

Traffic



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Traffic Engineering Analysis

RaceTrac

Stafford Road at Ronald Reagan Parkway

Plainfield, Indiana

Submitted by:

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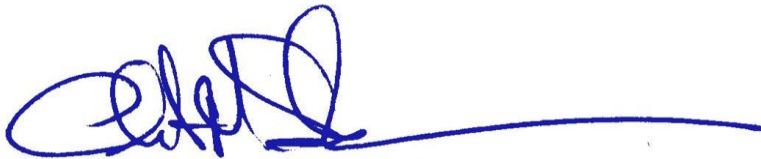
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Certification

I certify this Traffic Analysis has been prepared by me or under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering.



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05/21/2024



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Executive Summary

The proposed development, RaceTrac, is situated on the south side of Stafford Road between Columbia Road and Ronald Reagan Parkway in Plainfield, Indiana. The gas station consists of an 8,100 square foot convenience store with 22 fueling positions -- 16 non-truck plus 6 truck (see preliminary site plan on page 22).

The development is accessed via Midfield Court at Columbia Road and a second access¹, Swift Drive (shifted east²) between Columbia Road and Ronald Reagan Parkway.

Study scenarios for the AM and PM peak hours include:

1. Existing Traffic (2024)
2. Existing Traffic plus Background Growth³ (2026)
3. Existing Traffic plus Background Growth plus Projected Site Traffic (2026)
4. Existing Traffic plus Background Growth⁴ (2036)
5. Existing Traffic plus Background Growth plus Projected Site Traffic (2036)

Midfield Court at Columbia Road

A northbound right turn lane along Columbia Road is not warranted⁵ based on INDOT guidelines (see page 10) or Level of Service (LOS) analysis (see page 13).

Dual approach lanes for the Midfield Court approach to Columbia Road should be considered⁵ based on INDOT guidelines (see page 11) or LOS analysis (see pages 13-17). Dual approach lanes are often provided to allow right turning vehicles to exit without delay behind a vehicle waiting to turn left.

Stafford Road at Columbia Road

Under side-street stop control, this intersection will face challenges upon full build-out⁵ of the proposed development, with unacceptable LOS, particularly for the Columbia Road approaches during the AM and PM peak hours (see page 13).

Mitigation efforts considered the installation of a traffic control signal (see page 12), which emerged as the warranted and recommended option. As a signalized intersection with additional turn lanes, all turning movements are projected to have an acceptable LOS (see pages 14-17).

Stafford Road at Swift Drive (Right-in/Right-out)

An eastbound right turn lane along Stafford Road is not warranted based on INDOT guidelines (see page 10). All approaches at this intersection are projected to have an acceptable LOS and vehicle queueing based on projected 2036 full build-out traffic volumes (see page 13).

Stafford Road at Ronald Reagan Parkway

The recommended mitigation (see pages 14-17) results in an overall acceptable LOS. As development continues near this intersection, consideration should be given to three northbound left-turn lanes and/or additional northbound and southbound through lanes, as suggested in previous studies and the Town's Thoroughfare Plan, respectively.

¹ Right-in/Right-out Access

² The existing median for the channelized northbound right turning movement from Columbia Road to Stafford Road should be extended beyond the shifted Swift Drive.

³ 2 years of background traffic growth at an annual rate of 2%

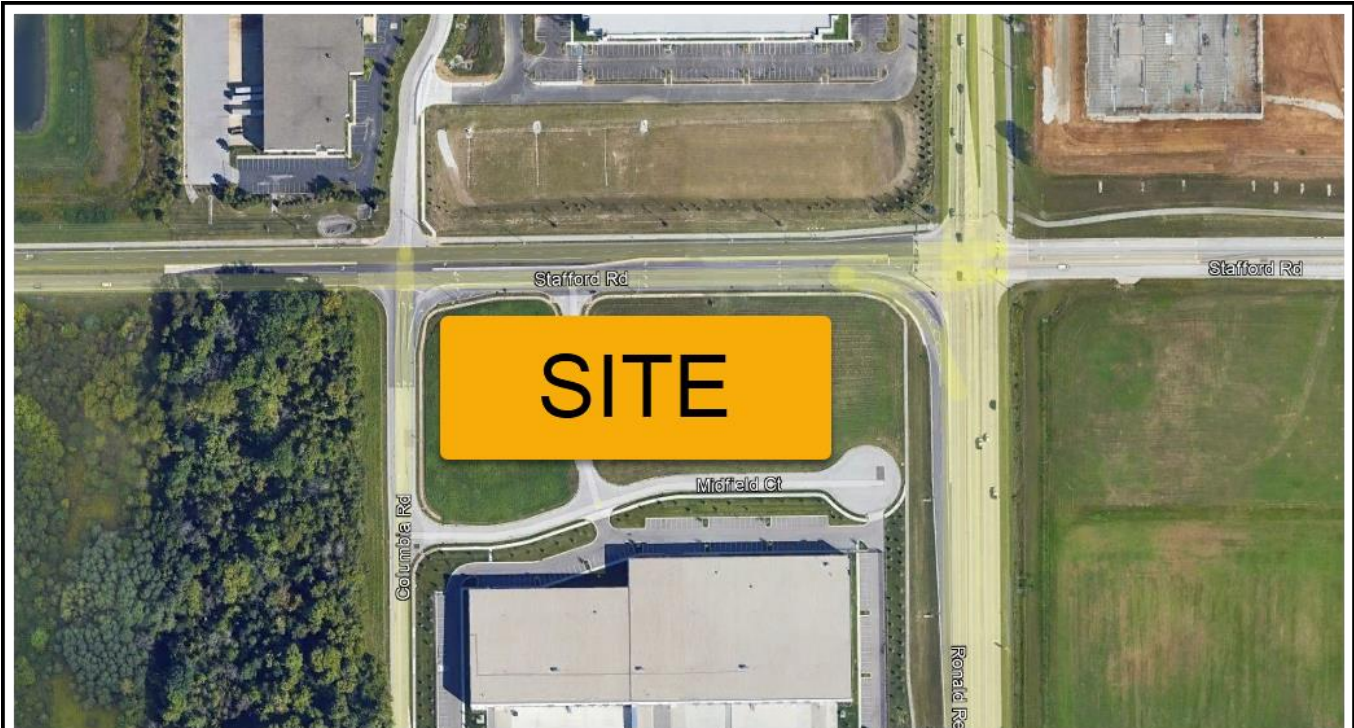
⁴ 12 years of background traffic growth at an annual rate of 2%

⁵ Using projected 2036 turning movements (existing traffic + background growth + projected site traffic).

Proposed Development

Development and Land Use Details

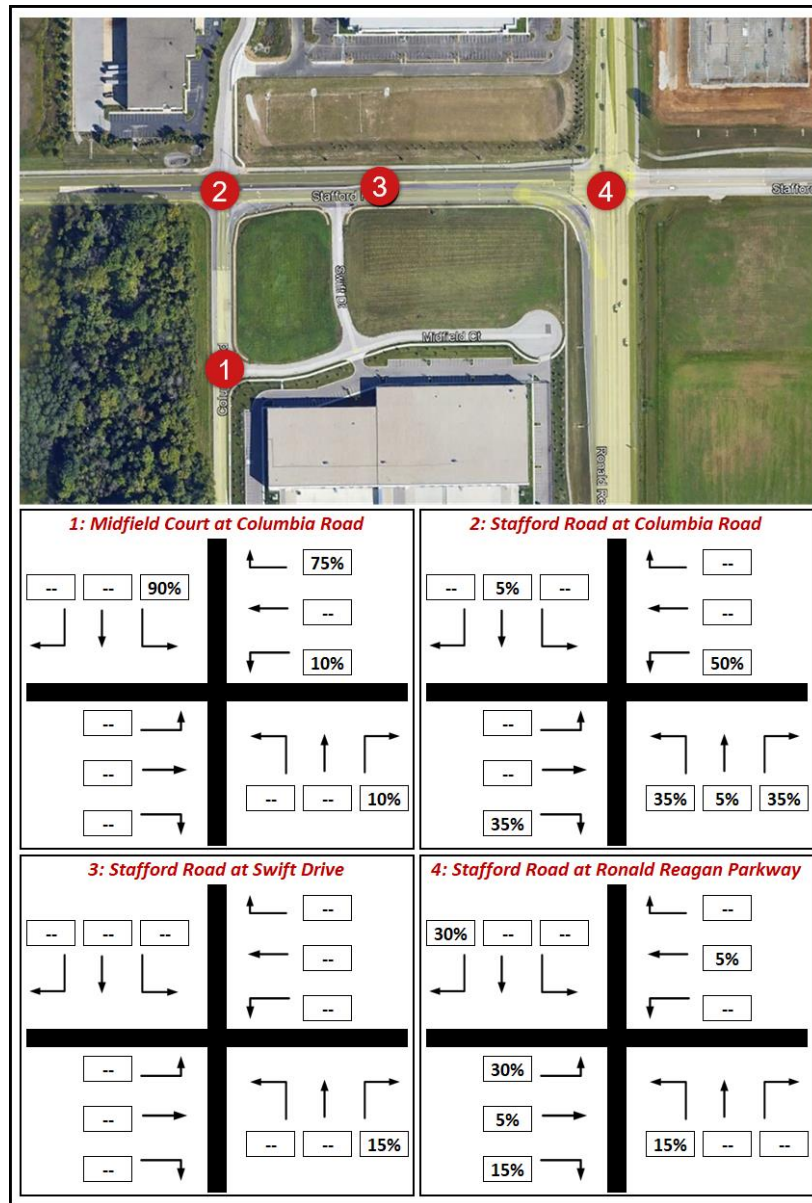
Based on traffic data from the Institute of Transportation Engineers' Trip Generation Manual (11th Edition), the expected traffic generated by the proposed development is detailed below:



Land Use Information			Trip Generation					
Land Use	Land Use Code	Size	Weekday		AM Peak Hour		PM Peak Hour	
			Entry	Exit	Entry	Exit	Entry	Exit
Convenience Store/Gas Station	945	16 Fueling Positions	2766	2766	253	253	215	215
		<i>New Site Traffic 25%</i>	692	692	63	63	54	54
		<i>Pass-by Site Traffic 75%</i>	2074	2074	190	190	161	161
Truck Stop	950	6 Fueling Positions	672	672	41	43	49	44
		<i>New Site Traffic 25%</i>	168	168	10	11	12	11
		<i>Pass-by Site Traffic 75%</i>	504	504	31	32	37	33
		Total Site Traffic	3438	3438	294	296	264	259
		New Site Traffic	860	860	73	74	66	65
		Pass-by Site Traffic	2578	2578	221	222	198	194

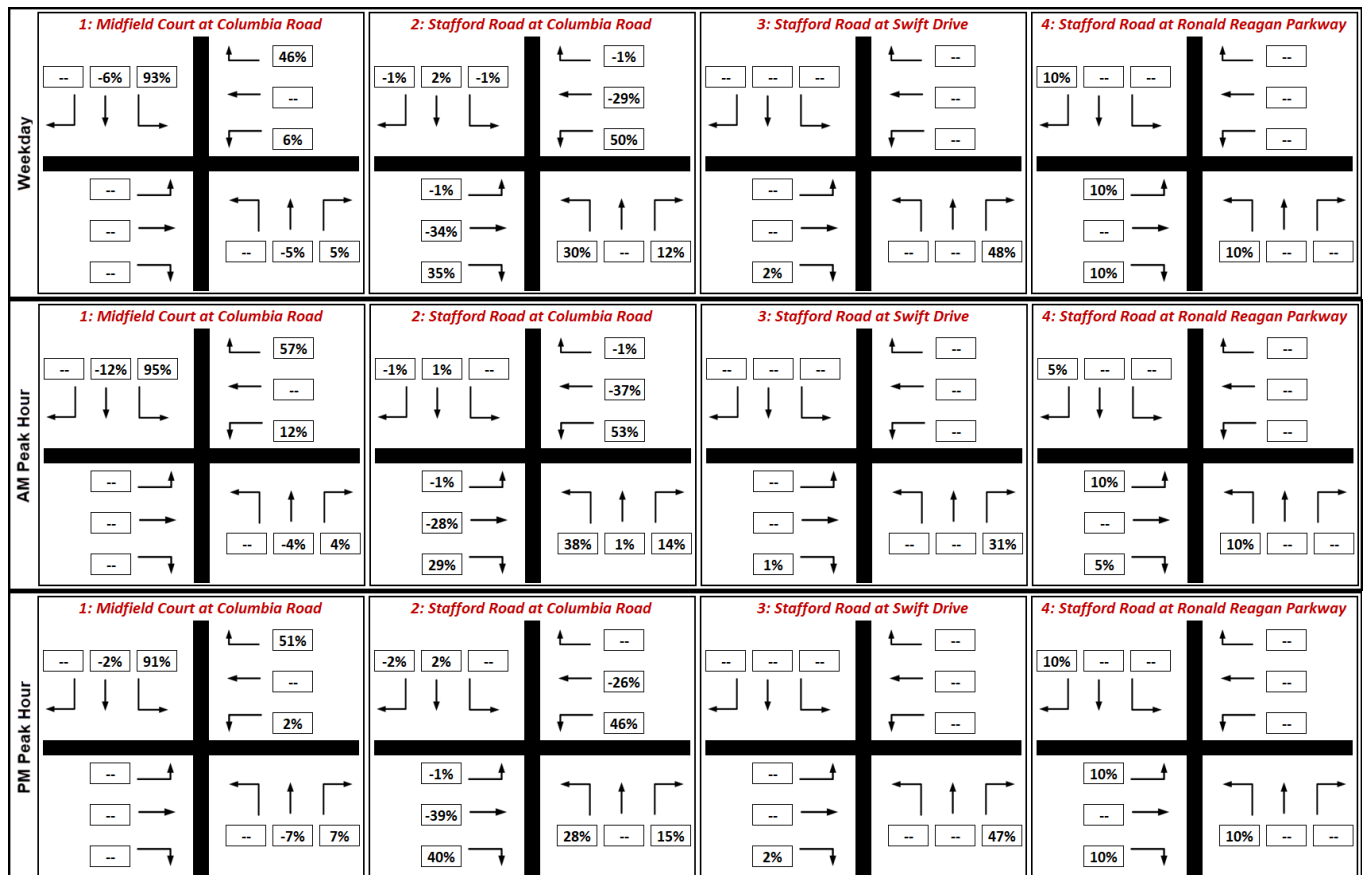
Distribution of New Site Traffic

The distribution of new site traffic is based on the nature of the proposed development and proximity to population centers. The following graphic depicts the distribution of new site traffic entering and exiting the proposed development:



Distribution of Pass-by Site Traffic

The balance of site traffic is considered pass-by traffic. The distribution of pass-by site traffic is based on existing traffic patterns in this area. The following graphic depict the portion of site traffic⁶ already on the roadway and choosing to patronize the development (i.e., pass-by traffic):



⁶ The negative adjustments reflect the existing traffic patronizing the development and is therefore a negative adjustment to through traffic volumes

Projected Peak Hour Turning Movements

2026 Full Build-out



AM Peak Hour (2026 Full Build-out)

1: Midfield Court at Columbia Road

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	0	102	1	1	260	0	0	0	0	0	0	1	365
Background Growth	0	4	0	0	11	0	0	0	0	0	0	0	15
New Site Traffic	0	-9	16	277	-27	0	0	0	0	34	0	182	473
Future Total	0	97	17	278	244	0	0	0	0	34	0	183	853

2: Stafford Road at Columbia Road

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	1	0	119	4	0	10	13	544	12	210	724	30	1667
Background Growth	0	0	5	0	0	0	1	22	0	8	29	1	66
New Site Traffic	110	6	56	0	6	-2	-2	-62	90	163	-82	0	283
Future Total	111	6	180	4	6	8	12	504	102	381	671	31	2016

3: Stafford Road at Swift Drive

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	0	0	0	0	0	0	0	88	1	0	0	0	89
Background Growth	0	-10	0	0	0	0	0	4	0	0	0	0	-6
New Site Traffic	0	10	80	0	0	0	0	26	2	0	37	0	155
Future Total	0	0	80	0	0	0	0	118	3	0	37	0	238

4: Stafford Road at Ronald Reagan Parkway

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	759	906	58	25	421	113	68	62	536	15	65	22	3050
Background Growth	31	37	2	1	17	5	3	3	22	1	3	1	126
New Site Traffic	33	0	0	0	0	33	44	4	22	0	4	0	140
Future Total	823	943	60	26	438	151	115	69	580	16	72	23	3316

PM Peak Hour (2026 Full Build-out)

1: Midfield Court at Columbia Road

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	0	237	1	1	63	0	0	0	0	0	0	1	303
Background Growth	0	10	0	0	3	0	0	0	0	0	0	0	13
New Site Traffic	0	-14	21	239	-4	0	0	0	0	11	0	147	400
Future Total	0	233	22	240	62	0	0	0	0	11	0	148	716

2: Stafford Road at Columbia Road

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	15	1	224	9	2	47	10	979	8	56	678	8	2037
Background Growth	1	0	9	0	0	2	0	40	0	2	27	0	81
New Site Traffic	77	3	52	0	7	-4	-2	-78	103	125	-52	0	231
Future Total	93	4	285	9	9	45	8	941	111	183	653	8	2349

3: Stafford Road at Swift Drive

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	0	0	5	0	0	0	0	162	1	0	0	0	168
Background Growth	0	0	0	0	0	0	0	7	0	0	0	0	7
New Site Traffic	0	0	101	0	0	0	0	23	4	0	33	0	161
Future Total	0	0	106	0	0	0	0	192	5	0	33	0	336

4: Stafford Road at Ronald Reagan Parkway

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	573	919	21	22	780	52	134	77	958	48	99	46	3729
Background Growth	23	37	1	1	32	2	5	39	2	4	2	151	
New Site Traffic	30	0	0	0	0	40	39	3	29	0	3	0	144
Future Total	626	956	22	23	812	94	178	83	1026	50	106	48	4024

2036 Full Build-out



AM Peak Hour (2036 Full Build-out)

1: Midfield Court at Columbia Road

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	0	102	1	1	260	0	0	0	0	0	0	1	365
Background Growth	0	27	0	0	70	0	0	0	0	0	0	0	97
New Site Traffic	0	-9	16	277	-27	0	0	0	0	34	0	182	473
Future Total	0	120	17	278	303	0	0	0	0	34	0	183	935

2: Stafford Road at Columbia Road

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	1	0	119	4	0	10	13	544	12	210	724	30	1667
Background Growth	0	0	32	1	0	3	3	146	3	56	194	8	446
New Site Traffic	110	6	56	0	6	-2	-2	-62	90	163	-82	0	283
Future Total	111	6	207	5	6	11	14	628	105	429	836	38	2396

3: Stafford Road at Swift Drive

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	0	0	0	0	0	0	0	88	1	0	0	0	89
Background Growth	0	-10	0	0	0	0	0	24	0	0	0	0	14
New Site Traffic	0	10	80	0	0	0	0	26	2	0	37	0	155
Future Total	0	0	80	0	0	0	0	138	3	0	37	0	258

4: Stafford Road at Ronald Reagan Parkway

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	759	906	58	25	421	113	68	62	536	15	65	22	3050
Background Growth	204	243	16	7	113	30	18	17	144	4	17	6	819
New Site Traffic	33	0	0	0	0	33	44	4	22	0	4	0	140
Future Total	996	1149	74	32	534	176	130	83	702	19	86	28	4009

PM Peak Hour (2036 Full Build-out)

1: Midfield Court at Columbia Road

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	0	237	1	1	63	0	0	0	0	0	0	1	303
Background Growth	0	64	0	0	17	0	0	0	0	0	0	0	81
New Site Traffic	0	-14	21	239	-4	0	0	0	0	11	0	147	400
Future Total	0	287	22	240	76	0	0	0	0	11	0	148	784

2: Stafford Road at Columbia Road

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	15	1	224	9	2	47	10	979	8	56	678	8	2037
Background Growth	4	0	60	2	1	13	3	263	2	15	182	2	547
New Site Traffic	77	3	52	0	7	-4	-2	-78	103	125	-52	0	231
Future Total	96	4	336	11	10	56	11	1164	113	196	808	10	2815

3: Stafford Road at Swift Drive

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	0	0	5	0	0	0	0	162	1	0	0	0	168
Background Growth	0	0	1	0	0	0	0	43	0	0	0	0	44
New Site Traffic	0	0	101	0	0	0	0	23	4	0	33	0	161
Future Total	0	0	107	0	0	0	0	228	5	0	33	0	373

4: Stafford Road at Ronald Reagan Parkway

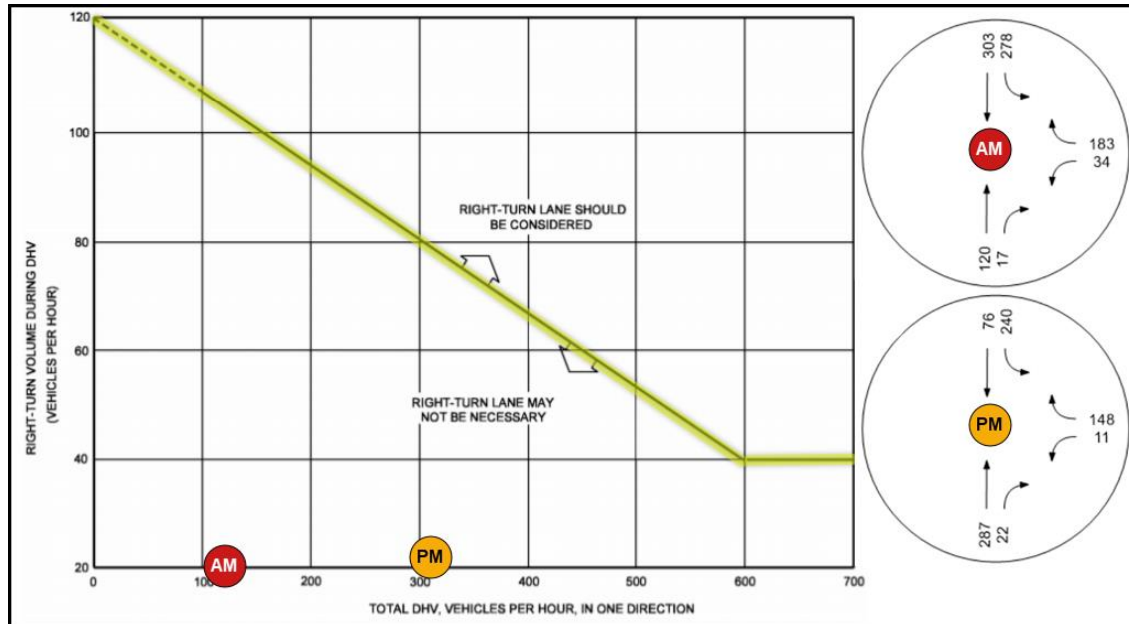
Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Final Base	573	919	21	22	780	52	134	77	958	48	99	46	3729
Background Growth	154	246	6	6	209	14	36	21	257	13	27	12	1001
New Site Traffic	30	0	0	0	0	40	39	3	29	0	3	0	144
Future Total	757	1165	27	28	989	106	209	101	1244	61	129	58	4874

Right Turn Lane Analysis

As stated in the INDOT Driveway Permit Manual: “Where the turning maneuver for a left- or right-turning vehicle occurs in a through travel lane, it disrupts the flow of through traffic. To minimize potential conflicts, the use of a turn lane may be warranted to improve the level of service and safety at the intersection.”

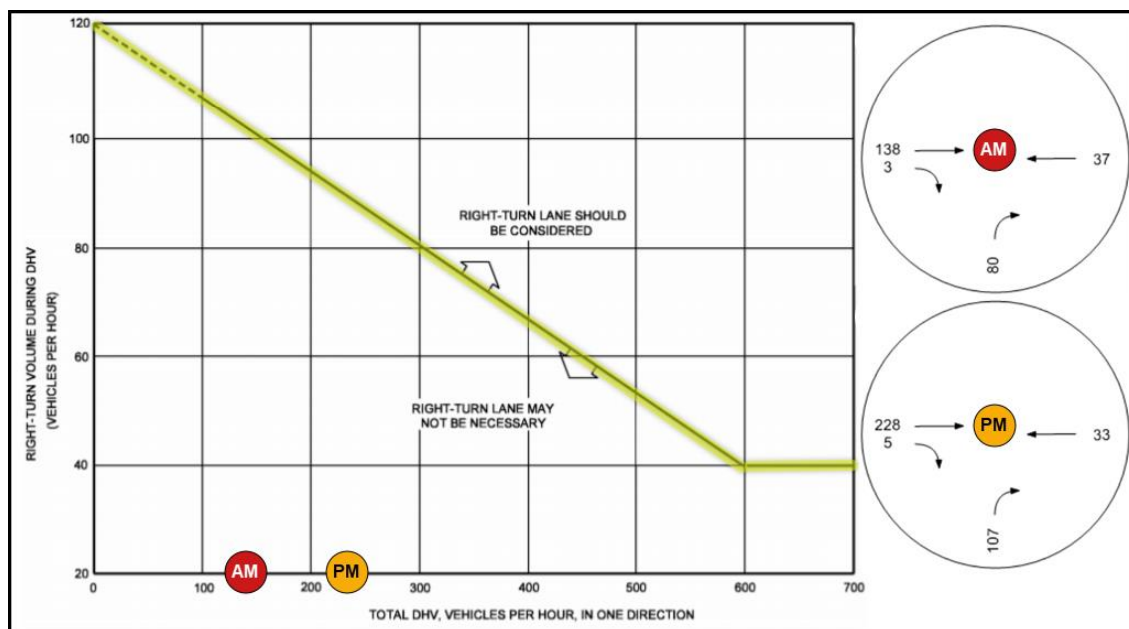
Midfield Court at Columbia Road

Based on INDOT criteria⁷ below, a northbound right turn lane⁸ is not necessary:



Stafford Road at Swift Drive

Based on INDOT criteria⁷ below, an eastbound right turn lane⁸ is not necessary:

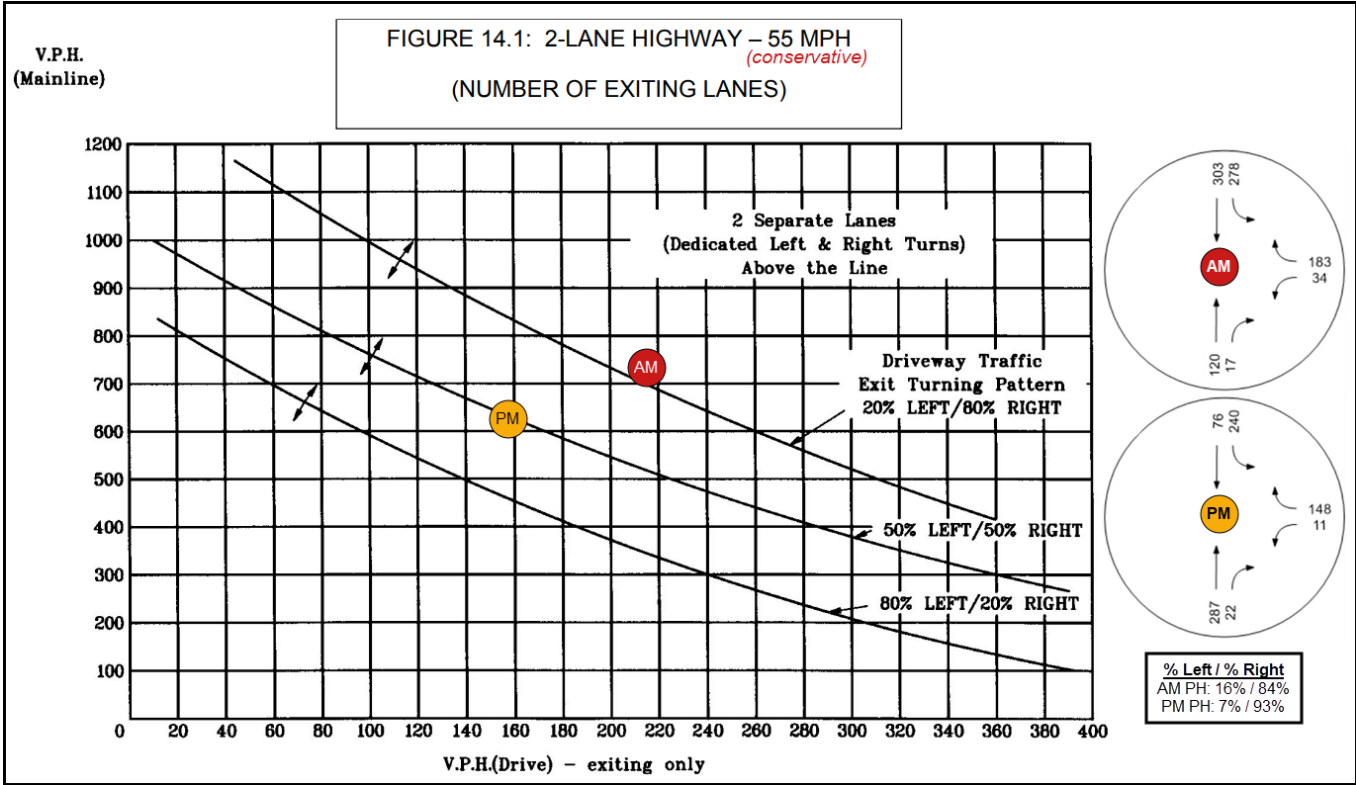


⁷ INDOT Driveway Permit Manual 2018

⁸ Using projected 2036 turning movements (existing traffic + background growth + projected site traffic)

Dual Exit Lanes Analysis – Midfield Court at Columbia Road

Dual exit lanes⁹ should be considered¹⁰ for the Midfield Court approach based on INDOT¹¹ guidelines below:



Note: the posted speed limit along Columbia Road is 35 mph

⁹ Regardless of requirements, dual exit lanes are often included to allow right turning vehicles to exit without delay behind a left turning vehicle
¹⁰ Using projected 2036 turning movements (existing traffic + background growth + projected site traffic)
¹¹ Indiana Department of Transportation (INDOT) – INDOT Driveway Manual 2018

Traffic Signal Warrant Summary

A traffic signal *is warranted* for the Stafford Road at Columbia Road intersection based on projected 2026 traffic volumes at full build-out¹².

Based on Table 4C-1 of the MUTCD¹³, posted speed limit¹⁴ of 40 mph, two or more lanes on the major street approaches, and two or more lanes on the minor street approach, the projected volumes warrant consideration of a future traffic signal were satisfied for 13 hours of a typical day (eight hours required).

Condition A—Minimum Vehicular Volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112
Condition B—Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

1. Table 4C-1, Condition “A” at the “100%” threshold – signal is warranted when Stafford Road exceeds 600 vehicles and Columbia Road approach exceeds 200 vehicles per hour for the same eight (8) hours of a typical day – **this threshold was satisfied for one (1) hour of the required eight (8) hours, therefore a traffic signal is not warranted based on Condition “A”.**
2. Table 4C-1, Condition “B” at the “100%” threshold – signal is warranted when Stafford Road exceeds 900 vehicles and Columbia Road approach exceeds 100 vehicles per hour for the same eight (8) hours of a typical day – **this threshold is satisfied for 13 hours of the required eight (8) hours, therefore a traffic signal is warranted based on Condition “B”.**

¹² Using projected 2026 turning movements (existing traffic + background growth + projected site traffic)

¹³ Manual on Uniform Traffic Control Devices (MUTCD)

¹⁴ Posted speed limit along Stafford Road is 40 mph

Level of Service Summary

The individual turning movements are provided in terms of Level of Service (LOS). In general, LOS “D” or better is considered acceptable while LOS “E” or “F” suggest volume exceeding the capacity of the intersection, approach, or turning movement:

LOS vs. Delay		
LOS	Signalized Intersection	Unsignalized Intersection
A	<10 seconds	<10 seconds
B	10-20 seconds	10-15 seconds
C	20-35 seconds	15-25 seconds
D	35-55 seconds	25-35 seconds
E	55-80 seconds	35-50 seconds
F	>80 seconds	>50 seconds

Source: Federal Highway Administration (FHWA)

2026 and 2036 Non-mitigated

The existing and forecasted turning movement volumes along with the existing intersection configurations and traffic control were used to evaluate traffic operations. The calculations for the intersections of Stafford Road at Columbia Road and Stafford Road at Ronald Reagan Parkway were completed using the Trafficware Synchro/SimTraffic software package. In this case, the results reflect the average of five SimTraffic microsimulation runs for each scenario. Additionally, calculations for the intersections of Midfield Court at Columbia Road and Stafford Road at Swift Drive, right-in and right-out, were completed using the Vistro software package.

Tables 1 and 2 show the results of the existing and forecasted 2026 and 2036 volumes, assuming the current geometry, traffic control, and timing parameters. Table 1 provides the AM peak hour results and Table 2 provides the PM peak hour results. Results are provided for the overall intersection, a Level of Service grade and average delay per vehicle for all movements, and individual movements. The full calculations for each study scenario are included in an Appendix (separate document).

Table 1 – AM Peak Hour Results with Existing Intersection Configuration and Traffic Control

Intersection & Study Scenario	Overall		Northbound			Southbound			Eastbound			Westbound		
	LOS	Delay	L	T	R	L	T	R	L	T	R	L	T	R
Midfield Ct at Columbia Rd (Side-Street Stop)														
2024 Existing				A	A	A	A					-		A
2026 Existing + BG				A	A	A	A					-		A
2036 Existing + BG				A	A	A	A					-		A
2026 Existing + BG + Site				A	A	A	A					E		C
2036 Existing + BG + Site				A	A	A	A					E		C
Stafford Rd at Columbia Rd (Side-Street Stop)														
2024 Existing	A	2	B	A	A	C	B	A	A	A	A	A	A	A
2026 Existing + BG	A	2	B	D	A	D	B	A	A	A	A	A	A	A
2036 Existing + BG	A	4	D	D	A	F	D	A	A	A	A	C	A	A
2026 Existing + BG + Site	C	21	F	F	A	F	F	A	B	A	A	C	A	A
2036 Existing + BG + Site	E	39	F	F	F	F	F	F	A	A	A	E	A	A
Stafford Rd at Swift Dr (Side-Street Stop)														
2024 Existing					-					A	A			
2026 Existing + BG					-					A	A			
2036 Existing + BG					-					A	A			
2026 Existing + BG + Site					A					A	A			
2036 Existing + BG + Site					A					A	A			
Stafford Rd at Ronald Reagan Pkwy (Traffic Signal)														
2024 Existing	C	28	D	B	B	E	D	C	D	C	A	D	E	A
2026 Existing + BG	C	30	D	B	B	E	D	C	D	C	A	D	E	A
2036 Existing + BG	D	37	E	C	C	F	E	D	E	C	A	E	E	B
2026 Existing + BG + Site	C	33	D	C	B	E	D	D	D	C	A	D	E	A
2036 Existing + BG + Site	D	44	E	C	C	F	E	D	E	C	A	D	E	B

Note: Overall equals the average Level of Service (LOS) grade and delay in seconds per vehicle for all traffic. The other LOS grades for individual movements by approach direction.

Table 2 – PM Peak Hour Results with Existing Intersection Configuration and Traffic Control

Intersection & Study Scenario	Overall		Northbound			Southbound			Eastbound			Westbound		
	LOS	Delay	L	T	R	L	T	R	L	T	R	L	T	R
Midfield Ct at Columbia Rd (Side-Street Stop)														
2024 Existing				A	A	A	A					-		B
2026 Existing + BG				A	A	A	A					-		B
2036 Existing + BG				A	A	A	A					-		B
2026 Existing + BG + Site				A	A	B	A					E		C
2036 Existing + BG + Site				A	A	B	A					F		C
Stafford Rd at Columbia Rd (Side-Street Stop)														
2024 Existing	A	4	F	A	A	F	F	D	A	A	A	C	A	A
2026 Existing + BG	A	3	E	C	A	F	D	A	B	A	A	C	A	A
2036 Existing + BG	A	7	F	B	B	F	F	B	A	A	A	D	A	A
2026 Existing + BG + Site	E	48	F	F	F	F	F	F	A	A	A	F	A	A
2036 Existing + BG + Site	F	90	F	F	F	F	F	F	A	C	C	F	A	A
Stafford Rd at Swift Dr (Side-Street Stop)														
2024 Existing					A					A	A			
2026 Existing + BG					A					A	A			
2036 Existing + BG					B					A	A			
2026 Existing + BG + Site					B					A	A			
2036 Existing + BG + Site					B					A	A			
Stafford Rd at Ronald Reagan Pkwy (Traffic Signal)														
2024 Existing	C	33	D	C	B	F	D	D	E	C	A	D	E	A
2026 Existing + BG	D	36	D	C	B	F	E	D	E	D	A	E	E	A
2036 Existing + BG	E	69	E	C	C	F	F	F	E	D	A	E	E	B
2026 Existing + BG + Site	D	38	E	C	C	F	E	D	E	D	A	D	E	A
2036 Existing + BG + Site	F	89	E	C	C	F	F	F	E	D	A	E	F	B

Note: Overall equals the average Level of Service (LOS) grade and delay in seconds per vehicle for all traffic. The other LOS grades for individual movements by approach direction.

As shown, the overall LOS is acceptable, although some individual movements have poor results. As the volumes through the intersections increase, delays and congestion are expected to increase with operations reaching unacceptable levels. More specifically, the results indicate:

- Left turn and through movements from Columbia Road to Stafford Road are difficult today and will be increasingly hard to complete in the future. The difficulty of these movements from the sides-street stop-controlled approaches could be a reason why so few vehicles were recorded completing those movements.
- The LOS F for the southbound left turn movement from Ronald Reagan Parkway to Stafford Road is primarily a function of the low volume for this movement.
- Mitigation is necessary to provide for safe and efficient operations accommodating the forecasted volumes.

2026 Mitigation

The 2026 mitigation focused on geometric and control improvements at each intersection. The recommended mitigation includes:

- Midfield Court at Columbia Road: Dual approach lanes should be implemented at full build-out for the Columbia Road approach (i.e., dedicated left and right exit lanes).
- Stafford Road at Columbia Road:
 - Signal control, using the existing lanes and providing protective/permissive left-turn operations for the Stafford Road approaches and permissive left turn operations for the Columbia Road approaches.
 - Constructing an exclusive eastbound right turn lane on Stafford Road.

- Stafford Road at Ronald Reagan Parkway:
 - Constructing an exclusive southbound right-turn lane on Ronald Reagan Parkway at Stafford Road.
 - Restriping the existing westbound lanes on Stafford Road at Ronald Reagan Parkway to provide one left-turn lane (same), one through lane (same), and one combined through/right-turn lane (changed).

Table 3 shows the results of assuming this mitigation compared to the projected 2026 Background and Full Build-out results without mitigation.

Table 3 – 2026 Peak Hour Results, Mitigated versus Unmitigated

Intersection & Study Scenario	Overall		Northbound			Southbound			Eastbound			Westbound		
	LOS	Delay	L	T	R	L	T	R	L	T	R	L	T	R
AM Peak Hour														
Midfield Ct at Columbia Rd (Side-Street Stop)														
2026 Existing + BG				A	A	A	A					-		A
2026 Existing + BG + Site				A	A	A	A					E		C
2026 Mitigation				A	A	A	A					E		B
Stafford Rd at Columbia Rd (Traffic Signal)														
2026 Existing + BG	A	3	E	C	A	F	D	A	B	A	A	C	A	A
2026 Existing + BG + Site	E	48	F	F	F	F	F	F	A	A	A	F	A	A
2026 Mitigation	B	15	C	B	A	C	C	A	B	B	A	C	A	A
Stafford Rd at Ronald Reagan Pkwy (Traffic Signal)														
2026 Existing + BG	D	36	D	C	B	F	E	D	E	D	A	E	E	A
2026 Existing + BG + Site	D	38	E	C	C	F	E	D	E	D	A	D	E	A
2026 Mitigation	C	31	D	C	C	E	D	B	D	C	A	D	D	B
PM Peak Hour														
Midfield Ct at Columbia Rd (Side-Street Stop)														
2026 Existing + BG				A	A	A	A					-		B
2026 Existing + BG + Site				A	A	B	A					E		C
2026 Mitigation				A	A	B	A					E		B
Stafford Rd at Columbia Rd (Traffic Signal)														
2026 Existing + BG	A	5	E	D	A	F	E	A	A	A	A	B	A	A
2026 Existing + BG + Site	F	53	F	F	F	F	F	F	B	A	A	E	A	A
2026 Mitigation	B	15	C	A	A	C	C	A	B	C	A	C	A	A
Stafford Rd at Ronald Reagan Pkwy (Traffic Signal)														
2026 Existing + BG	D	36	D	C	B	F	E	D	E	D	A	E	E	A
2026 Existing + BG + Site	D	38	E	C	C	F	E	D	E	D	A	D	E	A
2026 Mitigation	C	33	E	C	B	F	D	B	D	D	A	D	E	C

Note: Overall equals the average Level of Service (LOS) grade and delay in seconds per vehicle for all traffic. The other LOS grades for individual movements by approach direction.

As shown, the overall results are acceptable and individual movements are no worse than LOS E, except for the southbound left movement from Ronald Reagan Parkway to Stafford Road. However, the vehicle volume for this movement is relatively low compared to other movements at this intersection.

2036 Mitigation

When considering long-term mitigation, several factors are important:

- The primary issues are the high conflicting volumes between the northbound left-turn and southbound through movements on Ronald Reagan Parkway at Stafford Road, and the westbound left-turn and eastbound through movements on Stafford Road at Columbia Road (AM peak hour).
- The Town’s Thoroughfare Plan identifies the 2045 long-term need for six lanes, three through lanes in each direction, on Ronald Reagan Parkway between I-70 and E County Road 200S.

- The forecasts do not assume significant development on the east side of Ronald Reagan Parkway around the Stafford Road intersection.
- Improvements could increase the supply (geometric capacity improvements), reduce the demand (volume or route changes to reduce the number of vehicles through the study intersections), or eliminate one or more signal phasing/timing which is a subset of demand changes.

The first mitigation considered a geometric improvement only, providing sufficient lanes to accommodate the expected volume. The additional proposed mitigation includes:

- Stafford Road at Columbia Road:
 - Constructing an exclusive westbound right turn lane on Stafford Road.
 - Providing three southbound approach lanes on Columbia Road (left, through, and right).
- Stafford Road at Ronald Reagan Parkway:
 - Constructing an exclusive westbound right turn lane on Stafford Road.
 - Restriping the eastbound approach on Stafford at RRP for one left (same), one through (same), one through/right (changed), and one right.
- Updated signal timing at both signals to reflect the changed lanes.

Table 4 shows the results of assuming this mitigation compared to the projected 2036 Background and Full Build-out results without mitigation.

Table 4 – 2036 Peak Hour Results, Mitigated versus Unmitigated

Intersection & Study Scenario	Overall		Northbound			Southbound			Eastbound			Westbound		
	LOS	Delay	L	T	R	L	T	R	L	T	R	L	T	R
AM Peak Hour														
Midfield Ct at Columbia Rd (Side-Street Stop)														
2036 Existing + BG				A	A	A	A					-		A
2036 Existing + BG + Site				A	A	A	A					E		C
2036 Mitigation				A	A	A	A					E		B
Stafford Rd at Columbia Rd (Traffic Signal)														
2036 Existing + BG	A	4	D	D	A	F	D	A	A	A	A	C	A	A
2036 Existing + BG + Site	E	39	F	F	F	F	F	F	A	A	A	E	A	A
2036 Mitigation	B	18	C	C	A	C	C	A	B	C	A	D	A	A
Stafford Rd at Ronald Reagan Pkwy (Traffic Signal)														
2036 Existing + BG	D	37	E	C	C	F	E	D	E	C	A	E	E	B
2036 Existing + BG + Site	D	44	E	C	C	F	E	D	E	C	A	D	E	B
2036 Mitigation	D	38	E	C	C	E	E	B	D	C	A	D	E	B
PM Peak Hour														
Midfield Ct at Columbia Rd (Side-Street Stop)														
2036 Existing + BG				A	A	A	A					-		B
2036 Existing + BG + Site				A	A	B	A					F		C
2036 Mitigation				A	A	B	A					E		C
Stafford Rd at Columbia Rd (Traffic Signal)														
2036 Existing + BG	A	7	F	B	B	F	F	B	A	A	A	D	A	A
2036 Existing + BG + Site	F	90	F	F	F	F	F	F	A	C	C	F	A	A
2036 Mitigation	C	22	D	A	A	C	C	A	B	D	C	C	A	A
Stafford Rd at Ronald Reagan Pkwy (Traffic Signal)														
2036 Existing + BG	E	69	E	C	C	F	F	F	E	D	A	E	E	B
2036 Existing + BG + Site	F	89	E	C	C	F	F	F	E	D	A	E	F	B
2036 Mitigation	D	43	E	C	C	F	E	C	E	D	A	D	E	B

Note: Overall equals the average Level of Service (LOS) grade and delay in seconds per vehicle for all traffic. The other LOS grades for individual movements by approach direction.

As shown, the overall results for each intersection are acceptable.

Another form of mitigation is a reduction in demand or the number of vehicles through the study intersections. Reducing vehicle trips can be accomplished through different methods, including:

- Transit use with convenient, accessible, and safe stop locations.
- Car share or carpool programs to reduce single occupancy driving.
- Pedestrian and bicycle activity through local and regional systems of trails, sidewalks, and bicycle lanes, including safe crossings of busy vehicle roads.
- Telecommuting and at-home work to eliminate work trips.
- Off-peak hour work shifts, starting and ending outside the traditional weekday AM and PM peak hours.
- On-site facilities at work offices that allow employees the opportunity to arrive early and stay late to avoid peak period travel.
- Scheduling deliveries, garbage, and other related items outside of the traditional weekday AM and PM peak hours.

The study intersections were not re-evaluated assuming a reduction in vehicle trips due to implementation of one or more of the above methods. However, even a small reduction or shift of traffic away from the peak periods will improve operations.

Level of Service Analysis

[submitted as separate document]

Existing Turning Movement Volumes Details

Traffic data was collected during the week of April 15, 2024, at the following locations in Plainfield, Indiana:

Midfield Court at Columbia Road

Total Vehicles - AM Peak Hour													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
0600 - 0615	0	68	0	0	0	0	0	10	0	0	0	0	78
0615 - 0630	0	64	0	0	0	0	0	15	0	0	0	0	79
0630 - 0645	0	52	0	0	0	0	0	42	0	0	0	0	94
0645 - 0700	0	76	1	1	0	0	1	35	0	0	0	0	114
Totals	0	260	1	1	0	0	1	102	0	0	0	0	365
PHF	0.00	0.86	0.25	0.25	0.00	0.00	0.25	0.61	0.00	0.00	0.00	0.00	0.80
% Trucks	0%	5%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	6%

Total Vehicles - PM Peak Hour													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
1530 - 1545	0	14	1	0	0	0	1	100	0	0	0	0	116
1545 - 1600	0	19	0	0	0	0	0	60	0	0	0	0	79
1600 - 1615	0	12	0	1	0	0	0	42	0	0	0	0	55
1615 - 1630	0	18	0	0	0	0	0	35	0	0	0	0	53
Totals	0	63	1	1	0	0	1	237	0	0	0	0	303
PHF	0.00	0.83	0.25	0.25	0.00	0.00	0.25	0.59	0.00	0.00	0.00	0.00	0.65
% Trucks	0%	30%	0%	0%	0%	0%	0%	8%	0%	0%	0%	0%	12%

Stafford Road at Columbia Road

Total Vehicles - AM Peak Hour													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
0630 - 0645	3	0	0	7	158	51	43	0	0	3	129	3	397
0645 - 0700	3	0	1	12	220	75	38	0	0	2	128	7	486
0700 - 0715	1	0	2	6	161	41	18	0	0	6	146	1	382
0715 - 0730	3	0	1	5	185	43	20	0	1	1	141	2	402
Totals	10	0	4	30	724	210	119	0	1	12	544	13	1667
PHF	0.83	0.00	0.50	0.63	0.82	0.70	0.69	0.00	0.25	0.50	0.93	0.46	0.86
% Trucks	10%	0%	0%	3%	6%	6%	18%	0%	0%	0%	9%	0%	8%

Total Vehicles - PM Peak Hour													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
1530 - 1545	31	0	2	2	172	12	94	1	4	1	353	4	676
1545 - 1600	9	1	4	1	163	18	59	0	3	2	212	5	477
1600 - 1615	4	0	2	0	173	9	42	0	1	3	227	1	462
1615 - 1630	3	1	1	5	170	17	29	0	7	2	187	0	422
Totals	47	2	9	8	678	56	224	1	15	8	979	10	2037
PHF	0.38	0.50	0.56	0.40	0.98	0.78	0.60	0.25	0.54	0.67	0.69	0.50	0.75
% Trucks	4%	0%	0%	38%	12%	32%	8%	0%	0%	25%	6%	30%	9%

Stafford Road at Swift Drive

Total Vehicles - AM Peak Hour													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
0630 - 0645	0	0	0	0	0	0	0	0	0	0	39	0	39
0645 - 0700	0	0	0	0	0	0	0	0	0	0	21	0	21
0700 - 0715	0	0	0	0	0	0	0	0	0	1	13	0	14
0715 - 0730	0	0	0	0	0	0	0	0	0	0	14	0	14
Totals	0	0	0	0	0	0	0	0	0	1	87	0	88
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.98	0.00	0.56
% Trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	22%	0%	22%

Total Vehicles - PM Peak Hour													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
1530 - 1545	0	0	0	0	0	0	2	0	0	0	68	0	70
1545 - 1600	0	0	0	0	0	0	3	0	0	0	46	0	49
1600 - 1615	0	0	0	0	0	0	0	0	0	1	26	0	27
1615 - 1630	0	0	0	0	0	0	0	0	0	0	22	0	22
Totals	0	0	0	0	0	0	5	0	0	1	162	0	168
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.25	0.67	0.00	0.60
% Trucks	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	7%	0%	8%

Stafford Road at Ronald Reagan Parkway

Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
0630 - 0645	26	105	5	7	11	4	17	280	180	129	15	22	801
0645 - 0700	36	114	8	7	37	5	22	259	218	126	19	22	873
0700 - 0715	26	99	6	3	9	2	13	185	171	142	16	13	685
0715 - 0730	25	103	6	5	8	4	6	182	190	139	12	11	691
Totals	113	421	25	22	65	15	58	906	759	536	62	68	3050
PHF	0.78	0.92	0.78	0.79	0.44	0.75	0.66	0.81	0.87	0.94	0.82	0.77	0.87
% Trucks	5%	8%	16%	9%	0%	67%	9%	6%	7%	13%	3%	1%	8%

Total Vehicles - PM Peak Hour													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
1615 - 1630	13	191	1	10	27	11	8	208	141	170	21	23	824
1630 - 1645	16	176	8	14	26	10	7	253	158	300	16	34	1018
1645 - 1700	13	203	5	13	32	18	4	212	142	227	22	44	935
1700 - 1715	10	210	8	9	14	9	2	246	132	261	18	33	952
Totals	52	780	22	46	99	48	21	919	573	958	77	134	3729
PHF	0.81	0.93	0.69	0.82	0.77	0.67	0.66	0.91	0.91	0.80	0.88	0.76	0.92
% Trucks	10%	8%	9%	4%	5%	23%	43%	7%	12%	8%	4%	12%	9%

Traffic Signal Warrant Analysis

Traffic Signal Warrant Results – Stafford Road at Columbia Road

Signal Warrant Analysis - Condition "A"										
Time	Major-street (Stafford Road)				Minor-street (Columbia Road)				BOTH Major-street & Minor-street	Total Vehicles
	Eastbound	Westbound	Total	100% Threshold	Northbound	Southbound	Greatest Hourly Minor Approach Total	100% Threshold		
				600 Vehicles				200 Vehicles	100% Threshold	
0 - 1	184	90	274	Unsatisfied	21	2	21	Unsatisfied	Unsatisfied	297
1 - 2	47	63	110	Unsatisfied	36	5	36	Unsatisfied	Unsatisfied	151
2 - 3	142	72	214	Unsatisfied	23	0	23	Unsatisfied	Unsatisfied	237
3 - 4	171	113	284	Unsatisfied	14	1	14	Unsatisfied	Unsatisfied	299
4 - 5	201	464	665	SATISFIED	29	4	29	Unsatisfied	Unsatisfied	698
5 - 6	352	722	1074	SATISFIED	49	2	49	Unsatisfied	Unsatisfied	1125
6 - 7	490	952	1442	SATISFIED	117	10	117	Unsatisfied	Unsatisfied	1569
7 - 8	674	969	1643	SATISFIED	128	23	128	Unsatisfied	Unsatisfied	1794
8 - 9	577	659	1236	SATISFIED	121	19	121	Unsatisfied	Unsatisfied	1376
9 - 10	478	482	960	SATISFIED	114	21	114	Unsatisfied	Unsatisfied	1095
10 - 11	447	467	914	SATISFIED	129	37	129	Unsatisfied	Unsatisfied	1080
11 - 12	495	496	991	SATISFIED	135	41	135	Unsatisfied	Unsatisfied	1167
12 - 13	502	533	1035	SATISFIED	141	57	141	Unsatisfied	Unsatisfied	1233
13 - 14	587	650	1237	SATISFIED	128	28	128	Unsatisfied	Unsatisfied	1393
14 - 15	687	815	1502	SATISFIED	180	36	180	Unsatisfied	Unsatisfied	1718
15 - 16	1076	819	1895	SATISFIED	213	81	213	SATISFIED	SATISFIED	2189
16 - 17	1008	868	1876	SATISFIED	197	51	197	Unsatisfied	Unsatisfied	2124
17 - 18	837	804	1641	SATISFIED	170	36	170	Unsatisfied	Unsatisfied	1847
18 - 19	601	565	1166	SATISFIED	138	21	138	Unsatisfied	Unsatisfied	1325
19 - 20	432	333	765	SATISFIED	102	12	102	Unsatisfied	Unsatisfied	879
20 - 21	301	292	593	Unsatisfied	76	10	76	Unsatisfied	Unsatisfied	679
21 - 22	256	257	513	Unsatisfied	56	11	56	Unsatisfied	Unsatisfied	580
22 - 23	229	222	451	Unsatisfied	54	8	54	Unsatisfied	Unsatisfied	513
23 - 24	308	168	476	Unsatisfied	66	4	66	Unsatisfied	Unsatisfied	546
Totals	11082	11875	22957	16	2437	520	2437	1	1	25914

Signal Warrant Analysis - Condition "B"										
Time	Major-street (Stafford Road)				Minor-street (Columbia Road)				BOTH Major-street & Minor-street	Total Vehicles
	Eastbound	Westbound	Total	100% Threshold	Northbound	Southbound	Greatest Hourly Minor Approach Total	100% Threshold		
				900 Vehicles				100 Vehicles	100% Threshold	
0 - 1	184	90	274	Unsatisfied	21	2	21	Unsatisfied	Unsatisfied	297
1 - 2	47	63	110	Unsatisfied	36	5	36	Unsatisfied	Unsatisfied	151
2 - 3	142	72	214	Unsatisfied	23	0	23	Unsatisfied	Unsatisfied	237
3 - 4	171	113	284	Unsatisfied	14	1	14	Unsatisfied	Unsatisfied	299
4 - 5	201	464	665	Unsatisfied	29	4	29	Unsatisfied	Unsatisfied	698
5 - 6	352	722	1074	SATISFIED	49	2	49	Unsatisfied	Unsatisfied	1125
6 - 7	490	952	1442	SATISFIED	117	10	117	SATISFIED	SATISFIED	1569
7 - 8	674	969	1643	SATISFIED	128	23	128	SATISFIED	SATISFIED	1794
8 - 9	577	659	1236	SATISFIED	121	19	121	SATISFIED	SATISFIED	1376
9 - 10	478	482	960	SATISFIED	114	21	114	SATISFIED	SATISFIED	1095
10 - 11	447	467	914	SATISFIED	129	37	129	SATISFIED	SATISFIED	1080
11 - 12	495	496	991	SATISFIED	135	41	135	SATISFIED	SATISFIED	1167
12 - 13	502	533	1035	SATISFIED	141	57	141	SATISFIED	SATISFIED	1233
13 - 14	587	650	1237	SATISFIED	128	28	128	SATISFIED	SATISFIED	1393
14 - 15	687	815	1502	SATISFIED	180	36	180	SATISFIED	SATISFIED	1718
15 - 16	1076	819	1895	SATISFIED	213	81	213	SATISFIED	SATISFIED	2189
16 - 17	1008	868	1876	SATISFIED	197	51	197	SATISFIED	SATISFIED	2124
17 - 18	837	804	1641	SATISFIED	170	36	170	SATISFIED	SATISFIED	1847
18 - 19	601	565	1166	SATISFIED	138	21	138	SATISFIED	SATISFIED	1325
19 - 20	432	333	765	Unsatisfied	102	12	102	SATISFIED	Unsatisfied	879
20 - 21	301	292	593	Unsatisfied	76	10	76	Unsatisfied	Unsatisfied	679
21 - 22	256	257	513	Unsatisfied	56	11	56	Unsatisfied	Unsatisfied	580
22 - 23	229	222	451	Unsatisfied	54	8	54	Unsatisfied	Unsatisfied	513
23 - 24	308	168	476	Unsatisfied	66	4	66	Unsatisfied	Unsatisfied	546
Totals	11082	11875	22957	14	2437	520	2437	14	13	25914

Note: Posted speed limit along Stafford Road is 40 mph

Entering and Exiting Site Traffic Breakdown

Total Site Traffic Hourly Volumes		
Time	Entering	Exiting
0 - 1	31	32
1 - 2	18	21
2 - 3	13	16
3 - 4	16	24
4 - 5	32	46
5 - 6	84	84
6 - 7	160	168
7 - 8	214	210
8 - 9	200	196
9 - 10	184	177
10 - 11	190	187
11 - 12	196	189
12 - 13	213	209
13 - 14	205	199
14 - 15	221	217
15 - 16	242	236
16 - 17	251	249
17 - 18	244	235
18 - 19	213	216
19 - 20	151	153
20 - 21	123	129
21 - 22	95	95
22 - 23	79	85
23 - 24	62	65
Totals	3437	3438

New Site Traffic Hourly Volumes		
Time	Entering	Exiting
0 - 1	7	8
1 - 2	4	5
2 - 3	3	4
3 - 4	4	6
4 - 5	8	11
5 - 6	21	21
6 - 7	40	42
7 - 8	53	52
8 - 9	50	49
9 - 10	46	44
10 - 11	47	46
11 - 12	49	47
12 - 13	53	52
13 - 14	51	49
14 - 15	55	54
15 - 16	60	59
16 - 17	62	62
17 - 18	61	58
18 - 19	53	54
19 - 20	37	38
20 - 21	30	32
21 - 22	23	23
22 - 23	19	21
23 - 24	15	16
Totals	851	853

Pass-by Site Traffic Hourly Volumes		
Time	Entering	Exiting
0 - 1	24	24
1 - 2	14	16
2 - 3	10	12
3 - 4	12	18
4 - 5	24	35
5 - 6	63	63
6 - 7	120	126
7 - 8	161	158
8 - 9	150	147
9 - 10	138	133
10 - 11	143	141
11 - 12	147	142
12 - 13	160	157
13 - 14	154	150
14 - 15	166	163
15 - 16	182	177
16 - 17	189	187
17 - 18	183	177
18 - 19	160	162
19 - 20	114	115
20 - 21	93	97
21 - 22	72	72
22 - 23	60	64
23 - 24	47	49
Totals	2586	2585

24-Hour Turning Movement Volumes

Existing Traffic

Existing Traffic													
Stafford Road at Columbia Road													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR*	NBT	NBL	EBR	EBT	EBL	Total
0 - 1	1	0	1	0	64	13	5	0	0	2	171	2	259
1 - 2	2	0	3	0	45	11	23	0	1	1	43	0	129
2 - 3	0	0	0	0	56	10	13	0	2	3	131	1	216
3 - 4	1	0	0	2	75	27	3	0	0	0	161	2	271
4 - 5	1	1	2	2	341	94	4	0	1	0	189	1	636
5 - 6	0	0	2	16	485	169	6	0	1	4	319	9	1011
6 - 7	7	0	1	25	592	256	30	0	1	7	441	10	1370
7 - 8	14	1	5	27	699	149	19	0	3	19	600	12	1548
8 - 9	13	1	2	15	478	88	18	0	4	15	503	19	1156
9 - 10	12	0	6	7	339	68	15	1	9	15	421	8	901
10 - 11	22	4	7	8	323	66	19	2	13	5	398	12	879
11 - 12	35	0	2	10	362	52	14	1	24	10	428	22	960
12 - 13	37	3	13	9	382	65	17	1	16	19	424	21	1007
13 - 14	17	2	6	10	507	55	21	3	4	8	524	15	1172
14 - 15	24	0	9	4	581	140	58	3	7	9	619	14	1468
15 - 16	58	1	16	7	622	95	80	1	10	4	992	18	1904
16 - 17	29	1	16	8	714	46	56	0	13	10	933	5	1831
17 - 18	19	1	12	6	648	54	40	1	10	20	760	4	1575
18 - 19	13	0	5	3	456	28	14	0	13	5	553	2	1092
19 - 20	5	0	5	1	258	21	9	1	14	5	395	3	717
20 - 21	4	0	4	1	227	20	9	0	2	2	274	3	546
21 - 22	6	2	3	1	169	52	6	0	2	2	236	0	479
22 - 23	2	2	4	2	147	43	9	1	2	2	211	0	425
23 - 24	1	0	1	0	134	11	29	0	2	2	289	0	469
Totals	323	19	125	164	8704	1633	517	15	154	169	10015	183	22021

*Does not include vehicles using the channelized right turn lane

Existing Traffic plus Background Growth

Existing Traffic plus Background Growth													
Stafford Road at Columbia Road													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
0 - 1	1	0	1	0	67	14	5	0	0	2	178	2	270
1 - 2	2	0	3	0	47	11	24	0	1	1	45	0	134
2 - 3	0	0	0	0	58	10	14	0	2	3	136	1	224
3 - 4	1	0	0	2	78	28	3	0	0	0	168	2	282
4 - 5	1	1	2	2	355	98	4	0	1	0	197	1	662
5 - 6	0	0	2	17	505	176	6	0	1	4	332	9	1052
6 - 7	7	0	1	26	616	266	31	0	1	7	459	10	1424
7 - 8	15	1	5	28	727	155	20	0	3	20	624	12	1610
8 - 9	14	1	2	16	497	92	19	0	4	16	523	20	1204
9 - 10	12	0	6	7	353	71	16	1	9	16	438	8	937
10 - 11	23	4	7	8	336	69	20	2	14	5	414	12	914
11 - 12	36	0	2	10	377	54	15	1	25	10	445	23	998
12 - 13	38	3	14	9	397	68	18	1	17	20	441	22	1048
13 - 14	18	2	6	10	527	57	22	3	4	8	545	16	1218
14 - 15	25	0	9	4	604	146	60	3	7	9	644	15	1526
15 - 16	60	1	17	7	647	99	83	1	10	4	1032	19	1980
16 - 17	30	1	17	8	743	48	58	0	14	10	971	5	1905
17 - 18	20	1	12	6	674	56	42	1	10	21	791	4	1638
18 - 19	14	0	5	3	474	29	15	0	14	5	575	2	1136
19 - 20	5	0	5	1	268	22	9	1	15	5	411	3	745
20 - 21	4	0	4	1	236	21	9	0	2	2	285	3	567
21 - 22	6	2	3	1	176	54	6	0	2	2	246	0	498
22 - 23	2	2	4	2	153	45	9	1	2	2	220	0	442
23 - 24	1	0	1	0	139	11	30	0	2	2	301	0	487
Totals	335	19	128	168	9054	1700	538	15	160	174	10421	189	22901

Note: 2 years of background traffic growth at an annual rate of 2%

Site Traffic

Total Site Traffic													
Stafford Road at Columbia Road													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
0 - 1	0	0	0	0	-7	16	6	0	10	10	-8	0	27
1 - 2	0	0	0	0	-4	9	4	0	7	6	-5	0	17
2 - 3	0	0	0	0	-3	7	2	0	5	5	-3	0	13
3 - 4	0	0	0	0	-3	8	4	0	7	5	-4	0	17
4 - 5	0	0	0	0	-7	16	8	1	15	11	-8	0	36
5 - 6	-1	2	-1	-1	-18	43	15	1	26	29	-21	-1	73
6 - 7	-1	4	-1	-1	-35	80	30	2	53	56	-41	-1	145
7 - 8	-2	6	-2	-2	-47	108	37	3	65	75	-55	-2	184
8 - 9	-2	6	-2	-2	-44	100	35	2	61	71	-51	-2	172
9 - 10	-1	5	-1	-1	-40	92	31	2	55	64	-47	-1	158
10 - 11	-1	5	-1	-1	-41	96	33	2	58	66	-49	-1	166
11 - 12	-1	5	-1	-1	-43	99	33	2	59	68	-50	-1	169
12 - 13	-2	6	-2	-2	-46	107	37	3	65	75	-54	-2	185
13 - 14	-2	6	-2	-2	-45	103	35	2	62	72	-52	-2	175
14 - 15	-2	6	-2	-2	-48	111	39	3	68	77	-56	-2	192
15 - 16	-2	7	-2	-2	-53	121	42	3	74	85	-62	-2	209
16 - 17	-2	7	-2	-2	-55	126	44	3	78	88	-64	-2	219
17 - 18	-2	7	-2	-2	-53	123	41	3	73	85	-62	-2	209
18 - 19	-2	6	-2	-2	-46	107	38	3	68	75	-54	-2	189
19 - 20	-1	4	-1	-1	-33	76	27	2	48	53	-39	-1	134
20 - 21	-1	4	-1	-1	-27	62	23	2	40	44	-32	-1	112
21 - 22	-1	2	-1	-1	-21	48	17	1	30	33	-24	-1	82
22 - 23	-1	2	-1	-1	-17	40	15	1	26	28	-20	-1	71
23 - 24	0	2	0	0	-14	32	12	1	21	21	-16	0	59
Totals	-27	92	-27	-27	-750	1730	608	42	1074	1202	-877	-27	3013

Note: Negative adjustments reflect the existing traffic patronizing the development and is therefore a negative adjustment to through traffic volumes

Existing Traffic plus Background Growth plus Site Traffic

Existing Traffic plus Background Growth plus Site Traffic													
Stafford Road at Columbia Road													
Time	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	Total
0 - 1	1	0	1	0	60	30	11	0	10	12	170	2	297
1 - 2	2	0	3	0	43	20	28	0	8	7	40	0	151
2 - 3	0	0	0	0	55	17	16	0	7	8	133	1	237
3 - 4	1	0	0	2	75	36	7	0	7	5	164	2	299
4 - 5	1	1	2	2	348	114	12	1	16	11	189	1	698
5 - 6	-1	2	1	16	487	219	21	1	27	33	311	8	1125
6 - 7	6	4	0	25	581	346	61	2	54	63	418	9	1569
7 - 8	13	7	3	26	680	263	57	3	68	95	569	10	1794
8 - 9	12	7	0	14	453	192	54	2	65	87	472	18	1376
9 - 10	11	5	5	6	313	163	47	3	64	80	391	7	1095
10 - 11	22	9	6	7	295	165	53	4	72	71	365	11	1080
11 - 12	35	5	1	9	334	153	48	3	84	78	395	22	1167
12 - 13	36	9	12	7	351	175	55	4	82	95	387	20	1233
13 - 14	16	8	4	8	482	160	57	5	66	80	493	14	1393
14 - 15	23	6	7	2	556	257	99	6	75	86	588	13	1718
15 - 16	58	8	15	5	594	220	125	4	84	89	970	17	2189
16 - 17	28	8	15	6	688	174	102	3	92	98	907	3	2124
17 - 18	18	8	10	4	621	179	83	4	83	106	729	2	1847
18 - 19	12	6	3	1	428	136	53	3	82	80	521	0	1325
19 - 20	4	4	4	0	235	98	36	3	63	58	372	2	879
20 - 21	3	4	3	0	209	83	32	2	42	46	253	2	679
21 - 22	5	4	2	0	155	102	23	1	32	35	222	-1	580
22 - 23	1	4	3	1	136	85	24	2	28	30	200	-1	513
23 - 24	1	2	1	0	125	43	42	1	23	23	285	0	546
Totals	308	111	101	141	8304	3430	1146	57	1234	1376	9544	162	25914

