C&S Companies
499 Col. Eileen Collins Blvd.
Syracuse, NY 13212
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September 30, 2015

Mr. Nick Dovi, Deputy Superintendent
City of Cortland Department of Public Works
19 South Franklin Street
Cortland, New York 13045

Re: Greenbush Street and Central Avenue
Traffic Signal Warrant Analysis (Signal Decommission)

File: 131.018.001

Dear Mr. Dovi:

C&S Engineers, Inc. has completed the traffic signal warrant analysis for the intersection of Greenbush Street and Central Avenue to determine if the existing traffic signal is still warranted under current traffic demands and should be retained and upgraded, or is no longer warranted and can be decommissioned. Our findings are documented in this letter.

Existing Conditions:
The intersection of Greenbush Street and Central Avenue is a four-way intersection centrally located in the city, one block east of Church Street (NYS Routes 13 and 41) as shown in Figure 1 on the following page.

Greenbush Street carries a slightly heavier volume of traffic than Central Avenue and therefore is considered the artery street and Central Avenue is considered the side street for the purpose of this analysis. Both streets are functionally classified as local urban streets. Each leg of the intersection has a single approach lane to the intersection and a single departure lane from the intersection. Greenbush Street is approximately 32 feet wide curb to curb and Central Avenue is approximately 40 feet wide. The traffic signal phasing at this intersection is a simple two-phase operation with two signal heads facing each approach. There are no existing pedestrian signals for crossing any approaches of the intersection. Curb ramps are not compliant with the Americans with Disabilities Act (ADA) guidelines, and marked crosswalks are not present.

Turning movement traffic volume data was collected at the intersection on Thursday, August 13, 2015 during the morning and afternoon peak travel periods, 7 to 9 a.m. and 4 to 6 p.m., respectively. The morning peak hour was found to be from 7:30 to 8:30 and the afternoon peak hour was found to be from 4:00 to 5:00. Traffic was fairly balanced between all approaches during both peak periods and no specific movement was heavier than the others. See attached Exhibit A for complete traffic volume data.

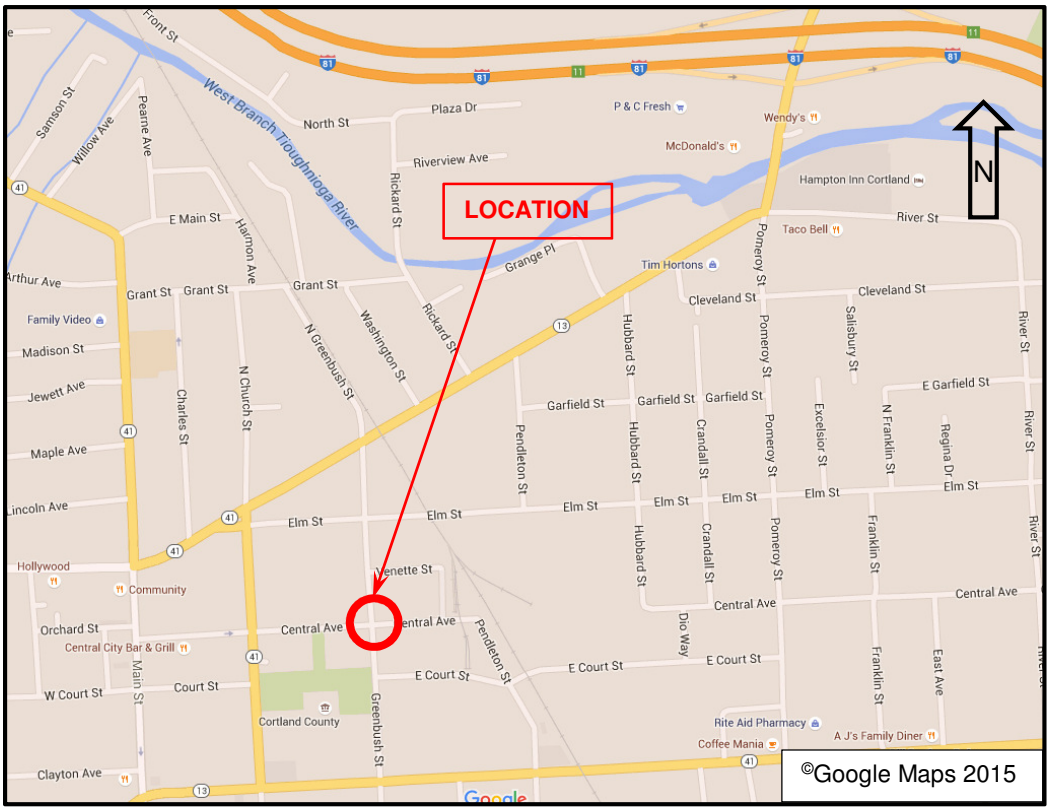

Figure 1 – Study Location

Accident data at the intersection was provided by the City of Cortland for a three-year period between July 2012 and July 2015. There were a total of four (4) accidents reported during that time frame. Of the four accidents, three (3) were rear end type accidents and one (1) was a side swipe accident. Two (2) of the accidents were due to a vehicle backing up to accommodate a large turning vehicle. These types of accidents could continue to occur with all way stop sign control and are unrelated to the existing traffic signal control.

Signal Warrant Analysis:

There are nine (9) warrants that are considered for the installation (or retention) of traffic signal control according to the United Stated Department of Transportation Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways, 2009 Edition. These warrants are guidelines and should be used along with engineering judgment to determine the need for traffic signal control. Chapter 4C, Traffic Control Signal Needs Studies, identifies these warrants which are briefly summarized below:

Warrant 1 – Eight-Hour Vehicular Volume: This warrant applies where the volume of intersection traffic is the principal reason for considering a traffic signal.

Warrant 2 – Four-Hour Volume: This warrant applies at locations where, for short periods of the day, side road traffic experiences excessive delays in attempting to enter or cross the artery.

Warrant 3 – Peak Hour Volume: This warrant applies at locations where, during the peak hour for the intersection, side road traffic is subject to extreme delays in attempting to enter or cross the artery based on volume data.

Warrant 4 – Minimum Pedestrian Volume: This warrant applies where the traffic volume on a major street is so heavy that pedestrians experience excessive delays crossing the artery.

Warrant 5 – School Crossing: This warrant applies when there is a considerable amount of school children crossing the artery and this is the principal reason for considering the traffic signal installation.

Warrant 6 – Coordinated Signal System: Under this warrant, **a** traffic signal would be considered if it would serve to sustain progressive movement and proper vehicle grouping as part of a coordinated signal system, even though other warrants are not satisfied.

Warrant 7 – Crash Experience: This warrant applies where the severity and frequency of accidents that could be mitigated by signal control are the principal reasons for considering installation of a traffic signal.

Warrant 8 – Roadway Network: This warrant applies at intersections between major arteries to encourage organization and concentration of traffic flow.

Warrant 9 – Intersection near a Railroad Grade Crossing: As the title of this warrant implies, this warrant is for intersections near railroad grade crossings that could improve safety by the installation of traffic signal control.

The signal warrant analysis for the intersection of Greenbush and Central Avenues is based on the intersection counts observed in August 2015, accident information provided by the City of Cortland, the geometric characteristics of the intersection, and an engineering site review of the intersection. Each of the warrants for traffic signal control are discussed below. The detailed analysis results are attached in Exhibit B.

Warrant 1 – Eight-Hour Vehicular Volume

To satisfy this warrant, the combined 8th highest hour traffic volume on the artery (both directions on Greenbush) must exceed 500 vehicles per hour (vph) and the 8th highest hour traffic volume on one of the side street (Central) approaches must exceed 150 vph. The 8th highest hourly volume on Greenbush and Central were observed to be 205 and 66 vph, respectively, and therefore, this warrant is not met. There is a second condition for this warrant which is also not met. See Exhibit B for further details.

Warrant 2 – Four-Hour Volume
This warrant is met when there is a particularly high volume of intersecting traffic for four hours of the day. The artery volumes and side road volumes combined need to meet certain thresholds to qualify (see Exhibit B). The 4-hour traffic volumes for Greenbush and Central do not meet these thresholds and therefore, this warrant is not satisfied.

Warrant 3 – Peak Hour Volume
Warrant 3 is satisfied when there are four (4) hours or more of stopped time delay for the side road and there are significant volumes through the intersection during the peak hour. There are only approximately 0.40 vehicle-hours of delay for Central under all-way stop control during the PM peak hour and therefore, this warrant is not met.

Warrant 4 – Minimum Pedestrian Volume
There needs to be a significant number of pedestrians (>100/hour) crossing at the intersection to satisfy this warrant. There are some pedestrians that cross at the study intersection, but not enough to satisfy the criteria for this warrant. This warrant is not met.

Warrant 5 – School Crossing
This warrant requires there to be insufficient gaps in the traffic stream for crossing pedestrians and there needs to be at least 20 students crossing during the highest crossing hour. This condition is not present for the intersection of Greenbush and Central, and therefore this warrant is not applicable.

Warrant 6 – Coordinated Signal System
The intersection of Greenbush and Central is not in the area of a coordinated signal system and therefore, this warrant is not applicable.

Warrant 7 – Crash Experience
This warrant is intended for locations that are not currently signalized and have an accident history that may be correctable by the installation of traffic signal control. Since this intersection is already signalized, this warrant is not applicable. Upon reviewing the accident history for this location, there were no accidents attributable to the traffic signal control. Removal of the traffic signal control and replacement with would all way stop sign control would likely have no impact on accident potential at this intersection. See attached Exhibit C for a summary of the accidents at this intersection.

Warrant 8 – Roadway network
Warrant 8 is intended for an intersection of two major roadways to aid in the operation of the roadway network. The volumes for Greenbush and Central are too low for this warrant and therefore, this warrant is not met.

Warrant 9 – Intersection near a Railroad Grade Crossing
The intersection of Greenbush and Central is not near a railroad grade crossing and therefore, this warrant is not applicable.

Upon reviewing the above warrants, none are satisfied for the intersection of Greenbush and Central Avenues under current conditions. Therefore, the traffic signal at this location can be considered for removal. If the City of Cortland does decide to decommission this traffic signal based on the results of this analysis, it is recommended the traffic signal be placed on all way red flash for a period of one to two months before completely removing the traffic signal to observe how the intersection operates under the new all way stop control. The intersection should remain all-way stop controlled by stop signs when the traffic signal is removed.

An all-way stop control capacity analysis was conducted and the results revealed that the intersection will operate at LOS A during the morning and afternoon peak hours. This is a very good level of service for an unsignalized intersection. See attached Exhibit D for complete capacity analysis results.

This concludes the findings of this study. If you have any questions or comments concerning the above or need additional information, please feel free to contact me.

Sincerely,
C&S ENGINEERS, INC.

Douglas O. Stansbury, P.E., PTOE
Managing Engineer

Attachments:
Exhibit A – Traffic Volumes
Exhibit B – Signal Warrant Analysis
Exhibit C – Accident Summary
Exhibit D – All-Way Stop Control Capacity Analysis

Exhibit A
Traffic Volumes

C&S Engineers, Inc.

499 Col. Eileen Collins Blvd - Syracsue, NY 13212

Cortland
Signal Warrant Analyses
Intersection Peak Hour Analysis

File Name : Central and GreenBush
Site Code : 00000002
Start Date : 8/13/2015
Page No : 1

Groups Printed- All Traffic

	Central Ave Eastbound				Central Ave Westbound				Green Bush St Northbound				Green Bush St Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00 AM	1	6	1	0	1	2	6	0	1	4	1	0	5	26	3	0	57
07:15 AM	1	2	3	0	0	3	5	0	0	6	0	0	2	16	2	0	40
07:30 AM	1	6	4	0	1	4	15	0	1	8	0	0	2	28	4	0	74
07:45 AM	3	8	3	0	0	6	13	0	4	21	0	0	5	30	11	0	104
Total	6	22	11	0	2	15	39	0	6	39	1	0	14	100	20	0	275
08:00 AM	3	3	2	0	0	4	15	0	3	18	1	0	1	20	7	0	77
08:15 AM	1	6	3	0	1	1	16	0	5	13	1	0	6	22	5	0	80
08:30 AM	3	5	2	0	1	2	7	0	3	15	0	0	1	23	1	0	63
08:45 AM	6	5	2	0	1	4	7	0	1	14	0	0	5	18	5	0	68
Total	13	19	9	0	3	11	45	0	12	60	2	0	13	83	18	0	288
*** BREAK ***																	
04:00 PM	12	13	2	0	0	4	12	0	0	19	2	0	14	29	2	0	109
04:15 PM	6	9	3	0	1	6	16	0	3	20	0	0	3	16	2	0	85
04:30 PM	12	8	3	0	0	5	16	0	4	30	1	0	16	28	6	0	129
04:45 PM	7	14	3	0	1	8	11	0	3	25	1	0	6	14	4	0	97
Total	37	44	11	0	2	23	55	0	10	94	4	0	39	87	14	0	420
05:00 PM	11	12	2	0	1	5	16	0	2	19	1	0	11	16	7	0	103
05:15 PM	7	9	1	0	1	2	12	0	2	11	1	0	3	13	8	0	70
05:30 PM	6	13	2	0	2	6	18	0	2	18	1	0	5	16	3	0	92
05:45 PM	5	6	2	0	0	1	8	0	3	11	1	0	6	13	4	0	60
Total	29	40	7	0	4	14	54	0	9	59	4	0	25	58	22	0	325
Grand Total	85	125	38	0	11	63	193	0	37	252	11	0	91	328	74	0	1308
Apprch %	34.3	50.4	15.3	0	4.1	23.6	72.3	0	12.3	84	3.7	0	18.5	66.5	15	0	
Total %	6.5	9.6	2.9	0	0.8	4.8	14.8	0	2.8	19.3	0.8	0	7	25.1	5.7	0	

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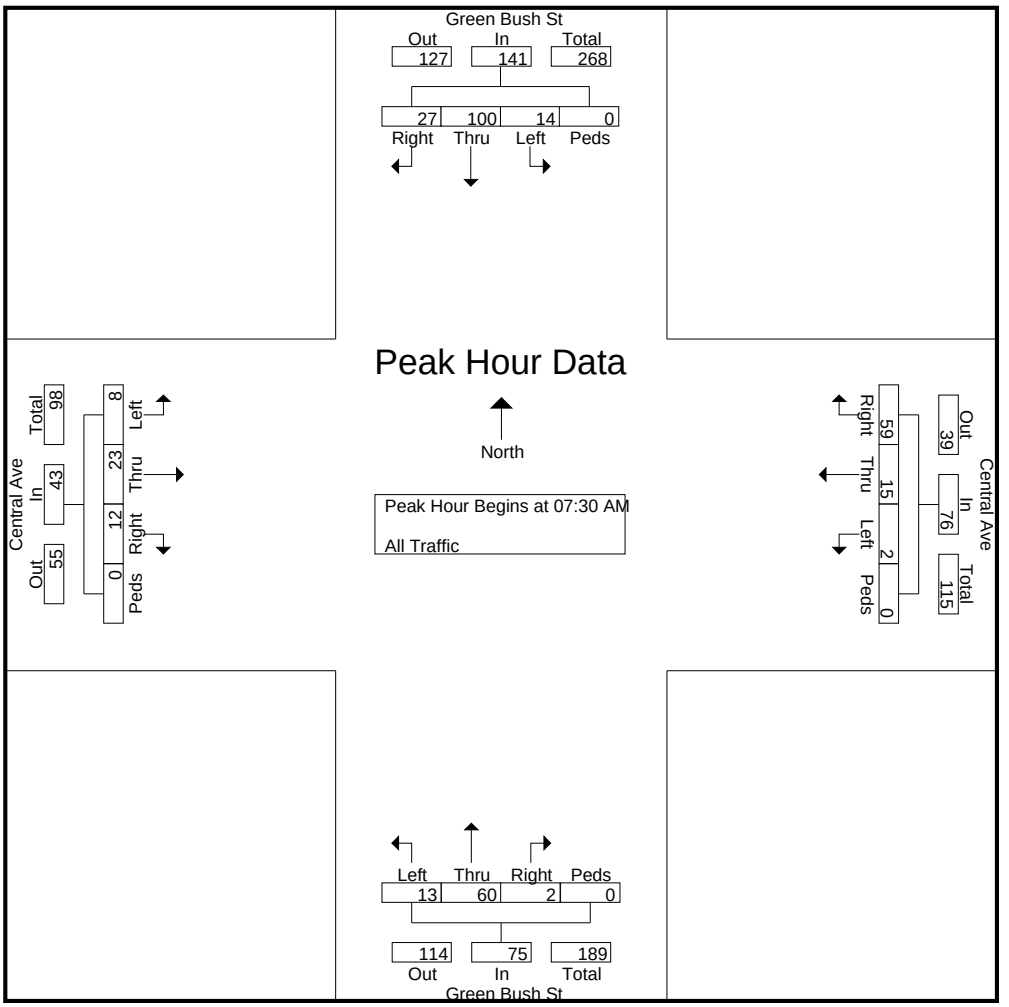
499 Col. Eileen Collins Blvd - Syracsue, NY 13212

Cortland
Signal Warrant Analyses
Intersection Peak Hour Analysis

File Name : Central and GreenBush
Site Code : 00000002
Start Date : 8/13/2015
Page No : 2

	Central Ave Eastbound					Central Ave Westbound					Green Bush St Northbound					Green Bush St Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	1	6	**4**	0	11	**1**	4	15	0	**20**	1	8	0	0	9	2	28	4	0	34	74
07:45 AM	**3**	**8**	3	0	**14**	0	**6**	13	0	19	4	**21**	0	0	**25**	5	**30**	**11**	0	**46**	**104**
08:00 AM	3	3	2	0	8	0	4	15	0	19	3	18	**1**	0	22	1	20	7	0	28	77
08:15 AM	1	6	3	0	10	1	1	**16**	0	18	**5**	13	1	0	19	**6**	22	5	0	33	80
Total Volume	8	23	12	0	43	2	15	59	0	76	13	60	2	0	75	14	100	27	0	141	335
% App. Total																					
PHF	.667	.719	.750	.000	.768	.500	.625	.922	.000	.950	.650	.714	.500	.000	.750	.583	.833	.614	.000	.766	.805



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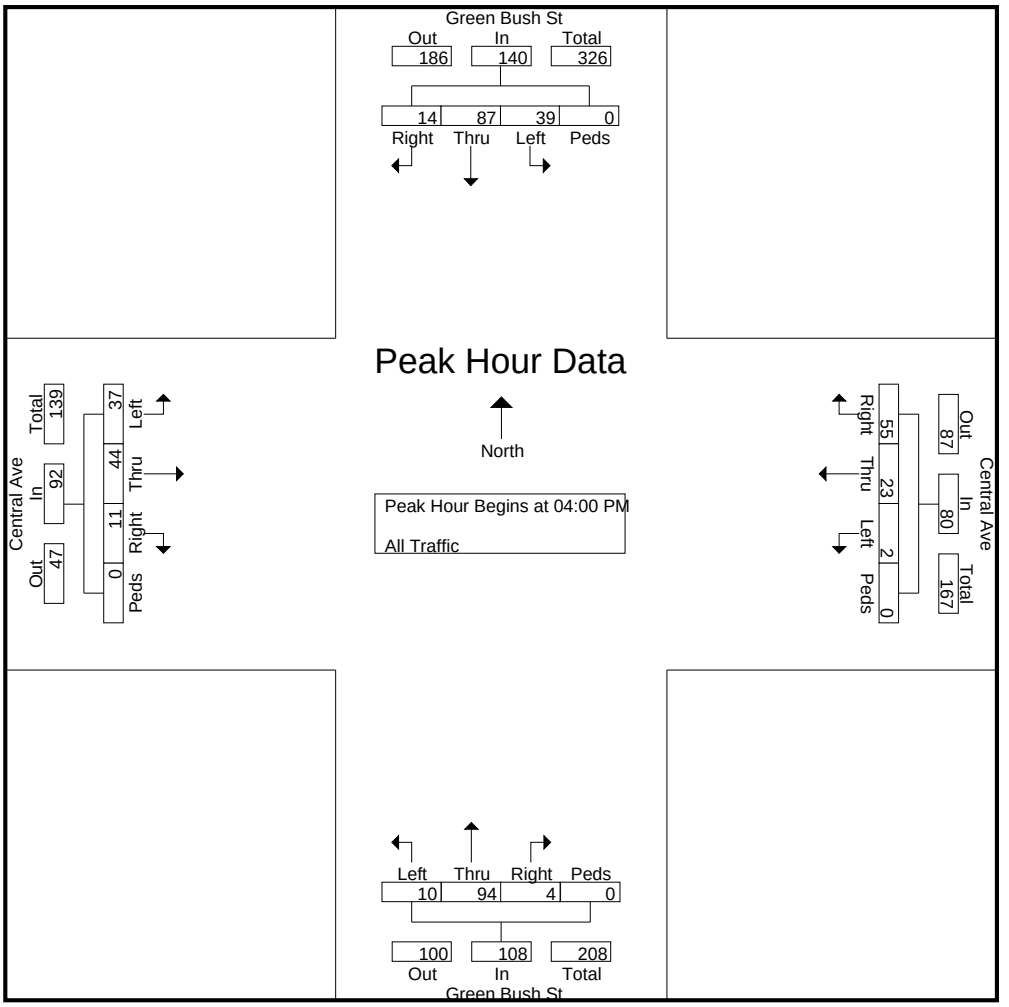
499 Col. Eileen Collins Blvd - Syracsue, NY 13212

Cortland
Signal Warrant Analyses
Intersection Peak Hour Analysis

File Name : Central and GreenBush
Site Code : 00000002
Start Date : 8/13/2015
Page No : 3

	Central Ave Eastbound					Central Ave Westbound					Green Bush St Northbound					Green Bush St Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	**12**	13	2	0	**27**	0	4	12	0	16	0	19	**2**	0	21	14	**29**	2	0	45	109
04:15 PM	6	9	**3**	0	18	**1**	6	**16**	0	**23**	3	20	0	0	23	3	16	2	0	21	85
04:30 PM	12	8	3	0	23	0	5	16	0	21	**4**	**30**	1	0	**35**	**16**	28	**6**	0	**50**	**129**
04:45 PM	7	**14**	3	0	24	1	**8**	11	0	20	3	25	1	0	29	6	14	4	0	24	97
Total Volume	37	44	11	0	92	2	23	55	0	80	10	94	4	0	108	39	87	14	0	140	420
% App. Total																					
PHF	.771	.786	.917	.000	.852	.500	.719	.859	.000	.870	.625	.783	.500	.000	.771	.609	.750	.583	.000	.700	.814



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499 Col. Eileen Collins Blvd - Syracsue, NY 13212

Cortland
Signal Warrant Analyses
Intersection Peak Hour Analysis

File Name : Central and GreenBush
Site Code : 00000002
Start Date : 8/13/2015
Page No : 1

Groups Printed- Heavy Vehicles

	Central Ave Eastbound				Central Ave Westbound				Green Bush St Northbound				Green Bush St Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
*** BREAK ***																	
07:15 AM	0	0	0	0	1	0	0	0	4	0	0	0	1	0	1	0	7
07:30 AM	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	3
07:45 AM	0	0	1	0	0	0	1	0	2	1	0	0	0	0	1	0	6
Total	0	0	1	0	1	0	3	0	7	1	0	0	1	0	2	0	16
08:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
08:15 AM	0	1	0	0	0	0	0	0	5	0	0	0	0	0	1	0	7
08:30 AM	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
08:45 AM	0	0	0	0	0	1	0	0	1	0	0	0	0	2	1	0	5
Total	0	2	0	0	0	1	0	0	8	0	0	0	1	2	2	0	16
*** BREAK ***																	
04:00 PM	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	4
04:15 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	3
04:30 PM	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	4
04:45 PM	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	4
Total	1	1	0	0	0	0	1	0	8	0	0	0	0	0	4	0	15
05:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	3
05:15 PM	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3
05:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	2
05:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	4
Total	0	0	0	0	0	0	0	0	6	1	0	0	1	0	4	0	12
Grand Total	1	3	1	0	1	1	4	0	29	2	0	0	3	2	12	0	59
Apprch %	20	60	20	0	16.7	16.7	66.7	0	93.5	6.5	0	0	17.6	11.8	70.6	0	
Total %	1.7	5.1	1.7	0	1.7	1.7	6.8	0	49.2	3.4	0	0	5.1	3.4	20.3	0	

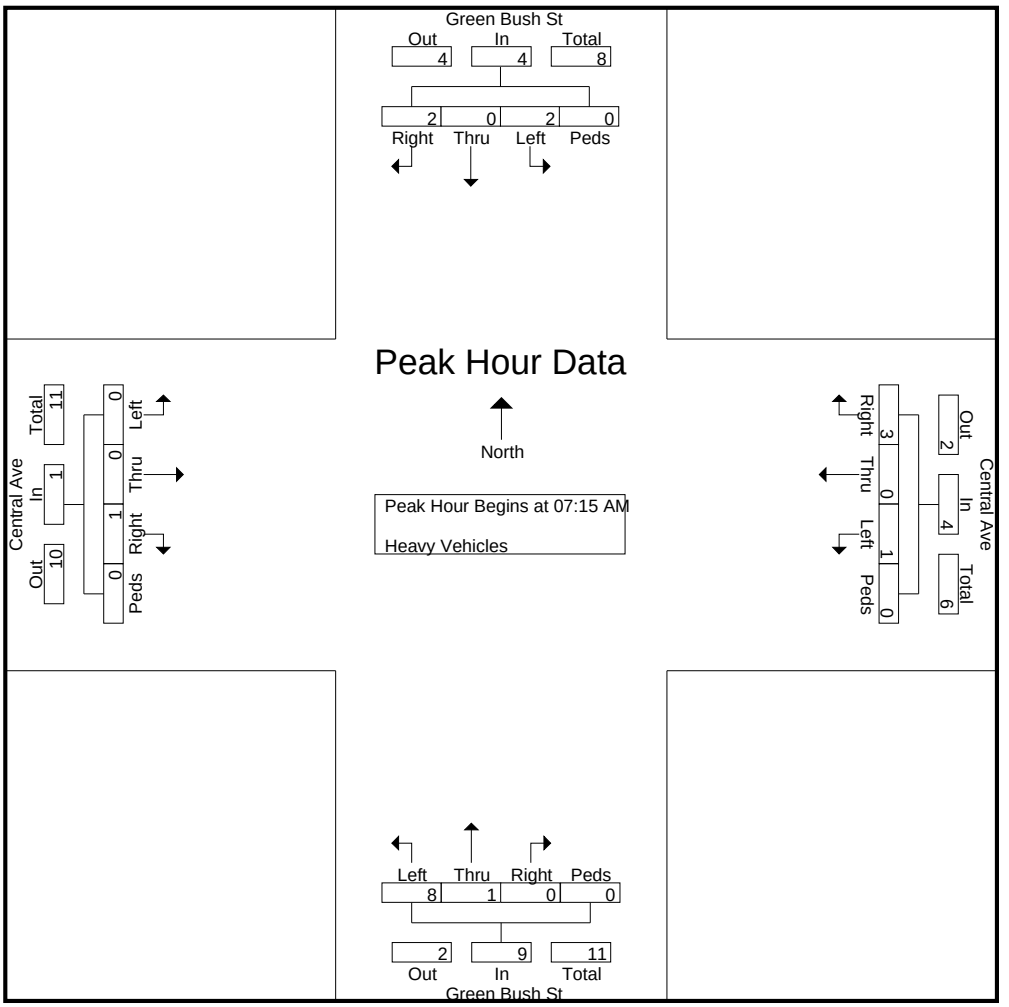
C&S Engineers, Inc.

499 Col. Eileen Collins Blvd - Syracsue, NY 13212

Cortland
Signal Warrant Analyses
Intersection Peak Hour Analysis

File Name : Central and GreenBush
Site Code : 00000002
Start Date : 8/13/2015
Page No : 2

	Central Ave Eastbound					Central Ave Westbound					Green Bush St Northbound					Green Bush St Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	0	0	0	**1**	0	0	0	1	**4**	0	0	0	**4**	**1**	0	**1**	0	**2**	**7**
07:30 AM	0	0	0	0	0	0	0	**2**	0	**2**	1	0	0	0	1	0	0	0	0	0	3
07:45 AM	0	0	**1**	0	**1**	0	0	1	0	1	2	**1**	0	0	3	0	0	1	0	1	6
08:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	2
Total Volume	0	0	1	0	1	1	0	3	0	4	8	1	0	0	9	2	0	2	0	4	18
% App. Total																					
PHF	.000	.000	.250	.000	.250	.250	.000	.375	.000	.500	.500	.250	.000	.000	.563	.500	.000	.500	.000	.500	.643



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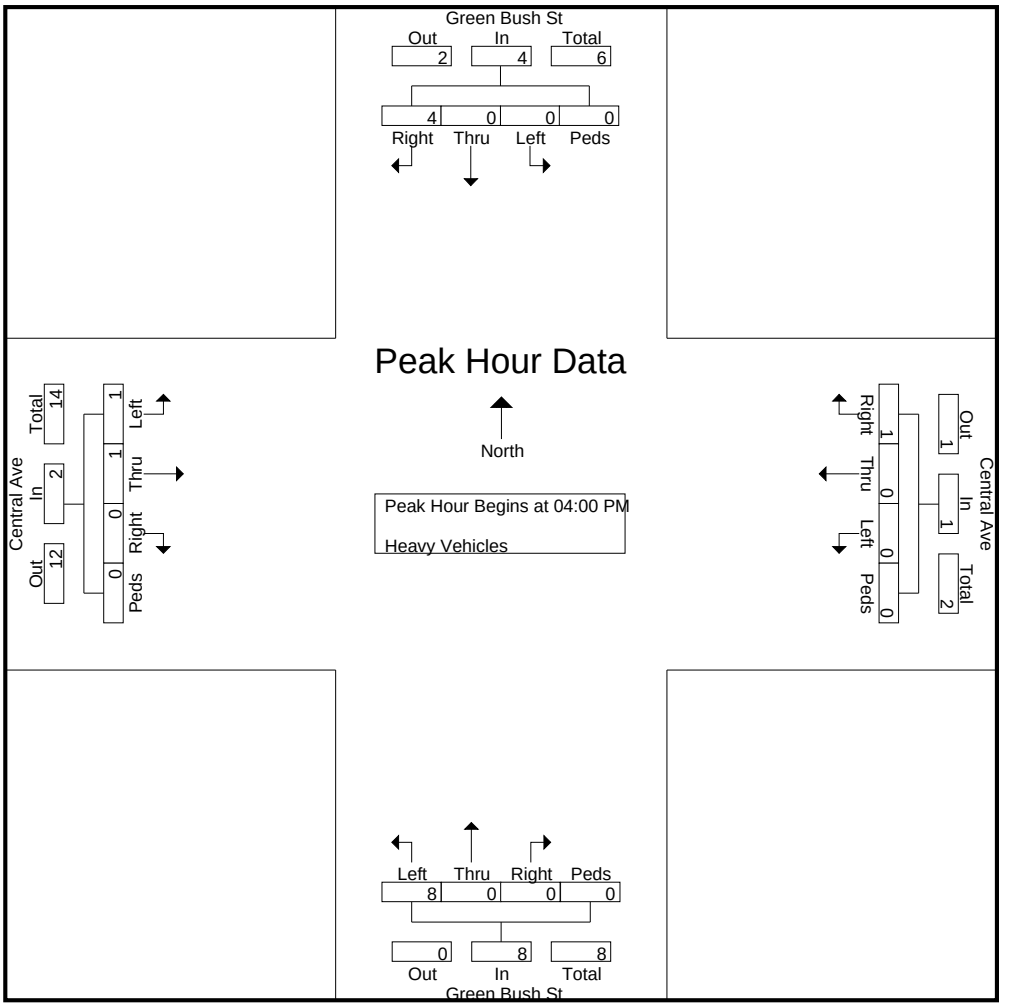
499 Col. Eileen Collins Blvd - Syracsue, NY 13212

Cortland
Signal Warrant Analyses
Intersection Peak Hour Analysis

File Name : Central and GreenBush
Site Code : 00000002
Start Date : 8/13/2015
Page No : 3

	Central Ave Eastbound					Central Ave Westbound					Green Bush St Northbound					Green Bush St Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	**3**	0	0	0	**3**	0	0	1	0	1	**4**
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	**2**	0	**2**	3
04:30 PM	0	0	0	0	0	0	0	**1**	0	**1**	3	0	0	0	3	0	0	0	0	0	4
04:45 PM	**1**	**1**	0	0	**2**	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	4
Total Volume	1	1	0	0	2	0	0	1	0	1	8	0	0	0	8	0	0	4	0	4	15
% App. Total																					
PHF	.250	.250	.000	.000	.250	.000	.000	.250	.000	.250	.667	.000	.000	.000	.667	.000	.000	.500	.000	.500	.938



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499 Col. Eileen Collins Blvd - Syracsue, NY 13212

Cortland
Signal Warrant Analyses
Intersection Peak Hour Analysis

File Name : Central and GreenBush
Site Code : 00000002
Start Date : 8/13/2015
Page No : 1

Groups Printed- Bikes/Peds

	Central Ave Eastbound				Central Ave Westbound				Green Bush St Northbound				Green Bush St Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
07:15 AM	0	1	0	0	0	2	0	0	0	1	0	0	0	2	1	0	7
07:30 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
07:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	3	0	0	2	4	0	0	0	1	0	0	0	2	1	0	13
08:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
08:15 AM	1	1	0	0	0	3	1	0	1	0	0	0	0	4	0	0	11
08:30 AM	0	0	1	0	0	0	1	0	2	1	0	0	0	2	0	0	7
08:45 AM	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2
Total	1	1	2	0	0	4	2	0	4	1	0	0	0	7	0	0	22
*** BREAK ***																	
04:00 PM	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	4
04:15 PM	0	1	0	0	0	0	2	0	3	0	0	0	0	0	0	0	6
04:30 PM	0	0	1	0	0	1	0	0	0	4	0	0	0	2	0	0	8
04:45 PM	1	1	0	0	0	0	0	0	1	2	0	0	1	4	0	0	10
Total	1	3	1	0	1	2	2	0	4	6	0	0	1	7	0	0	28
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
05:15 PM	0	0	0	0	0	0	1	0	0	2	0	0	0	4	1	0	8
05:30 PM	3	0	0	0	0	0	1	0	0	1	0	0	0	2	0	0	7
05:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2
Total	3	0	0	0	0	0	2	0	1	3	0	0	0	9	1	0	19
Grand Total	5	7	3	0	3	10	6	0	9	11	0	0	1	25	2	0	82
Apprch %	33.3	46.7	20	0	15.8	52.6	31.6	0	45	55	0	0	3.6	89.3	7.1	0	
Total %	6.1	8.5	3.7	0	3.7	12.2	7.3	0	11	13.4	0	0	1.2	30.5	2.4	0	

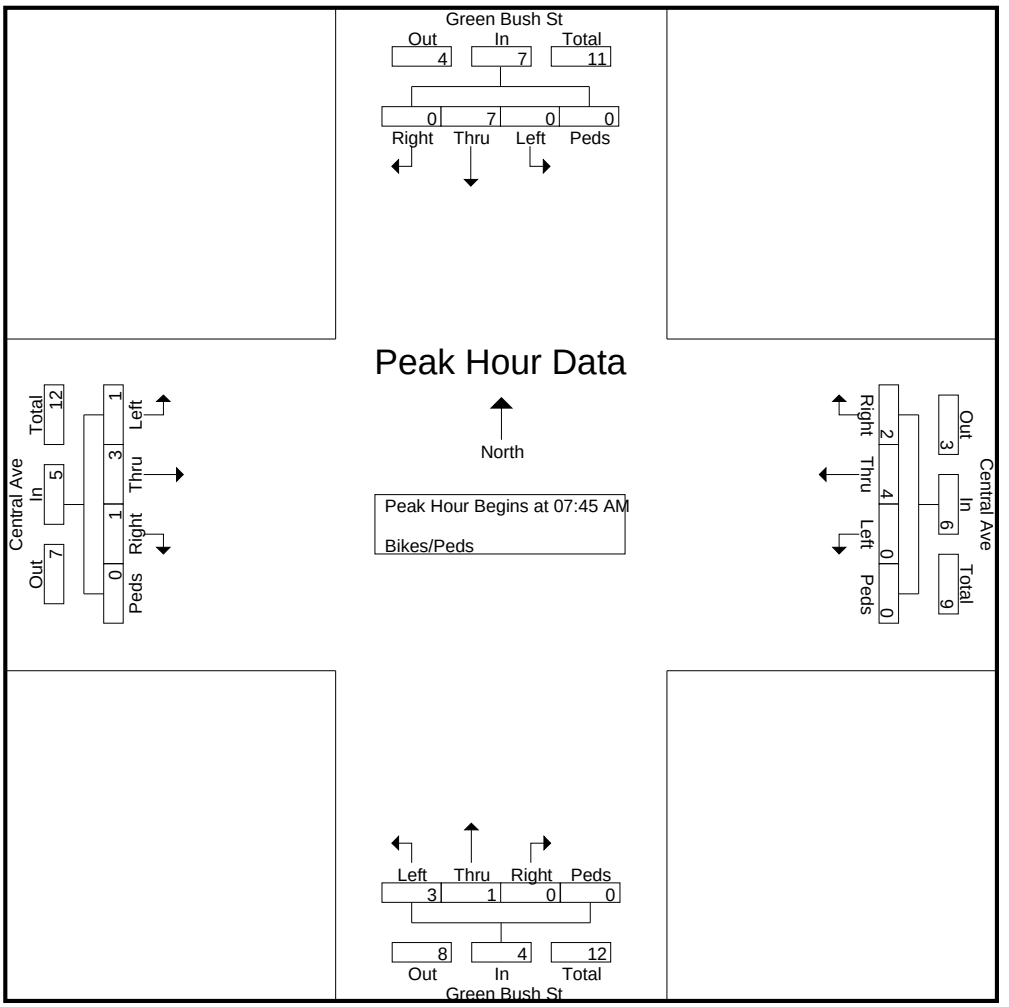
C&S Engineers, Inc.

499 Col. Eileen Collins Blvd - Syracsue, NY 13212

Cortland
Signal Warrant Analyses
Intersection Peak Hour Analysis

File Name : Central and GreenBush
Site Code : 00000002
Start Date : 8/13/2015
Page No : 2

	Central Ave Eastbound					Central Ave Westbound					Green Bush St Northbound					Green Bush St Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	**2**	0	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
08:00 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2
08:15 AM	**1**	1	0	0	2	0	**3**	**1**	0	**4**	1	0	0	0	1	0	**4**	0	0	**4**	**11**
08:30 AM	0	0	**1**	0	1	0	0	1	0	1	**2**	**1**	0	0	**3**	0	2	0	0	2	7
Total Volume	1	3	1	0	5	0	4	2	0	6	3	1	0	0	4	0	7	0	0	7	22
% App. Total																					
PHF	.250	.375	.250	.000	.625	.000	.333	.500	.000	.375	.375	.250	.000	.000	.333	.000	.438	.000	.000	.438	.500



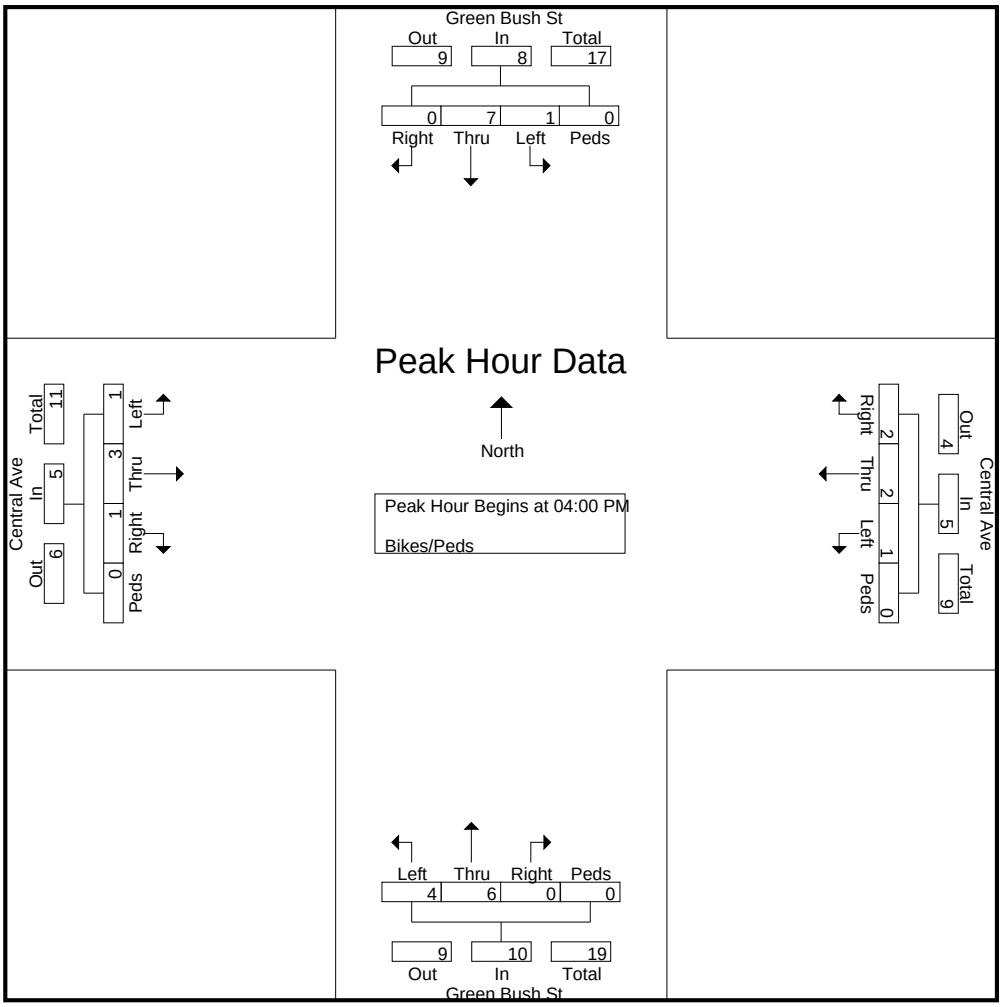
C&S Engineers, Inc.

499 Col. Eileen Collins Blvd - Syracsue, NY 13212

Cortland
Signal Warrant Analyses
Intersection Peak Hour Analysis

File Name : Central and GreenBush
Site Code : 00000002
Start Date : 8/13/2015
Page No : 3

	Central Ave Eastbound					Central Ave Westbound					Green Bush St Northbound					Green Bush St Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	**1**	0	0	1	**1**	**1**	0	0	**2**	0	0	0	0	0	0	1	0	0	1	4
04:15 PM	0	1	0	0	1	0	0	**2**	0	2	**3**	0	0	0	3	0	0	0	0	0	6
04:30 PM	0	0	**1**	0	1	0	1	0	0	1	0	**4**	0	0	**4**	0	2	0	0	2	8
04:45 PM	**1**	1	0	0	**2**	0	0	0	0	0	1	2	0	0	3	**1**	**4**	0	0	**5**	**10**
Total Volume	1	3	1	0	5	1	2	2	0	5	4	6	0	0	10	1	7	0	0	8	28
% App. Total																					
PHF	.250	.750	.250	.000	.625	.250	.500	.250	.000	.625	.333	.375	.000	.000	.625	.250	.438	.000	.000	.400	.700



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1				C&S Engineers, Inc.										Page 1		
2				499 Col. Eileen Collins Blvd - Syracuse												
3																
4														Site Code: Greenbush N of Elm		
5														Station ID:		
6																
7																
8														Latitude: 0' 0.0000 Undefined		
9																
10		Mon	Tue	Wed	Thu	Fri		Average		Sat	Sun		Week			
11		03-Aug-15	04-Aug-15	05-Aug-15	06-Aug-15	07-Aug-15		Day		08-Aug-15	09-Aug-15		Average			
12	12:00 AM		0	3	7	5		4		14	21		8			
13	01:00		0	4	1	4		2		4	8		4			
14	02:00		0	10	7	5		6		3	7		5			
15	03:00		0	5	4	7		4		6	4		4			
16	04:00		0	3	3	12		5		1	3		4			
17	05:00		0	19	20	20		15		5	5		12			
18	06:00		0	43	37	55		34		10	6		25			
19	07:00		0	83	78	75		59		37	15		48			
20	08:00		0	117	97	85		75		39	29		61			
21	09:00		0	135	81	102		80		57	45		70			
22	10:00		0	126	115	128		92		78	52		83			
23	11:00		0	109	95	135		85		85	56		80			
24	12:00 PM		0	148	161	169		120		65	52		99			
25	01:00		0	144	154	132		108		114	59		101			
26	02:00		0	140	125	143		102		71	38		86			
27	03:00		0	144	160	155		115		65	47		95			
28	04:00		0	147	166	179		123		77	28		100			
29	05:00		118	106	119	131		119		70	43		98			
30	06:00		58	62	90	85		74		46	41		64			
31	07:00		40	49	61	51		50		43	37		47			
32	08:00		53	49	49	58		52		47	25		47			
33	09:00		22	17	39	50		32		30	21		30			
34	10:00		28	23	25	33		27		27	21		26			
35	11:00		14	16	23	24		19		17	12		18			
36	Day Total	0	333	1702	1717	1843		1399		1011	675		1214			
37	% Avg. Wk	0.0%	23.8%	121.7%	122.8%	131.8%										
38	% Avg. We	0.0%	27.4%	140.3%	141.5%	151.9%		115.3%		83.3%	55.6%					
40																

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd - Syracuse, NY 13212

Site Code: Greenbush N of Elm
Station ID:

Latitude: 0' 0.0000 Undefined

	Mon	Tue	Wed	Thu	Fri		Average		Sat	Sun		Week
	10-Aug-15	11-Aug-15	12-Aug-15	13-Aug-15	14-Aug-15		Day		15-Aug-15	16-Aug-15		Average
12:00 AM	5	8	4	4	10		6		23	13		10
01:00	4	2	4	6	10		5		10	7		6
02:00	1	4	3	4	1		3		8	3		3
03:00	6	3	3	3	8		5		5	5		5
04:00	5	2	6	6	4		5		4	5		5
05:00	17	14	17	20	30		20		11	5		16
06:00	52	39	47	54	40		46		10	14		37
07:00	102	83	86	88	93		90		27	21		71
08:00	103	110	103	91	109		103		52	32		86
09:00	106	106	100	100	122		107		74	52		94
10:00	117	116	128	107	121		118		104	71		109
11:00	131	127	130	111	145		129		83	68		114
12:00 PM	150	143	149	162	193		159		75	48		131
01:00	141	108	113	126	147		127		87	41		109
02:00	115	113	133	115	154		126		55	50		105
03:00	139	134	150	133	142		140		62	45		115
04:00	168	155	156	138	199		163		53	46		131
05:00	105	96	111	130	128		114		71	52		99
06:00	62	53	79	62	76		66		56	43		62
07:00	47	43	52	46	70		52		44	29		47
08:00	33	51	51	36	41		42		50	50		45
09:00	28	47	30	23	41		34		37	35		34
10:00	29	17	14	30	23		23		39	24		25
11:00	7	17	12	22	28		17		14	11		16
Day Total	1673	1591	1681	1617	1935		1699		1054	770		1474
% Avg. Wk	98.4%	93.6%	98.9%	95.2%	113.9%							
% Avg. We	113.5%	107.9%	114.0%	109.7%	131.2%		115.3%		71.5%	52.2%		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1				C&S Engineers, Inc.										Page 3		
2				499 Col. Eileen Collins Blvd - Syracuse, NY 13212												
3																
4														Site Code: Central E of Greenbush		
5														Station ID:		
6																
7																
8														Latitude: 0' 0.0000 Undefined		
9																
10		Mon	Tue	Wed	Thu	Fri		Average		Sat	Sun		Week			
11		17-Aug-15	18-Aug-15	19-Aug-15	20-Aug-15	21-Aug-15		Day		22-Aug-15	23-Aug-15		Average			
12	12:00 AM	5						5					5			
13	01:00	3						3					3			
14	02:00	3						3					3			
15	03:00	6						6					6			
16	04:00	9						9					9			
17	05:00	17						17					17			
18	06:00	54						54					54			
19	07:00	85						85					85			
20	08:00	111						111					111			
21	09:00	94						94					94			
22	10:00	114						114					114			
23	11:00	115						115					115			
24	12:00 PM	135						135					135			
25	01:00	137						137					137			
26	02:00	135						135					135			
27	03:00	142						142					142			
28	04:00	139						139					139			
29	05:00	4						4					4			
30	06:00	2						2					2			
31	07:00	0						0					0			
32	08:00	0						0					0			
33	09:00	0						0					0			
34	10:00	0						0					0			
35	11:00	0						0					0			
36	Day Total	1310	0	0	0	0		1310		0	0		1310			
37	% Avg. Wk	100.0%	0.0%	0.0%	0.0%	0.0%										
38	% Avg. We	100.0%	0.0%	0.0%	0.0%	0.0%		100.0%		0.0%	0.0%					
39																
40																
42	Grand Tota	2983	1924	3383	3334	3778		4408		2065	1445		3998			

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1				C&S Engineers, Inc.										Page 1		
2				499 Col. Eileen Collins Blvd - Syracuse												
3																
4														Site Code: Greenbush N of Elm		
5														Station ID:		
6																
7																
8														Latitude: 0' 0.0000 Undefined		
9																
10		Mon	Tue	Wed	Thu	Fri		Average		Sat	Sun		Week			
11		03-Aug-15	04-Aug-15	05-Aug-15	06-Aug-15	07-Aug-15		Day		08-Aug-15	09-Aug-15		Average			
12	12:00 AM		0	7	11	11		7		16	20		11			
13	01:00		0	2	4	16		6		9	6		6			
14	02:00		0	8	10	9		7		4	1		5			
15	03:00		0	7	2	3		3		4	2		3			
16	04:00		0	3	4	6		3		5	4		4			
17	05:00		0	16	23	18		14		6	5		11			
18	06:00		0	64	62	66		48		23	11		38			
19	07:00		0	94	89	91		69		41	32		58			
20	08:00		0	115	119	129		91		63	56		80			
21	09:00		0	122	95	112		82		96	48		79			
22	10:00		0	136	132	152		105		120	78		103			
23	11:00		0	145	120	177		111		125	81		108			
24	12:00 PM		0	156	180	191		132		99	70		116			
25	01:00		0	143	163	144		113		134	64		108			
26	02:00		0	145	174	168		122		85	72		107			
27	03:00		0	155	172	199		132		101	70		116			
28	04:00		0	170	185	243		150		90	70		126			
29	05:00		146	122	132	157		139		78	87		120			
30	06:00		90	106	112	122		108		74	59		94			
31	07:00		79	73	92	102		87		58	68		79			
32	08:00		57	68	95	95		79		69	45		72			
33	09:00		46	47	65	75		58		50	37		53			
34	10:00		36	36	57	48		44		36	29		40			
35	11:00		20	29	43	31		31		20	13		26			
36	Day Total	0	474	1969	2141	2365		1737		1406	1028		1564			
37	% Avg. Wk	0.0%	27.3%	113.3%	123.2%	136.1%										
38	% Avg. We	0.0%	30.3%	125.9%	136.9%	151.2%		111.1%		89.9%	65.7%					
40																

C&S Engineers, Inc.

499 Col. Eileen Collins Blvd - Syracuse, NY 13212

Site Code: Greenbush N Vennette
Station ID: 4

Latitude: 0' 0.0000 Undefined

Start	03-Aug-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	Northboun	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo
12:00 AM	*	*	*	*	17	9	17	11	23	19	25	30	23	20	21	18
01:00	*	*	*	*	5	8	9	7	9	10	8	14	14	12	9	10
02:00	*	*	*	*	8	6	8	6	5	7	13	7	9	8	9	7
03:00	*	*	*	*	9	8	7	6	9	5	4	4	9	7	8	6
04:00	*	*	*	*	11	6	6	2	9	6	5	1	3	2	7	3
05:00	*	*	*	*	26	13	31	18	29	15	15	7	3	6	21	12
06:00	*	*	*	*	67	48	74	44	67	45	22	16	20	17	50	34
07:00	*	*	*	*	119	72	135	62	125	80	27	28	22	17	86	52
08:00	*	*	*	*	**188**	98	**147**	99	**173**	107	66	45	41	46	**123**	79
09:00	*	*	*	*	117	118	79	105	112	105	**119**	87	42	48	94	93
10:00	*	*	*	*	95	**129**	0	**215**	122	**134**	107	86	67	66	78	126
11:00	*	*	*	*	102	120	0	203	142	121	90	**107**	**69**	**84**	81	**127**
12:00 PM	*	*	*	*	**136**	183	146	203	154	196	93	101	63	93	**118**	155
01:00	*	*	*	*	118	159	128	154	144	153	**104**	105	73	70	113	128
02:00	*	*	*	*	131	144	115	167	125	151	95	**113**	61	67	105	128
03:00	*	*	*	*	128	161	**156**	168	144	199	84	93	62	73	115	139
04:00	*	*	*	*	108	**228**	128	**242**	**171**	**224**	88	91	68	**97**	113	**176**
05:00	*	*	*	*	93	142	105	175	125	155	73	90	**77**	80	95	128
06:00	*	*	**85**	**109**	103	100	75	122	94	110	80	80	57	74	82	99
07:00	*	*	73	72	64	74	88	99	71	84	46	73	54	59	66	77
08:00	*	*	52	67	53	94	62	84	66	71	60	79	60	56	59	75
09:00	*	*	52	58	43	51	37	57	51	72	59	61	52	38	49	56
10:00	*	*	24	38	40	44	48	63	49	48	41	45	34	28	39	44
11:00	*	*	30	34	30	36	33	34	34	46	33	42	16	27	29	36
Lane	0	0	316	378	1811	2051	1634	2346	2053	2163	1357	1405	999	1095	1570	1808
Day	0		694		3862		3980		4216		2762		2094		3378	
AM Peak	-	-	-	-	08:00	10:00	08:00	10:00	08:00	10:00	09:00	11:00	11:00	11:00	08:00	11:00
Vol.	-	-	-	-	188	129	147	215	173	134	119	107	69	84	123	127
PM Peak	-	-	18:00	18:00	12:00	16:00	15:00	16:00	16:00	16:00	13:00	14:00	17:00	16:00	12:00	16:00
Vol.	-	-	85	109	136	228	156	242	171	224	104	113	77	97	118	176

C&S Engineers, Inc.

499 Col. Eileen Collins Blvd - Syracuse, NY 13212

Site Code: Greenbush N Vennette
Station ID: 4

Latitude: 0' 0.0000 Undefined

Start	10-Aug-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	Northboun	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo
12:00 AM	21	15	20	14	8	37	15	22	18	23	3	56	16	28	14	28
01:00	10	7	6	10	5	13	9	5	8	14	0	20	3	13	6	12
02:00	4	3	5	4	9	11	2	5	6	5	1	18	2	11	4	8
03:00	8	7	7	9	9	11	12	3	8	13	3	21	3	12	7	11
04:00	11	3	10	7	7	3	5	6	9	12	0	16	0	8	6	8
05:00	23	8	23	9	22	10	23	9	24	13	3	17	2	6	17	10
06:00	71	34	78	33	73	36	58	43	72	27	12	43	5	20	53	34
07:00	120	78	115	59	120	59	120	71	116	72	17	46	19	30	90	59
08:00	**181**	118	**195**	99	**166**	106	**176**	104	**168**	101	20	91	8	32	**131**	93
09:00	106	105	96	97	71	133	99	91	105	113	**21**	114	**38**	88	77	106
10:00	106	123	126	**132**	77	122	100	**125**	97	124	21	169	22	108	78	129
11:00	101	**124**	98	131	60	**150**	96	108	76	**165**	14	**197**	24	**145**	67	**146**
12:00 PM	136	177	**119**	225	137	206	123	180	**29**	308	10	170	18	131	**82**	200
01:00	**142**	153	114	142	116	161	131	136	19	275	12	**174**	10	120	78	166
02:00	130	123	111	147	104	145	107	141	15	259	11	173	21	141	71	161
03:00	126	168	104	203	**138**	185	**136**	151	16	281	13	150	11	**144**	78	183
04:00	127	**222**	72	**268**	121	**224**	135	**203**	28	**335**	21	128	8	116	73	**214**
05:00	101	146	73	214	133	165	115	184	24	275	16	139	13	112	68	176
06:00	72	100	42	125	104	107	100	108	22	183	26	135	19	117	55	125
07:00	64	80	52	109	77	97	96	102	9	134	24	123	20	121	49	109
08:00	42	75	38	79	52	92	54	90	8	113	24	91	**28**	83	35	89
09:00	35	33	39	78	52	53	50	67	22	106	21	80	16	72	34	70
10:00	38	44	18	53	40	42	44	43	7	80	**27**	50	16	52	27	52
11:00	34	26	17	61	31	35	38	30	4	54	14	41	9	42	21	41
Lane	1809	1972	1578	2308	1732	2203	1844	2027	910	3085	334	2262	331	1752	1221	2230
Day	3781		3886		3935		3871		3995		2596		2083		3451	
AM Peak	08:00	11:00	08:00	10:00	08:00	11:00	08:00	10:00	08:00	11:00	09:00	11:00	09:00	11:00	08:00	11:00
Vol.	181	124	195	132	166	150	176	125	168	165	21	197	38	145	131	146
PM Peak	13:00	16:00	12:00	16:00	15:00	16:00	15:00	16:00	12:00	16:00	22:00	13:00	20:00	15:00	12:00	16:00
Vol.	142	222	119	268	138	224	136	203	29	335	27	174	28	144	82	214

C&S Engineers, Inc.

499 Col. Eileen Collins Blvd - Syracuse, NY 13212

Site Code: Greenbush N Vennette
Station ID: 4

Latitude: 0' 0.0000 Undefined

Start Time	17-Aug-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	Northboun	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo
12:00 AM	9	27	*	*	*	*	*	*	*	*	*	*	*	*	9	27
01:00	3	9	*	*	*	*	*	*	*	*	*	*	*	*	3	9
02:00	5	11	*	*	*	*	*	*	*	*	*	*	*	*	5	11
03:00	2	6	*	*	*	*	*	*	*	*	*	*	*	*	2	6
04:00	3	8	*	*	*	*	*	*	*	*	*	*	*	*	3	8
05:00	13	28	*	*	*	*	*	*	*	*	*	*	*	*	13	28
06:00	32	74	*	*	*	*	*	*	*	*	*	*	*	*	32	74
07:00	67	109	*	*	*	*	*	*	*	*	*	*	*	*	67	109
08:00	**119**	162	*	*	*	*	*	*	*	*	*	*	*	*	**119**	162
09:00	51	141	*	*	*	*	*	*	*	*	*	*	*	*	51	141
10:00	27	172	*	*	*	*	*	*	*	*	*	*	*	*	27	172
11:00	15	**200**	*	*	*	*	*	*	*	*	*	*	*	*	15	**200**
12:00 PM	23	241	*	*	*	*	*	*	*	*	*	*	*	*	23	241
01:00	29	236	*	*	*	*	*	*	*	*	*	*	*	*	29	236
02:00	23	233	*	*	*	*	*	*	*	*	*	*	*	*	23	233
03:00	29	260	*	*	*	*	*	*	*	*	*	*	*	*	29	260
04:00	**39**	**286**	*	*	*	*	*	*	*	*	*	*	*	*	**39**	**286**
05:00	31	169	*	*	*	*	*	*	*	*	*	*	*	*	31	169
06:00	8	4	*	*	*	*	*	*	*	*	*	*	*	*	8	4
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Lane	528	2376	0	0	0	0	0	0	0	0	0	0	0	0	528	2376
Day	2904		0		0		0		0		0		0		2904	
AM Peak	08:00	11:00	-	-	-	-	-	-	-	-	-	-	-	-	08:00	11:00
Vol.	119	200	-	-	-	-	-	-	-	-	-	-	-	-	119	200
PM Peak	16:00	16:00	-	-	-	-	-	-	-	-	-	-	-	-	16:00	16:00
Vol.	39	286	-	-	-	-	-	-	-	-	-	-	-	-	39	286

Comb. Total	6685	4580	7797	7851	8211	5358	4177	9733
ADT	ADT 3,422	AADT 3,422						

C&S Engineers, Inc.

499 Col. Eileen Collins Blvd - Syracuse, NY 13212

Site Code: 1
Station ID:

Latitude: 0' 0.0000 South

Start	03-Aug-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	Northboun	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo
12:00 AM	*	*	*	*	6	16	8	12	16	18	23	17	13	18	13	16
01:00	*	*	*	*	8	7	6	8	6	6	7	6	11	15	8	8
02:00	*	*	*	*	1	7	4	8	3	3	5	9	7	7	4	7
03:00	*	*	*	*	3	3	2	5	1	5	2	3	5	5	3	4
04:00	*	*	*	*	3	9	4	7	4	11	1	5	1	1	3	7
05:00	*	*	*	*	14	24	17	21	11	20	1	16	6	2	10	17
06:00	*	*	*	*	39	50	36	49	35	52	7	17	11	19	26	37
07:00	*	*	*	*	50	76	48	91	47	81	13	32	10	19	34	60
08:00	*	*	*	*	**84**	**110**	**83**	**93**	93	117	27	48	25	29	62	79
09:00	*	*	*	*	75	84	63	73	79	73	50	**91**	16	37	57	72
10:00	*	*	*	*	65	88	75	79	101	**118**	52	85	35	**69**	66	**88**
11:00	*	*	*	*	77	75	81	84	**106**	102	**55**	73	**46**	48	**73**	76
12:00 PM	*	*	*	*	103	99	115	97	104	124	46	67	62	50	86	87
01:00	*	*	*	*	95	94	100	113	91	109	**92**	81	49	55	85	90
02:00	*	*	*	*	83	94	96	89	81	99	64	82	43	44	73	82
03:00	*	*	*	*	92	**126**	93	**125**	88	101	52	**85**	27	41	70	**96**
04:00	*	*	*	*	**133**	100	**133**	108	**129**	**125**	46	69	**64**	**59**	**101**	92
05:00	*	*	**95**	**73**	81	67	110	84	84	76	55	59	44	48	78	68
06:00	*	*	74	66	50	76	74	70	49	62	45	55	42	37	56	61
07:00	*	*	37	56	34	45	47	59	41	38	35	38	22	45	36	47
08:00	*	*	31	43	51	39	43	50	26	42	37	46	25	37	36	43
09:00	*	*	29	41	28	25	36	36	45	33	26	26	17	36	30	33
10:00	*	*	23	22	19	31	24	31	31	30	23	21	22	26	24	27
11:00	*	*	19	21	23	24	19	25	25	21	23	24	14	7	20	20
Lane	0	0	308	322	1217	1369	1317	1417	1296	1466	787	1055	617	754	1054	1217
Day	0		630		2586		2734		2762		1842		1371		2271	
AM Peak	-	-	-	-	08:00	08:00	08:00	08:00	11:00	10:00	11:00	09:00	11:00	10:00	11:00	10:00
Vol.	-	-	-	-	84	110	83	93	106	118	55	91	46	69	73	88
PM Peak	-	-	17:00	17:00	16:00	15:00	16:00	15:00	16:00	16:00	13:00	15:00	16:00	16:00	16:00	15:00
Vol.	-	-	95	73	133	126	133	125	129	125	92	85	64	59	101	96

C&S Engineers, Inc.

499 Col. Eileen Collins Blvd - Syracuse, NY 13212

Site Code: 1
Station ID:

Latitude: 0' 0.0000 South

Start Time	10-Aug-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	Northboun	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo
12:00 AM	12	13	12	17	15	20	18	19	15	13	25	20	14	17	16	17
01:00	3	7	7	4	8	6	2	11	12	9	4	4	7	3	6	6
02:00	1	4	3	5	7	12	5	2	1	2	9	4	6	3	5	5
03:00	2	3	2	4	4	9	1	10	8	6	6	6	6	5	4	6
04:00	2	12	5	8	2	8	5	3	2	8	6	7	5	4	4	7
05:00	10	19	11	19	9	18	7	22	10	17	5	12	5	5	8	16
06:00	33	60	36	64	30	54	37	41	27	57	22	29	11	11	28	45
07:00	55	83	47	96	48	89	57	90	48	79	17	30	13	22	41	70
08:00	**92**	**115**	**88**	**120**	**78**	**100**	**101**	**121**	**81**	**99**	20	44	14	19	68	**88**
09:00	72	71	87	78	66	74	55	71	73	82	38	43	26	47	60	67
10:00	90	80	73	80	73	78	71	78	80	81	62	58	41	**58**	70	73
11:00	86	76	83	69	76	86	80	90	70	87	**67**	**76**	**48**	57	**73**	77
12:00 PM	101	103	**123**	**127**	117	104	104	97	118	109	61	54	67	53	**99**	92
01:00	92	100	89	93	99	87	81	91	98	108	60	**72**	39	56	80	87
02:00	75	92	84	98	79	111	92	98	108	98	**71**	56	41	**71**	79	89
03:00	**109**	98	96	118	107	107	90	**115**	79	106	53	70	**71**	51	86	95
04:00	100	**131**	118	122	**122**	**127**	**112**	107	**120**	**130**	53	60	36	59	94	**105**
05:00	85	76	108	88	91	107	110	86	113	92	45	50	42	36	85	76
06:00	54	51	54	41	68	70	58	68	60	65	42	58	45	50	54	58
07:00	30	48	34	55	40	60	51	83	49	42	47	33	37	51	41	53
08:00	37	39	40	38	42	42	52	42	39	45	16	27	26	29	36	37
09:00	18	16	28	40	29	33	25	24	39	42	32	36	26	28	28	31
10:00	19	24	17	28	20	19	20	28	24	28	26	33	19	29	21	27
11:00	14	20	18	24	20	26	19	25	14	22	13	15	12	18	16	21
Lane	1192	1341	1263	1436	1250	1447	1253	1422	1288	1427	800	897	657	782	1102	1248
Day	2533		2699		2697		2675		2715		1697		1439		2350	
AM Peak	08:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	11:00	10:00	11:00	08:00
Vol.	92	115	88	120	78	100	101	121	81	99	67	76	48	58	73	88
PM Peak	15:00	16:00	12:00	12:00	16:00	16:00	16:00	15:00	16:00	16:00	14:00	13:00	15:00	14:00	12:00	16:00
Vol.	109	131	123	127	122	127	112	115	120	130	71	72	71	71	99	105

C&S Engineers, Inc.

499 Col. Eileen Collins Blvd - Syracuse, NY 13212

Site Code: 1
Station ID:

Latitude: 0' 0.0000 South

Start Time	17-Aug-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	Northboun	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo	Northbou	Southbo
12:00 AM	16	13	*	*	*	*	*	*	*	*	*	*	*	*	16	13
01:00	2	6	*	*	*	*	*	*	*	*	*	*	*	*	2	6
02:00	8	7	*	*	*	*	*	*	*	*	*	*	*	*	8	7
03:00	1	4	*	*	*	*	*	*	*	*	*	*	*	*	1	4
04:00	2	9	*	*	*	*	*	*	*	*	*	*	*	*	2	9
05:00	6	14	*	*	*	*	*	*	*	*	*	*	*	*	6	14
06:00	37	56	*	*	*	*	*	*	*	*	*	*	*	*	37	56
07:00	45	79	*	*	*	*	*	*	*	*	*	*	*	*	45	79
08:00	73	**103**	*	*	*	*	*	*	*	*	*	*	*	*	73	**103**
09:00	66	79	*	*	*	*	*	*	*	*	*	*	*	*	66	79
10:00	68	76	*	*	*	*	*	*	*	*	*	*	*	*	68	76
11:00	**82**	89	*	*	*	*	*	*	*	*	*	*	*	*	**82**	89
12:00 PM	101	88	*	*	*	*	*	*	*	*	*	*	*	*	101	88
01:00	83	87	*	*	*	*	*	*	*	*	*	*	*	*	83	87
02:00	82	**104**	*	*	*	*	*	*	*	*	*	*	*	*	82	**104**
03:00	**103**	97	*	*	*	*	*	*	*	*	*	*	*	*	**103**	97
04:00	89	83	*	*	*	*	*	*	*	*	*	*	*	*	89	83
05:00	0	0	*	*	*	*	*	*	*	*	*	*	*	*	0	0
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Lane	864	994	0	0	0	0	0	0	0	0	0	0	0	0	864	994
Day	1858		0		0		0		0		0		0		1858	
AM Peak	11:00	08:00	-	-	-	-	-	-	-	-	-	-	-	-	11:00	08:00
Vol.	82	103	-	-	-	-	-	-	-	-	-	-	-	-	82	103
PM Peak	15:00	14:00	-	-	-	-	-	-	-	-	-	-	-	-	15:00	14:00
Vol.	103	104	-	-	-	-	-	-	-	-	-	-	-	-	103	104

Comb. Total	4391	3329	5283	5409	5477	3539	2810	6479
ADT	ADT 2,315	AADT 2,315					

Exhibit B

Signal Warrant Analysis

Signal Warrant Analysis: Greenbush Street / Central Avenue

Reference: FHWA Manual on Uniform Traffic Control Devices 2009 Edition, Chapter 4C Warrants
NYS Supplement MUTCD, 2009 Edition, Chapter 4C Warrants

Background Data:

Artery: Greenbush Street
Side Road: Central Avenuet

Growth Factor: N/A

Traffic Volumes:	Existing Peak Hr	8th Highest Hr*	
Artery (Total of Both Approaches, incl aux lns)	386	205	(est.)
Side Road (Highest of either approach, 1 dir only, incl	83	66	

* If 8th highest hour is not known, use 0.6 x peak hour

Number of Approach Lanes excluding Auxiliary Lanes
Artery: 1
Side Road: 1

Warrant 1 - Eight-Hour Vehicular Volume

85th percentile speed exceed 40 mph? No
OR
Is intersection within built up area of an isolated community having population less than 10,000? No
If answer is yes to either question, then 70% or 56% of condition can be applicable No

Condition A - Min Vehicular Volume

Number of lanes		VPH on Major				VPH on Higher Volume			
Each Approach		Total Both Approaches				Minor Approach			
Major	Minor	Incl Aux Lanes				Incl Aux Lanes			
		100%	80%	70%	56%	100%	80%	70%	56%
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 Continous Traffic

Number of lanes		VPH on Major				VPH on Higher Volume			
Each Approach		Total Both Approaches				Minor Approach			
Major	Minor	Incl Aux Lanes				Incl Aux Lanes			
		100%	80%	70%	56%	100%	80%	70%	56%
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

Major # Lanes 1 VPH on Artery 386
Minor # Lanes 1 VPH on Side Road 83

Warrant Satisfie **No**

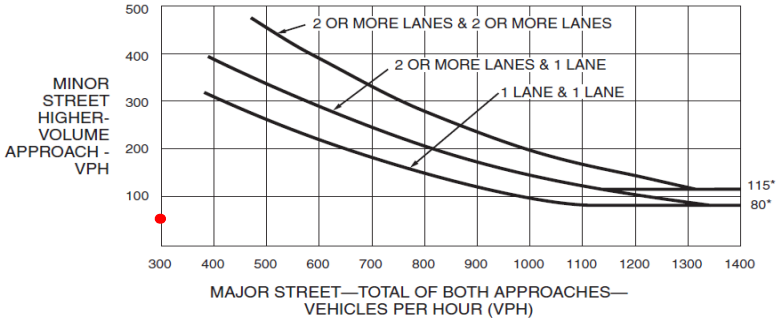
If 100% of A or B is met, then yes (same 8 hours for major/minor)
If 80% of A and B is met, then yes (same major/minor 8 hours, but not same for A&B)
If speed is > 40MPH and 70% of A or B is met, then yes
If speed is > 40MPH and 56% of A and B is met, then yes

Warrant 2 - Four Hour Volumes

Four Highest Hourly Volumes (any four hrs, same for side rd and artery, not necessarily consectutive)

Major	386	Minor	83
(Both Approaches)	348	lirection)	86
	322		65
	299		67

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.

If 4 volumes when plotted fall above curve shown for given approach lane configuration, warrant is satisfied

Does the 85th percentile speed exceed 40 mph? No

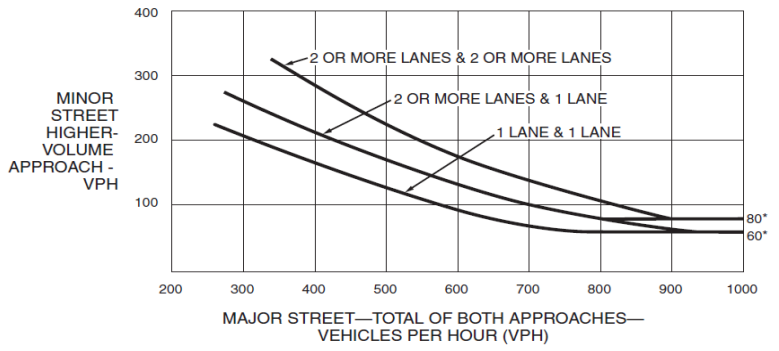
OR

Is intersection within built up area of an isolated community having population less than 10,000? No

If Yes to either, then the following graph should be used:

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



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

If 4 volumes when plotted fall above curve shown for given approach lane configuration, warrant is satisfied

Warrant Satisfied: **No**

Warrant 3 - Peak Hour

(used in unusual cases that attract or discharge a lot of vehicles in a short amount of time)

Criteria A or B need to be met for warrant to be met

Criteria A: need all three (3) conditions to be met

1) stopped time delay for minor (1 dir) equals or exceeds 4 veh/hrs (1 appr) or 5 veh/hr (2 appr) and No
2) volume on the same minor appr equals or exceeds 100 veh/hr (1 lane) or 150 veh/hr (2 lanes) and No
3) total entering volume equals or exceeds 650 veh/hr (3 appr) or 800 veh/hr (4 + appr) No

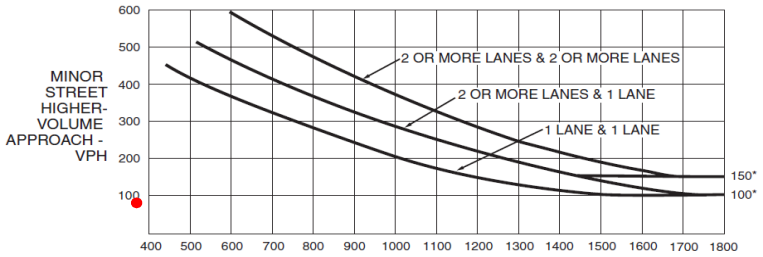
Criteria A met? No

Criteria B

Peak Hour Volume (any 4 consecutive 15 minute intervals)

Major 386 (Both Approaches) Minor 83 (1 direction)

Figure 4C-3. Warrant 3, Peak Hour



*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 for a minor-street approach with one lane.

If Peak Hour volume when plotted falls above curve shown for given approach lane configuration, Criteria B is satisfied

Does the 85th percentile speed exceed 40 mph? No

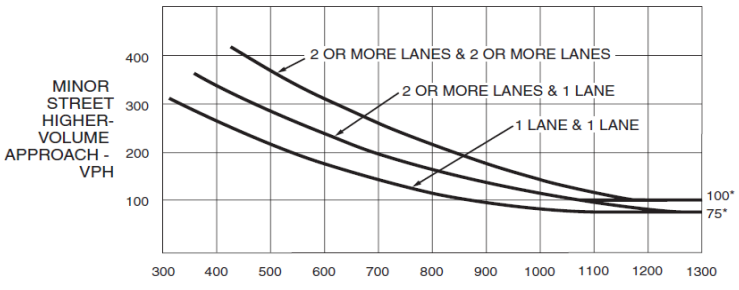
OR

Is intersection within built up area of an isolated community having population less than 10,000? No

If Yes to either, then the following graph should be used:

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*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 for a minor-street approach with one lane.

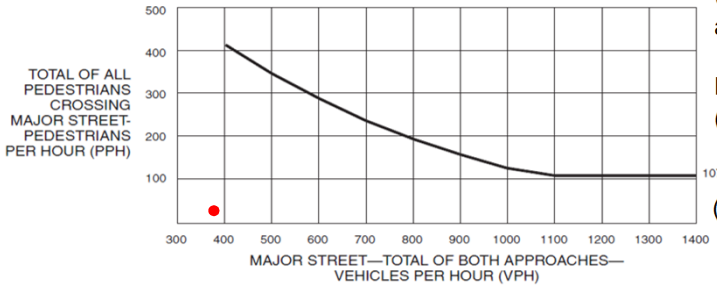
If Peak Hour volume when plotted falls above curve shown for given approach lane configuration, criteria B is satisfied

Criteria B met? No

Warrant Satisfied: **No**

Warrant 4 - Minimum Pedestrian Volume

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



*Note: 107 pph applies as the lower threshold volume.

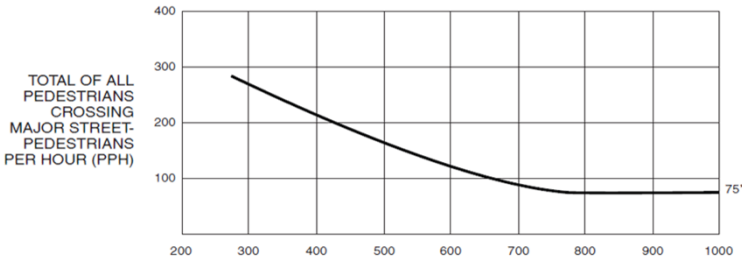
Use Figure 4C-5 for any 4 hours of an average day

Four-hour Volumes
(any 4 hours of an average day)

Major 386 (Both Approaches) Peds 21 (Crossing Major)

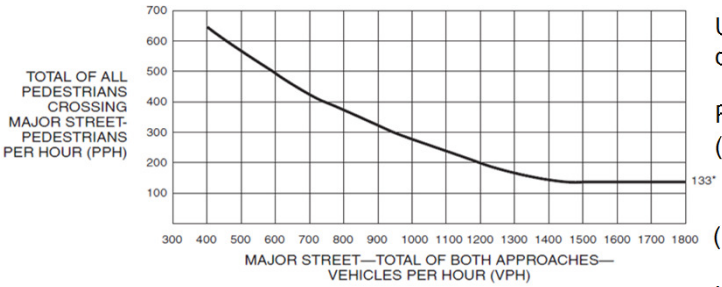
Use Figure 4C-6 for 4-hour volumes if the speed limit or 85th percentile speed on the major exceeds 35 MPH, or if the intersection lies in a built-up area of an isolated community of less than 10,000

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



*Note: 75 pph applies as the lower threshold volume.

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



*Note: 133 pph applies as the lower threshold volume.

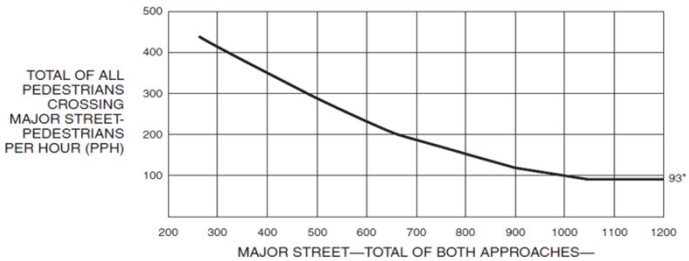
Use Figure 4C-7 for one hour (any 4 consecutive 15 min periods)

Peak Hour Volume
(any 4 consecutive 15 min intervals)

Major 386 (Both Approaches) Peds 21 (Crossing Major)

Use Figure 4C-8 for 4-hour volumes if the speed limit or 85th percentile speed on the major exceeds 35 MPH, or if the intersection lies in a built-up area of an isolated community of less than 10,000

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



*Note: 93 pph applies as the lower threshold volume.

This warrant shall not be applied at locations where the distance to the nearest signal along major is less than 90m (300ft)

*** The ped criterion may be reduced as much as 50% if the average crossing speed of a ped is less than 3.5 ft/s**

Warrant Satisfied: **No**

Warrant 5 - School Crossing

Are the # of adequate gaps in each hour less than the # of minutes in each hour? No
AND
Are there a minimum of 20 students during the highest crossing hour? No

This warrant shall not be applied at locations where the distance to the nearest signal along the

major is less than 90m (300ft)

Warrant Satisfied: **No**

Warrant 6 - Coordinated Signal System

Are the adjacent traffic control signals so far apart that they do no provide a necessary degree of vehicular platooning (1-way street or traffic mainly in 1 direction)? No
OR
On a 2-way street will proposed and adjacent signals provide a progressive operation? No

* This warrant should not be applied where the spacing of signals would be less than 300m (1000ft).

Warrant Satisfied: **No**

Warrant 7 - Crash Experience

Have adequate trial of less restrictive remedies with satisfactory observance and enforcement failed to reduce the number of accidents? No
AND
Have there been 5 or more reported accidents susceptible to correction by a traffic signal within a 12 month period? No
AND

Are vehicle and ped volumes at least 80% of the requirements specified in Warrants 1 (Cond A or B) or 4? (56% criteria can be used if applicable) No

The answer to all above questions must be "yes" to satisfy this warrant

Warrant Satisfied: **No**

4 accidents in 3 years 5/10-9/14, 3 of which Rear End Collisions

Warrant 8 - Roadway Network (for intersection of 2 majors)

1) Total Existing Weekday Peak Hour Volume Entering Intersection 546
Is this volume > 1000 VPH? No
AND
Do the ETC+5 yrs volumes satisfy warrants 1, 2 or 3? No

OR

2) 5th highest Weekend volume entering intersection
Is this volume > 1000 VPH? No

Both answers to 1) **or** the answer to 2) must be "yes" to satisfy this warrant

Warrant Satisfied: **No**

Warrant 9 - Intersection Near a Grade Crossing

Criteria A and B need to be met for warrant to be met

Criteria A:

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

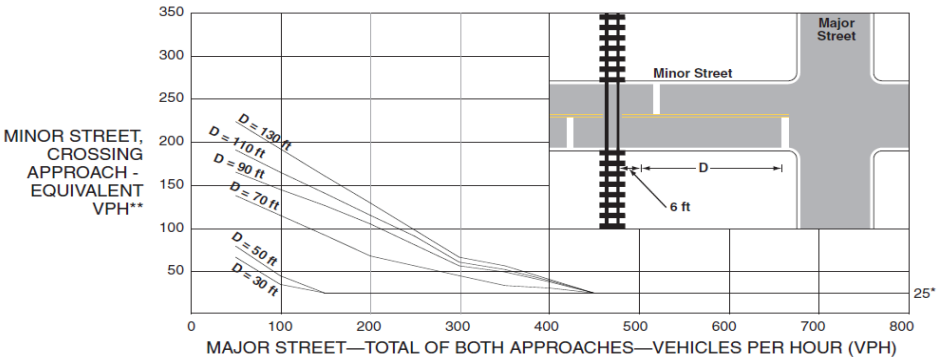
Criteria A met? No

Criteria B

Highest traffic volume hour with rail traffic (if rail schedule isn't known, use peak hour volumes)

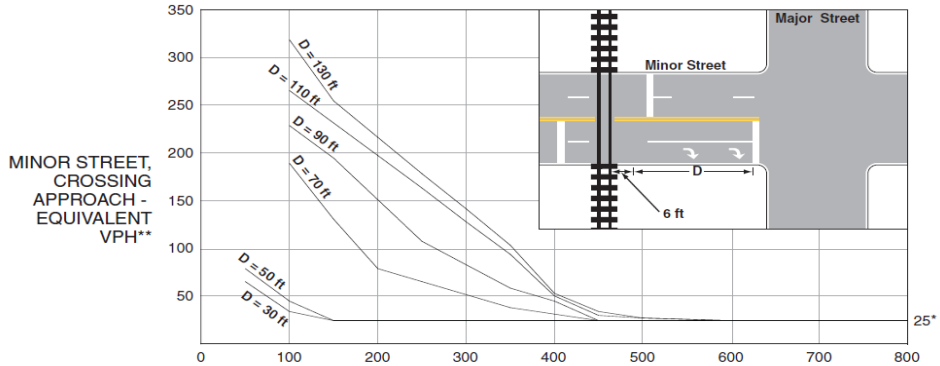
Major 386 (Both Approaches) Minor 83 (1 direction)

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



* 25 vph applies as the lower threshold volume
** VPH after applying the adjustment factors in Tables 4C-2, 4C-3, and/or 4C-4, if appropriate

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



* 25 vph applies as the lower threshold volume
** VPH after applying the adjustment factors in Tables 4C-2, 4C-3, and/or 4C-4, if appropriate

See MUTCD text for adjustment based on frequency of rail traffic, high-occupancy buses and tractor-trailer percentages

Criteria B met? No

Warrant Satisfied: **No**

Exhibit C

Accident Summary

Cortland Signal Warrant Analysis - 131.018.001 City of Cortland, NY Accident Report Analysis Table 3-Year Period: 7/262012 to 7/13/2015 Intersection	Date	# of Vehicles	Manner of Collision	Contributing Factor
Greenbush/Central	9/15/2014	2	Rear End	Unsafe Backing (to accommodate oversize vehicle)
Greenbush/Central	8/6/2014	2	SideSwipe	Improper Lane useage (passing turning Truck)
Greenbush/Central	9/27/2013	2	Rear End	Following too Close
Greenbush/Central	5/27/2010	2	Rear End	Unsafe Backing (to accommodate oversize vehicle)

Exhibit D
All-way Stop Control
Capacity Analysis

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: D. Stansbury
Agency/Co.: City of Cortland
Date Performed: 9/29/2015
Analysis Time Period: AM Peak
Intersection: Greenbush - Central
Jurisdiction: City of Cortland
Units: U. S. Customary
Analysis Year: 2015
Project ID:
East/West Street: Central
North/South Street: Greenbush

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	8	23	12	2	15	59	13	60	2	14	100	27
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.77		0.95		0.75			
Flow Rate	54		79		99		200	
% Heavy Veh	0		0		0		0	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	54		79		99		200	
Left-Turn	10		2		17		20	
Right-Turn	15		62		2		38	
Prop. Left-Turns	0.2		0.0		0.2		0.1	
Prop. Right-Turns	0.3		0.8		0.0		0.2	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	

hRT-adj	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7
hadj, computed	-0.1	-0.5	0.0	-0.1

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	54		79		99		200	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.05		0.07		0.09		0.18	
hd, final value	4.53		4.17		4.44		4.22	
x, final value	0.07		0.09		0.12		0.23	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.5		2.2		2.4		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	54		79		99		200	
Service Time	2.5		2.2		2.4		2.2	
Utilization, x	0.07		0.09		0.12		0.23	
Dep. headway, hd	4.53		4.17		4.44		4.22	
Capacity	304		329		349		450	
Delay	7.86		7.59		8.05		8.51	
LOS	A		A		A		A	
Approach:								
Delay	7.86		7.59		8.05		8.51	
LOS	A		A		A		A	

Intersection Delay 8.16 Intersection LOS A

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: D. Stansbury
Agency/Co.: City of Cortland
Date Performed: 9/29/2015
Analysis Time Period: PM Peak
Intersection: Greenbush - Central
Jurisdiction: City of Cortland
Units: U. S. Customary
Analysis Year: 2015
Project ID:
East/West Street: Central
North/South Street: Greenbush

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	37	44	11	2	23	55	10	94	4	39	87	14
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.85		0.87		0.77		0.70	
Flow Rate	106		91		139		199	
% Heavy Veh	0		0		0		0	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	106		91		139		199	
Left-Turn	43		2		12		55	
Right-Turn	12		63		5		20	
Prop. Left-Turns	0.4		0.0		0.1		0.3	
Prop. Right-Turns	0.1		0.7		0.0		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	

hRT-adj	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7
hadj, computed	0.0	-0.4	-0.0	-0.0

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	106		91		139		199	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.09		0.08		0.12		0.18	
hd, final value	4.83		4.44		4.62		4.55	
x, final value	0.14		0.11		0.18		0.25	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.8		2.4		2.6		2.5	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	106		91		139		199	
Service Time	2.8		2.4		2.6		2.5	
Utilization, x	0.14		0.11		0.18		0.25	
Dep. headway, hd	4.83		4.44		4.62		4.55	
Capacity	356		341		389		449	
Delay	8.63		8.00		8.62		9.07	
LOS	A		A		A		A	
Approach:								
Delay	8.63		8.00		8.62		9.07	
LOS	A		A		A		A	
Intersection Delay	8.68		Intersection LOS		A			