final report

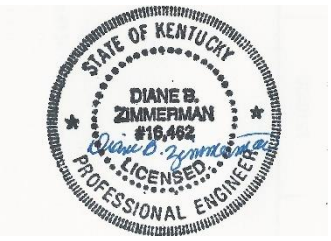
November 29, 2021

Traffic Impact Study

Apartments
400 Shelby Station Drive
Louisville, KY

Prepared for

Louisville Metro Planning Commission



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INTRODUCTION

The development plan for an apartment community on Shelby Station Drive in Louisville, KY shows 204 apartment units. **Figure 1** displays a map of the site. Access to the community will be from two entrances on Beckley Station 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 Beckley Station Road with Shelbyville Road and the proposed entrances on Beckley Station Road.

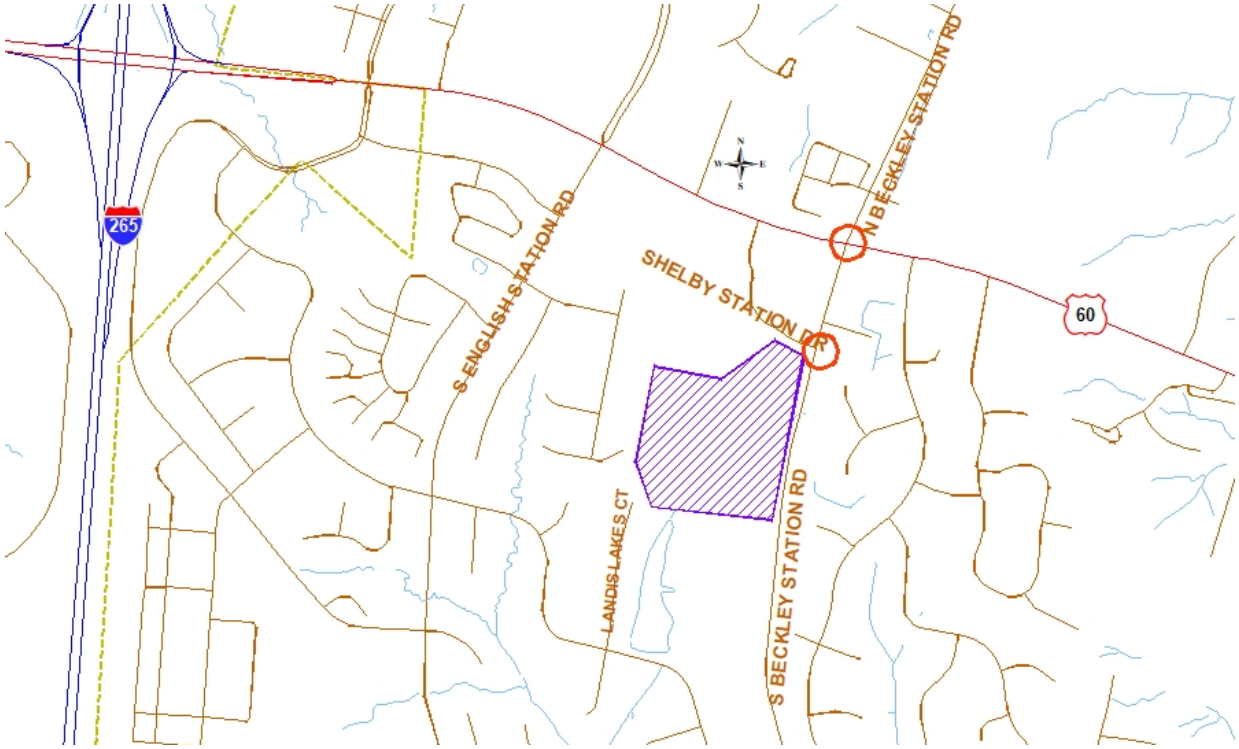


Figure 1. Site Map

EXISTING CONDITIONS

Beckley Station Road is a Metro-maintained road with an estimated 2021 ADT of 4,500 vehicles per day south of Shelby Station Drive, as estimated from the turning movement count. The road has two nine-foot lanes and a one-foot shoulder. The speed limit is 35 mph. There are sidewalks on both sides between Shelbyville Road and Shelby Station Drive. The intersection with Shelbyville Road is controlled with a traffic signal. There are left turn lanes on Shelbyville Road and right turn lanes on all approaches.

Peak hour traffic count for the intersections were obtained on September 28, 2021. The a.m. peak was 7:15 to 8:15 and the p.m. peak hour varied between the intersections. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data.

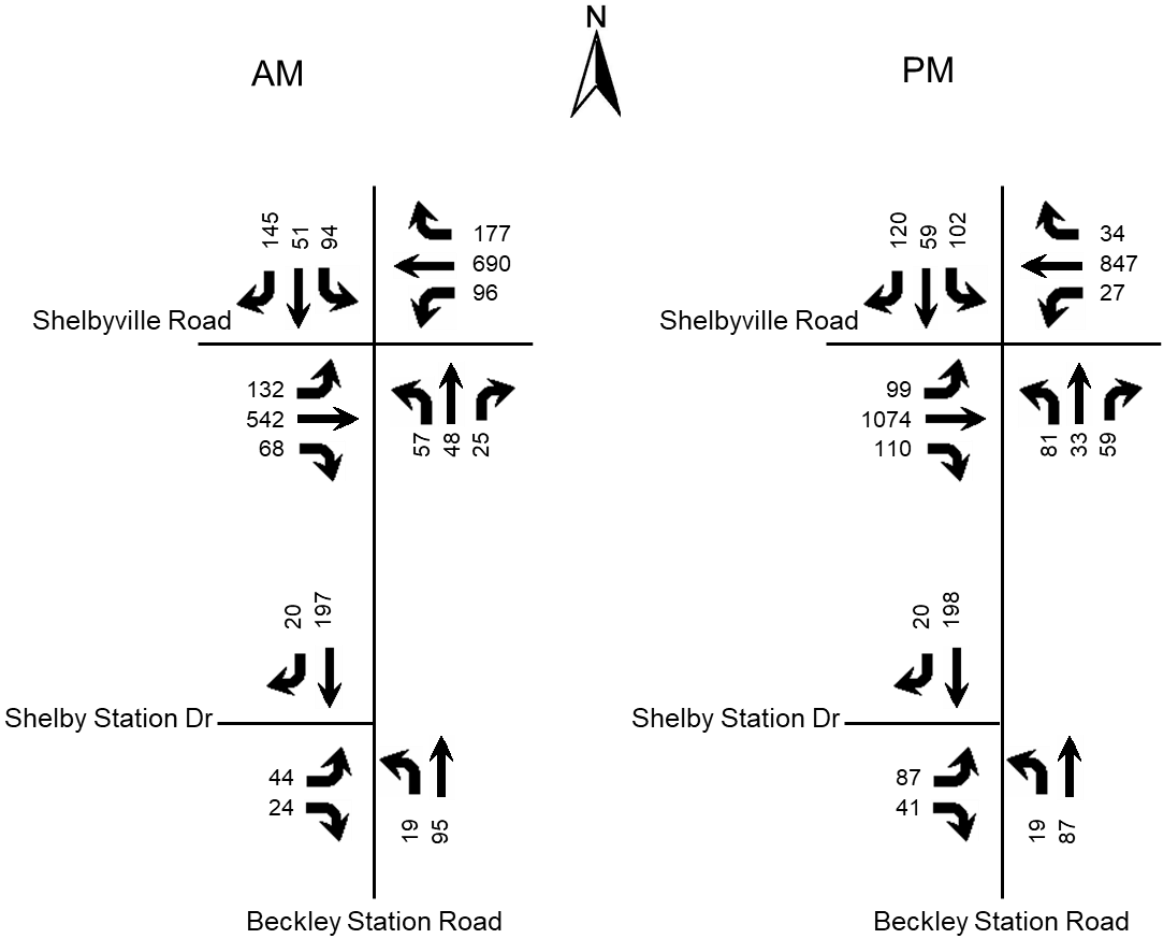


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2024. A review of the Kentucky Transportation Cabinet count stations in the vicinity (016) revealed moderate growth had occurred. An annual growth rate of 2.0% was selected and applied. Trip generation for the proposed hardware store and restaurant on Shelby Station Drive have been included. **Figure 3** illustrates the 2024 traffic volumes without the development.

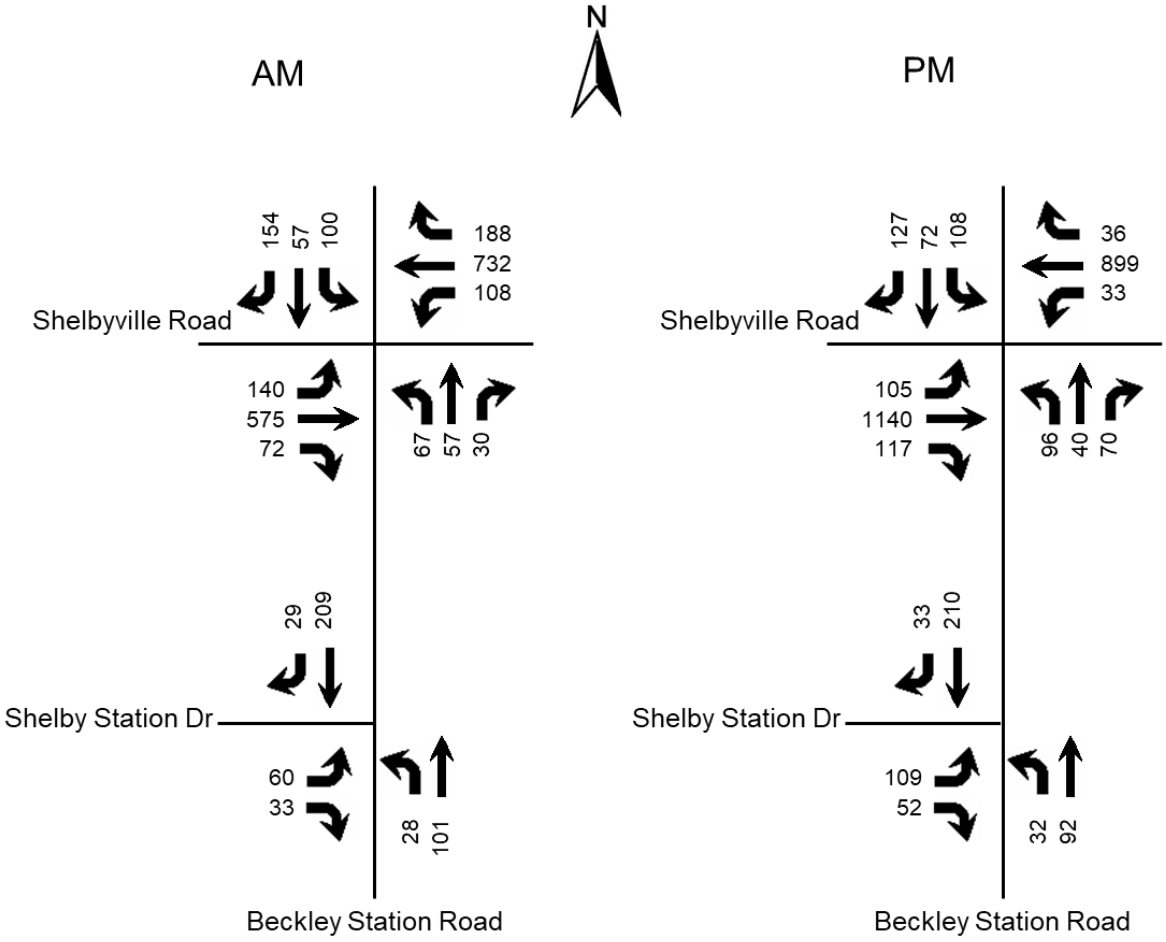


Figure 3. 2024 Peak Hour No Build Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 11th Edition contains trip generation rates for a wide range of developments. The land use 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 (204 units)	86	21	65	108	68	40

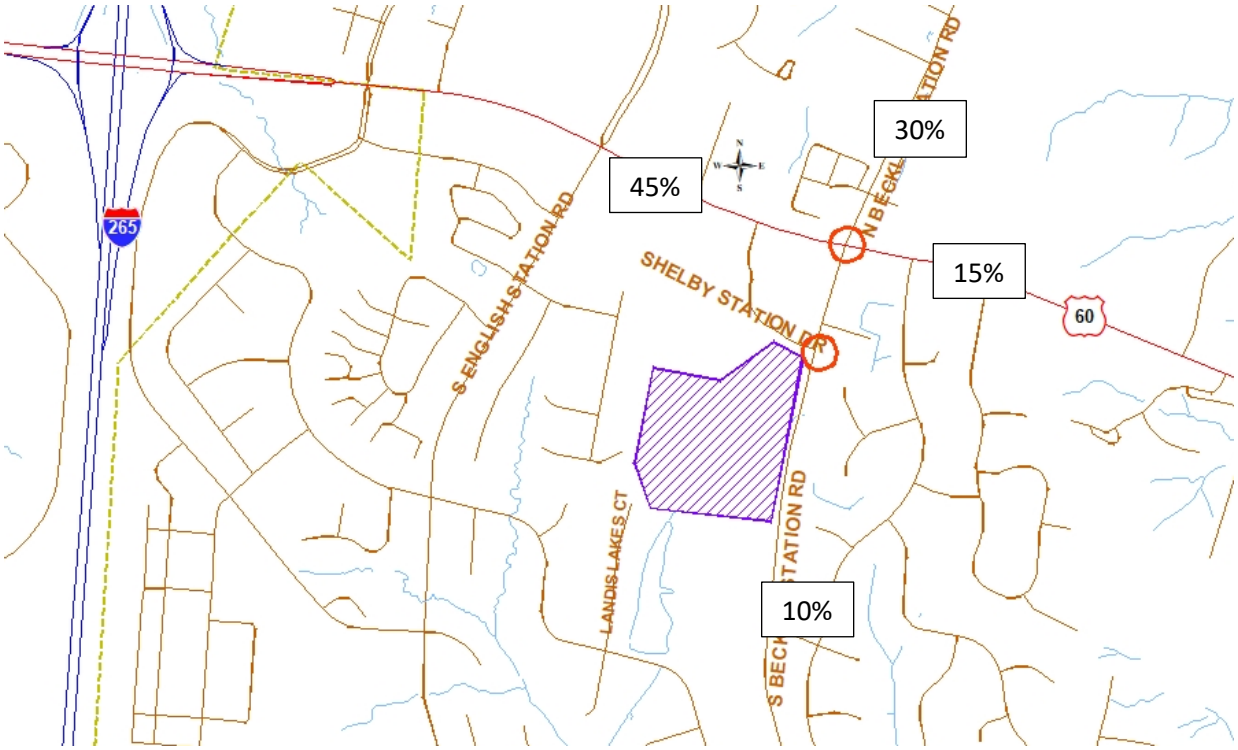


Figure 4. Trip Distribution Percentages

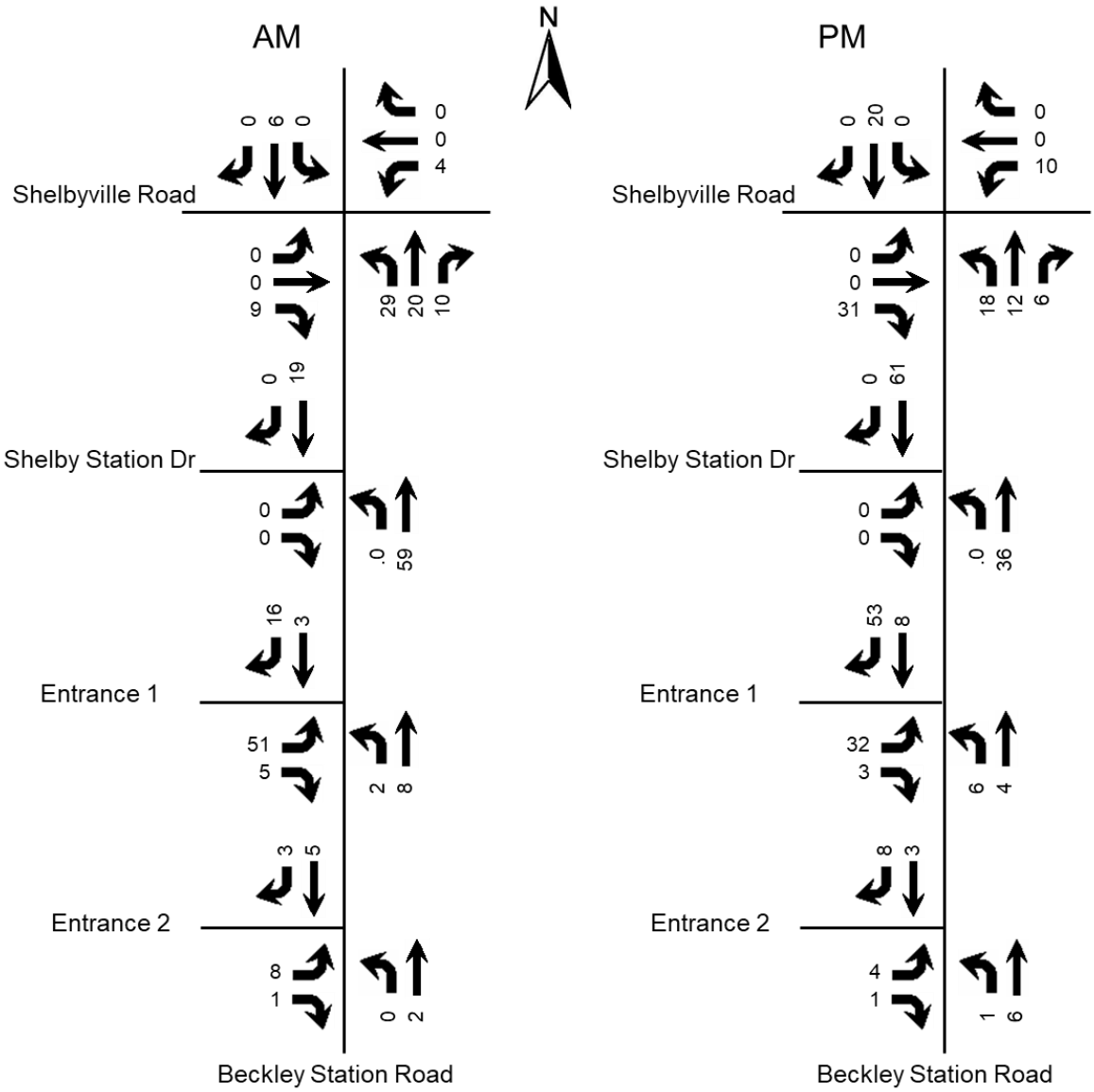


Figure 5. Peak Hour Trips Generated by Site

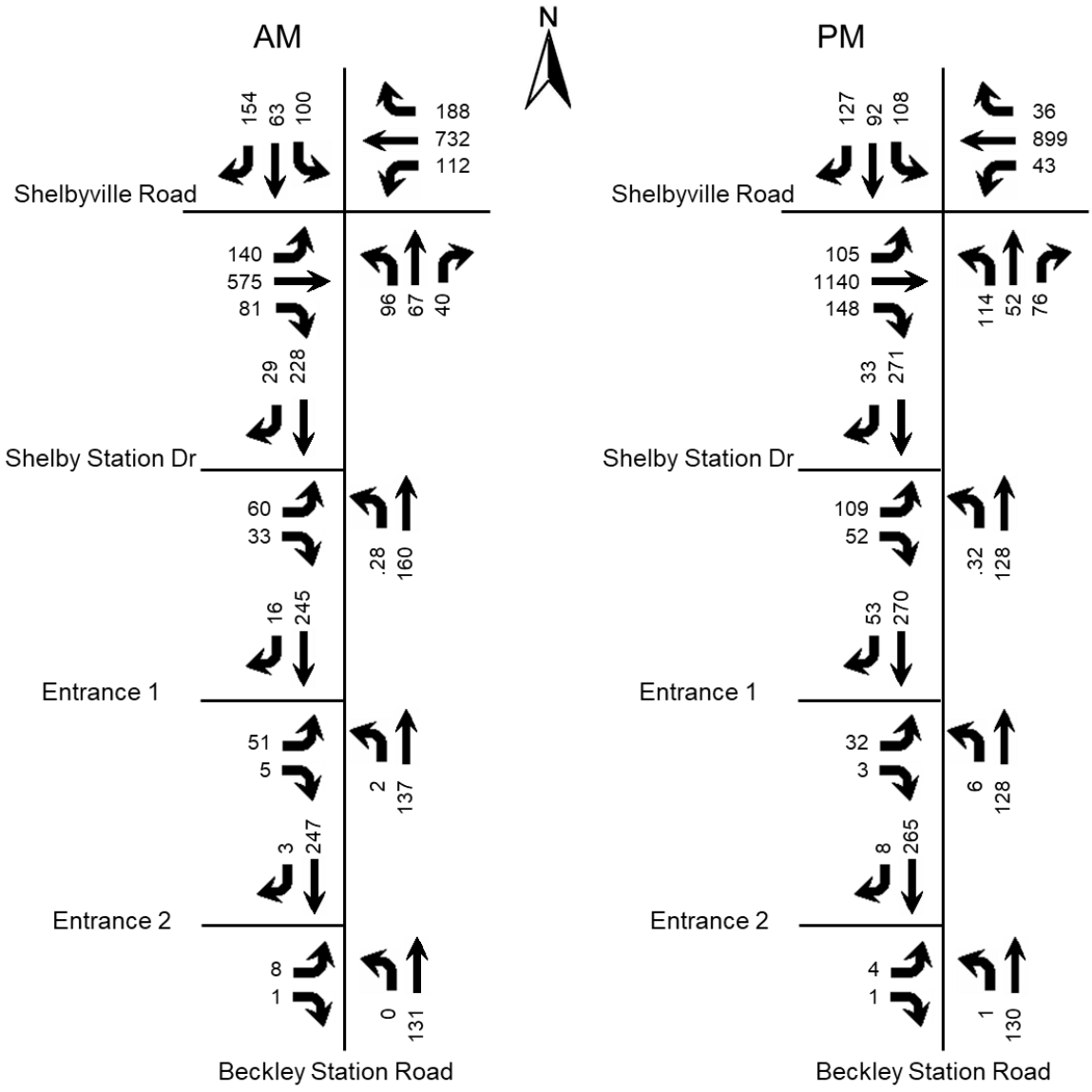


Figure 6. Build Peak Hour Volumes

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. 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 HCS Streets (version 7.9.5) software. The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

	A.M.			P.M.		
Approach	2021 Existing	2024 No Build	2024 Build	2021 Existing	2024 No Build	2024 Build
Shelbyville Road at Beckley Station Road	**C 21.5**	**C 22.6**	**C 24.0**	**C 21.6**	**C 23.1**	**C 24.9**
Shelbyville Road Eastbound	A 9.3	B 10.5	B 11.2	A 10.0	B 11.6	B 13.5
Shelbyville Road Westbound	B 10.2	B 11.6	B 12.4	A 9.7	B 10.9	B 12.6
Beckley Station Road Northbound	E 64.3	E 64.3	E 66.4	E 75.5	E 75.0	E 74.5
Beckley Station Southbound	E 71.2	E 69.2	E 67.0	E 79.8	E 77.9	E 74.1
Beckley Station Road at Shelby Station Drive						
Shelby Station Drive Eastbound	B 11.2	B 12.0	B 12.9	B 11.8	B 13.0	B 14.7
Beckley Station Road Northbound	A 8.0	A 8.0	A 8.1	A 7.7	A 7.8	A 8.0
Beckley Station Road at Entrance 1						
Entrance Eastbound			B 11.9			B 12.0
Beckley Station Road Northbound			A 7.8			A 8.0
Beckley Station Road at Entrance 2						
Entrance Eastbound			B 11.1			B 11.0
Beckley Station Road Northbound			A 7.8			A 7.8

Key: Level of Service, Delay in seconds per vehicle

The entrance was evaluated for turn lanes using the Kentucky Transportation Cabinet Highway Design Guidance Manual dated July, 2020. Using the volumes in Figure 6, the volume warrant for turn lanes is not met.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2024, there will be a minimal impact to the existing highway network, with the signalized intersection continuing to operate at acceptable levels of service. No improvements are needed.

APPENDIX

Traffic Counts

Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
www.marrtraffic.com

Jefferson County, KY

Site 1 of 2
S Beckley Station Rd (South)
S Beckley Station Rd (North)
Shelby Station Rd

Date
Tuesday, September 28, 2021

Weather
Fair
77°F

Lat/Long
38.237156°, -85.488972°

0700 - 0900 (Weekday 2h Session) (09-28-2021)
All vehicles

	Northbound				Southbound				Eastbound				
	S Beckley Station Rd (South)				S Beckley Station Rd (North)				Shelby Station Rd				
	Left	Thru	U-Turn	App	Thru	Right	U-Turn	App	Left	Right	U-Turn	App	Int
TIME	1.1	1.2	1.3	Total	1.4	1.5	1.6	Total	1.7	1.8	1.9	Total	Total
0700 - 0715	6	19	0	25	14	10	0	24	7	3	0	10	59
0715 - 0730	5	28	0	33	48	0	0	48	6	4	0	10	91
0730 - 0745	5	21	0	26	54	3	0	57	3	6	0	9	92
0745 - 0800	1	17	0	18	64	12	0	76	11	8	0	19	113
Hourly Total	17	85	0	**102**	180	25	0	**205**	27	21	0	**48**	**355**
0800 - 0815	8	29	0	37	31	5	0	36	24	6	0	30	103
0815 - 0830	8	27	0	35	22	2	0	24	21	3	0	24	83
0830 - 0845	7	28	0	35	16	6	0	22	16	2	0	18	75
0845 - 0900	8	13	0	21	11	14	0	25	11	3	0	14	60
Hourly Total	31	97	0	**128**	80	27	0	**107**	72	14	0	**86**	**321**
Grand Total	48	182	0	**230**	260	52	0	**312**	99	35	0	**134**	**676**
Approach %	20.87	79.13	0.00	-	83.33	16.67	0.00	-	73.88	26.12	0.00	-	
Intersection %	7.10	26.92	0.00	34.02	38.46	7.69	0.00	46.15	14.64	5.18	0.00	19.82	
PHF	0.59	0.82	0.00	**0.77**	0.77	0.42	0.00	**0.71**	0.46	0.75	0.00	**0.57**	**0.88**

1600 - 1800 (Weekday 2h Session) (09-28-2021)
All vehicles

	Northbound				Southbound				Eastbound				
	S Beckley Station Rd (South)				S Beckley Station Rd (North)				Shelby Station Rd				
	Left	Thru	U-Turn	App	Thru	Right	U-Turn	App	Left	Right	U-Turn	App	Int
TIME	1.1	1.2	1.3	Total	1.4	1.5	1.6	Total	1.7	1.8	1.9	Total	Total
1600 - 1615	6	19	0	25	28	2	0	30	21	7	0	28	83
1615 - 1630	4	11	0	15	34	10	0	44	17	12	0	29	88
1630 - 1645	3	22	0	25	29	6	0	35	24	9	0	33	93
1645 - 1700	2	27	0	29	45	8	0	53	24	10	0	34	116
Hourly Total	15	79	0	**94**	136	26	0	**162**	86	38	0	**124**	**380**
1700 - 1715	6	17	0	23	46	5	0	51	17	8	0	25	99
1715 - 1730	5	18	0	23	51	6	0	57	20	12	0	32	112
1730 - 1745	4	32	0	36	41	3	0	44	24	11	0	35	115
1745 - 1800	4	20	0	24	60	6	0	66	26	10	0	36	126
Hourly Total	19	87	0	**106**	198	20	0	**218**	87	41	0	**128**	**452**
Grand Total	34	166	0	**200**	334	46	0	**380**	173	79	0	**252**	**832**
Approach %	17.00	83.00	0.00	-	87.89	12.11	0.00	-	68.65	31.35	0.00	-	
Intersection %	4.09	19.95	0.00	24.04	40.14	5.53	0.00	45.67	20.79	9.50	0.00	30.29	
PHF	0.79	0.68	0.00	**0.74**	0.83	0.83	0.00	**0.83**	0.84	0.85	0.00	**0.89**	**0.90**

Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
www.marrtraffic.com

Jefferson County, KY

Site 2 of 2
S Beckley Station Rd
N Beckley Station Rd
US-60 Shelbyville Rd (West)
US-60 Shelbyville Rd (East)

Date
Tuesday, September 28, 2021

Weather
Fair
77°F

Lat/Long
38.238877°, -85.488317°

0700 - 0900 (Weekday 2h Session) (09-28-2021)
All vehicles

	Northbound					Southbound					Eastbound					Westbound					
	S Beckley Station Rd					N Beckley Station Rd					US-60 Shelbyville Rd (West)					US-60 Shelbyville Rd (East)					
	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Int
TIME	2.1	2.2	2.3	2.4	Total	2.5	2.6	2.7	2.8	Total	2.9	2.10	2.11	2.12	Total	2.13	2.14	2.15	2.16	Total	Total
0700 - 0715	19	9	3	0	31	10	2	23	0	35	23	46	12	0	81	12	306	13	0	331	478
0715 - 0730	12	15	3	0	30	18	8	40	0	66	47	129	16	0	192	24	224	72	0	320	608
0730 - 0745	8	16	3	0	27	38	18	41	0	97	36	136	14	0	186	24	145	59	0	228	538
0745 - 0800	17	2	7	0	26	31	17	41	0	89	17	119	22	0	158	35	145	25	0	205	478
Hourly Total	56	42	16	0	**114**	97	45	145	0	**287**	123	430	64	0	**617**	95	820	169	0	**1084**	**2102**
0800 - 0815	20	15	12	0	47	7	8	23	0	38	32	158	16	0	206	13	176	21	0	210	501
0815 - 0830	36	7	11	0	54	10	6	19	0	35	15	152	14	0	181	3	228	17	0	248	518
0830 - 0845	28	8	7	0	43	16	8	20	0	44	13	129	9	0	151	6	267	11	0	284	522
0845 - 0900	14	2	7	0	23	20	3	18	0	41	17	152	16	0	185	6	230	11	0	247	496
Hourly Total	98	32	37	0	**167**	53	25	80	0	**158**	77	591	55	0	**723**	28	901	60	0	**989**	**2037**
Grand Total	154	74	53	0	**281**	150	70	225	0	**445**	200	1021	119	0	**1340**	123	1721	229	0	**2073**	**4139**
Approach %	54.80	26.33	18.86	0.00	-	33.71	15.73	50.56	0.00	-	14.93	76.19	8.88	0.00	-	5.93	83.02	11.05	0.00	-	
Intersection %	3.72	1.79	1.28	0.00	6.79	3.62	1.69	5.44	0.00	10.75	4.83	24.67	2.88	0.00	32.37	2.97	41.58	5.53	0.00	50.08	
PHF	0.71	0.75	0.52	0.00	**0.69**	0.62	0.71	0.88	0.00	**0.75**	0.70	0.86	0.77	0.00	**0.90**	0.69	0.77	0.61	0.00	**0.75**	**0.87**

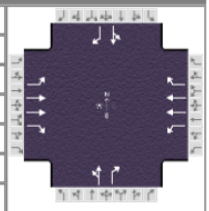
1600 - 1800 (Weekday 2h Session) (09-28-2021)
All vehicles

	Northbound					Southbound					Eastbound					Westbound					
	S Beckley Station Rd					N Beckley Station Rd					US-60 Shelbyville Rd (West)					US-60 Shelbyville Rd (East)					
	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Int
TIME	2.1	2.2	2.3	2.4	Total	2.5	2.6	2.7	2.8	Total	2.9	2.10	2.11	2.12	Total	2.13	2.14	2.15	2.16	Total	Total
1600 - 1615	19	4	15	0	38	22	4	28	0	54	24	277	22	0	323	3	165	7	0	175	590
1615 - 1630	15	2	11	0	28	23	14	31	0	68	24	255	20	0	299	9	162	7	0	178	573
1630 - 1645	22	7	16	0	45	25	5	28	0	58	21	272	24	0	317	8	222	5	0	235	655
1645 - 1700	24	9	18	0	51	29	23	33	0	85	27	270	24	0	321	5	193	13	0	211	668
Hourly Total	80	22	60	0	**162**	99	46	120	0	**265**	96	1074	90	0	**1260**	25	742	32	0	**799**	**2486**
1700 - 1715	19	6	10	0	35	22	21	27	0	70	23	296	27	0	346	2	215	10	0	227	678
1715 - 1730	16	11	15	0	42	26	10	32	0	68	28	236	35	0	299	12	217	6	0	235	644
1730 - 1745	26	9	15	0	50	22	11	26	0	59	26	274	25	0	325	8	198	8	0	214	648
1745 - 1800	23	10	17	0	50	23	19	24	0	66	32	228	41	0	301	7	214	11	0	232	649
Hourly Total	84	36	57	0	**177**	93	61	109	0	**263**	109	1034	128	0	**1271**	29	844	35	0	**908**	**2619**
Grand Total	164	58	117	0	**339**	192	107	229	0	**528**	205	2108	218	0	**2531**	54	1586	67	0	**1707**	**5105**
Approach %	48.38	17.11	34.51	0.00	-	36.36	20.27	43.37	0.00	-	8.10	83.29	8.61	0.00	-	3.16	92.91	3.93	0.00	-	
Intersection %	3.21	1.14	2.29	0.00	6.64	3.76	2.10	4.49	0.00	10.34	4.02	41.29	4.27	0.00	49.58	1.06	31.07	1.31	0.00	33.44	
PHF	0.84	0.75	0.82	0.00	**0.85**	0.88	0.64	0.91	0.00	**0.83**	0.88	0.91	0.79	0.00	**0.93**	0.56	0.95	0.65	0.00	**0.97**	**0.98**

HCS Reports

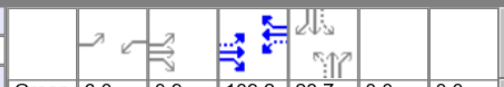
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	11/29/2021	Area Type	Other
Jurisdiction		Time Period		PHF	0.87
Urban Street	Shelbyville Rd	Analysis Year	2021	Analysis Period	1> 7:15
Intersection	Beckley Station Rd	File Name	Beckley St 21 AM.xus		
Project Description	Garrett				

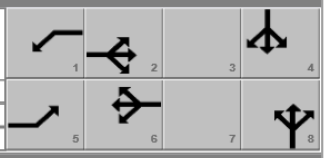


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	132	542	68	96	690	177	57	48	25	94	51	145

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	Begin
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.0	0.9		109.2	23.7	0.0	0.0					
Yellow	3.6	0.0		4.3	3.6	0.0	0.0					
Red	3.0	0.0		2.8	3.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	1.1	3.0		7.0		7.0
Phase Duration, s	13.5	117.2	12.6	116.3		30.3		30.3
Change Period, (*Y+R c*), s	6.6	7.1	6.6	7.1		6.6		6.6
Max Allow Headway (*MAH*), s	4.5	0.0	4.5	0.0		5.1		5.1
Queue Clearance Time (*g s*), s	6.2		5.0			14.6		20.9
Green Extension Time (*g e*), s	0.7	0.0	0.5	0.0		2.8		2.8
Phase Call Probability	1.00		0.99			1.00		1.00
Max Out Probability	0.00		0.00			0.00		0.00

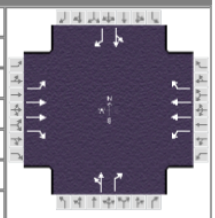
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	152	623	78	110	793	203		121	29		167	167
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1725	1696	1560	1781	1781	1585		1426	1610		1400	1547
Queue Service Time (*g s*), s	4.2	11.2	2.6	3.0	14.6	7.5		0.0	2.5		6.3	16.5
Cycle Queue Clearance Time (*g c*), s	4.2	11.2	2.6	3.0	14.6	7.5		12.6	2.5		18.9	16.5
Green Ratio (*g/C*)	0.73	0.69	0.69	0.72	0.68	0.68		0.15	0.15		0.15	0.15
Capacity (*c*), veh/h	511	2334	1073	596	2429	1081		246	238		244	229
Volume-to-Capacity Ratio (*X*)	0.297	0.267	0.073	0.185	0.326	0.188		0.491	0.121		0.683	0.728
Back of Queue (*Q*), ft/ln (95 th percentile)	70.2	192.9	41.2	49.1	237.6	117.9		218.5	46.1		278.4	288
Back of Queue (*Q*), veh/ln (95 th percentile)	2.7	7.3	1.6	1.9	9.4	4.6		8.2	1.8		11.1	11.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Uniform Delay (*d 1*), s/veh	7.5	9.5	8.2	7.3	10.4	9.3		63.3	59.1		66.5	65.1
Incremental Delay (*d 2*), s/veh	0.4	0.3	0.1	0.2	0.4	0.4		2.2	0.3		4.7	6.2
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	0.0
Control Delay (*d*), s/veh	7.9	9.8	8.3	7.4	10.8	9.7		65.4	59.5		71.2	71.3
Level of Service (LOS)	A	A	A	A	B	A		E	E		E	E
Approach Delay, s/veh / LOS	9.3	A		10.2	B		64.3	E		71.2	E	
Intersection Delay, s/veh / LOS	21.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.88	B	1.88	B	2.47	B	2.47	B
Bicycle LOS Score / LOS	1.19	A	1.40	A	0.73	A	1.04	A

 HCS™ Streets Version 7.9.5 Generated: 11/29/2021 12:59:52 PM

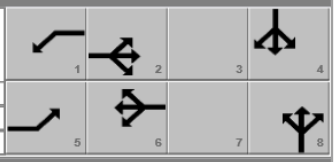
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	11/29/2021	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.87
Urban Street	Shelbyville Rd	Analysis Year	2024 No Build	Analysis Period	1> 7:15
Intersection	Beckley Station Rd	File Name	Beckley St 24 NB AM.xus		
Project Description	Garrett				



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	575	72	108	732	188	67	57	30	100	57	154

Signal Information					EB			WB			NB		
Cycle, s	160.0	Reference Phase	2										
Offset, s	0	Reference Point	Begin	Green	6.1	1.4		106.2	26.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.6	0.0		4.3	3.6	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	0.0		2.8	3.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	1.1	3.0		7.0		7.0
Phase Duration, s	14.0	114.7	12.7	113.3		32.6		32.6
Change Period, ($Y+R_c$), s	6.6	7.1	6.6	7.1		6.6		6.6
Max Allow Headway (*MAH*), s	4.5	0.0	4.5	0.0		5.1		5.1
Queue Clearance Time (g_s), s	6.8		5.6			17.2		22.9
Green Extension Time (g_e), s	0.7	0.0	0.5	0.0		3.2		3.1
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	161	661	83	124	841	216		143	34		180	177
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1725	1696	1560	1781	1781	1585		1402	1610		1370	1547
Queue Service Time (g_s), s	4.8	12.7	2.9	3.6	16.6	8.5		0.0	2.9		5.7	17.3
Cycle Queue Clearance Time (g_c), s	4.8	12.7	2.9	3.6	16.6	8.5		15.2	2.9		20.9	17.3
Green Ratio (*g/C*)	0.71	0.67	0.67	0.70	0.66	0.66		0.16	0.16		0.16	0.16
Capacity (*c*), veh/h	480	2282	1049	562	2365	1052		263	262		260	252
Volume-to-Capacity Ratio (*X*)	0.335	0.290	0.079	0.221	0.356	0.205		0.543	0.132		0.695	0.704
Back of Queue (*Q*), ft/ln (95 th percentile)	80.7	215.9	46.5	60.7	267.6	136		249.4	54.4		295.8	297.5
Back of Queue (*Q*), veh/ln (95 th percentile)	3.1	8.1	1.8	2.4	10.5	5.4		9.4	2.2		11.8	11.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Uniform Delay (d_1), s/veh	8.5	10.6	9.1	8.3	11.8	10.5		62.3	57.3		65.2	63.4
Incremental Delay (d_2), s/veh	0.5	0.3	0.1	0.2	0.4	0.4		2.5	0.3		4.7	5.0
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	0.0
Control Delay (*d*), s/veh	9.0	11.0	9.2	8.5	12.2	10.9		64.8	57.7		70.0	68.4
Level of Service (LOS)	A	B	A	A	B	B		E	E		E	E
Approach Delay, s/veh / LOS	10.5	B		11.6	B		63.4	E		69.2	E	
Intersection Delay, s/veh / LOS	22.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.88	B	1.89	B	2.47	B	2.47	B
Bicycle LOS Score / LOS	1.23	A	1.46	A	0.78	A	1.08	A

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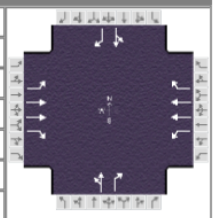
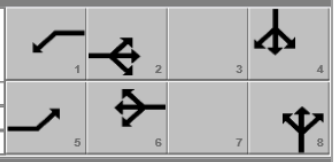
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	11/29/2021	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.87
Urban Street	Shelbyville Rd	Analysis Year	2024 Build	Analysis Period	1> 7:15
Intersection	Beckley Station Rd	File Name	Beckley St 24 B AM.xus		
Project Description	Garrett				



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	575	81	112	732	188	96	67	40	100	63	154

Signal Information					EB			WB			NB		
Cycle, s	160.0	Reference Phase	2										
Offset, s	0	Reference Point	Begin	Green	6.3	1.3		104.5	27.6	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.6	0.0		4.3	3.6	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	0.0		2.8	3.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	1.1	3.0		7.0		7.0
Phase Duration, s	14.2	112.8	12.9	111.6		34.2		34.2
Change Period, ($Y+R_c$), s	6.6	7.1	6.6	7.1		6.6		6.6
Max Allow Headway (*MAH*), s	4.5	0.0	4.5	0.0		5.1		5.1
Queue Clearance Time (g_s), s	6.9		5.8			24.2		23.6
Green Extension Time (g_e), s	0.7	0.0	0.5	0.0		3.4		3.5
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.00			0.01		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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	161	661	93	129	841	216		187	46		187	177
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1725	1696	1560	1781	1781	1585		1331	1610		1370	1547
Queue Service Time (g_s), s	4.9	13.1	3.4	3.8	17.2	8.8		0.6	3.9		0.0	17.1
Cycle Queue Clearance Time (g_c), s	4.9	13.1	3.4	3.8	17.2	8.8		22.2	3.9		21.6	17.1
Green Ratio (*g/C*)	0.70	0.66	0.66	0.69	0.65	0.65		0.17	0.17		0.17	0.17
Capacity (*c*), veh/h	472	2242	1031	554	2325	1035		266	278		273	267
Volume-to-Capacity Ratio (*X*)	0.341	0.295	0.090	0.232	0.362	0.209		0.706	0.165		0.687	0.663
Back of Queue (*Q*), ft/ln (95 th percentile)	84.5	224.1	55.3	65.7	277.1	141.9		323.2	72.1		302	292.5
Back of Queue (*Q*), veh/ln (95 th percentile)	3.2	8.4	2.1	2.6	10.9	5.6		12.1	2.9		12.1	11.3
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Uniform Delay (d_1), s/veh	9.1	11.4	9.8	8.9	12.6	11.2		64.0	56.4		63.7	61.8
Incremental Delay (d_2), s/veh	0.5	0.3	0.2	0.3	0.4	0.5		4.8	0.4		4.3	4.0
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	0.0
Control Delay (*d*), s/veh	9.7	11.8	10.0	9.1	13.1	11.6		68.8	56.8		68.0	65.8
Level of Service (LOS)	A	B	A	A	B	B		E	E		E	E
Approach Delay, s/veh / LOS	11.2	B		12.4	B		66.4	E		67.0	E	
Intersection Delay, s/veh / LOS	24.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.89	B	1.89	B	2.47	B	2.47	B
Bicycle LOS Score / LOS	1.24	A	1.47	A	0.87	A	1.09	A

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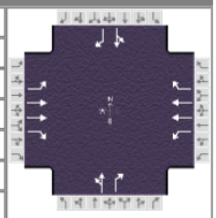
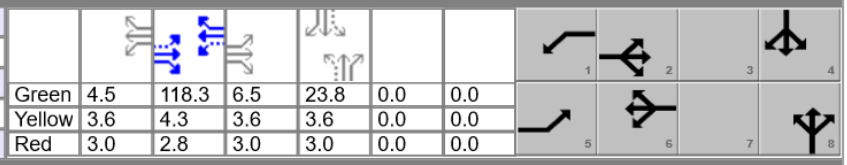
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	11/29/2021	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.98
Urban Street	Shelbyville Rd	Analysis Year	2021	Analysis Period	1> 4:30
Intersection	Beckley Station Rd	File Name	Beckley St 21 PM.xus		
Project Description	Garrett				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	99	1074	110	27	847	34	81	33	59	102	59	120

Signal Information			
Cycle, s	180.0	Reference Phase	2
Offset, s	0	Reference Point	Begin
Uncoordinated	No	Simult. Gap E/W	Off
Force Mode	Fixed	Simult. Gap N/S	On



	EB			WB			NB			SB		
Green	4.5	118.3	6.5	23.8	0.0	0.0						
Yellow	3.6	4.3	3.6	3.6	0.0	0.0						
Red	3.0	2.8	3.0	3.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.3	3.0	1.2	3.0		7.0		7.0
Phase Duration, s	13.1	138.5	11.1	136.5		30.4		30.4
Change Period, ($Y+R_c$), s	7.1	7.1	6.6	7.1		6.6		6.6
Max Allow Headway (*MAH*), s	4.5	0.0	4.5	0.0		5.1		5.1
Queue Clearance Time (g_s), s	2.0		2.9			17.2		21.2
Green Extension Time (g_e), s	0.1	0.0	0.1	0.0		2.7		2.6
Phase Call Probability	0.99		0.75			1.00		1.00
Max Out Probability	1.00		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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	101	1096	112	28	864	35		116	60		164	122
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1795	1560	1810	1766	1535		1336	1547		1503	1572
Queue Service Time (g_s), s	0.0	21.4	3.8	0.9	16.4	1.2		0.0	6.3		4.0	13.2
Cycle Queue Clearance Time (g_c), s	0.0	21.4	3.8	0.9	16.4	1.2		15.2	6.3		19.2	13.2
Green Ratio (*g/C*)	0.68	0.73	0.73	0.69	0.72	0.72		0.13	0.13		0.13	0.13
Capacity (*c*), veh/h	494	2620	1138	367	2540	1103		211	205		232	208
Volume-to-Capacity Ratio (*X*)	0.205	0.418	0.099	0.075	0.340	0.031		0.551	0.294		0.709	0.588
Back of Queue (*Q*), ft/ln (95 th percentile)	78	319.6	58.4	15.3	260.9	18.4		233.1	119.7		311.4	239.4
Back of Queue (*Q*), veh/ln (95 th percentile)	3.1	12.7	2.3	0.6	10.2	0.7		9.0	4.6		12.3	9.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Uniform Delay (d_1), s/veh	13.1	9.5	7.1	10.2	9.4	7.3		74.3	70.5		76.1	73.5
Incremental Delay (d_2), s/veh	0.2	0.5	0.2	0.1	0.4	0.1		3.2	1.1		5.6	3.7
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	0.0
Control Delay (*d*), s/veh	13.4	9.9	7.3	10.3	9.8	7.3		77.5	71.6		81.7	77.2
Level of Service (LOS)	B	A	A	B	A	A		E	E		F	E
Approach Delay, s/veh / LOS	10.0	A		9.7	A		75.5	E		79.8	E	
Intersection Delay, s/veh / LOS	21.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.87	B	1.98	B	2.48	B	2.48	B
Bicycle LOS Score / LOS	1.57	B	1.25	A	0.78	A	0.96	A

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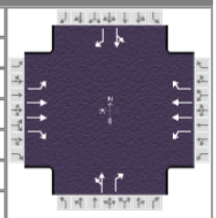
HCS7 Signalized Intersection Results Summary

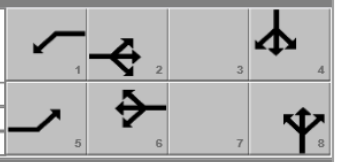
General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	11/29/2021	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.98
Urban Street	Shelbyville Rd	Analysis Year	2024 No Build	Analysis Period	1> 4:30
Intersection	Beckley Station Rd	File Name	Beckley St 24 NB PM.xus		
Project Description	Garrett				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	105	1140	117	33	899	36	96	40	70	108	72	127

Signal Information			
Cycle, s	180.0	Reference Phase	2
Offset, s	0	Reference Point	Begin
Uncoordinated	No	Simult. Gap E/W	Off
Force Mode	Fixed	Simult. Gap N/S	On

	EB			WB			NB			SB		
Green	4.9	115.4	6.5	26.4	0.0	0.0						
Yellow	3.6	4.3	3.6	3.6	0.0	0.0						
Red	3.0	2.8	3.0	3.0	0.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.3	3.0	1.2	3.0		7.0		7.0
Phase Duration, s	13.1	135.5	11.5	134.0		33.0		33.0
Change Period, (*Y+R c*), s	7.1	7.1	6.6	7.1		6.6		6.6
Max Allow Headway (*MAH*), s	4.5	0.0	4.5	0.0		5.1		5.1
Queue Clearance Time (*g s*), s	2.0		3.1			21.1		23.4
Green Extension Time (*g e*), s	0.1	0.0	0.1	0.0		3.0		3.0
Phase Call Probability	1.00		0.81			1.00		1.00
Max Out Probability	1.00		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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	107	1163	119	34	917	37		139	71		184	130
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1795	1560	1810	1766	1535		1288	1547		1507	1572
Queue Service Time (*g s*), s	0.0	24.7	4.3	1.1	18.6	1.3		0.0	7.4		2.3	13.8
Cycle Queue Clearance Time (*g c*), s	0.0	24.7	4.3	1.1	18.6	1.3		19.1	7.4		21.4	13.8
Green Ratio (*g/C*)	0.66	0.71	0.71	0.68	0.70	0.70		0.15	0.15		0.15	0.15
Capacity (*c*), veh/h	458	2561	1113	336	2490	1082		223	227		253	230
Volume-to-Capacity Ratio (*X*)	0.234	0.454	0.107	0.100	0.368	0.034		0.623	0.315		0.727	0.563
Back of Queue (*Q*), ft/ln (95 th percentile)	92.7	365.7	67.3	19.9	293.3	20.7		270.6	140.4		340	246.8
Back of Queue (*Q*), veh/ln (95 th percentile)	3.7	14.5	2.6	0.8	11.5	0.8		10.5	5.4		13.4	9.6
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Uniform Delay (*d 1*), s/veh	15.5	10.9	8.0	11.6	10.6	8.0		73.7	68.7		74.7	71.4
Incremental Delay (*d 2*), s/veh	0.3	0.6	0.2	0.2	0.4	0.1		4.0	1.1		5.6	3.0
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	0.0
Control Delay (*d*), s/veh	15.8	11.5	8.2	11.7	11.0	8.1		77.7	69.9		80.3	74.5
Level of Service (LOS)	B	B	A	B	B	A		E	E		F	E
Approach Delay, s/veh / LOS	11.6	B		10.9	B		75.0	E		77.9	E	
Intersection Delay, s/veh / LOS	23.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.88	B	1.98	B	2.48	B	2.48	B
Bicycle LOS Score / LOS	1.63	B	1.30	A	0.83	A	1.00	A

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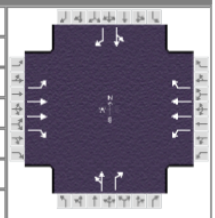
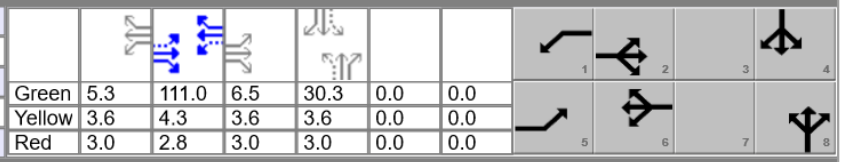
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250
Analyst	DBZ	Analysis Date	11/29/2021	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.98
Urban Street	Shelbyville Rd	Analysis Year	2024 Build	Analysis Period	1> 4:30
Intersection	Beckley Station Rd	File Name	Beckley St 24 B PM.xus		
Project Description	Garrett				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	105	1140	148	43	899	36	114	52	76	108	92	127

Signal Information			
Cycle, s	180.0	Reference Phase	2
Offset, s	0	Reference Point	Begin
Uncoordinated	No	Simult. Gap E/W	Off
Force Mode	Fixed	Simult. Gap N/S	On



	EB			WB			NB			SB		
Green	5.3	111.0		6.5	30.3		0.0	0.0				
Yellow	3.6	4.3		3.6	3.6		0.0	0.0				
Red	3.0	2.8		3.0	3.0		0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.3	3.0	1.2	3.0		7.0		7.0
Phase Duration, s	13.1	131.2	11.9	130.1		36.9		36.9
Change Period, ($Y+R_c$), s	7.1	7.1	6.6	7.1		6.6		6.6
Max Allow Headway (*MAH*), s	4.5	0.0	4.5	0.0		5.1		5.1
Queue Clearance Time (g_s), s	2.0		3.5			27.1		25.6
Green Extension Time (g_e), s	0.1	0.0	0.1	0.0		3.2		3.3
Phase Call Probability	1.00		0.89			1.00		1.00
Max Out Probability	1.00		0.00			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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	107	1163	151	44	917	37		169	78		204	130
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1795	1560	1810	1766	1535		1222	1547		1509	1572
Queue Service Time (g_s), s	0.0	26.8	6.0	1.5	20.0	1.4		1.5	7.9		0.0	13.4
Cycle Queue Clearance Time (g_c), s	0.0	26.8	6.0	1.5	20.0	1.4		25.1	7.9		23.6	13.4
Green Ratio (*g/C*)	0.64	0.69	0.69	0.66	0.68	0.68		0.17	0.17		0.17	0.17
Capacity (*c*), veh/h	441	2475	1076	323	2413	1048		239	260		285	264
Volume-to-Capacity Ratio (*X*)	0.243	0.470	0.140	0.136	0.380	0.035		0.708	0.298		0.717	0.490
Back of Queue (*Q*), ft/ln (95 th percentile)	101.4	398.4	96.7	28.3	316	22.6		322.6	148.4		365.2	239.8
Back of Queue (*Q*), veh/ln (95 th percentile)	4.0	15.8	3.7	1.1	12.3	0.9		12.5	5.7		14.4	9.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Uniform Delay (d_1), s/veh	18.0	12.8	9.6	13.3	12.2	9.3		72.8	65.6		72.1	67.9
Incremental Delay (d_2), s/veh	0.3	0.6	0.3	0.2	0.5	0.1		5.4	0.9		4.8	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	0.0
Control Delay (*d*), s/veh	18.3	13.5	9.9	13.6	12.7	9.3		78.2	66.5		76.8	69.9
Level of Service (LOS)	B	B	A	B	B	A		E	E		E	E
Approach Delay, s/veh / LOS	13.5	B		12.6	B		74.5	E		74.1	E	
Intersection Delay, s/veh / LOS	24.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.88	B	1.98	B	2.48	B	2.48	B
Bicycle LOS Score / LOS	1.66	B	1.31	A	0.90	A	1.04	A

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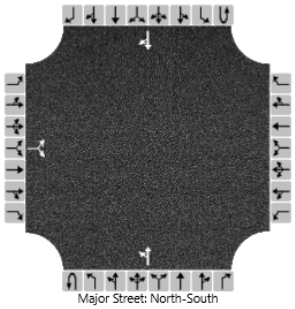
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Beckley St at Shelby St
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	11/29/2021	East/West Street	Shelby Station Dr
Analysis Year	2021	North/South Street	Beckley Station Rd
Time Analyzed	AM Peak	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Garrett		

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	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		44		24						19	95				197	20
Percent Heavy Vehicles (%)		9		0						16						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.49		6.20						4.26						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.58		3.30						2.34						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			77							22						
Capacity, c (veh/h)			654							1242						
v/c Ratio			0.12							0.02						
95% Queue Length, Q_{95} (veh)			0.4							0.1						
Control Delay (s/veh)			11.2							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.2								1.4						
Approach LOS		B														

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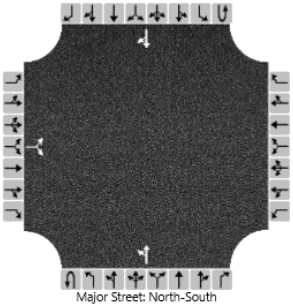
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Beckley St at Shelby St
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	11/29/2021	East/West Street	Shelby Station Dr
Analysis Year	2024	North/South Street	Beckley Station Rd
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Garrett		

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	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		60		33						28	101				209	29
Percent Heavy Vehicles (%)		9		0						16						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.49		6.20						4.26						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.58		3.30						2.34						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			106							32						
Capacity, c (veh/h)			618							1216						
v/c Ratio			0.17							0.03						
95% Queue Length, Q_{95} (veh)			0.6							0.1						
Control Delay (s/veh)			12.0							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	12.0								1.9							
Approach LOS	B															

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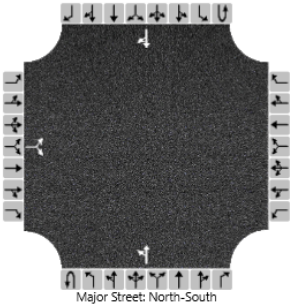
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Beckley St at Shelby St
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	11/29/2021	East/West Street	Shelby Station Dr
Analysis Year	2024	North/South Street	Beckley Station Rd
Time Analyzed	AM Peak Build	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Garrett		

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	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		60		33						28	160				228	29
Percent Heavy Vehicles (%)		9		0						16						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.49		6.20						4.26						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.58		3.30						2.34						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			106							32						
Capacity, c (veh/h)			561							1194						
v/c Ratio			0.19							0.03						
95% Queue Length, Q_{95} (veh)			0.7							0.1						
Control Delay (s/veh)			12.9							8.1						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	12.9								1.4							
Approach LOS	B															

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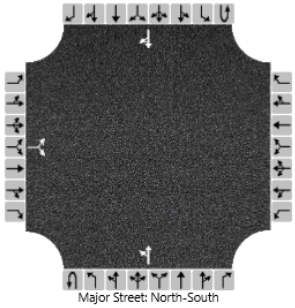
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Beckley St at Shelby St
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	11/29/2021	East/West Street	Shelby Station Dr
Analysis Year	2021	North/South Street	Beckley Station Rd
Time Analyzed	PM Peak	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Garrett		

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	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		87		41						19	87				198	20
Percent Heavy Vehicles (%)		1		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.41		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.51		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			142							21						
Capacity, c (veh/h)			672							1336						
v/c Ratio			0.21							0.02						
95% Queue Length, Q_{95} (veh)			0.8							0.0						
Control Delay (s/veh)			11.8							7.7						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.8								1.5						
Approach LOS		B														

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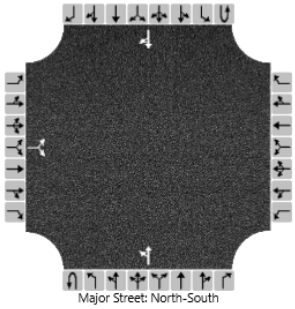
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Beckley St at Shelby St
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	11/29/2021	East/West Street	Shelby Station Dr
Analysis Year	2024	North/South Street	Beckley Station Rd
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Garrett		

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	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		109		52						32	92				210	33
Percent Heavy Vehicles (%)		1		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.41		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.51		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			179							36						
Capacity, c (veh/h)			628							1305						
v/c Ratio			0.29							0.03						
95% Queue Length, Q_{95} (veh)			1.2							0.1						
Control Delay (s/veh)			13.0							7.8						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		13.0								2.2						
Approach LOS		B														

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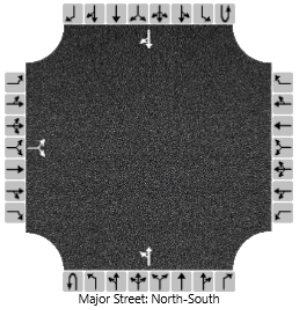
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Beckley St at Shelby St
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	11/29/2021	East/West Street	Shelby Station Dr
Analysis Year	2024	North/South Street	Beckley Station Rd
Time Analyzed	PM Peak Build	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Garrett		

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	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		109		52						32	128				271	33
Percent Heavy Vehicles (%)		1		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.41		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.51		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			179							36						
Capacity, c (veh/h)			550							1233						
v/c Ratio			0.33							0.03						
95% Queue Length, Q_{95} (veh)			1.4							0.1						
Control Delay (s/veh)			14.7							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	14.7								1.8							
Approach LOS	B															

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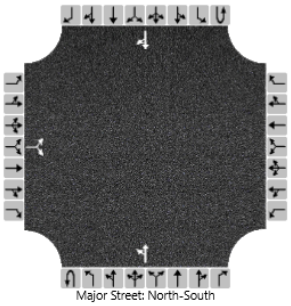
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Entrance 1 Bekcley Statio
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	11/29/2021	East/West Street	Entrance 1
Analysis Year	2024	North/South Street	Beckley Station Rd
Time Analyzed	AM Peak	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Garrett		

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	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		51		5						2	137				245	16
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						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)			64							2						
Capacity, c (veh/h)			584							1276						
v/c Ratio			0.11							0.00						
95% Queue Length, Q_{95} (veh)			0.4							0.0						
Control Delay (s/veh)			11.9							7.8						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.9								0.1						
Approach LOS		B														

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Entrance 1 AM.xtw
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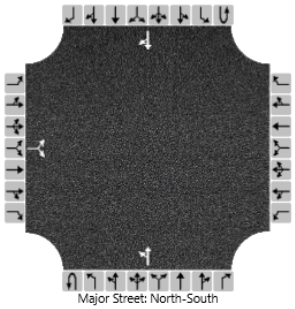
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Entrance 1 Bekcley Statio
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	11/29/2021	East/West Street	Entrance 1
Analysis Year	2024	North/South Street	Beckley Station Rd
Time Analyzed	PM Peak	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Garrett		

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	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		32		3						6	128				270	53
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						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)			39							7						
Capacity, c (veh/h)			553							1211						
v/c Ratio			0.07							0.01						
95% Queue Length, Q_{95} (veh)			0.2							0.0						
Control Delay (s/veh)			12.0							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		12.0								0.4						
Approach LOS		B														

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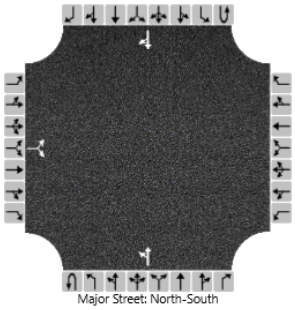
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Entrance 2 Bekcley Statio
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	11/29/2021	East/West Street	Entrance 2
Analysis Year	2024	North/South Street	Beckley Station Rd
Time Analyzed	AM Peak	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Garrett		

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	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		8		1						0	131				247	3
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						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)			10							0						
Capacity, c (veh/h)			600							1290						
v/c Ratio			0.02							0.00						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
Control Delay (s/veh)			11.1							7.8						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.1								0.0						
Approach LOS		B														

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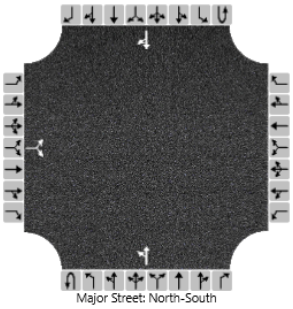
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Entrance 2 Bekcley Statio
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	11/29/2021	East/West Street	Entrance 2
Analysis Year	2024	North/South Street	Beckley Station Rd
Time Analyzed	PM Peak	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Garrett		

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	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		4		1						1	130				265	8
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						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)			6							1						
Capacity, c (veh/h)			601							1269						
v/c Ratio			0.01							0.00						
95% Queue Length, Q_{95} (veh)			0.0							0.0						
Control Delay (s/veh)			11.0							7.8						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.0								0.1						
Approach LOS		B														

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