Volume-to-Capacity Ratio (*X*)	0.773		0.463					0.358	0.499	0.530	0.385	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	8.0		4.1					4.8	6.2	4.5	4.4	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.00		0.00					0.00	0.00	0.42	0.00	
Uniform Delay (*d 1*), s/veh	27.6		25.6					17.5	18.6	10.7	8.0	
Incremental Delay (*d 2*), s/veh	4.8		1.5					0.2	1.0	0.7	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	32.4		27.0					17.8	19.6	11.4	8.1	
Level of Service (LOS)	C		C					B	B	B	A	
Approach Delay, s/veh / LOS	30.6		C	0.0			18.5		B	9.1		A
Intersection Delay, s/veh / LOS	16.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.39	A	1.65	B
Bicycle LOS Score / LOS		F			1.10	A	1.38	A

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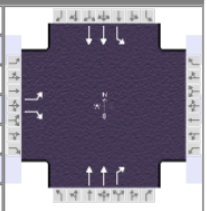
Received August 17, 2022 Planning & Design Services 22-DDP-0033

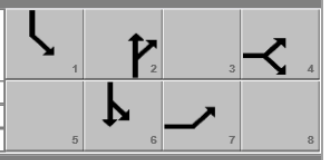
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2034 No Build	Analysis Period	1> 4:45
Intersection	I 265 EB	File Name	PM 34 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	277		148					446	288	314	752	

Signal Information					EB			WB			NB			SB		
Cycle, s	81.8	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	12.2	31.0		17.8	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	4.0		4.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	3.1		3.3	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		25.1				38.1	18.6	56.7
Change Period, (*Y+R c*), s		7.3				7.1	6.4	7.1
Max Allow Headway (*MAH*), s		5.2				5.1	4.6	5.1
Queue Clearance Time (*g s*), s		15.5				14.6	10.8	12.7
Green Extension Time (*g e*), s		2.4				16.4	1.3	17.0
Phase Call Probability		1.00				1.00	1.00	1.00
Max Out Probability		0.08				0.04	0.02	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	304		163					490	316	343	822	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753		1485					1781	1598	1767	1654	
Queue Service Time (*g s*), s	13.5		7.9					8.1	12.6	8.8	10.7	
Cycle Queue Clearance Time (*g c*), s	13.5		7.9					8.1	12.6	8.8	10.7	
Green Ratio (*g/C*)	0.22		0.22					0.38	0.38	0.55	0.61	
Capacity (*c*), veh/h	382		324					1349	605	603	2004	
Volume-to-Capacity Ratio (*X*)	0.796		0.502					0.363	0.523	0.569	0.410	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	9.1		5.0					5.5	7.2	5.1	5.2	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.00		0.00					0.00	0.00	0.47	0.00	
Uniform Delay (*d 1*), s/veh	30.3		28.1					18.3	19.7	11.2	8.5	
Incremental Delay (*d 2*), s/veh	5.3		1.7					0.2	1.0	0.7	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	35.6		29.8					18.6	20.7	11.9	8.6	
Level of Service (LOS)	D		C					B	C	B	A	
Approach Delay, s/veh / LOS	33.6		C	0.0			19.4		B	9.6		A
Intersection Delay, s/veh / LOS	17.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.31	B	2.31	B	1.39	A	1.65	B
Bicycle LOS Score / LOS		F			1.15	A	1.45	A

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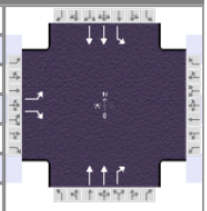
Received August 17, 2022 Planning & Design Services 22-DDP-0033

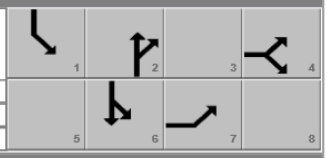
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2034 Build	Analysis Period	1> 4:45
Intersection	I 265 EB	File Name	PM 34 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	290		148					459	288	322	760	

Signal Information					EB			WB			NB			SB		
Cycle, s	82.6	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	12.2	31.0		18.6	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	4.0		4.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	3.1		3.3	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		25.9				38.1	18.6	56.7
Change Period, (*Y+R c*), s		7.3				7.1	6.4	7.1
Max Allow Headway (*MAH*), s		5.2				5.1	4.6	5.1
Queue Clearance Time (*g s*), s		16.2				14.8	10.8	12.5
Green Extension Time (*g e*), s		2.4				16.2	1.3	16.8
Phase Call Probability		1.00				1.00	1.00	1.00
Max Out Probability		0.10				0.04	0.02	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	319		163					504	316	338	797	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753		1485					1781	1598	1767	1654	
Queue Service Time (*g s*), s	14.2		7.9					8.5	12.8	8.8	10.5	
Cycle Queue Clearance Time (*g c*), s	14.2		7.9					8.5	12.8	8.8	10.5	
Green Ratio (*g/C*)	0.23		0.23					0.38	0.38	0.55	0.60	
Capacity (*c*), veh/h	396		335					1336	599	590	1984	
Volume-to-Capacity Ratio (*X*)	0.805		0.485					0.378	0.528	0.573	0.402	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	9.5		5.0					5.7	7.4	5.1	5.2	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.00		0.00					0.00	0.00	0.48	0.00	
Uniform Delay (*d 1*), s/veh	30.3		27.8					18.8	20.1	11.6	8.7	
Incremental Delay (*d 2*), s/veh	5.5		1.5					0.3	1.0	0.8	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	35.8		29.4					19.1	21.2	12.4	8.9	
Level of Service (LOS)	D		C					B	C	B	A	
Approach Delay, s/veh / LOS	33.6		C	0.0			19.9		B	9.9		A
Intersection Delay, s/veh / LOS	17.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.31	B	2.31	B	1.39	A	1.65	B
Bicycle LOS Score / LOS		F			1.16	A	1.47	A

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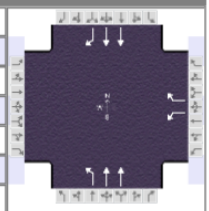
Received August 17, 2022 Planning & Design Services 22-DDP-0033

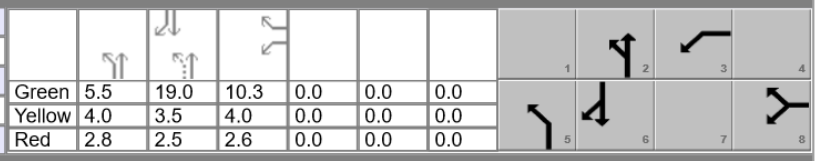
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2022	Analysis Period	1> 8:00
Intersection	I 265 WB	File Name	AM 22.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				140		180	147	388			339	271

Signal Information			
Cycle, s	54.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.5	19.0	10.3	0.0	0.0	0.0						
Yellow	4.0	3.5	4.0	0.0	0.0	0.0						
Red	2.8	2.5	2.6	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		7.3
Phase Duration, s				16.9	12.3	37.3		25.0
Change Period, (*Y+R* $_c$), s				6.6	6.8	6.0		6.0
Max Allow Headway (*MAH*), s				5.3	4.6	5.1		5.1
Queue Clearance Time (*g* $_s$), s				8.3	4.8	5.2		10.1
Green Extension Time (*g* $_e$), s				2.0	0.6	9.0		8.9
Phase Call Probability				0.99	0.91	1.00		1.00
Max Out Probability				0.00	0.00	0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	16
Adjusted Flow Rate (*v*), veh/h				154		198	163	430			373	298
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1781		1572	1781	1766			1738	1598
Queue Service Time (*g* $_s$), s				4.2		6.3	2.8	3.2			4.2	8.1
Cycle Queue Clearance Time (*g* $_c$), s				4.2		6.3	2.8	3.2			4.2	8.1
Green Ratio (*g/C*)				0.19		0.19	0.49	0.58			0.35	0.35
Capacity (*c*), veh/h				338		299	590	2041			1221	561
Volume-to-Capacity Ratio (*X*)				0.455		0.663	0.276	0.211			0.306	0.532
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)				3.0		4.2	1.5	1.5			2.6	4.6
Queue Storage Ratio (*RQ*) (90 th percentile)				0.00		0.00	0.13	0.00			0.00	0.00
Uniform Delay (*d* $_1$), s/veh				19.5		20.4	8.2	5.5			12.8	14.0
Incremental Delay (*d* $_2$), s/veh				1.4		3.6	0.3	0.1			0.2	1.0
Initial Queue Delay (*d* $_3$), s/veh				0.0		0.0	0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh				20.8		23.9	8.5	5.6			13.0	15.0
Level of Service (LOS)				C		C	A	A			B	B
Approach Delay, s/veh / LOS	0.0			22.6		C	6.4		A	13.9		B
Intersection Delay, s/veh / LOS	13.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.64	B	1.38	A
Bicycle LOS Score / LOS				F	0.97	A	1.04	A

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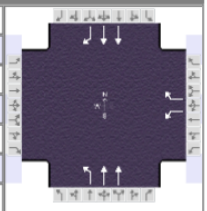
Received August 17, 2022 Planning & Design Services 22-DDP-0033

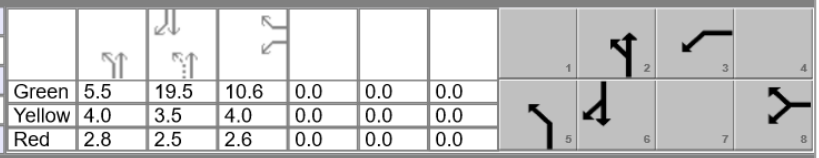
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2024 No Build	Analysis Period	1> 8:00
Intersection	I 265 WB	File Name	AM 24 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				143		184	150	396			346	276

Signal Information			
Cycle, s	55.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.5	19.5	10.6	0.0	0.0	0.0		
Yellow	4.0	3.5	4.0	0.0	0.0	0.0		
Red	2.8	2.5	2.6	0.0	0.0	0.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		7.3
Phase Duration, s				17.2	12.3	37.9		25.5
Change Period, (*Y+R c*), s				6.6	6.8	6.0		6.0
Max Allow Headway (*MAH*), s				5.3	4.6	5.1		5.1
Queue Clearance Time (*g s*), s				8.6	4.9	5.3		10.3
Green Extension Time (*g e*), s				2.0	0.6	9.2		9.2
Phase Call Probability				1.00	0.92	1.00		1.00
Max Out Probability				0.00	0.00	0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	16
Adjusted Flow Rate (*v*), veh/h				157		202	166	439			381	304
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1781		1572	1781	1766			1738	1598
Queue Service Time (*g s*), s				4.3		6.6	2.9	3.3			4.4	8.3
Cycle Queue Clearance Time (*g c*), s				4.3		6.6	2.9	3.3			4.4	8.3
Green Ratio (*g/C*)				0.19		0.19	0.49	0.58			0.35	0.35
Capacity (*c*), veh/h				343		302	587	2046			1235	567
Volume-to-Capacity Ratio (*X*)				0.459		0.669	0.283	0.215			0.308	0.535
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)				3.1		4.4	1.6	1.5			2.7	4.6
Queue Storage Ratio (*RQ*) (90 th percentile)				0.00		0.00	0.14	0.00			0.00	0.00
Uniform Delay (*d 1*), s/veh				19.7		20.6	8.3	5.6			12.9	14.1
Incremental Delay (*d 2*), s/veh				1.4		3.6	0.3	0.1			0.2	0.9
Initial Queue Delay (*d 3*), s/veh				0.0		0.0	0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh				21.1		24.2	8.6	5.6			13.0	15.0
Level of Service (LOS)				C		C	A	A			B	B
Approach Delay, s/veh / LOS	0.0			22.9		C	6.4		A	13.9		B
Intersection Delay, s/veh / LOS	13.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.64	B	1.38	A
Bicycle LOS Score / LOS				F	0.98	A	1.05	A

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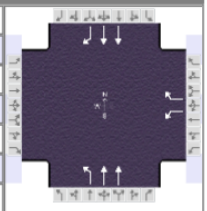
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Signalized Intersection Results Summary

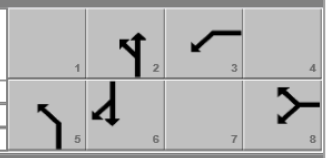
General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2024 Build	Analysis Period	1> 8:00
Intersection	I 265 WB	File Name	AM 24 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				143		188	150	404			370	289

Signal Information			
Cycle, s	55.6	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	5.5	19.8	10.8	0.0	0.0	0.0	
Yellow	4.0	3.5	4.0	0.0	0.0	0.0	
Red	2.8	2.5	2.6	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		7.3
Phase Duration, s				17.4	12.3	38.2		25.8
Change Period, (*Y+R c*), s				6.6	6.8	6.0		6.0
Max Allow Headway (*MAH*), s				5.3	4.6	5.1		5.1
Queue Clearance Time (*g s*), s				8.8	4.9	5.4		10.4
Green Extension Time (*g e*), s				2.1	0.6	9.5		9.4
Phase Call Probability				1.00	0.92	1.00		1.00
Max Out Probability				0.00	0.00	0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	16
Adjusted Flow Rate (*v*), veh/h				157		207	166	448			389	304
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1781		1572	1781	1766			1738	1598
Queue Service Time (*g s*), s				4.3		6.8	2.9	3.4			4.5	8.4
Cycle Queue Clearance Time (*g c*), s				4.3		6.8	2.9	3.4			4.5	8.4
Green Ratio (*g/C*)				0.19		0.19	0.49	0.58			0.36	0.36
Capacity (*c*), veh/h				347		306	582	2045			1240	570
Volume-to-Capacity Ratio (*X*)				0.453		0.675	0.286	0.219			0.314	0.534
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)				3.1		4.5	1.6	1.6			2.7	4.6
Queue Storage Ratio (*RQ*) (90 th percentile)				0.00		0.00	0.14	0.00			0.00	0.00
Uniform Delay (*d 1*), s/veh				19.8		20.8	8.4	5.7			13.0	14.2
Incremental Delay (*d 2*), s/veh				1.3		3.7	0.3	0.1			0.2	0.9
Initial Queue Delay (*d 3*), s/veh				0.0		0.0	0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh				21.1		24.4	8.6	5.7			13.1	15.1
Level of Service (LOS)				C		C	A	A			B	B
Approach Delay, s/veh / LOS	0.0			23.0		C	6.5		A	14.0		B
Intersection Delay, s/veh / LOS	13.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.64	B	1.38	A
Bicycle LOS Score / LOS				F	0.99	A	1.09	A

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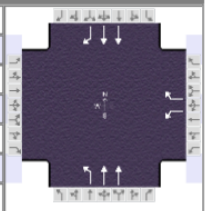
Received August 17, 2022 Planning & Design Services 22-DDP-0033

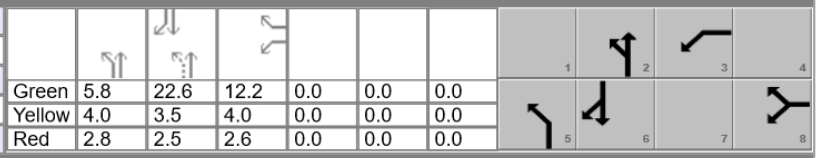
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2034 No Build	Analysis Period	1> 8:00
Intersection	I 265 WB	File Name	AM 34 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				158		203	166	437			382	305

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



	EB			WB			NB			SB		
Green	5.8	22.6		12.2	0.0	0.0	0.0					
Yellow	4.0	3.5		4.0	0.0	0.0	0.0					
Red	2.8	2.5		2.6	0.0	0.0	0.0					

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		7.3
Phase Duration, s				18.8	12.6	41.3		28.6
Change Period, (*Y+R c*), s				6.6	6.8	6.0		6.0
Max Allow Headway (*MAH*), s				5.3	4.6	5.1		5.1
Queue Clearance Time (*g s*), s				9.9	5.4	5.9		12.0
Green Extension Time (*g e*), s				2.2	0.7	10.7		10.6
Phase Call Probability				1.00	0.95	1.00		1.00
Max Out Probability				0.01	0.00	0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	16
Adjusted Flow Rate (*v*), veh/h				174		223	184	485			420	336
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1781		1572	1781	1766			1738	1598
Queue Service Time (*g s*), s				5.2		7.9	3.4	3.9			5.2	10.0
Cycle Queue Clearance Time (*g c*), s				5.2		7.9	3.4	3.9			5.2	10.0
Green Ratio (*g/C*)				0.20		0.20	0.51	0.59			0.38	0.38
Capacity (*c*), veh/h				361		319	576	2075			1310	602
Volume-to-Capacity Ratio (*X*)				0.481		0.699	0.320	0.234			0.321	0.558
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)				3.8		5.2	2.0	1.9			3.2	5.3
Queue Storage Ratio (*RQ*) (90 th percentile)				0.00		0.00	0.17	0.00			0.00	0.00
Uniform Delay (*d 1*), s/veh				21.2		22.2	8.6	5.9			13.3	14.8
Incremental Delay (*d 2*), s/veh				1.4		3.9	0.3	0.1			0.2	0.9
Initial Queue Delay (*d 3*), s/veh				0.0		0.0	0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh				22.6		26.2	9.0	6.0			13.4	15.7
Level of Service (LOS)				C		C	A	A			B	B
Approach Delay, s/veh / LOS	0.0			24.6		C	6.8		A	14.4		B
Intersection Delay, s/veh / LOS	13.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.64	B	1.38	A
Bicycle LOS Score / LOS				F	1.03	A	1.11	A

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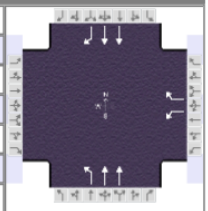
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2034 Build	Analysis Period	1> 8:00
Intersection	I 265 WB	File Name	AM 34 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				158		207	166	445			406	318

Signal Information					EB			WB			NB		
Cycle, s	60.6	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	5.9	22.9	12.4	0.0	0.0	0.0			
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	3.5	4.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.8	2.5	2.6	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		7.3
Phase Duration, s				19.0	12.7	41.6		28.9
Change Period, (*Y+R c*), s				6.6	6.8	6.0		6.0
Max Allow Headway (*MAH*), s				5.3	4.6	5.1		5.1
Queue Clearance Time (*g s*), s				10.2	5.4	6.1		12.1
Green Extension Time (*g e*), s				2.3	0.7	11.0		10.8
Phase Call Probability				1.00	0.96	1.00		1.00
Max Out Probability				0.01	0.00	0.00		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	16
Adjusted Flow Rate (*v*), veh/h				174		227	184	494			429	336
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1781		1572	1781	1766			1738	1598
Queue Service Time (*g s*), s				5.2		8.2	3.4	4.1			5.3	10.1
Cycle Queue Clearance Time (*g c*), s				5.2		8.2	3.4	4.1			5.3	10.1
Green Ratio (*g/C*)				0.20		0.20	0.51	0.59			0.38	0.38
Capacity (*c*), veh/h				365		323	571	2075			1315	604
Volume-to-Capacity Ratio (*X*)				0.475		0.705	0.322	0.238			0.326	0.556
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)				3.8		5.3	2.0	2.0			3.3	5.3
Queue Storage Ratio (*RQ*) (90 th percentile)				0.00		0.00	0.17	0.00			0.00	0.00
Uniform Delay (*d 1*), s/veh				21.2		22.4	8.7	6.0			13.4	14.9
Incremental Delay (*d 2*), s/veh				1.4		4.0	0.3	0.1			0.2	0.9
Initial Queue Delay (*d 3*), s/veh				0.0		0.0	0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh				22.6		26.4	9.1	6.1			13.5	15.7
Level of Service (LOS)				C		C	A	A			B	B
Approach Delay, s/veh / LOS	0.0			24.8		C	6.9		A	14.5		B
Intersection Delay, s/veh / LOS	13.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.64	B	1.38	A
Bicycle LOS Score / LOS				F	1.04	A	1.14	A

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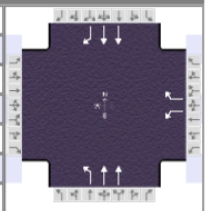
Received August 17, 2022 Planning & Design Services 22-DDP-0033

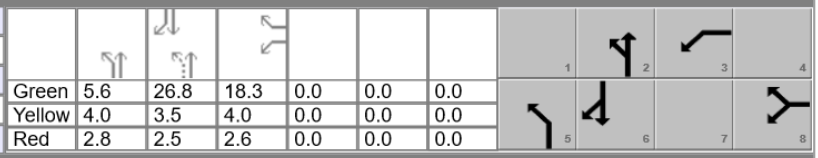
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.95
Urban Street	Smyrna Parkway	Analysis Year	2022	Analysis Period	1> 4:45
Intersection	I 265 WB	File Name	PM 22.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				334		277	128	515			612	263

Signal Information			
Cycle, s	70.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.6	26.8	18.3	0.0	0.0	0.0		
Yellow	4.0	3.5	4.0	0.0	0.0	0.0		
Red	2.8	2.5	2.6	0.0	0.0	0.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		7.3
Phase Duration, s				24.9	12.4	45.2		32.8
Change Period, (*Y+R c*), s				6.6	6.8	6.0		6.0
Max Allow Headway (*MAH*), s				5.2	4.6	5.1		5.1
Queue Clearance Time (*g s*), s				14.8	5.1	7.9		12.3
Green Extension Time (*g e*), s				3.5	0.5	14.9		14.5
Phase Call Probability				1.00	0.94	1.00		1.00
Max Out Probability				0.14	0.00	0.00		0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	16
Adjusted Flow Rate (*v*), veh/h				352		292	140	565			666	286
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1781		1572	1781	1766			1738	1598
Queue Service Time (*g s*), s				12.8		11.8	3.1	5.9			10.3	9.5
Cycle Queue Clearance Time (*g c*), s				12.8		11.8	3.1	5.9			10.3	9.5
Green Ratio (*g/C*)				0.26		0.26	0.49	0.56			0.38	0.38
Capacity (*c*), veh/h				464		410	428	1977			1330	611
Volume-to-Capacity Ratio (*X*)				0.757		0.711	0.328	0.286			0.501	0.468
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)				8.4		7.1	2.0	3.4			5.7	5.0
Queue Storage Ratio (*RQ*) (90 th percentile)				0.00		0.00	0.17	0.00			0.00	0.00
Uniform Delay (*d 1*), s/veh				23.9		23.5	11.2	8.1			16.5	16.3
Incremental Delay (*d 2*), s/veh				3.6		3.2	0.5	0.1			0.3	0.5
Initial Queue Delay (*d 3*), s/veh				0.0		0.0	0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh				27.5		26.8	11.6	8.2			16.8	16.8
Level of Service (LOS)				C		C	B	A			B	B
Approach Delay, s/veh / LOS	0.0			27.2		C	8.9		A	16.8		B
Intersection Delay, s/veh / LOS	17.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.65	B	1.38	A
Bicycle LOS Score / LOS				F	1.05	A	1.25	A

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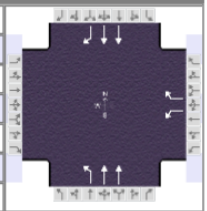
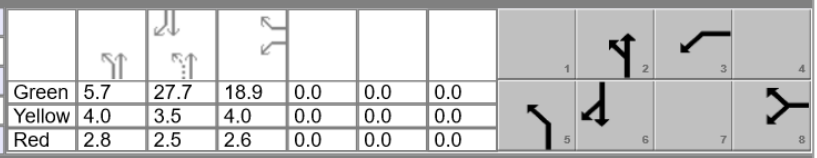
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.95
Urban Street	Smyrna Parkway	Analysis Year	2024 No Build	Analysis Period	1> 4:45
Intersection	I 265 WB	File Name	PM 24 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				341		283	131	525			624	268

Signal Information			
Cycle, s	71.6	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.7	27.7	18.9	0.0	0.0	0.0		
Yellow	4.0	3.5	4.0	0.0	0.0	0.0		
Red	2.8	2.5	2.6	0.0	0.0	0.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		7.3
Phase Duration, s				25.5	12.5	46.2		33.7
Change Period, (*Y+R c*), s				6.6	6.8	6.0		6.0
Max Allow Headway (*MAH*), s				5.2	4.6	5.1		5.1
Queue Clearance Time (*g s*), s				15.3	5.2	8.1		12.7
Green Extension Time (*g e*), s				3.5	0.5	15.4		15.0
Phase Call Probability				1.00	0.94	1.00		1.00
Max Out Probability				0.16	0.00	0.00		0.03

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	16
Adjusted Flow Rate (*v*), veh/h				359		298	144	576			680	292
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1781		1572	1781	1766			1738	1598
Queue Service Time (*g s*), s				13.3		12.3	3.2	6.1			10.7	9.8
Cycle Queue Clearance Time (*g c*), s				13.3		12.3	3.2	6.1			10.7	9.8
Green Ratio (*g/C*)				0.26		0.26	0.49	0.56			0.39	0.39
Capacity (*c*), veh/h				469		414	422	1981			1345	618
Volume-to-Capacity Ratio (*X*)				0.765		0.719	0.340	0.291			0.505	0.472
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)				8.7		7.4	2.1	3.5			5.9	5.2
Queue Storage Ratio (*RQ*) (90 th percentile)				0.00		0.00	0.17	0.00			0.00	0.00
Uniform Delay (*d 1*), s/veh				24.3		24.0	11.4	8.3			16.7	16.5
Incremental Delay (*d 2*), s/veh				3.7		3.3	0.5	0.1			0.3	0.5
Initial Queue Delay (*d 3*), s/veh				0.0		0.0	0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh				28.1		27.3	11.9	8.4			17.0	17.0
Level of Service (LOS)				C		C	B	A			B	B
Approach Delay, s/veh / LOS	0.0			27.7		C	9.1		A	17.0		B
Intersection Delay, s/veh / LOS	17.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.65	B	1.38	A
Bicycle LOS Score / LOS				F	1.06	A	1.26	A

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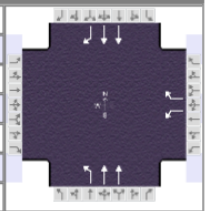
HCS Signalized Intersection Results Summary

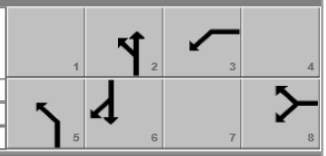
General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.95
Urban Street	Smyrna Parkway	Analysis Year	2024 Build	Analysis Period	1> 4:45
Intersection	I 265 WB	File Name	PM 24 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				341		296	131	551			640	276

Signal Information			
Cycle, s	73.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	5.7	29.1	19.3	0.0	0.0	0.0	
Yellow	4.0	3.5	4.0	0.0	0.0	0.0	
Red	2.8	2.5	2.6	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		7.3
Phase Duration, s				25.9	12.5	47.6		35.1
Change Period, (*Y+R c*), s				6.6	6.8	6.0		6.0
Max Allow Headway (*MAH*), s				5.2	4.6	5.1		5.1
Queue Clearance Time (*g s*), s				15.7	5.2	8.6		13.2
Green Extension Time (*g e*), s				3.6	0.5	16.5		15.9
Phase Call Probability				1.00	0.95	1.00		1.00
Max Out Probability				0.18	0.00	0.01		0.04

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	16
Adjusted Flow Rate (*v*), veh/h				359		312	144	605			699	301
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1781		1572	1781	1766			1738	1598
Queue Service Time (*g s*), s				13.7		13.4	3.2	6.6			11.2	10.3
Cycle Queue Clearance Time (*g c*), s				13.7		13.4	3.2	6.6			11.2	10.3
Green Ratio (*g/C*)				0.26		0.26	0.50	0.57			0.40	0.40
Capacity (*c*), veh/h				468		413	419	2000			1378	633
Volume-to-Capacity Ratio (*X*)				0.768		0.755	0.343	0.302			0.507	0.476
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)				9.0		8.0	2.1	3.8			6.1	5.4
Queue Storage Ratio (*RQ*) (90 th percentile)				0.00		0.00	0.18	0.00			0.00	0.00
Uniform Delay (*d 1*), s/veh				25.0		24.9	11.4	8.3			16.8	16.5
Incremental Delay (*d 2*), s/veh				3.8		4.0	0.5	0.1			0.2	0.5
Initial Queue Delay (*d 3*), s/veh				0.0		0.0	0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh				28.8		28.9	11.9	8.4			17.0	17.0
Level of Service (LOS)				C		C	B	A			B	B
Approach Delay, s/veh / LOS	0.0			28.9		C	9.1		A	17.0		B
Intersection Delay, s/veh / LOS	17.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.65	B	1.38	A
Bicycle LOS Score / LOS				F	1.08	A	1.28	A

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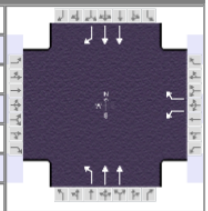
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Signalized Intersection Results Summary

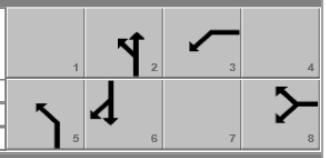
General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.95
Urban Street	Smyrna Parkway	Analysis Year	2034 No Build	Analysis Period	1> 4:45
Intersection	I 265 WB	File Name	PM 34 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				377		313	145	580			689	296

Signal Information			
Cycle, s	78.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.2	31.3	21.9	0.0	0.0	0.0	
Yellow	4.0	3.5	4.0	0.0	0.0	0.0	
Red	2.8	2.5	2.6	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		7.3
Phase Duration, s				28.5	13.0	50.4		37.3
Change Period, (*Y+R c*), s				6.6	6.8	6.0		6.0
Max Allow Headway (*MAH*), s				5.2	4.6	5.1		5.1
Queue Clearance Time (*g s*), s				18.3	5.9	9.6		14.4
Green Extension Time (*g e*), s				3.5	0.6	17.6		16.9
Phase Call Probability				1.00	0.97	1.00		1.00
Max Out Probability				0.33	0.00	0.01		0.05

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	16
Adjusted Flow Rate (*v*), veh/h				397		329	159	636			719	309
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1781		1572	1781	1766			1738	1598
Queue Service Time (*g s*), s				16.3		15.1	3.9	7.6			12.4	11.4
Cycle Queue Clearance Time (*g c*), s				16.3		15.1	3.9	7.6			12.4	11.4
Green Ratio (*g/C*)				0.28		0.28	0.50	0.56			0.40	0.40
Capacity (*c*), veh/h				495		437	409	1988			1381	635
Volume-to-Capacity Ratio (*X*)				0.802		0.755	0.389	0.320			0.521	0.487
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)				10.8		9.0	2.6	4.4			6.7	5.9
Queue Storage Ratio (*RQ*) (90 th percentile)				0.00		0.00	0.22	0.00			0.00	0.00
Uniform Delay (*d 1*), s/veh				26.5		26.1	12.4	9.2			18.1	17.8
Incremental Delay (*d 2*), s/veh				5.9		4.6	0.6	0.1			0.3	0.5
Initial Queue Delay (*d 3*), s/veh				0.0		0.0	0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh				32.4		30.7	13.0	9.3			18.3	18.3
Level of Service (LOS)				C		C	B	A			B	B
Approach Delay, s/veh / LOS	0.0			31.6		C	10.1		B	18.3		B
Intersection Delay, s/veh / LOS	19.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.65	B	1.39	A
Bicycle LOS Score / LOS				F	1.12	A	1.34	A

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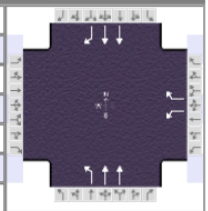
Received August 17, 2022 Planning & Design Services 22-DDP-0033

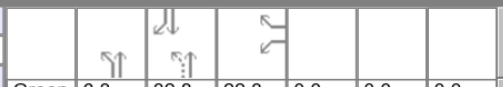
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.95
Urban Street	Smyrna Parkway	Analysis Year	2034 Build	Analysis Period	1> 4:45
Intersection	I 265 WB	File Name	PM 34 B.xus		
Project Description	Smyrna Village				

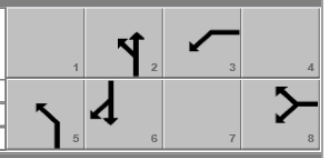


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				377		326	145	606			705	304

Signal Information			
Cycle, s	80.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.3	32.8	22.3	0.0	0.0	0.0						
Yellow	4.0	3.5	4.0	0.0	0.0	0.0						
Red	2.8	2.5	2.6	0.0	0.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		7.3
Phase Duration, s				28.9	13.1	51.9		38.8
Change Period, (*Y+R* $_c$), s				6.6	6.8	6.0		6.0
Max Allow Headway (*MAH*), s				5.2	4.6	5.1		5.1
Queue Clearance Time (*g* $_s$), s				18.8	5.9	10.1		14.9
Green Extension Time (*g* $_e$), s				3.5	0.6	18.8		17.9
Phase Call Probability				1.00	0.97	1.00		1.00
Max Out Probability				0.37	0.00	0.01		0.06

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	16
Adjusted Flow Rate (*v*), veh/h				397		343	159	664			738	318
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1781		1572	1781	1766			1738	1598
Queue Service Time (*g* $_s$), s				16.8		16.4	3.9	8.1			12.9	12.0
Cycle Queue Clearance Time (*g* $_c$), s				16.8		16.4	3.9	8.1			12.9	12.0
Green Ratio (*g/C*)				0.28		0.28	0.51	0.57			0.41	0.41
Capacity (*c*), veh/h				492		434	405	2007			1411	649
Volume-to-Capacity Ratio (*X*)				0.806		0.790	0.392	0.331			0.523	0.490
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)				11.1		9.8	2.6	4.7			7.0	6.1
Queue Storage Ratio (*RQ*) (90 th percentile)				0.00		0.00	0.22	0.00			0.00	0.00
Uniform Delay (*d* $_1$), s/veh				27.3		27.1	12.5	9.3			18.1	17.8
Incremental Delay (*d* $_2$), s/veh				6.4		6.3	0.6	0.1			0.2	0.5
Initial Queue Delay (*d* $_3$), s/veh				0.0		0.0	0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh				33.6		33.4	13.1	9.4			18.4	18.3
Level of Service (LOS)				C		C	B	A			B	B
Approach Delay, s/veh / LOS	0.0			33.5		C	10.1		B	18.3		B
Intersection Delay, s/veh / LOS	20.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.31	B	2.31	B	1.65	B	1.39	A
Bicycle LOS Score / LOS				F	1.14	A	1.36	A

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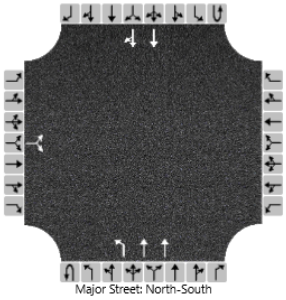
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Frontage Road
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/11/2022	East/West Street	Frontage Rd
Analysis Year	2022	North/South Street	Smyrna Parkway
Time Analyzed	AM Peak	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Village		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	2	0	0	0	2	0
Configuration			LR							L	T				T	TR
Volume (veh/h)		0		0					0	1	575				608	2
Percent Heavy Vehicles (%)		0		0					3	0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			0							1						
Capacity, c (veh/h)			0							912						
v/c Ratio										0.00						
95% Queue Length, Q_{95} (veh)										0.0						
Control Delay (s/veh)										9.0						
Level of Service (LOS)										A						
Approach Delay (s/veh)										0.0						
Approach LOS										A						

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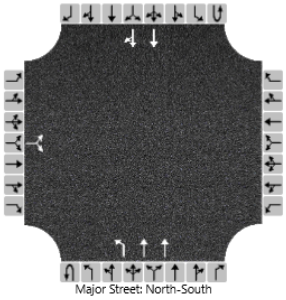
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Frontage Road
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/11/2022	East/West Street	Frontage Rd
Analysis Year	2024	North/South Street	Smyrna Parkway
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Village		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	2	0	0	0	2	0
Configuration			LR							L	T				T	TR
Volume (veh/h)		0		0					0	1	587				620	2
Percent Heavy Vehicles (%)		0		0					3	0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			0							1						
Capacity, c (veh/h)			0							901						
v/c Ratio										0.00						
95% Queue Length, Q_{95} (veh)										0.0						
Control Delay (s/veh)										9.0						
Level of Service (LOS)										A						
Approach Delay (s/veh)										0.0						
Approach LOS										A						

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AM 24 NB.xtw
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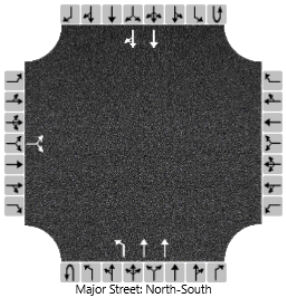
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Frontage Road
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/11/2022	East/West Street	Frontage Rd
Analysis Year	2024	North/South Street	Smyrna Parkway
Time Analyzed	AM Peak Build	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Village		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	2	0	0	0	2	0
Configuration			LR							L	T				T	TR
Volume (veh/h)		25		37					0	13	587				620	10
Percent Heavy Vehicles (%)		0		0					3	0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			70							15						
Capacity, c (veh/h)			473							894						
v/c Ratio			0.15							0.02						
95% Queue Length, Q_{95} (veh)			0.5							0.1						
Control Delay (s/veh)			13.9							9.1						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		13.9								0.2						
Approach LOS		B								A						

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AM 24 B.xtw
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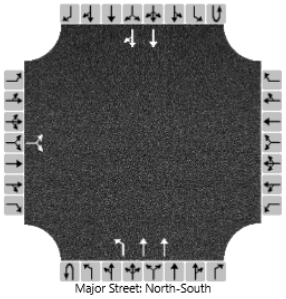
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Frontage Road
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/11/2022	East/West Street	Frontage Rd
Analysis Year	2034	North/South Street	Smyrna Parkway
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Village		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	2	0	0	0	2	0
Configuration			LR							L	T				T	TR
Volume (veh/h)		0		0					0	1	648				685	2
Percent Heavy Vehicles (%)		0		0					3	0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			0							1						
Capacity, c (veh/h)			0							846						
v/c Ratio										0.00						
95% Queue Length, Q_{95} (veh)										0.0						
Control Delay (s/veh)										9.3						
Level of Service (LOS)										A						
Approach Delay (s/veh)										0.0						
Approach LOS										A						

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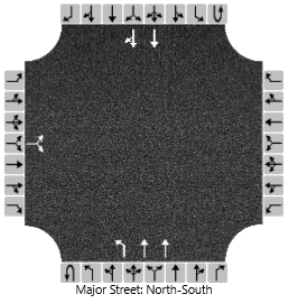
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Frontage Road
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/11/2022	East/West Street	Frontage Rd
Analysis Year	2034	North/South Street	Smyrna Parkway
Time Analyzed	AM Peak Build	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Village		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	2	0	0	0	2	0
Configuration			LR							L	T				T	TR
Volume (veh/h)		25		37					0	13	648				685	10
Percent Heavy Vehicles (%)		0		0					3	0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			70							15						
Capacity, c (veh/h)			437							839						
v/c Ratio			0.16							0.02						
95% Queue Length, Q_{95} (veh)			0.6							0.1						
Control Delay (s/veh)			14.8							9.4						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		14.8								0.2						
Approach LOS		B								A						

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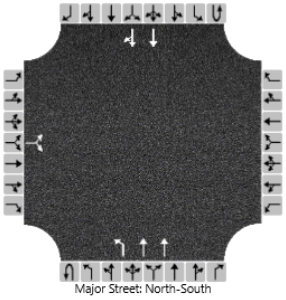
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Frontage Road
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/11/2022	East/West Street	Frontage Rd
Analysis Year	2022	North/South Street	Smyrna Parkway
Time Analyzed	PM Peak	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Village		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	2	0	0	0	2	0
Configuration			LR							L	T				T	TR
Volume (veh/h)		0		3					0	2	794				865	1
Percent Heavy Vehicles (%)		0		0					3	0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type | Storage	Left Only								1							

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			3							2						
Capacity, c (veh/h)			561							762						
v/c Ratio			0.01							0.00						
95% Queue Length, Q_{95} (veh)			0.0							0.0						
Control Delay (s/veh)			11.5							9.7						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	11.5								0.0							
Approach LOS	B								A							

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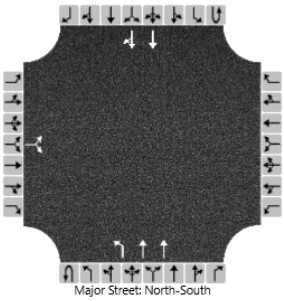
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Frontage Road
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/11/2022	East/West Street	Frontage Rd
Analysis Year	2024	North/South Street	Smyrna Parkway
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Village		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	2	0	0	0	2	0
Configuration			LR							L	T				T	TR
Volume (veh/h)		0		3					0	2	810				882	1
Percent Heavy Vehicles (%)		0		0					3	0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type | Storage	Left Only								1							

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			3							2						
Capacity, c (veh/h)			554							750						
v/c Ratio			0.01							0.00						
95% Queue Length, Q_{95} (veh)			0.0							0.0						
Control Delay (s/veh)			11.5							9.8						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	11.5								0.0							
Approach LOS	B								A							

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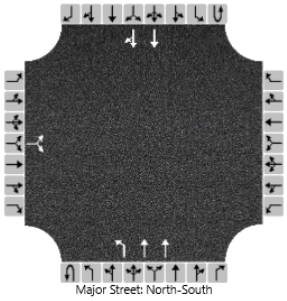
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Frontage Road
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/11/2022	East/West Street	Frontage Rd
Analysis Year	2024	North/South Street	Smyrna Parkway
Time Analyzed	PM Peak Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Village		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	2	0	0	0	2	0
Configuration			LR							L	T				T	TR
Volume (veh/h)		14		27					0	41	810				882	27
Percent Heavy Vehicles (%)		0		0					3	0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			43							43						
Capacity, c (veh/h)			383							733						
v/c Ratio			0.11							0.06						
95% Queue Length, Q_{95} (veh)			0.4							0.2						
Control Delay (s/veh)			15.6							10.2						
Level of Service (LOS)			C							B						
Approach Delay (s/veh)		15.6								0.5						
Approach LOS		C								A						

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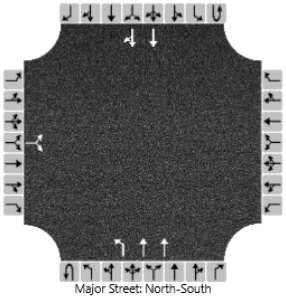
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Frontage Road
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/11/2022	East/West Street	Frontage Rd
Analysis Year	2034	North/South Street	Smyrna Parkway
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Village		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	2	0	0	0	2	0
Configuration			LR							L	T				T	TR
Volume (veh/h)		0		3					0	2	895				974	1
Percent Heavy Vehicles (%)		0		0					3	0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type | Storage	Left Only								1							

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			3							2						
Capacity, c (veh/h)			516							691						
v/c Ratio			0.01							0.00						
95% Queue Length, Q_{95} (veh)			0.0							0.0						
Control Delay (s/veh)			12.0							10.2						
Level of Service (LOS)			B							B						
Approach Delay (s/veh)	12.0								0.0							
Approach LOS	B								A							

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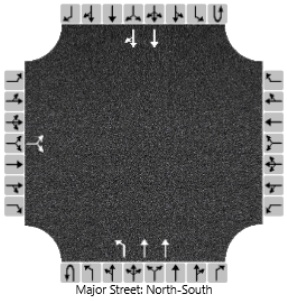
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Frontage Road
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/11/2022	East/West Street	Frontage Rd
Analysis Year	2034	North/South Street	Smyrna Parkway
Time Analyzed	PM Peak Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Village		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	2	0	0	0	2	0
Configuration			LR							L	T				T	TR
Volume (veh/h)		14		27					0	41	895				974	27
Percent Heavy Vehicles (%)		0		0					3	0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			43							43						
Capacity, c (veh/h)			347							675						
v/c Ratio			0.12							0.06						
95% Queue Length, Q_{95} (veh)			0.4							0.2						
Control Delay (s/veh)			16.8							10.7						
Level of Service (LOS)			C							B						
Approach Delay (s/veh)		16.8								0.5						
Approach LOS		C								A						

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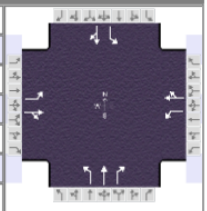
Received August 17, 2022 Planning & Design Services 22-DDP-0033

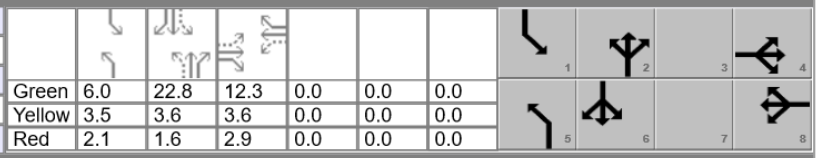
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2022	Analysis Period	1> 8:00
Intersection	Manslick	File Name	AM 22.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	23	14	61	136	15	23	49	451	74	19	414	21

Signal Information			
Cycle, s	58.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.0	22.8	12.3	0.0	0.0	0.0
Yellow	3.5	3.6	3.6	0.0	0.0	0.0
Red	2.1	1.6	2.9	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		18.8		18.8	11.6	28.0	11.6	28.0
Change Period, (*Y+R c*), s		6.5		6.5	5.6	5.2	5.6	5.2
Max Allow Headway (*MAH*), s		5.3		5.3	4.1	5.1	4.1	5.1
Queue Clearance Time (*g s*), s		4.4		10.7	2.9	14.9	2.4	14.2
Green Extension Time (*g e*), s		1.8		1.7	0.1	8.0	0.0	8.0
Phase Call Probability		0.99		0.99	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	25	82		149	42		54	494	81	21	478	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1354	1644		1326	1687		1781	1856	1585	1739	1869	
Queue Service Time (*g s*), s	0.9	2.4		6.2	1.2		0.9	12.9	1.9	0.4	12.2	
Cycle Queue Clearance Time (*g c*), s	2.1	2.4		8.7	1.2		0.9	12.9	1.9	0.4	12.2	
Green Ratio (*g/C*)	0.21	0.21		0.21	0.21		0.49	0.39	0.39	0.49	0.39	
Capacity (*c*), veh/h	380	346		346	355		473	725	619	422	730	
Volume-to-Capacity Ratio (*X*)	0.067	0.238		0.432	0.118		0.113	0.681	0.131	0.049	0.655	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	0.5	1.6		3.4	0.8		0.5	7.6	1.1	0.2	7.4	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.17	0.00		0.85	0.00		0.06	0.00	0.07	0.04	0.00	
Uniform Delay (*d 1*), s/veh	19.6	19.2		22.8	18.7		9.1	14.8	11.4	9.5	14.6	
Incremental Delay (*d 2*), s/veh	0.1	0.5		1.2	0.2		0.1	1.5	0.1	0.0	1.4	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	19.7	19.7		24.0	18.9		9.2	16.3	11.6	9.6	16.0	
Level of Service (LOS)	B	B		C	B		A	B	B	A	B	
Approach Delay, s/veh / LOS	19.7		B	22.9		C	15.1		B	15.7		B
Intersection Delay, s/veh / LOS	16.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.10	B	1.91	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.67	A	0.80	A	1.53	B	1.31	A

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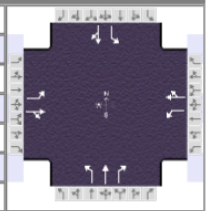
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2024 No Build	Analysis Period	1> 8:00
Intersection	Manslick	File Name	AM 24 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	23	14	62	139	15	23	50	460	75	19	422	21

Signal Information					EB			WB			NB			SB		
Cycle, s	59.6	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	6.0	23.6		12.7	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	3.6		3.6	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.1	1.6		2.9	0.0	0.0	0.0					

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		19.2		19.2	11.6	28.8	11.6	28.8
Change Period, (*Y+R* $_c$), s		6.5		6.5	5.6	5.2	5.6	5.2
Max Allow Headway (*MAH*), s		5.3		5.3	4.1	5.1	4.1	5.1
Queue Clearance Time (*g* $_s$), s		4.5		11.0	3.0	15.4	2.4	14.7
Green Extension Time (*g* $_e$), s		1.8		1.7	0.1	8.2	0.0	8.2
Phase Call Probability		0.99		0.99	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	25	84		153	42		55	504	82	21	487	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1354	1644		1325	1687		1781	1856	1585	1739	1869	
Queue Service Time (*g* $_s$), s	0.9	2.5		6.4	1.2		1.0	13.4	2.0	0.4	12.7	
Cycle Queue Clearance Time (*g* $_c$), s	2.2	2.5		9.0	1.2		1.0	13.4	2.0	0.4	12.7	
Green Ratio (*g/C*)	0.21	0.21		0.21	0.21		0.50	0.40	0.40	0.50	0.40	
Capacity (*c*), veh/h	381	350		346	359		468	735	628	416	740	
Volume-to-Capacity Ratio (*X*)	0.066	0.239		0.442	0.116		0.117	0.686	0.131	0.050	0.658	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	0.5	1.7		3.5	0.8		0.6	7.9	1.1	0.2	7.6	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.17	0.00		0.89	0.00		0.06	0.00	0.07	0.04	0.00	
Uniform Delay (*d* $_1$), s/veh	19.8	19.4		23.2	18.9		9.2	14.9	11.5	9.7	14.7	
Incremental Delay (*d* $_2$), s/veh	0.1	0.5		1.3	0.2		0.1	1.5	0.1	0.0	1.4	
Initial Queue Delay (*d* $_3$), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	19.9	19.9		24.5	19.1		9.3	16.5	11.6	9.7	16.1	
Level of Service (LOS)	B	B		C	B		A	B	B	A	B	
Approach Delay, s/veh / LOS	19.9	B		23.3	C		15.2	B		15.9	B	
Intersection Delay, s/veh / LOS	16.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.11	B	1.91	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.67	A	0.81	A	1.55	B	1.33	A

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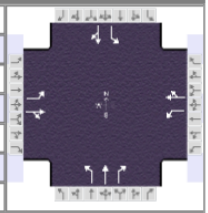
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2024 Build	Analysis Period	1> 8:00
Intersection	Manslick	File Name	AM 24 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	23	14	63	142	15	23	53	473	84	19	426	21

Signal Information			
Cycle, s	60.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	24.0	13.0	0.0	0.0	0.0	
Yellow	3.5	3.6	3.6	0.0	0.0	0.0	
Red	2.1	1.6	2.9	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		19.5		19.5	11.6	29.2	11.6	29.2
Change Period, (*Y+R c*), s		6.5		6.5	5.6	5.2	5.6	5.2
Max Allow Headway (*MAH*), s		5.3		5.3	4.1	5.1	4.1	5.1
Queue Clearance Time (*g s*), s		4.6		11.3	3.0	15.7	2.4	14.9
Green Extension Time (*g e*), s		1.8		1.7	0.1	8.4	0.0	8.4
Phase Call Probability		0.99		0.99	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	25	85		156	42		57	508	90	21	491	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1354	1643		1324	1687		1781	1856	1585	1739	1869	
Queue Service Time (*g s*), s	0.9	2.6		6.7	1.2		1.0	13.7	2.2	0.4	12.9	
Cycle Queue Clearance Time (*g c*), s	2.2	2.6		9.3	1.2		1.0	13.7	2.2	0.4	12.9	
Green Ratio (*g/C*)	0.22	0.22		0.22	0.22		0.50	0.40	0.40	0.50	0.40	
Capacity (*c*), veh/h	383	354		347	364		463	739	631	413	744	
Volume-to-Capacity Ratio (*X*)	0.066	0.239		0.450	0.115		0.123	0.687	0.143	0.051	0.660	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	0.5	1.7		3.7	0.8		0.6	8.0	1.2	0.2	7.8	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.17	0.00		0.92	0.00		0.07	0.00	0.08	0.04	0.00	
Uniform Delay (*d 1*), s/veh	19.9	19.6		23.4	19.0		9.3	15.0	11.6	9.8	14.8	
Incremental Delay (*d 2*), s/veh	0.1	0.5		1.3	0.2		0.1	1.5	0.1	0.1	1.4	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	20.0	20.0		24.7	19.2		9.4	16.6	11.7	9.8	16.3	
Level of Service (LOS)	C	C		C	B		A	B	B	A	B	
Approach Delay, s/veh / LOS	20.0	C		23.6	C		15.3	B		16.0	B	
Intersection Delay, s/veh / LOS	17.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.11	B	1.91	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.67	A	0.81	A	1.59	B	1.33	A

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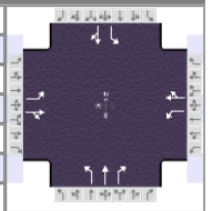
Received August 17, 2022 Planning & Design Services 22-DDP-0033

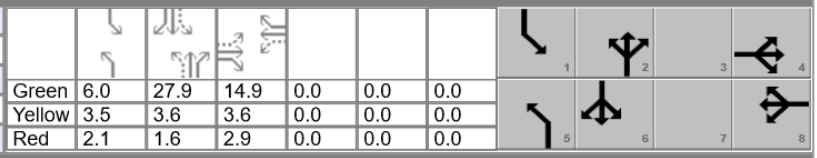
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2034 No Build	Analysis Period	1> 8:00
Intersection	Manslick	File Name	AM 34 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	25	15	68	154	17	25	55	508	83	21	466	23

Signal Information			
Cycle, s	66.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.0	27.9	14.9	0.0	0.0	0.0
Yellow	3.5	3.6	3.6	0.0	0.0	0.0
Red	2.1	1.6	2.9	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		21.4		21.4	11.6	33.1	11.6	33.1
Change Period, (*Y+R* $_c$), s		6.5		6.5	5.6	5.2	5.6	5.2
Max Allow Headway (*MAH*), s		5.3		5.3	4.1	5.1	4.1	5.1
Queue Clearance Time (*g* $_s$), s		5.0		13.1	3.1	18.4	2.4	17.4
Green Extension Time (*g* $_e$), s		2.0		1.9	0.1	9.6	0.0	9.6
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.00	0.00	0.01	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	27	91		169	46		60	557	91	23	537	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1349	1643		1316	1689		1781	1856	1585	1739	1869	
Queue Service Time (*g* $_s$), s	1.1	3.0		8.0	1.4		1.1	16.4	2.3	0.4	15.4	
Cycle Queue Clearance Time (*g* $_c$), s	2.6	3.0		11.1	1.4		1.1	16.4	2.3	0.4	15.4	
Green Ratio (*g/C*)	0.23	0.23		0.23	0.23		0.51	0.42	0.42	0.51	0.42	
Capacity (*c*), veh/h	383	371		345	381		435	783	669	387	789	
Volume-to-Capacity Ratio (*X*)	0.072	0.246		0.491	0.121		0.139	0.711	0.136	0.060	0.681	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	0.6	2.0		4.4	1.0		0.7	9.4	1.3	0.3	9.1	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.21	0.00		1.12	0.00		0.08	0.00	0.09	0.04	0.00	
Uniform Delay (*d* $_1$), s/veh	21.4	21.0		25.6	20.4		10.0	15.8	11.7	10.6	15.5	
Incremental Delay (*d* $_2$), s/veh	0.1	0.5		1.5	0.2		0.1	1.6	0.1	0.1	1.5	
Initial Queue Delay (*d* $_3$), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	21.5	21.5		27.1	20.6		10.2	17.4	11.8	10.6	17.0	
Level of Service (LOS)	C	C		C	C		B	B	B	B	B	
Approach Delay, s/veh / LOS	21.5	C		25.7	C		16.1	B		16.7	B	
Intersection Delay, s/veh / LOS	18.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.11	B	1.92	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.68	A	0.84	A	1.66	B	1.41	A

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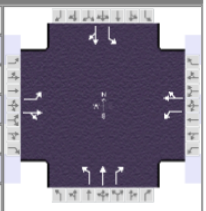
Received August 17, 2022 Planning & Design Services 22-DDP-0033

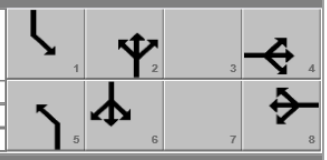
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.91
Urban Street	Smyrna Parkway	Analysis Year	2034 Build	Analysis Period	1> 8:00
Intersection	Manslick	File Name	AM 34 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	25	15	69	157	17	25	58	521	92	21	470	23

Signal Information					EB			WB			NB			SB		
Cycle, s	67.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	6.0	28.4		15.3	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	3.6		3.6	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.1	1.6		2.9	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		21.8		21.8	11.6	33.6	11.6	33.6
Change Period, (*Y+R c*), s		6.5		6.5	5.6	5.2	5.6	5.2
Max Allow Headway (*MAH*), s		5.3		5.3	4.1	5.1	4.1	5.1
Queue Clearance Time (*g s*), s		5.1		13.4	3.2	18.7	2.4	17.7
Green Extension Time (*g e*), s		2.0		1.9	0.1	9.8	0.0	9.8
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.00	0.00	0.01	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	27	92		173	46		62	560	99	23	542	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1349	1642		1314	1689		1781	1856	1585	1739	1869	
Queue Service Time (*g s*), s	1.1	3.1		8.3	1.5		1.2	16.7	2.6	0.4	15.7	
Cycle Queue Clearance Time (*g c*), s	2.6	3.1		11.4	1.5		1.2	16.7	2.6	0.4	15.7	
Green Ratio (*g/C*)	0.23	0.23		0.23	0.23		0.51	0.42	0.42	0.51	0.42	
Capacity (*c*), veh/h	385	375		346	386		431	786	672	384	792	
Volume-to-Capacity Ratio (*X*)	0.071	0.246		0.499	0.120		0.145	0.712	0.147	0.060	0.684	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	0.6	2.1		4.6	1.0		0.7	9.6	1.5	0.3	9.3	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.21	0.00		1.16	0.00		0.08	0.00	0.09	0.05	0.00	
Uniform Delay (*d 1*), s/veh	21.6	21.1		25.8	20.5		10.2	15.9	11.9	10.7	15.7	
Incremental Delay (*d 2*), s/veh	0.1	0.5		1.6	0.2		0.1	1.6	0.1	0.1	1.5	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	21.7	21.6		27.4	20.7		10.3	17.5	12.0	10.8	17.2	
Level of Service (LOS)	C	C		C	C		B	B	B	B	B	
Approach Delay, s/veh / LOS	21.6	C		26.0	C		16.1	B		16.9	B	
Intersection Delay, s/veh / LOS	18.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.11	B	1.92	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.69	A	0.85	A	1.70	B	1.42	A

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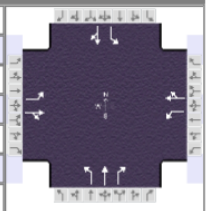
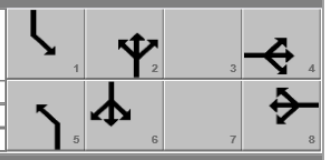
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.95
Urban Street	Smyrna Parkway	Analysis Year	2022	Analysis Period	1> 4:45
Intersection	Manslick	File Name	PM 22.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	23	68	72	127	43	33	68	589	140	37	668	25

Signal Information					EB			WB			NB			SB		
Cycle, s	85.3	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	6.0	43.0		18.9	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	3.6		3.6	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.1	1.6		2.9	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		25.4		25.4	11.6	48.2	11.6	48.2
Change Period, (*Y+R c*), s		6.5		6.5	5.6	5.2	5.6	5.2
Max Allow Headway (*MAH*), s		5.3		5.3	4.1	5.1	4.1	5.1
Queue Clearance Time (*g s*), s		8.2		16.9	3.6	23.9	2.8	29.0
Green Extension Time (*g e*), s		2.3		2.1	0.2	14.4	0.1	14.1
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.02	0.00	0.08	0.00	0.11

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	24	147		134	80		73	633	150	39	729	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1308	1725		1250	1735		1781	1856	1585	1739	1873	
Queue Service Time (*g s*), s	1.3	6.2		8.7	3.2		1.6	21.9	4.4	0.8	27.0	
Cycle Queue Clearance Time (*g c*), s	4.5	6.2		14.9	3.2		1.6	21.9	4.4	0.8	27.0	
Green Ratio (*g/C*)	0.22	0.22		0.22	0.22		0.58	0.50	0.50	0.58	0.50	
Capacity (*c*), veh/h	326	383		271	385		347	937	800	382	945	
Volume-to-Capacity Ratio (*X*)	0.074	0.384		0.493	0.208		0.210	0.676	0.188	0.102	0.772	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	0.7	4.6		4.8	2.4		1.0	12.0	2.6	0.5	15.0	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.25	0.00		1.21	0.00		0.11	0.00	0.17	0.09	0.00	
Uniform Delay (*d 1*), s/veh	28.9	28.2		34.6	27.1		12.7	15.9	11.6	11.4	17.1	
Incremental Delay (*d 2*), s/veh	0.1	0.9		2.0	0.4		0.3	1.0	0.1	0.1	1.9	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	29.0	29.1		36.5	27.4		13.0	16.9	11.7	11.5	19.1	
Level of Service (LOS)	C	C		D	C		B	B	B	B	B	
Approach Delay, s/veh / LOS	29.1	C		33.1	C		15.7	B		18.7	B	
Intersection Delay, s/veh / LOS	19.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.12	B	1.93	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.77	A	0.84	A	1.87	B	1.76	B

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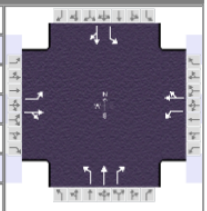
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.95
Urban Street	Smyrna Parkway	Analysis Year	2024 No Build	Analysis Period	1> 4:45
Intersection	Manslick	File Name	PM 24 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	23	69	73	130	44	34	69	601	143	38	681	25

Signal Information			
Cycle, s	87.8	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	44.8	19.7	0.0	0.0	0.0
Yellow	3.5	3.6	3.6	0.0	0.0	0.0
Red	2.1	1.6	2.9	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		26.2		26.2	11.6	50.0	11.6	50.0
Change Period, (*Y+R c*), s		6.5		6.5	5.6	5.2	5.6	5.2
Max Allow Headway (*MAH*), s		5.3		5.3	4.1	5.1	4.1	5.1
Queue Clearance Time (*g s*), s		8.5		17.6	3.6	25.0	2.9	30.3
Green Extension Time (*g e*), s		2.3		2.1	0.2	14.9	0.1	14.5
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.02	0.00	0.10	0.00	0.13

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	24	149		137	82		74	646	154	40	743	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1306	1726		1248	1734		1781	1856	1585	1739	1873	
Queue Service Time (*g s*), s	1.4	6.5		9.2	3.4		1.6	23.0	4.6	0.9	28.3	
Cycle Queue Clearance Time (*g c*), s	4.7	6.5		15.6	3.4		1.6	23.0	4.6	0.9	28.3	
Green Ratio (*g/C*)	0.22	0.22		0.22	0.22		0.58	0.51	0.51	0.58	0.51	
Capacity (*c*), veh/h	325	387		270	389		339	947	809	374	956	
Volume-to-Capacity Ratio (*X*)	0.075	0.386		0.506	0.211		0.219	0.683	0.190	0.107	0.778	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	0.8	4.8		5.0	2.5		1.0	12.6	2.8	0.6	15.8	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.26	0.00		1.27	0.00		0.12	0.00	0.18	0.10	0.00	
Uniform Delay (*d 1*), s/veh	29.6	28.9		35.6	27.7		13.2	16.2	11.7	11.7	17.5	
Incremental Delay (*d 2*), s/veh	0.1	0.9		2.1	0.4		0.3	1.1	0.1	0.1	2.0	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	29.8	29.8		37.6	28.1		13.5	17.2	11.8	11.8	19.5	
Level of Service (LOS)	C	C		D	C		B	B	B	B	B	
Approach Delay, s/veh / LOS	29.8	C		34.1	C		16.0	B		19.1	B	
Intersection Delay, s/veh / LOS	20.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.12	B	1.93	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.77	A	0.85	A	1.90	B	1.78	B

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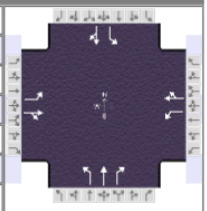
Received August 17, 2022 Planning & Design Services 22-DDP-0033

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.95
Urban Street	Smyrna Parkway	Analysis Year	2024 Build	Analysis Period	1> 4:45
Intersection	Manslick	File Name	PM 24 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	23	69	76	140	44	34	71	609	147	38	694	25

Signal Information					EB			WB			NB			SB		
Cycle, s	92.1	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	6.0	47.4		21.4	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	3.6		3.6	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.1	1.6		2.9	0.0	0.0	0.0					

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		27.9		27.9	11.6	52.6	11.6	52.6
Change Period, (*Y+R c*), s		6.5		6.5	5.6	5.2	5.6	5.2
Max Allow Headway (*MAH*), s		5.3		5.3	4.1	5.1	4.1	5.1
Queue Clearance Time (*g s*), s		8.9		19.3	3.8	27.5	2.9	32.3
Green Extension Time (*g e*), s		2.4		2.1	0.2	15.6	0.1	15.1
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.04	0.00	0.13	0.00	0.16

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	24	153		147	82		79	675	163	40	757	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1306	1723		1244	1734		1781	1856	1585	1739	1873	
Queue Service Time (*g s*), s	1.4	6.9		10.4	3.5		1.8	25.5	5.1	0.9	30.3	
Cycle Queue Clearance Time (*g c*), s	4.9	6.9		17.3	3.5		1.8	25.5	5.1	0.9	30.3	
Green Ratio (*g/C*)	0.23	0.23		0.23	0.23		0.58	0.51	0.51	0.58	0.51	
Capacity (*c*), veh/h	331	400		274	403		326	956	816	353	965	
Volume-to-Capacity Ratio (*X*)	0.073	0.382		0.538	0.204		0.241	0.706	0.200	0.113	0.784	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	0.8	5.0		5.6	2.6		1.2	13.9	3.1	0.6	16.9	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.27	0.00		1.41	0.00		0.13	0.00	0.20	0.10	0.00	
Uniform Delay (*d 1*), s/veh	30.5	29.8		37.1	28.5		14.1	17.0	12.1	12.6	18.2	
Incremental Delay (*d 2*), s/veh	0.1	0.9		2.3	0.4		0.3	1.1	0.1	0.1	2.0	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	30.6	30.7		39.4	28.9		14.4	18.2	12.2	12.8	20.2	
Level of Service (LOS)	C	C		D	C		B	B	B	B	C	
Approach Delay, s/veh / LOS	30.6	C		35.6	D		16.8	B		19.9	B	
Intersection Delay, s/veh / LOS	21.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.12	B	1.93	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.78	A	0.87	A	1.92	B	1.80	B

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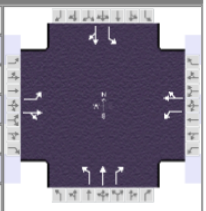
Received August 17, 2022 Planning & Design Services 22-DDP-0033

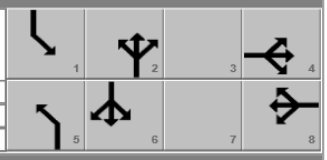
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.95
Urban Street	Smyrna Parkway	Analysis Year	2034 No Build	Analysis Period	1> 4:45
Intersection	Manslick	File Name	PM 34 NB.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	25	76	81	144	49	38	76	664	158	42	752	28

Signal Information					EB			WB			NB			SB		
Cycle, s	102.9	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	6.0	55.1		24.5	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	3.6		3.6	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.1	1.6		2.9	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		31.0		31.0	11.6	60.3	11.6	60.3
Change Period, (*Y+R c*), s		6.5		6.5	5.6	5.2	5.6	5.2
Max Allow Headway (*MAH*), s		5.3		5.3	4.1	5.1	4.1	5.1
Queue Clearance Time (*g s*), s		10.3		22.5	4.0	31.2	3.1	39.3
Green Extension Time (*g e*), s		2.6		2.0	0.2	17.0	0.1	15.8
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.12	0.00	0.20	0.00	0.29

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	26	165		152	92		81	703	167	44	821	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1294	1725		1230	1734		1781	1856	1585	1739	1873	
Queue Service Time (*g s*), s	1.7	8.3		12.2	4.4		2.0	29.2	5.6	1.1	37.3	
Cycle Queue Clearance Time (*g c*), s	6.1	8.3		20.5	4.4		2.0	29.2	5.6	1.1	37.3	
Green Ratio (*g/C*)	0.24	0.24		0.24	0.24		0.59	0.54	0.54	0.59	0.54	
Capacity (*c*), veh/h	323	411		264	413		289	994	849	341	1003	
Volume-to-Capacity Ratio (*X*)	0.081	0.402		0.575	0.222		0.278	0.708	0.197	0.130	0.819	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	1.0	5.9		6.3	3.3		1.3	15.7	3.5	0.7	21.0	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.34	0.00		1.60	0.00		0.15	0.00	0.22	0.12	0.00	
Uniform Delay (*d 1*), s/veh	34.0	33.0		41.7	31.5		16.6	17.9	12.4	13.7	19.8	
Incremental Delay (*d 2*), s/veh	0.2	0.9		2.8	0.4		0.4	1.1	0.1	0.2	3.5	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	34.1	33.9		44.5	31.9		17.0	19.0	12.5	13.9	23.3	
Level of Service (LOS)	C	C		D	C		B	B	B	B	C	
Approach Delay, s/veh / LOS	34.0	C		39.7	D		17.7	B		22.8	C	
Intersection Delay, s/veh / LOS	23.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.12	B	1.93	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.80	A	0.89	A	2.05	B	1.92	B

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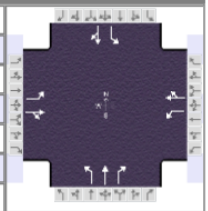
Received August 17, 2022 Planning & Design Services 22-DDP-0033

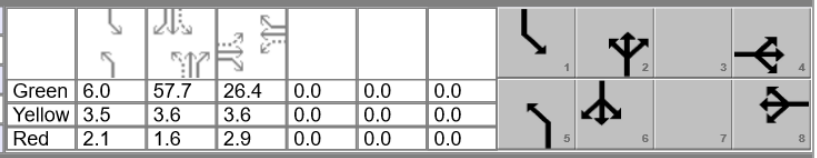
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	Aug 11, 2022	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.95
Urban Street	Smyrna Parkway	Analysis Year	2034 Build	Analysis Period	1> 4:45
Intersection	Manslick	File Name	PM 34 B.xus		
Project Description	Smyrna Village				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	25	76	84	154	49	38	78	672	162	42	765	28

Signal Information			
Cycle, s	107.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.0	57.7	26.4	0.0	0.0	0.0						
Yellow	3.5	3.6	3.6	0.0	0.0	0.0						
Red	2.1	1.6	2.9	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		32.9		32.9	11.6	62.9	11.6	62.9
Change Period, (*Y+R c*), s		6.5		6.5	5.6	5.2	5.6	5.2
Max Allow Headway (*MAH*), s		5.3		5.3	4.1	5.1	4.1	5.1
Queue Clearance Time (*g s*), s		10.8		24.5	4.2	33.6	3.1	41.9
Green Extension Time (*g e*), s		2.7		1.9	0.2	17.3	0.1	15.8
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.23	0.00	0.25	0.00	0.34

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	26	168		162	92		84	722	174	44	835	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1294	1722		1227	1734		1781	1856	1585	1739	1873	
Queue Service Time (*g s*), s	1.8	8.8		13.7	4.5		2.2	31.6	6.1	1.1	39.9	
Cycle Queue Clearance Time (*g c*), s	6.3	8.8		22.5	4.5		2.2	31.6	6.1	1.1	39.9	
Green Ratio (*g/C*)	0.25	0.25		0.25	0.25		0.59	0.54	0.54	0.59	0.54	
Capacity (*c*), veh/h	331	423		268	426		276	998	852	325	1007	
Volume-to-Capacity Ratio (*X*)	0.080	0.398		0.605	0.215		0.304	0.724	0.204	0.136	0.829	
Back of Queue (*Q*), ft/ln (90 th percentile)												
Back of Queue (*Q*), veh/ln (90 th percentile)	1.0	6.2		7.0	3.5		1.5	17.1	3.8	0.8	22.6	
Queue Storage Ratio (*RQ*) (90 th percentile)	0.35	0.00		1.76	0.00		0.17	0.00	0.24	0.13	0.00	
Uniform Delay (*d 1*), s/veh	34.8	33.9		43.3	32.3		17.8	18.8	12.9	14.7	20.7	
Incremental Delay (*d 2*), s/veh	0.1	0.9		3.1	0.4		0.5	1.4	0.1	0.2	4.1	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	34.9	34.8		46.4	32.6		18.3	20.2	13.0	14.9	24.8	
Level of Service (LOS)	C	C		D	C		B	C	B	B	C	
Approach Delay, s/veh / LOS	34.8	C		41.4	D		18.8	B		24.3	C	
Intersection Delay, s/veh / LOS	24.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	1.93	B	1.90	B	1.90	B
Bicycle LOS Score / LOS	0.81	A	0.91	A	2.07	B	1.94	B

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Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	27	Speed Limit (mph)	35
Advancing Volume (vph)	974		

Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

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