

final report

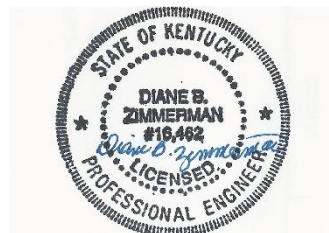
June 20, 2022

Traffic Impact Study

*Bull Run Townhomes
Herr Lane (KY 2050)
Louisville, KY*

Prepared for

**Louisville Metro Planning Commission
Kentucky Transportation Cabinet**



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INTRODUCTION

The development plan for Bull Run Townhomes on Herr Lane shows 72 townhome units. **Figure 1** displays a map of the site. Access to the development will be on Herr Lane opposite Wesboro Road. This is a shared entrance with Providence Point. 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 Herr Lane intersection with Brownsboro Road and the proposed entrance. The entrance on Herr Lane reflects the improvements agreed to with Providence Point –left turn lanes at Wesboro Road.

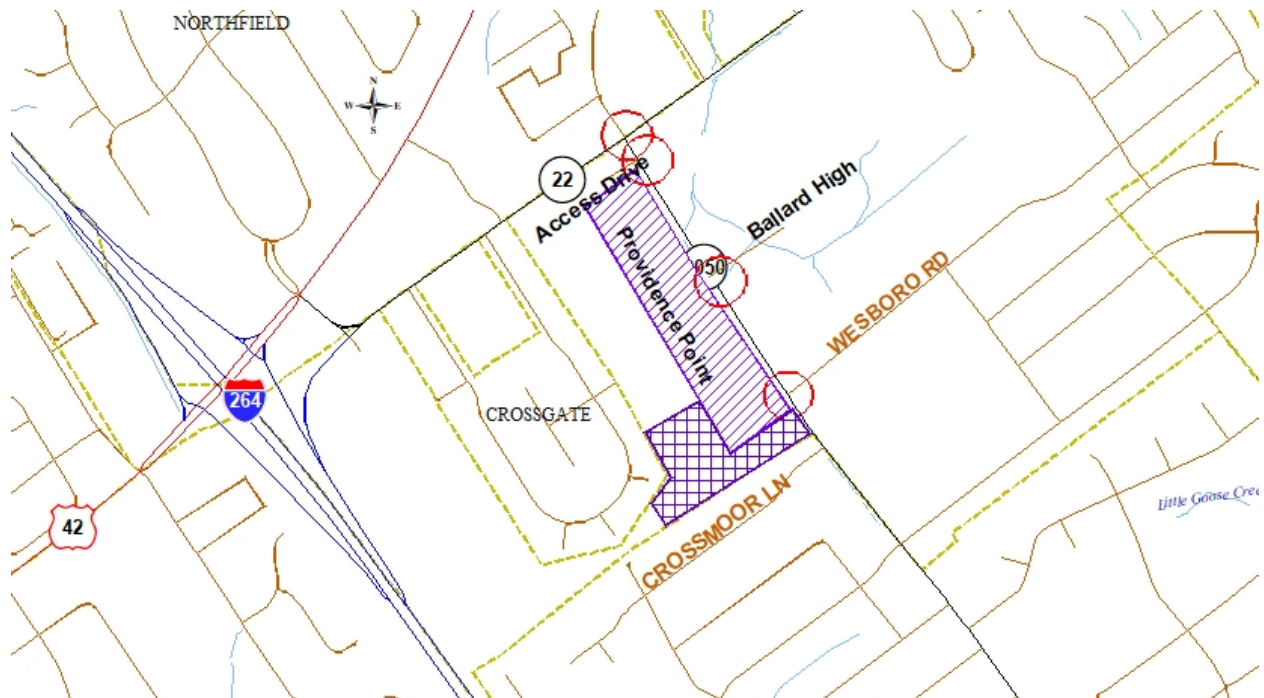


Figure 1. Site Map

EXISTING CONDITIONS

Herr Lane, KY 2050, is a state-maintained road with an estimated 2022 ADT of 11,500 vehicles per day between Brownsboro Road and Westport Road, as provided by the Kentucky Transportation Cabinet at station 195. The road is a two-lane highway with eleven-foot lanes, a five-foot shoulder (provided by the Kentucky Transportation Cabinet). The speed limit is 35 mph. There is a sidewalk on the east side of Herr Lane. The intersection with Brownsboro Road is controlled with a traffic signal. There are left turn lanes on all approaches. The eastbound and southbound approaches also have a right turn lane. TARC provides service along Herr Lane.

Peak hour traffic count for the intersections were obtained on Wednesday, August 21, 2019. The peak hours 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.

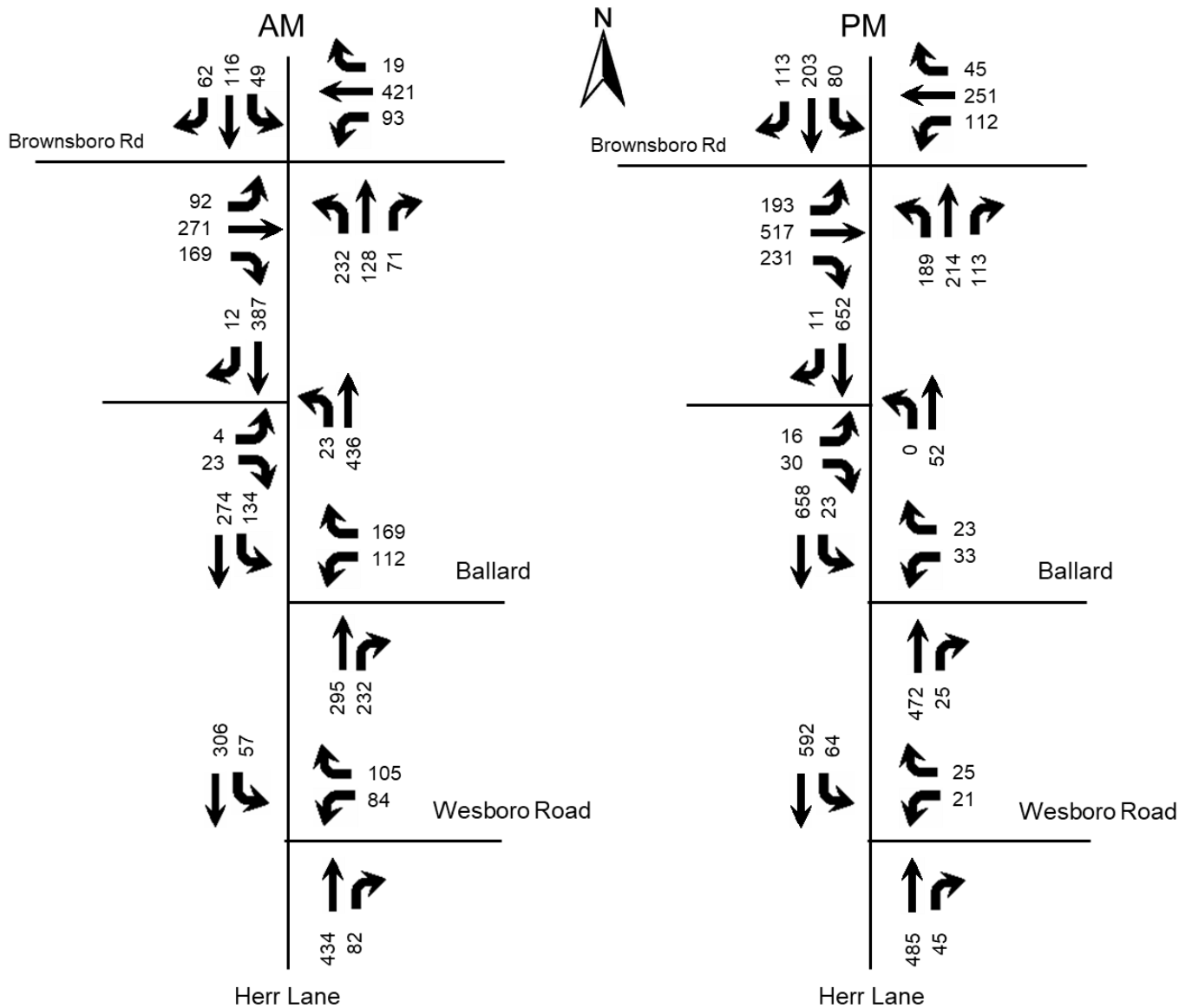


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2025. An annual growth rate of 0.5 percent was applied to the 2020 thru volumes on Herr Lane and all of Brownsboro Road. This was determined by the historical growth at KYTC station 195 and 196. Additionally, trip generation for the proposed Veterans Administration hospital and Providence Point has been included. The trip generation and distribution for the Veterans Administration hospital are from the October 2016 traffic impact study for the site. **Figure 3** displays the 2025 No Build peak hour volumes. These are the Build volumes from the Providence Point traffic impact study dated October 30, 2020.

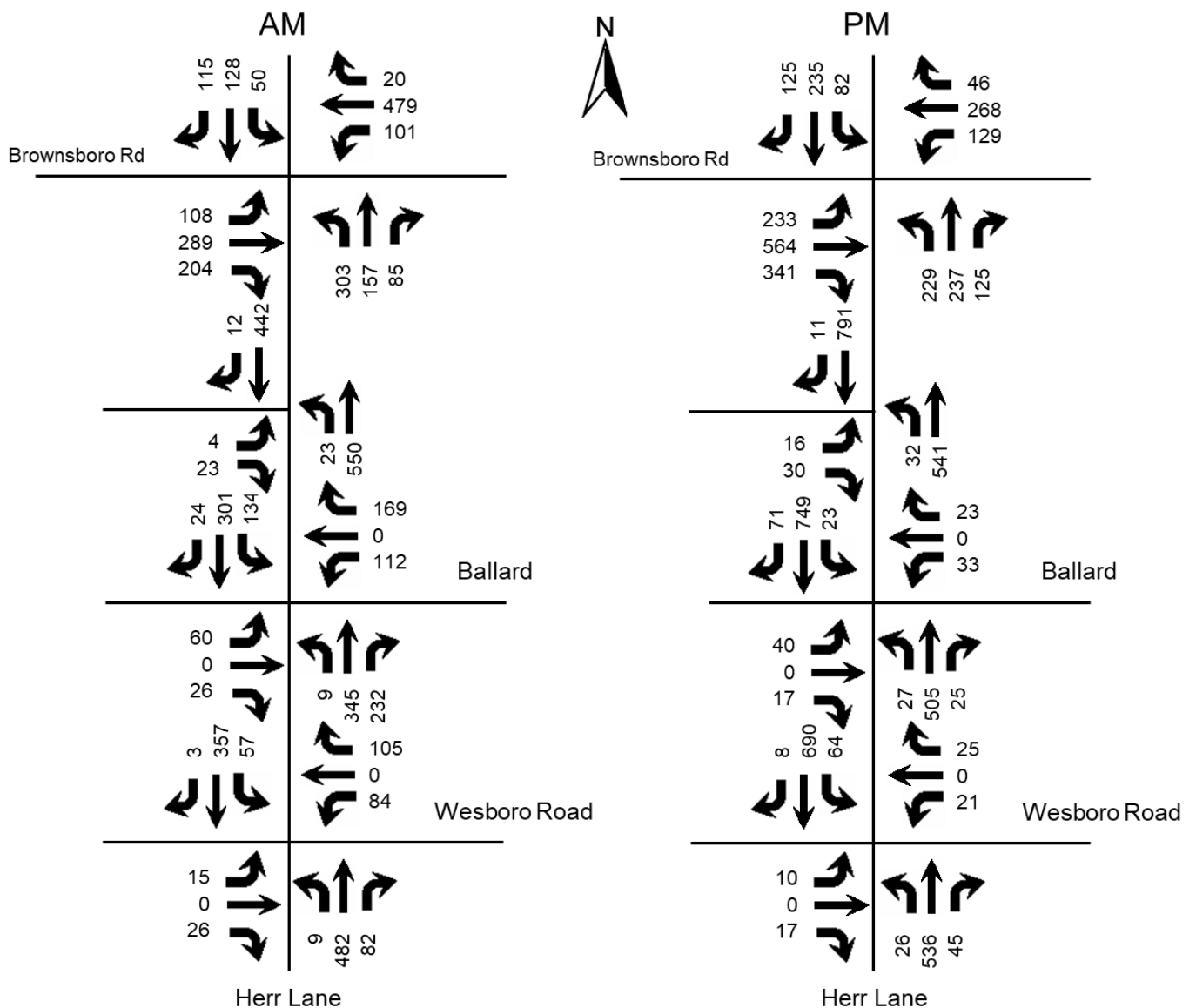


Figure 3. 2025 No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers [Trip Generation Manual](#), 10th Edition contains trip generation rates for a wide range of developments. The land use of “Multi-family (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

Land Use	A.M. Peak Hour			P.M. Peak Hour		
	Trips	In	Out	Trips	In	Out
Multi-family (Low-Rise) 72 units	45	11	34	52	33	19

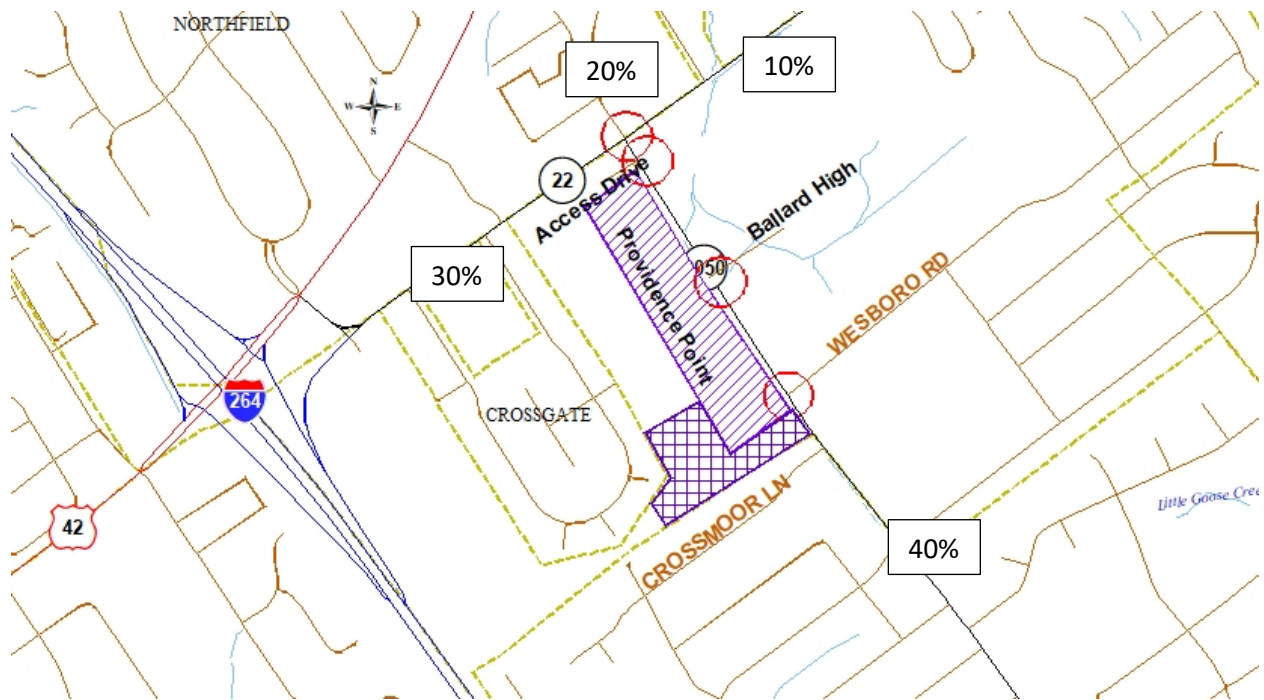


Figure 4. Trip Distribution Percentages

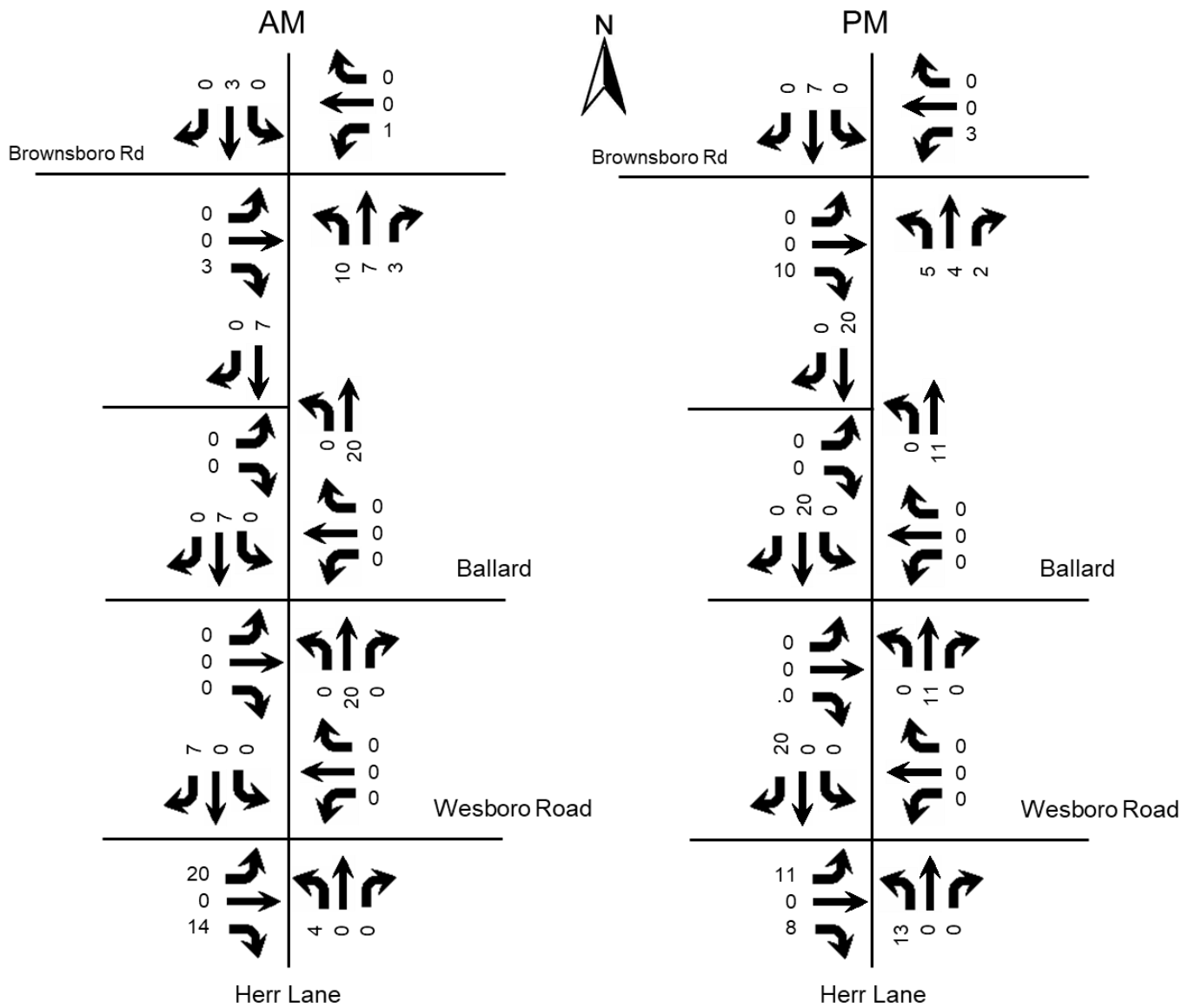


Figure 5. Peak Hour Trips Generated by Site

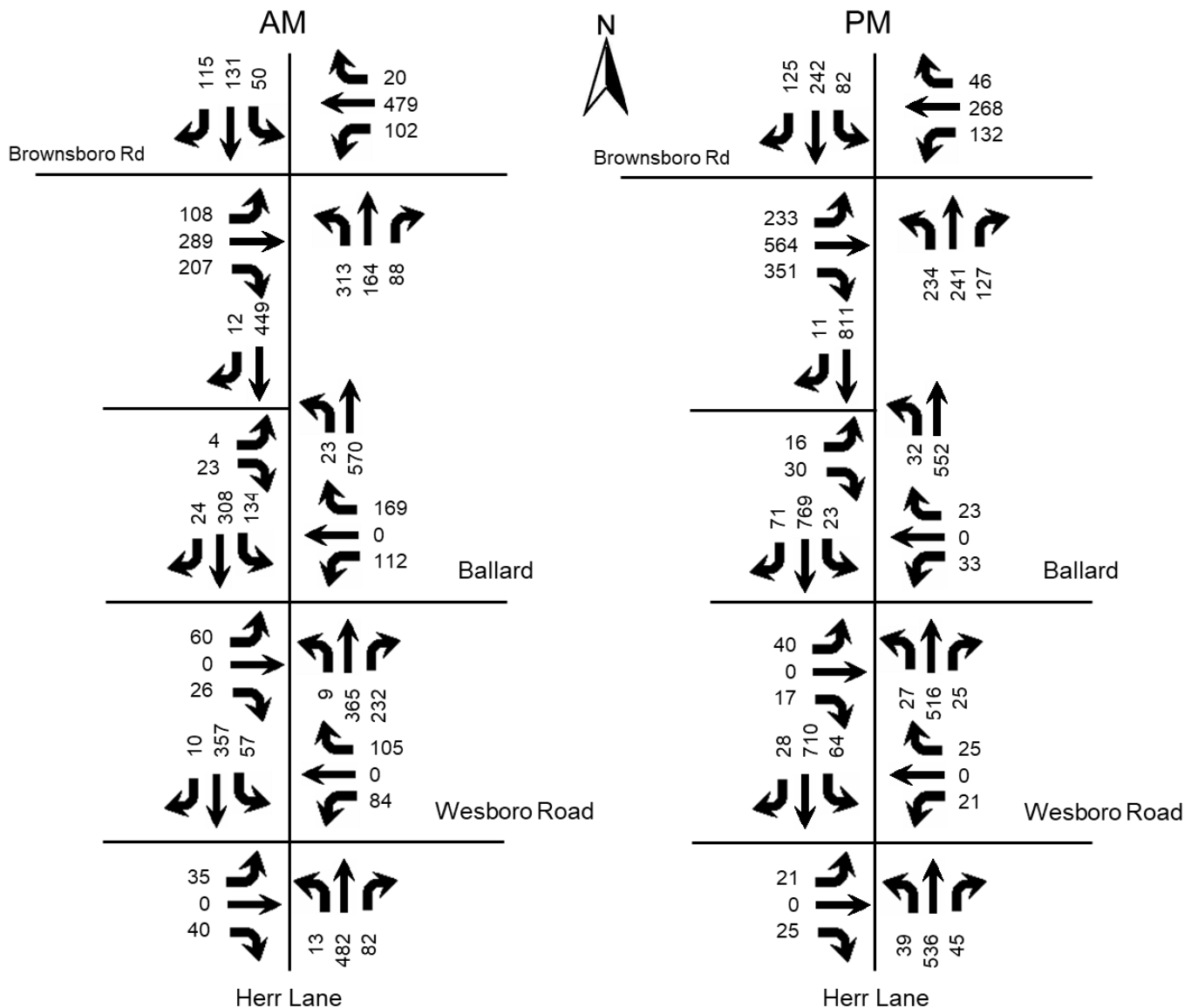


Figure 6. 2025 Build Peak Hour Volumes

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 for lanes at stop-controlled intersections.

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

The Build scenarios include left and right turn lanes at the entrance opposite Ballard High School, as well as widening the Ballard driveway to accommodate two exit lanes (a shared left/thru and a right). A two-way left turn lane will be constructed between Ballard and Wesboro Road. The Providence Point approved plan includes a traffic signal at the entrance opposite Ballard.

Table 2. Peak Hour Level of Service

Approach	A.M.			P.M.		
	2019 Existing	2025 No Build	2025 Build	2019 Existing	2025 No Build	2025 Build
Herr Lane at Brownsboro Road	C 30.7	D 39.5	D 40.6	D 40.9	E 56.5	E 58.8
Brownsboro Road Eastbound	C 23.0	C 28.1	C 28.9	D 35.2	D 46.5	D 48.1
Brownsboro Road Westbound	C 29.5	D 38.7	D 39.8	C 32.6	D 41.3	D 42.8
Herr Lane Northbound	D 36.0	D 45.4	D 46.5	D 50.9	E 74.2	E 77.8
Lime Kiln Southbound	D 40.8	D 52.6	D 53.8	D 52.6	E 77.4	F 80.0
Herr Lane at Access Road						
Access Road Eastbound	B 11.6	B 12.3	B 12.4	C 15.1	C 17.5	C 17.8
Herr Lane Northbound (left)	A 8.3	A 8.4	A 8.5	A 9.1	A 9.6	A 9.7
Herr Lane at Ballard High		B 15.7	B 15.5		A 7.0	A 7.0
Development Entrance Eastbound		D 37.5	D 37.5		D 47.0	D 47.0
Ballard High Westbound	D 32.1	D 46.5	D 46.5	D 25.1	D 46.9	D 46.9
Herr Lane Northbound (left)		A 5.3	A 5.4		A 3.1	A 3.2
Herr Lane Southbound (left)	A 9.3	A 5.9	A 6.0	A 8.6	A 4.1	A 4.3
Herr Lane at Wesboro Road						
Development Entrance Eastbound		C 18.1	C 21.1		C 18.7	C 21.5
Wesboro Road Westbound	D 27.2	C 21.1	C 20.4	C 16.9	B 14.7	C 16.4
Herr Lane Northbound (left)		A 8.2	A 8.3		A 9.3	A 9.4
Herr Lane Southbound (left)	A 9.8	B 10.1	B 10.1	A 8.8	A 9.0	A 9.0

Key: Level of Service, Delay in seconds per vehicle

The entrances were evaluated for turn lanes using the Kentucky Transportation Cabinet Highway Design Guidance Manual dated July, 2020. The traffic impact policy requires using volumes for ten years beyond opening date, or 2035. The 2035 volumes were determined applying a 0.5 percent annual growth rate from 2025. Figure 7 illustrates the 2035 No Build volumes. Figure 8 illustrates the 2035 Build Volumes. Using the volumes in Figure 8, left turn lanes will be required at the entrances opposite Ballard High and Wesboro Road. Table 3 summarizes the delay and Level of Service for 2035.

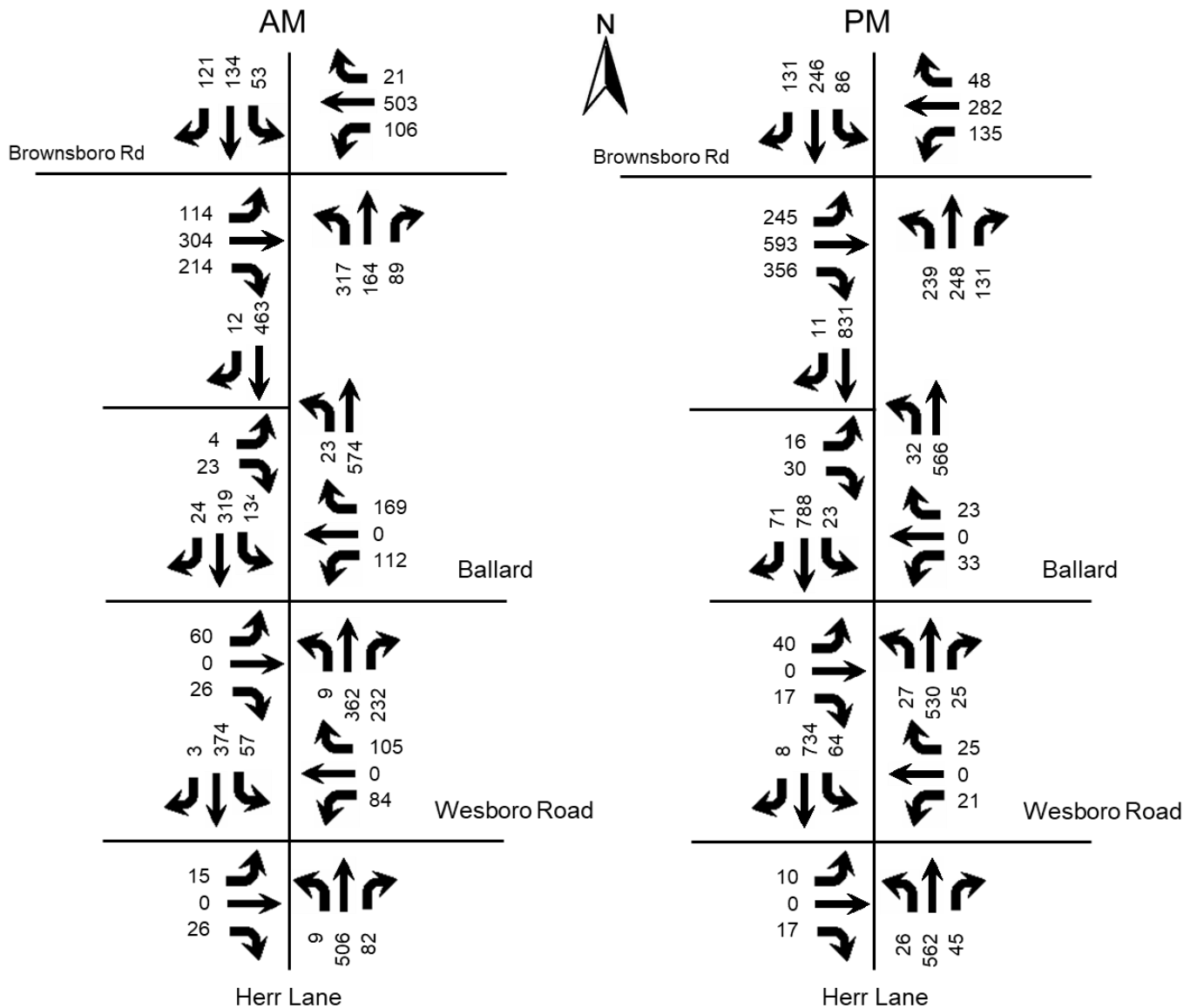


Figure 7. 2035 No Build Peak Hour Volumes

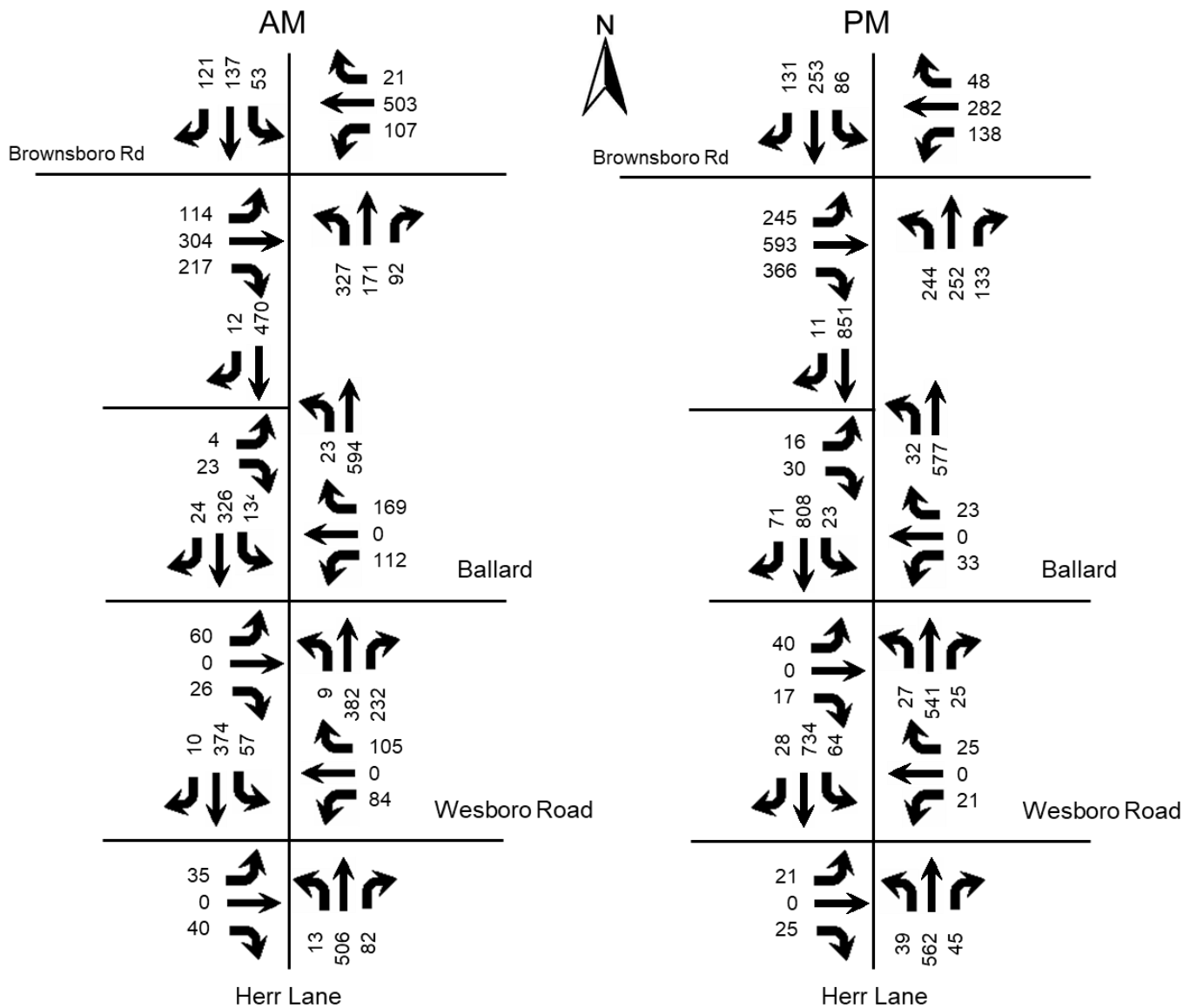


Figure 8. 2035 Build Peak Hour Volumes

Table 3. Peak Hour Level of Service (2035)

Approach	A.M.			P.M.		
	2019 Existing	2035 No Build	2035 Build	2019 Existing	2035 No Build	2035 Build
Herr Lane at Brownsboro Road	C 30.7	D 43.3	D 44.7	D 40.9	E 62.7	E 65.8
Brownsboro Road Eastbound	C 23.0	C 30.0	C 30.9	D 35.2	E 56.3	E 62.8
Brownsboro Road Westbound	C 29.5	D 42.7	D 44.1	C 32.6	D 47.4	D 45.5
Herr Lane Northbound	D 36.3	D 50.5	D 52.2	D 50.9	E 77.7	E 78.1
Lime Kiln Southbound	D 40.8	D 57.2	E 58.4	D 52.6	E 77.2	E 79.6
Herr Lane at Access Road						
Access Road Eastbound	B 11.6	B 12.5	B 12.6	C 15.1	C 18.2	C 18.7
Herr Lane Northbound (left)	A 8.3	A 8.5	A 8.5	A 9.1	A 9.8	A 9.9
Herr Lane at Ballard High		B 15.5	B 15.4		A 7.0	A 7.1
Development Entrance Eastbound		D 37.5	D 37.5		D 47.0	D 47.0
Ballard High Westbound	D 32.1	D 46.5	D 46.5	D 25.1	D 46.9	D 46.9
Herr Lane Northbound (left)		A 5.4	A 5.4		A 3.2	A 3.3
Herr Lane Southbound (left)	A 9.3	A 6.0	A 6.1	A 8.6	A 4.4	A 4.6
Herr Lane at Wesboro Road						
Development Entrance Eastbound		C 18.9	C 22.4		C 19.7	C 22.8
Wesboro Road Westbound	D 27.2	C 22.6	C 21.8	C 16.9	C 15.5	C 17.4
Herr Lane Northbound (left)		A 8.3	A 8.3		A 9.4	A 9.6
Herr Lane Southbound (left)	A 9.8	B 10.2	B 10.2	A 8.8	A 9.1	A 9.1

Key: Level of Service, Delay in seconds per vehicle

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2025 and 2035, there will be an impact to the existing highway network. The improvements required of Providence Point will be sufficient to handle the traffic generated by Bull Run Townhomes. The 2035 PM Build results reflect a

modification to the signal timing to allow more green time on Herr Lane at Brownsboro Road. If Bull Run Townhomes proceeds to construction before Providence Point, the improvements shown on Herr Lane at the entrance opposite Wesboro Road will be constructed and are sufficient for traffic generated by this development. No additional improvements are needed as a result of this development.

APPENDIX

Bull Run Townhomes
Herr Lane
Traffic Impact Study

Traffic Counts

Louisville, KY
Classified Turn Movement Count



Marr Traffic
Transportation Data Collection

41 Peabody Street, Nashville, TN 37210
10 Glenlake Parkway, Suite 130, Atlanta, GA 30328
555 Fayetteville Street, Suite 201, Raleigh, NC 27601
1229 South Shelby Street, Louisville, KY 40203
6565 North MacArthur Boulevard, Suite 225, Dallas, TX 75039

Site 1 of 4
Lime Kiln Ln
SR-22 Brownsboro Rd (East)
Herr Ln
SR-22 Brownsboro Rd (West)

hello@marrtraffic.com
www.marrtraffic.com

Lat/Long
38.283890°, -85.627964°
Weather
Mostly Cloudy
83°F

1 (800) 615-3765

Date
Wednesday, August 21, 2019

	Southbound						Westbound						Northbound						Eastbound						Int
	Lime Kiln Ln						SR-22 Brownsboro Rd (East)						Herr Ln						SR-22 Brownsboro Rd (West)						
	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	
0700 - 0715	0	6	14	5	2	27	0	29	71	1	5	106	0	57	17	12	11	97	0	8	125	64	2	199	429
0715 - 0730	0	35	33	17	1	86	0	15	72	3	8	98	0	72	18	13	37	140	0	14	119	70	2	205	529
0730 - 0745	0	6	29	21	0	56	0	15	120	6	0	141	0	82	33	29	7	151	0	15	57	33	0	105	453
0745 - 0800	0	2	24	13	1	40	0	31	95	5	1	132	0	43	41	18	2	104	0	36	39	31	1	107	383
0800 - 0815	0	6	30	11	0	47	0	32	134	5	1	172	0	35	36	11	5	87	0	27	56	35	0	118	424
0815 - 0830	0	2	37	15	0	54	0	41	90	6	0	137	0	36	24	10	0	70	0	32	54	47	0	133	394
0830 - 0845	0	3	34	19	0	56	0	33	93	5	1	132	0	37	24	7	0	68	0	21	42	41	0	104	360
0845 - 0900	0	7	33	22	0	62	0	31	91	11	0	133	0	72	35	25	0	132	0	34	58	47	0	139	466
1600 - 1615	0	13	50	26	1	90	0	32	84	12	1	129	0	56	49	33	1	139	0	54	154	76	0	284	642
1615 - 1630	0	20	58	41	0	119	0	23	61	11	0	95	0	51	55	24	1	131	0	61	136	58	1	256	601
1630 - 1645	0	21	60	25	0	106	0	26	52	11	0	89	0	43	54	24	3	124	0	43	127	50	0	220	539
1645 - 1700	0	26	35	21	0	82	0	31	54	11	0	96	0	34	56	32	0	122	0	35	100	47	0	182	482
1700 - 1715	0	15	67	36	4	122	0	26	58	7	5	96	0	38	43	21	8	110	0	29	103	72	0	204	532
1715 - 1730	0	13	60	26	1	100	0	33	70	9	2	114	0	49	72	32	9	162	0	23	97	67	1	188	564
1730 - 1745	0	13	55	27	1	96	0	37	66	6	1	110	0	51	53	26	1	131	0	27	110	58	0	195	532
1745 - 1800	0	16	76	22	0	114	0	36	54	10	0	100	0	46	42	8	0	96	0	22	91	61	0	174	484

0715 - 0730	0	35	33	17	1	86	0	15	72	3	8	98	0	72	18	13	37	140	0	14	119	70	2	205	529
0730 - 0745	0	6	29	21	0	56	0	15	120	6	0	141	0	82	33	29	7	151	0	15	57	33	0	105	453
0745 - 0800	0	2	24	13	1	40	0	31	95	5	1	132	0	43	41	18	2	104	0	36	39	31	1	107	383
0800 - 0815	0	6	30	11	0	47	0	32	134	5	1	172	0	35	36	11	5	87	0	27	56	35	0	118	424
AM PEAK	0	49	116	62	2	229	0	93	421	19	10	543	0	232	128	71	51	482	0	92	271	169	3	535	1789
1600 - 1615	0	13	50	26	1	90	0	32	84	12	1	129	0	56	49	33	1	139	0	54	154	76	0	284	642
1615 - 1630	0	20	58	41	0	119	0	23	61	11	0	95	0	51	55	24	1	131	0	61	136	58	1	256	601
1630 - 1645	0	21	60	25	0	106	0	26	52	11	0	89	0	43	54	24	3	124	0	43	127	50	0	220	539
1645 - 1700	0	26	35	21	0	82	0	31	54	11	0	96	0	34	56	32	0	122	0	35	100	47	0	182	482
PM PEAK	0	80	203	113	1	397	0	112	251	45	1	409	0	184	214	113	5	516	0	193	517	231	1	942	2264

Bull Run Townhomes
Herr Lane
Traffic Impact Study

Louisville, KY
Classified Turn Movement Count



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41 Peabody Street, Nashville, TN 37210
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555 Fayetteville Street, Suite 201, Raleigh, NC 27601
1229 South Shelby Street, Louisville, KY 40203
6565 North MacArthur Boulevard, Suite 225, Dallas, TX 75039

Site 2 of 4
Herr Ln (North)

Herr Ln (South)
Local Access

hello@marrtraffic.com
www.marrtraffic.com

Lat/Long
38.283288°, -85.627485°

1 (800) 615-3765

Date: Wednesday, August 21, 2019
Weather: Mostly Cloudy
83°F

	Southbound					Northbound					Eastbound					Int
	Herr Ln (North)					Herr Ln (South)					Local Access					
	U-Turn	Thru	Right	Peds	App	U-Turn	Left	Thru	Peds	App	U-Turn	Left	Right	Peds	App	
0700 - 0715	0	112	3	0	115	0	4	90	0	94	0	0	4	0	4	213
0715 - 0730	0	106	3	0	109	0	4	100	0	104	0	1	9	0	10	223
0730 - 0745	0	83	4	0	87	0	8	146	0	154	0	0	6	0	6	247
0745 - 0800	0	86	2	0	88	0	7	100	0	107	0	3	4	0	7	202
0800 - 0815	0	88	5	0	93	0	8	87	0	95	0	1	7	0	8	196
0815 - 0830	0	125	4	0	129	0	3	63	0	66	0	3	4	0	7	202
0830 - 0845	0	100	3	0	103	0	5	74	0	79	0	1	5	0	6	188
0845 - 0900	0	111	2	0	113	0	13	124	0	137	0	1	7	0	8	258
1600 - 1615	0	153	6	0	159	0	9	143	0	152	0	6	15	0	21	332
1615 - 1630	0	139	7	0	146	0	5	133	0	138	0	4	13	0	17	301
1630 - 1645	0	131	7	0	138	0	6	113	1	120	0	2	11	1	14	272
1645 - 1700	0	114	2	0	116	0	6	131	0	137	0	3	2	0	5	258
1700 - 1715	0	169	1	0	170	0	10	110	0	120	0	3	7	0	10	300
1715 - 1730	0	159	5	0	164	0	4	137	0	141	0	1	6	0	7	312
1730 - 1745	0	150	3	0	153	0	11	122	0	133	0	10	8	0	18	304
1745 - 1800	0	174	2	0	176	0	7	99	0	106	0	2	9	0	11	293

0700 - 0715	0	112	3	0	115	0	4	90	0	94	0	0	4	0	4	213
0715 - 0730	0	106	3	0	109	0	4	100	0	104	0	1	9	0	10	223
0730 - 0745	0	83	4	0	87	0	8	146	0	154	0	0	6	0	6	247
0745 - 0800	0	86	2	0	88	0	7	100	0	107	0	3	4	0	7	202
AM PEAK	0	387	12	0	399	0	23	436	0	459	0	4	23	0	27	885
1700 - 1715	0	169	1	0	170	0	10	110	0	120	0	3	7	0	10	300
1715 - 1730	0	159	5	0	164	0	4	137	0	141	0	1	6	0	7	312
1730 - 1745	0	150	3	0	153	0	11	122	0	133	0	10	8	0	18	304
1745 - 1800	0	174	2	0	176	0	7	99	0	106	0	2	9	0	11	293
PM PEAK	0	652	11	0	663	0	32	468	0	500	0	16	30	0	46	1209

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Herr Ln (North)
Local Access
Herr Ln (South)

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Lat/Long
38.281641°, -85.626151°

Weather
Mostly Cloudy
83°F

1 (800) 615-3765

Date
Wednesday, August 21, 2019

	Southbound					Westbound					Northbound					Int
	Herr Ln (North)					Ballard High School					Herr Ln (South)					
	U-Turn	Left	Thru	Peds	App	U-Turn	Left	Right	Peds	App	U-Turn	Thru	Right	Peds	App	
0700 - 0715	0	51	62	0	113	0	33	52	5	90	0	49	90	0	139	342
0715 - 0730	0	42	58	0	100	0	37	64	4	105	0	34	97	0	131	336
0730 - 0745	0	30	76	0	106	0	39	45	4	88	0	112	39	0	151	345
0745 - 0800	0	11	78	0	89	0	3	8	0	11	0	100	6	0	106	206
0800 - 0815	0	4	91	0	95	0	6	6	1	13	0	85	1	0	86	194
0815 - 0830	0	1	129	0	130	0	1	0	2	3	0	69	0	0	69	202
0830 - 0845	0	3	100	0	103	0	1	3	0	4	0	90	0	0	90	197
0845 - 0900	0	3	118	0	121	0	1	1	0	2	0	119	2	0	121	244
1600 - 1615	0	12	155	0	167	0	9	9	0	18	0	144	10	0	154	339
1615 - 1630	1	6	143	0	150	0	9	13	1	23	0	133	4	0	137	310
1630 - 1645	0	5	127	0	132	0	5	0	0	5	0	121	7	0	128	265
1645 - 1700	1	2	125	0	128	0	2	5	2	9	0	122	10	0	132	269
1700 - 1715	1	2	168	0	171	0	5	5	0	10	0	113	4	0	117	298
1715 - 1730	0	11	159	0	170	0	15	11	0	26	0	142	12	0	154	350
1730 - 1745	0	5	156	0	161	0	7	6	0	13	0	116	5	0	121	295
1745 - 1800	0	4	175	0	179	0	6	1	0	7	0	101	4	0	105	291

0700 - 0715	0	51	62	0	113	0	33	52	5	90	0	49	90	0	139	342
0715 - 0730	0	42	58	0	100	0	37	64	4	105	0	34	97	0	131	336
0730 - 0745	0	30	76	0	106	0	39	45	4	88	0	112	39	0	151	345
0745 - 0800	0	11	78	0	89	0	3	8	0	11	0	100	6	0	106	206
AM PEAK	0	134	274	0	408	0	112	169	13	294	0	295	232	0	527	1229
1700 - 1715	1	2	168	0	171	0	5	5	0	10	0	113	4	0	117	298
1715 - 1730	0	11	159	0	170	0	15	11	0	26	0	142	12	0	154	350
1730 - 1745	0	5	156	0	161	0	7	6	0	13	0	116	5	0	121	295
1745 - 1800	0	4	175	0	179	0	6	1	0	7	0	101	4	0	105	291
PM PEAK	1	22	658	0	681	0	33	23	0	56	0	472	25	0	497	1234

Bull Run Townhomes
 Herr Lane
 Traffic Impact Study

Louisville, KY
 Classified Turn Movement Count



Marr Traffic
 Transportation Data Collection

41 Peabody Street, Nashville, TN 37210
 10 Glenlake Parkway, Suite 130, Atlanta, GA 30328
 555 Fayetteville Street, Suite 201, Raleigh, NC 27601
 1229 South Shelby Street, Louisville, KY 40203
 6565 North MacArthur Boulevard, Suite 225, Dallas, TX 75039

Site 4 of 4
 Herr Ln (North)
 Wesboro Rd
 Herr Ln (South)

hello@marrtraffic.com
 www.marrtraffic.com

Lat/Long
 38.279709°, -85.624571°

1 (800) 615-3765

Date: Wednesday, August 21, 2019
 Weather: Mostly Cloudy
 83°F

	Southbound					Westbound					Northbound					Int
	Herr Ln (North)					Wesboro Rd					Herr Ln (South)					
	U-Turn	Left	Thru	Peds	App	U-Turn	Left	Right	Peds	App	U-Turn	Thru	Right	Peds	App	
0700 - 0715	0	25	69	0	94	0	26	27	0	53	0	133	45	0	178	325
0715 - 0730	0	19	66	0	85	0	28	35	0	63	0	102	28	0	130	278
0730 - 0745	0	8	106	0	114	0	22	31	2	55	0	105	7	0	112	281
0745 - 0800	0	5	65	0	70	0	8	12	0	20	0	94	2	0	96	186
0800 - 0815	0	5	89	0	94	0	6	8	0	14	0	83	0	0	83	191
0815 - 0830	0	4	107	0	111	0	6	9	0	15	0	57	4	0	61	187
0830 - 0845	0	5	88	0	93	0	12	12	0	24	0	82	3	0	85	202
0845 - 0900	0	5	90	0	95	0	7	5	3	15	0	122	11	0	133	243
1600 - 1615	0	8	158	0	166	0	2	6	0	8	0	123	8	0	131	305
1615 - 1630	0	11	147	0	158	0	4	4	1	9	0	117	11	0	128	295
1630 - 1645	0	12	127	0	139	0	5	4	0	9	0	119	12	0	131	279
1645 - 1700	0	11	113	0	124	0	2	7	0	9	0	126	10	0	136	269
1700 - 1715	0	15	161	0	176	0	6	5	1	12	0	114	7	0	121	309
1715 - 1730	0	17	147	0	164	0	3	3	0	6	0	149	10	0	159	329
1730 - 1745	0	14	145	0	159	0	7	11	0	18	0	116	13	0	129	306
1745 - 1800	0	18	139	0	157	0	5	6	0	11	0	106	15	0	121	289

0700 - 0715	0	25	69	0	94	0	26	27	0	53	0	133	45	0	178	325
0715 - 0730	0	19	66	0	85	0	28	35	0	63	0	102	28	0	130	278
0730 - 0745	0	8	106	0	114	0	22	31	2	55	0	105	7	0	112	281
0745 - 0800	0	5	65	0	70	0	8	12	0	20	0	94	2	0	96	186
AM PEAK	0	57	306	0	363	0	84	105	2	191	0	434	82	0	516	1070
1700 - 1715	0	15	161	0	176	0	6	5	1	12	0	114	7	0	121	309
1715 - 1730	0	17	147	0	164	0	3	3	0	6	0	149	10	0	159	329
1730 - 1745	0	14	145	0	159	0	7	11	0	18	0	116	13	0	129	306
1745 - 1800	0	18	139	0	157	0	5	6	0	11	0	106	15	0	121	289
PM PEAK	0	64	592	0	656	0	21	25	1	47	0	485	45	0	530	1233

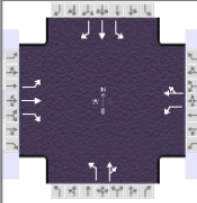
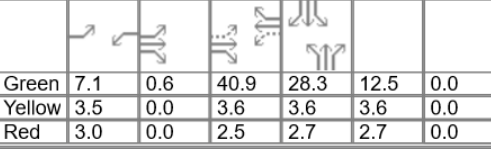

HCS Reports

HCS7 Signalized Intersection Results Summary																
General Information						Intersection Information										
Agency	Diane B. Zimmerman Traffic					Duration, h	0.250									
Analyst	DBZ	Analysis Date	Jul 23, 2020			Area Type	Other									
Jurisdiction		Time Period	AM Peak			PHF	0.85									
Urban Street	Herr Lane	Analysis Year	2019			Analysis Period	1> 7:15									
Intersection	Brownsbor Road		File Name	AM 19 Herr.xus												
Project Description	Providence Point															
Demand Information				EB			WB			NB			SB			
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h	92	271	169	93	421	19	232	128	71	49	116	62				
Signal Information																
Cycle, s	86.2	Reference Phase	2													
Offset, s	0	Reference Point	End													
Uncoordinated	Yes	Simult. Gap E/W	On	Green	5.4	0.1	28.9	17.6	9.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	Off	Yellow	3.5	0.0	3.6	3.6	3.6	0.0						
				Red	3.0	0.0	2.5	2.7	2.7	0.0						
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT					
Assigned Phase	5		2		1		6		4		8					
Case Number	1.1		3.0		1.1		4.0		10.0		9.0					
Phase Duration, s	12.0		35.1		11.9		35.0		23.9		15.3					
Change Period, (Y+R c), s	6.5		6.1		6.5		6.1		6.3		6.3					
Max Allow Headway (MAH), s	5.1		6.1		5.1		6.0		5.1		5.1					
Queue Clearance Time (g s), s	5.5		14.0		5.4		23.7		14.6		8.0					
Green Extension Time (g e), s	0.4		4.0		0.4		5.1		3.0		1.0					
Phase Call Probability	0.93		1.00		0.93		1.00		1.00		0.99					
Max Out Probability	0.00		0.00		0.00		0.00		0.00		0.00					
Movement Group Results				EB			WB			NB			SB			
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18				
Adjusted Flow Rate (v), veh/h	108	319	112	109	514		273	228		58	136	26				
Adjusted Saturation Flow Rate (s), veh/h/ln	1697	1841	1598	1781	1873		1767	1679		1781	1885	1610				
Queue Service Time (g s), s	3.5	12.0	4.3	3.4	21.7		12.6	10.8		2.6	6.0	1.3				
Cycle Queue Clearance Time (g c), s	3.5	12.0	4.3	3.4	21.7		12.6	10.8		2.6	6.0	1.3				
Green Ratio (g/C)	0.40	0.34	0.34	0.40	0.34		0.20	0.20		0.10	0.10	0.10				
Capacity (c), veh/h	263	620	538	382	629		361	343		186	197	168				
Volume-to-Capacity Ratio (X)	0.411	0.514	0.208	0.287	0.817		0.757	0.666		0.309	0.692	0.154				
Back of Queue (Q), ft/ln (95 th percentile)	67.3	229.8	72.5	62.9	384.4		243.5	213.1		53.2	137.7	23				
Back of Queue (Q), veh/ln (95 th percentile)	2.5	8.9	2.9	2.5	15.3		9.5	8.0		2.1	5.5	0.9				
Queue Storage Ratio (RQ) (95 th percentile)	0.45	0.23	0.21	0.42	0.38		0.70	0.21		0.35	0.14	0.15				
Uniform Delay (d 1), s/veh	19.8	23.0	20.4	17.9	26.3		32.4	31.7		35.8	37.3	35.2				
Incremental Delay (d 2), s/veh	1.5	1.4	0.4	0.6	5.6		4.6	3.2		1.3	6.1	0.6				
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	21.2	24.4	20.8	18.5	31.8		36.9	34.8		37.1	43.4	35.8				
Level of Service (LOS)	C	C	C	B	C		D	C		D	D	D				
Approach Delay, s/veh / LOS	23.0		C		29.5		C		36.0		D					
Intersection Delay, s/veh / LOS	30.7						C									
Multimodal Results				EB			WB			NB			SB			
Pedestrian LOS Score / LOS	1.92		B		2.16		B		1.94		B		2.25		B	
Bicycle LOS Score / LOS	1.38		A		1.52		B		1.31		A		0.85		A	

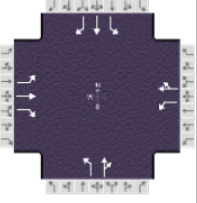
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information											
Agency	Diane B. Zimmerman Traffic			Duration, h	0.250										
Analyst	DBZ	Analysis Date	Oct 30, 2020	Area Type	Other										
Jurisdiction		Time Period	AM Peak	PHF	0.85										
Urban Street	Herr Lane	Analysis Year	2025 Build	Analysis Period	1> 7:15										
Intersection	Brownsboror Road	File Name	AM 25 B Herr.xus												
Project Description	Providence Point														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				108	289	204	101	479	20	303	157	85	50	129	115
Signal Information															
Cycle, s	112.1	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	Yes	Simult. Gap E/W	On	Green	6.9	0.6	40.2	27.0	12.1	0.0					
Force Mode	Fixed	Simult. Gap N/S	Off	Yellow	3.5	0.0	3.6	3.6	3.6	0.0					
				Red	3.0	0.0	2.5	2.7	2.7	0.0					
Timer Results				EB			WB			NB			SB		
Assigned Phase				5	2	1	6				4				
Case Number				1.1	3.0	1.1	4.0				10.0				
Phase Duration, s				14.0	46.9	13.4	46.3				33.3				
Change Period, (Y+R c), s				6.5	6.1	6.5	6.1				6.3				
Max Allow Headway (MAH), s				5.1	6.1	5.1	6.0				5.1				
Queue Clearance Time (g s), s				7.2	18.2	6.7	34.6				23.5				
Green Extension Time (g e), s				0.4	4.7	0.4	5.6				3.4				
Phase Call Probability				0.98	1.00	0.98	1.00				1.00				
Max Out Probability				0.01	0.00	0.00	0.05				0.09				
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	7	4	14	3	8	18
Adjusted Flow Rate (v), veh/h				127	340	153	119	584		356	279		59	152	88
Adjusted Saturation Flow Rate (s), veh/h/ln				1697	1841	1598	1781	1874		1767	1679		1781	1885	1610
Queue Service Time (g s), s				5.2	16.2	7.6	4.7	32.6		21.5	17.0		3.4	8.8	5.8
Cycle Queue Clearance Time (g c), s				5.2	16.2	7.6	4.7	32.6		21.5	17.0		3.4	8.8	5.8
Green Ratio (g/C)				0.43	0.36	0.36	0.42	0.36		0.24	0.24		0.11	0.11	0.11
Capacity (c), veh/h				232	671	582	385	672		426	405		193	204	174
Volume-to-Capacity Ratio (X)				0.547	0.507	0.263	0.308	0.868		0.836	0.688		0.305	0.744	0.506
Back of Queue (Q), ft/ln (95 th percentile)				105.9	299.5	131.9	90.1	565.4		391.7	308.7		71.8	200.9	110.7
Back of Queue (Q), veh/ln (95 th percentile)				4.0	11.6	5.2	3.5	22.4		15.3	11.6		2.8	8.0	4.4
Queue Storage Ratio (RQ) (95 th percentile)				0.71	0.30	0.38	0.60	0.57		1.12	0.31		0.48	0.20	0.74
Uniform Delay (d 1), s/veh				25.6	27.8	25.1	21.7	33.5		40.5	38.7		46.2	48.5	47.2
Incremental Delay (d 2), s/veh				2.8	1.3	0.5	0.6	8.5		7.8	3.0		1.3	7.4	3.2
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				28.5	29.1	25.6	22.4	42.0		48.3	41.7		47.4	56.0	50.4
Level of Service (LOS)				C	C	C	C	D		D	D		D	E	D
Approach Delay, s/veh / LOS				28.1	C		38.7	D		45.4	D		52.6	D	
Intersection Delay, s/veh / LOS				39.5						D					
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				1.93	B		2.17	B		1.95	B		2.26	B	
Bicycle LOS Score / LOS				1.51	B		1.65	B		1.54	B		0.98	A	

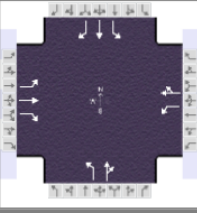
Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Signalized Intersection Results Summary															
General Information							Intersection Information								
Agency	Diane B. Zimmerman Traffic						Duration, h	0.250							
Analyst	DBZ	Analysis Date	Jun 20, 2022			Area Type	Other								
Jurisdiction		Time Period	AM Peak			PHF	0.85								
Urban Street	Herr Lane		Analysis Year	2025 Build		Analysis Period	1> 7:15								
Intersection	Brownsboror Road		File Name	AM 25 B Herr.xus											
Project Description	Bull Run Townhouses														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				108	289	207	102	479	20	313	164	88	50	131	115
Signal Information															
Cycle, s	114.5	Reference Phase	2												
Offset, s	0	Reference Point	End	Green	7.1	0.6	40.9	28.3	12.5	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	0.0	3.6	3.6	3.6	0.0					
Force Mode	Fixed	Simult. Gap N/S	Off	Red	3.0	0.0	2.5	2.7	2.7	0.0					
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase				5	2	1	6		4		8				
Case Number				1.1	3.0	1.1	4.0		10.0		9.0				
Phase Duration, s				14.2	47.6	13.6	47.0		34.6		18.8				
Change Period, (Y+R _c), s				6.5	6.1	6.5	6.1		6.3		6.3				
Max Allow Headway (MAH), s				5.1	6.1	5.1	6.0		5.1		5.1				
Queue Clearance Time (g _s), s				7.3	18.6	6.8	35.3		24.7		11.1				
Green Extension Time (g _e), s				0.4	4.7	0.4	5.5		3.5		1.3				
Phase Call Probability				0.98	1.00	0.98	1.00		1.00		1.00				
Max Out Probability				0.01	0.00	0.00	0.06		0.13		0.03				
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (v), veh/h				127	340	156	120	584		368	291		59	154	88
Adjusted Saturation Flow Rate (s), veh/h/ln				1697	1841	1598	1781	1874		1767	1680		1781	1885	1610
Queue Service Time (g _s), s				5.3	16.6	7.9	4.8	33.3		22.7	18.1		3.5	9.1	5.9
Cycle Queue Clearance Time (g _c), s				5.3	16.6	7.9	4.8	33.3		22.7	18.1		3.5	9.1	5.9
Green Ratio (g/C)				0.43	0.36	0.36	0.42	0.36		0.25	0.25		0.11	0.11	0.11
Capacity (c), veh/h				229	667	579	383	670		437	415		194	205	175
Volume-to-Capacity Ratio (X)				0.555	0.509	0.270	0.314	0.871		0.844	0.700		0.303	0.751	0.503
Back of Queue (Q), ft/ln (95 th percentile)															
Back of Queue (Q), veh/ln (95 th percentile)				4.1	11.9	5.5	3.7	23.0		16.2	12.2		2.9	8.2	4.5
Queue Storage Ratio (RQ) (95 th percentile)				0.73	0.31	0.40	0.62	0.58		1.18	0.33		0.49	0.21	0.75
Uniform Delay (d ₁), s/veh				26.3	28.6	25.8	22.3	34.4		41.1	39.3		47.1	49.6	48.2
Incremental Delay (d ₂), s/veh				3.0	1.3	0.5	0.7	8.9		8.8	3.1		1.2	7.6	3.2
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				29.3	29.9	26.4	23.0	43.3		49.8	42.4		48.3	57.2	51.3
Level of Service (LOS)				C	C	C	C	D		D	D		D	E	D
Approach Delay, s/veh / LOS				28.9	C	39.8	D	46.5	D	53.8	D				
Intersection Delay, s/veh / LOS				40.6				D							
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				1.93	B	2.17	B	1.95	B	2.26	B				
Bicycle LOS Score / LOS				1.52	B	1.65	B	1.57	B	0.98	A				

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information											
Agency	Diane B. Zimmerman Traffic			Duration, h	0.250										
Analyst	DBZ	Analysis Date	Oct 30, 2020	Area Type	Other										
Jurisdiction		Time Period	AM Peak	PHF	0.85										
Urban Street	Herr Lane	Analysis Year	2035 Build	Analysis Period	1> 7:15										
Intersection	Brownsboror Road	File Name	AM 35 B Herr.xus												
Project Description	Providence Point														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				114	304	214	106	503	21	317	164	89	53	134	121
Signal Information															
Cycle, s	121.5	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	Yes	Simult. Gap E/W	On	Green	7.5	0.7	44.9	29.9	13.3	0.0					
Force Mode	Fixed	Simult. Gap N/S	Off	Yellow	3.5	0.0	3.6	3.6	3.6	0.0					
				Red	3.0	0.0	2.5	2.7	2.7	0.0					
Timer Results				EB			WB			NB			SB		
Assigned Phase				5	2	1	6			4					
Case Number				1.1	3.0	1.1	4.0			10.0					
Phase Duration, s				14.8	51.7	14.0	51.0			36.2					
Change Period, (Y+R c), s				6.5	6.1	6.5	6.1			6.3					
Max Allow Headway (MAH), s				5.1	6.1	5.1	6.0			5.1					
Queue Clearance Time (g s), s				7.9	20.3	7.2	39.3			26.5					
Green Extension Time (g e), s				0.4	5.0	0.4	5.5			3.3					
Phase Call Probability				0.99	1.00	0.99	1.00			1.00					
Max Out Probability				0.01	0.00	0.01	0.12			0.19					
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	7	4	14	3	8	18
Adjusted Flow Rate (v), veh/h				134	358	165	125	613		373	292		62	158	95
Adjusted Saturation Flow Rate (s), veh/h/ln				1697	1841	1598	1781	1874		1767	1679		1781	1885	1610
Queue Service Time (g s), s				5.9	18.3	8.7	5.2	37.3		24.5	19.3		3.9	9.9	6.8
Cycle Queue Clearance Time (g c), s				5.9	18.3	8.7	5.2	37.3		24.5	19.3		3.9	9.9	6.8
Green Ratio (g/C)				0.44	0.38	0.38	0.43	0.37		0.25	0.25		0.11	0.11	0.11
Capacity (c), veh/h				223	691	600	383	692		435	413		195	206	176
Volume-to-Capacity Ratio (X)				0.602	0.518	0.275	0.325	0.886		0.857	0.706		0.320	0.765	0.541
Back of Queue (Q), ft/ln (95 th percentile)				121.7	334.2	154	101.9	647.9		448.6	346.7		83	222.1	131.1
Back of Queue (Q), veh/ln (95 th percentile)				4.6	13.0	6.1	4.0	25.7		17.5	13.0		3.3	8.8	5.2
Queue Storage Ratio (RQ) (95 th percentile)				0.81	0.33	0.44	0.68	0.65		1.28	0.35		0.55	0.22	0.87
Uniform Delay (d 1), s/veh				27.8	29.5	26.5	22.9	36.0		43.8	41.8		50.0	52.7	51.3
Incremental Delay (d 2), s/veh				3.7	1.3	0.5	0.7	10.6		10.7	3.5		1.3	8.1	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				31.5	30.7	27.0	23.6	46.6		54.5	45.4		51.3	60.8	54.9
Level of Service (LOS)				C	C	C	C	D		D	D		D	E	D
Approach Delay, s/veh / LOS				30.0	C		42.7	D		50.5	D		57.2	E	
Intersection Delay, s/veh / LOS				43.3						D					
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				1.93	B		2.17	B		1.96	B		2.26	B	
Bicycle LOS Score / LOS				1.57	B		1.70	B		1.58	B		1.01	A	

Bull Run Townhomes
Herr Lane
Traffic Impact Study

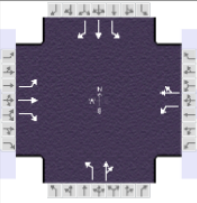
HCS Signalized Intersection Results Summary																					
General Information						Intersection Information															
Agency	Diane B. Zimmerman Traffic					Duration, h	0.250														
Analyst	DBZ	Analysis Date	Jun 20, 2022			Area Type	Other														
Jurisdiction		Time Period	AM Peak			PHF	0.85														
Urban Street	Herr Lane		Analysis Year	2035 Build		Analysis Period	1> 7:15														
Intersection	Brownsboror Road		File Name	AM 35 B Herr.xus																	
Project Description	Bull Run Townhomes																				
Demand Information				EB			WB			NB			SB								
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R						
Demand (v), veh/h				114	304	217	107	503	21	327	171	92	53	137	121						
Signal Information																					
Cycle, s	124.3	Reference Phase	2																		
Offset, s	0	Reference Point	End																		
Uncoordinated	Yes	Simult. Gap E/W	On		Green	7.7	0.7	45.7	31.2	13.7	0.0										
Force Mode	Fixed	Simult. Gap N/S	Off		Yellow	3.5	0.0	3.6	3.6	3.6	0.0										
					Red	3.0	0.0	2.5	2.7	2.7	0.0										
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT			
Assigned Phase				5		2		1		6				4				8			
Case Number				1.1		3.0		1.1		4.0				10.0				9.0			
Phase Duration, s				14.9		52.5		14.2		51.8				37.5				20.0			
Change Period, (Y+R c), s				6.5		6.1		6.5		6.1				6.3				6.3			
Max Allow Headway (MAH), s				5.1		6.1		5.1		6.0				5.1				5.1			
Queue Clearance Time (g s), s				8.0		20.8		7.4		40.2				27.9				12.3			
Green Extension Time (g e), s				0.4		5.0		0.4		5.4				3.3				1.4			
Phase Call Probability				0.99		1.00		0.99		1.00				1.00				1.00			
Max Out Probability				0.01		0.00		0.01		0.14				0.26				0.06			
Movement Group Results				EB			WB			NB			SB								
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R						
Assigned Movement				5	2	12	1	6	16	7	4	14	3	8	18						
Adjusted Flow Rate (v), veh/h				134	358	168	126	613		385	304		62	161	95						
Adjusted Saturation Flow Rate (s), veh/h/ln				1697	1841	1598	1781	1874		1767	1679		1781	1885	1610						
Queue Service Time (g s), s				6.0	18.8	9.2	5.4	38.2		25.9	20.5		4.0	10.3	7.0						
Cycle Queue Clearance Time (g c), s				6.0	18.8	9.2	5.4	38.2		25.9	20.5		4.0	10.3	7.0						
Green Ratio (g/C)				0.44	0.37	0.37	0.43	0.37		0.25	0.25		0.11	0.11	0.11						
Capacity (c), veh/h				219	687	596	380	689		444	422		197	208	178						
Volume-to-Capacity Ratio (X)				0.612	0.520	0.282	0.331	0.889		0.866	0.719		0.317	0.774	0.535						
Back of Queue (Q), ft/ln (95 th percentile)																					
Back of Queue (Q), veh/ln (95 th percentile)				4.7	13.3	6.4	4.2	26.4		18.5	13.8		3.3	9.2	5.3						
Queue Storage Ratio (RQ) (95 th percentile)				0.84	0.34	0.46	0.71	0.67		1.36	0.37		0.57	0.23	0.89						
Uniform Delay (d 1), s/veh				28.6	30.3	27.3	23.6	36.9		44.6	42.6		51.0	53.8	52.3						
Incremental Delay (d 2), s/veh				3.9	1.3	0.5	0.7	11.2		12.1	4.2		1.3	8.4	3.5						
Initial Queue Delay (d 3), s/veh				0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0						
Control Delay (d), s/veh				32.6	31.6	27.9	24.3	48.2		56.6	46.7		52.3	62.2	55.8						
Level of Service (LOS)				C	C	C	C	D		E	D		D	E	E						
Approach Delay, s/veh / LOS				30.9		C		44.1		D		52.2		D		58.4		E			
Intersection Delay, s/veh / LOS				44.7						D											
Multimodal Results				EB			WB			NB			SB								
Pedestrian LOS Score / LOS				1.93			B			2.17			B			1.96			B		
Bicycle LOS Score / LOS				1.58			B			1.71			B			1.62			B		

HCS7 Signalized Intersection Results Summary

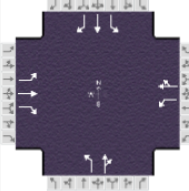

General Information				Intersection Information																														
Agency	Diane B. Zimmerman Traffic			Duration, h	0.250																													
Analyst	DBZ	Analysis Date	Jul 23, 2020	Area Type	Other																													
Jurisdiction		Time Period	PM Peak	PHF	0.88																													
Urban Street	Herr Lane	Analysis Year	2019	Analysis Period	1> 4:00																													
Intersection	Brownsboror Road	File Name	PM Herr 19.xus																															
Project Description	Providence Point																																	
Demand Information				EB			WB			NB			SB																					
Approach Movement		L	T	R	L	T	R	L	T	R	L	T	R																					
Demand (v), veh/h		193	517	231	112	251	45	184	214	113	80	203	113																					
Signal Information																																		
Cycle, s	124.8	Reference Phase	2																															
Offset, s	0	Reference Point	End																															
Uncoordinated	Yes	Simult. Gap E/W	On	Green	7.7	4.3	42.3	27.7	17.6	0.0																								
Force Mode	Fixed	Simult. Gap N/S	Off	Yellow	3.5	0.0	3.6	3.6	3.6	0.0																								
				Red	3.0	0.0	2.5	2.7	2.7	0.0																								
Timer Results				EBL			EBT			WBL			WBT			NBL			NBT			SBL			SBT									
Assigned Phase		5	2	1	6				4																									
Case Number		1.1	3.0	1.1	4.0				10.0																									
Phase Duration, s		18.5	52.7	14.2	48.4				34.0																									
Change Period, (Y+R c), s		6.5	6.1	6.5	6.1				6.3																									
Max Allow Headway (MAH), s		3.1	6.1	3.1	3.1				3.1																									
Queue Clearance Time (g s), s		11.8	37.5	7.7	20.1				26.6																									
Green Extension Time (g e), s		0.1	9.0	0.1	0.6				1.0																									
Phase Call Probability		1.00	1.00	0.99	1.00				1.00																									
Max Out Probability		0.96	0.02	0.01	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	7	4	14	3	8	18																					
Adjusted Flow Rate (v), veh/h		219	588	218	127	328		209	363		91	231	22																					
Adjusted Saturation Flow Rate (s), veh/h/ln		1795	1885	1560	1810	1827		1781	1780		1810	1870	1572																					
Queue Service Time (g s), s		9.8	35.5	12.8	5.7	18.1		12.9	24.6		5.7	15.0	1.5																					
Cycle Queue Clearance Time (g c), s		9.8	35.5	12.8	5.7	18.1		12.9	24.6		5.7	15.0	1.5																					
Green Ratio (g/C)		0.44	0.37	0.37	0.40	0.34		0.23	0.23		0.15	0.15	0.15																					
Capacity (c), veh/h		437	704	583	231	620		396	410		255	278	222																					
Volume-to-Capacity Ratio (X)		0.502	0.834	0.374	0.550	0.530		0.528	0.884		0.357	0.828	0.097																					
Back of Queue (Q), ft/ln (50 th percentile)		104.8	429.1	125.8	61.8	203.2		145.1	296.3		64.6	181.8	15.1																					
Back of Queue (Q), veh/ln (50 th percentile)		4.2	17.0	4.9	2.5	8.0		5.7	11.8		2.6	7.2	0.6																					
Queue Storage Ratio (RQ) (50 th percentile)		0.70	0.43	0.36	0.41	0.20		0.41	0.30		0.43	0.18	0.10																					
Uniform Delay (d 1), s/veh		24.4	35.7	28.6	29.4	33.3		42.9	46.5		48.6	52.2	46.8																					
Incremental Delay (d 2), s/veh		0.3	5.5	0.9	0.8	0.3		0.4	8.7		0.3	2.4	0.1																					
Initial Queue Delay (d 3), s/veh		0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0																					
Control Delay (d), s/veh		24.7	41.2	29.4	30.1	33.6		43.3	55.3		48.9	54.6	46.9																					
Level of Service (LOS)		C	D	C	C	C		D	E		D	D	D																					
Approach Delay, s/veh / LOS		35.2		D	32.6		C	50.9		D	52.6		D																					
Intersection Delay, s/veh / LOS		40.9						D																										
Multimodal Results				EB			WB			NB			SB																					
Pedestrian LOS Score / LOS		1.94		B	2.25		B	1.96		B	2.21		B																					
Bicycle LOS Score / LOS		2.18		B	1.24		A	1.43		A	1.05		A																					

HCS7 Signalized Intersection Results Summary

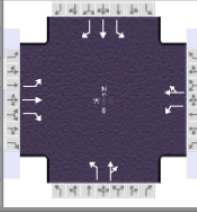
General Information				Intersection Information																							
Agency	Diane B. Zimmerman Traffic			Duration, h	0.250																						
Analyst	DBZ	Analysis Date	Oct 30, 2020	Area Type	Other																						
Jurisdiction		Time Period	PM Peak	PHF	0.88																						
Urban Street	Herr Lane	Analysis Year	2025 Build	Analysis Period	1> 4:00																						
Intersection	Brownsboror Road	File Name	PM Herr 25 B.xus																								
Project Description	Providence Point																										
Demand Information				EB			WB			NB			SB														
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R												
Demand (v), veh/h				233	564	341	129	268	46	229	237	125	82	235	125												
Signal Information																											
Cycle, s	161.9	Reference Phase	2																								
Offset, s	0	Reference Point	End																								
Uncoordinated	Yes	Simult. Gap E/W	On	Green	10.3	4.7	58.4	38.3	25.1	0.0																	
Force Mode	Fixed	Simult. Gap N/S	Off	Yellow	3.5	0.0	3.6	3.6	3.6	0.0																	
				Red	3.0	0.0	2.5	2.7	2.7	0.0																	
Timer Results				EBL			EBT			WBL			WBT			NBL			NBT			SBL			SBT		
Assigned Phase				5	2	12	1	6	16	7	4	14	3	8	18												
Case Number				1.1	3.0	1.1	4.0	10.0	9.0																		
Phase Duration, s				21.5	69.2	16.8	64.5	44.6	31.4																		
Change Period, (Y+R c), s				6.5	6.1	6.5	6.1	6.3	6.3																		
Max Allow Headway (MAH), s				3.1	6.1	3.1	3.1	3.1	3.1																		
Queue Clearance Time (g s), s				17.0	52.9	10.2	26.4	37.8	24.6																		
Green Extension Time (g e), s				0.0	10.2	0.1	0.7	0.4	0.4																		
Phase Call Probability				1.00	1.00	1.00	1.00	1.00	1.00																		
Max Out Probability				1.00	0.21	0.15	0.00	1.00	0.19																		
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	7	4	14	3	8	18												
Adjusted Flow Rate (v), veh/h				265	641	343	147	349		260	402		93	267	35												
Adjusted Saturation Flow Rate (s), veh/h/ln				1795	1885	1560	1810	1829		1781	1779		1810	1870	1572												
Queue Service Time (g s), s				15.0	50.9	27.9	8.2	24.4		21.2	35.8		7.4	22.6	3.1												
Cycle Queue Clearance Time (g c), s				15.0	50.9	27.9	8.2	24.4		21.2	35.8		7.4	22.6	3.1												
Green Ratio (g/C)				0.45	0.39	0.39	0.42	0.36		0.24	0.24		0.16	0.16	0.16												
Capacity (c), veh/h				429	735	608	210	660		421	432		280	301	243												
Volume-to-Capacity Ratio (X)				0.617	0.872	0.565	0.698	0.529		0.618	0.932		0.333	0.887	0.145												
Back of Queue (Q), ft/ln (50 th percentile)				173.3	644.9	284.1	96	282		246.9	481.7		86.3	313.3	32.4												
Back of Queue (Q), veh/ln (50 th percentile)				6.9	25.6	11.0	3.8	11.1		9.7	19.1		3.5	12.3	1.3												
Queue Storage Ratio (RQ) (50 th percentile)				1.16	0.64	0.81	0.64	0.28		0.71	0.48		0.58	0.31	0.22												
Uniform Delay (d 1), s/veh				31.1	45.7	38.7	38.0	40.9		55.3	60.0		61.0	67.0	59.2												
Incremental Delay (d 2), s/veh				2.0	9.5	1.8	3.6	0.2		1.7	25.2		0.3	18.4	0.1												
Initial Queue Delay (d 3), s/veh				0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0												
Control Delay (d), s/veh				33.1	55.2	40.4	41.6	41.1		57.0	85.3		61.3	85.4	59.3												
Level of Service (LOS)				C	E	D	D	D		E	F		E	F	E												
Approach Delay, s/veh / LOS				46.5		D	41.3		D	74.2		E	77.4		E												
Intersection Delay, s/veh / LOS				56.5						E																	
Multimodal Results				EB			WB			NB			SB														
Pedestrian LOS Score / LOS				1.95		B	2.26		B	1.97		B	2.22		B												
Bicycle LOS Score / LOS				2.55		C	1.31		A	1.58		B	1.14		A												

HCS Signalized Intersection Results Summary																
General Information						Intersection Information										
Agency	Diane B. Zimmerman Traffic					Duration, h	0.250									
Analyst	DBZ	Analysis Date	Jun 20, 2022			Area Type	Other									
Jurisdiction		Time Period	PM Peak			PHF	0.88									
Urban Street	Herr Lane		Analysis Year	2025 Build		Analysis Period	1> 4:00									
Intersection	Brownsboror Road		File Name	PM Herr 25 B.xus												
Project Description						Bull Run Townhomes										
Demand Information				EB			WB			NB			SB			
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R	
Demand (v), veh/h				233	564	351	132	268	46	234	241	127	82	242	125	
Signal Information																
Cycle, s	166.6	Reference Phase	2													
Offset, s	0	Reference Point	End													
Uncoordinated	Yes	Simult. Gap E/W	On	Green	10.7	4.3	60.3	39.7	26.4	0.0						
Force Mode	Fixed	Simult. Gap N/S	Off	Yellow	3.5	0.0	3.6	3.6	3.6	0.0						
				Red	3.0	0.0	2.5	2.7	2.7	0.0						
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT					
Assigned Phase				5	2	1	6		4		8					
Case Number				1.1	3.0	1.1	4.0		10.0		9.0					
Phase Duration, s				21.5	70.7	17.2	66.4		46.0		32.7					
Change Period, (Y+R _c), s				6.5	6.1	6.5	6.1		6.3		6.3					
Max Allow Headway (MAH), s				3.1	6.1	3.1	3.1		3.1		3.1					
Queue Clearance Time (g _s), s				17.5	54.5	10.6	27.1		39.6		26.0					
Green Extension Time (g _e), s				0.0	10.0	0.1	0.7		0.1		0.4					
Phase Call Probability				1.00	1.00	1.00	1.00		1.00		1.00					
Max Out Probability				1.00	0.25	0.24	0.00		1.00		0.25					
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	7	4	14	3	8	18	
Adjusted Flow Rate (v), veh/h				265	641	355	150	349		266	409		93	275	35	
Adjusted Saturation Flow Rate (s), veh/h/ln				1795	1885	1560	1810	1829		1781	1779		1810	1870	1572	
Queue Service Time (g _s), s				15.5	52.5	30.0	8.6	25.1		22.3	37.6		7.6	24.0	3.2	
Cycle Queue Clearance Time (g _c), s				15.5	52.5	30.0	8.6	25.1		22.3	37.6		7.6	24.0	3.2	
Green Ratio (g/C)				0.46	0.39	0.39	0.43	0.36		0.24	0.24		0.16	0.16	0.16	
Capacity (c), veh/h				434	731	605	208	662		424	435		287	308	249	
Volume-to-Capacity Ratio (X)				0.611	0.877	0.586	0.721	0.527		0.627	0.941		0.325	0.894	0.141	
Back of Queue (Q), ft/ln (50 th percentile)																
Back of Queue (Q), veh/ln (50 th percentile)				7.0	26.5	11.9	4.1	11.4		10.3	20.3		3.5	13.2	1.3	
Queue Storage Ratio (RQ) (50 th percentile)				1.18	0.67	0.88	0.69	0.29		0.75	0.51		0.59	0.33	0.22	
Uniform Delay (d ₁), s/veh				31.2	47.3	40.4	39.2	41.9		56.8	61.8		62.2	68.7	60.3	
Incremental Delay (d ₂), s/veh				1.8	10.2	1.9	5.3	0.2		2.1	28.2		0.2	19.8	0.1	
Initial Queue Delay (d ₃), s/veh				0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Control Delay (d), s/veh				33.0	57.5	42.3	44.4	42.1		58.9	90.0		62.4	88.5	60.4	
Level of Service (LOS)				C	E	D	D	D		E	F		E	F	E	
Approach Delay, s/veh / LOS				48.1		D	42.8	D		77.8	E		80.0	F		
Intersection Delay, s/veh / LOS				58.8						E						
Multimodal Results				EB			WB			NB			SB			
Pedestrian LOS Score / LOS				1.95	B	2.26	B	1.97	B	2.22	B					
Bicycle LOS Score / LOS				2.57	C	1.31	A	1.60	B	1.15	A					

HCS7 Signalized Intersection Results Summary

HCS7 Signalized Intersection Results Summary																
General Information						Intersection Information										
Agency	Diane B. Zimmerman Traffic					Duration, h	0.250									
Analyst	DBZ	Analysis Date	Oct 30, 2020			Area Type	Other									
Jurisdiction		Time Period	PM Peak			PHF	0.88									
Urban Street	Herr Lane	Analysis Year	2035 Build			Analysis Period	1> 4:00									
Intersection	Brownsbor Road	File Name	PM Herr 35 B2.xus													
Project Description	Providence Point															
Demand Information				EB			WB			NB		SB				
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h	245	593	356	135	282	48	239	248	131	86	246	131				
Signal Information																
Cycle, s	173.7	Reference Phase	2	Green	11.2	3.8	62.6	42.9	28.1	0.0	1	2	3	4		
Offset, s	0	Reference Point	End	Yellow	3.5	0.0	3.6	3.6	3.6	0.0	5	6	7	8		
Uncoordinated	Yes	Simult. Gap E/W	On	Red	3.0	0.0	2.5	2.7	2.7	0.0						
Force Mode	Fixed	Simult. Gap N/S	Off													
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT					
Assigned Phase	5		2		1		6		4		8					
Case Number	1.1		3.0		1.1		4.0		10.0		9.0					
Phase Duration, s	21.5		72.6		17.7		68.7		49.2		34.4					
Change Period, (Y+R c), s	6.5		6.1		6.5		6.1		6.3		6.3					
Max Allow Headway (MAH), s	3.1		6.1		3.1		3.1		3.1		3.1					
Queue Clearance Time (g s), s	17.0		61.1		11.1		29.9		42.3		27.4					
Green Extension Time (g e), s	0.0		5.4		0.1		0.7		0.5		0.7					
Phase Call Probability	1.00		1.00		1.00		1.00		1.00		1.00					
Max Out Probability	1.00		0.83		0.40		0.00		1.00		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	7	4	14	3	8	18				
Adjusted Flow Rate (v), veh/h	278	674	360	153	367		272	422		98	280	42				
Adjusted Saturation Flow Rate (s), veh/h/ln	1795	1885	1560	1810	1829		1781	1779		1810	1870	1572				
Queue Service Time (g s), s	15.0	59.1	32.2	9.1	27.9		23.5	40.3		8.3	25.4	4.0				
Cycle Queue Clearance Time (g c), s	15.0	59.1	32.2	9.1	27.9		23.5	40.3		8.3	25.4	4.0				
Green Ratio (g/C)	0.45	0.39	0.39	0.44	0.36		0.25	0.25		0.17	0.17	0.17				
Capacity (c), veh/h	401	732	597	192	659		439	449		292	313	254				
Volume-to-Capacity Ratio (X)	0.695	0.921	0.604	0.799	0.557		0.618	0.939		0.334	0.893	0.165				
Back of Queue (Q), ft/ln (95 th percentile)	172	1014.6	484.9	206	474.3		412.7	730.9		174.5	488.6	74.6				
Back of Queue (Q), veh/ln (95 th percentile)	6.8	40.3	18.8	8.2	18.7		16.2	29.0		7.0	19.2	2.9				
Queue Storage Ratio (RQ) (95 th percentile)	1.15	1.01	1.39	1.37	0.47		1.18	0.73		1.16	0.49	0.50				
Uniform Delay (d 1), s/veh	37.8	51.0	43.1	41.4	44.5		58.2	63.6		64.5	71.3	62.7				
Incremental Delay (d 2), s/veh	4.3	16.8	2.5	12.4	0.3		1.6	25.7		0.2	12.4	0.1				
Initial Queue Delay (d 3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0				
Control Delay (d), s/veh	42.2	67.8	45.5	53.8	44.7		59.8	89.3		64.8	83.7	62.9				
Level of Service (LOS)	D	E	D	D	D		E	F		E	F	E				
Approach Delay, s/veh / LOS	56.3			E			47.4			D			77.7		E	
Intersection Delay, s/veh / LOS	62.7						E									
Multimodal Results				EB			WB			NB		SB				
Pedestrian LOS Score / LOS	1.95		B		2.27		B		1.97		B		2.23		B	
Bicycle LOS Score / LOS	2.65		C		1.35		A		1.63		B		1.18		A	

HCS Signalized Intersection Results Summary

General Information				Intersection Information																				
Agency	Diane B. Zimmerman Traffic			Duration, h	0.250																			
Analyst	DBZ	Analysis Date	Jun 20, 2022	Area Type	Other																			
Jurisdiction		Time Period	PM Peak	PHF	0.88																			
Urban Street	Herr Lane	Analysis Year	2035 Build	Analysis Period	1> 4:00																			
Intersection	Brownsboror Road	File Name	PM Herr 35 B.xus																					
Project Description	Bull Run Townhomes																							
Demand Information				EB			WB			NB			SB											
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R												
Demand (v), veh/h	245	593	366	138	282	48	244	252	133	86	253	131												
Signal Information																								
Cycle, s	171.9	Reference Phase	2																					
Offset, s	0	Reference Point	End																					
Uncoordinated	Yes	Simult. Gap E/W	On	Green	10.0	1.1	63.9	43.3	28.4	0.0														
Force Mode	Fixed	Simult. Gap N/S	Off	Yellow	3.5	0.0	3.6	3.6	3.6	0.0														
				Red	3.0	0.0	2.5	2.7	2.7	0.0														
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT													
Assigned Phase				5	2	1	6		4		8													
Case Number				1.1	3.0	1.1	4.0		10.0		9.0													
Phase Duration, s				16.5	70.0	17.6	71.1		49.6		34.7													
Change Period, (Y+R _c), s				6.5	6.1	6.5	6.1		6.3		6.3													
Max Allow Headway (MAH), s				3.1	6.1	3.1	3.1		3.1		3.1													
Queue Clearance Time (g _s), s				12.0	61.5	11.0	28.8		42.5		27.9													
Green Extension Time (g _e), s				0.0	2.4	0.1	0.7		0.8		0.6													
Phase Call Probability				1.00	1.00	1.00	1.00		1.00		1.00													
Max Out Probability				1.00	1.00	0.37	0.00		0.53		0.04													
Movement Group Results				EB			WB			NB			SB											
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R												
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18												
Adjusted Flow Rate (v), veh/h	278	674	372	157	367		277	428		98	288	42												
Adjusted Saturation Flow Rate (s), veh/h/ln	1795	1885	1560	1810	1829		1781	1779		1810	1870	1572												
Queue Service Time (g _s), s	10.0	59.5	33.7	9.0	26.8		23.7	40.5		8.2	25.9	3.9												
Cycle Queue Clearance Time (g _c), s	10.0	59.5	33.7	9.0	26.8		23.7	40.5		8.2	25.9	3.9												
Green Ratio (g/C)	0.43	0.38	0.38	0.45	0.38		0.26	0.26		0.17	0.17	0.17												
Capacity (c), veh/h	362	712	580	194	692		448	448		299	320	260												
Volume-to-Capacity Ratio (X)	0.770	0.946	0.640	0.809	0.531		0.619	0.957		0.327	0.898	0.162												
Back of Queue (Q), ft/ln (95 th percentile)																								
Back of Queue (Q), veh/ln (95 th percentile)	11.7	41.5	19.7	8.2	18.0		16.3	29.4		6.9	20.1	2.9												
Queue Storage Ratio (RQ) (95 th percentile)	1.96	1.05	1.45	1.37	0.46		1.18	0.74		1.14	0.51	0.49												
Uniform Delay (d ₁), s/veh	46.8	52.2	44.5	40.5	41.6		57.0	62.6		63.3	70.2	61.5												
Incremental Delay (d ₂), s/veh	8.9	21.7	3.3	13.2	0.4		1.3	28.3		0.2	17.5	0.1												
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0												
Control Delay (d), s/veh	55.6	74.0	47.8	53.7	42.0		58.3	90.9		63.5	87.8	61.6												
Level of Service (LOS)	E	E	D	D	D		E	F		E	F	E												
Approach Delay, s/veh / LOS	62.8			E			45.5			D			78.1			E			79.6			E		
Intersection Delay, s/veh / LOS	65.8												E											
Multimodal Results				EB			WB			NB			SB											
Pedestrian LOS Score / LOS	1.95			B			2.26			B			1.97			B								
Bicycle LOS Score / LOS	2.67			C			1.35			A			1.65			B								

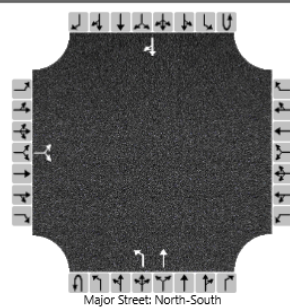
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Access Rd							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	7/23/2020							East/West Street	Access Road							
Analysis Year	2019							North/South Street	Herr Lane							
Time Analyzed	AM Peak							Peak Hour Factor	0.90							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p style="text-align: center;">Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		4		23						23	436				387	12
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type Storage		Left Only								1						
Critical and Follow-up Headways																
Base Critical Headway (sec)		7.1		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)			30							26						
Capacity, c (veh/h)			578							1127						
v/c Ratio			0.05							0.02						
95% Queue Length, Q ₉₅ (veh)			0.2							0.1						
Control Delay (s/veh)			11.6							8.3						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.6								0.4						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Access Rd							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	10/30/2020							East/West Street	Access Road							
Analysis Year	2025							North/South Street	Herr Lane							
Time Analyzed	AM Peak Build							Peak Hour Factor	0.90							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p style="text-align: center;">Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		4		23						23	550				442	12
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type Storage		Left Only											1			
Critical and Follow-up Headways																
Base Critical Headway (sec)		7.1		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)			30							26						
Capacity, c (veh/h)			526							1071						
v/c Ratio			0.06							0.02						
95% Queue Length, Q ₉₅ (veh)			0.2							0.1						
Control Delay (s/veh)			12.3							8.4						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		12.3								0.3						
Approach LOS		B								A						

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	DBZ			Intersection	Herr Lane at Access Rd		
Agency/Co.	Diane B Zimmerman Traffic Engineering			Jurisdiction			
Date Performed	6/20/22			East/West Street	Access Road		
Analysis Year	2025			North/South Street	Herr Lane		
Time Analyzed	AM Peak Build			Peak Hour Factor	0.90		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	Bull Run Townhomes						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		0	0	0		0	1	1	0	0	0	1	0
Configuration			LR							L	T						TR
Volume (veh/h)		4		23						23	570					449	12
Percent Heavy Vehicles (%)		0		0						0							
Proportion Time Blocked																	
Percent Grade (%)		0															
Right Turn Channelized																	
Median Type Storage		Left Only												1			

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		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)			30							26							
Capacity, c (veh/h)			519							1063							
v/c Ratio			0.06							0.02							
95% Queue Length, Q ₉₅ (veh)			0.2							0.1							
Control Delay (s/veh)			12.4							8.5							
Level of Service (LOS)			B							A							
Approach Delay (s/veh)		12.4								0.3							
Approach LOS		B								A							

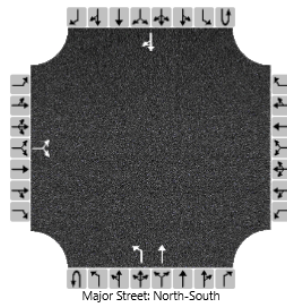
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Access Rd							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	10/30/2020							East/West Street	Access Road							
Analysis Year	2035							North/South Street	Herr Lane							
Time Analyzed	AM Peak Build							Peak Hour Factor	0.90							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p>Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		4		23						23	574				463	12
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type Storage		Left Only											1			
Critical and Follow-up Headways																
Base Critical Headway (sec)		7.1		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)			30							26						
Capacity, c (veh/h)			509							1050						
v/c Ratio			0.06							0.02						
95% Queue Length, Q ₉₅ (veh)			0.2							0.1						
Control Delay (s/veh)			12.5							8.5						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		12.5								0.3						
Approach LOS		B								A						

Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	DBZ			Intersection	Herr Lane at Access Rd		
Agency/Co.	Diane B Zimmerman Traffic Engineering			Jurisdiction			
Date Performed	6/20/22			East/West Street	Access Road		
Analysis Year	2035			North/South Street	Herr Lane		
Time Analyzed	AM Peak Build			Peak Hour Factor	0.90		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	Bull Run Townhomes						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		4		23						23	594					470
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type Storage		Left Only											1			

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		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

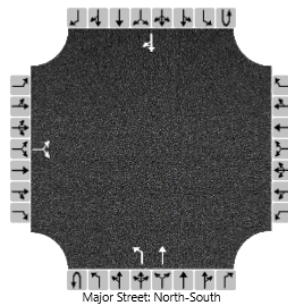
Flow Rate, v (veh/h)			30							26						
Capacity, c (veh/h)			502							1043						
v/c Ratio			0.06							0.02						
95% Queue Length, Q ₉₅ (veh)			0.2							0.1						
Control Delay (s/veh)			12.6							8.5						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		12.6								0.3						
Approach LOS		B								A						

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Access Rd							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	7/23/2020							East/West Street	Access Road							
Analysis Year	2019							North/South Street	Herr Lane							
Time Analyzed	PM Peak							Peak Hour Factor	0.97							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p>Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		16		30						32	468				652	11
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type Storage					Left Only								1			
Critical and Follow-up Headways																
Base Critical Headway (sec)		7.1		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)			47							33						
Capacity, c (veh/h)			403							919						
v/c Ratio			0.12							0.04						
95% Queue Length, Q ₉₅ (veh)			0.4							0.1						
Control Delay (s/veh)			15.1							9.1						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		15.1								0.6						
Approach LOS		C								A						

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	DBZ			Intersection	Herr Lane at Access Rd		
Agency/Co.	Diane B Zimmerman Traffic Engineering			Jurisdiction			
Date Performed	10/30/2020			East/West Street	Access Road		
Analysis Year	2025			North/South Street	Herr Lane		
Time Analyzed	PM Peak Build			Peak Hour Factor	0.97		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	Providence Point						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		16		30						32	541				791	11
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type Storage		Left Only											1			

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		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)			47							33						
Capacity, c (veh/h)			336							813						
v/c Ratio			0.14							0.04						
95% Queue Length, Q ₉₅ (veh)			0.5							0.1						
Control Delay (s/veh)			17.5							9.6						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		17.5								0.5						
Approach LOS		C								A						

Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Two-Way Stop-Control Report																		
General Information								Site Information										
Analyst	DBZ							Intersection	Herr Lane at Access Rd									
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction										
Date Performed	6/20/22							East/West Street	Access Road									
Analysis Year	2025							North/South Street	Herr Lane									
Time Analyzed	PM Peak Build							Peak Hour Factor	0.97									
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25									
Project Description	Bull Run Townhomes																	
Lanes																		
<p style="text-align: center;">Major Street: North-South</p>																		
Vehicle Volumes and Adjustments																		
Approach	Eastbound				Westbound				Northbound				Southbound					
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R		
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6		
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0		
Configuration			LR							L	T					TR		
Volume (veh/h)		16		30						32	552				811	11		
Percent Heavy Vehicles (%)		0		0						0								
Proportion Time Blocked																		
Percent Grade (%)		0																
Right Turn Channelized																		
Median Type Storage		Left Only									1							
Critical and Follow-up Headways																		
Base Critical Headway (sec)		7.1		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)			47							33								
Capacity, c (veh/h)			328							799								
v/c Ratio			0.14							0.04								
95% Queue Length, Q ₉₅ (veh)			0.5							0.1								
Control Delay (s/veh)			17.8							9.7								
Level of Service (LOS)			C							A								
Approach Delay (s/veh)		17.8								0.5								
Approach LOS		C								A								

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Access Rd							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	10/30/2020							East/West Street	Access Road							
Analysis Year	2035							North/South Street	Herr Lane							
Time Analyzed	PM Peak Build							Peak Hour Factor	0.97							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p style="text-align: center;">Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		16		30						32	566				831	11
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type Storage					Left Only								1			
Critical and Follow-up Headways																
Base Critical Headway (sec)		7.1		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)			47							33						
Capacity, c (veh/h)			319							785						
v/c Ratio			0.15							0.04						
95% Queue Length, Q ₉₅ (veh)			0.5							0.1						
Control Delay (s/veh)			18.2							9.8						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		18.2								0.5						
Approach LOS		C														

Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Two-Way Stop-Control Report																	
General Information								Site Information									
Analyst	DBZ							Intersection	Herr Lane at Access Rd								
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction									
Date Performed	6/20/22							East/West Street	Access Road								
Analysis Year	2035							North/South Street	Herr Lane								
Time Analyzed	PM Peak Build							Peak Hour Factor	0.97								
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25								
Project Description	Bull Run Townhomes																
Lanes																	
<p style="text-align: center;">Major Street: North-South</p>																	
Vehicle Volumes and Adjustments																	
Approach	Eastbound				Westbound				Northbound				Southbound				
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		0	0	0		0	1	1	0		0	1	0
Configuration			LR							L	T					TR	
Volume (veh/h)		16		30						32	577				851	11	
Percent Heavy Vehicles (%)		0		0						0							
Proportion Time Blocked																	
Percent Grade (%)		0															
Right Turn Channelized																	
Median Type Storage		Left Only											1				
Critical and Follow-up Headways																	
Base Critical Headway (sec)		7.1		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)			47							33							
Capacity, c (veh/h)			311							771							
v/c Ratio			0.15							0.04							
95% Queue Length, Q ₉₅ (veh)			0.5							0.1							
Control Delay (s/veh)			18.7							9.9							
Level of Service (LOS)			C							A							
Approach Delay (s/veh)		18.7								0.5							
Approach LOS		C								A							

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Ballard							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	7/23/2020							East/West Street	Ballard							
Analysis Year	2019							North/South Street	Herr Lane							
Time Analyzed	AM Peak							Peak Hour Factor	0.89							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p style="text-align: center;">Major Street: North-South</p>																
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	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R					TR		LT	
Volume (veh/h)						112		169			295	232		134	274	
Percent Heavy Vehicles (%)						22		6						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type Storage						Undivided										
Critical and Follow-up Headways																
Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.62		6.26						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.70		3.35						2.21		
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						126		190						151		
Capacity, c (veh/h)						183		592						989		
v/c Ratio						0.69		0.32						0.15		
95% Queue Length, Q ₉₅ (veh)						4.2		1.4						0.5		
Control Delay (s/veh)						59.5		13.9						9.3		
Level of Service (LOS)						F		B						A		
Approach Delay (s/veh)						32.1								4.2		
Approach LOS						D										

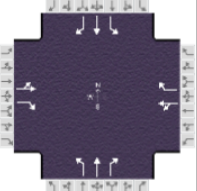
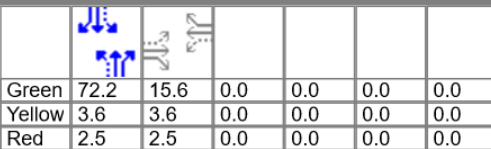

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information											
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250										
Analyst	DBZ	Analysis Date	Oct 30, 2020	Area Type	Other										
Jurisdiction		Time Period	AM Peak	PHF	0.89										
Urban Street	Herr Lane	Analysis Year	2025	Analysis Period	1> 7:00										
Intersection	Ballard/Entrance	File Name	Ballard AM 25 B.xus												
Project Description	Providence Point														
Demand Information				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R			
Demand (v), veh/h	60	0	26	112	0	169	9	345	232	134	301	24			
Signal Information															
Cycle, s	100.0	Reference Phase	2	Green	72.2	15.6	0.0	0.0	0.0	0.0	0.0	0.0			
Offset, s	0	Reference Point	End	Yellow	3.6	3.6	0.0	0.0	0.0	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Red	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On												
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					4		8		2		6				
Case Number					7.0		7.0		5.0		5.0				
Phase Duration, s					21.7		21.7		78.3		78.3				
Change Period, (Y+R c), s					6.1		6.1		6.1		6.1				
Max Allow Headway (MAH), s					5.2		5.2		0.0		0.0				
Queue Clearance Time (g s), s					6.1		13.9								
Green Extension Time (g e), s					2.2		1.6		0.0		0.0				
Phase Call Probability					1.00		1.00								
Max Out Probability					0.02		0.23								
Movement Group Results				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R			
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16			
Adjusted Flow Rate (v), veh/h		67	29		126	190	10	388	261	151	338	27			
Adjusted Saturation Flow Rate (s), veh/h/ln		1440	1610		1193	1535	1059	1841	1610	1004	1870	1610			
Queue Service Time (g s), s		0.0	1.6		5.8	11.9	0.3	7.4	5.4	6.2	6.1	0.5			
Cycle Queue Clearance Time (g c), s		4.1	1.6		10.0	11.9	6.5	7.4	5.4	13.6	6.1	0.5			
Green Ratio (g/C)		0.16	0.16		0.16	0.16	0.72	0.72	0.72	0.72	0.72	0.72			
Capacity (c), veh/h		296	251		258	239	772	1330	1163	723	1351	1163			
Volume-to-Capacity Ratio (X)		0.228	0.117		0.488	0.795	0.013	0.292	0.224	0.208	0.250	0.023			
Back of Queue (Q), ft/ln (95 th percentile)		66.8	28.2		157.6	227	3.2	114.6	71	59.5	94.4	6.2			
Back of Queue (Q), veh/ln (95 th percentile)		2.7	1.1		5.4	8.7	0.1	4.4	2.8	2.4	3.7	0.2			
Queue Storage Ratio (RQ) (95 th percentile)		0.67	0.28		0.90	0.76	0.03	0.00	0.95	0.59	0.00	0.08			
Uniform Delay (d 1), s/veh		37.4	36.3		39.9	40.7	5.8	4.9	4.6	7.3	4.7	3.9			
Incremental Delay (d 2), s/veh		0.6	0.3		2.0	8.9	0.0	0.6	0.4	0.7	0.4	0.0			
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		37.9	36.6		41.9	49.5	5.8	5.4	5.0	7.9	5.1	4.0			
Level of Service (LOS)		D	D		D	D	A	A	A	A	A	A			
Approach Delay, s/veh / LOS	37.5	D		46.5	D		5.3	A			5.9	A			
Intersection Delay, s/veh / LOS	15.7						B								
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.13	B		2.13	B		1.85	B			1.85	B			
Bicycle LOS Score / LOS	0.65	A		1.01	A		1.57	B			1.34	A			

HCS Signalized Intersection Results Summary

General Information				Intersection Information											
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250										
Analyst	DBZ	Analysis Date	Jun 20, 2022	Area Type	Other										
Jurisdiction		Time Period	AM Peak	PHF	0.89										
Urban Street	Herr Lane	Analysis Year	2025	Analysis Period	1> 7:00										
Intersection	Ballard/Entrance	File Name	Ballard AM 25 B.xus												
Project Description	Bull Run Townhomes														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				60	0	26	112	0	169	9	365	232	134	308	24
Signal Information															
Cycle, s	100.0	Reference Phase	2	Green	72.2	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Offset, s	0	Reference Point	End	Yellow	3.6	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Uncoordinated	No	Simult. Gap E/W	On	Red	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On												
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					4		8		2		6				
Case Number					7.0		7.0		5.0		5.0				
Phase Duration, s					21.7		21.7		78.3		78.3				
Change Period, (Y+R c), s					6.1		6.1		6.1		6.1				
Max Allow Headway (MAH), s					5.2		5.2		0.0		0.0				
Queue Clearance Time (g s), s					6.1		13.9								
Green Extension Time (g e), s					2.2		1.6		0.0		0.0				
Phase Call Probability					1.00		1.00								
Max Out Probability					0.02		0.23								
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h				67	29		126	190		10	410	261	151	346	27
Adjusted Saturation Flow Rate (s), veh/h/ln				1440	1610		1193	1535		1051	1841	1610	983	1870	1610
Queue Service Time (g s), s				0.0	1.6		5.8	11.9		0.3	8.0	5.4	6.5	6.3	0.5
Cycle Queue Clearance Time (g c), s				4.1	1.6		10.0	11.9		6.6	8.0	5.4	14.4	6.3	0.5
Green Ratio (g/C)				0.16	0.16		0.16	0.16		0.72	0.72	0.72	0.72	0.72	0.72
Capacity (c), veh/h				296	251		258	239		765	1330	1163	704	1351	1163
Volume-to-Capacity Ratio (X)				0.228	0.117		0.488	0.795		0.013	0.308	0.224	0.214	0.256	0.023
Back of Queue (Q), ft/ln (95 th percentile)															
Back of Queue (Q), veh/ln (95 th percentile)				2.7	1.1		5.4	8.7		0.1	4.8	2.8	2.4	3.8	0.2
Queue Storage Ratio (RQ) (95 th percentile)				0.67	0.28		0.90	0.76		0.03	0.00	0.95	0.61	0.00	0.08
Uniform Delay (d 1), s/veh				37.4	36.3		39.9	40.7		5.9	5.0	4.6	7.5	4.7	3.9
Incremental Delay (d 2), s/veh				0.6	0.3		2.0	8.9		0.0	0.6	0.4	0.7	0.5	0.0
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				37.9	36.6		41.9	49.5		5.9	5.6	5.0	8.2	5.2	4.0
Level of Service (LOS)				D	D		D	D		A	A	A	A	A	A
Approach Delay, s/veh / LOS				37.5	D		46.5	D		5.4	A		6.0	A	
Intersection Delay, s/veh / LOS				15.5					B						
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.13	B		2.13	B		1.85	B		1.85	B	
Bicycle LOS Score / LOS				0.65	A		1.01	A		1.61	B		1.35	A	

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information											
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250										
Analyst	DBZ	Analysis Date	Sep 30, 2020	Area Type	Other										
Jurisdiction		Time Period	AM Peak	PHF	0.89										
Urban Street	Herr Lane	Analysis Year	2035	Analysis Period	1> 7:00										
Intersection	Ballard/Entrance	File Name	Ballard AM 35 B.xus												
Project Description	Providence Point														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				60	0	26	112	0	169	9	362	232	134	319	24
Signal Information															
Cycle, s	100.0	Reference Phase	2	Green	72.2	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Offset, s	0	Reference Point	End	Yellow	3.6	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Red	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On												
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					4		8		2		6				
Case Number					7.0		7.0		5.0		5.0				
Phase Duration, s					21.7		21.7		78.3		78.3				
Change Period, (Y+R c), s					6.1		6.1		6.1		6.1				
Max Allow Headway (MAH), s					5.2		5.2		0.0		0.0				
Queue Clearance Time (g s), s					6.1		13.9								
Green Extension Time (g e), s					2.2		1.6		0.0		0.0				
Phase Call Probability					1.00		1.00								
Max Out Probability					0.02		0.23								
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h				67	29		126	190		10	407	261	151	358	27
Adjusted Saturation Flow Rate (s), veh/h/ln				1440	1610		1193	1535		1039	1841	1610	986	1870	1610
Queue Service Time (g s), s				0.0	1.6		5.8	11.9		0.3	7.9	5.4	6.4	6.6	0.5
Cycle Queue Clearance Time (g c), s				4.1	1.6		10.0	11.9		6.9	7.9	5.4	14.3	6.6	0.5
Green Ratio (g/C)				0.16	0.16		0.16	0.16		0.72	0.72	0.72	0.72	0.72	0.72
Capacity (c), veh/h				296	251		258	239		754	1330	1163	707	1351	1163
Volume-to-Capacity Ratio (X)				0.228	0.117		0.488	0.795		0.013	0.306	0.224	0.213	0.265	0.023
Back of Queue (Q), ft/ln (95 th percentile)				66.8	28.2		157.6	227		3.3	122	71	61	101.6	6.2
Back of Queue (Q), veh/ln (95 th percentile)				2.7	1.1		5.4	8.7		0.1	4.7	2.8	2.4	4.0	0.2
Queue Storage Ratio (RQ) (95 th percentile)				0.67	0.28		0.90	0.76		0.03	0.00	0.95	0.61	0.00	0.08
Uniform Delay (d 1), s/veh				37.4	36.3		39.9	40.7		6.0	4.9	4.6	7.5	4.8	3.9
Incremental Delay (d 2), s/veh				0.6	0.3		2.0	8.9		0.0	0.6	0.4	0.7	0.5	0.0
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				37.9	36.6		41.9	49.5		6.0	5.5	5.0	8.2	5.2	4.0
Level of Service (LOS)				D	D		D	D		A	A	A	A	A	A
Approach Delay, s/veh / LOS				37.5	D		46.5	D		5.4	A		6.0	A	
Intersection Delay, s/veh / LOS				15.5						B					
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.13	B		2.13	B		1.85	B		1.85	B	
Bicycle LOS Score / LOS				0.65	A		1.01	A		1.61	B		1.37	A	

Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Signalized Intersection Results Summary															
General Information							Intersection Information								
Agency	Diane B. Zimmerman Traffic Engineering						Duration, h	0.250							
Analyst	DBZ	Analysis Date	Jun 20, 2022			Area Type	Other								
Jurisdiction		Time Period	AM Peak			PHF	0.89								
Urban Street	Herr Lane		Analysis Year	2035		Analysis Period	1> 7:00								
Intersection	Ballard/Entrance		File Name	Ballard AM 35 B.xus											
Project Description	Bull Run Townhomes														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				60	0	26	112	0	169	9	382	232	134	326	24
Signal Information															
Cycle, s	100.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	On	Green	72.2	15.6	0.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.6	3.6	0.0	0.0	0.0	0.0					
				Red	2.5	2.5	0.0	0.0	0.0	0.0					
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					4		8		2		6				
Case Number					7.0		7.0		5.0		5.0				
Phase Duration, s					21.7		21.7		78.3		78.3				
Change Period, (Y+R c), s					6.1		6.1		6.1		6.1				
Max Allow Headway (MAH), s					5.2		5.2		0.0		0.0				
Queue Clearance Time (g s), s					6.1		13.9								
Green Extension Time (g e), s					2.2		1.6		0.0		0.0				
Phase Call Probability					1.00		1.00								
Max Out Probability					0.02		0.23								
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h				67	29		126	190		10	429	261	151	366	27
Adjusted Saturation Flow Rate (s), veh/h/ln				1440	1610		1193	1535		1032	1841	1610	966	1870	1610
Queue Service Time (g s), s				0.0	1.6		5.8	11.9		0.3	8.4	5.4	6.7	6.8	0.5
Cycle Queue Clearance Time (g c), s				4.1	1.6		10.0	11.9		7.1	8.4	5.4	15.1	6.8	0.5
Green Ratio (g/C)				0.16	0.16		0.16	0.16		0.72	0.72	0.72	0.72	0.72	0.72
Capacity (c), veh/h				296	251		258	239		748	1330	1163	688	1351	1163
Volume-to-Capacity Ratio (X)				0.228	0.117		0.488	0.795		0.014	0.323	0.224	0.219	0.271	0.023
Back of Queue (Q), ft/ln (95 th percentile)															
Back of Queue (Q), veh/ln (95 th percentile)				2.7	1.1		5.4	8.7		0.1	5.1	2.8	2.5	4.1	0.2
Queue Storage Ratio (RQ) (95 th percentile)				0.67	0.28		0.90	0.76		0.03	0.00	0.95	0.63	0.00	0.08
Uniform Delay (d 1), s/veh				37.4	36.3		39.9	40.7		6.0	5.0	4.6	7.8	4.8	3.9
Incremental Delay (d 2), s/veh				0.6	0.3		2.0	8.9		0.0	0.6	0.4	0.7	0.5	0.0
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				37.9	36.6		41.9	49.5		6.1	5.7	5.0	8.5	5.3	4.0
Level of Service (LOS)					D	D		D	D		A	A	A	A	A
Approach Delay, s/veh / LOS				37.5	D		46.5	D		5.4	A		6.1	A	
Intersection Delay, s/veh / LOS				15.4						B					
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.13	B		2.13	B		1.85	B		1.85	B	
Bicycle LOS Score / LOS				0.65	A		1.01	A		1.64	B		1.38	A	

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Ballard							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	7/23/2020							East/West Street	Ballard							
Analysis Year	2019							North/South Street	Herr Lane							
Time Analyzed	PM Peak							Peak Hour Factor	0.88							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p>Major Street: North-South</p>																
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	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R					TR		LT	
Volume (veh/h)						33		23			472	25		23	658	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
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)						38		26						26		
Capacity, c (veh/h)						160		538						1017		
v/c Ratio						0.23		0.05						0.03		
95% Queue Length, Q ₉₅ (veh)						0.9		0.2						0.1		
Control Delay (s/veh)						34.2		12.0						8.6		
Level of Service (LOS)						D		B						A		
Approach Delay (s/veh)						25.1								0.7		
Approach LOS						D										

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information				Diagram							
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250										
Analyst	DBZ	Analysis Date	Oct 30, 2020	Area Type	Other										
Jurisdiction		Time Period	PM Peak	PHF	0.88										
Urban Street	Herr Lane	Analysis Year	2025	Analysis Period	1> 7:00										
Intersection	Ballard/Entrance	File Name	Ballard PM 25 B.xus												
Project Description	Providence Point														
Demand Information				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R			
Demand (v), veh/h	40	0	17	33	0	23	27	505	23	23	749	71			
Signal Information															
Cycle, s	100.0	Reference Phase	2	Green	82.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0			
Offset, s	0	Reference Point	End	Yellow	3.6	3.6	0.0	0.0	0.0	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Red	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On												
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					4		8		2		6				
Case Number					7.0		7.0		5.0		5.0				
Phase Duration, s					11.9		11.9		88.1		88.1				
Change Period, (Y+R c), s					6.1		6.1		6.1		6.1				
Max Allow Headway (MAH), s					5.1		5.1		0.0		0.0				
Queue Clearance Time (g s), s					5.1		4.5								
Green Extension Time (g e), s					0.5		0.5		0.0		0.0				
Phase Call Probability					0.97		0.97								
Max Out Probability					0.00		0.00								
Movement Group Results				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R			
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16			
Adjusted Flow Rate (v), veh/h		45	19		38	26	31	574	26	26	851	81			
Adjusted Saturation Flow Rate (s), veh/h/ln		1440	1610		1440	1610	658	1885	1610	852	1885	1610			
Queue Service Time (g s), s		0.6	1.1		0.0	1.6	1.6	7.9	0.3	0.8	14.8	1.0			
Cycle Queue Clearance Time (g c), s		3.1	1.1		2.5	1.6	16.5	7.9	0.3	8.7	14.8	1.0			
Green Ratio (g/C)		0.06	0.06		0.06	0.06	0.82	0.82	0.82	0.82	0.82	0.82			
Capacity (c), veh/h		156	94		156	94	514	1545	1320	703	1545	1320			
Volume-to-Capacity Ratio (X)		0.291	0.206		0.240	0.278	0.060	0.371	0.020	0.037	0.551	0.061			
Back of Queue (Q), ft/ln (95 th percentile)		51.5	22.1		42.1	30.2	10.1	84.9	2.7	5.8	161.7	8.7			
Back of Queue (Q), veh/ln (95 th percentile)		2.1	0.9		1.7	1.2	0.4	3.4	0.1	0.2	6.4	0.3			
Queue Storage Ratio (RQ) (95 th percentile)		0.52	0.22		0.24	0.10	0.10	0.00	0.04	0.06	0.00	0.12			
Uniform Delay (d 1), s/veh		45.8	44.9		45.5	45.1	5.7	2.3	1.7	3.5	3.0	1.7			
Incremental Delay (d 2), s/veh		1.5	1.5		1.1	2.3	0.2	0.7	0.0	0.1	1.4	0.1			
Initial Queue Delay (d 3), s/veh		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Control Delay (d), s/veh		47.2	46.4		46.6	47.3	5.9	3.0	1.7	3.6	4.4	1.8			
Level of Service (LOS)		D	D		D	D	A	A	A	A	A	A			
Approach Delay, s/veh / LOS	47.0	D		46.9	D		3.1	A		4.1	A				
Intersection Delay, s/veh / LOS	7.0						A								
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.14	B		2.14	B		1.82	B		1.82	B				
Bicycle LOS Score / LOS	0.59	A		0.59	A		1.53	B		2.07	B				

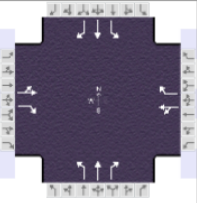
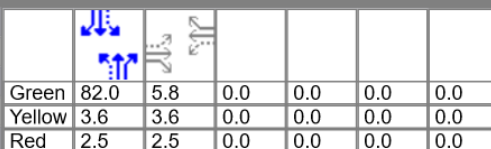

Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Signalized Intersection Results Summary															
General Information						Intersection Information									
Agency	Diane B. Zimmerman Traffic Engineering					Duration, h	0.250								
Analyst	DBZ		Analysis Date	Jun 20, 2022		Area Type	Other								
Jurisdiction			Time Period	PM Peak		PHF	0.88								
Urban Street	Herr Lane		Analysis Year	2025		Analysis Period	1> 7:00								
Intersection	Ballard/Entrance		File Name	Ballard PM 25 B.xus											
Project Description	Bull Run Townhomes														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				40	0	17	33	0	23	27	516	23	23	769	71
Signal Information															
Cycle, s	100.0	Reference Phase	2	Green	82.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Offset, s	0	Reference Point	End	Yellow	3.6	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Uncoordinated	No	Simult. Gap E/W	On	Red	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On												
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					4		8		2		6				
Case Number					7.0		7.0		5.0		5.0				
Phase Duration, s					11.9		11.9		88.1		88.1				
Change Period, (Y+R c), s					6.1		6.1		6.1		6.1				
Max Allow Headway (MAH), s					5.1		5.1		0.0		0.0				
Queue Clearance Time (g s), s					5.1		4.5								
Green Extension Time (g e), s					0.5		0.5		0.0		0.0				
Phase Call Probability					0.97		0.97								
Max Out Probability					0.00		0.00								
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h				45	19		38	26	31	586	26	26	874	81	
Adjusted Saturation Flow Rate (s), veh/h/ln				1440	1610		1440	1610	644	1885	1610	842	1885	1610	
Queue Service Time (g s), s				0.6	1.1		0.0	1.6	1.7	8.1	0.3	0.8	15.6	1.0	
Cycle Queue Clearance Time (g c), s				3.1	1.1		2.5	1.6	17.3	8.1	0.3	9.0	15.6	1.0	
Green Ratio (g/C)				0.06	0.06		0.06	0.06	0.82	0.82	0.82	0.82	0.82	0.82	
Capacity (c), veh/h				156	94		156	94	500	1545	1320	694	1545	1320	
Volume-to-Capacity Ratio (X)				0.291	0.206		0.240	0.278	0.061	0.379	0.020	0.038	0.566	0.061	
Back of Queue (Q), ft/ln (95 th percentile)															
Back of Queue (Q), veh/ln (95 th percentile)				2.1	0.9		1.7	1.2	0.4	3.5	0.1	0.2	6.8	0.3	
Queue Storage Ratio (RQ) (95 th percentile)				0.52	0.22		0.24	0.10	0.11	0.00	0.04	0.06	0.00	0.12	
Uniform Delay (d 1), s/veh				45.8	44.9		45.5	45.1	5.9	2.4	1.7	3.5	3.0	1.7	
Incremental Delay (d 2), s/veh				1.5	1.5		1.1	2.3	0.2	0.7	0.0	0.1	1.5	0.1	
Initial Queue Delay (d 3), s/veh				0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh				47.2	46.4		46.6	47.3	6.2	3.1	1.7	3.6	4.5	1.8	
Level of Service (LOS)				D	D		D	D	A	A	A	A	A	A	
Approach Delay, s/veh / LOS				47.0	D		46.9	D	3.2	A		4.3	A		
Intersection Delay, s/veh / LOS				7.0					A						
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.14	B		2.14	B	1.82	B	1.82	B			
Bicycle LOS Score / LOS				0.59	A		0.59	A	1.55	B	2.11	B			

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information											
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250										
Analyst	DBZ	Analysis Date	Oct 30, 2020	Area Type	Other										
Jurisdiction		Time Period	PM Peak	PHF	0.88										
Urban Street	Herr Lane	Analysis Year	2035	Analysis Period	1> 4:00										
Intersection	Ballard/Entrance	File Name	Ballard PM 35 B.xus												
Project Description	Providence Point														
Demand Information				EB			WB			NB			SB		
Approach Movement		L	T	R	L	T	R	L	T	R	L	T	R		
Demand (v), veh/h		40	0	17	33	0	23	27	530	25	23	788	71		
Signal Information															
Cycle, s	100.0	Reference Phase	2	Green	82.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Offset, s	0	Reference Point	End	Yellow	3.6	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Red	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On												
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					4		8		2		6				
Case Number					7.0		7.0		5.0		5.0				
Phase Duration, s					11.9		11.9		88.1		88.1				
Change Period, (Y+R c), s					6.1		6.1		6.1		6.1				
Max Allow Headway (MAH), s					5.1		5.1		0.0		0.0				
Queue Clearance Time (g s), s					5.1		4.5								
Green Extension Time (g e), s					0.5		0.5		0.0		0.0				
Phase Call Probability					0.97		0.97								
Max Out Probability					0.00		0.00								
Movement Group Results				EB			WB			NB			SB		
Approach Movement		L	T	R	L	T	R	L	T	R	L	T	R		
Assigned Movement		7	4	14	3	8	18	5	2	12	1	6	16		
Adjusted Flow Rate (v), veh/h		45	19		38	26	31	602	28	26	895	81			
Adjusted Saturation Flow Rate (s), veh/h/ln		1440	1610		1440	1610	631	1885	1610	830	1885	1610			
Queue Service Time (g s), s		0.6	1.1		0.0	1.6	1.8	8.5	0.3	0.9	16.3	1.0			
Cycle Queue Clearance Time (g c), s		3.1	1.1		2.5	1.6	18.1	8.5	0.3	9.3	16.3	1.0			
Green Ratio (g/C)		0.06	0.06		0.06	0.06	0.82	0.82	0.82	0.82	0.82	0.82			
Capacity (c), veh/h		156	94		156	94	486	1545	1320	682	1545	1320			
Volume-to-Capacity Ratio (X)		0.291	0.206		0.240	0.278	0.063	0.390	0.022	0.038	0.579	0.061			
Back of Queue (Q), ft/ln (95 th percentile)		51.5	22.1		42.1	30.2	10.8	91.1	3	6.1	178.8	8.7			
Back of Queue (Q), veh/ln (95 th percentile)		2.1	0.9		1.7	1.2	0.4	3.6	0.1	0.2	7.1	0.3			
Queue Storage Ratio (RQ) (95 th percentile)		0.52	0.22		0.24	0.10	0.11	0.00	0.04	0.06	0.00	0.12			
Uniform Delay (d 1), s/veh		45.8	44.9		45.5	45.1	6.2	2.4	1.7	3.6	3.1	1.7			
Incremental Delay (d 2), s/veh		1.5	1.5		1.1	2.3	0.2	0.7	0.0	0.1	1.6	0.1			
Initial Queue Delay (d 3), s/veh		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Control Delay (d), s/veh		47.2	46.4		46.6	47.3	6.5	3.1	1.7	3.7	4.7	1.8			
Level of Service (LOS)		D	D		D	D	A	A	A	A	A	A			
Approach Delay, s/veh / LOS		47.0	D		46.9	D	3.2	A		4.4	A				
Intersection Delay, s/veh / LOS		7.0						A							
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS		2.14	B		2.14	B	1.82	B		1.82	B				
Bicycle LOS Score / LOS		0.59	A		0.59	A	1.58	B		2.14	B				

Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Signalized Intersection Results Summary															
General Information						Intersection Information									
Agency	Diane B. Zimmerman Traffic Engineering					Duration, h	0.250								
Analyst	DBZ	Analysis Date	Jun 20, 2022			Area Type	Other								
Jurisdiction		Time Period	PM Peak			PHF	0.88								
Urban Street	Herr Lane		Analysis Year	2035		Analysis Period	1> 4:00								
Intersection	Ballard/Entrance		File Name	Ballard PM 35 B.xus											
Project Description	Bull Run Townhomes														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				40	0	17	33	0	23	27	541	25	23	808	71
Signal Information															
Cycle, s	100.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	On		Green	82.0	5.8	0.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On		Yellow	3.6	3.6	0.0	0.0	0.0	0.0				
					Red	2.5	2.5	0.0	0.0	0.0	0.0				
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					4		8		2		6				
Case Number					7.0		7.0		5.0		5.0				
Phase Duration, s					11.9		11.9		88.1		88.1				
Change Period, (Y+R c), s					6.1		6.1		6.1		6.1				
Max Allow Headway (MAH), s					5.1		5.1		0.0		0.0				
Queue Clearance Time (g s), s					5.1		4.5								
Green Extension Time (g e), s					0.5		0.5		0.0		0.0				
Phase Call Probability					0.97		0.97								
Max Out Probability					0.00		0.00								
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h				45	19		38	26	31	615	28	26	918	81	
Adjusted Saturation Flow Rate (s), veh/h/ln				1440	1610		1440	1610	618	1885	1610	820	1885	1610	
Queue Service Time (g s), s				0.6	1.1		0.0	1.6	1.8	8.7	0.3	0.9	17.1	1.0	
Cycle Queue Clearance Time (g c), s				3.1	1.1		2.5	1.6	19.0	8.7	0.3	9.6	17.1	1.0	
Green Ratio (g/C)				0.06	0.06		0.06	0.06	0.82	0.82	0.82	0.82	0.82	0.82	
Capacity (c), veh/h				156	94		156	94	473	1545	1320	673	1545	1320	
Volume-to-Capacity Ratio (X)				0.291	0.206		0.240	0.278	0.065	0.398	0.022	0.039	0.594	0.061	
Back of Queue (Q), ft/ln (95 th percentile)															
Back of Queue (Q), veh/ln (95 th percentile)				2.1	0.9		1.7	1.2	0.4	3.7	0.1	0.2	7.5	0.3	
Queue Storage Ratio (RQ) (95 th percentile)				0.52	0.22		0.24	0.10	0.11	0.00	0.04	0.06	0.00	0.12	
Uniform Delay (d 1), s/veh				45.8	44.9		45.5	45.1	6.5	2.4	1.7	3.7	3.2	1.7	
Incremental Delay (d 2), s/veh				1.5	1.5		1.1	2.3	0.3	0.8	0.0	0.1	1.7	0.1	
Initial Queue Delay (d 3), s/veh				0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh				47.2	46.4		46.6	47.3	6.8	3.2	1.7	3.8	4.9	1.8	
Level of Service (LOS)					D	D		D	D	A	A	A	A	A	
Approach Delay, s/veh / LOS				47.0	D		46.9	D	3.3	A		4.6	A		
Intersection Delay, s/veh / LOS				7.1					A						
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.14	B		2.14	B	1.82	B		1.82	B		
Bicycle LOS Score / LOS				0.59	A		0.59	A	1.60	B		2.18	B		

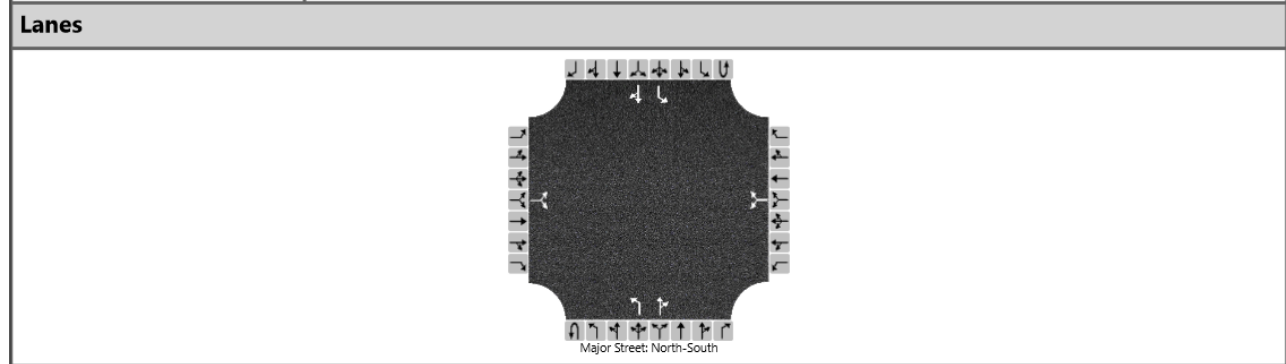
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Wesboro							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	7/23/2020							East/West Street	Wesboro							
Analysis Year	2019							North/South Street	Herr Lane							
Time Analyzed	AM Peak							Peak Hour Factor	0.82							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p>Major Street: North-South</p>																
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	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						84		105			434	82		57	306	
Percent Heavy Vehicles (%)						8		7						33		
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)						6.48		6.27						4.43		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.57		3.36						2.50		
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						230								70		
Capacity, c (veh/h)						386								820		
v/c Ratio						0.60								0.08		
95% Queue Length, Q ₉₅ (veh)						3.7								0.3		
Control Delay (s/veh)						27.2								9.8		
Level of Service (LOS)						D								A		
Approach Delay (s/veh)						27.2								2.4		
Approach LOS						D										

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Wesboro							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	10/30/2020							East/West Street	Wesboro							
Analysis Year	2025							North/South Street	Herr Lane							
Time Analyzed	AM Peak Build							Peak Hour Factor	0.82							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p style="text-align: center;">Major Street: North-South</p>																
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	1	0	0	1	1	0	0	1	1	0
Configuration			LR				LR			L		TR		L		TR
Volume (veh/h)		15		26		84		105		9	482	82		57	357	3
Percent Heavy Vehicles (%)		0		0		8		7		0				33		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Left Only								1							
Critical and Follow-up Headways																
Base Critical Headway (sec)		7.1		6.2		7.1		6.2		4.1				4.1		
Critical Headway (sec)		7.10		6.20		7.18		6.27		4.10				4.43		
Base Follow-Up Headway (sec)		3.5		3.3		3.5		3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50		3.30		3.57		3.36		2.20				2.50		
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)			50				230			11				70		
Capacity, c (veh/h)			325				450			1132				778		
v/c Ratio			0.15				0.51			0.01				0.09		
95% Queue Length, Q ₉₅ (veh)			0.5				2.8			0.0				0.3		
Control Delay (s/veh)			18.1				21.1			8.2				10.1		
Level of Service (LOS)			C				C			A				B		
Approach Delay (s/veh)	18.1				21.1				0.1				1.4			
Approach LOS	C				C											

Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	DBZ			Intersection	Herr Lane at Wesboro		
Agency/Co.	Diane B Zimmerman Traffic Engineering			Jurisdiction			
Date Performed	6/20/22			East/West Street	Wesboro		
Analysis Year	2025			North/South Street	Herr Lane		
Time Analyzed	AM Peak Build			Peak Hour Factor	0.82		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	Bull Run Townhomes						



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound					
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R		
Movement																		
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6		
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0		
Configuration			LR				LR			L		TR		L		TR		
Volume (veh/h)		35		40		84		105		13	482	82		57	357	10		
Percent Heavy Vehicles (%)		0		0		8		7		0				33				
Proportion Time Blocked																		
Percent Grade (%)		0				0												
Right Turn Channelized																		
Median Type Storage		Left Only									1							

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2		7.1		6.2		4.1				4.1		
Critical Headway (sec)		7.10		6.20		7.18		6.27		4.10				4.43		
Base Follow-Up Headway (sec)		3.5		3.3		3.5		3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50		3.30		3.57		3.36		2.20				2.50		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			91				230				16				70				
Capacity, c (veh/h)			314				460				1123				778				
v/c Ratio			0.29				0.50				0.01				0.09				
95% Queue Length, Q ₉₅ (veh)			1.2				2.7				0.0				0.3				
Control Delay (s/veh)			21.1				20.4				8.3				10.1				
Level of Service (LOS)			C				C				A				B				
Approach Delay (s/veh)		21.1				20.4					0.2					1.4			
Approach LOS		C				C					A					A			

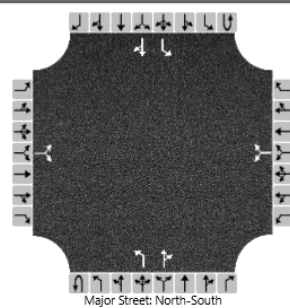
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Wesboro							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	10/30/2020							East/West Street	Wesboro							
Analysis Year	2035							North/South Street	Herr Lane							
Time Analyzed	AM Peak Build							Peak Hour Factor	0.82							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p style="text-align: center;">Major Street: North-South</p>																
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	1	0	0	1	1	0	0	1	1	0
Configuration			LR				LR			L		TR		L		TR
Volume (veh/h)		15		26		84		105		9	506	82		57	374	3
Percent Heavy Vehicles (%)		0		0		8		7		0				33		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Left Only								1							
Critical and Follow-up Headways																
Base Critical Headway (sec)		7.1		6.2		7.1		6.2		4.1				4.1		
Critical Headway (sec)		7.10		6.20		7.18		6.27		4.10				4.43		
Base Follow-Up Headway (sec)		3.5		3.3		3.5		3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50		3.30		3.57		3.36		2.20				2.50		
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)			50				230			11				70		
Capacity, c (veh/h)			308				431			1112				757		
v/c Ratio			0.16				0.54			0.01				0.09		
95% Queue Length, Q ₉₅ (veh)			0.6				3.1			0.0				0.3		
Control Delay (s/veh)			18.9				22.6			8.3				10.2		
Level of Service (LOS)			C				C			A				B		
Approach Delay (s/veh)	18.9				22.6				0.1				1.3			
Approach LOS	C				C											

Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Herr Lane at Wesboro
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/20/22	East/West Street	Wesboro
Analysis Year	2035	North/South Street	Herr Lane
Time Analyzed	AM Peak Build	Peak Hour Factor	0.82
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Bull Run Townhomes		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0	
Configuration			LR				LR			L		TR		L		TR	
Volume (veh/h)		35		40		84		105		13	506	82		57	374	10	
Percent Heavy Vehicles (%)		0		0		8		7		0				33			
Proportion Time Blocked																	
Percent Grade (%)		0				0											
Right Turn Channelized																	
Median Type Storage		Left Only												1			

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2		7.1		6.2		4.1				4.1		
Critical Headway (sec)		7.10		6.20		7.18		6.27		4.10				4.43		
Base Follow-Up Headway (sec)		3.5		3.3		3.5		3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50		3.30		3.57		3.36		2.20				2.50		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			91				230				16				70		
Capacity, c (veh/h)			297				440				1104				757		
v/c Ratio			0.31				0.52				0.01				0.09		
95% Queue Length, Q ₉₅ (veh)			1.3				3.0				0.0				0.3		
Control Delay (s/veh)			22.4				21.8				8.3				10.2		
Level of Service (LOS)			C				C				A				B		
Approach Delay (s/veh)		22.4				21.8				0.2				1.3			
Approach LOS		C				C				A				A			

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Wesboro							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	7/23/2020							East/West Street	Wesboro							
Analysis Year	2019							North/South Street	Herr Lane							
Time Analyzed	PM Peak							Peak Hour Factor	0.94							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p>Major Street: North-South</p>																
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	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						21		25			485	45		64	592	
Percent Heavy Vehicles (%)						0		4						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		6.24						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.34						2.20		
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						49								68		
Capacity, c (veh/h)						350								1018		
v/c Ratio						0.14								0.07		
95% Queue Length, Q ₉₅ (veh)						0.5								0.2		
Control Delay (s/veh)						16.9								8.8		
Level of Service (LOS)						C								A		
Approach Delay (s/veh)						16.9								1.7		
Approach LOS						C										

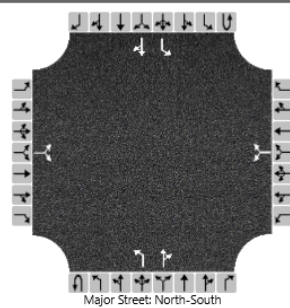
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Herr Lane at Wesboro							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	10/30/2020							East/West Street	Wesboro							
Analysis Year	2025							North/South Street	Herr Lane							
Time Analyzed	PM Peak Build							Peak Hour Factor	0.94							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Providence Point															
Lanes																
<p>Major Street: North-South</p>																
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	1	0	0	1	1	0	0	1	1	0
Configuration			LR				LR			L		TR		L		TR
Volume (veh/h)		10		17		21		25		26	536	45		64	690	8
Percent Heavy Vehicles (%)		0		0		0		4		0				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Left Only								1							
Critical and Follow-up Headways																
Base Critical Headway (sec)		7.1		6.2		7.1		6.2		4.1				4.1		
Critical Headway (sec)		7.10		6.20		7.10		6.24		4.10				4.10		
Base Follow-Up Headway (sec)		3.5		3.3		3.5		3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50		3.30		3.50		3.34		2.20				2.20		
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)			29				49			28				68		
Capacity, c (veh/h)			291				421			874				972		
v/c Ratio			0.10				0.12			0.03				0.07		
95% Queue Length, Q ₉₅ (veh)			0.3				0.4			0.1				0.2		
Control Delay (s/veh)			18.7				14.7			9.3				9.0		
Level of Service (LOS)			C				B			A				A		
Approach Delay (s/veh)	18.7				14.7				0.4				0.8			
Approach LOS	C				B											

Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	DBZ			Intersection	Herr Lane at Wesboro		
Agency/Co.	Diane B Zimmerman Traffic Engineering			Jurisdiction			
Date Performed	6/20/22			East/West Street	Wesboro		
Analysis Year	2025			North/South Street	Herr Lane		
Time Analyzed	PM Peak Build			Peak Hour Factor	0.94		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	Bull Run Townhomes						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	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	1	0	0	1	1	0	0	1	1	0	
Configuration			LR				LR			L		TR		L		TR	
Volume (veh/h)		21		25		21		25		39	536	45		64	690	28	
Percent Heavy Vehicles (%)		0		0		0		4		0				0			
Proportion Time Blocked																	
Percent Grade (%)		0				0											
Right Turn Channelized																	
Median Type Storage		Left Only								1							

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2		7.1		6.2		4.1				4.1		
Critical Headway (sec)		7.10		6.20		7.10		6.24		4.10				4.10		
Base Follow-Up Headway (sec)		3.5		3.3		3.5		3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50		3.30		3.50		3.34		2.20				2.20		

Delay, Queue Length, and Level of Service

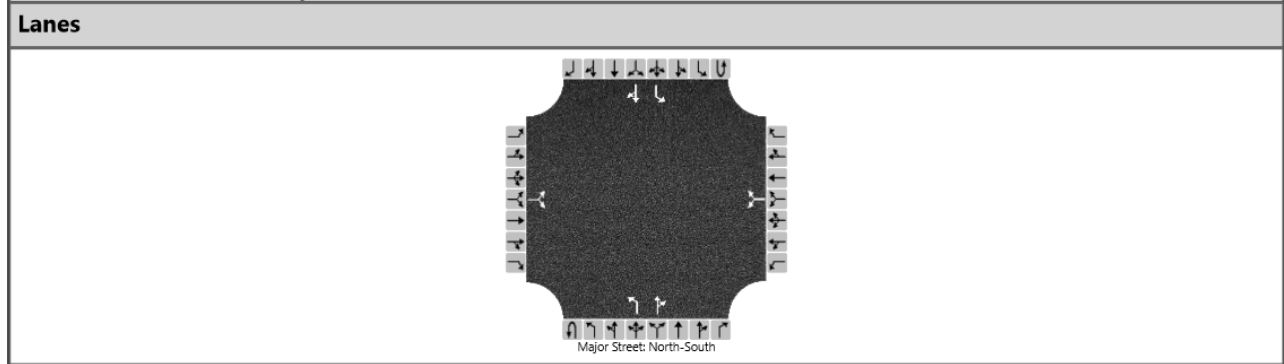
Flow Rate, v (veh/h)			49			49				41				68			
Capacity, c (veh/h)			267			364				858				972			
v/c Ratio			0.18			0.13				0.05				0.07			
95% Queue Length, Q ₉₅ (veh)			0.7			0.5				0.2				0.2			
Control Delay (s/veh)			21.5			16.4				9.4				9.0			
Level of Service (LOS)			C			C				A				A			
Approach Delay (s/veh)		21.5				16.4				0.6				0.7			
Approach LOS		C				C				A				A			

HCS7 Two-Way Stop-Control Report																		
General Information								Site Information										
Analyst	DBZ							Intersection	Herr Lane at Wesboro									
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction										
Date Performed	10/30/2020							East/West Street	Wesboro									
Analysis Year	2035							North/South Street	Herr Lane									
Time Analyzed	PM Peak Build							Peak Hour Factor	0.94									
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25									
Project Description	Providence Point																	
Lanes																		
<p style="text-align: center;">Major Street: North-South</p>																		
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	1	0	0	1	1	0	0	1	1	0		
Configuration			LR				LR			L		TR		L		TR		
Volume (veh/h)		10		17		21		25		26	562	45		64	734	8		
Percent Heavy Vehicles (%)		0		0		0		4		0				0				
Proportion Time Blocked																		
Percent Grade (%)		0				0												
Right Turn Channelized																		
Median Type Storage		Left Only												1				
Critical and Follow-up Headways																		
Base Critical Headway (sec)		7.1		6.2		7.1		6.2		4.1				4.1				
Critical Headway (sec)		7.10		6.20		7.10		6.24		4.10				4.10				
Base Follow-Up Headway (sec)		3.5		3.3		3.5		3.3		2.2				2.2				
Follow-Up Headway (sec)		3.50		3.30		3.50		3.34		2.20				2.20				
Delay, Queue Length, and Level of Service																		
Flow Rate, v (veh/h)			29				49			28				68				
Capacity, c (veh/h)			273				392			839				949				
v/c Ratio			0.11				0.12			0.03				0.07				
95% Queue Length, Q ₉₅ (veh)			0.3				0.4			0.1				0.2				
Control Delay (s/veh)			19.7				15.5			9.4				9.1				
Level of Service (LOS)			C				C			A				A				
Approach Delay (s/veh)		19.7				15.5					0.4				0.7			
Approach LOS		C				C												

Bull Run Townhomes
Herr Lane
Traffic Impact Study

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	DBZ			Intersection	Herr Lane at Wesboro		
Agency/Co.	Diane B Zimmerman Traffic Engineering			Jurisdiction			
Date Performed	6/20/22			East/West Street	Wesboro		
Analysis Year	2035			North/South Street	Herr Lane		
Time Analyzed	PM Peak Build			Peak Hour Factor	0.94		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	Bull Run Townhomes						



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound					
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R		
Movement																		
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6		
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0		
Configuration			LR				LR			L		TR		L		TR		
Volume (veh/h)		21		25		21		25		39	562	45		64	734	28		
Percent Heavy Vehicles (%)		0		0		0		4		0				0				
Proportion Time Blocked																		
Percent Grade (%)		0				0												
Right Turn Channelized																		
Median Type Storage		Left Only									1							

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2		7.1		6.2		4.1				4.1		
Critical Headway (sec)		7.10		6.20		7.10		6.24		4.10				4.10		
Base Follow-Up Headway (sec)		3.5		3.3		3.5		3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50		3.30		3.50		3.34		2.20				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			49				49				41				68		
Capacity, c (veh/h)			250				340				824				949		
v/c Ratio			0.20				0.14				0.05				0.07		
95% Queue Length, Q ₉₅ (veh)			0.7				0.5				0.2				0.2		
Control Delay (s/veh)			22.8				17.4				9.6				9.1		
Level of Service (LOS)			C				C				A				A		
Approach Delay (s/veh)		22.8				17.4				0.6				0.7			
Approach LOS		C				C				A				A			