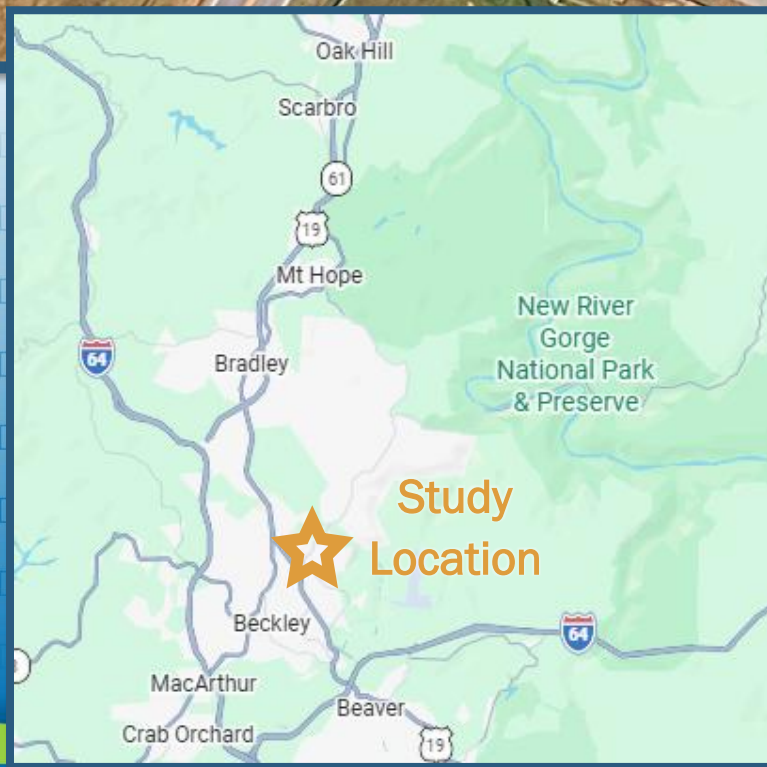


Stanaford Road (WV 41) & Woodcrest Drive Safety Study



Prepared for: Fayette Raleigh Metropolitan Planning Organization
Prepared by: **BURGESS & NIPLE**

June 2026
Draft

Table of Contents

1.0	Introduction	2
2.0	Crash Trends Analysis	3
3.0	Site Visit Observations	4
4.0	Existing Capacity Analysis.....	5
5.0	Intersection Control Warrant Analysis	6
6.0	Turn Lane Warrant Analysis	7
7.0	Potential Countermeasures	7
8.0	Conclusion and Recommendation	10

List of Figures

Figure 1: Study Intersection	2
Figure 2: Crash Frequency by Type	3
Figure 3: Crash Diagram, 2020-2024 Data	3

List of Tables

Table 1: Existing Capacity Analysis for Stanaford Road and Woodcrest Drive	6
Table 2: Summary of MUTCD Signal Warrants.....	7

List of Photos

Photo 1: Deteriorated Pavement on Stanaford Road	4
Photo 2: Deteriorated Pavement on Woodcrest Drive	5
Photo 3: Faded Pavement Markings on Woodcrest Drive	5
Photo 4: Vegetation along curve on Stanaford Road	8
Photo 5: Deteriorated Pavement and Faded Pavement Markings on Woodcrest Drive.....	8
Photo 6: Unsignalized Continuous Green T-Intersection Example.....	9

List of Appendices

Appendix A – Crash Diagram	
Appendix B – Traffic Counts	
Appendix C – Existing Capacity Analysis	
Appendix D – Signal Warrants Report	
Appendix E – Turn Lane Warrants Analysis	

1.0 Introduction

The purpose of this study is to evaluate existing safety and operational conditions and identify potential countermeasures to reduce crash frequency and severity at the intersection of Stanaford Road (WV 41) and Woodcrest Drive in Beckley, West Virginia. The analysis included a peak hour site visit, crash analysis to determine crash trends, existing traffic capacity analysis, signal warrant analysis, turn lane warrant analysis, and identification of potential countermeasures.

The intersection of Stanaford Road and Woodcrest Drive is a T-intersection with stop control on the minor approach (Woodcrest Drive). Stanaford Road (WV 41) is a north-south two-lane, minor arterial road with a posted speed limit of 45 miles per hour. At the intersection with Woodcrest Drive, Stanaford Road is uncontrolled with no turning lanes. Woodcrest Drive is an east-west two-lane road classified as a local road with a posted speed limit of 25 miles per hour. At the intersection with Stanaford Road, Woodcrest Drive includes dedicated left- and right-turn lanes and is equipped with a stop sign. The area surrounding the intersection is a mix of residential and institutional. Woodrow Wilson High School is on Woodcrest Drive just east of the intersection and Beckley ARH Hospital is on Stanaford Road just south of the intersection. There is a reverse curve with an advisory speed of 35 miles per hour to the north of the intersection on Stanaford Road. The study intersection is shown in **Figure 1**.

Figure 1: Study Intersection



2.0 Crash Trends Analysis

Crash data between 2020 and 2024 was obtained from WVDOT's safety data management tool, AASHTOWare Safety. The original data set consisted of seven (7) crashes in the study area. The West Virginia Uniform Traffic Crash Reports (UTCR) were reviewed for accuracy and one (1) was considered unrelated to the study area due to being incorrectly geolocated, leaving a total of six (6) crashes. **Figure 2** shows the crash frequency by type of crash. The primary crash types were angle and rear end, with two (2) crashes each. Other crash types were right turn and fixed object. Two (2) injury crashes occurred, which equates to a 33% injury rate overall. One angle crash resulted in a serious injury and one rear end crash resulted in a minor injury.

Figure 2: Crash Frequency by Type

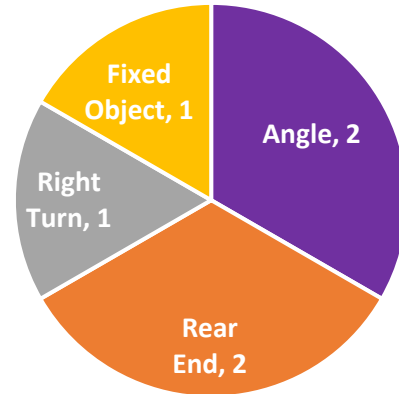


Figure 3, below, shows a detailed crash diagram.

Figure 3: Crash Diagram, 2020-2024 Data



Four (4) or 67% of crashes occurred during dry conditions, indicating weather is likely not a significant contributing factor. The majority, or 67% of crashes, occurred during the AM hours. All crashes occurred between Wednesday and Friday, with three (3) or 50% occurring on Friday. There was no clear correlation with month of year; however, March experienced the highest number of crashes, with two (2) crashes.

Angle Crashes

Angle crashes accounted for two (2) crashes. Both crashes involved a driver attempting to turn left from Woodcrest Drive and colliding with a vehicle traveling northbound on Stanaford Road. Both crashes were related to failure to yield. One angle crash resulted in serious injury.

Rear End Crashes

Rear end crashes also accounted for two (2) crashes during the study period. All rear end crashes occurred in the southbound direction when a southbound vehicle was waiting to turn left onto Woodcrest Drive. One of the crashes occurred when a vehicle was going around the reverse curve just north of the intersection and slid on wet pavement. One rear end crash resulted in minor injury.

Right Turn Crash

The right turn crash involved a driver attempting to turn right from Woodcrest Drive and colliding with a vehicle traveling northbound on Stanaford Road. The crash was related to failure to yield.

Fixed Object Crash

There was one fixed object crash, and it was non-intersection related. The crash involved a driver losing control of the vehicle and striking a power pole in northeast corner of the intersection.

A copy of the Crash Diagram is included in **Appendix A**.

3.0 Site Visit Observations

A field visit was performed by the consultant team on Thursday, May 28, 2026 from 8:30 AM to 9:30 AM to analyze existing conditions and observe traffic behaviors.

At the intersection, pavement was observed to be deteriorated on both Stanaford Road and Woodcrest Drive. **Photo 1** shows the deteriorated pavement on Stanaford Road and **Photo 2** shows the deteriorated pavement on Woodcrest Drive. As shown in **Photo 3**, the pavement markings for the intersection on Woodcrest Drive are faded. The vegetation within the reverse curve just north of the intersection limits visibility of southbound vehicles waiting to turn left onto Woodcrest Drive. Vehicles tend to pull beyond the stop line to judge a safe gap for turning out of Woodcrest Drive.



Photo 1: Deteriorated Pavement on Stanaford Road



Photo 2: Deteriorated Pavement on Woodcrest Drive



Photo 3: Faded Pavement Markings on Woodcrest Drive

4.0 Existing Capacity Analysis

Traffic counts at the intersection of Stanaford Road and Woodcrest Drive were collected on Thursday, May 21, 2026 between the hours of 7:00 AM and 7:00 PM. Peak hours for the study area were determined to be 7:00 AM to 8:00 AM and 2:15 PM to 3:15 PM. Traffic count data can be found in **Appendix B**.

The capacity of the intersection was evaluated with existing traffic control and traffic volumes using the HCM methodologies in *HCS* software. **Table 1** summarizes the existing analysis for the intersection. Results are presented using the following metrics:

- Control Delay – The additional travel time caused by the presence of traffic control devices.
- Level of Service – A qualitative measure used to define how well vehicles travel through an intersection. LOS classifications range from A through F, with A representing free flow conditions and F representing an over capacity intersection with stop-and-go traffic. Unsignalized intersections ranked LOS D or better are considered acceptable.
- V/C Ratio– Volume to Capacity ratio, which is used to measure an intersection’s ability to accommodate vehicular demand. A ratio greater than 1.0 indicates the demand exceeds capacity, while a ratio of 0.93 or less is considered acceptable.
- 95th Percentile Queue – The highest queue length, in feet, that exceeds 95% of all other observed queue lengths.

Table 1: Existing Capacity Analysis for Stanaford Road and Woodcrest Drive

INTERSECTION	APPROACH	AM Peak				PM Peak			
		Stop Control				Stop Control			
		LOS	DELAY	V/C	QUEUE	LOS	DELAY	V/C	QUEUE
Stanaford Road (WV 41) & Woodcrest Drive	WB Left	D	28.5	0.63	104'	E	38.6	0.74	147'
	WB Right	A	9.9	0.06	5'	B	11.7	0.12	10'
	Westbound	D	25.5	--	--	D	32.8	--	--
	NB Thru-Right	Free-Flow				Free-Flow			
	Northbound	Free-Flow				Free-Flow			
	SB Left-Thru	A	8.1	0.05	3'	A	8.5	0.03	3'
	Southbound	A	1.7	--	--	A	1.4	--	--
	Intersection Total	A	8.1	--	--	B	10.2	--	--

The intersection is performing well under existing conditions. Although the westbound left-turn movement fails during the PM peak hour, the approach overall operates acceptably. **Appendix C** includes the full analysis report for the intersection.

5.0 Intersection Control Warrant Analysis

A traffic signal warrant analysis was conducted using MUTCD 11th Edition methodologies in *HCS* software. The warrants applicable to this location are Warrants 1, 2, 3, and 7. A copy of the Warrants Report is provided in **Appendix D**.

Warrant 1 - Eight-Hour Vehicular Volume - a signal is warranted if conditions outlined in Section 4C.02 of the MUTCD are met for any eight hours of an average day.

Warrant 2 – Four-Hour Vehicular Volume - a signal is warranted if conditions defined in Section 4C.03 of the MUTCD are met for any four hours of an average day.

Warrant 3 – Peak Hour - a signal is warranted if conditions outlined in Section 4C.04 of the MUTCD are all met for the same one hour of an average day. This warrant is typically applicable in unusual situations such as office complexes, manufacturing plants, or industrial complexes where a large number of vehicles are released over a short period of time.

Warrant 7 - Crash Experience - a signal is warranted if crash history and other conditions defined in Section 4C.08 of the MUTCD are met.

A summary of the MUTCD Signal Warrant findings are shown in **Table 2**.

Table 2: Summary of MUTCD Signal Warrants

Warrant	Description	Status
Warrant 1	Eight-Hour Vehicular Volume	Met
Warrant 2	Four-Hour Vehicular Volume	Met
Warrant 3	Peak Hour	Met
Warrant 7	Crash Experience	Not Met

Warrant 1, Warrant 2, and Warrant 3 are met based on the 70% factors defined in MUTCD, but a typical standard of practice is that new signals should meet the 100% factors to justify installation. Warrant 1, Warrant 2, and Warrant 3's 100% factors are not met at this location.

To justify a signal, only one warrant needs to be met; however, meeting a warrant does not necessarily require installation of a traffic signal. Additional engineering judgement is needed to evaluate whether the surrounding land use, geometrics, and general context make sense for a signal. In this case, a signal is not recommended at this location due to concerns related to sight distance restrictions caused by the horizontal curve and vegetation in advance of the intersection on Stanaford Road.

6.0 Turn Lane Warrant Analysis

A turn lane warrant analysis was completed for the Stanaford Road approaches at the intersection. The right turn lane warrant is met for a northbound right turn lane in both the AM and PM peak hour. The left turn lane warrant is met for a southbound left turn lane in the AM peak hour. **Appendix E** includes the full turn lane warrant analysis for the intersection.

Although the turn lane warrant is met for a northbound right-turn lane, it is not recommended at this intersection due to concerns that it would make it more difficult for vehicles to exit Woodcrest Drive. A left turn lane in the southbound direction is recommended.

7.0 Potential Countermeasures

Based on the analysis described above, the following countermeasures were identified for further study:

Short-term Countermeasures

Clear vegetation along the inside of the horizontal curve just north of the intersection – Given the prevalence of rear end crashes in the southbound direction, crash report narratives, and field observations, vegetation along the curve just north of the intersection should be cleared. The vegetation along the curve is shown in **Photo 4**.



Photo 4: Vegetation along curve on Stanaford Road

Extend turn lanes on Woodcrest Drive – Based on queue length and delay, the turn lanes on Woodcrest Drive should be extended from 90 feet to 150 feet. This can be accomplished through pavement markings only because the roadway is wide enough to accommodate both turning lanes through approximately 300 feet east of the intersection.

Improve stop line placement on Woodcrest Drive – As observed in the field review, vehicles tend to pull beyond the stop line to judge a safe gap for turning out of Woodcrest Drive. Improving the stop line placement would improve the sight distance for vehicles exiting Woodcrest Drive and may reduce the angle crashes occurring at the intersection.

Medium-term Countermeasures

Resurface and refresh pavement markings on Woodcrest Drive and on Stanaford Road from Pine Lodge Drive to Dixieland Road – The pavement is in poor condition, and the pavement markings are faded on both Woodcrest Drive and Stanaford Road. The deteriorated pavement and faded pavement markings on Woodcrest Drive are provided in **Photo 5**.



Photo 5: Deteriorated Pavement and Faded Pavement Markings on Woodcrest Drive

Complete a pedestrian safety study for the Stanaford Road Corridor from East Beckley Bypass to Dixieland Road – There are pedestrian crossing signs without painted crosswalks on Stanaford Road near the main entrance to the Beckley ARH Hospital and at Pine Lodge Drive, and a sidewalk extends from East Beckley Bypass to the main entrance to Beckley ARH Hospital. Additionally, eight pedestrians were counted crossing the Woodcrest Road intersection despite the

lack of pedestrian infrastructure at the intersection. Completing a pedestrian safety study would further analyze the corridor to identify adequate pedestrian accommodations.

Long-term Countermeasures

The following long-term alternatives are recommended for the intersection:

Option 1 - Install a southbound left turn lane – Based on the turn lane warrant analysis, the criteria for a 225-foot southbound left turn lane is met. This countermeasure would involve widening the roadway to accommodate the turning lanes.

Option 2 - Convert the intersection to an unsignalized continuous green T-intersection – This countermeasure involves widening the roadway to add a southbound left turn lane, an acceleration lane for vehicles turning left from the westbound approach, and making the through southbound movement continuous. The westbound approach would remain stop-controlled, and the southbound lanes would be separated by bollards. This countermeasure could help reduce the number of southbound rear end crashes by providing dedicated space for left-turning vehicles and reduce the number of angle crashes because left-turning vehicles from Woodcrest Drive would only need to look south when judging a safe turning gap. An example of an unsignalized continuous green T-intersection is shown in **Photo 6**. While this example is more complex than what would be implemented at the Woodcrest Drive intersection, it does provide a helpful visual representation of the lane configuration.

Photo 6: Unsignalized Continuous Green T-Intersection Example



Install sidewalk along Stanaford Drive – Although there is an existing sidewalk from East Beckley Bypass to the main entrance of Beckley ARH Hospital, no additional pedestrian accommodations are provided along Stanaford Drive. Additionally, eight pedestrians were observed crossing at the Woodcrest Road intersection despite the lack of pedestrian infrastructure. Sidewalks are needed due to nearby vulnerable road user generators along Stanaford Drive, including Beckley ARH Hospital and Woodrow Wilson High School.

8.0 Conclusion and Recommendation

The intersection of Stanaford Road and Woodcrest Drive in its current configuration experiences several safety challenges.

The following countermeasures may help mitigate crashes and improve traffic operations within the study area in the short-, medium-, and long-term. Short-term recommendations are assumed to typically take less than two years to implement, medium-term recommendations are typically assumed to take between two and five years to implement, and long-term recommendations typically take more than five years to implement.

Short-term recommendations include:

- Clear vegetation along the inside of the horizontal curve just north of the intersection
- Extend turn lanes on Woodcrest Drive
- Improve stop line placement on Woodcrest Drive

Medium-term recommendations include:

- Resurface and refresh pavement markings on Woodcrest Drive and on Stanaford Road from Pine Lodge Drive to Dixieland Road
- Complete a pedestrian safety study for the Stanaford Road Corridor from East Beckley Bypass to Dixieland Road

Long-term recommendations include:

- Option 1 - Install a southbound left turn lane
- Option 2 - Convert the intersection to an unsignalized continuous green T-intersection
- Install sidewalk along Stanaford Drive

**APPENDIX A:
CRASH DIAGRAM**

LEGEND

NON-INTERSECTION RELATED CRASH

OF CRASHES (A1)

PATTERN (A1)

DIRECTION OF TRAVEL (A1)

AT FAULT VEHICLE (A1)

ANGLE (A1)

REAR END (A1)

FIXED OBJECT (A1)

RIGHT TURN (A1)

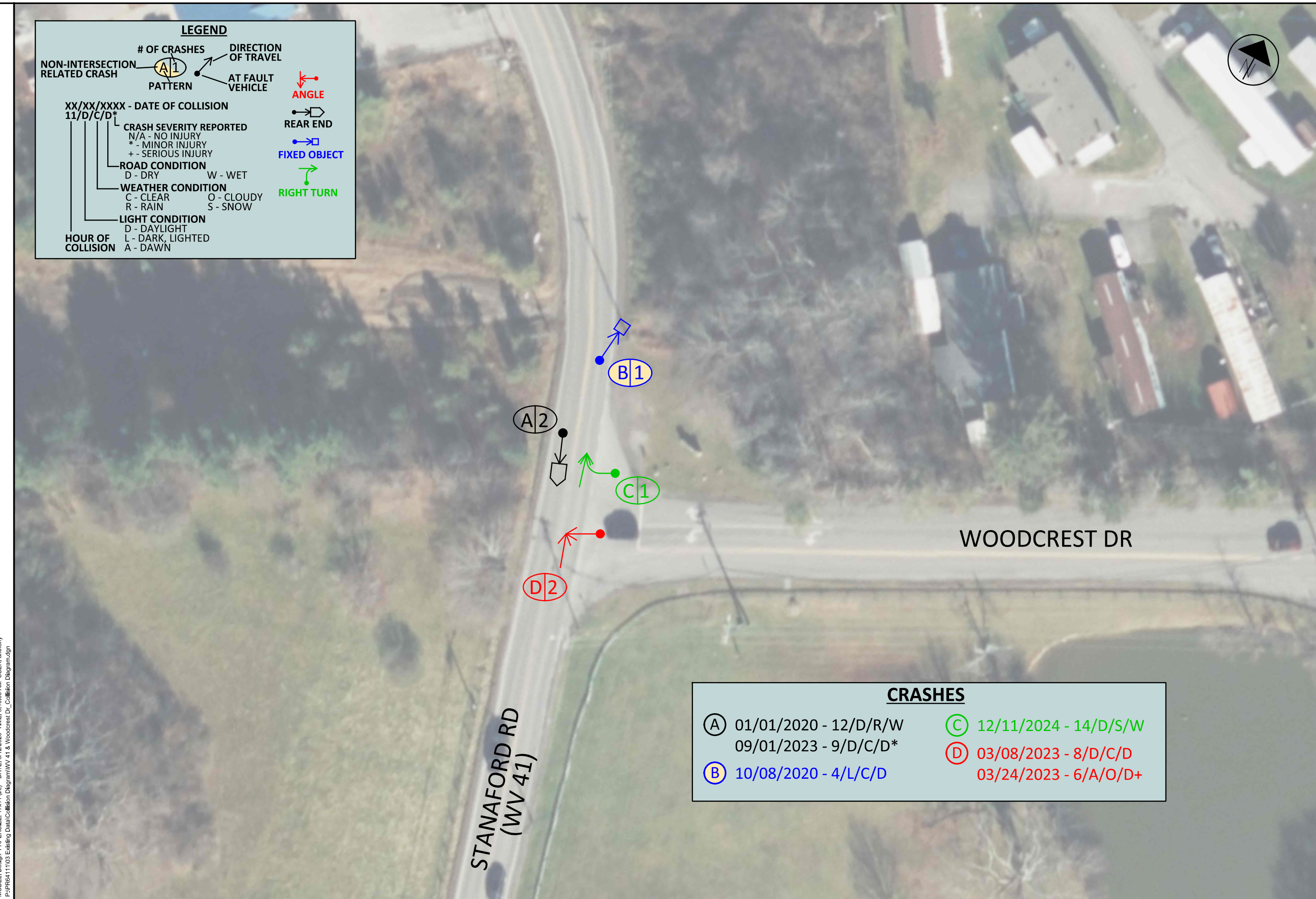
XX/XX/XXXX - DATE OF COLLISION
11/D/C/D*

CRASH SEVERITY REPORTED
N/A - NO INJURY
* - MINOR INJURY
+ - SERIOUS INJURY

ROAD CONDITION
D - DRY W - WET

WEATHER CONDITION
C - CLEAR O - CLOUDY
R - RAIN S - SNOW

LIGHT CONDITION
D - DAYLIGHT
L - DARK, LIGHTED
A - DAWN



WOODCREST DR

STANAFORD RD
(WV 41)

CRASHES	
(A) 01/01/2020 - 12/D/R/W 09/01/2023 - 9/D/C/D*	(C) 12/11/2024 - 14/D/S/W
(B) 10/08/2020 - 4/L/C/D	(D) 03/08/2023 - 8/D/C/D 03/24/2023 - 6/A/O/D+

DESIGN AGENCY
B&N
BURGESS & NIPLE

DESIGNER
EFA

REVIEWER
MLV 06-26

PROJECT ID
PR64111

SHEET TOTAL
1 1

**APPENDIX B:
TRAFFIC COUNTS**

WV41 & Woodcrest Dr - TMC

Thu May 21, 2026

Full Length (7 AM-7 PM)

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

All Movements

ID: 1405363, Location: 37.801512, -81.167168



Provided by: Burgess & Niple : West Virginia
4424 Emerson Ave,
Parkersburg, WV, 26104, US

Leg Direction	WV41 Southbound					Woodcrest Dr Westbound					WV41 Northbound					Int
	T	L	U	App	Ped*	R	L	U	App	Ped*	R	T	U	App	Ped*	
2026-05-21 7:00AM	54	20	0	74	0	15	82	0	97	0	54	25	0	79	0	250
7:15AM	58	13	0	71	0	13	61	0	74	0	29	30	0	59	0	204
7:30AM	46	5	0	51	0	6	21	0	27	1	14	36	0	50	0	128
7:45AM	80	6	0	86	0	3	26	0	29	0	32	43	0	75	0	190
Hourly Total	238	44	0	282	0	37	190	0	227	1	129	134	0	263	0	772
8:00AM	74	9	0	83	0	7	20	0	27	0	27	42	0	69	0	179
8:15AM	49	8	0	57	0	2	26	0	28	0	28	40	0	68	0	153
8:30AM	72	3	0	75	0	4	24	0	28	0	20	32	0	52	0	155
8:45AM	68	3	0	71	0	3	21	0	24	0	27	49	0	76	0	171
Hourly Total	263	23	0	286	0	16	91	0	107	0	102	163	0	265	0	658
9:00AM	41	6	0	47	0	6	29	0	35	0	16	45	0	61	0	143
9:15AM	36	1	0	37	0	2	27	0	29	0	20	24	0	44	0	110
9:30AM	54	3	0	57	0	4	24	0	28	0	25	40	0	65	0	150
9:45AM	57	3	0	60	0	6	31	0	37	0	23	33	0	56	0	153
Hourly Total	188	13	0	201	0	18	111	0	129	0	84	142	0	226	0	556
10:00AM	34	8	0	42	0	8	27	0	35	0	30	41	0	71	0	148
10:15AM	52	6	0	58	0	6	26	0	32	2	29	45	0	74	0	164
10:30AM	57	1	0	58	0	4	34	0	38	0	20	44	0	64	0	160
10:45AM	48	8	0	56	0	5	30	0	35	0	33	54	0	87	0	178
Hourly Total	191	23	0	214	0	23	117	0	140	2	112	184	0	296	0	650
11:00AM	63	6	0	69	0	12	36	0	48	1	19	55	0	74	0	191
11:15AM	52	9	0	61	0	7	30	0	37	0	27	46	0	73	0	171
11:30AM	60	5	0	65	0	9	27	0	36	0	14	50	0	64	0	165
11:45AM	49	4	0	53	0	5	27	0	32	1	17	65	0	82	0	167
Hourly Total	224	24	0	248	0	33	120	0	153	2	77	216	0	293	0	694
12:00PM	54	3	0	57	0	7	34	0	41	1	23	71	0	94	0	192
12:15PM	57	8	0	65	0	6	35	0	41	0	23	48	0	71	0	177
12:30PM	63	3	0	66	0	10	18	0	28	0	31	47	0	78	0	172
12:45PM	44	9	0	53	0	6	29	0	35	0	34	72	0	106	0	194
Hourly Total	218	23	0	241	0	29	116	0	145	1	111	238	0	349	0	735
1:00PM	54	6	0	60	0	2	20	0	22	0	33	58	0	91	0	173
1:15PM	59	4	0	63	0	6	19	0	25	0	26	57	0	83	0	171
1:30PM	55	6	0	61	0	14	27	0	41	0	24	51	0	75	0	177
1:45PM	43	9	0	52	0	8	29	0	37	0	50	34	0	84	0	173
Hourly Total	211	25	0	236	0	30	95	0	125	0	133	200	0	333	0	694
2:00PM	49	8	0	57	0	4	41	0	45	0	48	57	0	105	0	207
2:15PM	43	9	0	52	0	10	43	0	53	0	53	60	0	113	0	218
2:30PM	56	6	0	62	0	32	84	0	116	0	43	65	0	108	0	286
2:45PM	53	10	0	63	0	11	53	0	64	0	29	72	0	101	0	228
Hourly Total	201	33	0	234	0	57	221	0	278	0	173	254	0	427	0	939
3:00PM	46	5	0	51	0	8	42	0	50	0	20	88	0	108	0	209
3:15PM	50	5	0	55	0	7	30	0	37	0	28	62	0	90	0	182
3:30PM	77	4	0	81	0	7	34	0	41	1	23	76	0	99	0	221
3:45PM	55	3	0	58	0	6	28	0	34	1	24	75	0	99	0	191
Hourly Total	228	17	0	245	0	28	134	0	162	2	95	301	0	396	0	803
4:00PM	49	4	0	53	0	7	27	0	34	0	24	78	0	102	0	189
4:15PM	54	3	0	57	0	6	30	0	36	0	26	74	0	100	0	193
4:30PM	63	7	0	70	0	6	25	0	31	0	26	72	0	98	0	199
4:45PM	68	3	0	71	0	4	34	0	38	0	23	82	0	105	0	214
Hourly Total	234	17	0	251	0	23	116	0	139	0	99	306	0	405	0	795
5:00PM	58	2	0	60	0	8	38	0	46	0	20	79	0	99	0	205
5:15PM	49	3	0	52	0	6	27	0	33	0	21	69	0	90	0	175

Leg Direction	WV41 Southbound					Woodcrest Dr Westbound					WV41 Northbound					Int
	T	L	U	App	Ped*	R	L	U	App	Ped*	R	T	U	App	Ped*	
5:30PM	57	4	0	61	0	3	13	0	16	0	20	53	0	73	0	150
5:45PM	39	3	0	42	0	2	25	0	27	0	23	49	1	73	0	142
Hourly Total	203	12	0	215	0	19	103	0	122	0	84	250	1	335	0	672
6:00PM	48	2	0	50	0	2	12	0	14	0	11	40	0	51	0	115
6:15PM	27	2	0	29	0	3	11	0	14	0	20	37	0	57	0	100
6:30PM	30	3	0	33	0	2	10	0	12	0	12	41	0	53	0	98
6:45PM	32	4	0	36	0	1	8	0	9	0	17	42	0	59	0	104
Hourly Total	137	11	0	148	0	8	41	0	49	0	60	160	0	220	0	417
Total	2536	265	0	2801	0	321	1455	0	1776	8	1259	2548	1	3808	0	8385
% Approach	90.5%	9.5%	0%	-	-	18.1%	81.9%	0%	-	-	33.1%	66.9%	0%	-	-	-
% Total	30.2%	3.2%	0%	33.4%	-	3.8%	17.4%	0%	21.2%	-	15.0%	30.4%	0%	45.4%	-	-
Motorcycles	1	0	0	1	-	0	1	0	1	-	0	1	0	1	-	3
% Motorcycles	0%	0%	0%	0%	-	0%	0.1%	0%	0.1%	-	0%	0%	0%	0%	-	0%
Lights	2444	257	0	2701	-	310	1432	0	1742	-	1245	2438	1	3684	-	8127
% Lights	96.4%	97.0%	0%	96.4%	-	96.6%	98.4%	0%	98.1%	-	98.9%	95.7%	100%	96.7%	-	96.9%
Single-Unit Trucks	80	4	0	84	-	6	8	0	14	-	6	91	0	97	-	195
% Single-Unit Trucks	3.2%	1.5%	0%	3.0%	-	1.9%	0.5%	0%	0.8%	-	0.5%	3.6%	0%	2.5%	-	2.3%
Articulated Trucks	4	1	0	5	-	0	0	0	0	-	0	5	0	5	-	10
% Articulated Trucks	0.2%	0.4%	0%	0.2%	-	0%	0%	0%	0%	-	0%	0.2%	0%	0.1%	-	0.1%
Buses	7	3	0	10	-	5	14	0	19	-	8	13	0	21	-	50
% Buses	0.3%	1.1%	0%	0.4%	-	1.6%	1.0%	0%	1.1%	-	0.6%	0.5%	0%	0.6%	-	0.6%
Pedestrians	-	-	-	-	0	-	-	-	-	8	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-

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

WV41 & Woodcrest Dr - TMC

Thu May 21, 2026

Full Length (7 AM-7 PM)

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

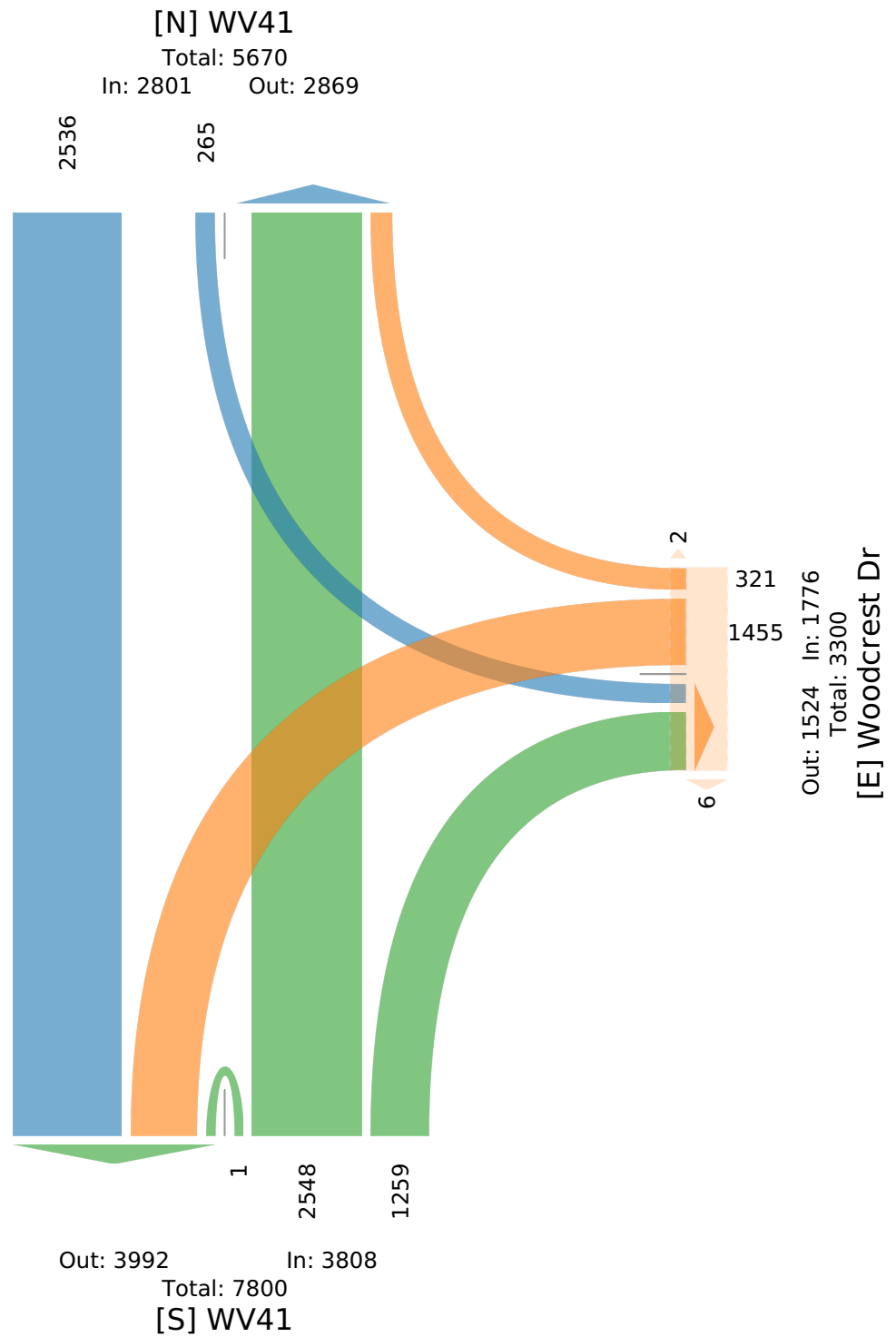
All Movements

ID: 1405363, Location: 37.801512, -81.167168



Provided by: Burgess & Niple : West Virginia

4424 Emerson Ave,
Parkersburg, WV, 26104, US



WV41 & Woodcrest Dr - TMC

Thu May 21, 2026

AM Peak (7 AM - 8 AM)

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

All Movements

ID: 1405363, Location: 37.801512, -81.167168



Provided by: Burgess & Niple : West Virginia
4424 Emerson Ave,
Parkersburg, WV, 26104, US

Leg Direction	WV41 Southbound					Woodcrest Dr Westbound					WV41 Northbound					
Time	T	L	U	App	Ped*	R	L	U	App	Ped*	R	T	U	App	Ped*	Int
2026-05-21 7:00AM	54	20	0	74	0	15	82	0	97	0	54	25	0	79	0	250
7:15AM	58	13	0	71	0	13	61	0	74	0	29	30	0	59	0	204
7:30AM	46	5	0	51	0	6	21	0	27	1	14	36	0	50	0	128
7:45AM	80	6	0	86	0	3	26	0	29	0	32	43	0	75	0	190
Total	238	44	0	282	0	37	190	0	227	1	129	134	0	263	0	772
% Approach	84.4%	15.6%	0%	-	-	16.3%	83.7%	0%	-	-	49.0%	51.0%	0%	-	-	-
% Total	30.8%	5.7%	0%	36.5%	-	4.8%	24.6%	0%	29.4%	-	16.7%	17.4%	0%	34.1%	-	-
PHF	0.744	0.550	-	0.820	-	0.617	0.579	-	0.585	-	0.597	0.779	-	0.832	-	0.772
Motorcycles	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Motorcycles	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Lights	231	43	0	274	-	36	186	0	222	-	128	123	0	251	-	747
% Lights	97.1%	97.7%	0%	97.2%	-	97.3%	97.9%	0%	97.8%	-	99.2%	91.8%	0%	95.4%	-	96.8%
Single-Unit Trucks	4	0	0	4	-	0	0	0	0	-	0	5	0	5	-	9
% Single-Unit Trucks	1.7%	0%	0%	1.4%	-	0%	0%	0%	0%	-	0%	3.7%	0%	1.9%	-	1.2%
Articulated Trucks	1	0	0	1	-	0	0	0	0	-	0	1	0	1	-	2
% Articulated Trucks	0.4%	0%	0%	0.4%	-	0%	0%	0%	0%	-	0%	0.7%	0%	0.4%	-	0.3%
Buses	2	1	0	3	-	1	4	0	5	-	1	5	0	6	-	14
% Buses	0.8%	2.3%	0%	1.1%	-	2.7%	2.1%	0%	2.2%	-	0.8%	3.7%	0%	2.3%	-	1.8%
Pedestrians	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-

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

WV41 & Woodcrest Dr - TMC

Thu May 21, 2026

AM Peak (7 AM - 8 AM)

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

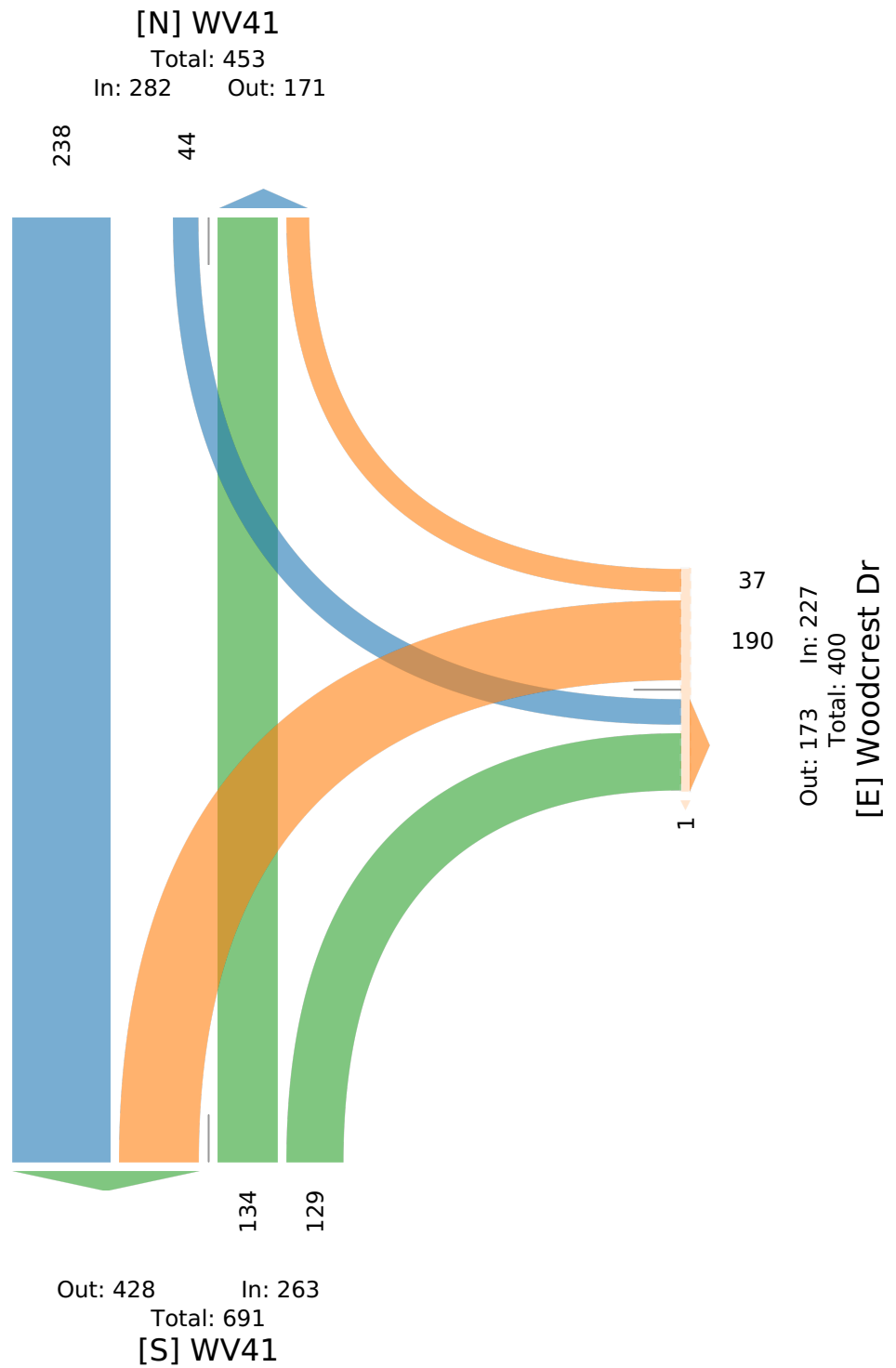
All Movements

ID: 1405363, Location: 37.801512, -81.167168



Provided by: Burgess & Niple : West Virginia

4424 Emerson Ave,
Parkersburg, WV, 26104, US



WV41 & Woodcrest Dr - TMC

Thu May 21, 2026

Midday Peak (12 PM - 1 PM)

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

All Movements

ID: 1405363, Location: 37.801512, -81.167168



Provided by: Burgess & Niple : West Virginia
4424 Emerson Ave,
Parkersburg, WV, 26104, US

Leg Direction	WV41 Southbound					Woodcrest Dr Westbound					WV41 Northbound					
Time	T	L	U	App	Ped*	R	L	U	App	Ped*	R	T	U	App	Ped*	Int
2026-05-21 12:00PM	54	3	0	57	0	7	34	0	41	1	23	71	0	94	0	192
12:15PM	57	8	0	65	0	6	35	0	41	0	23	48	0	71	0	177
12:30PM	63	3	0	66	0	10	18	0	28	0	31	47	0	78	0	172
12:45PM	44	9	0	53	0	6	29	0	35	0	34	72	0	106	0	194
Total	218	23	0	241	0	29	116	0	145	1	111	238	0	349	0	735
% Approach	90.5%	9.5%	0%	-	-	20.0%	80.0%	0%	-	-	31.8%	68.2%	0%	-	-	-
% Total	29.7%	3.1%	0%	32.8%	-	3.9%	15.8%	0%	19.7%	-	15.1%	32.4%	0%	47.5%	-	-
PHF	0.865	0.639	-	0.913	-	0.725	0.829	-	0.884	-	0.816	0.826	-	0.823	-	0.947
Motorcycles	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Motorcycles	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Lights	210	21	0	231	-	29	114	0	143	-	109	230	0	339	-	713
% Lights	96.3%	91.3%	0%	95.9%	-	100%	98.3%	0%	98.6%	-	98.2%	96.6%	0%	97.1%	-	97.0%
Single-Unit Trucks	8	0	0	8	-	0	2	0	2	-	2	7	0	9	-	19
% Single-Unit Trucks	3.7%	0%	0%	3.3%	-	0%	1.7%	0%	1.4%	-	1.8%	2.9%	0%	2.6%	-	2.6%
Articulated Trucks	0	1	0	1	-	0	0	0	0	-	0	1	0	1	-	2
% Articulated Trucks	0%	4.3%	0%	0.4%	-	0%	0%	0%	0%	-	0%	0.4%	0%	0.3%	-	0.3%
Buses	0	1	0	1	-	0	0	0	0	-	0	0	0	0	-	1
% Buses	0%	4.3%	0%	0.4%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0.1%
Pedestrians	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-

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

WV41 & Woodcrest Dr - TMC

Thu May 21, 2026

Midday Peak (12 PM - 1 PM)

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

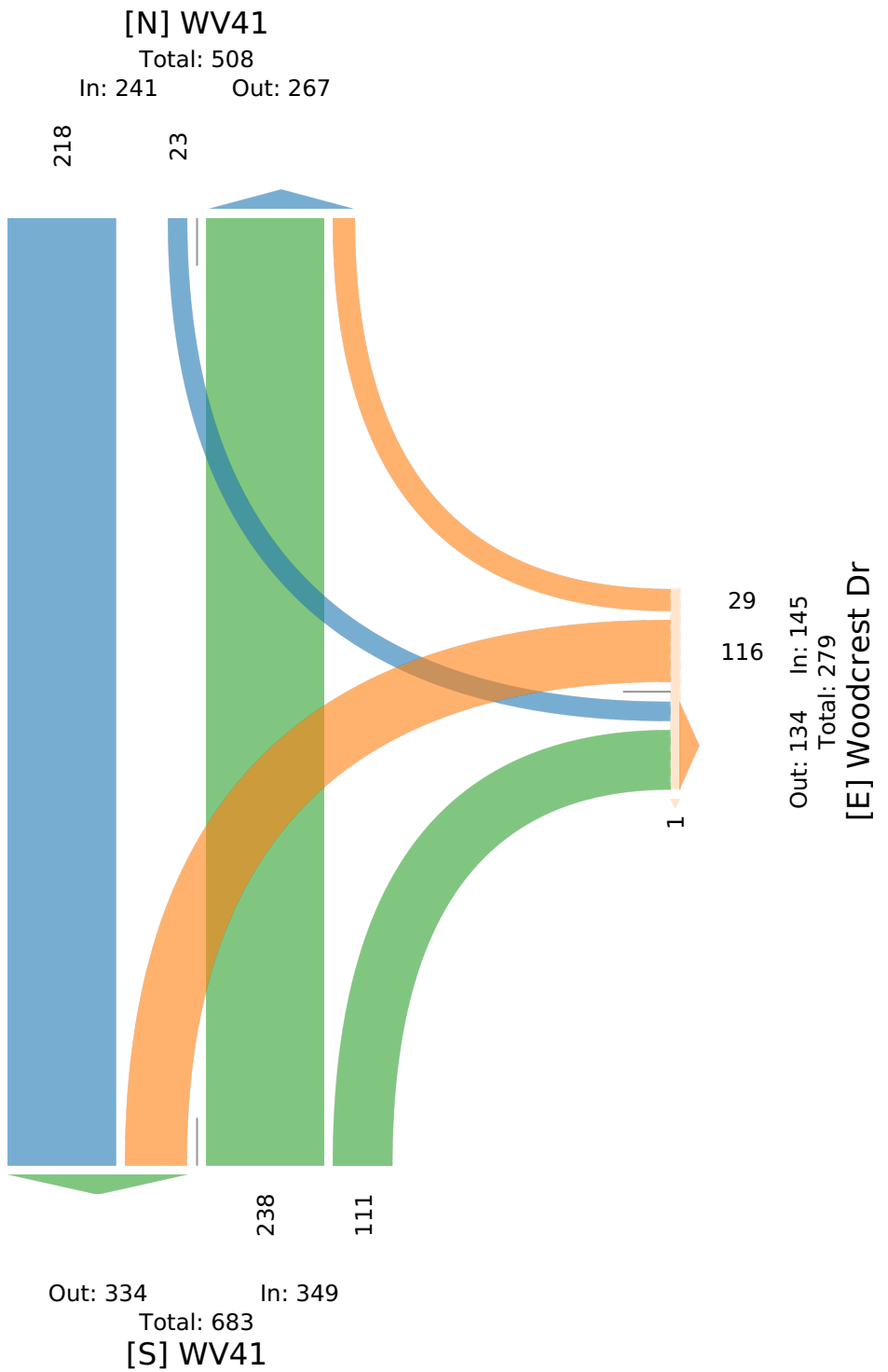
All Movements

ID: 1405363, Location: 37.801512, -81.167168



Provided by: Burgess & Niple : West Virginia

4424 Emerson Ave,
Parkersburg, WV, 26104, US



WV41 & Woodcrest Dr - TMC

Thu May 21, 2026

PM Peak (2:15 PM - 3:15 PM) - Overall Peak Hour

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

All Movements

ID: 1405363, Location: 37.801512, -81.167168



Provided by: Burgess & Niple : West Virginia
4424 Emerson Ave,
Parkersburg, WV, 26104, US

Leg Direction	WV41 Southbound					Woodcrest Dr Westbound					WV41 Northbound					Int
	T	L	U	App	Ped*	R	L	U	App	Ped*	R	T	U	App	Ped*	
2026-05-21 2:15PM	43	9	0	52	0	10	43	0	53	0	53	60	0	113	0	218
2:30PM	56	6	0	62	0	32	84	0	116	0	43	65	0	108	0	286
2:45PM	53	10	0	63	0	11	53	0	64	0	29	72	0	101	0	228
3:00PM	46	5	0	51	0	8	42	0	50	0	20	88	0	108	0	209
Total	198	30	0	228	0	61	222	0	283	0	145	285	0	430	0	941
% Approach	86.8%	13.2%	0%	-	-	21.6%	78.4%	0%	-	-	33.7%	66.3%	0%	-	-	-
% Total	21.0%	3.2%	0%	24.2%	-	6.5%	23.6%	0%	30.1%	-	15.4%	30.3%	0%	45.7%	-	-
PHF	0.884	0.750	-	0.905	-	0.477	0.661	-	0.610	-	0.684	0.810	-	0.951	-	0.823
Motorcycles	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Motorcycles	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Lights	184	30	0	214	-	58	219	0	277	-	142	273	0	415	-	906
% Lights	92.9%	100%	0%	93.9%	-	95.1%	98.6%	0%	97.9%	-	97.9%	95.8%	0%	96.5%	-	96.3%
Single-Unit Trucks	11	0	0	11	-	0	0	0	0	-	0	10	0	10	-	21
% Single-Unit Trucks	5.6%	0%	0%	4.8%	-	0%	0%	0%	0%	-	0%	3.5%	0%	2.3%	-	2.2%
Articulated Trucks	1	0	0	1	-	0	0	0	0	-	0	0	0	0	-	1
% Articulated Trucks	0.5%	0%	0%	0.4%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0.1%
Buses	2	0	0	2	-	3	3	0	6	-	3	2	0	5	-	13
% Buses	1.0%	0%	0%	0.9%	-	4.9%	1.4%	0%	2.1%	-	2.1%	0.7%	0%	1.2%	-	1.4%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

WV41 & Woodcrest Dr - TMC

Thu May 21, 2026

PM Peak (2:15 PM - 3:15 PM) - Overall Peak Hour

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

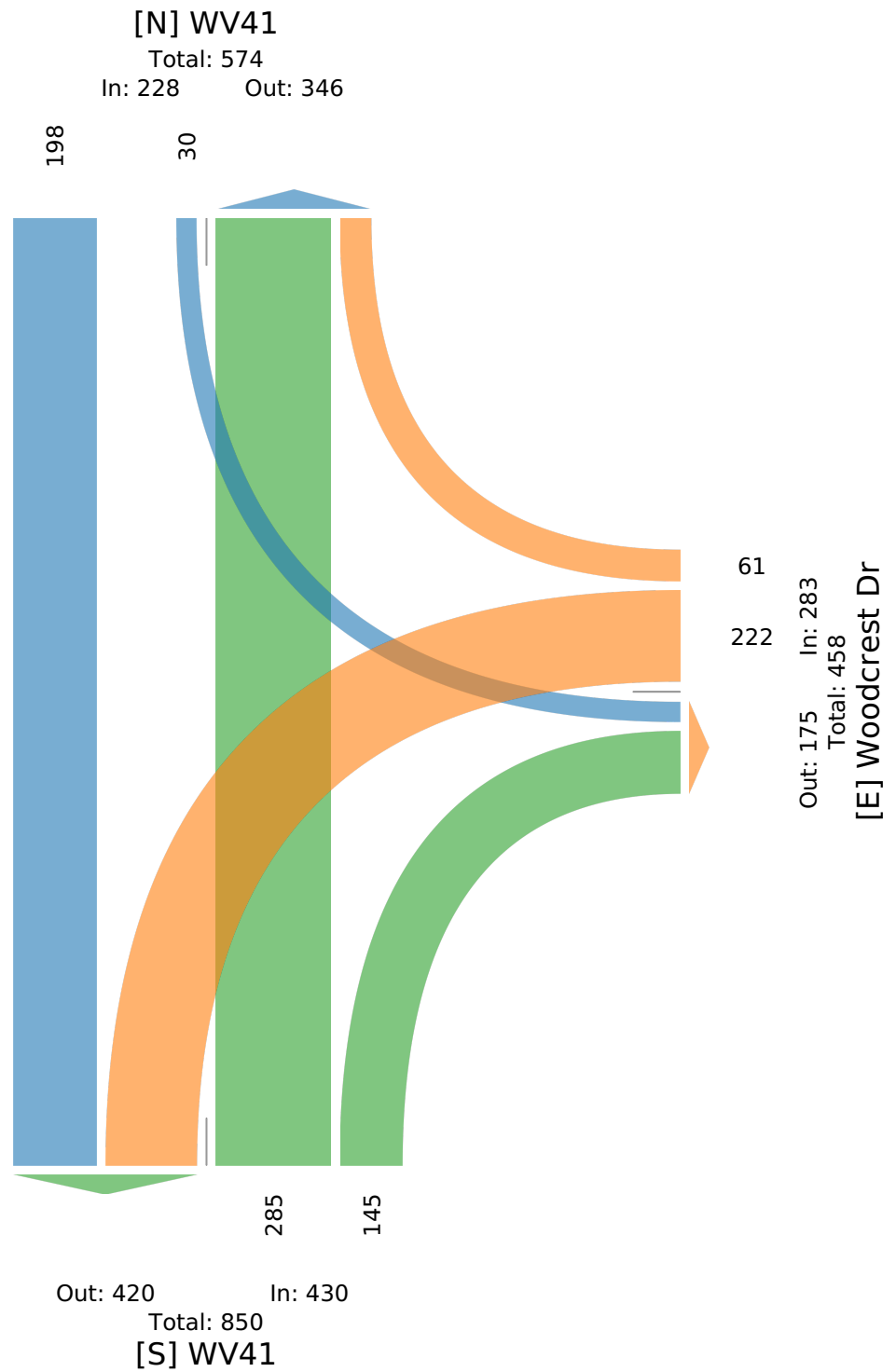
All Movements

ID: 1405363, Location: 37.801512, -81.167168



Provided by: Burgess & Niple : West Virginia

4424 Emerson Ave,
Parkersburg, WV, 26104, US

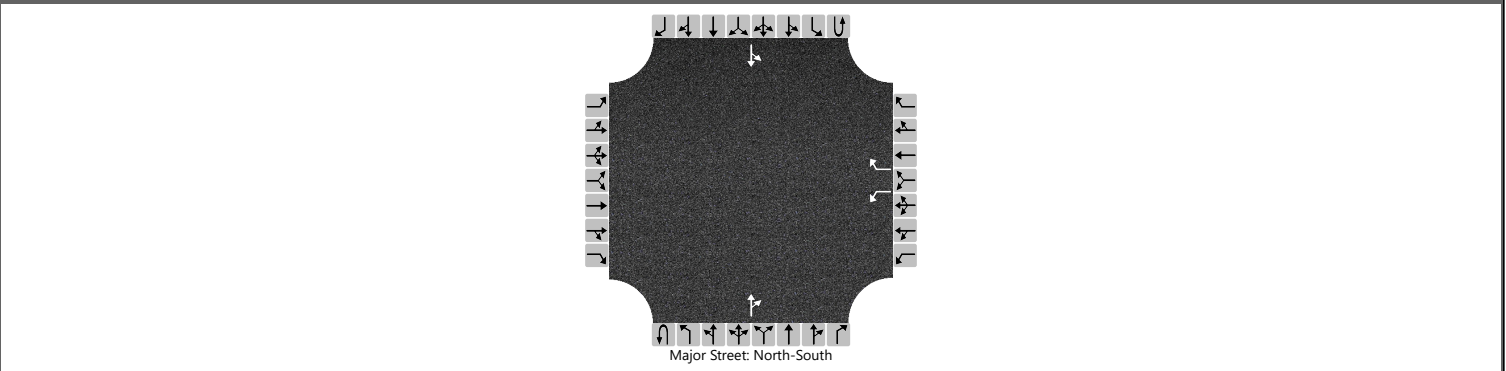


**APPENDIX C:
EXISTING CAPACITY ANALYSIS**

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Emilee Anthony	Intersection	WV 41 & Woodcrest Drive
Agency/Co.	B&N	Jurisdiction	Raleigh County
Date Performed	5/27/2026	East/West Street	Woodcrest Drive
Analysis Year	2026	North/South Street	WV 41
Time Analyzed	AM Peak	Peak Hour Factor	0.77
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	WV 41 & Woodcrest Drive Study		

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	0	0		1	0	1		0	1	0		0	1	0
Configuration						L		R				TR		LT		
Volume (veh/h)						190		37			134	129		44	238	
Percent Heavy Vehicles (%)						2		3						2		
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)						6.42		6.23							4.12		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.52		3.32							2.22		

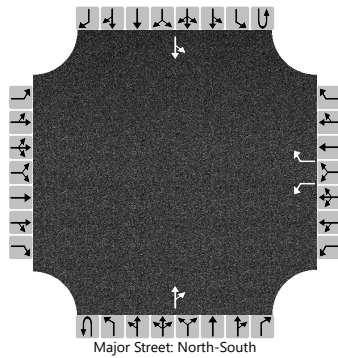
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						247		48							57		
Capacity, c (veh/h)						392		779							1216		
v/c Ratio						0.63		0.06							0.05		
95% Queue Length, Q ₉₅ (veh)						4.1		0.2							0.1		
95% Queue Length, Q ₉₅ (ft)						104.2		5.1							2.5		
Control Delay (s/veh)						28.5		9.9							8.1	0.5	
Level of Service (LOS)						D		A							A	A	
Approach Delay (s/veh)					25.5								1.7				
Approach LOS					D								A				

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Emilee Anthony	Intersection	WV 41 & Woodcrest Drive
Agency/Co.	B&N	Jurisdiction	Raleigh County
Date Performed	5/27/2026	East/West Street	Woodcrest Drive
Analysis Year	2026	North/South Street	WV 41
Time Analyzed	PM Peak	Peak Hour Factor	0.82
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	WV 41 & Woodcrest Drive Study		

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	0	0		1	0	1		0	1	0		0	1	0
Configuration						L		R				TR		LT		
Volume (veh/h)						222		61			285	145		30	198	
Percent Heavy Vehicles (%)						1		5						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)						6.41		6.25						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.34						2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						271		74						37		
Capacity, c (veh/h)						364		614						1053		
v/c Ratio						0.74		0.12						0.03		
95% Queue Length, Q ₉₅ (veh)						5.8		0.4						0.1		
95% Queue Length, Q ₉₅ (ft)						146.6		10.4						2.5		
Control Delay (s/veh)						38.6		11.7						8.5	0.3	
Level of Service (LOS)						E		B						A	A	
Approach Delay (s/veh)					32.8								1.4			
Approach LOS					D								A			

**APPENDIX D:
SIGNAL WARRANTS REPORT**

HCS Warrants Report

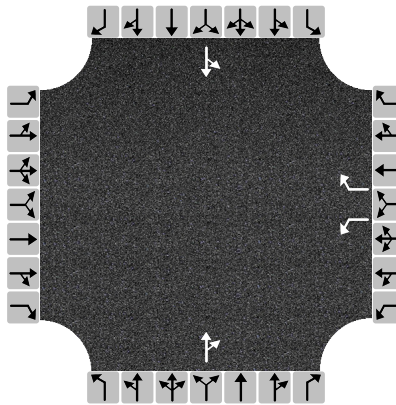
Project Information

Analyst	Emilee Anthony	Date	6/8/2026
Agency	B&N	Analysis Year	2026
Jurisdiction	Raleigh County	Time Period Analyzed	2026
Units	U.S. Customary	MUTCD Method	MUTCD 11 (2023)
Project Description	WV 41 & Woodcrest Drive		

General

Major Street Direction	North-South	Population < 10,000	No
Starting Time Interval	7:00	Coordinated Signal System	No
Major Street Speed (mi/h)	45	Nearest Signal (ft)	1800
Adequate Trials of Crash Exp. Alt.	No		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Movement												
Number of Lanes, N	0	0	0	1	0	1	0	1	0	0	1	0
Lane Usage				L		R		TR			LT	
Vehicle Volumes Averages (veh/h)	0	0	0	121	0	26	0	212	104	22	211	0
Pedestrian median refuge available	No			No			No			No		
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay Averages (s/veh)	0.0			0.0			0.0			0.0		
Delay Averages (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	4
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	10

Volume Summary														
Hours	Major Volume (veh/h)	Minor Volume (veh/h)	Total Volume (veh/h)	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (70%)
7:00 - 8:00	545	227	772	1	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
8:00 - 9:00	551	107	658	0	0	No	No	Yes	Yes	No	No	No	No	No
9:00 - 10:00	427	129	556	0	0	No	Yes	No	Yes	No	No	No	No	No
10:00 - 11:00	510	140	650	2	0	Yes	Yes	No	Yes	No	No	No	No	No
11:00 - 12:00	541	153	694	2	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
12:00 - 13:00	590	145	735	1	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
13:00 - 14:00	569	125	694	0	0	No	Yes	Yes	Yes	No	No	No	No	No
14:00 - 15:00	661	278	939	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
15:00 - 16:00	641	162	803	2	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
16:00 - 17:00	656	139	795	0	0	No	Yes	Yes	Yes	Yes	No	No	No	No
17:00 - 18:00	549	122	671	0	0	No	Yes	Yes	Yes	No	No	No	No	No
18:00 - 19:00	368	49	417	0	0	No	No	No	No	No	No	No	No	No
Total	6608	1776	8384	8	0	6	10	9	11	6	0	1	0	0

Pedestrian Volume									
15th % pedestrian speed < 3.5 ft/s					Pedestrian refuge present?			NB	SB
Hours	Major Street Vehicular Volume (veh/h)			Major Street Pedestrian Volume (ped/h)			4A (70%)	4B (70%)	
	NB	SB	Total	NB	SB	Total			
7:00 - 8:00	263	282	545	0	0	0	No	No	
8:00 - 9:00	265	286	551	0	0	0	No	No	
9:00 - 10:00	226	201	427	0	0	0	No	No	
10:00 - 11:00	296	214	510	0	0	0	No	No	
11:00 - 12:00	293	248	541	0	0	0	No	No	
12:00 - 13:00	349	241	590	0	0	0	No	No	
13:00 - 14:00	333	236	569	0	0	0	No	No	
14:00 - 15:00	427	234	661	0	0	0	No	No	
15:00 - 16:00	396	245	641	0	0	0	No	No	
16:00 - 17:00	405	251	656	0	0	0	No	No	
17:00 - 18:00	334	215	549	0	0	0	No	No	
18:00 - 19:00	220	148	368	0	0	0	No	No	
Totals	3807	2801	6608	0	0	0	0	0	

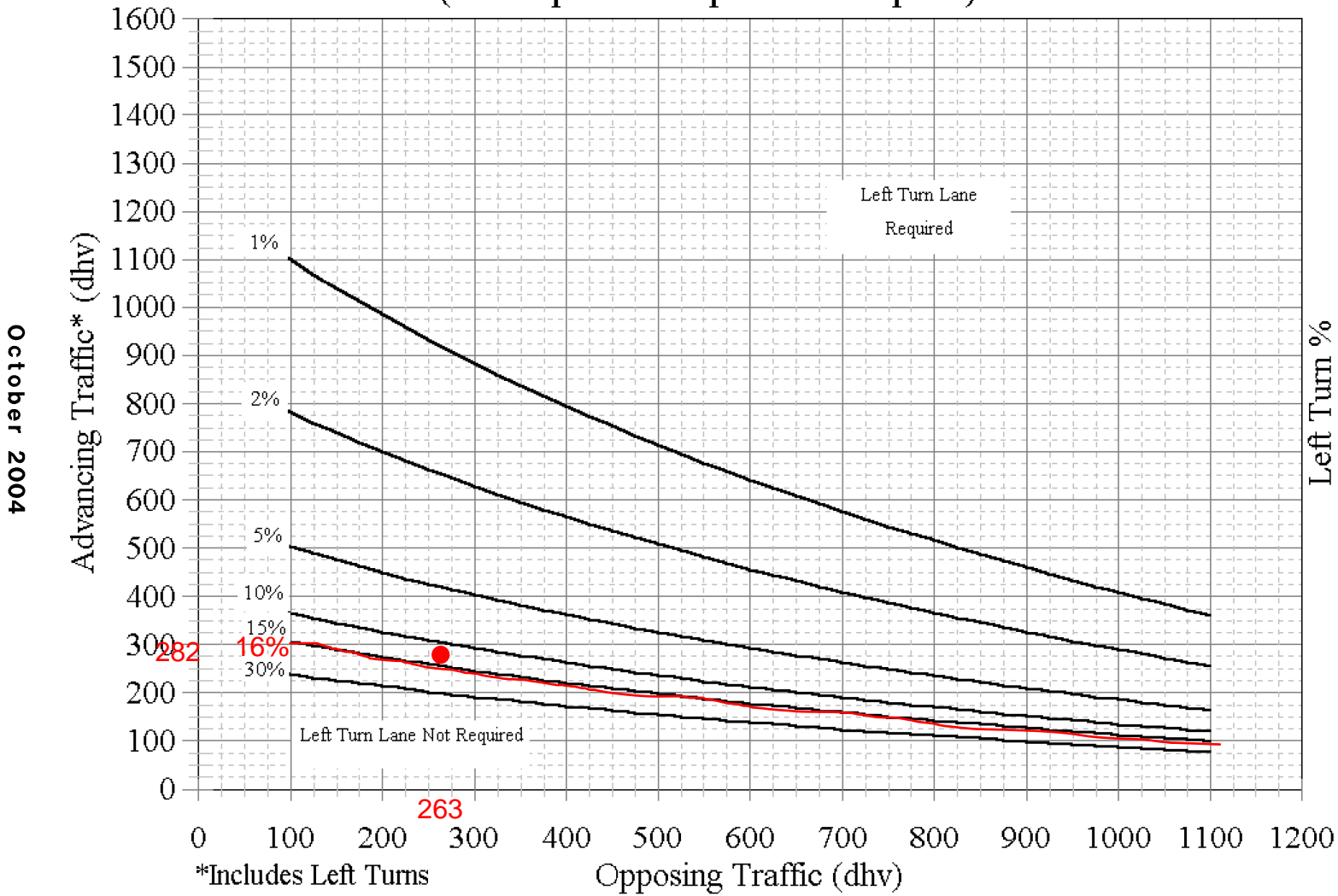
Warrants	
Warrant 1: Eight-Hour Vehicular Volume	✓
A. Minimum Vehicular Volumes (Both major approaches --and-- more critical minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- more critical minor approach) --or--	✓
56% Vehicular --and-- Interruption Volumes (Both major approaches --and-- more critical minor approach)	✓
Warrant 2: Four-Hour Vehicular Volume	✓
Four-Hour Vehicular Volume (Both major approaches --and-- more critical minor approach)	✓
Warrant 3: Peak Hour	✓

A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- more critical minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. Peak-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported Crash History --and--	
B1. Angle Crashes and Pedestrian Crashes within a 1-year Period (All Severities)	
B2. Angle Crashes and Pedestrian Crashes within a 1-year Period (Fatal-and-Injury)	
B3. Angle Crashes and Pedestrian Crashes within a 3-year Period (All Severities)	
B4. Angle Crashes and Pedestrian Crashes within a 3-year Period (Fatal-and-Injury)	
C. 56% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	✓
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

APPENDIX E:
TURN LANE WARRANTS ANALYSIS

WV 41 & Woodcrest Dr
AM Peak - Southbound

2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



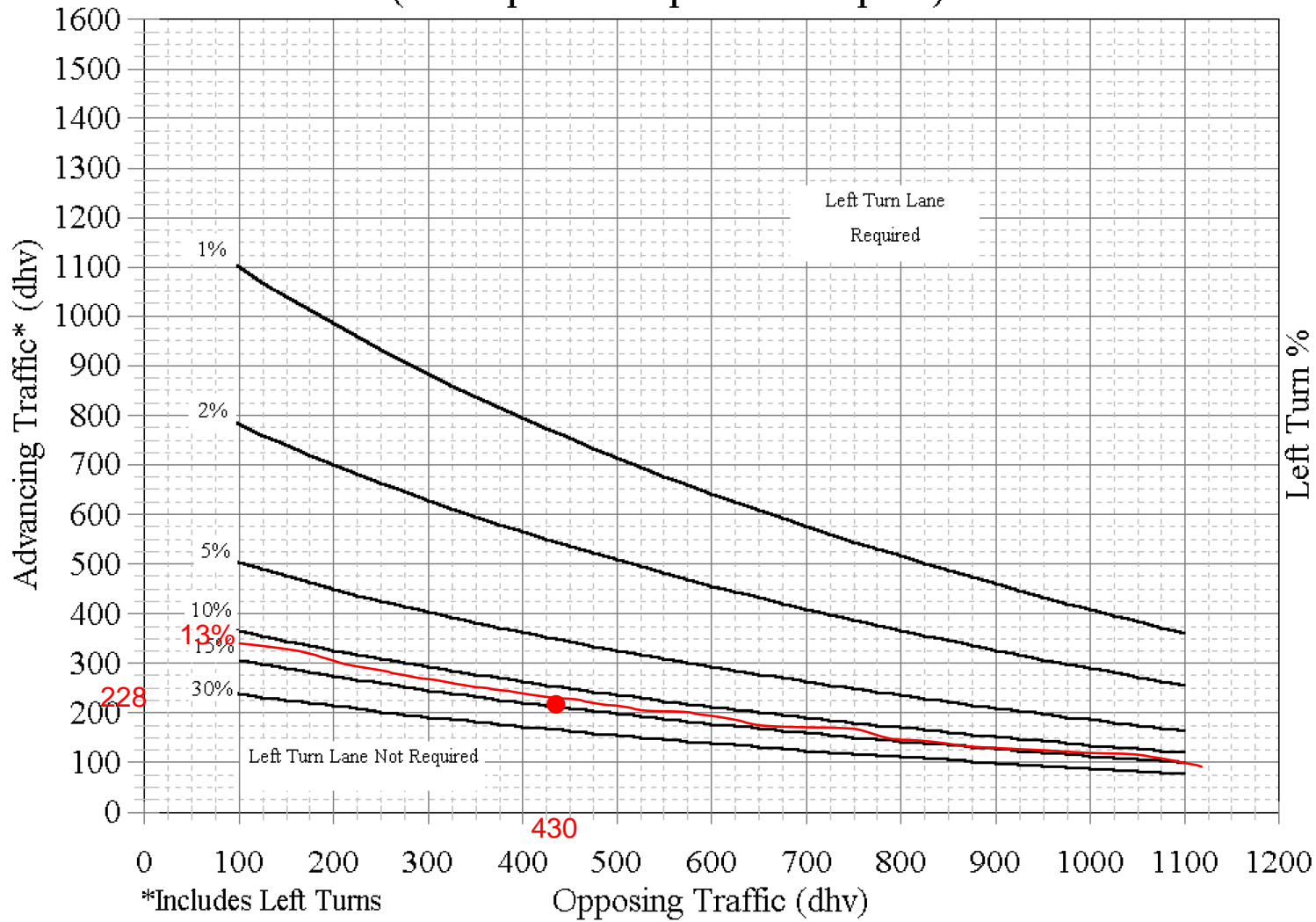
2-LANE LEFT TURN LANE
WARRANT (HIGH SPEED)

401-5b
REFERENCE SECTION
401.6.1

WV 41 & Woodcrest Dr
PM Peak - Southbound

2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)

October 2004



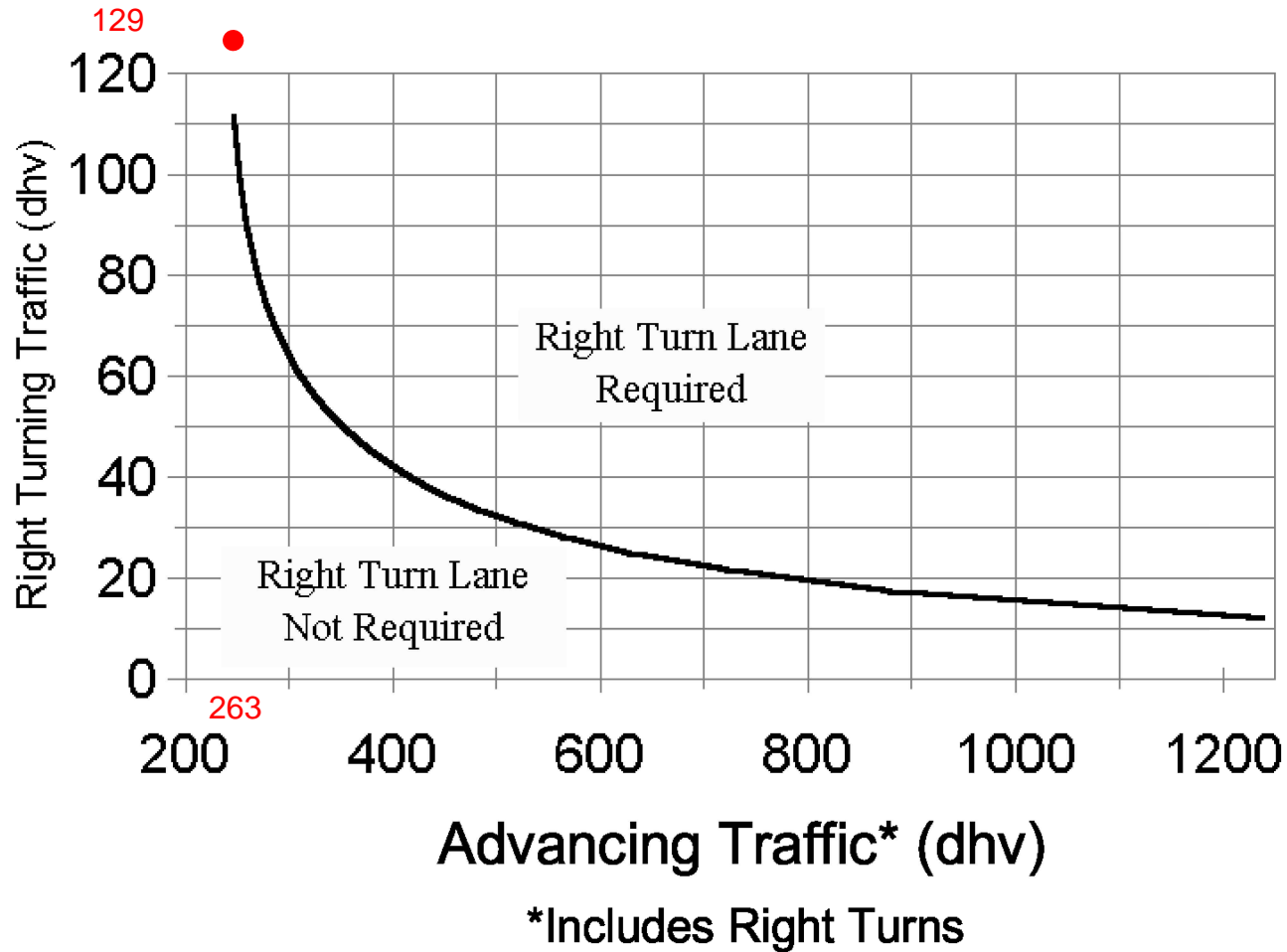
2-LANE LEFT TURN LANE
WARRANT (HIGH SPEED)

401-5b
REFERENCE SECTION
401.6.1

WV 41 & Woodcrest Dr
AM Peak - Northbound

2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed



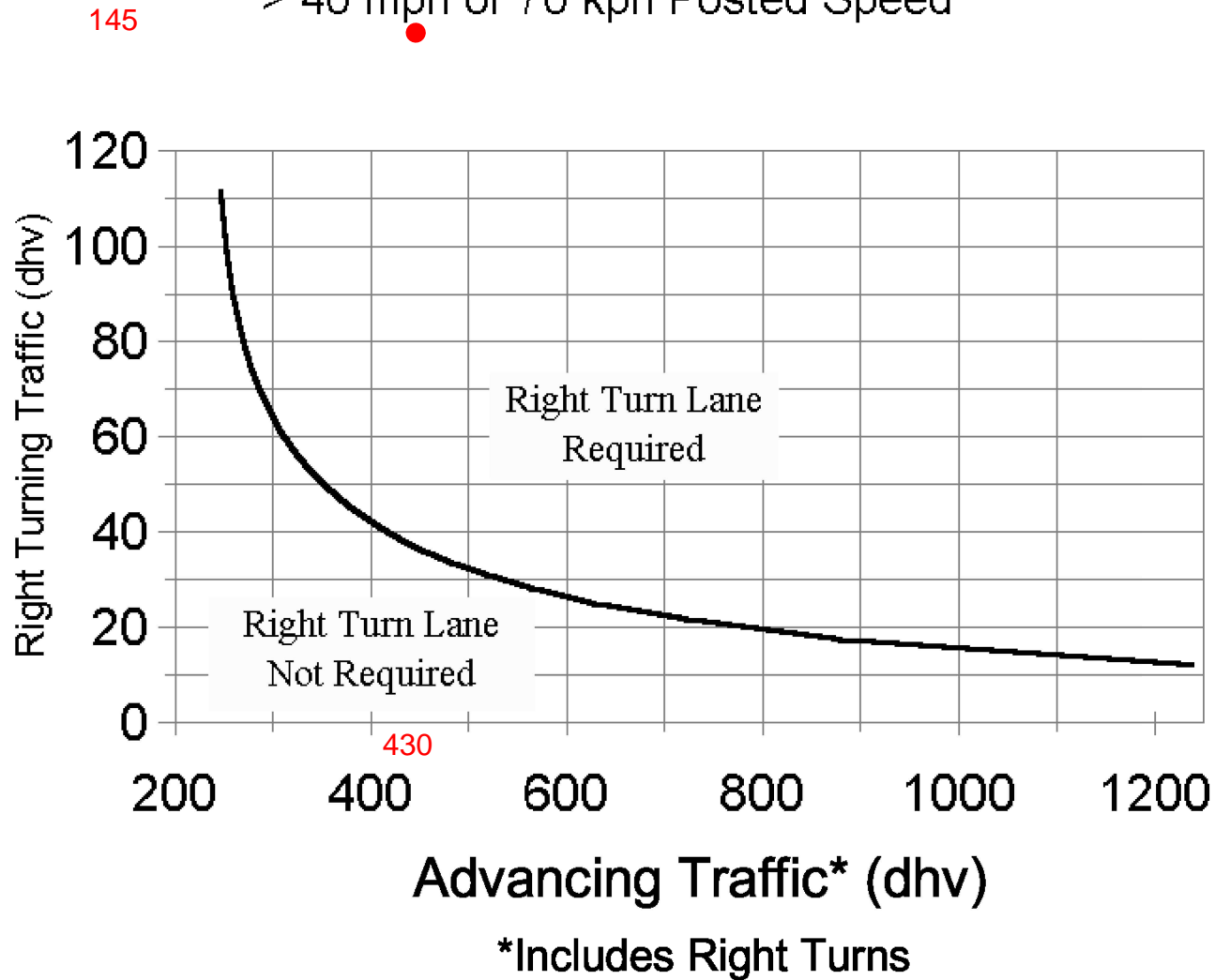
October 2004

2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)	
401-6b	REFERENCE SECTION 401.6.3

WV 41 & Woodcrest Dr
PM Peak - Northbound

2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed



145

430

October 2004

2-LANE RIGHT TURN LANE
WARRANT (HIGH SPEED)

REFERENCE SECTION
401.6.3

401-6b

BASIS FOR COMPUTING LENGTH OF TURN LANES	401-9
	REFERENCE SECTIONS 401.6.1 & 401.6.3

Type of Traffic Control	Design Speed		
	30-35	40-65	
	Turn Demand Volume		
	All	Low*	High
Signalized	A	B ** C	B ** C
Unsignalized Stopped Crossroad	A	A	A
Unsignalized Through Road	A	B	** B or C

* Low is considered 10% or less of approach traffic volume

** Whichever is greater

CONDITION A	QUEUE ONLY
Length = Queue Length (Figure 401-10)	

CONDITION B	HIGH SPEED DECELERATION ONLY
Design Speed	Length (feet)
40	75
45	125
50	175
55	250
60	300
65	375

CONDITION C	MODERATE SPEED DECELERATION AND QUEUE
Design Speed	Length (feet)
40	75 + Queue Length (Figure 401-10)
45	75 "
50	100 "
55	125 "
60	150 "
65	175 "

75+50 = 125ft

For explanation, see Turn Lane Design Example

QUEUE LENGTH AT INTERSECTIONS	401-10
	REFERENCE SECTIONS 401.6.1 & 401.6.3

Vehicles/Cycle =
44/60 = 0.73 = 1

*Average # of Vehicles/Cycle	Queue Length (feet)
1	50
2	100
3	150
4	175
5	200
6	250
7	275
8	325
9	350
10	375
11	400
12	450
13	475
14	500
15	525
16	550
17	600
18	625
19	650
20	675
21	725
22	750
23	775
24	800
25	825
26	875
27	900
28	925
29	950
30	975

*Average # of Vehicles/Cycle	Queue Length (feet)
31	1025
32	1050
33	1075
34	1100
35	1125
36	1150
37	1175
38	1200
39	1225
40	1250
41	1300
42	1325
43	1350
44	1375
45	1400
46	1450
47	1475
48	1500
49	1525
50	1550
51	1600
52	1625
53	1650
54	1675
55	1700
56	1750
57	1775
58	1800
59	1825
60	1850

NOTE: ADDITIONAL TURN LANE STORAGE MAY BE REQUIRED WHEN THE AVERAGE VEHICLES PER CYCLE >= 10 AND THE HEAVY VEHICLES ARE >= 10%.

$$* \text{ AVERAGE VEHICLES PER CYCLE} = \frac{\text{DHV (TURNING LANE)}}{\text{CYCLES/HOUR}}$$

IF CYCLES ARE UNKNOWN ASSUME:

- UNIGNALIZED OR 2 PHASE = 60 CYCLES/HOUR
- 3 PHASE = 40 CYCLES/HOUR
- 4 PHASE = 30 CYCLES/HOUR

BASIS FOR COMPUTING LENGTH OF TURN LANES	401-9
	REFERENCE SECTIONS 401.6.1 & 401.6.3

Type of Traffic Control	Design Speed		
	30-35	40-65	
	Turn Demand Volume		
	All	Low*	High
Signalized	A	B ** C	B ** C
Unsignalized Stopped Crossroad	A	A	A
Unsignalized Through Road	A	B	** B or C

* Low is considered 10% or less of approach traffic volume

** Whichever is greater

CONDITION A	QUEUE ONLY
Length = Queue Length (Figure 401-10)	

CONDITION B	HIGH SPEED DECELERATION ONLY
Design Speed	Length (feet)
40	75
45	125
50	175
55	250
60	300
65	375

CONDITION C	MODERATE SPEED DECELERATION AND QUEUE
Design Speed	Length (feet)
40	75 + Queue Length (Figure 401-10)
45	75 "
50	100 "
55	125 "
60	150 "
65	175 "

75+150 = 225ft

For explanation, see Turn Lane Design Example

QUEUE LENGTH AT INTERSECTIONS	401-10
	REFERENCE SECTIONS 401.6.1 & 401.6.3

Vehicles/Cycle =
129/60 = 2.15 = 3

*Average # of Vehicles/Cycle	Queue Length (feet)
1	50
2	100
3	150
4	175
5	200
6	250
7	275
8	325
9	350
10	375
11	400
12	450
13	475
14	500
15	525
16	550
17	600
18	625
19	650
20	675
21	725
22	750
23	775
24	800
25	825
26	875
27	900
28	925
29	950
30	975

*Average # of Vehicles/Cycle	Queue Length (feet)
31	1025
32	1050
33	1075
34	1100
35	1125
36	1150
37	1175
38	1200
39	1225
40	1250
41	1300
42	1325
43	1350
44	1375
45	1400
46	1450
47	1475
48	1500
49	1525
50	1550
51	1600
52	1625
53	1650
54	1675
55	1700
56	1750
57	1775
58	1800
59	1825
60	1850

NOTE: ADDITIONAL TURN LANE STORAGE MAY BE REQUIRED WHEN THE AVERAGE VEHICLES PER CYCLE >= 10 AND THE HEAVY VEHICLES ARE >= 10%.

$$* \text{ AVERAGE VEHICLES PER CYCLE} = \frac{\text{DHV (TURNING LANE)}}{\text{CYCLES/HOUR}}$$

IF CYCLES ARE UNKNOWN ASSUME:

- UNIGNALIZED OR 2 PHASE = 60 CYCLES/HOUR
- 3 PHASE = 40 CYCLES/HOUR
- 4 PHASE = 30 CYCLES/HOUR

BASIS FOR COMPUTING LENGTH OF TURN LANES	401-9
	REFERENCE SECTIONS 401.6.1 & 401.6.3

Type of Traffic Control	Design Speed		
	30-35	40-65	
	Turn Demand Volume		
	All	Low*	High
Signalized	A	B ** C	B ** C
Unsignalized Stopped Crossroad	A	A	A
Unsignalized Through Road	A	B	** B or C

* Low is considered 10% or less of approach traffic volume

** Whichever is greater

CONDITION A	QUEUE ONLY
Length = Queue Length (Figure 401-10)	

CONDITION B	HIGH SPEED DECELERATION ONLY
Design Speed	Length (feet)
40	75
45	125
50	175
55	250
60	300
65	375

CONDITION C	MODERATE SPEED DECELERATION AND QUEUE
Design Speed	Length (feet)
40	75 + Queue Length (Figure 401-10)
45	75 "
50	100 "
55	125 "
60	150 "
65	175 "

75+150 = 225ft

For explanation, see Turn Lane Design Example

QUEUE LENGTH AT INTERSECTIONS	401-10
	REFERENCE SECTIONS 401.6.1 & 401.6.3

Vehicles/Cycle =
145/60 = 2.41 = 3

*Average # of Vehicles/Cycle	Queue Length (feet)
1	50
2	100
3	150
4	175
5	200
6	250
7	275
8	325
9	350
10	375
11	400
12	450
13	475
14	500
15	525
16	550
17	600
18	625
19	650
20	675
21	725
22	750
23	775
24	800
25	825
26	875
27	900
28	925
29	950
30	975

*Average # of Vehicles/Cycle	Queue Length (feet)
31	1025
32	1050
33	1075
34	1100
35	1125
36	1150
37	1175
38	1200
39	1225
40	1250
41	1300
42	1325
43	1350
44	1375
45	1400
46	1450
47	1475
48	1500
49	1525
50	1550
51	1600
52	1625
53	1650
54	1675
55	1700
56	1750
57	1775
58	1800
59	1825
60	1850

NOTE: ADDITIONAL TURN LANE STORAGE MAY BE REQUIRED WHEN THE AVERAGE VEHICLES PER CYCLE >= 10 AND THE HEAVY VEHICLES ARE >= 10%.

$$* \text{ AVERAGE VEHICLES PER CYCLE} = \frac{\text{DHV (TURNING LANE)}}{\text{CYCLES/HOUR}}$$

IF CYCLES ARE UNKNOWN ASSUME:

- UNIGNALIZED OR 2 PHASE = 60 CYCLES/HOUR
- 3 PHASE = 40 CYCLES/HOUR
- 4 PHASE = 30 CYCLES/HOUR