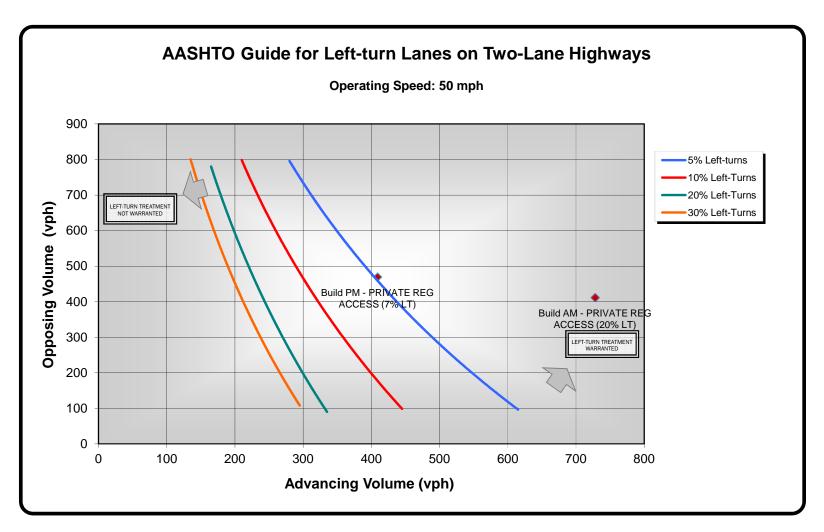
PROJECT NAME: Regeneron Mill Creek

LOCATION: 3rd Ave Ext & Regeneron Access

DATE: 1/24/2018

CHA PROJ. #: 33295

DESCRIPTION:





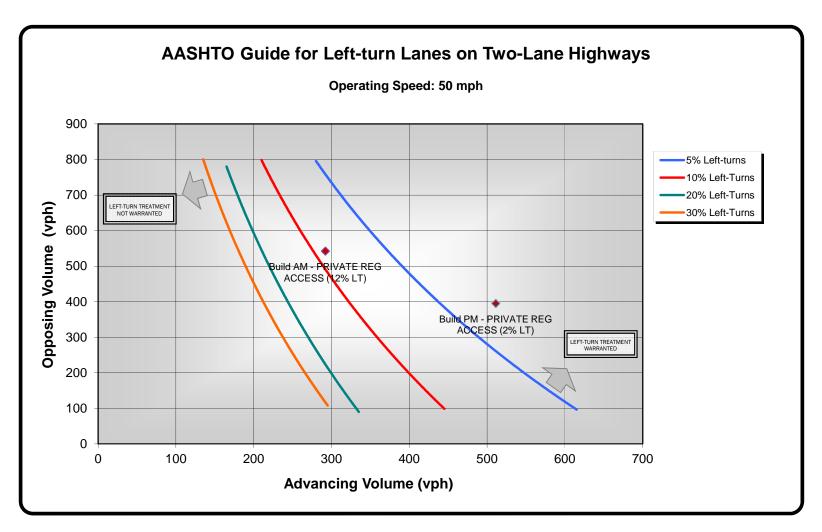
PROJECT NAME: Regeneron Mill Creek

LOCATION: NY 151 & Tempel Lane

DATE: 1/24/2018

CHA PROJ. #: 33295

DESCRIPTION:





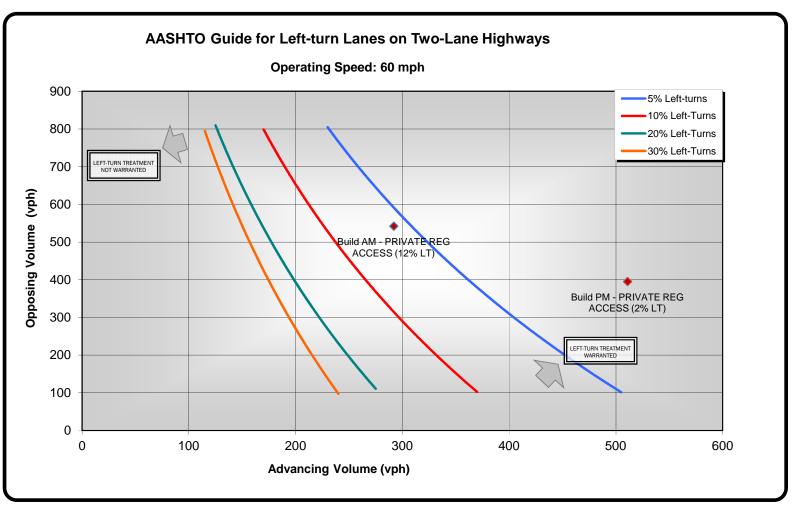
PROJECT NAME: Regeneron Mill Creek

LOCATION: NY 151 & Tempel Lane

DATE: 1/24/2018

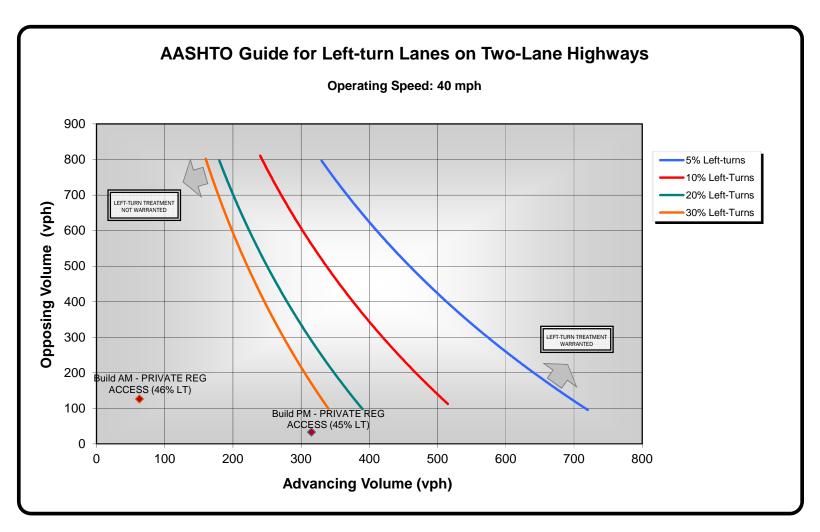
CHA PROJ. #: 33295

DESCRIPTION:





DESCRIPTION:



source: A Policy on Geometric Design of Highways and Streets, 6th Edition; American Association of State Highway and Transportation Officials (2011): Table 9-23



DATE: 1/24/2018

33295

CHA PROJ. #:

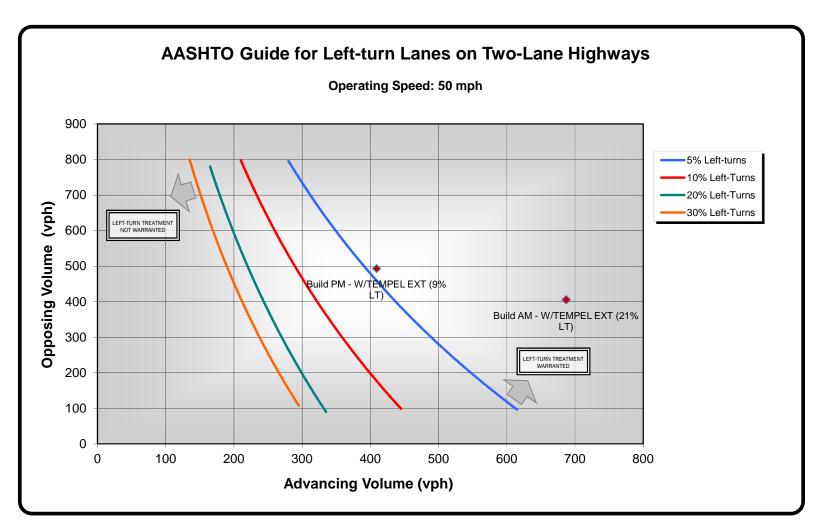
PROJECT NAME: Regeneron Mill Creek

LOCATION: 3rd Ave Ext & Tempel Lane

DATE: 1/24/2018

CHA PROJ. #: 33295

DESCRIPTION:



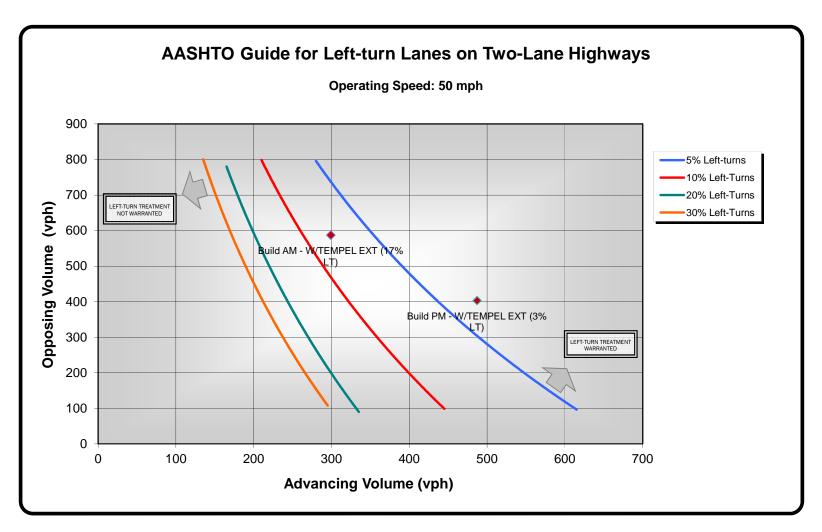


PROJECT NAME: Regeneron Mill Creek

LOCATION: NY 151 & Tempel Lane

DATE: 1/24/2018
CHA PROJ. #: 33295

DESCRIPTION:



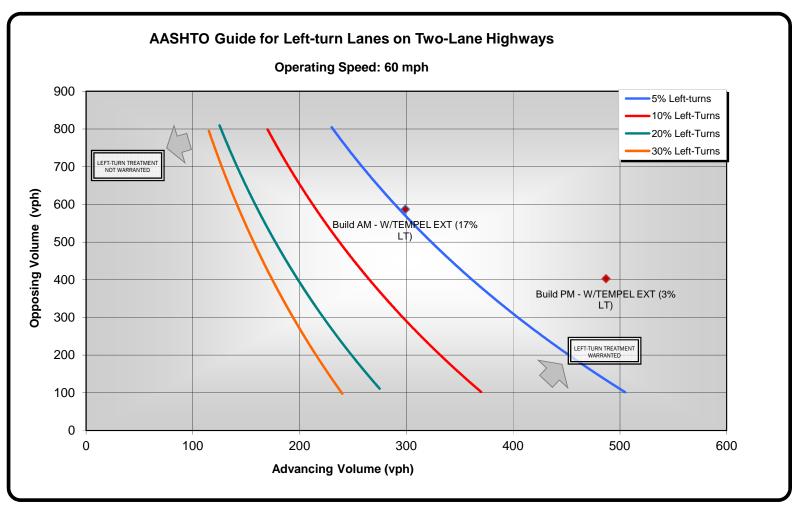


PROJECT NAME: Regeneron Mill Creek

LOCATION: NY 151 & Tempel Lane

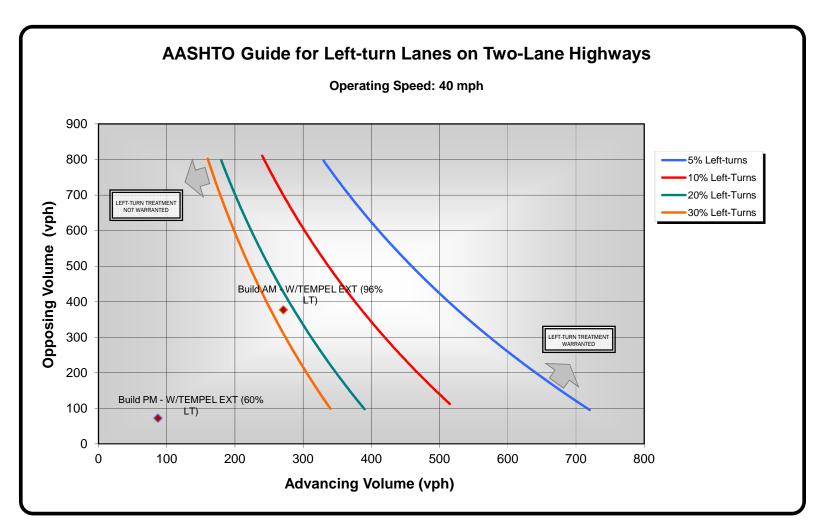
DATE: 1/24/2018
CHA PROJ. #: 33295

DESCRIPTION:



PROJECT NAME: Regeneron Mill Creek
LOCATION: Tempel Lane & Regeneron Access

DESCRIPTION:







DATE: 1/24/2018

33295

CHA PROJ. #:

DESCRIPTION:

AASHTO Guide for Left-turn Lanes on Two-Lane Highways Operating Speed: 40 mph 900 800 5% Left-turns 10% Left-Turns 700 20% Left-Turns EFT-TURN TREATMENT Opposing Volume (vph) 30% Left-Turns 600 500 400 300 LEFT-TURN TREATMENT WARRANTED Build AM - W/TEMPEL EXT (40% 200 100 Build PM - W/TEMPEL EXT (41% 300 0 100 200 400 500 600 700 800 Advancing Volume (vph)

source: A Policy on Geometric Design of Highways and Streets, 6th Edition; American Association of State Highway and Transportation Officials (2011): Table 9-23



DATE: 1/24/2018

33295

CHA PROJ. #:

TRAFFIC SIGNAL WARRANT SUMMARY

Project : Regeneron Location: Regeneron East Greenl Intersection: Regener		Analyst: Date: Checked By: CHA Project No.	SEB January 30, 2018 33295
Major Street: 3rd Aven Minor Street: Regener Critical Approach Speed Posted Speed Limit:	on Access (Alt 1)	Nur	mber of Approach Lanes: mber of Approach Lanes: 2 Intersection Approaches: 4
Volume Level Criteria 1. Is the critical spe	ned of major street traffic > 40 mph ? n in a built-up area of isolated community	of <10,000 populati	
If Question 1 or 2 at	pove is answered "Yes", then use "70%" v	olume level	Use: 70 %
Traffic Volume Inpu	t		
Analysis Condition:	Full Build without Tempel Farms		
Data Source:	ATR Data & Trip Gen		

						Hou	rly Volu	ımes					
	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	2-6pm	md2-9
Major Street (Both Approaches)	284	1,139	594	452	408	492	608	532	497	461	710	878	527
Minor Street (Highest Approach)	32	35	52	41	35	79	78	49	91	140	258	176	58
Pedestrian Volume Crossing Major Street (Total of all crossings)													

Not	es:				
L					



WARRANT 1- EIGHT-HOUR VEHICULAR VOLUME

Applicable:

Number of Hours Satisfied:

No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.

Satisfied:

Yes ⊠ No

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied. Should be applied only after adequate trial of

other alternatives that would cause less delay and inconvenience to traffic has failed to solve the traffic problem.

Condition A - Minimum Vehicular Volume

	of lanes for n each approach		•	ır on majoı approach		Vehicles per hour on higher-volume minor-street approach (one direction only)					
Major Street	Minor Street	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>		
1 2 or more 2 or more 1	1	500 600 600 500	400 480 480 400	350 420 420 350	280 336 336 280	150 150 200 200	120 120 160 160	105 105 140 140	84 84 112 112		

Table 4C-1, USMUTCD, 2009

	Minimum						Но	urly Vo	lumes					
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	2-6pm	6-7pm
Major Street (Both Approaches)	350	284	1,139	594	452	408	492	608	532	497	461	710	878	527
Minor Street (Highest Approach)	140	32	35	52	41	35	79	78	49	91	140	258	176	58
<u> </u>	satisfied?	·									$\overline{\mathbf{A}}$	V	$\overline{\checkmark}$	

Warrant Criteria Satisfied for Condition A?

Condition B - Interruption of Continuous Traffic

	of lanes for n each approach		•	ır on majoı approach		Vehicles per hour on higher-volume minor-street approach (one direction only)					
Major Street	Minor Street	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>		
1 2 or more 2 or more 1	1	750 900 900 750	600 720 720 600	525 630 630 525	420 504 504 420	75 75 100 100	60 60 80 80	53 53 70 70	42 42 56 56		

source: Table 4C-1, USMUTCD, 2009

	Minimum						Но	urly Vo	lumes					
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	525	284	1,139	594	452	408	492	608	532	497	461	710	878	527
Minor Street (Highest Approach)	70	32	35	52	41	35	79	78	49	91	140	258	176	58
	satisfied?												•	

Warrant Criteria Satisfied for Condition B? NO Number of Hours Satisfied: 3



WARRANT 1- EIGHT-HOUR VEHICULAR VOLUME (Con't)

Combination of Conditions A & B

Condition A

	Minimum						Но	urly Vo	lumes					
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	280	284	1,139	594	452	408	492	608	532	497	461	710	878	527
Minor Street (Highest Approach)	112	32	35	52	41	35	79	78	49	91	140	258	176	58
	satisfied?			•		•		•			$\overline{\checkmark}$	V	V	

Warrant Criteria 80% Satisfied for Condition A ? No Number of Hours Satisfied: 3

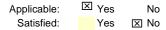
Condition B

	Minimum						F	lourly \	/olume	s				
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	2-6pm	md / -9
Major Street (Both Approaches)	420	284	1,139	594	452	408	492	608	532	497	461	710	878	527
Minor Street (Highest Approach)	56	32	35	52	41	35	79	78	49	91	140	258	176	58
	satisfied?						$\overline{\checkmark}$	$\overline{\checkmark}$		V	$\overline{\checkmark}$	$\overline{\checkmark}$	$\overline{\mathbf{A}}$	$\overline{\checkmark}$

Warrant Criteria 80% Satisfied for Condition A ? No Number of Hours Satisfied: 7

Warrant Criteria 80% Satisfied for Conditions A and B? NO Number of Hours Satisfied: 3

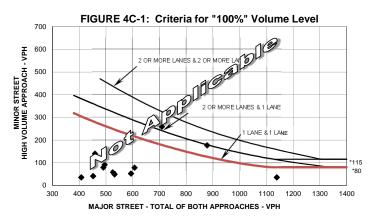




Speed on mainline is above 40 mph or community less than 10,000 - use criteria for 70% volume level

Vo	lumes	
Hour	Major Street	Minor Street
6-7 am	284	32
7-8 am	1,139	35
8-9 am	594	52
9-10am	452	41
10-11am	408	35
11-12pm	492	79
12-1pm	608	78
1-2pm	532	49
2-3pm	497	91
3-4pm	461	140
4-5pm	710	258
5-6pm	878	176
6-7pm	527	58

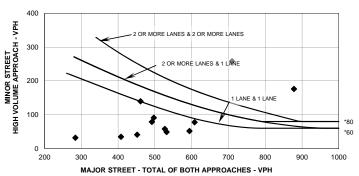
Plot four volume combinations on the applicable figure below.



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

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 40mph (70 km/hr) on Major Street)



* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes & 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



WARRANT 3 - PEAK HOUR VEHICULAR VOLUME

The Peak Hour Volume signal warrant shall be applied only un unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Applicable:

☐ Yes No

Satisfied:
☐ Yes No

CONDITION A

Criteria

1. Total Stopped Time Delay on Minor Approach

 Average Delay per vehicle (sec):
 AM
 28.0
 PM
 26.2

 Peak Hour Volume:
 52
 258

 Total 1-hour stopped delay (veh-hrs):
 0.4
 1.9

 Volume Criteria
 5
 5

Criteria: 4 veh-hrs for 1-lane approach; or 5 veh-hrs for 2-lane approach

Criteria 1 Satisfied? Yes ⊠ No
Criteria 2 Satisfied? ⊠ Yes No
Criteria 3 Satisfied? ⊠ Yes No

Note: All 3 criteria need to be satified for Condition A to be met

2. Minor-Street Approach Volume

Minor Street Volume: 258
Number of Approach Lanes: 2
Volume Criteria: 150

Criteria: 100 vph for 1 lane; 150 vph for 2 lanes

3. Intersection Peak-Hour Volume

Total Entering Volume: 1,209

Number of Approaches: 4

Volume Criteria: 800

Criteria: 650 vph for 3 approaches; or

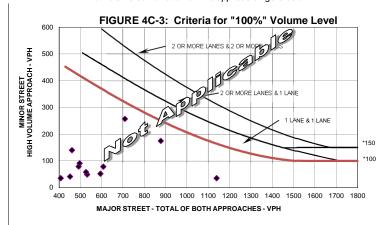
800 vph for 4 or more approaches

CONDITION B

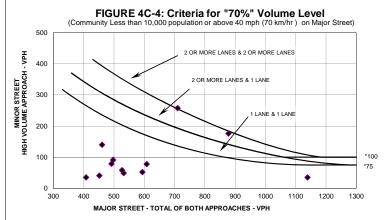
Speed on mainline is above 40 mph or community less than 10,000 - use criteria for 70% volume level

Vo	lumes	
Hour	Major Street	Minor Street
6-7 am	284	32
7-8 am	1,139	35
8-9 am	594	52
9-10am	452	41
10-11am	408	35
11-12pm	492	79
12-1pm	608	78
1-2pm	532	49
2-3pm	497	91
3-4pm	461	140
4-5pm	710	258
5-6pm	878	176
6-7pm	527	58

Plot volume combination on the applicable figure below.



* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



TRAFFIC SIGNAL WARRANT SUMMARY

	Project : Regeneron Location: Tempel & 3rd Ave Ext East Greenbush, NY Analyst: SEB Date: January 24, 2018 Checked By: CHA Project No. 33295													
Intersection: Tempel La	ane & 3	Brd Ave	nue Ex	tensior	1									
Major Street: 3rd Ave Ex Minor Street: Tempel La	ne (Alt							Nu	mber of	Approa	ach Lan	es:	1 2	
Critical Approach Speed: Posted Speed Limit:		mpl 15 mpl					Nur	nber of	Interse	ction Ap	proach	es:	4	
Critical Approach Speed: 45 mph Number of Intersection Approaches: 4 mph Volume Level Criteria 1. Is the critical speed of major street traffic > 40 mph ?														
						Hou	rly Volu	ımes						1
	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	2-6pm	md2-9	
Major Street	292	1,092	665	475	425	506	624	547	510	474	729	902	542	
(Both Approaches) Minor Street 39 68 112 82 51 90 94 63 108 154 267 186 71														
Pedestrian Volume Crossing Major Street (Total of all crossings)														
Notes:														



WARRANT 1- EIGHT-HOUR VEHICULAR VOLUME

Applicable:

Yes

No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.

Satisfied:

Yes ⊠ No

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied. Should be applied only after adequate trial of other alternatives that would cause less delay and inconvenience to traffic has failed to solve the traffic problem.

Condition A - Minimum Vehicular Volume

Number of moving traffic or		•	ur on majoi approach		Vehicles per hour on higher-volume minor-street approach (one direction only)				
Major Street	Minor Street	<u>100%</u>	80%	<u>70%</u>	<u>56%</u>	<u>100%</u>	80%	<u>70%</u>	<u>56%</u>
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

source: Table 4C-1, USMUTCD, 2009

	Minimum	Hourly Volumes												
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	350	292	1,092	665	475	425	506	624	547	510	474	729	902	542
Minor Street (Highest Approach)	140	39	68	112	82	51	90	94	63	108	154	267	186	71

Warrant Criteria Satisfied for Condition A?	NO	Number of Hours Satisfied:	3	

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach				ır on majoı approach		Vehicles per hour on higher-volume minor-street approach (one direction only)					
Major Street	Minor Street	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>		
1 2 or more 2 or more 1	1 1 2 or more 2 or more	750 900 900 750	600 720 720 600	525 630 630 525	420 504 504 420	75 75 100 100	60 60 80 80	53 53 70 70	42 42 56 56		

source: Table 4C-1, USMUTCD, 2009

	Minimum						Но	urly Vo	lumes					
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	2-6pm	6-7pm
Major Street (Both Approaches)	525	292	1,092	665	475	425	506	624	547	510	474	729	902	542
Minor Street (Highest Approach)	70	39	68	112	82	51	90	94	63	108	154	267	186	71
	satisfied?		-	V				V				ব	V	N

Warrant Criteria Satisfied for Condition B? NO Number of Hours Satisfied: 5



WARRANT 1- EIGHT-HOUR VEHICULAR VOLUME (Con't)

Combination of Conditions A & B

Condition A

	Minimum						Но	urly Vo	lumes					
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	280	292	1,092	665	475	425	506	624	547	510	474	729	902	542
Minor Street (Highest Approach)	112	39	68	112	82	51	90	94	63	108	154	267	186	71
	satisfied?	·		$\overline{\checkmark}$	-		•	•			$\overline{\checkmark}$	$\overline{\checkmark}$	$\overline{\checkmark}$	

Warrant Criteria 80% Satisfied for Condition A ? _____ NO ___ Number of Hours Satisfied: _____4

Condition B

	Minimum						F	lourly \	/olume	s				
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	2-6pm	6-7pm
Major Street (Both Approaches)	420	292	1,092	665	475	425	506	624	547	510	474	729	902	542
Minor Street (Highest Approach)	56	39	68	112	82	51	90	94	63	108	154	267	186	71
	notiofied?		IJ	IJ	Ŋ		IJ	Ŋ	Ŋ	IJ	Ŋ	Ŋ	Ŋ	Ŋ

Warrant Criteria 80% Satisfied for Condition A ? YES Number of Hours Satisfied: 11

Warrant Criteria 80% Satisfied for Conditions A and B? No Number of Hours Satisfied: 4



WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

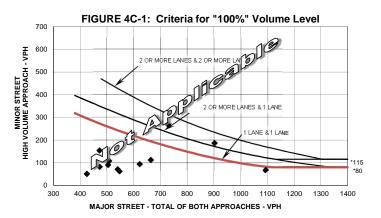
If all four points lie above the appropriate line, then the warrant is satisfied.



Speed on mainline is above 40 mph or community less than 10,000 - use criteria for 70% volume level

Vo	lumes	
Hour	Major Street	Minor Street
6-7 am	292	39
7-8 am	1,092	68
8-9 am	665	112
9-10am	475	82
10-11am	425	51
11-12pm	506	90
12-1pm	624	94
1-2pm	547	63
2-3pm	510	108
3-4pm	474	154
4-5pm	729	267
5-6pm	902	186
6-7pm	542	71

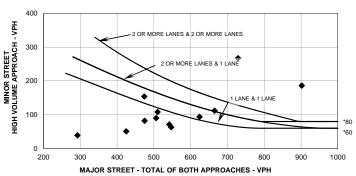
Plot four volume combinations on the applicable figure below.



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

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 40mph (70 km/hr) on Major Street)



* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes & 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



WARRANT 3 - PEAK HOUR VEHICULAR VOLUME

The Peak Hour Volume signal warrant shall be applied only un unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Applicable:

Satisfied:

Yes No

Satisfied:

Yes No

CONDITION A

Criteria

1. Total Stopped Time Delay on Minor Approach

 Average Delay per vehicle (sec):
 AM
 53.1
 PM
 29.9

 Peak Hour Volume:
 112
 268

 Total 1-hour stopped delay (veh-hrs):
 1.7
 2.2

 Volume Criteria
 5
 5

Criteria: 4 veh-hrs for 1-lane approach; or 5 veh-hrs for 2-lane approach

Criteria 1 Satisfied? Yes ⊠ No
Criteria 2 Satisfied? ⊠ Yes No
Criteria 3 Satisfied? ⊠ Yes No

Note: All 3 criteria need to be satified for Condition A to be met

2. Minor-Street Approach Volume

Minor Street Volume: 268
Number of Approach Lanes: 2
Volume Criteria: 150

Criteria: 100 vph for 1 lane; 150 vph for 2 lanes

3. Intersection Peak-Hour Volume

Total Entering Volume: 1,218

Number of Approaches: 4

Volume Criteria: 800

Criteria: 650 vph for 3 approaches; or

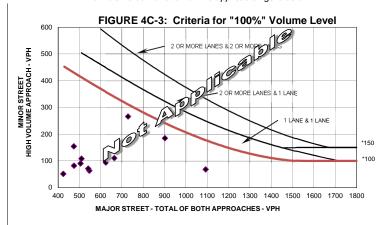
800 vph for 4 or more approaches

CONDITION B

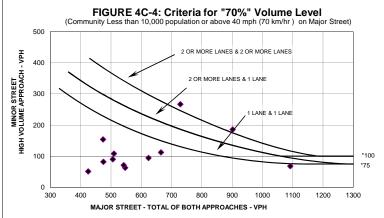
Speed on mainline is above 40 mph or community less than 10,000 - use criteria for 70% volume level

Vo	lumes	
Hour	Major Street	Minor Street
6-7 am	292	39
7-8 am	1,092	68
8-9 am	665	112
9-10am	475	82
10-11am	425	51
11-12pm	506	90
12-1pm	624	94
1-2pm	547	63
2-3pm	510	108
3-4pm	474	154
4-5pm	729	267
5-6pm	902	186
6-7pm	542	71

Plot volume combination on the applicable figure below.



* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



TRAFFIC SIGNAL WARRANT SUMMARY

	Analyst: SEB									
Project : Regeneron	Date: January 23, 2018									
Location: Tempel & NYS Route 151	Checked By:									
East Greenbush, NY	CHA Project No. 33295									
Intersection: Tempel Lane & Red Mill Road	, <u> </u>									
Major Street: Red Mill Road (NY Route 151)	Number of Approach Lanes: 1									
Minor Street: Tempel Lane	Number of Approach Lanes: 2									
Tompor Earle	Trainbor of Approach Euroc.									
Critical Approach Speed: 45 mph Posted Speed Limit: 45 mph	Number of Intersection Approaches: 3									
Volume Level Criteria 1. Is the critical speed of major street traffic > 40 mph ? x Yes No 2. Is the intersection in a built-up area of isolated community of <10,000 population?										
If Question 1 or 2 above is answered "Yes", then use "70%" volume level Use: 70 %										

Traffic Volume Input

Analysis Condition: Build Sensitivity Analysis

Data Source: ATR Data & Trip Gen

						Hou	rly Volι	ımes					
	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	2-6pm	md2-9
Major Street (Both Approaches)	458	834	750	481	394	437	500	460	578	618	851	906	522
Minor Street (Highest Approach)	29	43	58	52	70	115	113	82	115	156	246	193	90
Pedestrian Volume Crossing Major Street (Total of all crossings)													

NI	2+22	i
IV	otes	

This Worksheet is for a Private Regeneron Access on 3rd Avenue Extension (Alt 1)
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1
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WARRANT 1- EIGHT-HOUR VEHICULAR VOLUME

Applicable:

No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.

Satisfied:

Yes ⊠ No

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied. Should be applied only after adequate trial of other alternatives that would cause less delay and inconvenience to traffic has failed to solve the traffic problem.

Condition A - Minimum Vehicular Volume

Number of moving traffic or		•	ur on majoi approach		Vehicles per hour on higher-volume minor-street approach (one direction only)				
Major Street	Minor Street	<u>100%</u>	80%	<u>70%</u>	<u>56%</u>	<u>100%</u>	80%	<u>70%</u>	<u>56%</u>
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

source: Table 4C-1, USMUTCD, 2009

	Minimum	Hourly Volumes												
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	350	458	834	750	481	394	437	500	460	578	618	851	906	522
Minor Street (Highest Approach)	140	29	43	58	52	70	115	113	82	115	156	246	193	90

satisfied?

Warrant Criteria Satisfied for Condition A? NO Number of Hours Satisfied: 3

Condition B - Interruption of Continuous Traffic

	Number of lanes for moving traffic on each approach			ır on majoı approach		Vehicles per hour on higher-volume minor-street approach (one direction only)				
Major Street	Minor Street	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>	
1 2 or more 2 or more 1	1 1 2 or more 2 or more	750 900 900 750	600 720 720 600	525 630 630 525	420 504 504 420	75 75 100 100	60 60 80 80	53 53 70 70	42 42 56 56	

source: Table 4C-1, USMUTCD, 2009

	Minimum	Hourly Volumes												
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	525	458	834	750	481	394	437	500	460	578	618	851	906	522
Minor Street (Highest Approach)	70	29	43	58	52	70	115	113	82	115	156	246	193	90
	satisfied?									$\overline{\checkmark}$	$\overline{\checkmark}$	V	$\overline{\checkmark}$	

Warrant Criteria Satisfied for Condition B ? NO Number of Hours Satisfied: 4



WARRANT 1- EIGHT-HOUR VEHICULAR VOLUME (Con't)

Combination of Conditions A & B

Condition A

	Minimum	Hourly Volumes												
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	280	458	834	750	481	394	437	500	460	578	618	851	906	522
Minor Street (Highest Approach)	112	29	43	58	52	70	115	113	82	115	156	246	193	90
	satisfied?						$\overline{\mathbf{A}}$	$\overline{\mathbf{A}}$		$\overline{\mathbf{A}}$	$\overline{\checkmark}$		V	

Warrant Criteria 80% Satisfied for Condition A ? _____NO Number of Hours Satisfied: ____6

Condition B

	Minimum						F	lourly \	/olume	s				
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	md / -9
Major Street (Both Approaches)	420	458	834	750	481	394	437	500	460	578	618	851	906	522
Minor Street (Highest Approach)	56	29	43	58	52	70	115	113	82	115	156	246	193	90
	satisfied?	•		$\overline{\checkmark}$		•	V	$\overline{\checkmark}$	$\overline{\checkmark}$	V	V	$\overline{\checkmark}$	V	V

Warrant Criteria 80% Satisfied for Condition B?	YES	Number of Hours Satisfied:	9	
Warrant Criteria 80% Satisfied for Conditions A and	B? NO	Number of Hours Satisfied:	6	



WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable:

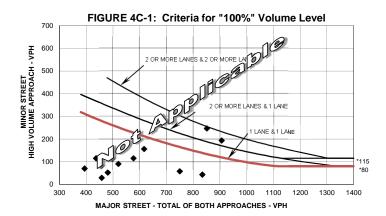
X Yes No
Satisfied:

Yes X No

Speed on mainline is above 40 mph or community less than 10,000 - use criteria for 70% volume level

Vo	lumes	
Hour	Major Street	Minor Street
6-7 am	458	29
7-8 am	834	43
8-9 am	750	58
9-10am	481	52
10-11am	394	70
11-12pm	437	115
12-1pm	500	113
1-2pm	460	82
2-3pm	578	115
3-4pm	618	156
4-5pm	851	246
5-6pm	906	193
6-7pm	522	90

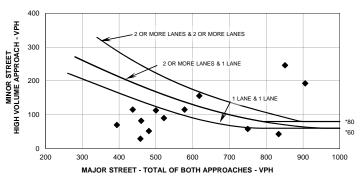
Plot four volume combinations on the applicable figure below.



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

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 40mph (70 km/hr) on Major Street)



* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes & 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



WARRANT 3 - PEAK HOUR VEHICULAR VOLUME

The Peak Hour Volume signal warrant shall be applied only un unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Applicable: Satisfied: Yes No Satisfied: Yes No

CONDITION A

Criteria

1. Total Stopped Time Delay on Minor Approach

 Average Delay per vehicle (sec):
 AM
 20.1
 PM
 68.9

 Peak Hour Volume:
 60
 249

 Total 1-hour stopped delay (veh-hrs):
 0.3
 4.8

 Volume Criteria
 5
 5

Criteria: 4 veh-hrs for 1-lane approach; or 5 veh-hrs for 2-lane approach

Criteria 1 Satisfied? Yes ⊠ No
Criteria 2 Satisfied? ⊠ Yes No
Criteria 3 Satisfied? ⊠ Yes No

Note: All 3 criteria need to be satified for Condition A to be met

2. Minor-Street Approach Volume

Minor Street Volume: 249
Number of Approach Lanes: 2
Volume Criteria: 150

Criteria: 100 vph for 1 lane; 150 vph for 2 lanes

3. Intersection Peak-Hour Volume

Total Entering Volume: 1,155

Number of Approaches: 3

Volume Criteria: 650

Criteria: 650 vph for 3 approaches; or

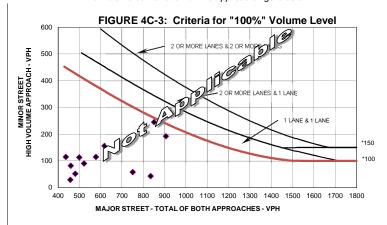
800 vph for 4 or more approaches

CONDITION B

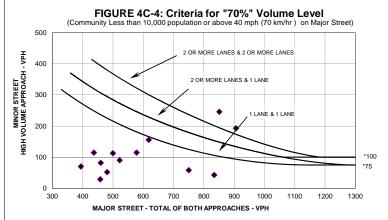
Speed on mainline is above 40 mph or community less than 10,000 - use criteria for 70% volume level

Vo	lumes	
Hour	Major Street	Minor Street
6-7 am	458	29
7-8 am	834	43
8-9 am	750	58
9-10am	481	52
10-11am	394	70
11-12pm	437	115
12-1pm	500	113
1-2pm	460	82
2-3pm	578	115
3-4pm	618	156
4-5pm	851	246
5-6pm	906	193
6-7pm	522	90

Plot volume combination on the applicable figure below.



* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



TRAFFIC SIGNAL WARRANT SUMMARY

	Analyst: SEB
Project : Regeneron	Date: January 23, 2018
Location: Tempel & NY Route 151	Checked By:
East Greenbush, NY	CHA Project No. 33295
East Greenbush, NT	CHA Project No.
Intersection: Tempel Lane & Red Mill Road (NY Route 151)	
Major Street: Red Mill Road (NY Route 151)	Number of Approach Lanes: 1
Minor Street: Tempel Lane	Number of Approach Lanes: 2
remper Lane	Number of Approach Lanes.
Critical Approach Speed: 45 mph Posted Speed Limit: 45 mph	Number of Intersection Approaches: 3
Volume Level Criteria 1. Is the critical speed of major street traffic > 40 mph ? 2. Is the intersection in a built-up area of isolated community	of <10,000 population? $x Yes No$ Yes $x No$
Population: 16,500	
If Question 1 or 2 above is answered "Yes", then use "70%" v	rolume level Use: 70 %

Traffic Volume Input

Analysis Condition: Build Sensitivity Analysis

Data Source: ATR Data & Trip Gen

						Hou	rly Volu	ımes					
	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	2-6pm	6-7pm
Major Street (Both Approaches)	414	886	701	472	387	429	491	452	568	607	836	890	512
Minor Street (Highest Approach)	33	48	68	59	75	125	124	89	127	173	281	214	98
Pedestrian Volume Crossing Major Street (Total of all crossings)													

N	lote	S

This worksheet includes the Extension of Tempel Lane (Alt 2)



WARRANT 1- EIGHT-HOUR VEHICULAR VOLUME

Applicable:

Number of Hours Satisfied:

No

⊠ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied. Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied. Should be applied only after adequate trial of

Satisfied: Yes

other alternatives that would cause less delay and inconvenience to traffic has failed to solve the traffic problem.

Condition A - Minimum Vehicular Volume

Number of moving traffic on			•	ır on major approache		Vehicles per hour on higher-volume minor-street approach (one direction only)					
Major Street	Minor Street	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>		
1 2 or more 2 or more 1	1	500 600 600 500	400 480 480 400	350 420 420 350	280 336 336 280	150 150 200 200	120 120 160 160	105 105 140 140	84 84 112 112		

Table 4C-1, USMUTCD, 2009

	Minimum		Hourly Volumes											
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	2-6pm	6-7pm
Major Street (Both Approaches)	350	414	886	701	472	387	429	491	452	568	607	836	890	512
Minor Street (Highest Approach)	140	33	48	68	59	75	125	124	89	127	173	281	214	98
<u> </u>	satisfied?	·									$\overline{\mathbf{A}}$	V	$\overline{\checkmark}$	

Condition B - Interruption of Continuous Traffic

Warrant Criteria Satisfied for Condition A?

	Number of lanes for moving traffic on each approach			ır on majoı approach		Vehicles per hour on higher-volume minor-street approach (one direction only)					
Major Street	Minor Street	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>	<u>100%</u>	<u>80%</u>	<u>70%</u>	<u>56%</u>		
1 2 or more 2 or more 1	1	750 900 900 750	600 720 720 600	525 630 630 525	420 504 504 420	75 75 100 100	60 60 80 80	53 53 70 70	42 42 56 56		

source: Table 4C-1, USMUTCD, 2009

	Minimum						Но	urly Vo	lumes					
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	525	414	886	701	472	387	429	491	452	568	607	836	890	512
Minor Street (Highest Approach)	70	33	48	68	59	75	125	124	89	127	173	281	214	98
	satisfied?	-								$\overline{\checkmark}$	$\overline{\checkmark}$	V	$\overline{\checkmark}$	

Warrant Criteria Satisfied for Condition B? Number of Hours Satisfied:



WARRANT 1- EIGHT-HOUR VEHICULAR VOLUME (Con't)

Combination of Conditions A & B

Condition A

	Minimum		Hourly Volumes											
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	md2-9
Major Street (Both Approaches)	280	414	886	701	472	387	429	491	452	568	607	836	890	512
Minor Street (Highest Approach)	112	33	48	68	59	75	125	124	89	127	173	281	214	98
	satisfied?	·					$\overline{\checkmark}$	$\overline{\mathbf{A}}$		$\overline{\mathbf{V}}$	$\overline{\checkmark}$	$\overline{\checkmark}$	$\overline{\checkmark}$	

Warrant Criteria 80% Satisfied for Condition A ? _____NO Number of Hours Satisfied: ____6

Condition B

	Minimum						F	lourly \	/olume	s				
	Volume Requirements (based on input criteria)	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	2-6pm	6-7pm
Major Street (Both Approaches)	420	414	886	701	472	387	429	491	452	568	607	836	890	512
Minor Street (Highest Approach)	56	33	48	68	59	75	125	124	89	127	173	281	214	98
	satisfied?			$\overline{\checkmark}$	$\overline{\checkmark}$		$\overline{\checkmark}$	$\overline{\mathbf{Q}}$						

Warrant Criteria 80% Satisfied for Condition B ? YES	_	Number of Hours Satisfied:	10	
Warrant Criteria 80% Satisfied for Conditions A and B?	NO	Number of Hours Satisfied:	6	



WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable:

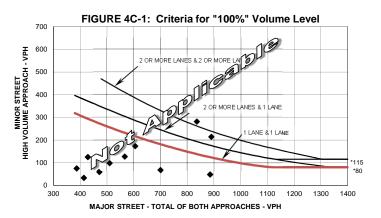
X Yes No
Satisfied:

Yes X No

Speed on mainline is above 40 mph or community less than 10,000 - use criteria for 70% volume level

Vo	lumes	
Hour	Major Street	Minor Street
6-7 am	414	33
7-8 am	886	48
8-9 am	701	68
9-10am	472	59
10-11am	387	75
11-12pm	429	125
12-1pm	491	124
1-2pm	452	89
2-3pm	568	127
3-4pm	607	173
4-5pm	836	281
5-6pm	890	214
6-7pm	512	98

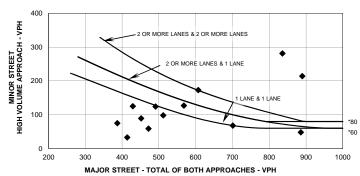
Plot four volume combinations on the applicable figure below.



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

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 40mph (70 km/hr) on Major Street)



* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes & 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



WARRANT 3 - PEAK HOUR VEHICULAR VOLUME

The Peak Hour Volume signal warrant shall be applied only un unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Applicable: ☐ Yes No Satisfied: ☐ Yes No

CONDITION A

Criteria

1. Total Stopped Time Delay on Minor Approach

 Average Delay per vehicle (sec):
 AM
 23.3
 PM
 96.1

 Peak Hour Volume:
 70
 284

 Total 1-hour stopped delay (veh-hrs):
 0.5
 7.6

 Volume Criteria
 5
 5

Criteria: 4 veh-hrs for 1-lane approach; or 5 veh-hrs for 2-lane approach

Criteria 1 Satisfied? ⊠ Yes No
Criteria 2 Satisfied? ⊠ Yes No
Criteria 3 Satisfied? ⊠ Yes No

Note: All 3 criteria need to be satified for Condition A to be met

2. Minor-Street Approach Volume

Minor Street Volume: 284
Number of Approach Lanes: 2
Volume Criteria: 150

Criteria: 100 vph for 1 lane; 150 vph for 2 lanes

3. Intersection Peak-Hour Volume

Total Entering Volume: 1,174

Number of Approaches: 3

Volume Criteria: 650

Criteria: 650 vph for 3 approaches; or

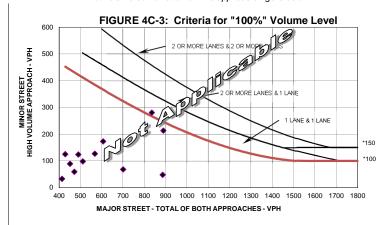
800 vph for 4 or more approaches

CONDITION B

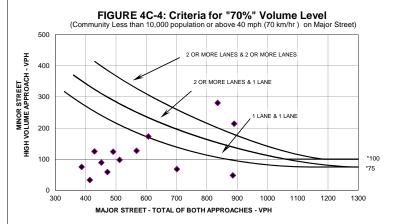
Speed on mainline is above 40 mph or community less than 10,000 - use criteria for 70% volume level

Vo	lumes	
Hour	Major Street	Minor Street
6-7 am	414	33
7-8 am	886	48
8-9 am	701	68
9-10am	472	59
10-11am	387	75
11-12pm	429	125
12-1pm	491	124
1-2pm	452	89
2-3pm	568	127
3-4pm	607	173
4-5pm	836	281
5-6pm	890	214
6-7pm	512	98

Plot volume combination on the applicable figure below.



* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume threshold for a minor street approach with one lane.

