



MEMORANDUM

To: Mark Witsman, PE
Town Engineer, Town of McCordsville

From: Meg Hunter, Kimley-Horn
Drew Wolfred, PE, Kimley-Horn

Date: May 24, 2024

Subject: Traffic Signal Warrant Analysis and Cost Estimate
Intersection of 600 W and Brookside Parkway / Emerald Boulevard

Introduction

Kimley-Horn and Associates, Inc. (Kimley-Horn) was retained by the Town of McCordsville to perform a traffic signal warrant analysis and provide an Opinion of the Probable Construction Cost for a traffic signal installation at the intersection of 600 W and Brookside Parkway / Emerald Boulevard. It is understood that the intersection to the north, 600 W & 900 N, is planned to be converted into a roundabout. With the removal of the signal, there will likely be fewer gaps in the mainline traffic flow, which could hinder operations at the minor street approaches at the study intersection.

Weekday turning movement counts used in this study were collected between 6:00 AM and 7:00 PM on Wednesday, May 1, 2024. A copy of the traffic counts is included in the **Attachments**.

Traffic Signal Warrant Analysis

The Existing (2024) intersection volumes were compared to the volume thresholds for Warrant 1 (8-Hour), Warrant 2 (4-Hour), and Warrant 3 (Peak Hour) outlined in Section 4C of the Indiana Manual on Uniform Traffic Control Devices (IMUTCD).

Table 1 shows the results for the Warrant 1 (8-Hour) analysis. Per the IMUTCD, to meet the criteria for Warrant 1, approach volumes must exceed Warrant 1A, Warrant 1B, or a combination of Warrant 1A and Warrant 1B for 8 hours. Warrant 1A focuses on the total volume of vehicles at an intersection, while Warrant 1B focuses on the minor approaches' ability to find gaps in mainline traffic. As shown in **Table 1**, Existing (2024) traffic volumes meet the Warrant 1B volume thresholds for 11 hours.

Table 1: Warrant 1 – 8 Hour Warrant

Warrant / Time	Traffic Volume		Meets Warrant?		
	Major Street	Higher-Volume Minor-Leg Approach	Warrant 1A	Warrant 1B	Warrant 1A & 1B
Warrant 1A	500	150	-	-	-
Warrant 1B	750	75	-	-	-
Combination					
Warrant 1A	400	120	-	-	-
Warrant 1B	600	60	-	-	-
6:00 AM	771	68			
7:00 AM	1302	123		X	X
8:00 AM	1300	116		X	
9:00 AM	936	100		X	
10:00 AM	867	109		X	
11:00 AM	865	120		X	X
12:00 PM	1005	86		X	
1:00 PM	1070	79		X	
2:00 PM	1128	71			
3:00 PM	1348	93		X	
4:00 PM	1429	111		X	
5:00 PM	1663	110		X	
6:00 PM	1302	88		X	
Total Number of Hours Warrant is Met			0	11	2
Meets Warrant Criteria?			No	Yes	No

In addition to Warrant 1 (8-Hour), the Existing (2024) volumes were compared to the volume thresholds for Warrant 2 (4-Hour) and Warrant 3 (Peak Hour). To meet Warrant 2 (4-Hours), volumes must exceed the volume threshold for 4 hours. Likewise, to meet Warrant 3 (Peak Hour), volumes must exceed the volume threshold for 1 hour. **Figure 1** shows the results of Warrant 2 (4-Hour) and the Warrant 3 (Peak Hour) analysis. With Existing (2024) volumes, the intersection of 600 W and Brookside Parkway / Emerald Boulevard meets Warrant 2 (4-Hour) volume criteria in 6 hours and meets Warrant 3 (Peak Hour) volume criteria in 2 hours.

Since the intersection of 600 W and Brookside Parkway / Emerald Boulevard meets Warrant 1 (8-Hours), Warrant 2 (4-Hours), and Warrant 3 (Peak Hour), a traffic signal is recommended based on existing traffic volumes.

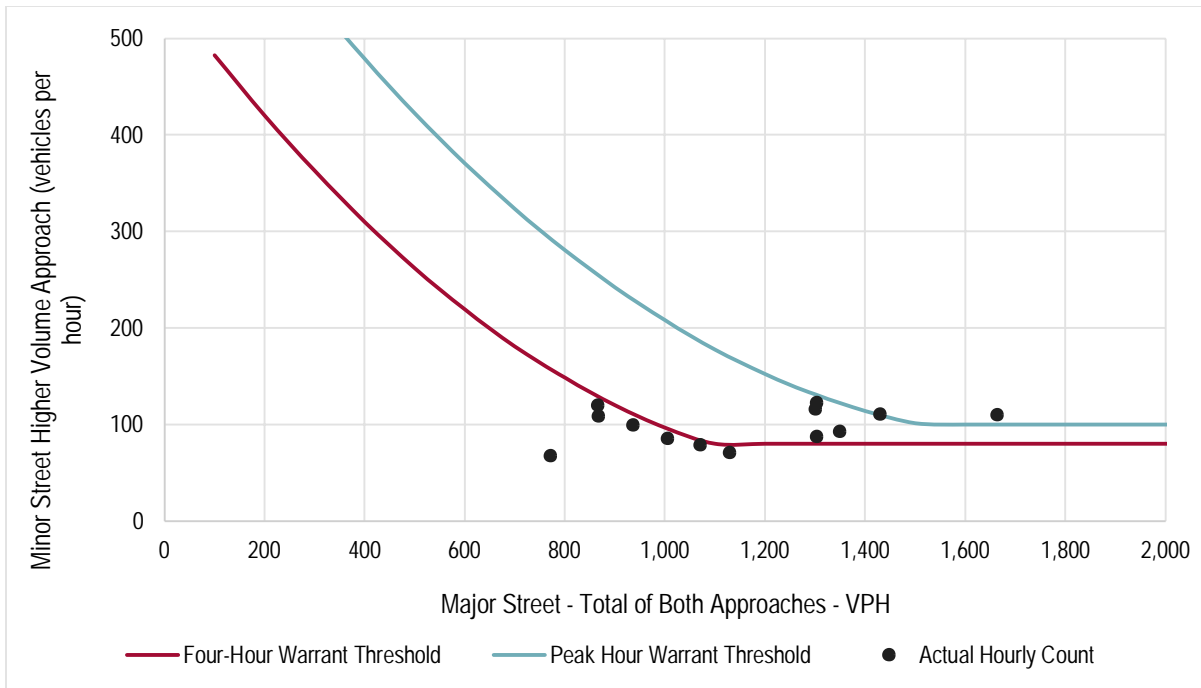


Figure 1: Warrant 2 (4-Hour) and Warrant 3 (Peak Hour)

Opinion of Probable Construction Costs

The following section outlines an Opinion of Probable Construction Cost (“OPCC”) for the installation of a traffic signal and associated improvements at the intersection of 600 W and Brookside Parkway / Emerald Boulevard. **Table 2** outlines the OPCC for the baseline traffic signal & intersection improvements as well as three additional enhancements for the Town to consider.

Figure 2 illustrates a schematic plan of the baseline improvements, and **Figure 3** illustrates the additional intersection enhancements.

Through talks with the Town of McCordsville, it is understood that the Town prefers decorative cantilever signal poles; however, the cost is a concern. Therefore, the baseline OPCC assumes standard span wire signal poles, and the decorative cantilever signal poles are one of the potential enhancement options. Additionally, per guidance from the Town, it was assumed that there is sufficient right-of-way (ROW) and pavement and that no utility relocations are expected.

The OPCC provided herein is based on the following preliminary schematic figures. There are no current design plans for the contemplated improvements nor does Kimley-Horn have any field survey or information on subsurface utility information. This OPCC represents both Kimley-Horn's judgment as design professionals familiar with the construction industry as well as available bid tabulations from similar and recent projects. No escalation is included in this Opinion of Probable Construction Costs. As is the practice industry-wide, Kimley-Horn cannot guarantee that proposals, bids, or actual construction costs will not vary from its OPCC.

Table 2: 600 W & Brookside Pkwy / Emerald Blvd Intersection Improvements – OPCC

Item	Subtotal
Baseline Improvements	
Traffic Signal Installation	\$ 216,000
Pedestrian Accommodations	\$ 57,000
Pavement Markings and Signage	\$ 15,000
<i>Total OPCC for Baseline</i>	<i>\$ 288,000</i>
Additional Enhancement Options	
1 - Crosswalk Safety Improvement (South Leg)	\$ 30,000
2 - New Crosswalk (North Leg)	\$ 40,000
3 - Decorated Signal Poles (Cantilever)	\$ 202,000

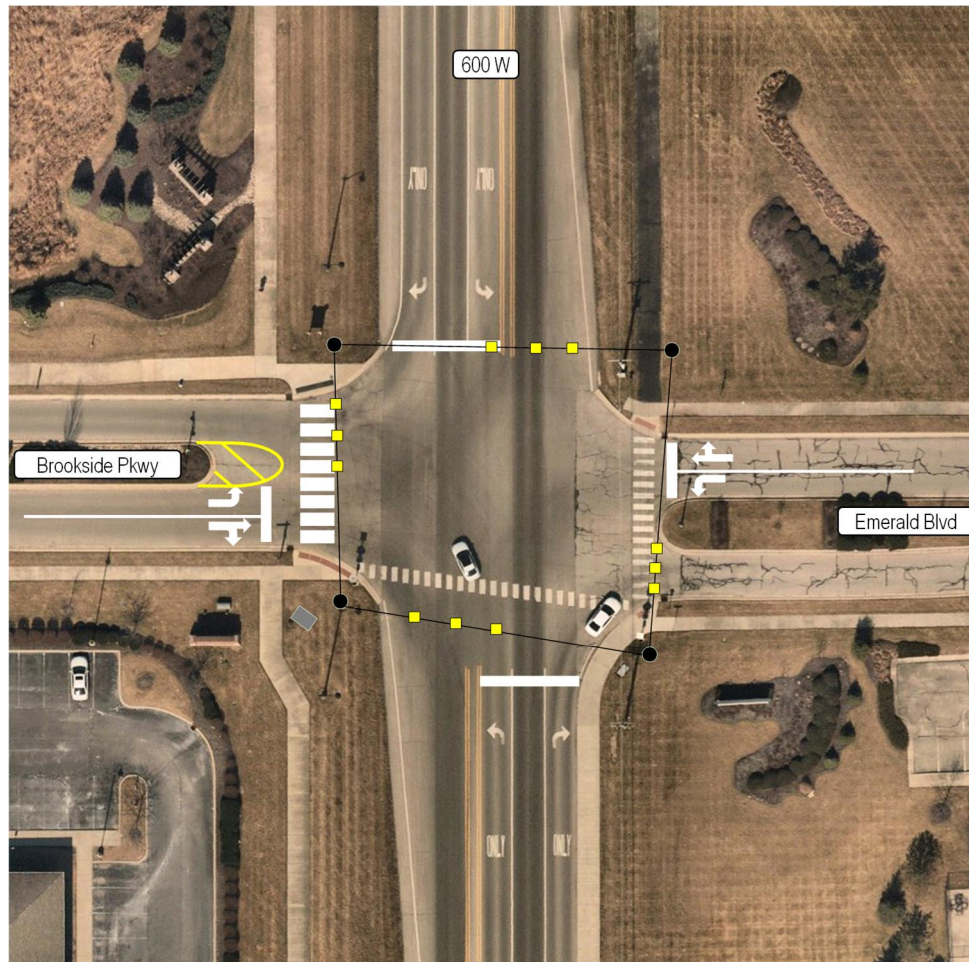


Figure 2: Schematic of the Baseline Improvements

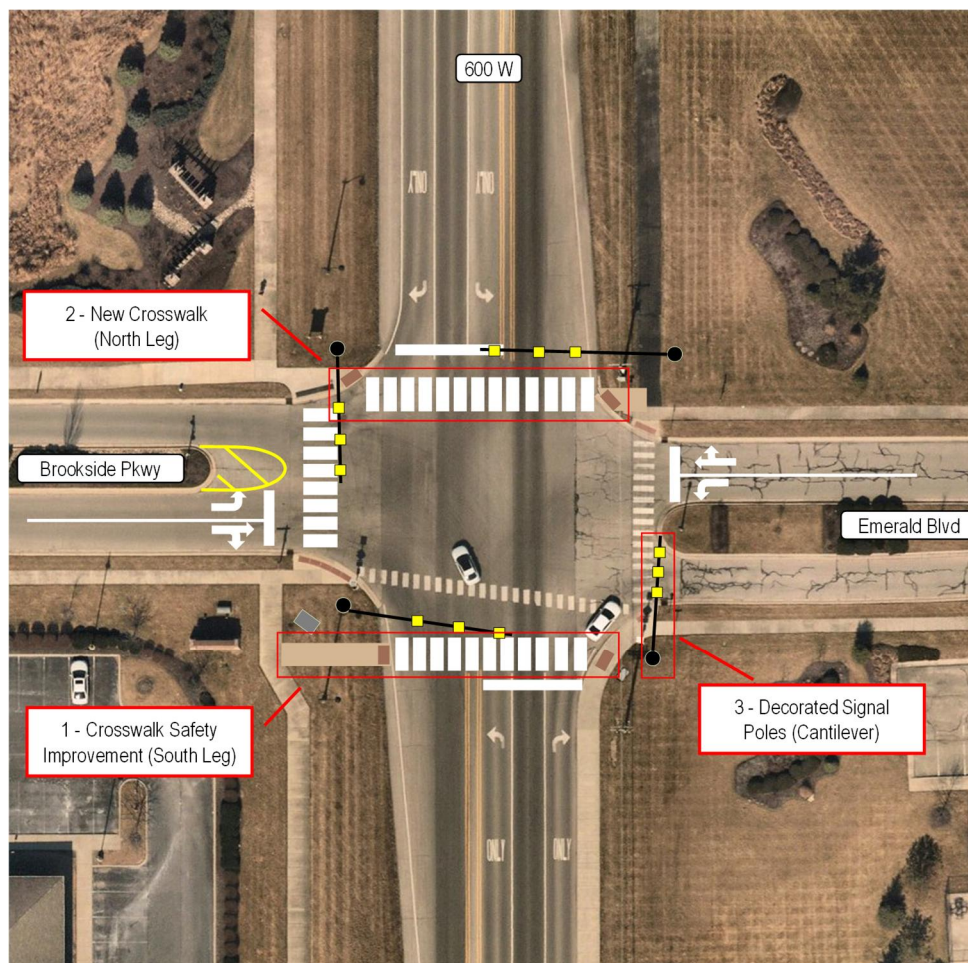


Figure 3: Schematic of the Enhancement Options

Note: The schematic plans shown herein are for information only and do not illustrate all elements associated with the intersection improvements such as signal controller cabinet, conduits, detectors, power connection, etc.

Attachments

Existing (2024) Traffic Counts

Brookside Pkwy / 600 W - TMC

Wed May 1, 2024

Full Length (6 AM-7 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1177861, Location: 39.907397, -85.919074



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Emerald Blvd Eastbound							Emerald Blvd Westbound							600 W Northbound							600 W Southbound							
Time	R	T	L	U	App	Ped*		R	T	L	U	App	Ped*		R	T	L	U	App	Ped*		R	T	L	U	App	Ped*	Int	
2024-05-01 6:00AM	0	0	0	0	0	0		0	0	9	0	9	0		0	37	4	0	41	0		4	88	0	0	92	0		142
6:15AM	6	1	5	0	12	0		2	0	7	0	9	0		4	55	3	0	62	0		5	115	1	0	121	0		204
6:30AM	14	0	11	0	25	0		4	0	12	0	16	0		2	96	4	0	102	0		4	120	1	0	125	0		268
6:45AM	18	0	13	0	31	0		3	1	13	0	17	0		1	88	5	0	94	0		2	132	0	0	134	0		276
Hourly Total	38	1	29	0	68	0		9	1	41	0	51	0		7	276	16	0	299	0		15	455	2	0	472	0		890
7:00AM	26	1	9	0	36	1		5	0	14	0	19	0		1	88	3	0	92	0		6	173	0	0	179	0		326
7:15AM	36	0	5	0	41	0		4	0	20	0	24	0		5	107	8	0	120	0		6	161	1	0	168	0		353
7:30AM	26	0	2	0	28	0		4	0	11	0	15	0		19	157	23	0	199	0		8	171	0	0	179	0		421
7:45AM	11	0	7	0	18	0		5	1	4	0	10	0		7	157	13	0	177	0		19	166	3	0	188	0		393
Hourly Total	99	1	23	0	123	1		18	1	49	0	68	0		32	509	47	0	588	0		39	671	4	0	714	0		1493
8:00AM	17	2	11	0	30	0		3	1	6	0	10	0		6	153	18	0	177	0		12	143	3	1	159	0		376
8:15AM	17	1	8	0	26	0		6	1	6	0	13	1		5	157	15	0	177	0		6	135	1	0	142	1		358
8:30AM	14	2	18	0	34	0		0	0	5	0	5	0		4	128	16	0	148	0		21	160	2	0	183	0		370
8:45AM	12	1	13	0	26	0		7	3	4	0	14	1		1	128	22	0	151	0		33	129	2	0	164	0		355
Hourly Total	60	6	50	0	116	0		16	5	21	0	42	2		16	566	71	0	653	0		72	567	8	1	648	1		1459
9:00AM	14	0	10	0	24	0		7	0	5	0	12	0		2	81	4	0	87	0		11	107	4	0	122	0		245
9:15AM	18	1	8	0	27	0		3	0	12	0	15	0		4	96	10	0	110	0		8	116	3	0	127	0		279
9:30AM	10	1	10	0	21	0		4	0	3	0	7	0		4	91	16	0	111	0		14	100	2	0	116	0		255
9:45AM	20	0	8	0	28	0		0	0	8	0	8	0		4	104	20	0	128	0		18	115	2	0	135	0		299
Hourly Total	62	2	36	0	100	0		14	0	28	0	42	0		14	372	50	0	436	0		51	438	11	0	500	0		1078
10:00AM	10	1	16	0	27	0		3	1	5	0	9	0		6	79	14	0	99	0		10	82	0	0	92	0		227
10:15AM	11	0	15	0	26	0		2	2	1	0	5	0		11	101	7	1	120	0		5	98	3	0	106	0		257
10:30AM	9	1	9	0	19	0		5	0	8	0	13	0		6	93	12	0	111	0		10	100	3	0	113	0		256
10:45AM	17	2	18	0	37	1		6	0	4	0	10	0		2	101	10	0	113	0		19	94	1	0	114	0		274
Hourly Total	47	4	58	0	109	1		16	3	18	0	37	0		25	374	43	1	443	0		44	374	7	0	425	0		1014
11:00AM	13	1	14	1	29	0		3	1	4	0	8	1		3	111	11	0	125	1		8	101	1	0	110	0		272
11:15AM	13	0	22	0	35	0		0	0	5	0	5	0		7	89	6	0	102	0		10	90	1	0	101	0		243
11:30AM	7	0	9	0	16	0		0	0	3	0	3	0		4	89	11	0	104	0		13	98	1	0	112	0		235
11:45AM	26	3	12	0	41	0		3	0	6	0	9	0		4	87	11	0	102	0		6	102	1	0	109	0		261
Hourly Total	59	4	57	1	121	0		6	1	18	0	25	1		18	376	39	0	433	1		37	391	4	0	432	0		1011
12:00PM	8	1	9	0	18	0		2	0	6	0	8	0		6	127	11	0	144	0		12	92	3	0	107	0		277
12:15PM	11	0	11	0	22	0		4	0	1	0	5	3		2	110	14	0	126	1		15	110	3	0	128	0		281
12:30PM	13	0	9	0	22	1		2	0	12	0	14	2		6	113	6	0	125	0		9	133	2	0	144	0		305
12:45PM	16	0	8	0	24	0		2	0	3	0	5	0		4	110	9	0	123	0		11	96	1	0	108	0		260
Hourly Total	48	1	37	0	86	1		10	0	22	0	32	5		18	460	40	0	518	1		47	431	9	0	487	0		1123
1:00PM	17	0	10	0	27	0		3	0	6	0	9	0		7	109	7	0	123	0		7	139	3	0	149	0		308
1:15PM	12	0	4	0	16	0		1	0	7	0	8	0		6	107	7	0	120	0		5	109	3	0	117	0		261
1:30PM	7	0	7	0	14	0		2	1	0	0	3	0		10	116	20	0	146	0		10	104	3	0	117	0		280
1:45PM	9	3	10	0	22	0		2	0	3	1	6	0		16	132	5	0	153	0		9	132	4	0	145	0		326
Hourly Total	45	3	31	0	79	0		8	1	16	1	26	0		39	464	39	0	542	0		31	484	13	0	528	0		1175
2:00PM	12	0	8	0	20	0		0	0	6	0	6	0		11	116	19	0	146	0		6	103	2	0	111	0		283
2:15PM	10	1	5	0	16	0		4	0	7	0	11	0		9	132	7	0	148	0		9	135	1	0	145	0		320
2:30PM	15	0	3	0	18	0		2	0	1	0	3	0		5	130	10	0	145	0		11	125	2	0	138	0		304
2:45PM	8	1	8	0	17	0		1	0	5	0	6	0		10	143	10	0	163	0		7	123	2	0	132	0		318
Hourly Total	45	2	24	0	71	0		7	0	19	0	26	0		35	521	46	0	602	0		33	486	7	0	526	0		1225
3:00PM	18	4	11	0	33	0		4	1	7	0	12	0		16	178	19	0	213	0		10	111	4	0	125	0		383
3:15PM	11	2	7	0	20	0		3	1	5	0	9	0		9	147	20	0	176	0		12	138	4	0	154	0		359
3:30PM	12	0	9	0	21	0		3	1	6	0	10	0		15	136	14	0	165	0		7	162	2	0	171	0		367
3:45PM	13	0	6	0	19	0		0	1	11	0	12	0		11	165	21	0	197	0		19	124	4	0	147	0		375
Hourly Total	54	6	33	0	93	0		10	4	29	0	43	0		51	626	74	0	751	0		48	535	14	0	597	0		1484
4:00PM	16	0	7	0	23	0		2	0	3	0	5	0		12	142	14	0	168	0		15	133	2	0	150	0		346
4:15PM	12	0	12	0	24	0		3	0	1	0	4	1		13	152	11	0											

Leg Direction	Emerald Blvd Eastbound							Emerald Blvd Westbound							600 W Northbound							600 W Southbound							
Time	R	T	L	U	App	Ped*		R	T	L	U	App	Ped*		R	T	L	U	App	Ped*		R	T	L	U	App	Ped*	Int	
6:30PM	7	0	11	0	18	0		4	1	5	0	10	0		6	134	10	0	150	0		13	132	1	0	146	0	324	
6:45PM	8	0	7	0	15	0		1	1	5	0	7	1		12	117	30	0	159	1		16	91	0	0	107	0	288	
Hourly Total	44	3	41	1	89	1		14	6	24	0	44	1		48	591	74	0	713	1		64	517	8	0	589	0	1435	
Total	751	37	486	2	1276	6		149	26	315	1	491	11		411	6572	689	1	7673	5		612	6586	116	1	7315	1	16755	
% Approach	58.9%	2.9%	38.1%	0.2%	-	-		30.3%	5.3%	64.2%	0.2%	-	-		5.4%	85.7%	9.0%	0%	-	-		8.4%	90.0%	1.6%	0%	-	-	-	
% Total	4.5%	0.2%	2.9%	0%	7.6%	-		0.9%	0.2%	1.9%	0%	2.9%	-		2.5%	39.2%	4.1%	0%	45.8%	-		3.7%	39.3%	0.7%	0%	43.7%	-	-	
Lights	734	37	478	2	1251	-		147	26	315	1	489	-		400	6196	674	0	7270	-		603	6184	115	1	6903	-	15913	
% Lights	97.7%	100%	98.4%	100%	98.0%	-		98.7%	100%	100%	100%	99.6%	-		97.3%	94.3%	97.8%	0%	94.7%	-		98.5%	93.9%	99.1%	100%	94.4%	-	95.0%	
Articulated Trucks	0	0	0	0	0	-		0	0	0	0	0	-		0	54	0	0	54	-		1	73	0	0	74	-	128	
% Articulated Trucks	0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0.8%	0%	0%	0.7%	-		0.2%	1.1%	0%	0%	1.0%	-	0.8%	
Buses and Single-Unit Trucks	17	0	8	0	25	-		2	0	0	0	2	-		11	322	15	1	349	-		8	329	1	0	338	-	714	
% Buses and Single-Unit Trucks	2.3%	0%	1.6%	0%	2.0%	-		1.3%	0%	0%	0%	0.4%	-		2.7%	4.9%	2.2%	100%	4.5%	-		1.3%	5.0%	0.9%	0%	4.6%	-	4.3%	
Pedestrians	-	-	-	-	-	5		-	-	-	-	-	8		-	-	-	-	-	4		-	-	-	-	-	-	1	
% Pedestrians	-	-	-	-	-	83.3%		-	-	-	-	-	72.7%		-	-	-	-	-	80.0%		-	-	-	-	-	-	100%	
Bicycles on Crosswalk	-	-	-	-	-	1		-	-	-	-	-	3		-	-	-	-	-	1		-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	16.7%		-	-	-	-	-	27.3%		-	-	-	-	-	20.0%		-	-	-	-	-	0%		

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Brookside Pkwy / 600 W - TMC

Wed May 1, 2024

Full Length (6 AM-7 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks,
Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1177861, Location: 39.907397, -85.919074



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

