

COUNT DATE 5/29/2019 (IC 187-19)

DIST \_\_\_\_\_ CO \_\_\_\_\_ RTE \_\_\_\_\_ PM \_\_\_\_\_

CALC DC DATE 6/24/19  
CHK \_\_\_\_\_ DATE \_\_\_\_\_

MAJOR ST. Del Mar Heights Road  
MINOR ST. Mercado Drive

CRITICAL APPROACH SPEED 47 MPH  
CRITICAL APPROACH SPEED 25 MPH

Speed limit or critical speed on major street traffic > 64km/h (40 mph)....  or } **RURAL (R)**  
In built up area of isolated community of < 10,000 population.....  } **URBAN (U)**

**WARRANT 1-Eight Hour Vehicular Volume** SATISFIED  YES  NO  
(Condition A or Condition B or Combination of A and B must be satisfied)

**CONDITION A - Minimum Vehicle Volume** 100% SATISFIED  YES  NO  
80% SATISFIED  YES  NO

		MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)												Hour
APPROACH		U	R	U	R	7-8	8-9	4-5	5-6					
MAJOR STREET		1		2 or MORE										
Both Approaches		500	350	600	420	1535	1300	1512	1567					
Major Street		(400)	(280)	(480)	(336)									
Highest Approach		150	105	200	140	255	45	29	19					
Minor Street		(120)	(84)	(160)	(112)									

**CONDITION B - Interruption of Continous Traffic** 100% SATISFIED  YES  NO  
80% SATISFIED  YES  NO

		MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)												Hour
APPROACH		U	R	U	R	7-8	8-9	4-5	5-6					
MAJOR STREET		1		2 or MORE						0	0	0	0	
Both Approaches		750	525	900	630	1535	1300	1512	1567	0	0	0	0	
Major Street		(600)	(420)	(720)	(504)									
Highest Approach		75	53	100	70	255	45	29	19	0	0	0	0	
Minor Street		(50)	(42)	(80)	(56)									

**Combination of Conditions A & B** SATISFIED  YES  NO

REQUIREMENT	CONDITION	✓	FULFILLED
TWO CONDITIONS SATISFIED 80%	A. MINIMUM VEHICULAR VOLUME	<input type="checkbox"/>	<input type="checkbox"/> YES <input type="checkbox"/> NO
	AND, B. INTERRUPTION OF CONTINUOUS TRAFFIC	<input type="checkbox"/>	
AND, AN ADEQUATE TRIAL OF OTHER ALTERNATIVES THAT COULD CAUSE LESS DELAY AND INCONVENIENCE TO TRAFFIC HAS FAILED TO SOLVE THE TRAFFIC PROBLEMS			<input type="checkbox"/> YES <input type="checkbox"/> NO

**WARRANT 2 - FOUR HOUR VEHICULAR VOLUME**

SATISFIED\*  YES  NO

Record hourly vehicular volumes for any four hours on an average day.

APPROACH LANES	One	Two or More	7-8	8-9	4-5	5-6	HOURS
Both Approaches - Major Street	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1535	1300	1512	1567	
Higher Approach - Minor Street	<input type="checkbox"/>	<input checked="" type="checkbox"/>	255	45	29	19	

*All plotted points fall above curve in Figure 4C-1 (Urban Areas)	<input type="checkbox"/> YES <input type="checkbox"/> NO
OR All plotted points fall above the applicable curve in Figure 4C-2 (Rural Areas)	<input type="checkbox"/> YES <input type="checkbox"/> NO

**WARRANT 3 - PEAK HOUR**

(Part A or Part B must be satisfied)

SATISFIED  YES  NO

**Part A**

SATISFIED  YES  NO

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for one-lane approach, or five vehicle-hours for a two-lane approach; <u>AND</u>	<input type="checkbox"/> YES <input type="checkbox"/> NO
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic or 150 vph for two moving lanes; <u>AND</u>	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

**Part B**

SATISFIED  YES  NO

APPROACH LANES	One	Two or More	7:30-8:30am
Both Approaches - Major Street	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1535
Higher Approach - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	285

← ENTER CORRECT HOURS

↑ ENTER PEAK HOUR VOL.

The plotted point falls above the applicable curve in Figure 4C-3 (Urban Areas)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
OR The plotted point falls above the applicable curve in Figure 4C-4 (Rural Areas)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic

**WARRANT 4 - PEDESTRIAN VOLUME**  
 (Part 1 AND Part 2 must be satisfied)

SATISFIED  YES  NO

**Part 1** (Parts A OR B must be satisfied)

SATISFIED  YES  NO

A. Hours --->

	7-8	8-9	4-5	5-6
Vehicles per hour for any 4 hours	1353	1300	1512	1567
Pedestrians per hour for any 4 hours	0	1	2	1

**Figure 4C-5 or Figure 4C-6**

SATISFIED  YES  NO

B. Hours --->

Vehicles per hour for any 1 hour				
Pedestrians per hour for any 1 hour				

**Figure 4C-7 or Figure 4C-8**

SATISFIED  YES  NO

**Part 2**

SATISFIED  YES  NO

<u>AND</u> , The distance to the nearest traffic signal the major street is greater than 90m (300 ft)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
<u>OR</u> , The proposed traffic signal will not restrict progressive traffic flow along the major street.	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

**WARRANT 5 - School Crossing**  
 (Part A AND Part B must be satisfied)

N/A

SATISFIED  YES  NO

**Part A**

Gaps/minute and # of children

Gaps vs. Minutes	Minutes Children Using Crossing	Hour
	Number of Adequate Gaps	
School Age Pedestrians Crossing Street/hour		

SATISFIED  YES  NO

Gaps < Minutes  YES  NO

AND Children > 20/hr  YES  NO

AND, Consideration has been given to less restrictive remedial measures.  YES  NO

**Part B**

SATISFIED  YES  NO

The distance to the nearest traffic signal along the major street is greater than 90 m (300 ft)	<input type="checkbox"/> YES <input type="checkbox"/> NO
<u>OR</u> , The proposed signal will not restrict the progressive moment of traffic	<input type="checkbox"/> YES <input type="checkbox"/> NO

**WARRANT 6 - Coordinated Signal System**  
(All Parts Must Be Satisfied)

SATISFIED  YES  NO

Minimum Requirements ≥ 300 m (1000 ft)	DISTANCE TO NEAREST SIGNAL N >1000 ft, S >1000 ft, E >1000 ft, W >1000 ft	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.		<input type="checkbox"/> YES	<input type="checkbox"/> NO
OR, On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.		<input type="checkbox"/> YES	<input type="checkbox"/> NO

**WARRANT 7 - Crash Experience Warrant**  
(All Parts Must Be Satisfied)

SATISFIED  YES  NO

Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency.		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REQUIREMENTS	Number of crashes reported within a 12 month period susceptible to correction by a traffic signal, and involving injury or damage exceeding the requirements for a reportable crash.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
5 OR MORE	none (3/31/2016-3/31/2019)		
REQUIREMENTS	CONDITIONS <input checked="" type="checkbox"/>		
ONE CONDITION SATISFIED 80%	Warrant 1, Condition A - Minimum Vehicular Volume	<input type="checkbox"/>	<input type="checkbox"/> YES <input type="checkbox"/> NO
	OR, Warrant 1, Condition B Interruption of Continuous Traffic	<input type="checkbox"/>	
	OR, Warrant 4, Pedestrian Volume Condition Ped Volume ≥ 152 for any hour OR, Ped Volume ≥ 80 for any 4 hours	<input type="checkbox"/>	

**WARRANT 8 - Roadway Network**  
(All Parts Must Be Satisfied)

SATISFIED  YES  NO

MINIMUM VOLUME REQUIREMENTS	ENTERING VOLUMES - ALL APPROACHES	<input checked="" type="checkbox"/>	FULFILLED
1000 Veh/HR	During Typical Weekday Peak Hour <u>1820</u> Veh/HR and has a 5-year projected traffic volumes that meet one or more of Warrants 1, 2, and 3 during an average weekday.	<input type="checkbox"/>	<input type="checkbox"/> YES <input type="checkbox"/> NO
	OR During Each of Any 5 Hrs. of a Sat. or Sun. <u>        </u> Veh/HR	<input type="checkbox"/>	
CHARACTERISTICS OF MAJOR ROUTES		Major Route A	Major Route B
Hwy. System Serving as Principal Network for Trough Traffic		Y	N
Rural or Suburban Highway Outside Of, Entering, or Traversing a City		Y	N
Appears as a Major Route on an Official Plan		Y	N
Any Major Route Characteristics Met, Both Streets			<input type="checkbox"/> YES <input type="checkbox"/> NO

**WARRANT 9 - Intersection Near a Grade Crossing**  
*(BOTH Parts A AND B Must Be Satisfied)*

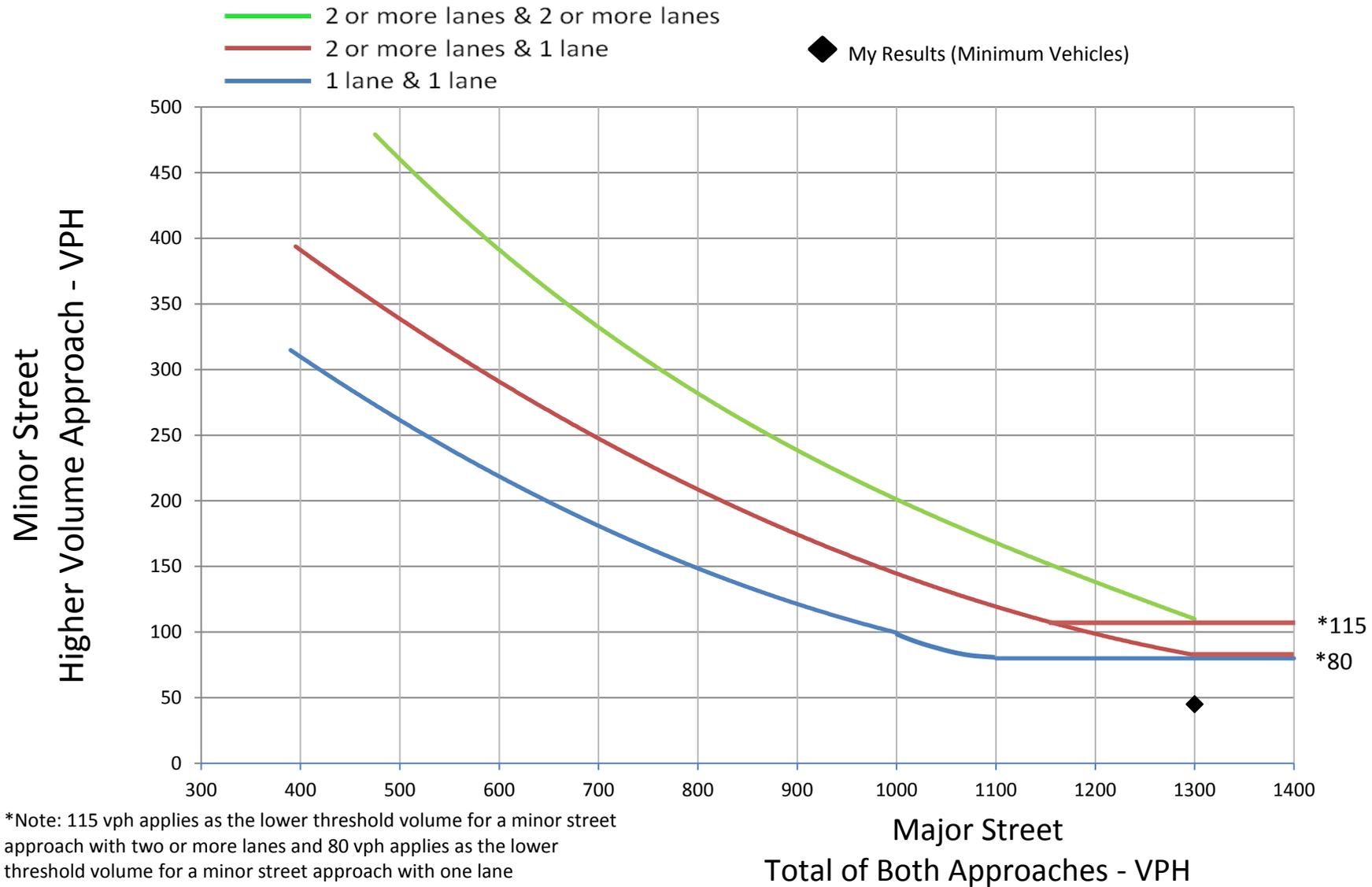
<p><u>Part A</u></p> <p>A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 ft of the stop line or yield line on the approach. Track Center Line to Limit Line _____ ft</p>	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
<p><u>Part B</u></p> <p><b><u>THERE IS ONE MINOR STREET APPROACH LANE AT THE TRACK CROSSING -</u></b>                  During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point falls above the applicable curve in Figure 4C-9.</p> <p>Major Street - Total of both approaches: _____ VPH                  Minor Street - Crosses the track (one direction only, approaching the intersection):                  _____ VPH X AF (Use tables 4C-2, 3, &amp; 4 below to calculate AF) = _____ VPH</p> <hr style="border-top: 1px dashed black;"/> <p><b><u>OR, THERE ARE TWO OR MORE MINOR STREET APPROACH LANES AT THE TRACK CROSSING-</u></b>                  During the highest traffic volume hour which rail traffic uses the crossing, the plotted point falls above the applicable curve in Figure 4C-10.</p> <p>Major Street - Total of both approaches: _____ VPH                  Minor Street - Crosses the track (one direction only, approaching the intersection):                  _____ VPH X AF (Use tables 4C-2, 3, &amp; 4 below to calculate AF) = _____ VPH</p>	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

The minor street approach volume may be multiplied by up to three follow adjustment factors (AF) as described in Section 4C.10.

- 1 - Number of Rail Traffic per Day \_\_\_\_\_ Adjustment factor from table 4C-2 \_\_\_\_\_
- 2 - Percentage of High-Occupancy Buses on Minor Street Approach \_\_\_\_\_% Adjustment factor from table 4C-3 \_\_\_\_\_
- 3 - Percentage of Tractor-Trailer Trucks on Minor Street Approach \_\_\_\_\_% Adjustment factor from table 4C-3 \_\_\_\_\_

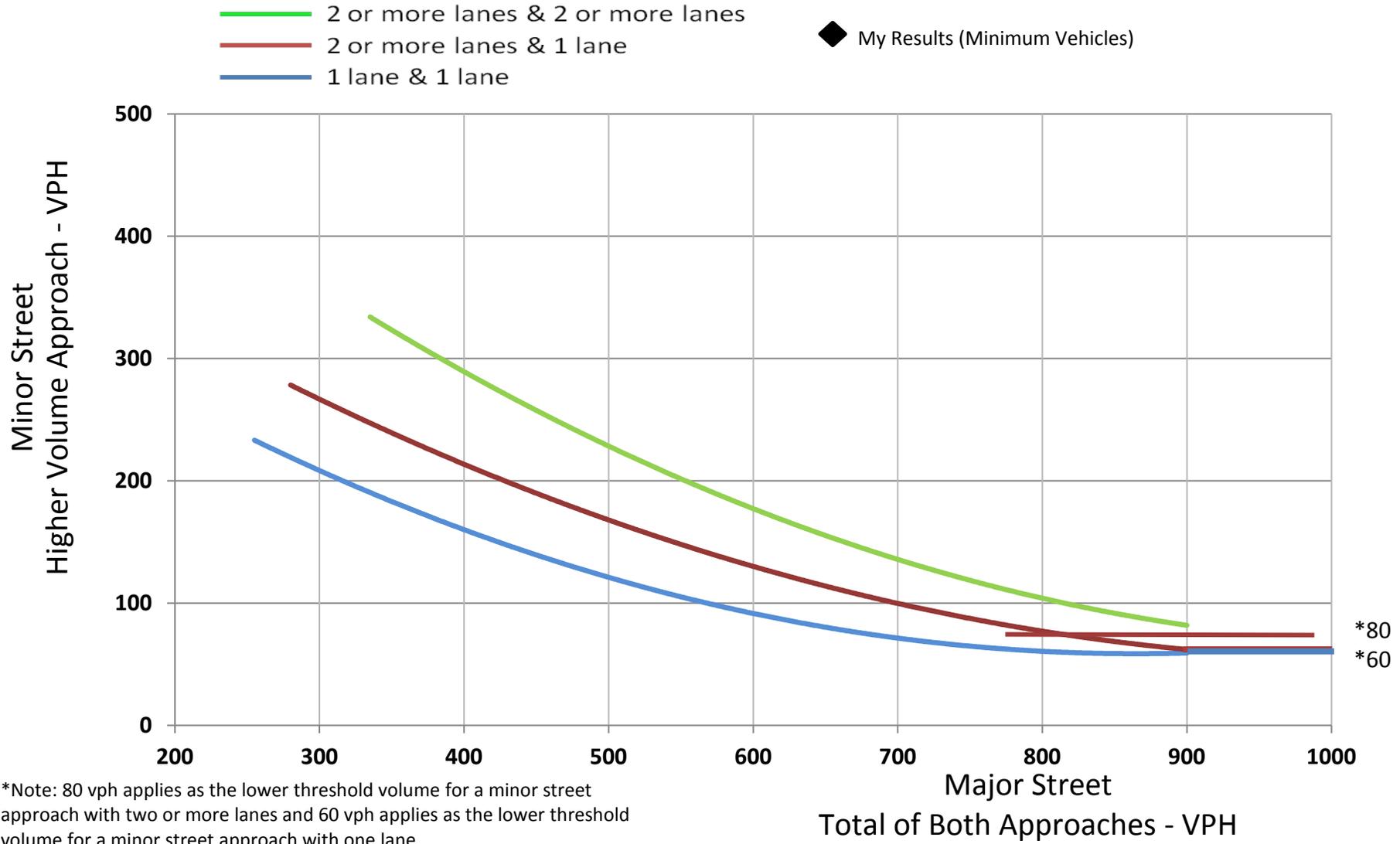
**NOTE: If no data is available or known, then use AF = 1 (no adjustment)**

**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**

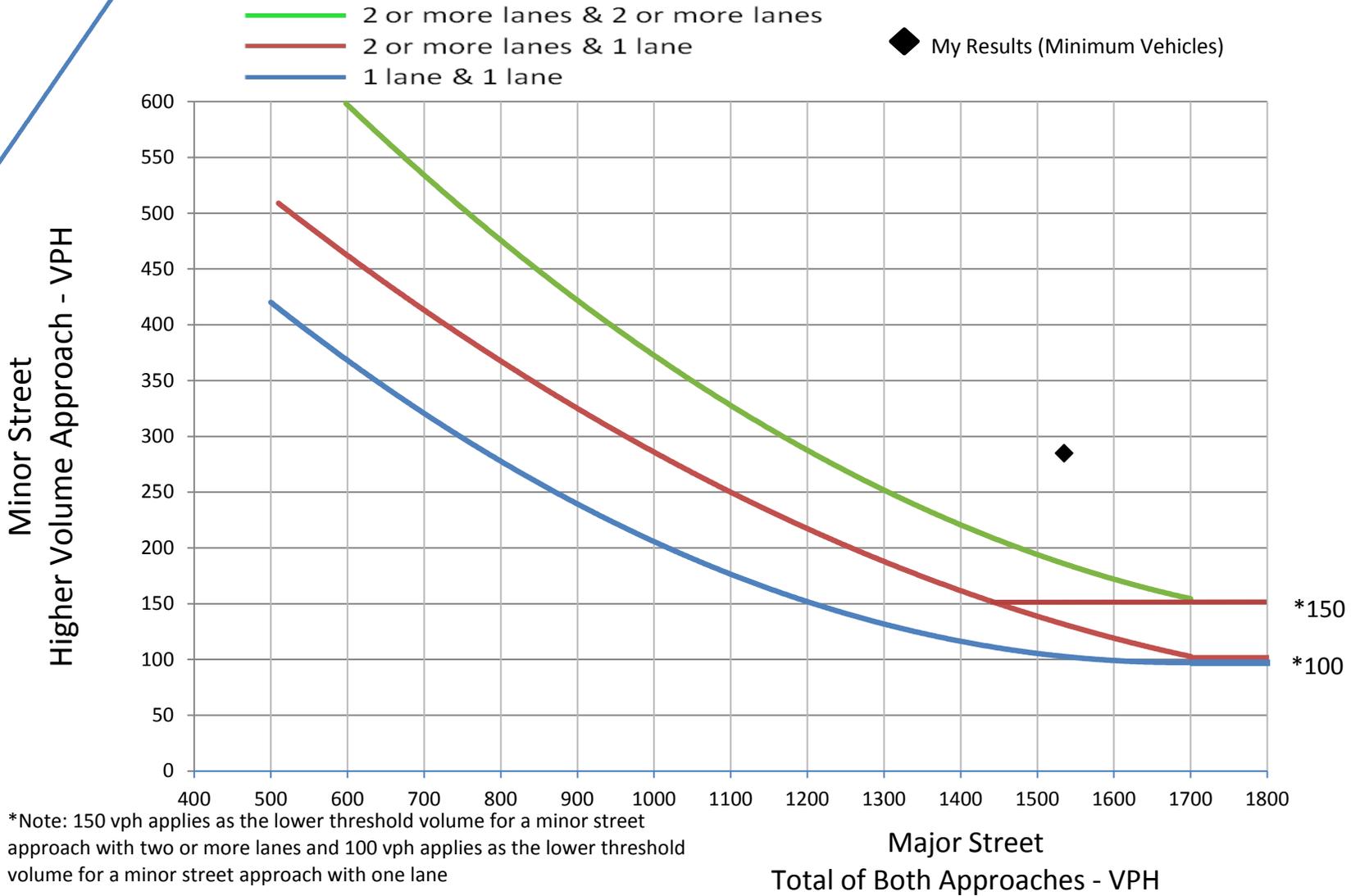


\*Note: 115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor street approach with one lane

**Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)  
(Community less than 10,000 population or above 40 MPH on MAJOR STREET)**



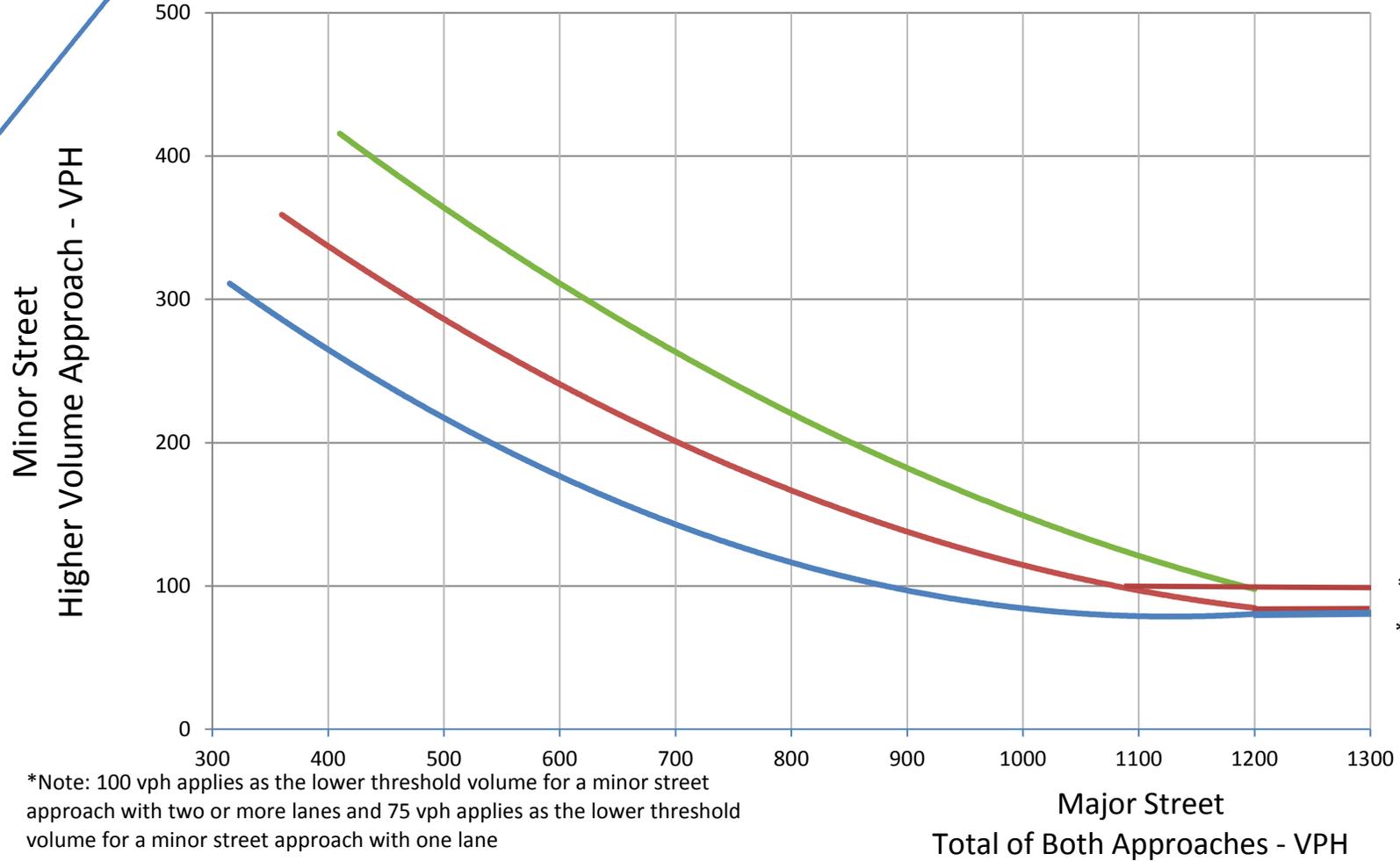
**Figure 4C-3. Warrant 3, Peak Hour**



California MUTCD 2012 Edition  
 (FHWA's MUTCD 2009 Edition, as amended for use in California)

**Figure 4C-3. Warrant 3, Peak Hour (70%)**  
**(Community less than 10,000 population or above 40 MPH on MAJOR STREET)**

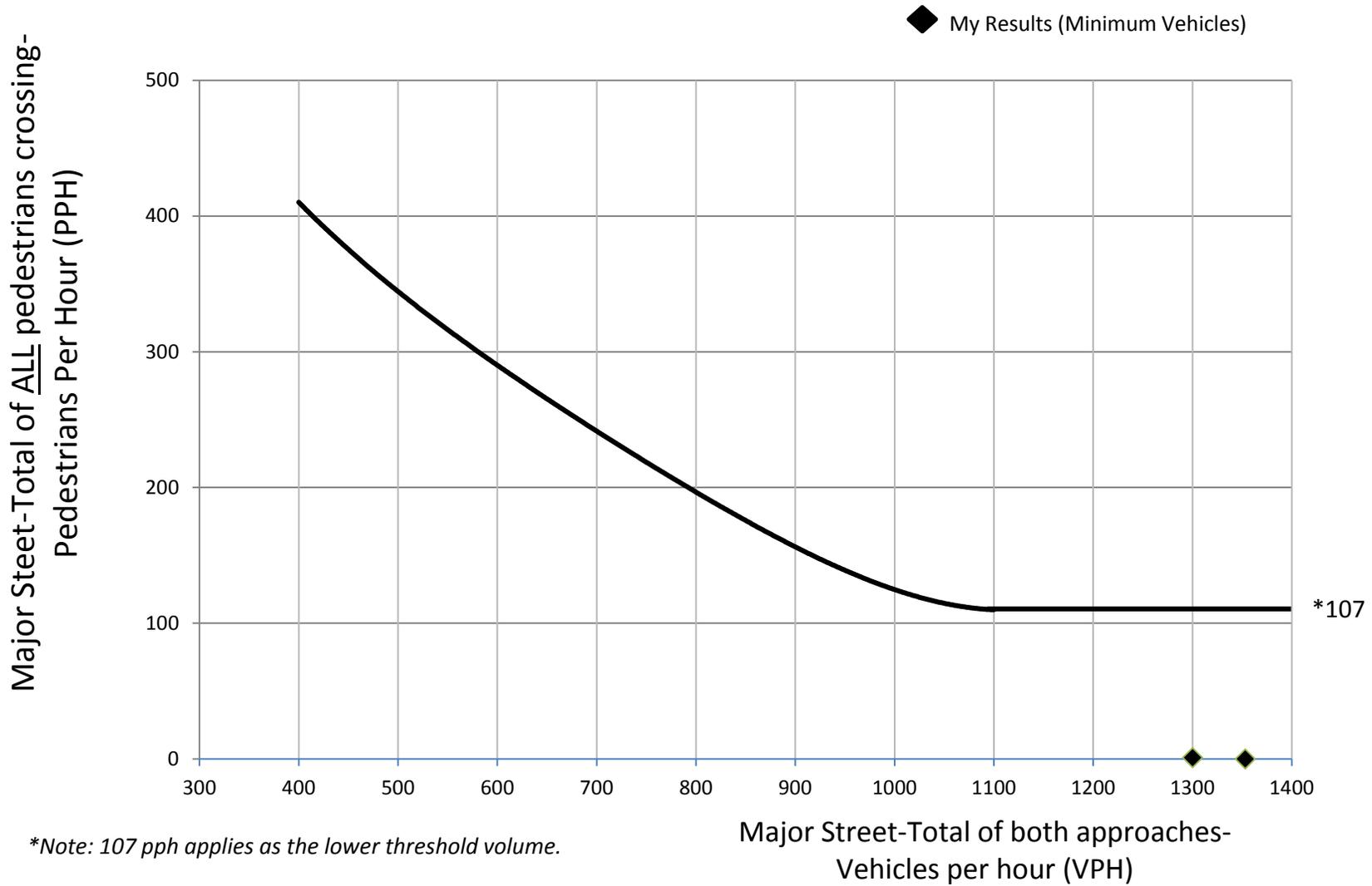
- 2 or more lanes & 2 or more lanes
- 2 or more lanes & 1 lane
- 1 lane & 1 lane
- ◆ My Results (Minimum Vehicles)



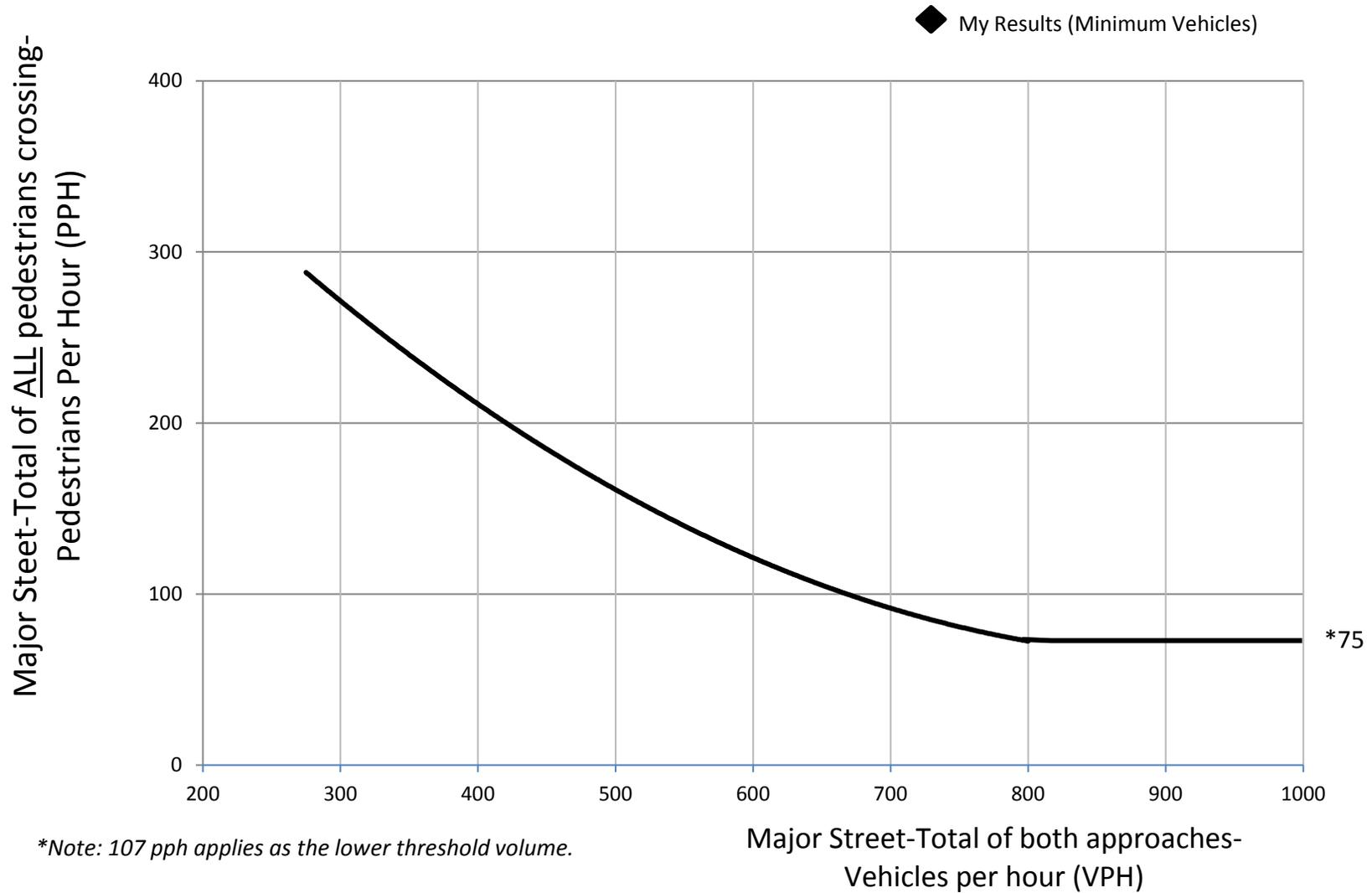
■  
(1535,285)

\*100  
 \*75

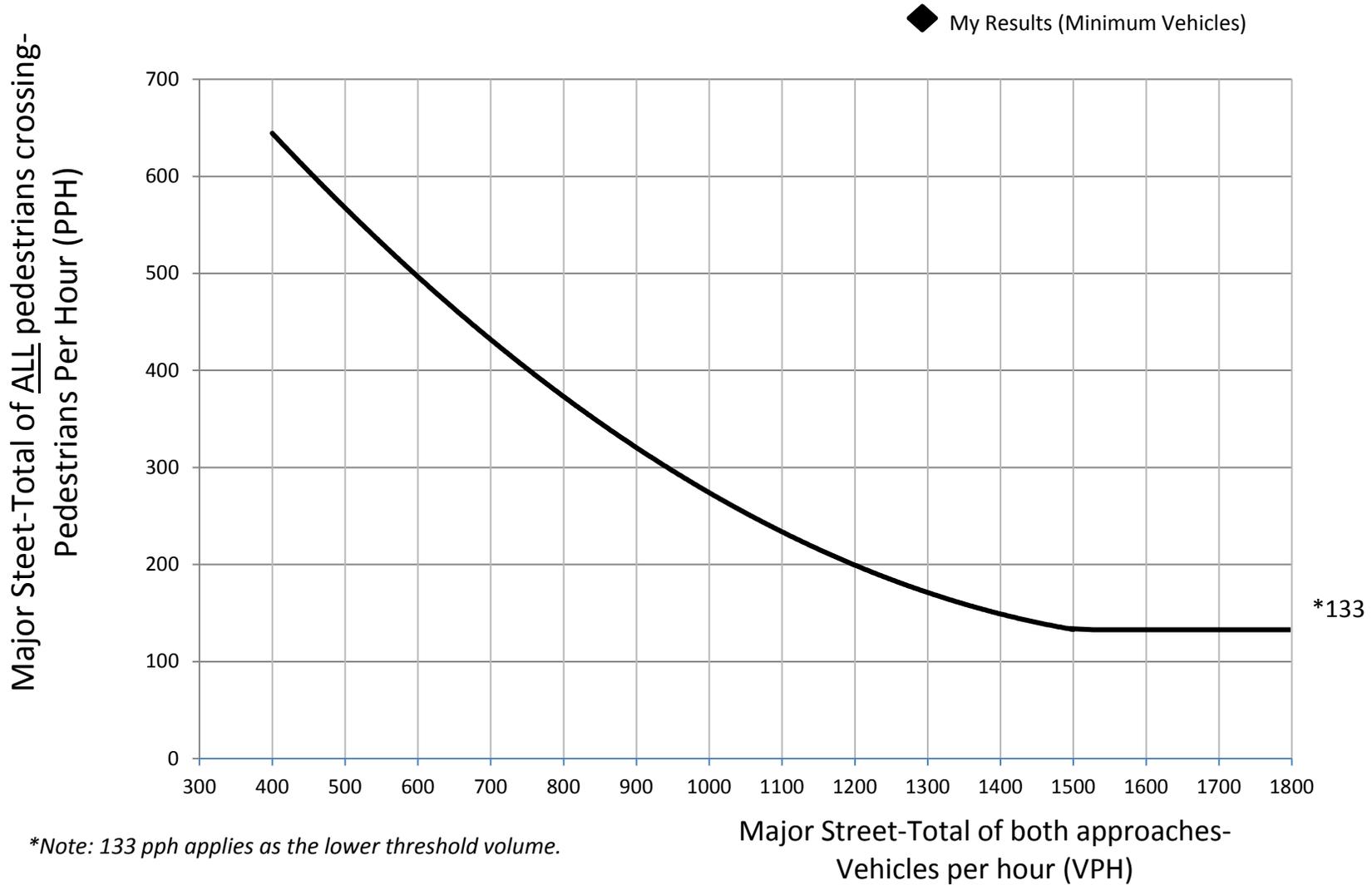
**Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume**



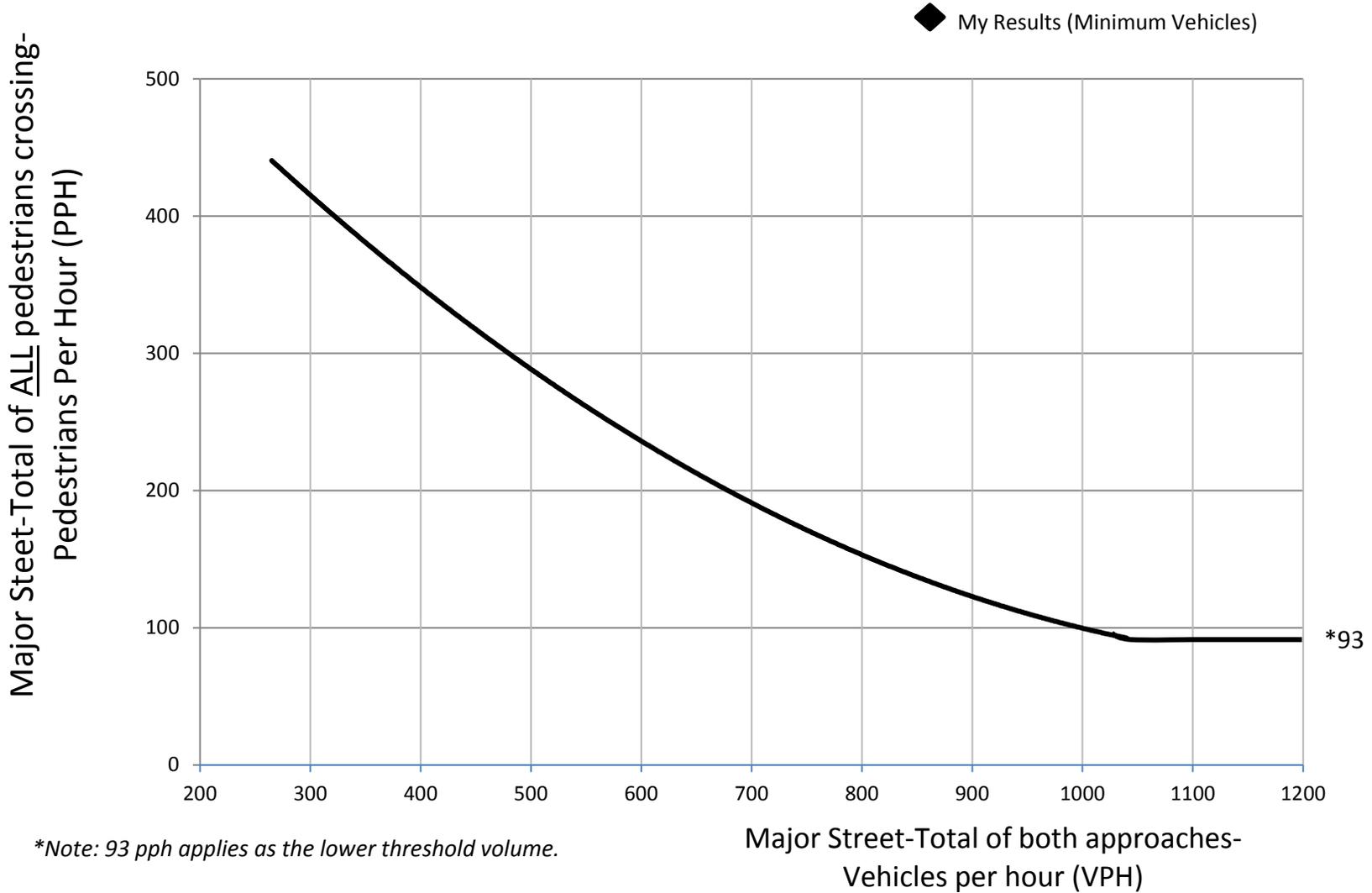
**Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)**



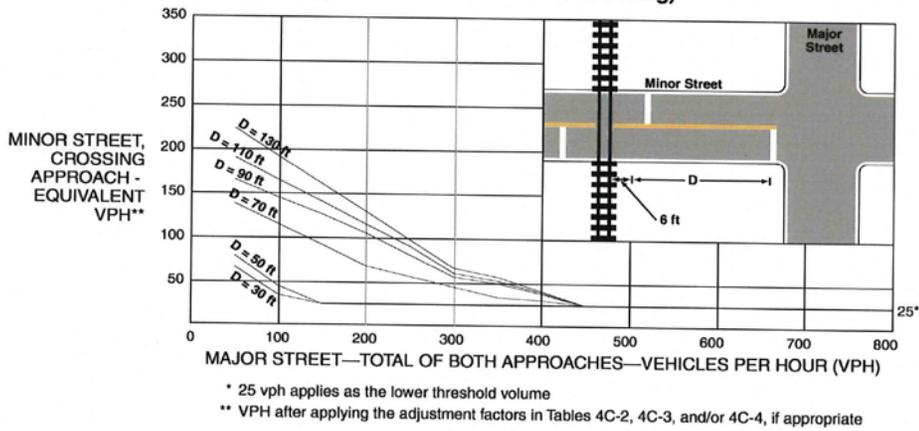
**Figure 4C-7. Warrant 4, Pedestrian Peak Hour**



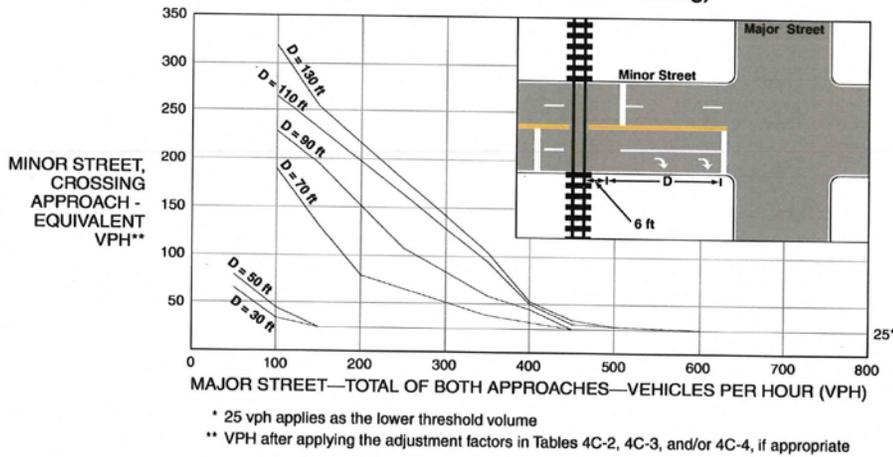
**Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)**



**Figure 4C-9. Warrant 9, Intersection Near a Grade Crossing  
 (One Approach Lane at the Track Crossing)**



**Figure 4C-10. Warrant 9, Intersection Near a Grade Crossing  
 (Two or More Approach Lanes at the Track Crossing)**



**Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume**

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% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
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% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
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

<sup>a</sup> Basic minimum hourly volume.  
<sup>b</sup> Used for combination of Conditions A and B after adequate trial of other remedial measures.  
<sup>c</sup> May be used when the major-street speed exceeds ~~70 km/h~~ 64 km/h or exceeds 40 mph or in an isolated community with a population of less than 10,000.  
<sup>d</sup> May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds ~~70 km/h~~ 64 km/h or exceeds 40 mph or in an isolated community with a population of less than 10,000.

*(This space left intentionally blank)*

**Table 4C-2. Warrant 9, Adjustment Factor for Daily Frequency of Rail Traffic**

Rail Traffic per Day	Adjustment Factor
1	0.67
2	0.91
3 to 5	1.00
6 to 8	1.18
9 to 11	1.25
12 or more	1.33

**Table 4C-3. Warrant 9, Adjustment Factor for Percentage of High-Occupancy Buses**

% of High-Occupancy Buses* on Minor-Street Approach	Adjustment Factor
0%	1.00
2%	1.09
4%	1.19
6% or more	1.32

\* A high-occupancy bus is defined as a bus occupied by at least 20 people.

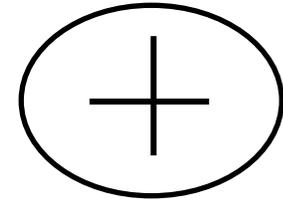
**Table 4C-4. Warrant 9, Adjustment Factor for Percentage of Tractor-Trailer Trucks**

% of Tractor-Trailer Trucks on Minor-Street Approach	Adjustment Factor	
	D less than 70 feet	D of 70 feet or more
0% to 2.5%	0.50	0.50
2.6% to 7.5%	0.75	0.75
7.6% to 12.5%	1.00	1.00
12.6% to 17.5%	2.30	1.15
17.6% to 22.5%	2.70	1.35
22.6% to 27.5%	3.28	1.64
More than 27.5%	4.18	2.09

\* Entire Count Period

NUMBER OF LANES

PEDESTRIANS	
TOTAL *	PEAK



Insert North Point

TOTAL *			
PM PEAK			
AM PEAK			

NUMBER OF LANES

PEDESTRIANS	PEAK	
	TOTAL *	

AM PEAK	PM PEAK	TOTAL*

AM PEAK	PM PEAK	TOTAL*

PEDESTRIANS	PEAK	
	TOTAL *	

NUMBER OF LANES

DIRECTIONAL TRAFFIC COUNT

Dist \_\_\_ Co \_\_\_ Rte \_\_\_ PM \_\_\_\_\_

(Intersection Given Name)

(City)

(Day)

(Date)

Hour

to

Hour

TOTAL *			
PM PEAK			
AM PEAK			

NUMBER OF LANES

PEDESTRIANS	
TOTAL *	PEAK

AM Peak \_\_\_\_\_  
 (Hour) (Volume)

PM Peak \_\_\_\_\_  
 (Hour) (Volume)

COUNT DATE \_\_\_\_\_  
 CALC \_\_\_\_\_ DATE \_\_\_\_\_  
 CHK \_\_\_\_\_ DATE \_\_\_\_\_

DIST \_\_\_\_\_ CO \_\_\_\_\_ RTE \_\_\_\_\_ PM \_\_\_\_\_  
 MAJOR ST. \_\_\_\_\_ MPH  
 MINOR ST. \_\_\_\_\_ MPH

Speed limit or critical speed on major street traffic > 64km/h (40 mph)....  } **RURAL (R)**  
 In built up area of isolated community of < 10,000 population.....  } **URBAN(U)**

**(Based on Estimated Average Daily Traffic - See Note)**

URBAN..... RURAL.....		Minimum Requirements EADT			
<b>CONDITION A - Minimum Vehicular Volume</b>		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied _____ Not Satisfied _____					
Number of lanes for moving traffic on each approach		Urban	Rural	Urban	Rural
Major Street	Minor Street				
1.....	1.....	8,000	5,600	2,400	1,680
2 or More.....	1.....	9,600	6,720	2,400	1,680
2 or More.....	2 or More.....	9,600	6,720	3,200	2,240
1.....	2 or More.....	8,000	5,600	3,200	2,240
<b>CONDITION B - Interruption of Continuous Traffic</b>		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied _____ Not Satisfied _____					
Number of lanes for moving traffic on each approach		Urban	Rural	Urban	Rural
Major Street	Minor Street				
1.....	1.....	12,000	8,400	1,200	850
2 or More.....	1.....	14,400	10,080	1,200	850
2 or More.....	2 or More.....	14,400	10,080	1,600	1,120
1.....	2 or More.....	12,000	8,400	1,600	1,120
<b>Combination of CONDITIONS A + B</b>		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied _____ Not Satisfied _____					
No one condition satisfied, but following conditions fulfilled 80% or more.....					
_____ A _____ B					

**Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.**

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.