final report

May 18, 2018

Traffic Analysis

Stephen Foster Avenue (US 62 and US 31E)
Bardstown, KY

Prepared for

Haydon Materials
Kentucky Transportation Cabinet

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INTRODUCTION

Stephen Foster Avenue in Bardstown, KY runs from the center of downtown to the western city limits. It is designated as US 31E and US 62, with US 31E departing at Cathedral Manor. The intersection of Stephen Foster Avenue and Cathedral Manor is the focus of this study. **Figure 1** displays a map of the site. The intersection has had several alternatives proposed to improve the operation of the intersection. To evaluate the impacts of the improvements, the adjacent intersections of 5th Street and Barton Road have been included in the analysis.

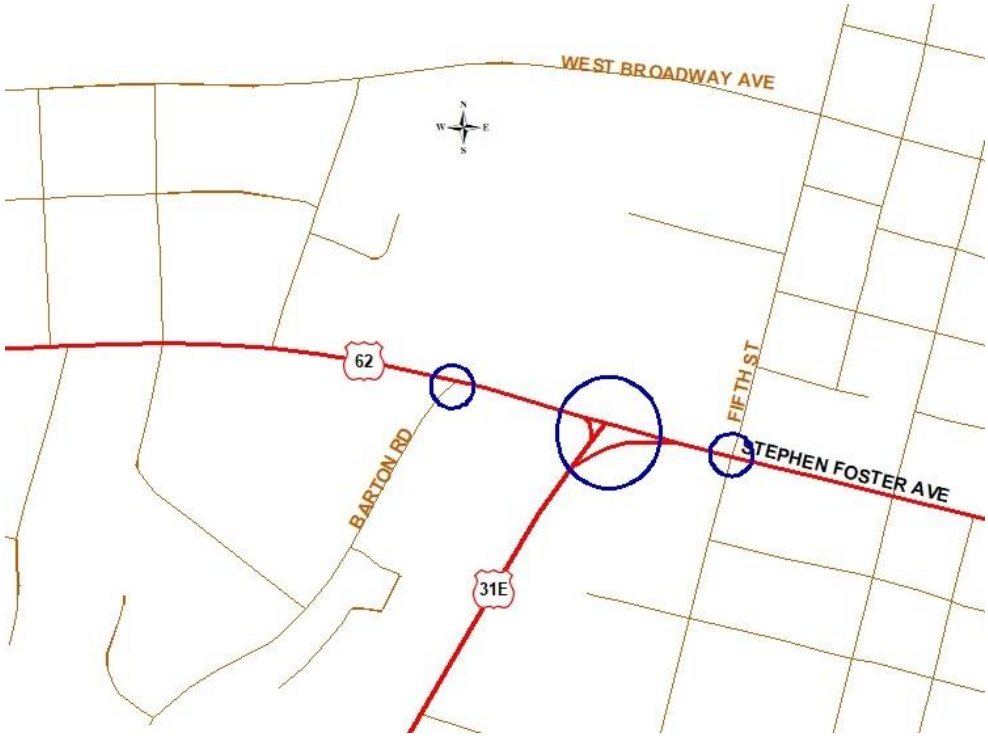


Figure 1. Site Map

EXISTING CONDITIONS

Stephen Foster Avenue is a state maintained road with an estimated 2017 ADT of 18,100 vehicles per day between 3rd Street and Cathedral Manor, as provided by a 2017 Kentucky Transportation Cabinet traffic forecast. The road is a four-lane highway with eleven-foot lanes. The speed limit is 35 mph. There are sidewalks. The intersection with 5th Street is controlled with a traffic signal. There are left turn lanes on each approach. The intersection with Cathedral Manor is controlled with a stop sign on Cathedral Manor. There is a right turn lane on the two approaches with a yield sign and a left turn lane on Stephen Foster Avenue.

Stephen Foster Avenue west of Cathedral Manor has an estimated 2017 ADT of 9,600 vehicles per day between Cathedral Manor and North Elm Street, from the same traffic forecast. This section of Stephen Foster Avenue is a two-lane highway with twelve-foot lanes and a marked parking area. The intersection with Barton Road is controlled with a stop sign on Barton Road. There are no turn lanes at the intersection.

Cathedral Manor (US 31E) is a state maintained road with an estimated 2017 ADT of 11,000 vehicles per day between the Martha Layne Collins Parkway and Stephen Foster Avenue, as provided by the same forecast. The road is a two-lane highway with eleven-foot lanes. The speed limit is 35 mph.

The previously mentioned traffic forecast contained peak hour turning movements for the intersections of Cathedral Manor and 5th Street. The diagrams from the forecast are included in the Appendix. A peak hour turning movement count was obtained at the intersection of Stephen Foster Avenue and Barton Road, including the St. Joseph school driveway as the north leg of the intersection. The intersection was counted from 7:00 to 9:00 am and 3:00 to 6:00 pm. The peak hour of the intersections occurred between 7:15 and 8:15 am and 4:30 to 5:30 pm.

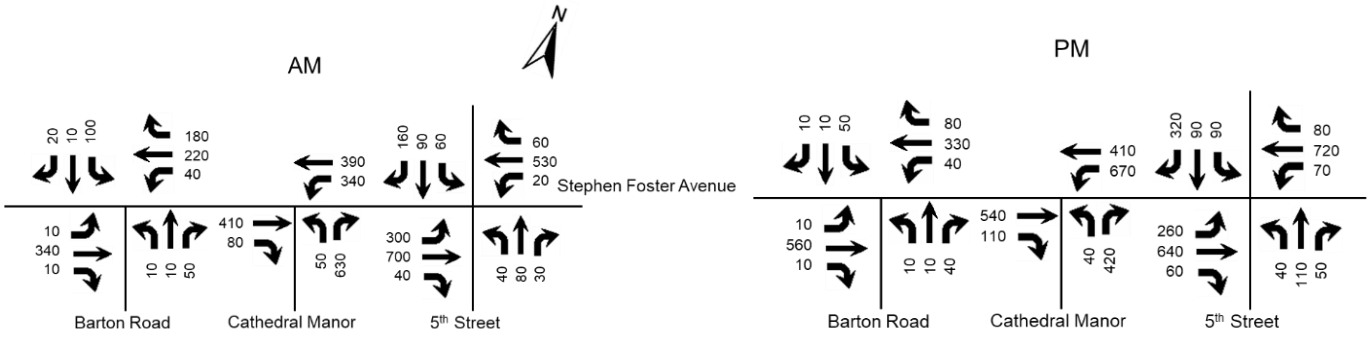


Figure 2. Existing (2017) Peak Design Hour Volumes

FUTURE CONDITIONS

The future analysis year is 2040. These volumes are from the traffic forecast for the No Build of the Western Bypass (page 30).

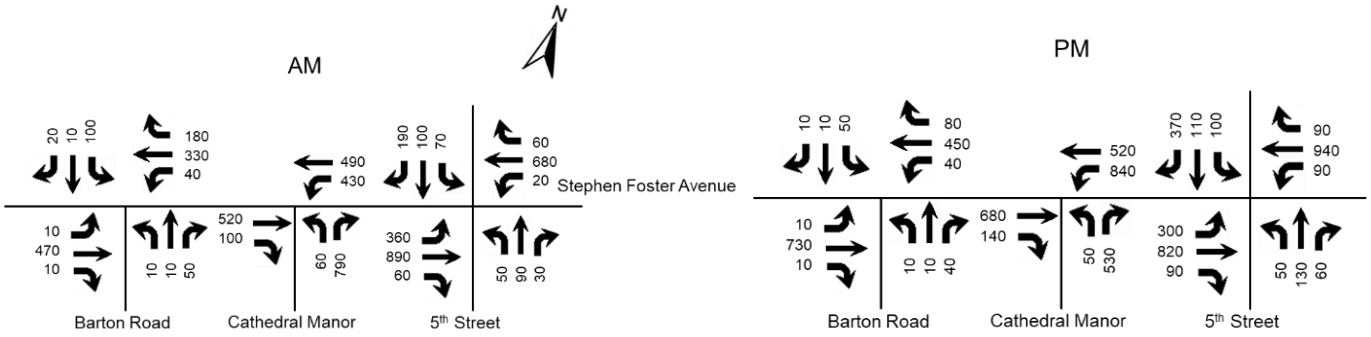


Figure 3. 2040 Peak Design Hour Volumes

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. 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, 6th edition. Future delays and Level of Service were determined for the intersections using the Synchro (Version 10.1) software and the Highway Capacity Software (Version 7.4). The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

	A.M.				P.M.			
Approach	2017 Existing	2040 Existing	2040 Signal	2040 Roundabout	2017 Existing	2040 Existing	2040 Signal	2040 Roundabout
Stephen Foster at Barton Road								
Stephen Foster Eastbound (left)	A 8.4	A 8.9	A 8.9	A 8.9	A 8.2	A 8.6	A 8.6	A 8.6
Stephen Foster Westbound (left)	A 8.8	A 9.5	A 9.5	A 9.5	A 8.9	A 9.6	A 9.6	A 9.6
Barton Road Northbound	C 16.1	C 22.4	C 22.4	C 22.4	C 19.3	D 27.6	D 27.6	D 27.6
School Driveway Southbound	F 60.4	F 229.1	F 229.1	F 229.1	E 39.6	F 98.4	F 98.4	F 98.4
Stephen Foster at Cathedral Manor			**B 13.2**	**F 107.4**			**C 27.7**	**F 147.4**
Stephen Foster Eastbound			B 17.7	F 51.3			D 43.5	F 315.9
Stephen Foster Westbound (left)	B 10.5	B 13.1	A 9.0	D 25.9	C 16.8	F 53.4	C 22.9	F 86.8
Cathedral Manor Northbound	F 52.5	F 216.9	C 31.3	F 236.6	F 387.8	F ~	C 20.5	F 51.5
Stephen Foster at 5th Street	**C 28.2**	**D 35.2**	**C 32.9**	**D 35.2**	**C 29.7**	**D 49.9**	**D 49.2**	**D 49.9**
Stephen Foster Eastbound	C 24.6	C 27.4	C 22.7	C 27.4	C 23.0	C 25.6	C 23.6	C 25.6
Stephen Foster Westbound	D 40.9	D 54.8	D 54.8	D 54.8	D 44.2	F 93.1	F 93.1	F 93.1
5th Street Northbound	B 18.5	C 24.6	C 24.6	C 24.6	B 16.8	C 21.8	C 21.8	C 21.8
5th Street Southbound	B 20.5	C 27.7	C 27.7	C 27.7	B 17.8	C 29.1	C 29.1	C 29.1

Key: Level of Service, Delay in seconds per vehicle

A single lane roundabout does not provide a desirable level of service. Due to the heavy volume of conflicting flows no roundabout configuration was identified that would provide a satisfactory level of service. For the signal option, the eastbound traffic needs two through lanes. The westbound queue will queue through the intersection at 5th Street in either scenario.

Of the three bypass alternatives, only the inner bypass removes a significant amount of pm traffic from the intersection. None of the three reduce traffic enough to allow the roundabout to function appropriately.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2040, the intersection of Stephen Foster Avenue and Cathedral Manor will experience failing levels of service. The recommended improvement for this intersection is the installation of a traffic signal with the addition of an eastbound thru lane.

APPENDIX

Traffic Counts

Study Name US 62 & Barton Rd
Start Date 01/10/2018
Start Time 7:00 AM
Site Code

Groundbreaking by Design.

	Entrance Southbound			US 62 Westbound				Barton Rd Northbound			US 62 Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	U-Turn	Right	Thru	Left	Right	Thru	Left	Total
7:00 AM	0	0	0	2	42	7	0	21	0	1	1	53	0	127
7:15 AM	0	0	0	16	47	6	0	25	0	1	1	60	2	158
7:30 AM	4	0	23	40	37	5	0	10	0	0	1	75	1	196
7:45 AM	6	0	33	69	41	7	0	8	0	0	1	98	6	269
8:00 AM	6	0	25	52	50	7	1	3	0	1	2	66	5	218
8:15 AM	2	0	6	9	61	7	0	3	0	0	1	64	1	154
8:30 AM	0	0	7	3	49	6	0	7	1	2	2	51	0	128
8:45 AM	1	0	0	2	62	7	0	5	0	1	0	44	0	122
3:00 PM	3	0	18	13	77	9	0	42	0	4	2	91	0	259
3:15 PM	1	0	14	23	70	6	0	36	0	2	1	82	2	237
3:30 PM	1	0	15	5	65	9	0	11	0	0	1	113	0	220
3:45 PM	2	0	4	11	72	8	0	16	0	0	1	87	0	201
4:00 PM	2	0	11	4	69	12	0	7	0	1	0	73	0	179
4:15 PM	2	0	4	9	70	8	0	16	0	1	2	66	0	178
4:30 PM	3	0	4	11	70	7	1	12	1	1	2	100	2	214
4:45 PM	1	0	8	26	86	12	2	12	0	0	1	80	3	231
5:00 PM	2	1	25	19	94	10	0	7	0	0	2	85	2	247
5:15 PM	1	0	10	20	87	3	0	10	1	0	1	78	3	214
5:30 PM	4	0	9	15	66	1	0	10	0	2	0	69	1	177
5:45 PM	0	0	5	13	82	5	0	5	0	0	0	79	2	191

	Entrance Southbound			US 62 Westbound				Barton Rd Northbound			US 62 Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	U-Turn	Right	Thru	Left	Right	Thru	Left	Total
7:15 AM	0	0	0	16	47	6	0	25	0	1	1	60	2	158
7:30 AM	4	0	23	40	37	5	0	10	0	0	1	75	1	196
7:45 AM	6	0	33	69	41	7	0	8	0	0	1	98	6	269
8:00 AM	6	0	25	52	50	7	1	3	0	1	2	66	5	218
AM Peak	**16**	**0**	**81**	**177**	**175**	**25**	**1**	**46**	**0**	**2**	**5**	**299**	**14**	**841**
4:30 PM	3	0	4	11	70	7	1	12	1	1	2	100	2	214
4:45 PM	1	0	8	26	86	12	2	12	0	0	1	80	3	231
5:00 PM	2	1	25	19	94	10	0	7	0	0	2	85	2	247
5:15 PM	1	0	10	20	87	3	0	10	1	0	1	78	3	214
PM Peak	**7**	**1**	**47**	**76**	**337**	**32**	**3**	**41**	**2**	**1**	**6**	**343**	**10**	**906**

Study Name US 62 & US 31E
Start Date 01/10/2018
Start Time 7:00 AM
Site Code

	US 62 Westbound			US 31E Northbound			US 62 Eastbound			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Total
7:00 AM	45	39	0	79	7	0	5	68	0	243
7:15 AM	59	66	0	118	10	0	15	69	0	337
7:30 AM	80	51	0	147	3	0	10	97	0	388
7:45 AM	107	56	0	158	10	0	16	122	0	469
8:00 AM	105	66	0	99	7	0	13	83	0	373
8:15 AM	71	66	0	88	6	0	10	64	0	305
8:30 AM	54	59	0	80	6	0	5	60	0	264
8:45 AM	62	60	0	74	9	0	6	43	0	254
3:00 PM	95	101	0	77	6	0	26	124	0	429
3:15 PM	91	101	0	98	7	0	24	109	0	430
3:30 PM	70	112	0	103	5	0	25	110	0	425
3:45 PM	82	113	0	75	9	0	10	90	0	379
4:00 PM	75	144	0	77	10	0	16	78	0	400
4:15 PM	81	138	0	66	6	0	15	71	0	377
4:30 PM	79	117	0	94	12	0	26	96	0	424
4:45 PM	117	163	0	79	6	0	17	83	0	465
5:00 PM	112	147	0	90	7	0	26	92	0	474
5:15 PM	99	141	0	88	12	0	15	86	0	441
5:30 PM	70	129	0	91	12	0	14	72	0	388
5:45 PM	94	127	0	74	6	0	12	77	0	390

	US 62 Westbound			US 31E Northbound			US 62 Eastbound			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Total
7:15 AM	59	66	0	118	10	0	15	69	0	337
7:30 AM	80	51	0	147	3	0	10	97	0	388
7:45 AM	107	56	0	158	10	0	16	122	0	469
8:00 AM	105	66	0	99	7	0	13	83	0	373
AM PEAK	**351**	**239**	**0**	**522**	**30**	**0**	**54**	**371**	**0**	**1567**
4:30 PM	79	117	0	94	12	0	26	96	0	424
4:45 PM	117	163	0	79	6	0	17	83	0	465
5:00 PM	112	147	0	90	7	0	26	92	0	474
5:15 PM	99	141	0	88	12	0	15	86	0	441
PM PEAK	**407**	**568**	**0**	**351**	**37**	**0**	**84**	**357**	**0**	**1804**

Study Name US 62 & N 5th St
Start Date 01/10/2018
Start Time 7:00 AM
Site Code

Engineering Planning
Groundbreaking by Design.

	N 5th St Southbound			US 62 Westbound			S 5th St Northbound			US 62 Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	TOTAL
7:00 AM	23	7	12	9	60	2	1	10	0	1	113	33	271
7:15 AM	40	6	6	10	81	0	5	10	1	3	125	56	343
7:30 AM	37	10	15	11	91	3	4	18	6	4	174	63	436
7:45 AM	33	15	20	21	122	4	3	19	10	11	201	64	523
8:00 AM	31	15	25	7	119	5	6	16	15	5	135	46	425
8:15 AM	23	14	13	18	102	5	5	12	8	5	106	42	353
8:30 AM	24	17	12	7	85	14	6	9	4	4	102	33	317
8:45 AM	28	7	16	9	89	5	3	11	4	1	83	32	288
3:00 PM	50	17	25	9	126	8	7	23	10	3	153	43	474
3:15 PM	45	14	23	19	136	6	5	10	6	4	156	45	469
3:30 PM	59	30	34	4	117	9	7	15	4	5	155	42	481
3:45 PM	55	28	18	12	138	4	11	21	5	5	111	37	445
4:00 PM	62	15	15	17	150	12	1	27	5	5	117	41	467
4:15 PM	63	20	15	9	160	5	8	17	0	2	98	32	429
4:30 PM	55	25	14	13	144	8	4	15	8	4	144	47	481
4:45 PM	73	16	27	14	190	12	11	17	7	4	125	29	525
5:00 PM	68	22	23	10	175	6	9	29	10	2	131	46	531
5:15 PM	70	16	16	20	167	6	9	16	6	4	127	44	501
5:30 PM	60	17	19	9	136	3	7	14	4	3	119	41	432
5:45 PM	62	18	20	12	151	13	8	15	4	1	105	44	453

	N 5th St Southbound			US 62 Westbound			S 5th St Northbound			US 62 Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	TOTAL
7:30 AM	37	10	15	11	91	3	4	18	6	4	174	63	436
7:45 AM	33	15	20	21	122	4	3	19	10	11	201	64	523
8:00 AM	31	15	25	7	119	5	6	16	15	5	135	46	425
8:15 AM	23	14	13	18	102	5	5	12	8	5	106	42	353
AM PEAK	**124**	**54**	**73**	**57**	**434**	**17**	**18**	**65**	**39**	**25**	**616**	**215**	**1737**
4:30 PM	55	25	14	13	144	8	4	15	8	4	144	47	481
4:45 PM	73	16	27	14	190	12	11	17	7	4	125	29	525
5:00 PM	68	22	23	10	175	6	9	29	10	2	131	46	531
5:15 PM	70	16	16	20	167	6	9	16	6	4	127	44	501
PM PEAK	**266**	**79**	**80**	**57**	**676**	**32**	**33**	**77**	**31**	**14**	**527**	**166**	**2038**

Exerpts from:

Traffic Forecast Technical Report
Bardstown
Item No. 04-8809.00
FINAL REPORT

PROJECT: US 31E & KY 245
ITEM NUMBER: 4-8809.00
MARS NUMBER: 0
REQUEST DATE: Friday, March 31, 2017
ANALYST: Cameron Manley
YEAR: **2017** **Design Hour Volumes**
INTERSECTION: US 31E & US 62

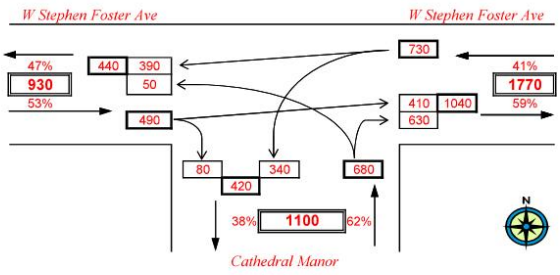
NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2017 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T1 (2017 No-Build)

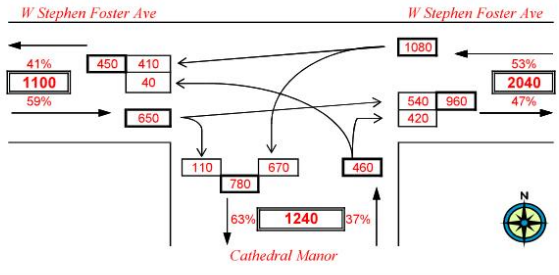
***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

Location Map

2017 AM Design Hour



2017 PM Design Hour



PROJECT: Bardstown Traffic Forecast
ITEM NUMBER: 4-8809.00
MARS NUMBER: 0
REQUEST DATE: 42825
ANALYST: Cameron Manley
YEAR: **2040 Design Hour Volumes**
INTERSECTION: US 31E & KY 245

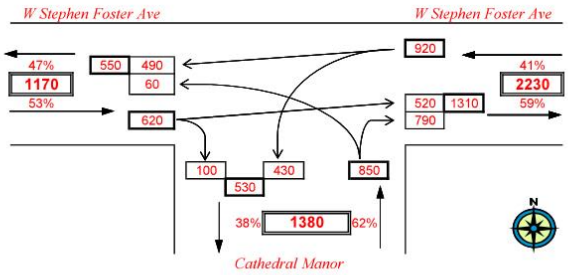
NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T1 (2040 No-Build)

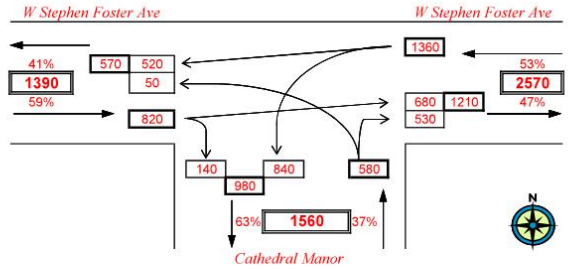
*DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS

Location Map

2040 AM Design Hour



2040 PM Design Hour



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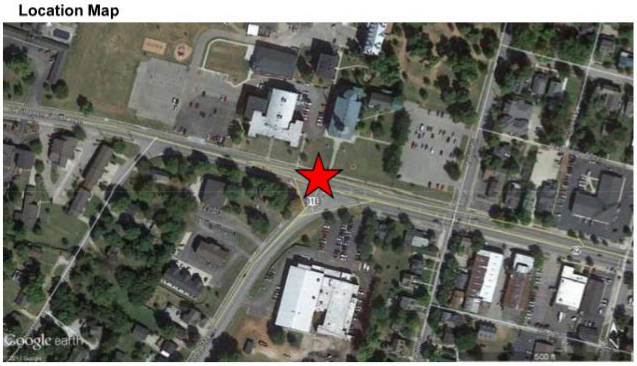
MARS NUMBER: 0
REQUEST DATE: 42825
ANALYST: Cameron Manley
YEAR: **2040 Design Hour Volumes**
INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

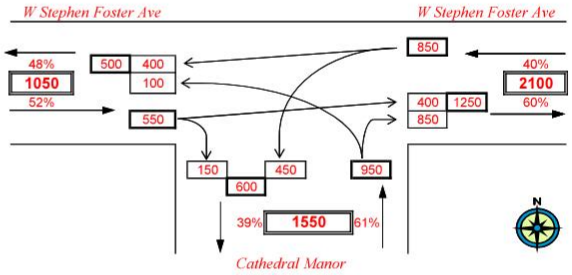
TURN MOVEMENT T1 (2040 Inner Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

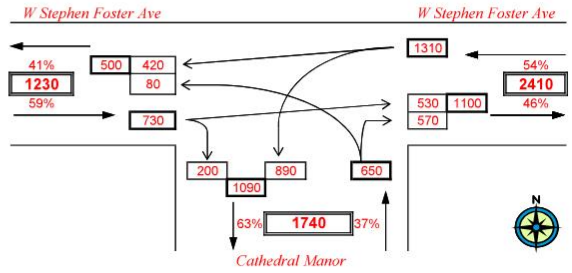
Location Map



2040 AM Design Hour



2040 PM Design Hour



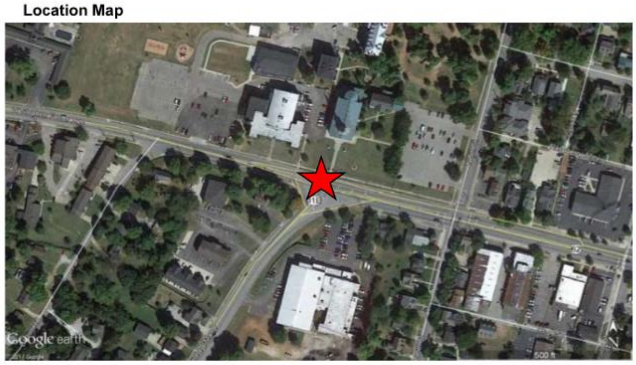
PROJECT: Bardstown Traffic Forecast
ITEM NUMBER: 4-8809.00
MARS NUMBER: 0
REQUEST DATE: 42825
ANALYST: Cameron Manley
YEAR: **2040 Design Hour Volumes**
INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

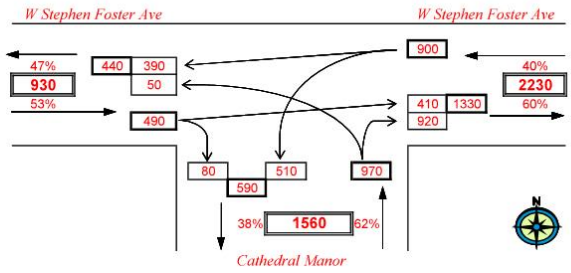
TURN MOVEMENT T1 (2040 Short Outer Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

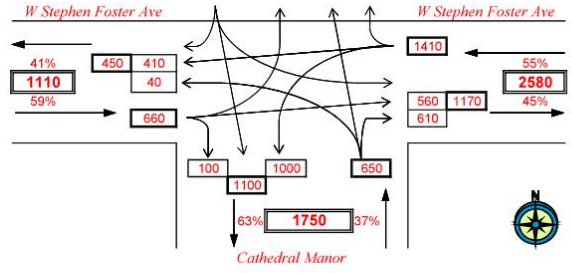
Location Map



2040 AM Design Hour



2040 PM Design Hour



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REQUEST DATE: 42825
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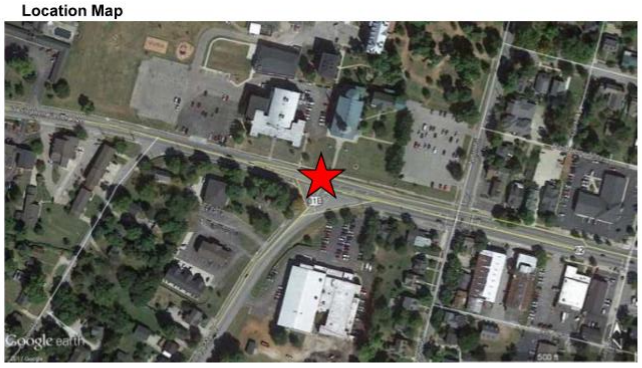
YEAR: **2040 Design Hour Volumes**
INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

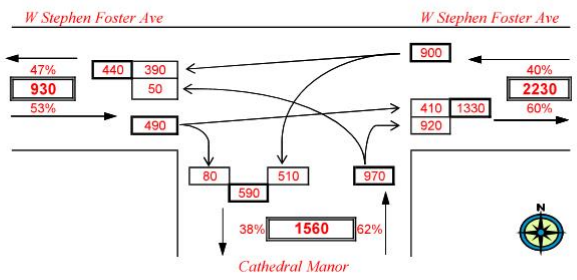
TURN MOVEMENT T1 (2040 Long Outer Bypass)

*DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS

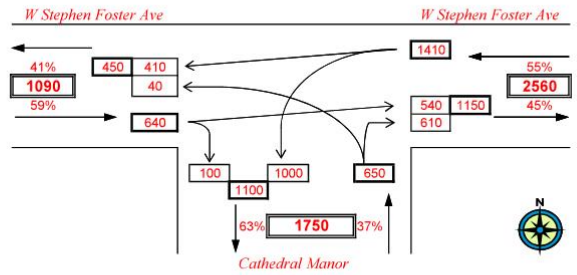
Location Map



2040 AM Design Hour



2040 PM Design Hour



Synchro Reports

HCM 6th TWSC
5: Barton Lane & Stephen Foster 05/18/2018

Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	340	10	40	220	180	10	10	50	100	10	20
Future Vol, veh/h	10	340	10	40	220	180	10	10	50	100	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	45	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	0	8	0	28	7	1	0	0	11	1	0	0
Mvmt Flow	13	436	13	51	282	231	13	13	64	128	13	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	513	0	0	449	0	0	988	1084	443	1007	975	398
Stage 1	-	-	-	-	-	-	469	469	-	500	500	-
Stage 2	-	-	-	-	-	-	519	615	-	507	475	-
Critical Hdwy	4.1	-	-	4.38	-	-	7.1	6.5	6.31	7.11	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Follow-up Hdwy	2.2	-	-	2.452	-	-	3.5	4	3.399	3.509	4	3.3
Pot Cap-1 Maneuver	1063	-	-	987	-	-	228	219	596	220	253	656
Stage 1	-	-	-	-	-	-	579	564	-	555	546	-
Stage 2	-	-	-	-	-	-	544	485	-	550	561	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1063	-	-	987	-	-	195	199	596	174	230	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	195	199	-	174	230	-
Stage 1	-	-	-	-	-	-	570	555	-	546	505	-
Stage 2	-	-	-	-	-	-	471	449	-	472	552	-

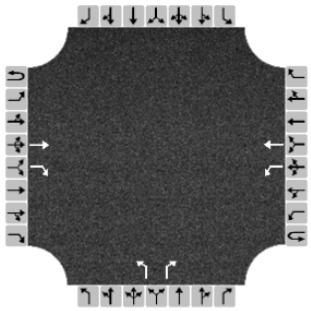
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.8	16.1	60.4
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	195	447	1063	-	-	987	-	-	176	479
HCM Lane V/C Ratio	0.066	0.172	0.012	-	-	0.052	-	-	0.765	0.067
HCM Control Delay (s)	24.8	14.7	8.4	0	-	8.8	0	-	71.7	13.1
HCM Lane LOS	C	B	A	A	-	A	A	-	F	B
HCM 95th %tile Q(veh)	0.2	0.6	0	-	-	0.2	-	-	5	0.2

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Stephen Foster at Cathedr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	4/18/2018	East/West Street	Stephen Foster
Analysis Year	2017	North/South Street	Cathedral Manor
Time Analyzed	AM Peak	Peak Hour Factor	0.84
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Stephen Foster		

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	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			410	80		340	390			50		0				
Percent Heavy Vehicles (%)						4				3		2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized			Yes				No				Yes				No	
Median Type/Storage			Left Only								1					

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						405				60		0				
Capacity, c (veh/h)						1063				133		580				
v/c Ratio						0.38				0.45		0.00				
95% Queue Length, Q_{95} (veh)						1.8				2.0		0.0				
Control Delay (s/veh)						10.5				52.5		11.2				
Level of Service, LOS						B				F		B				
Approach Delay (s/veh)						4.9				52.5						
Approach LOS										F						

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HCM 6th Signalized Intersection Summary
7: Fifth Ave & Stephen Foster

05/18/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	700	40	20	530	60	40	80	30	60	90	160
Future Volume (veh/h)	300	700	40	20	530	60	40	80	30	60	90	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1826	1811	1781	1781	1900	1826	1826	1856	1900	1900
Adj Flow Rate, veh/h	361	843	48	24	639	72	48	96	36	72	108	193
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	5	5	6	8	8	0	5	5	3	0	0
Cap, veh/h	434	1194	68	283	750	84	375	495	186	516	239	427
Arrive On Green	0.18	0.36	0.36	0.06	0.24	0.24	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1767	3336	190	1725	3067	345	1095	1266	475	1248	611	1092
Grp Volume(v), veh/h	361	438	453	24	352	359	48	0	132	72	0	301
Grp Sat Flow(s),veh/h/ln	1767	1735	1792	1725	1692	1719	1095	0	1740	1248	0	1703
Q Serve(g_s), s	11.4	17.4	17.4	0.8	15.9	15.9	2.7	0.0	4.0	3.2	0.0	10.5
Cycle Q Clear(g_c), s	11.4	17.4	17.4	0.8	15.9	15.9	13.2	0.0	4.0	7.2	0.0	10.5
Prop In Lane	1.00		0.11	1.00		0.20	1.00		0.27	1.00		0.64
Lane Grp Cap(c), veh/h	434	621	641	283	414	421	375	0	680	516	0	666
V/C Ratio(X)	0.83	0.71	0.71	0.08	0.85	0.85	0.13	0.00	0.19	0.14	0.00	0.45
Avail Cap(c_a), veh/h	570	807	833	285	468	475	375	0	680	516	0	666
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.2	22.1	22.1	19.9	28.8	28.8	22.9	0.0	16.1	18.4	0.0	18.0
Incr Delay (d2), s/veh	7.9	2.0	1.9	0.1	12.8	12.8	0.7	0.0	0.6	0.6	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	6.9	7.1	0.3	7.6	7.7	0.8	0.0	1.7	1.0	0.0	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.2	24.0	24.0	20.0	41.6	41.6	23.6	0.0	16.7	19.0	0.0	20.2
LnGrp LOS	C	C	C	C	D	D	C	A	B	B	A	C
Approach Vol, veh/h		1252			735			180			373	
Approach Delay, s/veh		24.6			40.9			18.5			20.0	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	33.5		36.7	18.8	24.5		36.7				
Change Period (Y+Rc), s	* 4.8	* 4.9		* 5.4	* 4.8	* 4.9		* 5.4				
Max Green Setting (Gmax), s	* 5.1	* 37		* 23	* 20	* 22		* 23				
Max Q Clear Time (g_c+I1), s	2.8	19.4		12.5	13.4	17.9		15.2				
Green Ext Time (p_c), s	0.0	5.3		1.6	0.7	1.6		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	28.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
5: Barton Lane & Stephen Foster 05/18/2018

Intersection	
Int Delay, s/veh	25.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	470	10	40	330	180	10	10	50	100	10	20
Future Vol, veh/h	10	470	10	40	330	180	10	10	50	100	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	45	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	0	8	0	28	7	1	0	0	11	1	0	0
Mvmt Flow	13	603	13	51	423	231	13	13	64	128	13	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	654	0	0	616	0	0	1296	1392	610	1315	1283	539
Stage 1	-	-	-	-	-	-	636	636	-	641	641	-
Stage 2	-	-	-	-	-	-	660	756	-	674	642	-
Critical Hdwy	4.1	-	-	4.38	-	-	7.1	6.5	6.31	7.11	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Follow-up Hdwy	2.2	-	-	2.452	-	-	3.5	4	3.399	3.509	4	3.3
Pot Cap-1 Maneuver	943	-	-	850	-	-	140	143	478	136	167	546
Stage 1	-	-	-	-	-	-	469	475	-	465	473	-
Stage 2	-	-	-	-	-	-	455	419	-	446	472	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	943	-	-	850	-	-	114	126	478	~ 99	147	546
Mov Cap-2 Maneuver	-	-	-	-	-	-	114	126	-	~ 99	147	-
Stage 1	-	-	-	-	-	-	459	465	-	455	427	-
Stage 2	-	-	-	-	-	-	379	378	-	368	462	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.7	22.4	229.1
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	114	326	943	-	-	850	-	-	101	354
HCM Lane V/C Ratio	0.112	0.236	0.014	-	-	0.06	-	-	1.333	0.091
HCM Control Delay (s)	40.5	19.4	8.9	0	-	9.5	0	-	279.8	16.2
HCM Lane LOS	E	C	A	A	-	A	A	-	F	C
HCM 95th %tile Q(veh)	0.4	0.9	0	-	-	0.2	-	-	9.5	0.3

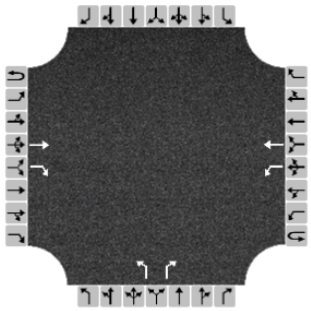
Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Stephen Foster at Cathedr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	4/18/2018	East/West Street	Stephen Foster
Analysis Year	2040	North/South Street	Cathedral Manor
Time Analyzed	AM Peak	Peak Hour Factor	0.84
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Stephen Foster		

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	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			520	100		430	490			60		0				
Percent Heavy Vehicles (%)						4				3		2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized			Yes				No				Yes				No	
Median Type/Storage			Left Only								1					

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						512				71		0				
Capacity, c (veh/h)						950				70		488				
v/c Ratio						0.54				1.03		0.00				
95% Queue Length, Q_{95} (veh)						3.3				5.3		0.0				
Control Delay (s/veh)						13.1				216.9		12.4				
Level of Service, LOS						B				F		B				
Approach Delay (s/veh)						6.1				216.9						
Approach LOS										F						

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HCM 6th Signalized Intersection Summary
7: Fifth Ave & Stephen Foster

05/18/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	890	60	20	680	60	50	90	30	70	100	190
Future Volume (veh/h)	360	890	60	20	680	60	50	90	30	70	100	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1826	1811	1781	1781	1900	1826	1826	1856	1900	1900
Adj Flow Rate, veh/h	434	1072	72	24	819	72	60	108	36	84	120	229
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	5	5	6	8	8	0	5	5	3	0	0
Cap, veh/h	477	1402	94	268	869	76	246	424	141	415	189	361
Arrive On Green	0.21	0.42	0.42	0.06	0.28	0.28	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1767	3299	222	1725	3147	277	1048	1310	437	1234	584	1115
Grp Volume(v), veh/h	434	563	581	24	440	451	60	0	144	84	0	349
Grp Sat Flow(s),veh/h/ln	1767	1735	1786	1725	1692	1732	1048	0	1747	1234	0	1699
Q Serve(g_s), s	14.3	22.1	22.2	0.7	20.4	20.4	4.1	0.0	4.9	4.3	0.0	14.0
Cycle Q Clear(g_c), s	14.3	22.1	22.2	0.7	20.4	20.4	18.1	0.0	4.9	9.2	0.0	14.0
Prop In Lane	1.00		0.12	1.00		0.16	1.00		0.25	1.00		0.66
Lane Grp Cap(c), veh/h	477	737	759	268	468	478	246	0	566	415	0	550
V/C Ratio(X)	0.91	0.76	0.76	0.09	0.94	0.94	0.24	0.00	0.25	0.20	0.00	0.63
Avail Cap(c_a), veh/h	550	807	831	270	468	478	246	0	566	415	0	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	19.6	19.6	18.4	28.3	28.3	30.7	0.0	19.9	23.3	0.0	23.0
Incr Delay (d2), s/veh	17.8	4.0	3.9	0.1	27.6	27.2	2.3	0.0	1.1	1.1	0.0	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	8.9	9.2	0.3	11.3	11.5	1.2	0.0	2.1	1.4	0.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.4	23.6	23.5	18.6	55.9	55.5	33.1	0.0	21.0	24.4	0.0	28.5
LnGrp LOS	D	C	C	B	E	E	C	A	C	C	A	C
Approach Vol, veh/h		1578			915			204			433	
Approach Delay, s/veh		27.4			54.8			24.6			27.7	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	38.9		31.3	21.7	27.0		31.3				
Change Period (Y+Rc), s	* 4.8	* 4.9		* 5.4	* 4.8	* 4.9		* 5.4				
Max Green Setting (Gmax), s	* 5.1	* 37		* 23	* 20	* 22		* 23				
Max Q Clear Time (g_c+I1), s	2.7	24.2		16.0	16.3	22.4		20.1				
Green Ext Time (p_c), s	0.0	6.1		1.4	0.6	0.0		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
5: Barton Lane & Stephen Foster 05/18/2018

Intersection	
Int Delay, s/veh	25.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	470	10	40	330	180	10	10	50	100	10	20
Future Vol, veh/h	10	470	10	40	330	180	10	10	50	100	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	45	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	0	8	0	28	7	1	0	0	11	1	0	0
Mvmt Flow	13	603	13	51	423	231	13	13	64	128	13	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	654	0	0	616	0	0	1296	1392	610	1315	1283	539
Stage 1	-	-	-	-	-	-	636	636	-	641	641	-
Stage 2	-	-	-	-	-	-	660	756	-	674	642	-
Critical Hdwy	4.1	-	-	4.38	-	-	7.1	6.5	6.31	7.11	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Follow-up Hdwy	2.2	-	-	2.452	-	-	3.5	4	3.399	3.509	4	3.3
Pot Cap-1 Maneuver	943	-	-	850	-	-	140	143	478	136	167	546
Stage 1	-	-	-	-	-	-	469	475	-	465	473	-
Stage 2	-	-	-	-	-	-	455	419	-	446	472	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	943	-	-	850	-	-	114	126	478	~ 99	147	546
Mov Cap-2 Maneuver	-	-	-	-	-	-	114	126	-	~ 99	147	-
Stage 1	-	-	-	-	-	-	459	465	-	455	427	-
Stage 2	-	-	-	-	-	-	379	378	-	368	462	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.7	22.4	229.1
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	114	326	943	-	-	850	-	-	101	354
HCM Lane V/C Ratio	0.112	0.236	0.014	-	-	0.06	-	-	1.333	0.091
HCM Control Delay (s)	40.5	19.4	8.9	0	-	9.5	0	-	279.8	16.2
HCM Lane LOS	E	C	A	A	-	A	A	-	F	C
HCM 95th %tile Q(veh)	0.4	0.9	0	-	-	0.2	-	-	9.5	0.3

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
3: Cathedral Manor & Stephen Foster

05/18/2018

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	520	100	430	490	60	790
Future Volume (veh/h)	520	100	430	490	60	790
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1796	1796	1841	1811	1856	1870
Adj Flow Rate, veh/h	619	119	512	583	71	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	7	7	4	6	3	2
Cap, veh/h	1355	260	621	1268	353	
Arrive On Green	0.47	0.47	0.18	0.70	0.20	0.00
Sat Flow, veh/h	2946	548	1753	1811	1767	1585
Grp Volume(v), veh/h	369	369	512	583	71	0
Grp Sat Flow(s),veh/h/ln	1706	1698	1753	1811	1767	1585
Q Serve(g_s), s	13.1	13.1	12.2	12.8	3.0	0.0
Cycle Q Clear(g_c), s	13.1	13.1	12.2	12.8	3.0	0.0
Prop In Lane		0.32	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	810	806	621	1268	353	
V/C Ratio(X)	0.46	0.46	0.82	0.46	0.20	
Avail Cap(c_a), veh/h	810	806	1004	1268	353	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.29	0.29	1.00	0.00
Uniform Delay (d), s/veh	15.9	15.9	11.2	6.0	30.0	0.0
Incr Delay (d2), s/veh	1.9	1.9	0.9	0.4	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	5.1	3.8	3.9	1.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.7	17.7	12.1	6.3	31.3	0.0
LnGrp LOS	B	B	B	A	C	
Approach Vol, veh/h	738			1095	71	A
Approach Delay, s/veh	17.7			9.0	31.3	
Approach LOS	B			A	C	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	20.3	47.2			67.5	22.5
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	35.5	23.0			63.0	18.0
Max Q Clear Time (g_c+I1), s	14.2	15.1			14.8	5.0
Green Ext Time (p_c), s	1.6	2.8			4.3	0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [NER] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
7: Fifth Ave & Stephen Foster

05/18/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	890	60	20	680	60	50	90	30	70	100	190
Future Volume (veh/h)	360	890	60	20	680	60	50	90	30	70	100	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1826	1811	1781	1781	1900	1826	1826	1856	1900	1900
Adj Flow Rate, veh/h	434	1072	72	24	819	72	60	108	36	84	120	229
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	5	5	6	8	8	0	5	5	3	0	0
Cap, veh/h	477	1402	94	268	869	76	246	424	141	415	189	361
Arrive On Green	0.21	0.42	0.42	0.06	0.28	0.28	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1767	3299	222	1725	3147	277	1048	1310	437	1234	584	1115
Grp Volume(v), veh/h	434	563	581	24	440	451	60	0	144	84	0	349
Grp Sat Flow(s),veh/h/ln	1767	1735	1786	1725	1692	1732	1048	0	1747	1234	0	1699
Q Serve(g_s), s	14.3	22.1	22.2	0.7	20.4	20.4	4.1	0.0	4.9	4.3	0.0	14.0
Cycle Q Clear(g_c), s	14.3	22.1	22.2	0.7	20.4	20.4	18.1	0.0	4.9	9.2	0.0	14.0
Prop In Lane	1.00		0.12	1.00		0.16	1.00		0.25	1.00		0.66
Lane Grp Cap(c), veh/h	477	737	759	268	468	478	246	0	566	415	0	550
V/C Ratio(X)	0.91	0.76	0.76	0.09	0.94	0.94	0.24	0.00	0.25	0.20	0.00	0.63
Avail Cap(c_a), veh/h	550	807	831	270	468	478	246	0	566	415	0	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.35	0.35	0.35	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	19.6	19.6	18.4	28.3	28.3	30.7	0.0	19.9	23.3	0.0	23.0
Incr Delay (d2), s/veh	7.6	1.4	1.4	0.1	27.6	27.2	2.3	0.0	1.1	1.1	0.0	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	8.4	8.6	0.3	11.3	11.5	1.2	0.0	2.1	1.4	0.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.1	21.0	21.0	18.6	55.9	55.5	33.1	0.0	21.0	24.4	0.0	28.5
LnGrp LOS	C	C	C	B	E	E	C	A	C	C	A	C
Approach Vol, veh/h		1578			915			204			433	
Approach Delay, s/veh		22.7			54.8			24.6			27.7	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	38.9		31.3	21.7	27.0		31.3				
Change Period (Y+Rc), s	* 4.8	* 4.9		* 5.4	* 4.8	* 4.9		* 5.4				
Max Green Setting (Gmax), s	* 5.1	* 37		* 23	* 20	* 22		* 23				
Max Q Clear Time (g_c+I1), s	2.7	24.2		16.0	16.3	22.4		20.1				
Green Ext Time (p_c), s	0.0	6.1		1.4	0.6	0.0		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	32.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
5: Barton Lane & Stephen Foster 05/18/2018

Intersection	
Int Delay, s/veh	25.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	470	10	40	330	180	10	10	50	100	10	20
Future Vol, veh/h	10	470	10	40	330	180	10	10	50	100	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	45	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	0	8	0	28	7	1	0	0	11	1	0	0
Mvmt Flow	13	603	13	51	423	231	13	13	64	128	13	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	654	0	0	616	0	0	1296	1392	610	1315	1283	539
Stage 1	-	-	-	-	-	-	636	636	-	641	641	-
Stage 2	-	-	-	-	-	-	660	756	-	674	642	-
Critical Hdwy	4.1	-	-	4.38	-	-	7.1	6.5	6.31	7.11	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Follow-up Hdwy	2.2	-	-	2.452	-	-	3.5	4	3.399	3.509	4	3.3
Pot Cap-1 Maneuver	943	-	-	850	-	-	140	143	478	136	167	546
Stage 1	-	-	-	-	-	-	469	475	-	465	473	-
Stage 2	-	-	-	-	-	-	455	419	-	446	472	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	943	-	-	850	-	-	114	126	478	~ 99	147	546
Mov Cap-2 Maneuver	-	-	-	-	-	-	114	126	-	~ 99	147	-
Stage 1	-	-	-	-	-	-	459	465	-	455	427	-
Stage 2	-	-	-	-	-	-	379	378	-	368	462	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.7	22.4	229.1
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	114	326	943	-	-	850	-	-	101	354
HCM Lane V/C Ratio	0.112	0.236	0.014	-	-	0.06	-	-	1.333	0.091
HCM Control Delay (s)	40.5	19.4	8.9	0	-	9.5	0	-	279.8	16.2
HCM Lane LOS	E	C	A	A	-	A	A	-	F	C
HCM 95th %tile Q(veh)	0.4	0.9	0	-	-	0.2	-	-	9.5	0.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

AM No Build 04/16/2018 Roundabout
DBZ

Synchro 10 Report
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HCM 6th Roundabout
3: Cathedral Manor & Stephen Foster 05/18/2018

Intersection	
Intersection Delay, s/veh	107.4
Intersection LOS	F

Approach	EB	WB	NE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	738	1095	1011
Demand Flow Rate, veh/h	786	1150	1032
Vehicles Circulating, veh/h	532	73	662
Vehicles Exiting, veh/h	691	1621	656
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	51.3	25.9	236.6
Approach LOS	F	D	F

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	786	1150	1032
Cap Entry Lane, veh/h	802	1281	702
Entry HV Adj Factor	0.939	0.952	0.980
Flow Entry, veh/h	738	1095	1011
Cap Entry, veh/h	753	1220	688
V/C Ratio	0.980	0.898	1.469
Control Delay, s/veh	51.3	25.9	236.6
LOS	F	D	F
95th %tile Queue, veh	16	14	48

HCM 6th Signalized Intersection Summary
7: Fifth Ave & Stephen Foster

05/18/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	890	60	20	680	60	50	90	30	70	100	190
Future Volume (veh/h)	360	890	60	20	680	60	50	90	30	70	100	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1826	1811	1781	1781	1900	1826	1826	1856	1900	1900
Adj Flow Rate, veh/h	434	1072	72	24	819	72	60	108	36	84	120	229
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	5	5	6	8	8	0	5	5	3	0	0
Cap, veh/h	477	1402	94	268	869	76	246	424	141	415	189	361
Arrive On Green	0.21	0.42	0.42	0.06	0.28	0.28	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1767	3299	222	1725	3147	277	1048	1310	437	1234	584	1115
Grp Volume(v), veh/h	434	563	581	24	440	451	60	0	144	84	0	349
Grp Sat Flow(s),veh/h/ln	1767	1735	1786	1725	1692	1732	1048	0	1747	1234	0	1699
Q Serve(g_s), s	14.3	22.1	22.2	0.7	20.4	20.4	4.1	0.0	4.9	4.3	0.0	14.0
Cycle Q Clear(g_c), s	14.3	22.1	22.2	0.7	20.4	20.4	18.1	0.0	4.9	9.2	0.0	14.0
Prop In Lane	1.00		0.12	1.00		0.16	1.00		0.25	1.00		0.66
Lane Grp Cap(c), veh/h	477	737	759	268	468	478	246	0	566	415	0	550
V/C Ratio(X)	0.91	0.76	0.76	0.09	0.94	0.94	0.24	0.00	0.25	0.20	0.00	0.63
Avail Cap(c_a), veh/h	550	807	831	270	468	478	246	0	566	415	0	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	19.6	19.6	18.4	28.3	28.3	30.7	0.0	19.9	23.3	0.0	23.0
Incr Delay (d2), s/veh	17.8	4.0	3.9	0.1	27.6	27.2	2.3	0.0	1.1	1.1	0.0	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	8.9	9.2	0.3	11.3	11.5	1.2	0.0	2.1	1.4	0.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.4	23.6	23.5	18.6	55.9	55.5	33.1	0.0	21.0	24.4	0.0	28.5
LnGrp LOS	D	C	C	B	E	E	C	A	C	C	A	C
Approach Vol, veh/h		1578			915			204			433	
Approach Delay, s/veh		27.4			54.8			24.6			27.7	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	38.9		31.3	21.7	27.0		31.3				
Change Period (Y+Rc), s	* 4.8	* 4.9		* 5.4	* 4.8	* 4.9		* 5.4				
Max Green Setting (Gmax), s	* 5.1	* 37		* 23	* 20	* 22		* 23				
Max Q Clear Time (g_c+I1), s	2.7	24.2		16.0	16.3	22.4		20.1				
Green Ext Time (p_c), s	0.0	6.1		1.4	0.6	0.0		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
5: Barton Lane & Stephen Foster 05/18/2018

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	560	10	40	330	80	10	10	40	50	10	10
Future Vol, veh/h	10	560	10	40	330	80	10	10	40	50	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	45	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	2	0	2	2	1	0	0	24	2	0	0
Mvmt Flow	11	609	11	43	359	87	11	11	43	54	11	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	446	0	0	620	0	0	1137	1169	615	1153	1131	403
Stage 1	-	-	-	-	-	-	637	637	-	489	489	-
Stage 2	-	-	-	-	-	-	500	532	-	664	642	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.5	6.44	7.12	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.5	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4	3.516	3.518	4	3.3
Pot Cap-1 Maneuver	1125	-	-	960	-	-	181	195	453	174	205	652
Stage 1	-	-	-	-	-	-	469	475	-	561	553	-
Stage 2	-	-	-	-	-	-	557	529	-	450	472	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1125	-	-	960	-	-	161	181	453	142	190	652
Mov Cap-2 Maneuver	-	-	-	-	-	-	161	181	-	142	190	-
Stage 1	-	-	-	-	-	-	462	468	-	553	520	-
Stage 2	-	-	-	-	-	-	504	497	-	391	465	-

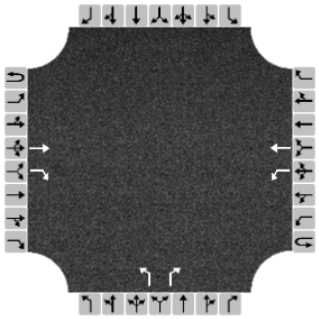
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.8	19.3	39.6
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	161	348	1125	-	-	960	-	-	145	360
HCM Lane V/C Ratio	0.068	0.156	0.01	-	-	0.045	-	-	0.412	0.045
HCM Control Delay (s)	29	17.3	8.2	0	-	8.9	0	-	46.2	15.5
HCM Lane LOS	D	C	A	A	-	A	A	-	E	C
HCM 95th %tile Q(veh)	0.2	0.5	0	-	-	0.1	-	-	1.8	0.1

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Stephen Foster at Cathedr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	4/18/2018	East/West Street	Stephen Foster
Analysis Year	2017	North/South Street	Cathedral Manor
Time Analyzed	PM Peak	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Stephen Foster		

Lanes



Major Street: East-West

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	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			540	110		670	410			40		0				
Percent Heavy Vehicles (%)						3				3		1				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized			Yes				No				Yes				No	
Median Type/Storage							Left Only								1	

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						705				42		0				
Capacity, c (veh/h)						998				35		524				
v/c Ratio						0.71				1.19		0.00				
95% Queue Length, Q_{95} (veh)						6.2				4.4		0.0				
Control Delay (s/veh)						16.8				387.8		11.9				
Level of Service, LOS						C				F		B				
Approach Delay (s/veh)							10.4				387.8					
Approach LOS											F					

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HCM 6th Signalized Intersection Summary
7: Fifth Ave & Stephen Foster

05/18/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	640	60	70	720	80	40	110	50	60	90	160
Future Volume (veh/h)	260	640	60	70	720	80	40	110	50	60	90	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1841	1870	1841	1841	1856	1885	1885	1885	1900	1900
Adj Flow Rate, veh/h	271	667	62	73	750	83	42	115	52	62	94	167
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	4	4	2	4	4	3	1	1	1	0	0
Cap, veh/h	357	1086	101	320	840	93	431	508	230	523	253	450
Arrive On Green	0.13	0.34	0.34	0.06	0.26	0.26	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1810	3235	300	1781	3175	351	1110	1229	556	1228	614	1090
Grp Volume(v), veh/h	271	360	369	73	413	420	42	0	167	62	0	261
Grp Sat Flow(s),veh/h/ln	1810	1749	1787	1781	1749	1777	1110	0	1785	1228	0	1704
Q Serve(g_s), s	8.1	13.8	13.8	2.3	18.2	18.2	2.2	0.0	4.8	2.8	0.0	8.5
Cycle Q Clear(g_c), s	8.1	13.8	13.8	2.3	18.2	18.2	10.7	0.0	4.8	7.6	0.0	8.5
Prop In Lane	1.00		0.17	1.00		0.20	1.00		0.31	1.00		0.64
Lane Grp Cap(c), veh/h	357	587	600	320	463	470	431	0	737	523	0	704
V/C Ratio(X)	0.76	0.61	0.61	0.23	0.89	0.89	0.10	0.00	0.23	0.12	0.00	0.37
Avail Cap(c_a), veh/h	572	813	831	322	483	491	431	0	737	523	0	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	22.2	22.2	19.3	28.3	28.3	20.0	0.0	15.2	17.7	0.0	16.3
Incr Delay (d2), s/veh	3.4	1.0	1.0	0.4	18.1	18.0	0.5	0.0	0.7	0.5	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	5.5	5.6	0.9	9.5	9.6	0.6	0.0	2.1	0.8	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	23.3	23.3	19.7	46.5	46.3	20.4	0.0	15.9	18.1	0.0	17.8
LnGrp LOS	C	C	C	B	D	D	C	A	B	B	A	B
Approach Vol, veh/h		1000			906			209			323	
Approach Delay, s/veh		23.0			44.2			16.8			17.8	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	31.8		38.4	15.5	26.1		38.4				
Change Period (Y+Rc), s	* 4.8	* 4.9		* 5.4	* 4.8	* 4.9		* 5.4				
Max Green Setting (Gmax), s	* 5.1	* 37		* 23	* 20	* 22		* 23				
Max Q Clear Time (g_c+I1), s	4.3	15.8		10.5	10.1	20.2		12.7				
Green Ext Time (p_c), s	0.0	4.4		1.5	0.6	1.0		0.7				

Intersection Summary	
HCM 6th Ctrl Delay	29.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
5: Barton Lane & Stephen Foster 05/18/2018

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	730	10	40	450	80	10	10	40	50	10	10
Future Vol, veh/h	10	730	10	40	450	80	10	10	40	50	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	45	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	2	0	2	2	1	0	0	24	2	0	0
Mvmt Flow	11	793	11	43	489	87	11	11	43	54	11	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	576	0	0	804	0	0	1451	1483	799	1467	1445	533
Stage 1	-	-	-	-	-	-	821	821	-	619	619	-
Stage 2	-	-	-	-	-	-	630	662	-	848	826	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.5	6.44	7.12	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.5	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4	3.516	3.518	4	3.3
Pot Cap-1 Maneuver	1007	-	-	820	-	-	110	126	353	106	133	551
Stage 1	-	-	-	-	-	-	371	391	-	476	483	-
Stage 2	-	-	-	-	-	-	473	462	-	356	389	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1007	-	-	820	-	-	93	114	353	80	120	551
Mov Cap-2 Maneuver	-	-	-	-	-	-	93	114	-	80	120	-
Stage 1	-	-	-	-	-	-	364	383	-	466	445	-
Stage 2	-	-	-	-	-	-	417	426	-	297	381	-

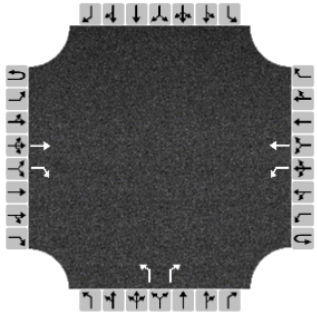
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	27.6	98.4
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	93	249	1007	-	-	820	-	-	83	251
HCM Lane V/C Ratio	0.117	0.218	0.011	-	-	0.053	-	-	0.72	0.065
HCM Control Delay (s)	48.8	23.4	8.6	0	-	9.6	0	-	119.7	20.3
HCM Lane LOS	E	C	A	A	-	A	A	-	F	C
HCM 95th %tile Q(veh)	0.4	0.8	0	-	-	0.2	-	-	3.5	0.2

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Stephen Foster at Cathedr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	4/18/2018	East/West Street	Stephen Foster
Analysis Year	2040	North/South Street	Cathedral Manor
Time Analyzed	PM Peak	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Stephen Foster		

Lanes



Major Street: East-West

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	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			680	140		840	520			50		0				
Percent Heavy Vehicles (%)						3				3		1				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized			Yes				No				Yes				No	
Median Type/Storage				Left Only							1					

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						884				53		0				
Capacity, c (veh/h)						879				0		432				
v/c Ratio						1.01						0.00				
95% Queue Length, Q_{95} (veh)						18.5						0.0				
Control Delay (s/veh)						53.4						13.3				
Level of Service, LOS						F						B				
Approach Delay (s/veh)						33.0										
Approach LOS																

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HCM 6th Signalized Intersection Summary
7: Fifth Ave & Stephen Foster

05/18/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	820	90	90	940	90	50	130	60	100	110	370
Future Volume (veh/h)	300	820	90	90	940	90	50	130	60	100	110	370
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1841	1870	1841	1841	1856	1885	1885	1885	1900	1900
Adj Flow Rate, veh/h	312	854	94	94	979	94	52	135	62	104	115	385
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	4	4	2	4	4	3	1	1	1	0	0
Cap, veh/h	361	1155	127	278	891	86	199	471	216	459	148	495
Arrive On Green	0.15	0.36	0.36	0.06	0.28	0.28	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1810	3177	350	1781	3224	310	891	1223	561	1195	384	1285
Grp Volume(v), veh/h	312	470	478	94	531	542	52	0	197	104	0	500
Grp Sat Flow(s),veh/h/ln	1810	1749	1778	1781	1749	1785	891	0	1784	1195	0	1669
Q Serve(g_s), s	9.4	18.7	18.7	2.9	22.1	22.1	4.4	0.0	6.1	5.3	0.0	21.0
Cycle Q Clear(g_c), s	9.4	18.7	18.7	2.9	22.1	22.1	25.4	0.0	6.1	11.4	0.0	21.0
Prop In Lane	1.00		0.20	1.00		0.17	1.00		0.31	1.00		0.77
Lane Grp Cap(c), veh/h	361	636	646	278	483	493	199	0	687	459	0	643
V/C Ratio(X)	0.86	0.74	0.74	0.34	1.10	1.10	0.26	0.00	0.29	0.23	0.00	0.78
Avail Cap(c_a), veh/h	547	813	827	280	483	493	199	0	687	459	0	643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	22.2	22.2	19.5	29.0	29.0	32.7	0.0	17.0	20.9	0.0	21.6
Incr Delay (d2), s/veh	9.0	2.7	2.6	0.7	70.6	70.4	3.2	0.0	1.0	1.1	0.0	9.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	7.6	7.7	1.2	18.1	18.5	1.1	0.0	2.6	1.6	0.0	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.9	24.8	24.8	20.2	99.6	99.3	35.9	0.0	18.0	22.1	0.0	30.6
LnGrp LOS	C	C	C	C	F	F	D	A	B	C	A	C
Approach Vol, veh/h		1260			1167			249			604	
Approach Delay, s/veh		25.6			93.1			21.8			29.1	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	34.0		36.2	16.8	27.0		36.2				
Change Period (Y+Rc), s	* 4.8	* 4.9		* 5.4	* 4.8	* 4.9		* 5.4				
Max Green Setting (Gmax), s	* 5.1	* 37		* 23	* 20	* 22		* 23				
Max Q Clear Time (g_c+I1), s	4.9	20.7		23.0	11.4	24.1		27.4				
Green Ext Time (p_c), s	0.0	5.5		0.0	0.6	0.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	49.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
5: Barton Lane & Stephen Foster 05/18/2018

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↑			↕	
Traffic Vol, veh/h	10	730	10	40	450	80	10	10	40	50	10	10
Future Vol, veh/h	10	730	10	40	450	80	10	10	40	50	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	45	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	2	0	2	2	1	0	0	24	2	0	0
Mvmt Flow	11	793	11	43	489	87	11	11	43	54	11	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	576	0	0	804	0	0	1451	1483	799	1467	1445	533
Stage 1	-	-	-	-	-	-	821	821	-	619	619	-
Stage 2	-	-	-	-	-	-	630	662	-	848	826	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.5	6.44	7.12	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.5	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4	3.516	3.518	4	3.3
Pot Cap-1 Maneuver	1007	-	-	820	-	-	110	126	353	106	133	551
Stage 1	-	-	-	-	-	-	371	391	-	476	483	-
Stage 2	-	-	-	-	-	-	473	462	-	356	389	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1007	-	-	820	-	-	93	114	353	80	120	551
Mov Cap-2 Maneuver	-	-	-	-	-	-	93	114	-	80	120	-
Stage 1	-	-	-	-	-	-	364	383	-	466	445	-
Stage 2	-	-	-	-	-	-	417	426	-	297	381	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	27.6	98.4
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	93	249	1007	-	-	820	-	-	83	251
HCM Lane V/C Ratio	0.117	0.218	0.011	-	-	0.053	-	-	0.72	0.065
HCM Control Delay (s)	48.8	23.4	8.6	0	-	9.6	0	-	119.7	20.3
HCM Lane LOS	E	C	A	A	-	A	A	-	F	C
HCM 95th %tile Q(veh)	0.4	0.8	0	-	-	0.2	-	-	3.5	0.2

HCM 6th Signalized Intersection Summary
3: Cathedral Manor & Stephen Foster

05/18/2018

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	680	140	840	520	50	530
Future Volume (veh/h)	680	140	840	520	50	530
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1856	1841	1856	1885
Adj Flow Rate, veh/h	716	0	884	547	53	558
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	4	4	3	4	3	1
Cap, veh/h	987		909	1404	268	946
Arrive On Green	0.28	0.00	0.44	0.76	0.15	0.15
Sat Flow, veh/h	3681	0	1767	1841	1767	1598
Grp Volume(v), veh/h	716	0	884	547	53	558
Grp Sat Flow(s),veh/h/ln	1749	0	1767	1841	1767	1598
Q Serve(g_s), s	22.2	0.0	49.4	12.1	3.1	18.2
Cycle Q Clear(g_c), s	22.2	0.0	49.4	12.1	3.1	18.2
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	987		909	1404	268	946
V/C Ratio(X)	0.73		0.97	0.39	0.20	0.59
Avail Cap(c_a), veh/h	987		944	1404	268	946
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.29	0.29	1.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	23.9	4.8	44.5	15.4
Incr Delay (d2), s/veh	4.6	0.0	10.1	0.2	1.6	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.0	0.0	25.7	3.8	1.5	9.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	43.5	0.0	33.9	5.1	46.2	18.1
LnGrp LOS	D		C	A	D	B
Approach Vol, veh/h	716	A		1431	611	
Approach Delay, s/veh	43.5			22.9	20.5	
Approach LOS	D			C	C	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	57.6	38.8			96.4	23.6
Change Period (Y+Rc), s	* 4.8	* 4.9			* 4.9	5.4
Max Green Setting (Gmax), s	* 55	* 32			* 92	18.2
Max Q Clear Time (g_c+I1), s	51.4	24.2			14.1	20.2
Green Ext Time (p_c), s	1.4	2.7			4.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	27.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

PM No Build 04/16/2018 No Build Signal Imp
DBZ

Synchro 10 Report
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HCM 6th Signalized Intersection Summary
7: Fifth Ave & Stephen Foster 05/18/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	820	90	90	940	90	50	130	60	100	110	370
Future Volume (veh/h)	300	820	90	90	940	90	50	130	60	100	110	370
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1841	1870	1841	1841	1856	1885	1885	1885	1900	1900
Adj Flow Rate, veh/h	312	854	94	94	979	94	52	135	62	104	115	385
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	4	4	2	4	4	3	1	1	1	0	0
Cap, veh/h	361	1155	127	278	891	86	199	471	216	459	148	495
Arrive On Green	0.15	0.36	0.36	0.06	0.28	0.28	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1810	3177	350	1781	3224	310	891	1223	561	1195	384	1285
Grp Volume(v), veh/h	312	470	478	94	531	542	52	0	197	104	0	500
Grp Sat Flow(s),veh/h/ln	1810	1749	1778	1781	1749	1785	891	0	1784	1195	0	1669
Q Serve(g_s), s	9.4	18.7	18.7	2.9	22.1	22.1	4.4	0.0	6.1	5.3	0.0	21.0
Cycle Q Clear(g_c), s	9.4	18.7	18.7	2.9	22.1	22.1	25.4	0.0	6.1	11.4	0.0	21.0
Prop In Lane	1.00		0.20	1.00		0.17	1.00		0.31	1.00		0.77
Lane Grp Cap(c), veh/h	361	636	646	278	483	493	199	0	687	459	0	643
V/C Ratio(X)	0.86	0.74	0.74	0.34	1.10	1.10	0.26	0.00	0.29	0.23	0.00	0.78
Avail Cap(c_a), veh/h	547	813	827	280	483	493	199	0	687	459	0	643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.52	0.52	0.52	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	22.2	22.2	19.5	29.0	29.0	32.7	0.0	17.0	20.9	0.0	21.6
Incr Delay (d2), s/veh	5.0	1.4	1.4	0.7	70.6	70.4	3.2	0.0	1.0	1.1	0.0	9.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	7.4	7.5	1.2	18.1	18.5	1.1	0.0	2.6	1.6	0.0	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.8	23.6	23.5	20.2	99.6	99.3	35.9	0.0	18.0	22.1	0.0	30.6
LnGrp LOS	C	C	C	C	F	F	D	A	B	C	A	C
Approach Vol, veh/h		1260			1167			249			604	
Approach Delay, s/veh		23.6			93.1			21.8			29.1	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	34.0		36.2	16.8	27.0		36.2				
Change Period (Y+Rc), s	* 4.8	* 4.9		* 5.4	* 4.8	* 4.9		* 5.4				
Max Green Setting (Gmax), s	* 5.1	* 37		* 23	* 20	* 22		* 23				
Max Q Clear Time (g_c+I1), s	4.9	20.7		23.0	11.4	24.1		27.4				
Green Ext Time (p_c), s	0.0	5.5		0.0	0.6	0.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	49.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
5: Barton Lane & Stephen Foster 05/18/2018

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	730	10	40	450	80	10	10	40	50	10	10
Future Vol, veh/h	10	730	10	40	450	80	10	10	40	50	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	45	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	2	0	2	2	1	0	0	24	2	0	0
Mvmt Flow	11	793	11	43	489	87	11	11	43	54	11	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	576	0	0	804	0	0	1451	1483	799	1467	1445	533
Stage 1	-	-	-	-	-	-	821	821	-	619	619	-
Stage 2	-	-	-	-	-	-	630	662	-	848	826	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.5	6.44	7.12	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.5	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4	3.516	3.518	4	3.3
Pot Cap-1 Maneuver	1007	-	-	820	-	-	110	126	353	106	133	551
Stage 1	-	-	-	-	-	-	371	391	-	476	483	-
Stage 2	-	-	-	-	-	-	473	462	-	356	389	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1007	-	-	820	-	-	93	114	353	80	120	551
Mov Cap-2 Maneuver	-	-	-	-	-	-	93	114	-	80	120	-
Stage 1	-	-	-	-	-	-	364	383	-	466	445	-
Stage 2	-	-	-	-	-	-	417	426	-	297	381	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	27.6	98.4
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	93	249	1007	-	-	820	-	-	83	251
HCM Lane V/C Ratio	0.117	0.218	0.011	-	-	0.053	-	-	0.72	0.065
HCM Control Delay (s)	48.8	23.4	8.6	0	-	9.6	0	-	119.7	20.3
HCM Lane LOS	E	C	A	A	-	A	A	-	F	C
HCM 95th %tile Q(veh)	0.4	0.8	0	-	-	0.2	-	-	3.5	0.2

HCM 6th Roundabout
3: Cathedral Manor & Stephen Foster 05/18/2018

Intersection	
Intersection Delay, s/veh	147.4
Intersection LOS	F

Approach	EB	WB	NE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	863	1431	611
Demand Flow Rate, veh/h	893	1480	619
Vehicles Circulating, veh/h	911	55	745
Vehicles Exiting, veh/h	624	1309	1059
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	315.9	86.8	51.5
Approach LOS	F	F	F

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	893	1480	619
Cap Entry Lane, veh/h	545	1305	645
Entry HV Adj Factor	0.967	0.967	0.987
Flow Entry, veh/h	863	1431	611
Cap Entry, veh/h	527	1261	637
V/C Ratio	1.639	1.134	0.959
Control Delay, s/veh	315.9	86.8	51.5
LOS	F	F	F
95th %tile Queue, veh	49	36	14

HCM 6th Signalized Intersection Summary
7: Fifth Ave & Stephen Foster

05/18/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	820	90	90	940	90	50	130	60	100	110	370
Future Volume (veh/h)	300	820	90	90	940	90	50	130	60	100	110	370
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1841	1870	1841	1841	1856	1885	1885	1885	1900	1900
Adj Flow Rate, veh/h	312	854	94	94	979	94	52	135	62	104	115	385
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	4	4	2	4	4	3	1	1	1	0	0
Cap, veh/h	361	1155	127	278	891	86	199	471	216	459	148	495
Arrive On Green	0.15	0.36	0.36	0.06	0.28	0.28	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1810	3177	350	1781	3224	310	891	1223	561	1195	384	1285
Grp Volume(v), veh/h	312	470	478	94	531	542	52	0	197	104	0	500
Grp Sat Flow(s),veh/h/ln	1810	1749	1778	1781	1749	1785	891	0	1784	1195	0	1669
Q Serve(g_s), s	9.4	18.7	18.7	2.9	22.1	22.1	4.4	0.0	6.1	5.3	0.0	21.0
Cycle Q Clear(g_c), s	9.4	18.7	18.7	2.9	22.1	22.1	25.4	0.0	6.1	11.4	0.0	21.0
Prop In Lane	1.00		0.20	1.00		0.17	1.00		0.31	1.00		0.77
Lane Grp Cap(c), veh/h	361	636	646	278	483	493	199	0	687	459	0	643
V/C Ratio(X)	0.86	0.74	0.74	0.34	1.10	1.10	0.26	0.00	0.29	0.23	0.00	0.78
Avail Cap(c_a), veh/h	547	813	827	280	483	493	199	0	687	459	0	643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	22.2	22.2	19.5	29.0	29.0	32.7	0.0	17.0	20.9	0.0	21.6
Incr Delay (d2), s/veh	9.0	2.7	2.6	0.7	70.6	70.4	3.2	0.0	1.0	1.1	0.0	9.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	7.6	7.7	1.2	18.1	18.5	1.1	0.0	2.6	1.6	0.0	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.9	24.8	24.8	20.2	99.6	99.3	35.9	0.0	18.0	22.1	0.0	30.6
LnGrp LOS	C	C	C	C	F	F	D	A	B	C	A	C
Approach Vol, veh/h		1260			1167			249			604	
Approach Delay, s/veh		25.6			93.1			21.8			29.1	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	34.0		36.2	16.8	27.0		36.2				
Change Period (Y+Rc), s	* 4.8	* 4.9		* 5.4	* 4.8	* 4.9		* 5.4				
Max Green Setting (Gmax), s	* 5.1	* 37		* 23	* 20	* 22		* 23				
Max Q Clear Time (g_c+I1), s	4.9	20.7		23.0	11.4	24.1		27.4				
Green Ext Time (p_c), s	0.0	5.5		0.0	0.6	0.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	49.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.