City of Kingston

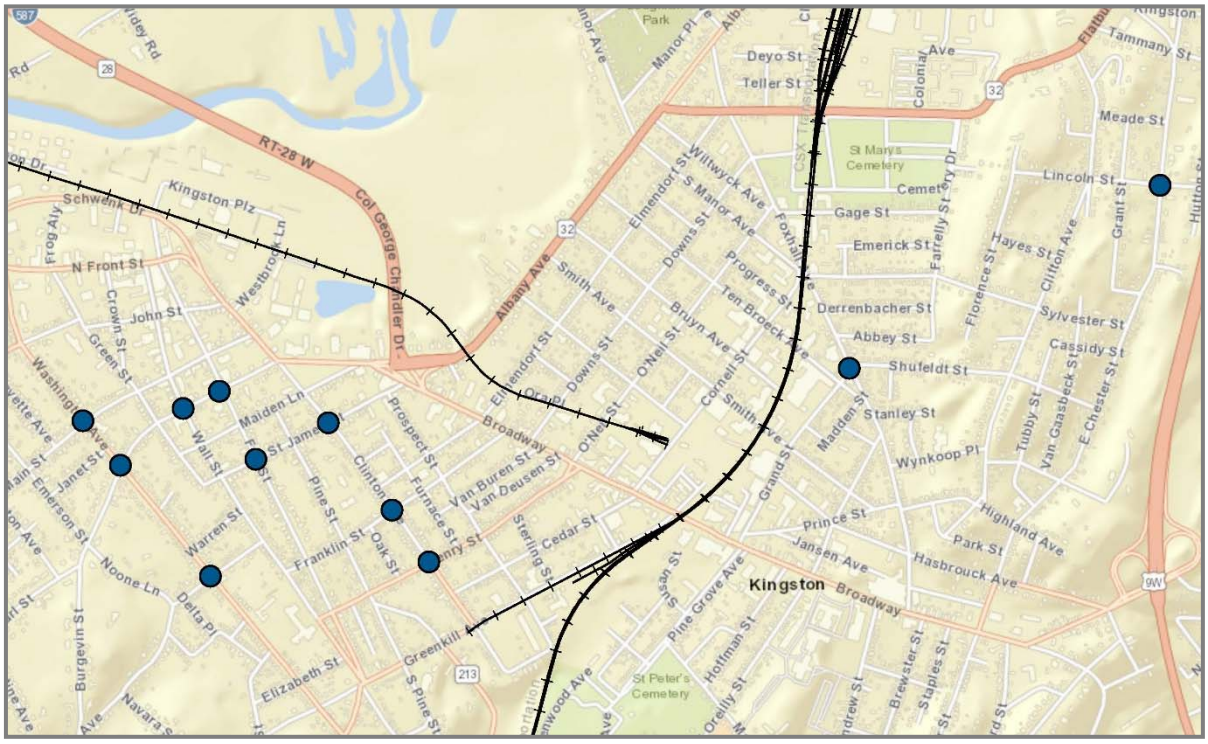
Traffic Signal Warrant Evaluation

City of Kingston, New York

CME Project No. 118-064

Prepared For:

Ulster County Transportation Council
244 Fair Street
PO Box 1800
Kingston, New York 12402



March 31, 2020

Prepared By:

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MEMORANDUM

Creighton Manning

ENGINEERS
PLANNERS
SURVEYORS

Date: March 31, 2020

To: Ulster County Transportation Council

From: Mark Nadolny and Mark A. Sargent, P.E.

Project: City of Kingston Traffic Signal Warrant Evaluation
Ulster County, New York

Re: Traffic Signal Removal Assessment

The Ulster County Transportation Council (UCTC) initiated this study to evaluate the effectiveness of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum warrants to justify their continued operation. One of the key objectives stated in the City of Kingston's Comprehensive Plan is to provide safe, efficient, and reliable traffic mobility throughout the City in order to improve the quality of life for residents, business owners, and the traveling public – whether by vehicle, bicycle, transit, or by foot. Unwarranted traffic signals can create unnecessary intersection delay, increase the rerouting of traffic to less-appropriate roads, promote disrespect for traffic control devices, and result in higher crash rates. In addition, city officials have indicated that it has become increasingly difficult to secure replacement parts for many of these aging traffic signals. . At the same time, operating and maintaining unjustified traffic signals is not an effective use of the City of Kingston's limited resources. For these reasons, the justification for continued operation of some traffic signals may no longer exist. It is therefore essential that a detailed traffic engineering study be conducted to determine if aging traffic signals should be removed rather than replaced in order to allocate City resources more appropriately at justified locations.

The study evaluates traffic operations from 7:00 a.m. to 7:00 p.m. on a typical peak day, and during peak periods to determine if a traffic signal is justified and whether or not an alternative traffic control can be implemented to provide safe and efficient movement through the City of Kingston for all modes of traffic. The assessment indicates that none of the intersections meet any of the warrants and all 11 traffic signals could be removed at the study area intersections without any adverse impact to traffic and pedestrian safety or operations. The purpose of this Memorandum is to summarize the assessment and recommendations developed for the following 11 study area intersections located in the City of Kingston. The study area is shown on Figure 1 at the end of this memo.

1. Washington Avenue/Linderman Avenue (Pre-Timed Traffic Signal)
2. Washington Avenue/Pearl Street (Pre-Timed Traffic Signal)
3. Washington Avenue/Main Street (Traffic Signal set to Flash)
4. Wall Street/Pearl Street (Pre-Timed Traffic Signal)
5. Fair Street/Pearl Street (Pre-Timed Traffic Signal)
6. Clinton Avenue/St. James Street (Traffic Signal set to Flash)
7. Clinton Avenue/Franklin Street (Traffic Signal set to Flash)
8. Clinton Avenue/Henry Street (Traffic Signal set to Flash)
9. Fair Street/St. James Street (Pre-Timed Traffic Signal)
10. Foxhall Avenue/Grand Street/Shufeldt Street (Traffic Signal set to Flash)
11. East Chester Street/Lincoln Street (Traffic Signal set to Flash)

A detailed evaluation for each intersection is included under Attachments A through K. This assessment includes a review of existing conditions such as vehicle speeds, crashes, physical characteristics, and alternative forms of traffic control including:

- Traffic signal control (existing condition at four intersections)
- Two-Way stop control
- All-way stop control (existing condition at four intersections due to traffic signals set to flash)

1.0 Existing Conditions

Data Collection

Intersection turning movement counts were conducted at the 11 study area intersections on Wednesday, May 8, 2019 from 7:00 a.m. to 7:00 p.m. The raw turning movement count data is included under Attachment L. The 2019 existing AM and PM peak hour traffic volumes summarized on Figure 2 and Figure 3 form the basis for the intersection level of service analysis. A review of the NYSDOT *Project Development Manual - Appendix 5* indicates that safety related projects on existing highways typically do not require future design year traffic volumes; therefore, the existing traffic volumes were used for the intersection evaluations.

Speed Data

The current regulatory speed limit for all roads in the City of Kingston is 30-mph. Speed data collected by NYSDOT on various roadways in the project area indicates that 85th percentile speeds typically range from 24-mph to 38-mph; therefore, the signal warrant assessment provided below are based on standard warrants (not based on the reduced volume warrants since operating speeds in the project area do not exceed 40-mph). The results of the speed data for applicable roadways are shown on Table 1.

Table 1 – Speed Data

Approach	Posted Speed Limit	Average Speed		85th Percentile Speed	
		NB/EB	SB/WB	NB/EB	SB/WB
Clinton Avenue (N. Front Street to Henry Street)	30	23	16	28	24
Fair Street (Henry Street to N. Front Street)	30	--	16	--	24
Henry Street (Henry Street to NY Route 32)	30	16	22	24	27
St James Street (Green Street to Broadway)	30	22	22	27	26
Wall Street (Henry Street to N. Front Street)	30	20	21	24	24
Foxhall Avenue (Prince Street to Albany Avenue)	30	26	25	32	31
East Chester Street (Hasbrouck Avenue to Flatbush Avenue)	30	31	31	38	37

Accident Analysis Summary

An accident analysis was performed at the 11 study area intersections in accordance with NYS Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersections. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at each intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant crash types for the intersections and also provides the intersection crash rates which can be compared to the State-wide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to all 11 study area intersections. It is noted that the character

of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type											Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Right Turn	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total	
Washington Ave/Linderman Ave	1	4	1	0	0	0	1	1	1	2	1	0	0	0	0	**6**	**0.69**
Washington Ave/Pearl St	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	**2**	**0.17**
Washington Ave/Main St	4	1	1	0	0	0	0	2	0	0	0	3	0	0	1	**6**	**0.52**
Wall St/Pearl St	2	0	6	0	0	0	1	6	0	1	0	0	0	0	0	**8**	**1.00**
Fair St/Pearl St	6	2	2	0	2	1	1	1	1	0	0	3	1	0	0	**10**	**1.31**
Clinton Ave/St. James St	2	2	1	0	0	0	1	1	0	2	0	0	0	1	0	**5**	**0.83**
Clinton Ave/Franklin St	3	1	1	0	0	0	0	1	1	0	0	1	0	2	0	**5**	**0.80**
Clinton Ave/Henry St	2	1	1	0	0	0	1	0	0	2	0	0	0	0	1	**4**	**0.60**
Fair Street/St. James Street	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	**2**	**0.46**
Foxhall Avenue/Grand Street/ Shufeldt Street	1	2	1	0	0	0	0	1	1	1	1	0	0	0	0	**4**	**0.48**
East Chester Street/Lincoln Street	1	1	2	0	0	0	1	2	0	1	0	0	0	0	0	**4**	**0.49**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

Specific accident summaries for the 11 study area intersections are included under Attachments A through K and an overall accident summary (TE-213 equivalent) is included under Attachment N.

The removal of unwarranted traffic signals at intersections with high accident rates located in urban areas has been shown to decrease all types of accidents by 24 percent and reduces pedestrian crashes by 17 percent based on an assessment of 199 intersections, as noted in the *Signalized Intersection Informational Guide – Second Edition* published by the U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA).

2.0 Signal Warrant Evaluation

Description of Signal Warrants

The existing traffic conditions and physical characteristics of the intersections were compared to signal warrant criteria contained in the *2009 Manual of Uniform Traffic Control Devices* (National MUTCD), published by the Federal Highway Administration (FHWA) to determine if existing traffic conditions would warrant the installation of a traffic signal. The National MUTCD specifies the minimum criteria that must be met in order for a traffic signal to be justified. The satisfaction of a signal warrant in itself is not necessarily justification for a traffic signal. Other engineering and operational factors must be considered. The National MUTCD contains nine warrants, eight of which were evaluated in detail (Intersection Near a Grade Crossing warrant excluded):

- Warrant 1 – Eight-Hour Vehicular Volume - This warrant is satisfied if for any eight hours of an average day the traffic volumes for Condition A or Condition B specified in Table 4C-1 of the National MUTCD are met for the main arterial and the higher volume side road approach to the intersection.
- Warrant 2 – Four-Hour Vehicular Volume - This warrant is met when for any four hours of an average day, points plotted on the graph presented on Figure 4C-1 of the National MUTCD fall above the appropriate curve.
- Warrant 3 – Peak Hour - This warrant is met when for any one hour of an average day, points plotted on the graph presented on Figure 4C-3 of the National MUTCD fall above the appropriate curve.
- Warrant 4 – Pedestrian Volume - The Pedestrian Volume warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street. This warrant is used when for any four hours of an average day, points plotted on the graph presented on Figure 4C-7 of the National MUTCD fall above the appropriate curve.
- Warrant 5 – School Crossing - The School Crossing warrant is intended for application where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word "school children" includes elementary through high school students. This warrant is used when the number and size of groups of school children at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the school children are using the crossing is less than the number of minutes in the same period and there are a minimum of 20 school children during the highest crossing hour.
- Warrant 6 – Coordinated Signal System - The Coordinated Signal System warrant is intended for application where progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles. The need for traffic control is considered when adjacent traffic control signals to an intersection are so far apart that they do not provide the necessary degree of vehicular platooning for a one-way street or a street that has traffic predominantly in one direction or where adjacent traffic control signals will collectively provide a progressive operation on a two-way street.
- Warrant 7 – Crash Experience - The Crash Experience warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal. This warrant is used when five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage exceeding the applicable requirements for a reportable crash. In addition, for each of any eight hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Conditions A or B in Table 4C-1 of the National MUTCD exists on the major-street and the higher-volume minor-street approach, respectively, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant.
- Warrant 8 – Rodway System - The Roadway System warrant is intended for application where installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network. The need for a traffic control signal shall be considered if intersection of two or more major routes meets one or both of the following criteria:
    A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vph during the peak hour of a typical weekday and has 5-year projected traffic volumes, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or
    B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vph for each of any 5 hours of a non-normal business day (Saturday or Sunday).

Table 3 summarizes the signal warrant assessment included under Attachments A through K for the 11 study area intersections.

Table 3 – Summary of Signal Warrant Analysis

Intersection	Signal Warrant Satisfied?								At Least One Warrant Met?
	#1	#2	#3	#4	#5	#6	#7	#8	
Washington Avenue/Linderman Avenue	No	No	No	No	No	No	No	No	No
Washington Avenue/Pearl Street	No	No	No	No	No	No	No	No	No
Washington Avenue/Main Street	No	No	No	No	No	No	No	No	No
Wall Street/Pearl Street	No	No	No	No	No	No	No	No	No
Fair Street/Pearl Street	No	No	No	No	No	No	No	No	No
Clinton Avenue/Henry Street	No	No	No	No	No	No	No	No	No
Clinton Avenue/Franklin Street	No	No	No	No	No	No	No	No	No
Clinton Avenue/St. James Street	No	No	No	No	No	No	No	No	No
Fair Street/St. James Street	No	No	No	No	No	No	No	No	No
Foxhall Avenue/Grand Street/ Shufeldt Street	No	No	No	No	No	No	No	No	No
East Chester Street/Lincoln Street	No	No	No	No	No	No	No	No	No

The assessment indicates that none of the intersections meet any of the warrants and all 11 traffic signals could be removed at the study area intersections without having an adverse impact on safety or traffic operations.

3.0 Traffic Control Alternatives and Intersection Assessment Comparison

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided under Section 2.0.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if these intersections will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control – A pre-timed traffic signal without vehicle detection is currently provided at all 11 study area intersections (although, five operate on flash).
- Two-Way Stop Control – Stop sign control on the minor street approaches.
- All-Way Stop Control – Stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations for each alternative were made using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Detailed descriptions of LOS criteria for signalized and unsignalized intersections and copies of the detailed level of service reports are provided under each attachment developed for the 11 study area intersections. Table 4 summarizes the traffic control assessment included under Attachments A through K for the 11 study area intersections.

Table 4 – Traffic Control Summary

Intersection	Does Traffic Control Provide Adequate Levels of Service?		
	Traffic Signal	Two-Way Stop Control	All Way Stop Control
Washington Ave/ Linderman Ave	**Yes**	**Yes**	**Yes**
Washington Ave/Pearl St	**Yes**	**No**	**Yes**
Washington Ave/Main St	**Yes**	**Yes**	**Yes**
Fair St/Pearl St	**Yes**	**Yes**	**Yes**
Wall St/Pearl St	**Yes**	**Yes**	**Yes**
Clinton Ave/Henry St	**Yes**	**Yes**	**Yes**
Clinton Ave/Franklin St	**Yes**	**Yes**	**Yes**
Clinton Ave/St. James St	**Yes**	**Yes**	**Yes**
Fair Street/St. James Street	**Yes**	**Yes**	**Yes**
Foxhall Avenue/Grand Street/ Shufeldt Street	**Yes**	**Yes**	**Yes**
East Chester Street/Lincoln Street	**Yes**	**Yes**	**Yes**

The assessment indicates that all three traffic control alternatives will provide adequate operations at the 11 study area intersections, except at the Washington Avenue/Pearl Street intersection where two-way stop control would provide LOS E conditions during the PM peak hour.

Traffic Operations with DRI Modifications

The *Kingston Downton Revitalization Initiative* (Kingston DRI) recommends accessibility and circulation improvements in the Uptown Stockade area. In general, the proposed improvements would reverse street directions along Wall Street and Fair Street in addition to some secondary streets such as John Street and Main Street. This change would have the most significant traffic pattern impact on the following study area intersections:

- Washington Avenue/Pearl Street
- Washington Avenue/Main Street
- Wall Street/Pearl Street
- Fair Street/Pearl Street
- Fair Street/St. James Street

A sensitivity analysis was conducted to determine if the traffic control alternatives would change if the proposed *Kingston DRI* traffic circulation modification was implemented. The existing traffic volumes were redistributed based on a review of the proposed *Kingston DRI* plan and are shown on Figure 4 and Figure 5. Table 5 summarizes the traffic control assessment included under Attachments B through E and Attachment I.

Table 5 – Kingston DRI Traffic Control Summary

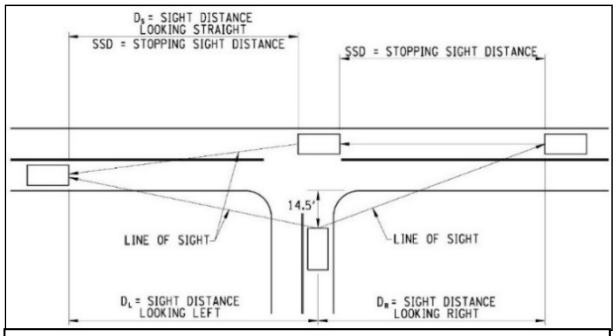
Intersection	Does Traffic Control Provide Adequate Levels of Service?		
	Traffic Signal	Two-Way Stop Control	All Way Stop Control
Washington Ave/Pearl St	**Yes**	**No**	**Yes**
Washington Ave/Main St	**Yes**	**Yes**	**Yes**
Fair St/Pearl St	**Yes**	**No**	**Yes**
Wall St/Pearl St	**Yes**	**Yes**	**Yes**
Fair Street/St. James Street	**Yes**	**Yes**	**Yes**

The assessment indicates that a traffic signal and all-way stop control alternatives will provide adequate operations at the four study area intersections if the *Kingston DRI* recommendations are implemented. It is noted that two-way stop control will not provide adequate operations at the Fair Street/Pearl Street intersection and at the Washington Street/Pearl Street intersection.

3.1 Two-Way Stop Control – Sight Distance Evaluation

In order to maintain existing two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the study area intersections. Available *intersection* sight distance was measured from the perspective of a vehicle turning left or right from the side street onto the main street. In addition, the sight distance for vehicles traveling in either direction along the main street looking straight ahead to turn left on to the side street was measured. The available intersection sight distance on a roadway should provide drivers a sufficient view of the intersecting highway to allow vehicles to enter or exit the intersection without excessively slowing vehicles traveling at or near the operating speed on the intersecting mainline.

Stopping sight distance was also measured at the study intersections. Stopping sight distance is the length of the roadway ahead that is visible to the driver. The available stopping sight distance on a roadway should be of sufficient length to enable a vehicle traveling at or near the operating speed to stop before reaching a stationary object in its path. The following diagram illustrates these sight distance measurements.



Intersection and Stopping Sight Distance Measurements

As noted above, travel speed data collected in the City of Kingston indicates that the 85th percentile speed on City streets is generally less than the 30-mph posted speed limit (with the exception of the East Chester Street near Lincoln Street). The sight distances measured in the field were compared to the guidelines presented in the American Association of State Highway Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets 2011* for a 30-mph operating speed for all applicable intersections (with the exception of the 40-mph operating speed for the East Chester Street/Lincoln Street intersection). Table 6 summarizes the sight distance assessment included under Attachments A through K for the 11 study area intersections.

Table 6 – Sight Distance Evaluation

Intersection	Adequate Sight Distance Provided?							
	Intersection Sight Distance[1]						Stopping Sight Distance[2]	
	Right Turn from Side St	Crossing Maneuver from Side St		Left Turn from Side St		Left Turn from Major St	$SSD_{EB, NB}$	$SSD_{WB, SB}$
		Looking Left	Looking Right	Looking Left	Looking Right			
Washington Ave/ Linderman Ave	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Washington Ave/Pearl St	No	No	No	No	No	Yes	Yes	Yes
Washington Ave/Main St	No	No	No	No	No	Yes	Yes	Yes
Fair St/Pearl St	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Wall St/Pearl St	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Clinton Ave/Henry St	No	No	No	No	No	Yes	Yes	Yes
Clinton Ave/Franklin St	No	No	No	No	No	Yes	Yes	Yes
Clinton Ave/St. James St	No	No	No	No	No	Yes	Yes	Yes
Fair St/St. James St	No	No	No	No	No	Yes	Yes	Yes
Foxhall Ave/Grand St/ Shufeldt St	No	No	Yes	No	Yes	Yes	Yes	Yes
East Chester St/Lincoln St	Yes	Yes	No	Yes	No	Yes	Yes	Yes

3.2 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement in which the following guidance and options apply:

Section 2B.04.02
"Engineering judgment" should be used to establish intersection control. The following factors should be considered:

A. Vehicular, bicycle, and pedestrian traffic volumes on all approaches;
B. Number and angle of approaches;
C. Approach speeds;
D. Sight distance available on each approach; and
E. Reported crash experience."

Section 2B.07.04
The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. All-way stop control is used where the volume of traffic on the intersecting roads is approximately equal. All-way stop control should be considered when one or more of the following conditions exist:

A. Where traffic control signals are justified, the all-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.
B. Five or more reported crashes in a 12-month period that are susceptible to correction by an all-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.
C. Minimum volumes:

1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and
2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; and/or

D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values.

Section 2B.07.05

Other criteria that may be considered in an engineering study include:

A. The need to control left-turn conflicts;
B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop;
D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where all-way stop control would improve traffic operational characteristics of the intersection.

Table 7 summarizes the all-way stop assessment included under Attachments A through K for the 11 study area intersections.

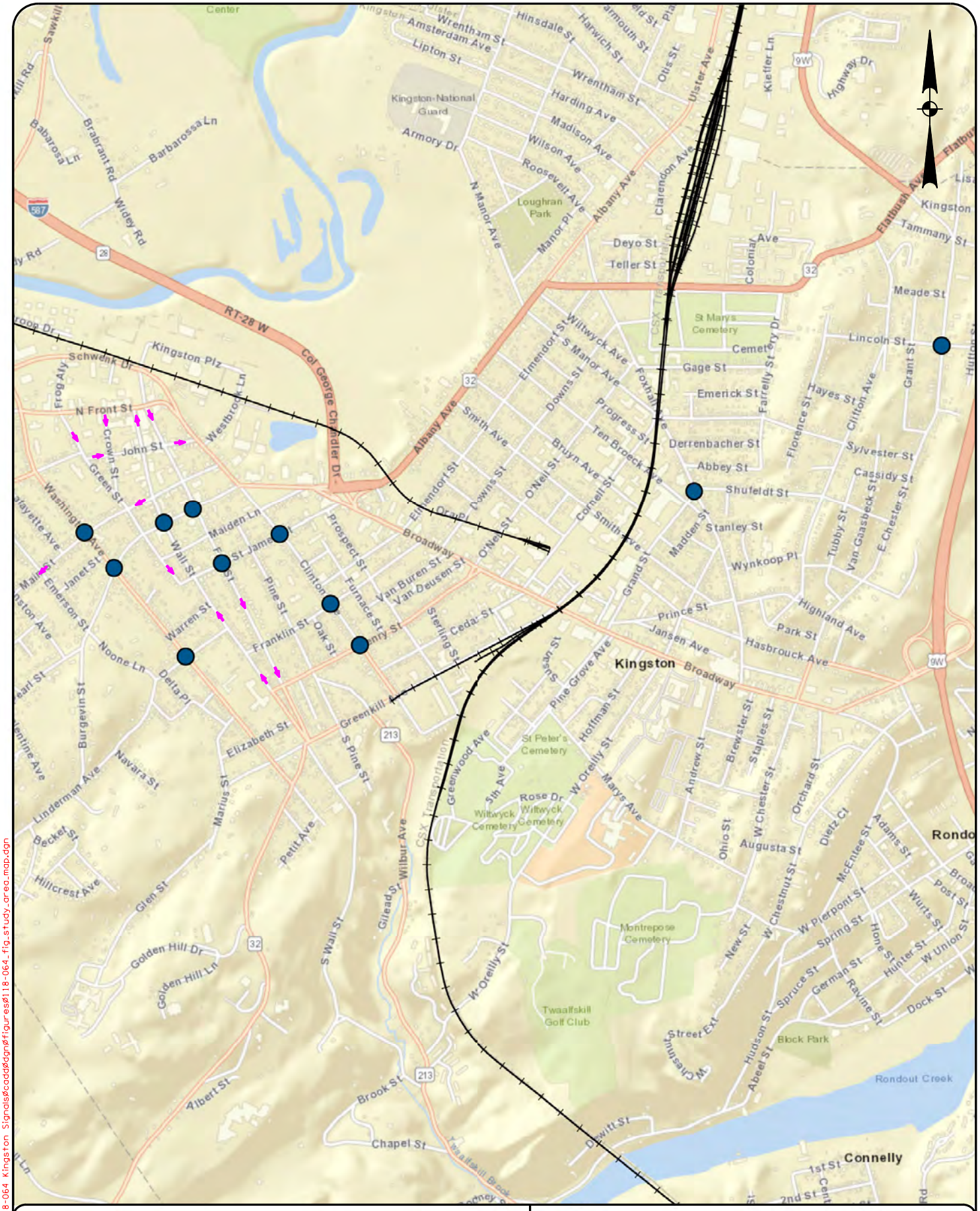
Table 7 – All-Way Stop Control Criteria

Intersection	All-Way Stop Criteria Met?							
	Section 2B.07.04				Section 2B.07.05			
	A	B	C	D	A	B	C	D
Washington Ave/ Linderman Ave	NA	No	No	No	NA	No	Yes	Yes
Washington Ave/Pearl St	NA	No	No	No	NA	No	Yes	Yes
Washington Ave/Main St	NA	No	No	No	NA	No	Yes	Yes
Fair St/Pearl St	NA	No	No	No	NA	No	Yes	Yes
Wall St/Pearl St	NA	No	No	No	NA	No	Yes	Yes
Clinton Ave/Henry St	NA	No	No	No	NA	No	Yes	Yes
Clinton Ave/Franklin St	NA	No	No	No	NA	No	Yes	Yes
Clinton Ave/St. James St	NA	No	No	No	NA	No	Yes	Yes
Fair St/St. James St	NA	No	No	No	NA	No	Yes	Yes
Foxhall Ave/Grand St/Shufeldt St	NA	No	No	No	NA	No	Yes	No
East Chester St/Lincoln St	NA	No	No	No	NA	No	No	Yes

NA = Not Applicable

4.0 Conclusions

The existing traffic signals at all 11 study area intersections could be removed and replaced with all-way stop control without impeding vehicular, pedestrian and cyclist safety or traffic operations. All-way stop control is the preferred method due to limited sight lines at the intersections. It is recommended that stop signs with supplemental "All-Way" plaques be installed on all approaches. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. The intersections will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.



STUDY AREA MAP

TRAFFIC SIGNAL WARRANT EVALUATION
CITY OF KINGSTON, NEW YORK

Creighton Manning

PROJECT:	118-064	DATE:	02/2020	FIGURE:	1

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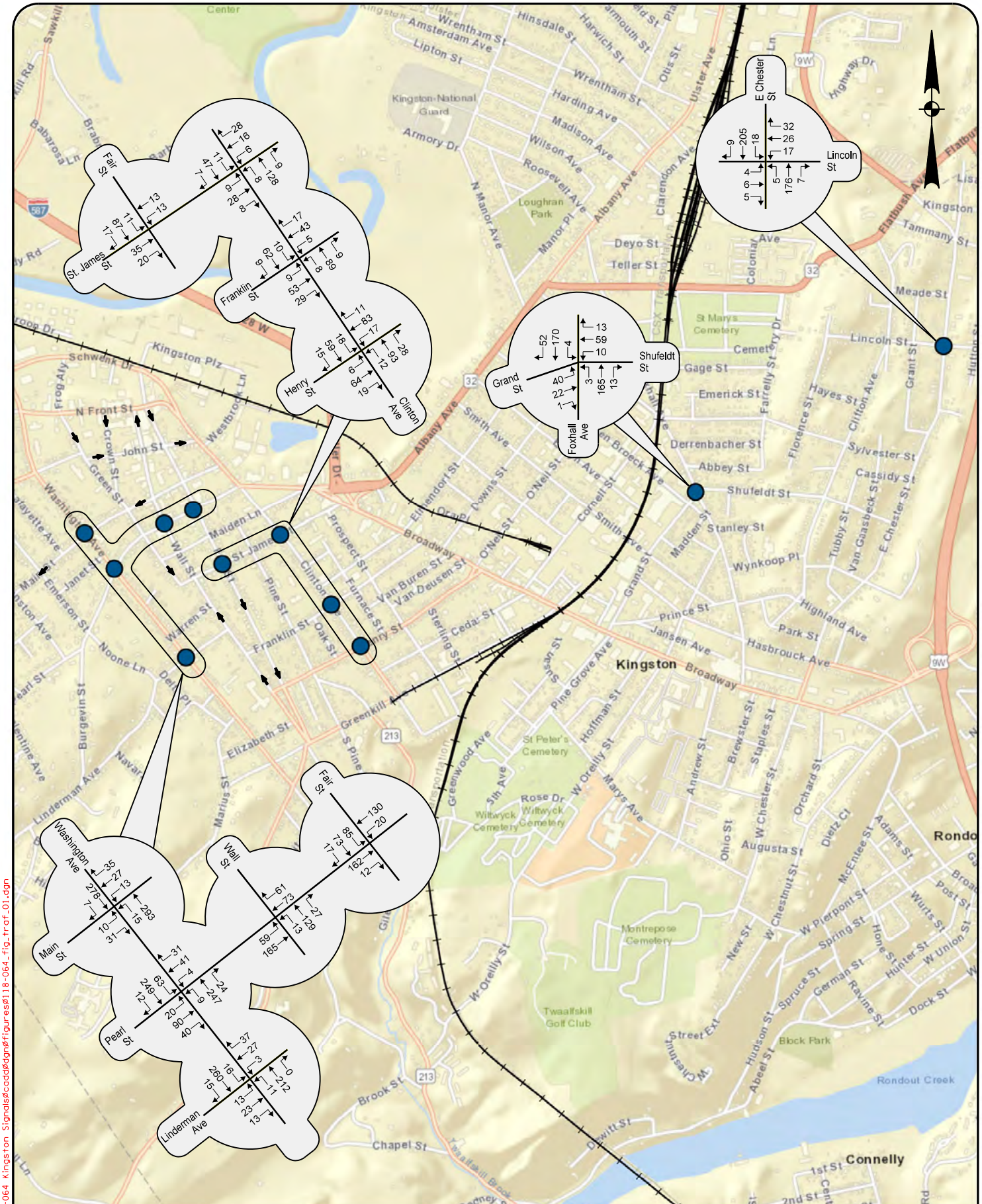

2019 EXISTING TRAFFIC VOLUMES
AM PEAK HOUR

TRAFFIC SIGNAL WARRANT EVALUATION
CITY OF KINGSTON, NEW YORK

Creighton Manning

PROJECT:	118-064	DATE:	02/2020	FIGURE:	2

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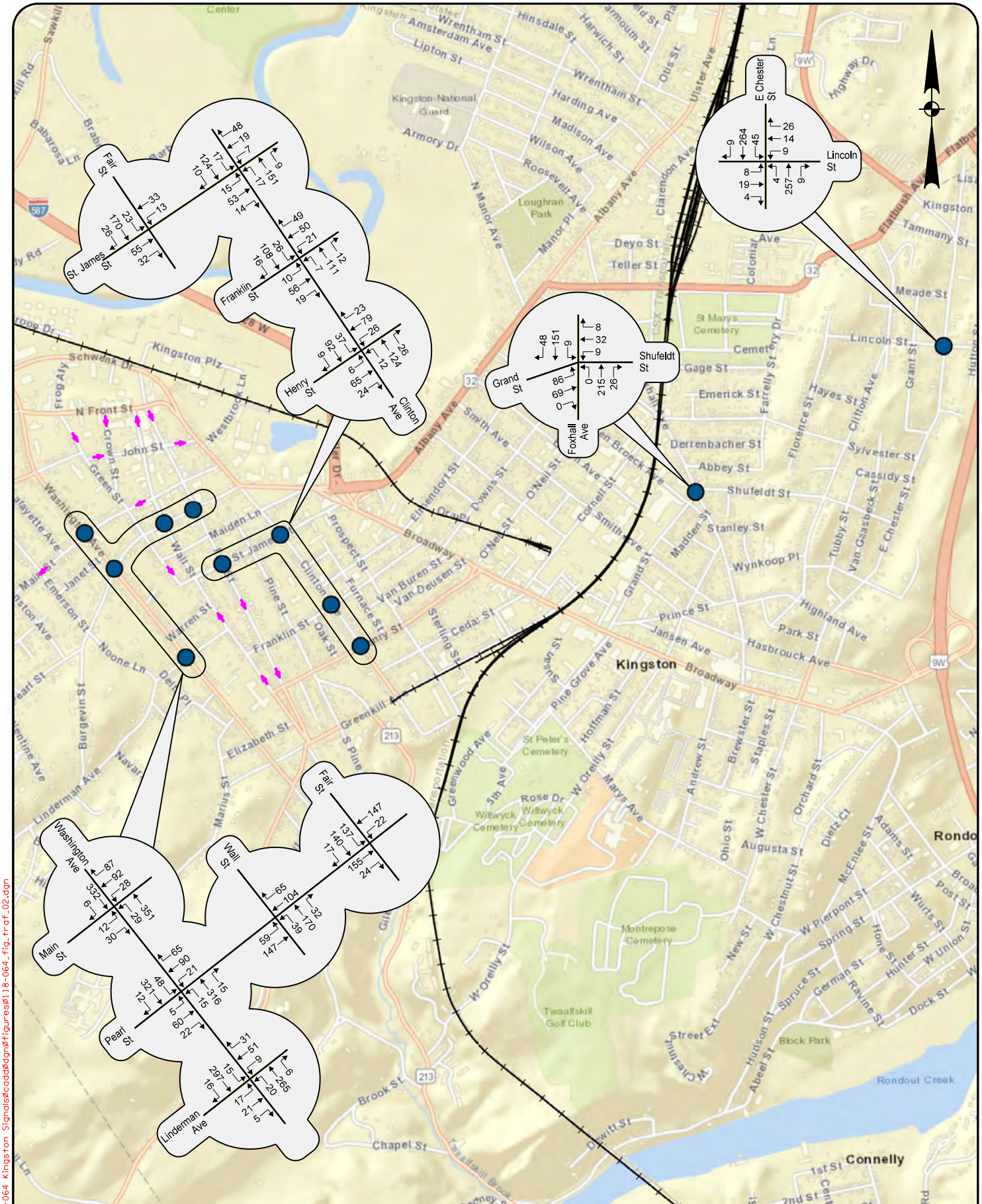

2019 EXISTING TRAFFIC VOLUMES
PM PEAK HOUR

TRAFFIC SIGNAL WARRANT EVALUATION
CITY OF KINGSTON, NEW YORK

Creighton Manning

PROJECT:	118-064	DATE:	02/2020	FIGURE:	3

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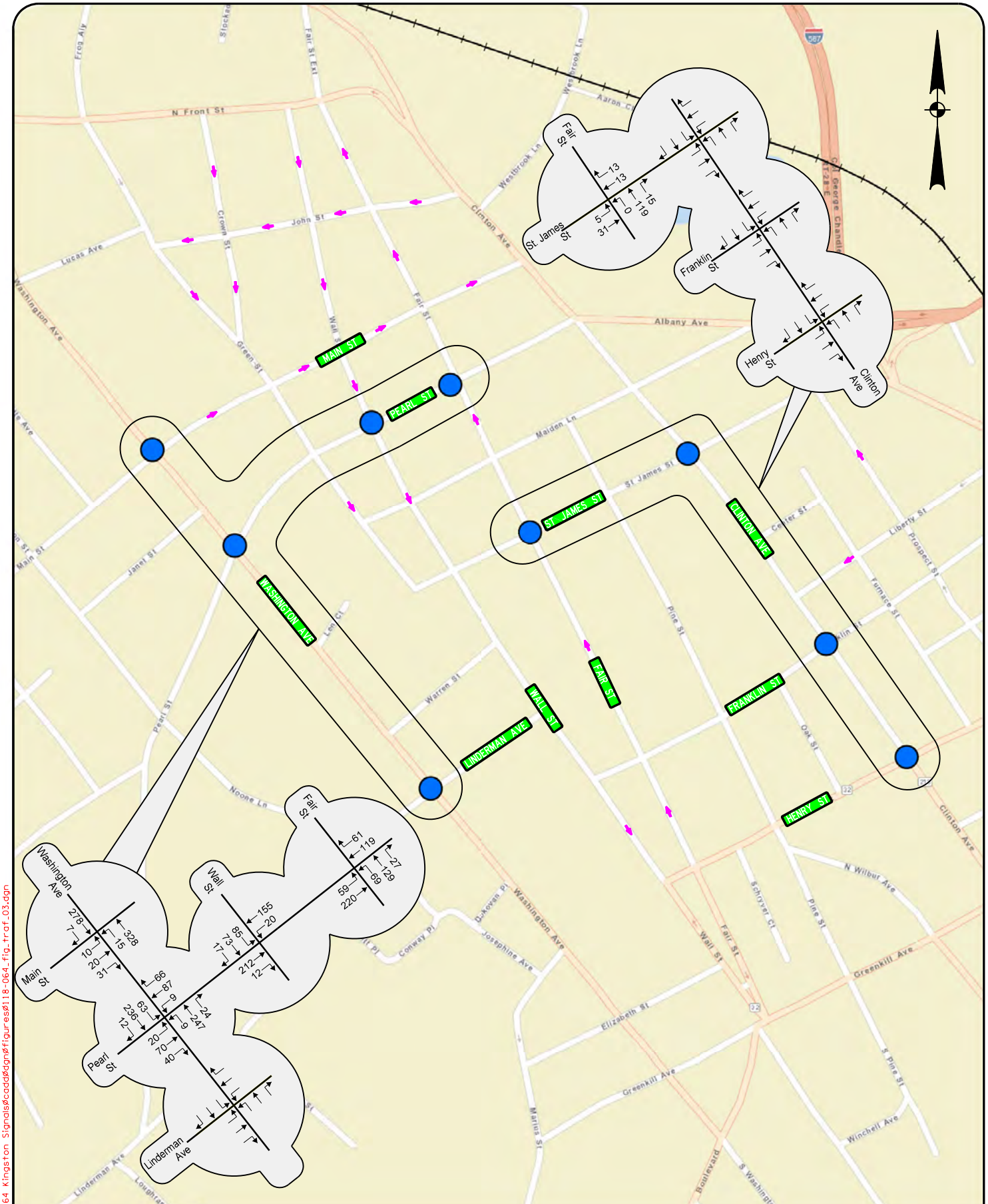

2019 EXISTING TRAFFIC VOLUMES
AM PEAK HOUR
DRI ALTERNATIVE

TRAFFIC SIGNAL WARRANT EVALUATION
CITY OF KINGSTON, NEW YORK

Creighton Manning

PROJECT:	118-064	DATE:	02/2020	FIGURE:	4

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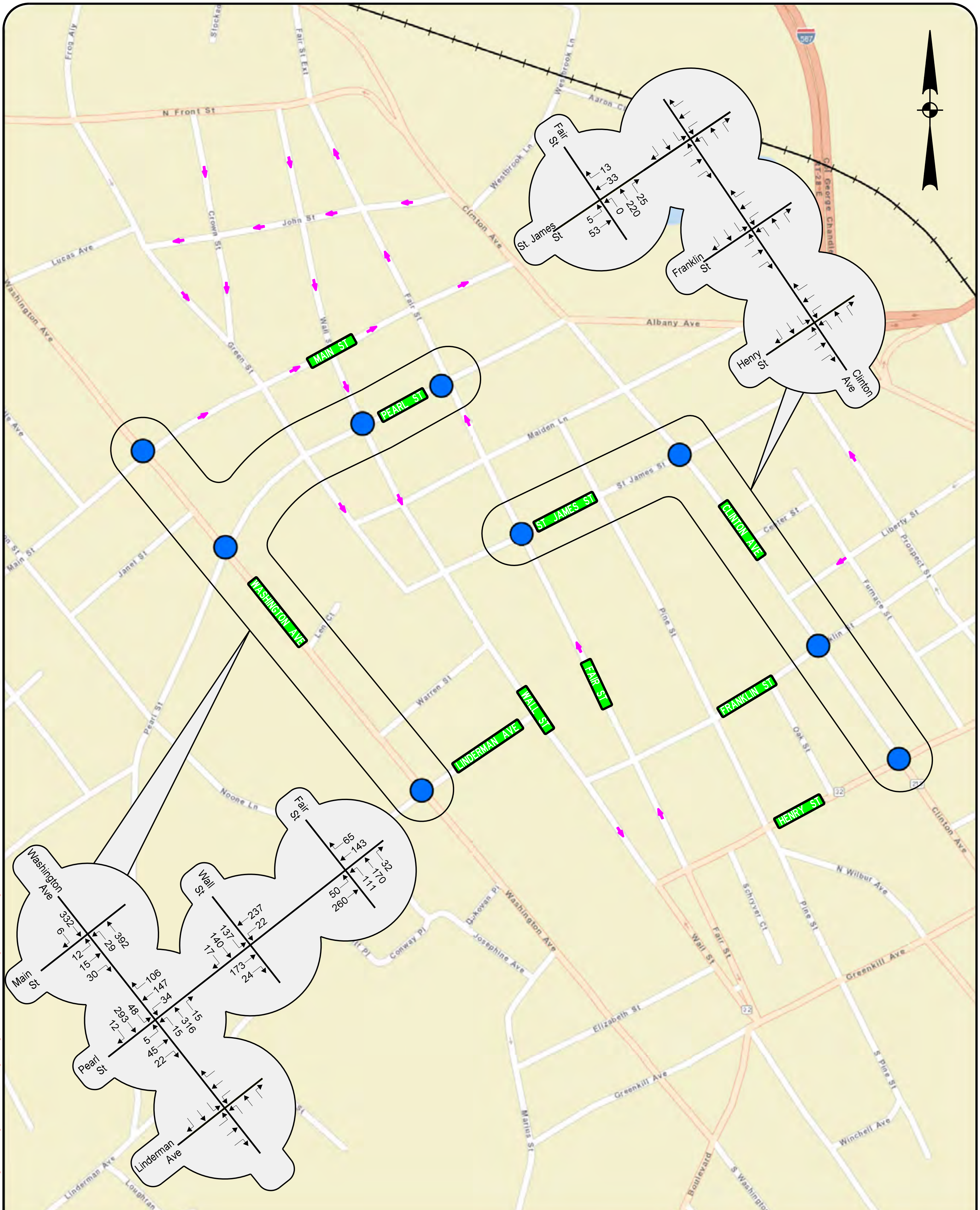


2019 EXISTING TRAFFIC VOLUMES
PM PEAK HOUR
DRI ALTERNATIVE

TRAFFIC SIGNAL WARRANT EVALUATION
CITY OF KINGSTON, NEW YORK

Creighton Manning

PROJECT:	118-064	DATE:	02/2020	FIGURE:	5

Attachment A
Washington Avenue/Linderman Avenue Assessment

Traffic Signal Removal Assessment
City of Kingston, New York

Washington Avenue/Linderman Avenue Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the Washington Avenue/Linderman Avenue intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum traffic and safety warrants to justify their continued operation.

Roadways Serving the Study Area

Washington Avenue is classified as an urban minor arterial and provides north-south travel from I-587 to Petit Avenue. Washington Avenue is a 28 foot wide roadway that allows two-way traffic and on-street parking on the west side of the road. The city speed limit is 30 mph and land uses along Washington Avenue near Linderman Avenue include the *George Washington Elementary School* and residential land uses.

Linderman Avenue is classified as an urban local road and provides east-west travel from Wall Street to County Club Lane. Linderman Avenue is a 24 to 28 foot wide roadway that allows two-way traffic and on-street parking on both sides of the road. The city speed limit it is 30 mph and land uses along Linderman Avenue near Washington Avenue generally include residential land uses.

Study Area Intersection

The Washington Avenue/Linderman Avenue intersection is a four-leg intersection controlled by a pre-timed traffic signal control. Each approach provides a single lane for shared travel movements on all approaches.

Pedestrian/Bicycle Accommodations

Sidewalks exist on both sides of Washington Avenue and Linderman Avenue. There are marked crosswalks on all approaches of the study area intersection. Bike Route 32 travels south on Linderman Avenue and continues east on Washington Avenue. Table 1 summarizes the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

Washington Avenue/ Linderman Avenue Intersection	Washington Ave. NB Approach		Washington Ave SB Approach		Linderman Ave EB Approach		Linderman Ave WB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	0	0	0	0	2	0	3	0	5	0
8:00 to 9:00 a.m.	1	0	1	0	2	0	7	0	11	0
9:00 to 10:00 a.m.	4	0	3	0	2	1	1	0	10	1
10:00 to 11:00 a.m.	0	0	0	0	1	0	2	0	3	0
11:00 a.m. to 12:00 p.m.	3	0	2	0	4	0	3	0	12	0
12:00 to 1:00 p.m.	0	0	0	0	2	0	3	0	5	0
1:00 to 2:00 p.m.	4	0	2	0	6	0	2	0	14	0
2:00 to 3:00 p.m.	2	0	3	0	2	0	11	0	18	0
3:00 to 4:00 p.m.	4	0	11	0	4	1	5	1	24	2
4:00 to 5:00 p.m.	2	1	2	0	6	0	0	0	10	1
5:00 to 6:00 p.m.	2	0	0	0	0	0	1	5	3	5
6:00 to 7:00 p.m.	4	0	2	0	2	0	3	0	11	0
Total	26	1	26	0	33	2	41	6	126	9

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches in an urban setting is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type											Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total	
Washington Avenue/Linderman Avenue	1	4	1	0	0	1	1	1	2	1	0	0	0	0	**6**	**0.70**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were six total accidents at the Washington Avenue/Linderman Avenue intersection during the three year period, which results in an accident rate slightly higher than the average accident rate when compared to similar intersections. Of the six accidents, one resulted in an injury while the remaining five were either a property damage only accident or a non-reportable accident. Non reportable accidents are collisions that result in damage less than $1,000. There were no fatal accidents and no pedestrian related collisions. The two right-angle accidents reported at this intersection were attributed to driver inattention or a disregard to the traffic signal control. The left-turn and overtaking accidents were the result of vehicles failing to yield the right-of-way. The rear end accident occurred due to a westbound vehicle following too closely while the only fixed object accident occurred due to slippery pavement conditions. The predominant accident type at the study area intersection is right angle collisions (two total); however, they are associated with driver error and not the result of geometric or operational issues with the intersection. An accident summary (TE-213 equivalent) at the Washington Avenue/Linderman Avenue intersection is included under Attachment J.

The removal of unwarranted traffic signals at intersections with high accident rates located in urban areas has been shown to decrease all types of accidents by 24 percent based on an assessment of 199 intersections, as noted in the *Desktop Reference for Crash Reduction Factors* published by the U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA).

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table 3 summarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A "Yes" under the "Signal Warrants Met?" column indicates that the criteria are satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment K.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]			Signal Warrants Met?			
	Washington Ave NB/SB	Linderman Ave		#1		#2	#3
		EB	WB	Cond. A	Cond. B		
7:00 AM	456	48	54	No	No	No	No
8:00 AM	487	41	70	No	No	No	No
9:00 AM	392	35	50	No	No	No	No
10:00 AM	343	24	56	No	No	No	No
11:00 AM	349	38	44	No	No	No	No
12:00 PM	443	28	52	No	No	No	No
1:00 PM	418	35	54	No	No	No	No
2:00 PM	542	38	95	No	No	No	No
3:00 PM	622	31	90	No	No	No	No
4:00 PM	585	35	100	No	No	No	No
5:00 PM	554	44	88	No	No	No	No
6:00 PM	354	36	81	No	No	No	No
Required Volumes	**Two Lane Major Street**			**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	Two Lane Minor Street			**150**	**75**		
Overall Warrant Met?				**No**	**No**	**No**	**No**

[1] Volumes on Washington Avenue and Linderman Avenue as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the Washington Avenue/Linderman Avenue intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on Washington Avenue[1]	Existing Pedestrian Volume Crossing Washington Avenue[1]	Signal Warrant #4 Met?
7:00 AM	456	0	No
8:00 AM	487	2	No
9:00 AM	392	7	No
10:00 AM	343	0	No
11:00 AM	349	5	No
12:00 PM	443	0	No
1:00 PM	418	6	No
2:00 PM	542	5	No
3:00 PM	622	15	No
4:00 PM	585	4	No
5:00 PM	554	2	No
6:00 PM	354	6	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on Washington Avenue and pedestrian volumes crossing Washington Avenue as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell well short of the minimum 107 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the *George Washington Elementary School* is located approximately 800-feet southeast of the intersection on Washington Avenue; however, the school crossing warrant is not met since adequate gaps in vehicle traffic flow are provided on Washington Avenue based on a review of the turning movement count data and the SimTraffic simulation.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

Washington Avenue/ Linderman Avenue Intersection	Collision Severity				Collision Type						Signal Warrant #7 Met?
	Non-Reportable	Property Damage	Injury	Fatal	Overtaking	Right Angle	Rear-End	Fixed Object	Left-Turn	Total	
Jun 1, 2015 to May 31, 2016	0	0	0	0	0	0	0	0	0	**0**	No
Jun 1, 2016 to May 31, 2017	1	0	1	0	0	1	0	0	1	**2**	No
Jun 1, 2017 to May 31, 2018	0	4	0	0	1	1	1	1	0	**4**	No
Required Volumes	**Two-Lane Major Street**										**See Table 4C-1**
	Two-Lane Minor Street										
Overall Warrant Met?											**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on Washington Avenue is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the Washington Avenue/Linderman Avenue intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control (existing conditions) – A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the eastbound and westbound Linderman Avenue approaches.
- All-Way Stop Control – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Attachment L contains further detailed descriptions

of LOS criteria for signalized and unsignalized intersections and copies of the detailed level of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Washington Avenue/Linderman Avenue					
Existing	Linderman Avenue EB	LTR	S	B (14.9)	B (14.8)
	Linderman Avenue WB	LTR		B (15.4)	B (15.5)
	Washington Avenue NB	LTR		B (10.6)	B (11.1)
	Washington Avenue SB	LTR		B (11.9)	B (11.5)
		Overall		B (12.0)	B (12.0)
Alternatives	Washington Avenue NB	L	TW	A (0.4)	A (0.5)
	Washington Avenue SB	L		A (0.4)	A (0.4)
	Linderman Avenue EB	LTR		C (15.1)	C (17.0)
	Linderman Avenue WB	LTR		B (13.2)	C (15.7)
	Linderman Avenue EB	LTR	AW	A (8.9)	A (9.1)
	Linderman Avenue WB	LTR		A (8.7)	A (9.2)
	Washington Avenue NB	LTR		B (10.1)	B (10.8)
	Washington Avenue SB	LTR		B (11.3)	B (11.3)
		Overall		B (10.4)	B (10.7)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the Washington Avenue/Linderman Avenue intersection indicates that all three traffic control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS C conditions or better on all approaches).

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal (Existing)	Two-Way Stop	All-Way Stop	Signal (Existing)	Two-Way Stop	All-Way Stop
Stops (#)	359	169	631	438	203	752
Fuel Consumed (gal)	9	7	10	11	8	13
CO Emissions (kg)	0.64	0.49	0.73	0.77	0.59	0.88
NOx Emissions (kg)	0.12	0.09	0.14	0.15	0.11	0.17
VOC Emissions (kg)	0.15	0.11	0.17	0.18	0.14	0.20

The analysis shows the following:

- The existing traffic signal and the two-way stop alternative are comparable in terms of emissions and fuel consumption; however, the all-way stop alternative increases the number of vehicle stops which creates a higher environmental/emission impacts associated with idling/braking/accelerating at the intersection.
- The two-way stop alternative has the lowest environmental/emissions impacts compared to the remaining two intersection control options.
- All traffic control alternatives are considered feasible.

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the Washington Avenue/Linderman Avenue intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that Washington Avenue would be the major street and a stop sign would be installed on the Linderman Avenue approaches. The results of the sight distance evaluation are summarized in Table 8.

Table 8 – Sight Distance Evaluation (feet)

Washington Avenue/ Linderman Avenue		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from Linderman Ave (D_L)	Crossing Maneuver from Linderman Avenue		Left Turn from Linderman Avenue		Left Turn from Washington Ave (D_S)	SSD_{NB}	SSD_{SB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
Washington Ave/ Linderman Ave **East Leg**	Available	155	155	>400	155	>400	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175
Washington Ave/ Linderman Ave **West Leg**	Available	230	230	225	230	225	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175

1. Intersection sight distance is measured at 14.5 feet back from Washington Avenue at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on Washington Avenue.
3. Sight distance measurements are compared to AASHTO recommended distances for a 30-mph operating speed on Washington Avenue.

The sight distance analysis on Washington Avenue shows that the available stopping sight distance and the available intersection sight distance looking straight to make left turns from Washington Avenue on to both legs of Linderman Avenue exceed AASHTO guidelines for the 30-mph operating speed. The analysis also shows that the sight distance looking left from the east leg of Linderman Avenue does not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left or right turn from Linderman Avenue or to cross Washington Avenue due to a row of hedges. In addition, the analysis shows that the sight distances looking left and right from the west leg of Linderman Avenue do not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left or right turn from Linderman Avenue or to cross Washington Avenue due to vegetation and a fence. The available sight lines looking left and right from the east and west legs of Linderman Avenue are illustrated below in Photographs 1 through 4.

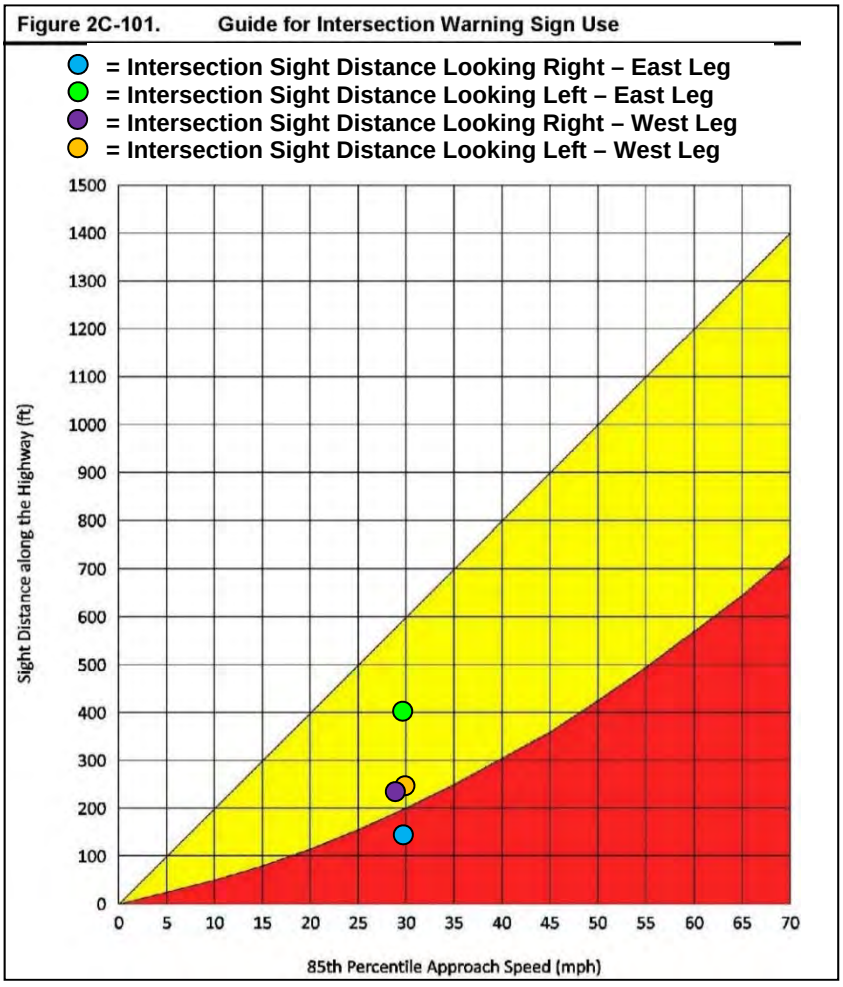
Photograph 1 – Sight distance looking left (D_L) from the east leg of Linderman Avenue

Photograph 2 – Sight distance looking right (D_R) from the east leg of Linderman Avenue

Photograph 3 – Sight distance looking left (D_L) from the west leg of Linderman Avenue

Photograph 4 – Sight distance looking right (D_R) from the west leg of Linderman Avenue

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of "Intersection Warning" signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking left from the east leg of Linderman Avenue is critically limited due to the row of hedges. At a minimum, an "Intersection Warning" sign is recommended if the two-way stop control condition were implemented. It is noted that the available sight distance could be mitigated if on-street parking was restricted near the intersection; however, it is anticipated that the City of Kingston would not consider limiting on-street parking in the vicinity of the intersection.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 9 summarizes which of the criteria are met for the Washington Avenue/Linderman Avenue intersection.

Table 9 – All-Way Stop Criteria

Washington Avenue/ Linderman Avenue	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	Yes

Table 10 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the Washington Avenue/Linderman Avenue intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the Washington Avenue/Linderman Avenue intersection should be removed and replaced with all-way stop control due to limited sight lines. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the eastbound and westbound Linderman Avenue approaches and the northbound and southbound Washington Avenue approaches. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. Stop ahead signs (W3-1) with flags should be placed on each approach. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD. On-street parking should be set back for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

R1-1

R1-3P


W3-1

Attachment B
Washington Avenue/Pearl Street Assessment

Traffic Signal Removal Assessment
City of Kingston, New York

Washington Avenue/Pearl Street Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the Washington Avenue/Pearl Street intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum traffic and safety warrants to justify their continued operation.

Roadways Serving the Study Area

Washington Avenue is classified as an urban minor arterial and provides north-south travel from I-587 to Petit Avenue. Washington Avenue is a 28 foot wide roadway that allows two-way traffic and on-street parking on the west side of the road. The city speed limit is 30 mph and land uses along Washington Avenue near Pearl Street generally include residential land uses.

Pearl Street is classified as an urban major collector and provides east-west travel from Ringtop Road to Clinton Avenue. Pearl Street is a 28 to 30 foot wide roadway that allows two-way traffic and on-street parking on the south side of the road near the Washington Avenue intersection. The city speed limit is 30 mph and land uses along Pearl Street near Washington Avenue generally include residential land uses.

Study Area Intersection

The Washington Avenue/Pearl Street intersection is a four-leg intersection controlled by a pre-timed traffic signal. Each approach provides a single lane for shared travel movements on all approaches.

Pedestrian/Bicycle Accommodations

Sidewalks exist on both sides of Washington Avenue and Pearl Street. There are marked crosswalks on all approaches of the study area intersection. Table 1 summarizes the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

Washington Avenue/ Pearl Street Intersection	Washington Ave. NB Approach		Washington Ave. SB Approach		Pearl Street EB Approach		Pearl Street WB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	0	0	2	0	1	0	3	0	6	0
8:00 to 9:00 a.m.	0	0	2	0	1	0	2	0	5	0
9:00 to 10:00 a.m.	2	0	3	1	1	0	6	0	12	1
10:00 to 11:00 a.m.	5	0	2	0	4	0	4	0	15	0
11:00 a.m. to 12:00 p.m.	3	0	4	1	2	1	6	0	15	1
12:00 to 1:00 p.m.	1	0	5	0	0	0	4	0	10	0
1:00 to 2:00 p.m.	9	0	9	0	5	0	7	0	30	0
2:00 to 3:00 p.m.	2	0	2	0	1	0	7	1	12	0
3:00 to 4:00 p.m.	0	0	2	0	9	0	11	0	22	0
4:00 to 5:00 p.m.	2	0	0	0	1	0	1	0	4	0
5:00 to 6:00 p.m.	6	0	6	1	2	0	1	1	15	1
6:00 to 7:00 p.m.	8	0	2	0	3	0	2	0	15	0
Total	38	0	39	3	30	1	54	2	161	3

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches in an urban setting is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type											Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total	
Washington Avenue/Pearl Street	1	1	0	0	0	0	1	1	0	0	0	0	0	0	**2**	**0.17**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were two total accidents at the Washington Avenue/Pearl Street intersection during the three year period, which results in an accident rate lower than the average accident rate when compared to similar intersections. Of the two accidents, one resulted in property damage only while the other was a non-reportable accident. Non reportable accidents are collisions that result in damage less than $1,000. There were no fatal accidents and no pedestrian related collisions. The rear-end accident reported at this intersection was attributed to driver inattention by a motorist traveling in the southbound direction while the overtaking accident was the result of improper lane usage while the vehicles were traveling in the westbound direction. There was no predominant accident type at the study area intersection. An accident summary (TE-213 equivalent) at the Washington Avenue/Pearl Street intersection is included under Attachment J.

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table 3 ummarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A “Yes” under the “Signal Warrants Met?” column indicates that the criteria are satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment K.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]			Signal Warrants Met?			
	Washington Ave NB/SB	Pearl St		#1		#2	#3
		EB	WB	Cond. A	Cond. B		
7:00 AM	517	130	43	No	No	No	No
8:00 AM	596	155	77	Yes	No	No	No
9:00 AM	505	74	89	No	No	No	No
10:00 AM	445	89	103	No	No	No	No
11:00 AM	442	51	146	No	No	No	No
12:00 PM	520	74	128	No	No	No	No
1:00 PM	490	93	106	No	No	No	No
2:00 PM	626	89	128	No	No	No	No
3:00 PM	705	100	140	No	No	No	No
4:00 PM	658	90	155	Yes	No	No	No
5:00 PM	671	94	164	Yes	No	No	No
6:00 PM	394	72	129	No	No	No	No
Required Volumes	**Two Lane Major Street**			**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	Two Lane Minor Street			**150**	**75**		
Overall Warrant Met?				**No**	**No**	**No**	**No**

[1] Volumes on Washington Avenue and Pearl Street as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the Washington Avenue/Pearl Street intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on Washington Avenue[1]	Existing Pedestrian Volume Crossing Washington Avenue[1]	Signal Warrant #4 Met?
7:00 AM	517	2	No
8:00 AM	596	2	No
9:00 AM	505	5	No
10:00 AM	445	7	No
11:00 AM	442	7	No
12:00 PM	520	6	No
1:00 PM	490	18	No
2:00 PM	626	4	No
3:00 PM	705	2	No
4:00 PM	658	2	No
5:00 PM	671	12	No
6:00 PM	394	10	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on Washington Avenue and pedestrian volumes crossing Washington Avenue as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell well short of the minimum 107 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the *St. Joseph's School* is located approximately 700-feet northeast of the intersection on Pearl Street; however, the school crossing warrant is not met since adequate gaps in vehicle traffic flow are provided on Washington Avenue based on a review of the turning movement count data and the SimTraffic simulation.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

Washington Avenue/ Pearl Street Intersection	Collision Severity				Collision Type						Signal Warrant #7 Met?
	Non-Reportable	Property Damage	Injury	Fatal	Overtaking	Right Angle	Rear-End	Fixed Object	Left-Turn	Total	
Jun 1, 2015 to May 31, 2016	1	1	0	0	1	0	1	0	0	**2**	No
Jun 1, 2016 to May 31, 2017	0	0	0	0	0	0	0	0	0	**0**	No
Jun 1, 2017 to May 31, 2018	0	0	0	0	0	0	0	0	0	**0**	No
Required Volumes	**Two-Lane Major Street**										**See Table 4C-1**
	Two-Lane Minor Street										
Overall Warrant Met?											**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on Washington Avenue is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the Washington Avenue/Pearl Street intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control (existing conditions) – A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the eastbound and westbound Pearl Street approaches.
- All-Way Stop Control – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Attachment L contains further detailed descriptions of LOS criteria for signalized and unsignalized intersections and copies of the detailed level of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Washington Avenue/Pearl Street					
Existing	Pearl Street EB	LTR	S	C (24.3)	C (22.6)
	Pearl Street WB	LTR		C (22.5)	C (25.5)
	Washington Avenue NB	LTR		B (11.3)	B (12.0)
	Washington Avenue SB	LTR		B (12.0)	B (12.7)
		Overall		B (14.9)	B (15.6)
Alternatives	Washington Avenue NB	L	TW	A (7.9)	A (8.1)
	Washington Avenue SB	L		A (8.0)	A (8.2)
	Pearl Street EB	LTR		C (23.4)	C (24.6)
	Pearl Street WB	LTR		C (16.6)	E (36.8)
	Pearl Street EB	LTR	AW	B (10.7)	B (11.2)
	Pearl Street WB	LTR		A (9.7)	B (12.8)
	Washington Avenue NB	LTR		B (12.2)	C (17.8)
	Washington Avenue SB	LTR		B (13.5)	C (19.7)
		Overall		B (12.2)	C (17.1)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the Washington Avenue/Pearl Street intersection indicates that the traffic signal control and all-way stop control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS C conditions or better on all approaches); however, the westbound Pearl Street approach will operate at LOS E during the PM peak hour under two-way stop control.

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal (Existing)	Two-Way Stop	All-Way Stop	Signal (Existing)	Two-Way Stop	All-Way Stop
Stops (#)	476	354	829	601	399	989
Fuel Consumed (gal)	10	8	12	13	11	15
CO Emissions (kg)	0.71	0.57	0.82	0.90	0.74	1.08
NOx Emissions (kg)	0.14	0.11	0.16	0.18	0.14	0.21
VOC Emissions (kg)	0.16	0.13	0.19	0.21	0.17	0.25

The analysis shows the following:

- The existing traffic signal and the two-way stop alternative are comparable in terms of emissions and fuel consumption; however, the all-way stop alternative increases the number of vehicle stops which creates a higher environmental/emission impacts associated with idling/braking/accelerating at the intersection.
- The two-way stop alternative has the lowest environmental/emissions impacts compared to the remaining two intersection control options.
- All traffic control alternatives are considered feasible.

Traffic Operations – Sensitivity Analysis

A review of the *Kingston Downtown Revitalization Initiative* (Kingston DRI) indicates that a transportation plan has been recommended to improve accessibility and circulation in the Uptown Stockade area. In general, the proposed improvements would reverse street directions along Wall Street and Fair Street in addition to some secondary streets such as John Street and Main Street. This improvement would impact at least four of the eight study area intersections. A sensitivity analysis was conducted to determine if the preferred traffic control alternatives would change if the proposed traffic pattern change was implemented. The existing traffic volumes were redistributed based on a review of the proposed *Kingston DRI* plan and are shown on Figure 4 and Figure 5. A level of service sensitivity analysis was conducted at the Washington Avenue/Pearl Street intersection similar to the assessment provided in section 3.0. Table 8 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 8 – Level of Service Kingston DRI Sensitivity Analysis Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Washington Avenue/Pearl Street					
Existing	Pearl Street EB	LTR	S	C (23.8)	C (22.2)
	Pearl Street WB	LTR		C (25.3)	C (31.7)
	Washington Avenue NB	LTR		B (11.3)	B (12.0)
	Washington Avenue SB	LTR		B (11.8)	B (12.3)
		Overall		B (15.8)	B (18.1)
Alternatives	Washington Avenue NB	L	TW	A (7.8)	A (8.0)
	Washington Avenue SB	L		A (8.0)	A (8.2)
	Pearl Street EB	LTR		C (22.3)	C (23.5)
	Pearl Street WB	LTR		C (20.9)	F (90.7)
	Pearl Street EB	LTR	AW	B (10.8)	B (11.6)
	Pearl Street WB	LTR		B (11.1)	B (17.9)
	Washington Avenue NB	LTR		B (13.1)	C (21.1)
	Washington Avenue SB	LTR		B (14.2)	C (21.8)
		Overall		B (12.8)	C (19.8)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The sensitivity analysis indicates that the Washington Avenue/Pearl Street intersection will operate adequately during the AM and PM peak hours under traffic signal control and the all-way stop control options if the proposed improvement plan recommended in the *Kingston DRI* is implemented in the Uptown Stockade area (LOS C conditions or better on all approaches). The westbound Pearl Street approach will operate at LOS F during the PM peak hour under two-way stop control if the proposed changes are implemented.

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the Washington Avenue/Pearl Street intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that Washington Avenue would be the major street and a stop sign would be installed on the Pearl Street approaches. The results of the sight distance evaluation are summarized in Table 9.

Table 9 – Sight Distance Evaluation (feet)

Washington Avenue/ Pearl Street		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from Pearl St (D_L)	Crossing Maneuver from Pearl Street		Left Turn from Pearl Street		Left Turn from Washington Ave (D_S)	SSD_{NB}	SSD_{SB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
Washington Ave/ Pearl St **East Leg**	Available	215	215	225	215	225	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175
Washington Ave/ Pearl St **West Leg**	Available	175 [+335]	175 [+335]	155 (275)	175 [+335]	155 (275)	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175

1. Intersection sight distance is measured at 14.5 feet back from Washington Avenue at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on Washington Avenue.
3. Sight distance measurements are compared to AASHTO recommended distances for a 30-mph operating speed on Washington Avenue.
XX [YY] = Available Sight Distance Limited by On-Street Parking [Available Sight Distance without On-Street Parking]
XX (YY) = Available Sight Distance Limited by Vegetation (Available Sight Distance with Vegetation Cleared)

The sight distance analysis on Washington Avenue shows that the available stopping sight distance and the available intersection sight distance looking straight to make left turns from Washington Avenue on to both legs of Pearl Street exceed AASHTO guidelines for the 30-mph operating speed. The analysis also shows that the sight distance looking left or right from the east leg of Pearl Street does not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left or right turn from Pearl Street or to cross Washington Avenue due to vegetation. In addition, the analysis shows that the sight distances looking left and right from the west leg of Pearl Street do not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left or right turn from Pearl Street or to cross Washington Avenue due to on-street parking and trees. The sight distance looking left and right from the west leg of the intersection could be improved if on-street parking was restricted. The available sight lines looking left and right from the east and west legs of Pearl Street are illustrated below in Photographs 1 through 4.

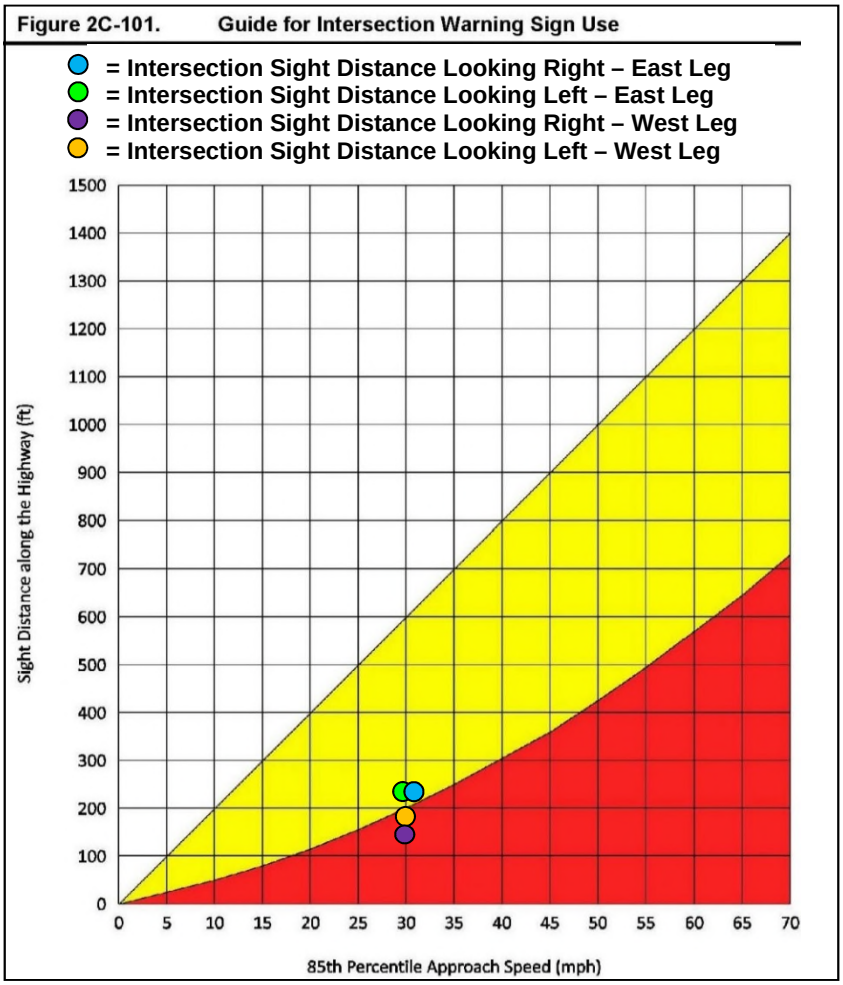
Photograph 1 – Sight distance looking left (D_L) from the east leg of Pearl Street

Photograph 2 – Sight distance looking right (D_R) from the east leg of Pearl Street

Photograph 3 – Sight distance looking left (D_L) from the west leg of Pearl Street

Photograph 4 – Sight distance looking right (D_R) from the west leg of Pearl Street

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of "Intersection Warning" signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking left and right from the west leg of Pearl Street is critically limited due to on-street parking. It is noted that the available sight distance on several approaches could be mitigated if on-street parking was restricted near the intersection; however, it is anticipated that the City of Kingston would not consider limiting on-street parking in the vicinity of the intersection.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 10 summarizes which of the criteria are met for the Washington Avenue/Pearl Street intersection.

Table 10 – All-Way Stop Criteria

Washington Avenue/ Pearl Street	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	Yes

Table 10 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the Washington Avenue/Pearl Street intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the Washington Avenue/Pearl Street intersection should be removed and replaced with all-way stop control due to limited sight lines and poor levels of service under two-way stop control. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the eastbound and westbound Pearl Street approaches and the northbound and southbound Washington Avenue approaches. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. Stop ahead signs (W3-1) with flags should be placed on each approach. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD. On-street parking should be set back for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

Attachment C
Washington Avenue/Main Street Assessment

Traffic Signal Removal Assessment
City of Kingston, New York

Washington Avenue/Main Street Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the Washington Avenue/Main Street intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum traffic and safety warrants to justify their continued operation.

Roadways Serving the Study Area

Washington Avenue is classified as an urban minor arterial and provides north-south travel from I-587 to Petit Avenue. Washington Avenue is a 28 to 30 foot wide roadway that allows two-way traffic. On-street parking is permitted on the west side of Washington Avenue; however, on-street parking is restricted on both sides of the street between the Main Street and Janet Street intersections. The city speed limit is 30 mph and land uses along Washington Avenue near Main Street generally include residential land uses.

Main Street is classified as an urban local road and provides east-west travel from Grandview Avenue to Clinton Avenue. Main Street is a 30 foot wide roadway that allows two-way traffic west of Washington Avenue and one-way traffic in the westbound direction east of Washington Avenue. On-street parking is permitted on both sides of the road west of Washington Avenue and on the south side of the road east of Washington Avenue. The city speed limit it is 30 mph and land uses along Main Street near Washington Avenue generally include residential land uses.

Study Area Intersection

The Washington Avenue/Main Street intersection is a four-leg intersection that provides a single travel lane for shared travel movements on all approaches. It is noted that Main Street is a one-way roadway in the westbound direction east of Washington Avenue. A pre-timed traffic signal is provided at this intersection; however, it is currently operating under all-red flash control.

Pedestrian/Bicycle Accommodations

Sidewalks exist on both sides of Washington Avenue and Main Street. There are marked crosswalks on all approaches of the study area intersection. Table 1 summarizes the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

Washington Avenue/ Main Street Intersection	Washington Ave. NB Approach		Washington Ave SB Approach		Main Street EB Approach		Main Street WB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	5	0	3	0	3	0	7	0	18	0
8:00 to 9:00 a.m.	4	0	11	0	1	0	12	2	28	2
9:00 to 10:00 a.m.	4	0	7	0	2	0	16	1	29	1
10:00 to 11:00 a.m.	2	0	5	0	3	0	5	0	15	0
11:00 a.m. to 12:00 p.m.	7	0	10	0	3	0	16	1	36	1
12:00 to 1:00 p.m.	8	1	18	0	5	0	5	0	36	1
1:00 to 2:00 p.m.	6	0	4	0	4	0	10	0	24	0
2:00 to 3:00 p.m.	4	0	4	1	4	0	15	0	27	1
3:00 to 4:00 p.m.	8	0	7	0	8	0	16	0	39	0
4:00 to 5:00 p.m.	6	0	7	0	5	0	9	0	27	0
5:00 to 6:00 p.m.	5	0	8	0	4	0	6	1	23	1
6:00 to 7:00 p.m.	8	0	5	0	6	0	10	1	29	1
Total	67	1	89	1	48	0	127	6	331	8

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches in an urban setting is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type											Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total	
Washington Avenue/Main Street	4	1	1	0	0	0	2	0	0	0	3	0	0	1	**6**	**0.52**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were six total accidents at the Washington Avenue/Main Street intersection during the three year period, which results in an accident rate similar to the average accident rate when compared to similar intersections. Of the six accidents, one resulted in an injury while the remaining five were either a property damage only accident or a non-reportable accident. Non-reportable accidents are collisions that result in damage less than $1,000. There were no fatal accidents and no pedestrian related collisions. The three collisions with parked cars occurred when mainline vehicles sideswiped vehicles legally parked on the street due to driver inattention. The two rear-end accidents were the result of driver inattention and following too closely for vehicles traveling northbound and southbound on Washington

Avenue. There was one accident with no detailed information provided other than an injury which was reported. The predominant accident type at the study area intersection is collisions with parked cars (three total); however, they are associated with driver inattention and not the result of geometric or operational issues with the intersection. An accident summary (TE-213 equivalent) at the Washington Avenue/Main Street intersection is included under Attachment M.

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table 3 summarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A "Yes" under the "Signal Warrants Met?" column indicates that the criteria are satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment N.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]			Signal Warrants Met?			
	Washington Ave NB/SB	Main Street		#1		#2	#3
		EB	WB	Cond. A	Cond. B		
7:00 AM	500	33	74	No	No	No	No
8:00 AM	578	40	73	No	No	No	No
9:00 AM	504	37	97	No	No	No	No
10:00 AM	485	33	103	No	No	No	No
11:00 AM	465	30	105	No	No	No	No
12:00 PM	518	37	124	No	No	No	No
1:00 PM	502	31	110	No	No	No	No
2:00 PM	631	32	149	No	No	No	No
3:00 PM	723	25	150	Yes	Yes	No	No
4:00 PM	668	33	184	Yes	Yes	No	No
5:00 PM	570	45	202	Yes	Yes	No	No
6:00 PM	396	37	113	No	No	No	No
Required Volumes	**Two Lane Major Street**			**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	Two Lane Minor Street			**150**	**75**		
Overall Warrant Met?				**No**	**No**	**No**	**No**

[1] Volumes on Washington Avenue and Main Street as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the Washington Avenue/Main Street intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on Washington Avenue[1]	Existing Pedestrian Volume Crossing Washington Avenue[1]	Signal Warrant #4 Met?
7:00 AM	500	8	No
8:00 AM	578	15	No
9:00 AM	504	11	No
10:00 AM	485	7	No
11:00 AM	465	17	No
12:00 PM	518	26	No
1:00 PM	502	10	No
2:00 PM	631	8	No
3:00 PM	723	15	No
4:00 PM	668	13	No
5:00 PM	570	13	No
6:00 PM	396	13	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on Washington Avenue and pedestrian volumes crossing Washington Avenue as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell well short of the minimum 107 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the *St. Joseph's School* is located approximately ¼ of a mile southeast of the intersection on Pearl Street; however, the school crossing warrant is not met since adequate gaps in vehicle traffic flow are provided on Washington Avenue based on a review of the turning movement count data and the SimTraffic simulation.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

Washington Avenue/ Main Street Intersection	Collision Severity				Collision Type				Signal Warrant #7 Met?
	Non-Reportable	Property Damage	Injury	Fatal	Parked Car	Rear-End	Unknown	Total	
Jun 1, 2015 to May 31, 2016	1	0	1	0	1	0	1	**2**	No
Jun 1, 2016 to May 31, 2017	2	0	0	0	0	2	0	**2**	No
Jun 1, 2017 to May 31, 2018	1	1	0	0	2	0	0	**2**	No
Required Volumes	**Two-Lane Major Street**								**See Table 4C-1**
	Two-Lane Minor Street								
Overall Warrant Met?									**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on Washington Avenue is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the Washington Avenue/Main Street intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control – A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the eastbound and westbound Main Street approaches.
- All-Way Stop Control (existing conditions since the traffic signal is operating under all-red flash control) – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F

generally represents conditions with very long delays. Attachment O contains further detailed descriptions of LOS criteria for signalized and unsignalized intersections and copies of the detailed level of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Washington Avenue/Main Street					
Existing	Main Street EB	LR	AW	A (8.5)	A (9.9)
	Main Street WB	LTR		A (9.1)	B (12.8)
	Washington Avenue NB	LT		B (11.4)	C (17.8)
	Washington Avenue SB	TR		B (10.8)	C (15.9)
		Overall		B (10.7)	C (15.7)
Alternatives	Washington Avenue NB	L	TW	A (8.1)	A (8.2)
	Main Street EB	LR		B (12.2)	C (18.5)
	Main Street WB	LTR		B (14.2)	C (31.8)
	Main Street EB	LR	S	B (12.8)	B (12.8)
	Main Street WB	LTR		B (13.2)	B (15.4)
	Washington Avenue NB	LT		B (12.7)	B (14.3)
	Washington Avenue SB	TR		B (12.6)	B (13.5)
		Overall		B (12.7)	B (14.2)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the Washington Avenue/Main Street intersection indicates that all three traffic control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS C conditions or better on all approaches).

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal	Two-Way Stop	All-Way Stop (Existing)	Signal	Two-Way Stop	All-Way Stop (Existing)
Stops (#)	409	148	710	595	315	968
Fuel Consumed (gal)	7	4	8	10	7	12
CO Emissions (kg)	0.46	0.26	0.56	0.67	0.49	0.85
NOx Emissions (kg)	0.09	0.05	0.11	0.13	0.10	0.17
VOC Emissions (kg)	0.11	0.06	0.13	0.16	0.11	0.20

The analysis shows the following:

- The traffic signal and the existing all-way stop alternatives are comparable in terms of emissions and fuel consumption.
- The two-way stop alternative has the lowest environmental/emissions impacts compared to the remaining two intersection control options.
- All traffic control alternatives are considered feasible.

Traffic Operations – Sensitivity Analysis

A review of the *Kingston Downtown Revitalization Initiative* (Kingston DRI) indicates that a transportation plan has been recommended to improve accessibility and circulation in the Uptown Stockade area. In general, the proposed improvements would reverse street directions along Wall Street and Fair Street in addition to some secondary streets such as John Street and Main Street. This improvement would impact at least four of the eight study area intersections. A sensitivity analysis was conducted to determine if the preferred traffic control alternatives would change if the proposed traffic pattern change was implemented. The existing traffic volumes were redistributed based on a review of the proposed *Kingston DRI* plan and are shown on Figure 4 and Figure 5. A level of service sensitivity analysis was conducted at the Washington Avenue/Main Street intersection similar to the assessment provided in section 3.0. Table 8 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 8 – Level of Service Kingston DRI Sensitivity Analysis Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Washington Avenue/Main Street					
Existing	Main Street EB	LTR	AW	A (8.7)	A (9.2)
	Washington Avenue NB	LTR		B (11.6)	B (14.1)
	Washington Avenue SB	LTR		B (10.4)	B (12.0)
		Overall		B (10.8)	B (12.9)
Alternatives	Washington Avenue NB	L	TW	A (8.1)	A (8.2)
	Washington Avenue SB	L		A (0.0)	A (0.0)
	Main Street EB	LTR		B (11.7)	B (13.6)
	Main Street EB	LTR	S	B (13.0)	B (13.0)
	Washington Avenue NB	LTR		B (13.3)	B (15.1)
	Washington Avenue SB	LTR		B (12.6)	B (13.5)
		Overall		B 13.0)	B (14.3)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The sensitivity analysis indicates that the Washington Avenue/Main Street intersection will operate adequately during the AM and PM peak hours under all traffic control options if the proposed improvement plan recommended in the *Kingston DRI* is implemented in the Uptown Stockade area (LOS B conditions or better on all approaches).

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the Washington Avenue/Main Street intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that Washington Avenue would be the major street and a stop sign would be installed on the Main Street approaches. The results of the sight distance evaluation are summarized in Table 9.

Table 9 – Sight Distance Evaluation (feet)

Washington Avenue/ Main Street		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from Main Street (D_L)	Crossing Maneuver from Main Street		Left Turn from Main Street		Left Turn from Washington Ave (D_S)	SSD_{NB}	SSD_{SB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
Washington Ave/ Main Street **East Leg**	Available	+335	+335	140	+335	140	NA	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175
Washington Ave/ Main Street **West Leg**	Available	70 [+335]	70 [+335]	260 [+335]	70 [+335]	260 [+335]	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175

1. Intersection sight distance is measured at 14.5 feet back from Washington Avenue at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on Washington Avenue.
3. Sight distance measurements are compared to AASHTO recommended distances for a 30-mph operating speed on Washington Avenue.
XX [YY] = Available Sight Distance Limited by On-Street Parking [Available Sight Distance without On-Street Parking]

The sight distance analysis on Washington Avenue shows that the available stopping sight distance and the available intersection sight distance looking straight to make left turns from Washington Avenue on to the west leg of Main Street exceed AASHTO guidelines for the 30-mph operating speed. The analysis also shows that the sight distance looking left and right from the west leg of Main Street do not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left or right turn from Main Street due to cars parked on the street at the corner of the intersection and telephone poles. In addition, the analysis shows that the sight distance looking right from the east leg of Main Street does not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left turn from Main Street or to cross Washington Avenue due to cars, telephone poles, and a fence on the northeast corner of the intersection. The available sight lines looking left and right from the east and west legs of Main Street are illustrated below in Photographs 1 through 4

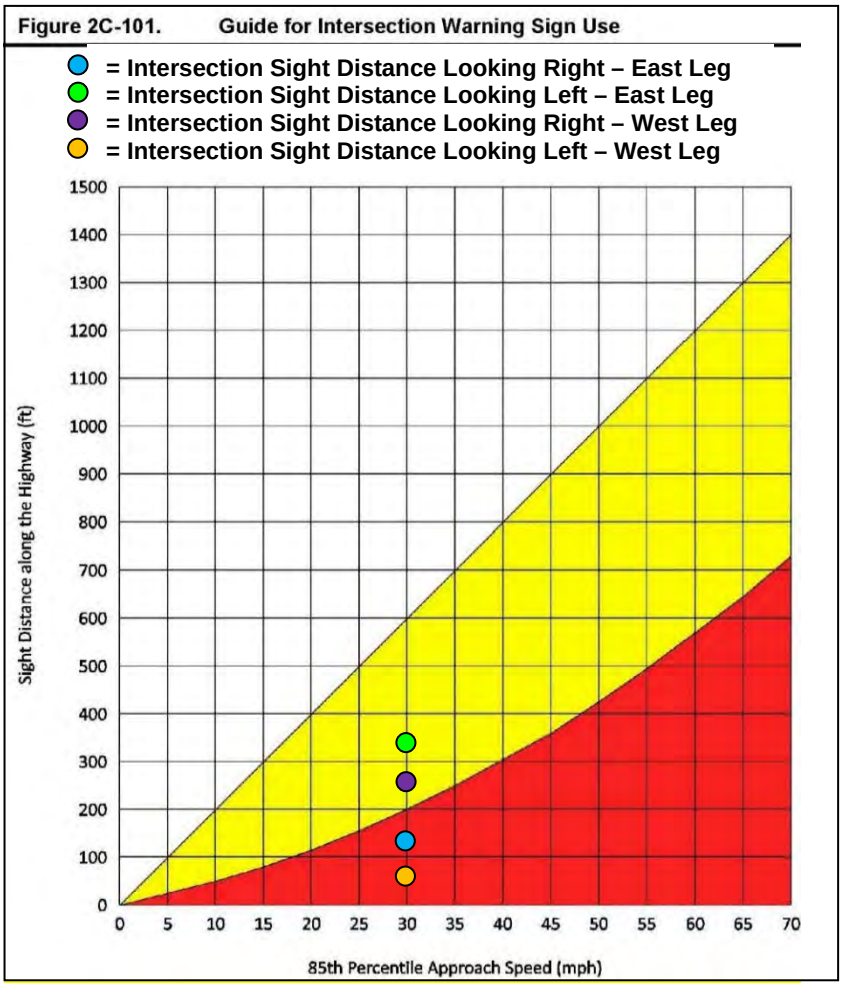
Photograph 1 – Sight distance looking left (D_L) from the east leg of Main Street

Photograph 2 – Sight distance looking right (D_R) from the east leg of Main Street

Photograph 3 – Sight distance looking left (D_L) from the west leg of Main Street

Photograph 4 – Sight distance looking right (D_R) from the west leg of Main Street

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of "Intersection Warning" signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking left from the west leg of Main Street and looking right from the east leg of Main Street are critically limited due to on-street parking. At a minimum, an "Intersection Warning" sign is recommended if the two-way stop control condition were implemented. It is noted that the available sight distance on several approaches could be mitigated if on-street parking was restricted near the intersection; however, it is anticipated that the City of Kingston would not consider limiting on-street parking in the vicinity of the intersection.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 10 summarizes which of the criteria are met for the Washington Avenue/Main Street intersection.

Table 10 – All-Way Stop Criteria

Washington Avenue/ Main Street	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	Yes

Table 10 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the Washington Avenue/Main Street intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the Washington Avenue/Main Street intersection should be removed and replaced with all-way stop control due to limited sight lines. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the eastbound and westbound Main Street approaches and the northbound and southbound Washington Avenue approaches. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. Stop ahead signs (W3-1) with flags should be placed on each approach. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD. On-street parking should be set back for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

Attachment D
Pearl Street/Wall Street Assessment

Traffic Signal Removal Assessment
City of Kingston, New York

Pearl Street/Wall Street Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the Pearl Street/Wall Street intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum traffic and safety warrants to justify their continued operation.

Roadways Serving the Study Area

Pearl Street is classified as an urban major collector and provides east-west travel from Ringtop Road to Clinton Avenue. Pearl Street is a 34 foot wide roadway that allows two-way traffic and metered on-street parking on the south side of the road east of the Wall Street intersection. The city speed limit is 30 mph and land uses along Pearl Street near Wall Street include the *St. Jospeh's School*, *Fair Street Church*, and a mix of commercial and residential land.

Wall Street is classified as an urban major collector and provides northbound travel from Henry Street to N. Front Street. Wall Street is a 26 foot wide roadway that allows one-way traffic in the northbound direction and metered on-street parking on the west side of the road north of the Pearl Street intersection. The city speed limit is 30 mph and land uses along Wall Street near Pearl Street include the *St. Jospeh's School*, *St. Joseph's Church*, and a mix of commercial and residential land.

Study Area Intersection

The Pearl Street/Wall Street intersection is a four-leg intersection controlled by a pre-timed traffic signal. Wall Street is a one-way road in the northbound direction. Each approach provides a single lane for shared travel movements on all approaches. Vehicles traveling westbound on Pearl Street and northbound on Wall Street are not allowed to make a right-turn on red.

Pedestrian/Bicycle Accommodations

Sidewalks exist on both sides of Wall Street and Pearl Street. There are marked crosswalks on all approaches of the study area intersection. Table 1 summarizes the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

Pearl Street/Wall Street Intersection	Pearl Street EB Approach		Pearl Street WB Approach		Wall Street NB Approach		Wall Street SB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	2	0	4	0	1	0	4	0	11	0
8:00 to 9:00 a.m.	4	0	9	0	3	0	7	0	23	0
9:00 to 10:00 a.m.	12	0	7	0	2	1	10	0	31	1
10:00 to 11:00 a.m.	15	0	10	0	4	0	5	1	34	1
11:00 a.m. to 12:00 p.m.	12	1	19	0	9	0	6	0	46	1
12:00 to 1:00 p.m.	10	0	6	0	5	0	14	0	35	0
1:00 to 2:00 p.m.	9	2	20	1	7	0	10	3	46	6
2:00 to 3:00 p.m.	11	0	13	0	10	0	10	1	44	1
3:00 to 4:00 p.m.	16	0	16	1	21	0	10	0	63	1
4:00 to 5:00 p.m.	25	1	9	0	4	0	3	0	41	1
5:00 to 6:00 p.m.	10	0	30	0	12	0	13	0	65	0
6:00 to 7:00 p.m.	2	0	3	1	4	0	4	0	13	1
Total	128	4	146	3	82	1	96	5	452	13

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches in an urban setting is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type											Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total	
Pearl Street/Wall Street	2	0	6	0	0	1	6	0	1	0	0	0	0	0	**8**	**1.00**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were eight total accidents at the Pearl Street/Wall Street intersection during the three year period, which results in an accident rate approximately two times the average accident rate when compared to similar intersections. Of the eight accidents, six resulted in injuries, while the remaining two were non-reportable accidents which are collisions that result in damage less than $1,000. There were no fatal accidents and no pedestrian related collisions. All six of the rear end accidents reported at this intersection were attributed to driver inattention. The right angle accident occurred when a driver disregarded the red light while traveling northbound on Wall Street and was struck by a vehicle on Pearl Street. Similarly, the left-turn accident occurred when a driver on Wall Street disregarded the red

light while making a northbound left turn and was struck by a vehicle on Pearl Street. The predominant accident type at the study area intersection is rear end collisions (six total); however, they are associated with driver error and not the result of geometric or operational issues with the intersection. An accident summary (TE-213 equivalent) at the Pearl Street/Wall Street intersection is included under Attachment M.

The removal of unwarranted traffic signals at intersections with high accident rates located in urban areas has been shown to decrease all types of accidents by 24 percent based on an assessment of 199 intersections, as noted in the *Desktop Reference for Crash Reduction Factors* published by the U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA).

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table 3 summarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A "Yes" under the "Signal Warrants Met?" column indicates that the criteria are satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment N.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]		Signal Warrants Met?			
	Pearl Street EB/WB	Wall Street NB	#1		#2	#3
			Cond. A	Cond. B		
7:00 AM	174	101	No	No	No	No
8:00 AM	316	194	No	No	No	No
9:00 AM	336	142	No	No	No	No
10:00 AM	314	118	No	No	No	No
11:00 AM	364	145	No	No	No	No
12:00 PM	327	167	No	No	No	No
1:00 PM	325	134	No	No	No	No
2:00 PM	347	184	No	No	No	No
3:00 PM	366	241	No	No	No	No
4:00 PM	331	183	No	No	No	No
5:00 PM	381	170	No	No	No	No
6:00 PM	238	102	No	No	No	No
Required Volumes	**Two Lane Major Street**		**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	One Lane Minor Street		**150**	**75**		
Overall Warrant Met?			**No**	**No**	**No**	**No**

[1] Volumes on Pearl Street and Wall Street as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the Pearl Street/Wall Street intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on Pearl Street[1]	Existing Pedestrian Volume Crossing Pearl Street[1]	Signal Warrant #4 Met?
7:00 AM	174	6	No
8:00 AM	316	13	No
9:00 AM	336	19	No
10:00 AM	314	25	No
11:00 AM	364	31	No
12:00 PM	327	16	No
1:00 PM	325	29	No
2:00 PM	347	24	No
3:00 PM	366	32	No
4:00 PM	331	34	No
5:00 PM	381	40	No
6:00 PM	238	5	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on Pearl Street and pedestrian volumes crossing Pearl Street as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell well short of the minimum 107 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the *St. Joseph's School* is located on the southwest corner of the intersection; however, the school crossing warrant is not met since adequate gaps in vehicle traffic flow are provided on Pearl Street based on a review of the turning movement count data and the SimTraffic simulation.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

Pearl Street/Wall Street Intersection	Collision Severity			Collision Type				Signal Warrant #7 Met?
	Non-Reportable	Injury	Fatal	Right Angle	Rear-End	Left-Turn	Total	
Jun 1, 2015 to May 31, 2016	1	2	0	1	2	0	**3**	No
Jun 1, 2016 to May 31, 2017	0	2	0		1	1	**2**	No
Jun 1, 2017 to May 31, 2018	1	2	0	0	3	0	**3**	No
Required Volumes	**Two-Lane Major Street**							**See Table 4C-1**
	Two-Lane Minor Street							
Overall Warrant Met?								**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on Pearl Street is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the Pearl Street/Wall Street intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control (existing conditions) – A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the northbound Wall Street approach.
- All-Way Stop Control – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Attachment O contains further detailed

descriptions of LOS criteria for signalized and unsignalized intersections and copies of the detailed level of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Pearl Street/Wall Street					
Existing	Pearl Street EB	LT	S	B (16.0)	B (15.7)
	Pearl Street WB	TR		B (15.1)	B (15.8)
	Wall Street NB	LTR		B (11.4)	B (12.3)
	Overall			B (14.3)	B (14.4)
Alternatives	Pearl Street EB	L	TW	A (7.7)	A (7.8)
	Wall Street NB	LTR		B (12.6)	C (15.4)
	Pearl Street EB	LT	AW	B (10.5)	B (10.5)
	Pearl Street WB	TR		A (8.8)	A (9.5)
	Wall Street NB	LTR		A (9.9)	B (11.2)
	Overall			A (9.9)	B (10.5)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the Pearl Street/Wall Street intersection indicates that all three traffic control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS C conditions or better on all approaches).

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal (Existing)	Two-Way Stop	All-Way Stop	Signal (Existing)	Two-Way Stop	All-Way Stop
Stops (#)	257	253	527	296	312	607
Fuel Consumed (gal)	5	4	6	5	5	7
CO Emissions (kg)	0.35	0.31	0.44	0.38	0.38	0.50
NOx Emissions (kg)	0.07	0.06	0.09	0.07	0.07	0.10
VOC Emissions (kg)	0.08	0.07	0.10	0.09	0.09	0.12

The analysis shows the following:

- The existing traffic signal and the two-way stop alternative are comparable in terms of emissions and fuel consumption; however, the all-way stop alternative increases the number of vehicle stops which creates a higher environmental/emission impacts associated with idling/braking/accelerating at the intersection.
- The two-way stop alternative has the lowest environmental/emissions impacts compared to the remaining two intersection control options.
- All traffic control alternatives are considered feasible.

Traffic Operations – Sensitivity Analysis

A review of the *Kingston Downtown Revitalization Initiative* (Kingston DRI) indicates that a transportation plan has been recommended to improve accessibility and circulation in the Uptown Stockade area. In general, the proposed improvements would reverse street directions along Wall Street and Fair Street in addition to some secondary streets such as John Street and Main Street. This improvement would impact at least four of the eight study area intersections. A sensitivity analysis was conducted to determine if the preferred traffic control alternatives would change if the proposed traffic pattern change was implemented. The existing traffic volumes were redistributed based on a review of the proposed *Kingston DRI* plan and are shown on Figure 4 and Figure 5. A level of service sensitivity analysis was conducted at the Pearl Street/Wall Street intersection similar to the assessment provided in section 3.0. Table 8 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 8 – Level of Service Kingston DRI Sensitivity Analysis Summary

Intersection				Control	Existing 2019	
					AM Peak Hour	PM Peak Hour
Pearl Street/Wall Street						
Existing		Pearl Street EB	TR	S	B (16.1)	B (15.8)
		Pearl Street WB	LT		A (5.9)	A (6.7)
		Wall Street SB	LTR		B (11.5)	B (13.2)
			Overall		B (11.6)	B (11.6)
Alternatives		Pearl Street WB	L	TW	A (7.9)	A (7.8)
		Wall Street SB	LTR		C (16.1)	D (28.7)
		Pearl Street EB	TR	AW	B (10.5)	B (11.6)
		Pearl Street WB	LT		A (10.0)	B (13.0)
		Wall Street SB	LTR		B (10.5)	B (14.7)
			Overall		B (10.3)	B (13.3)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The sensitivity analysis indicates that the Pearl Street/Wall Street intersection will operate adequately during the AM and PM peak hours under all three traffic control options if the proposed improvement plan recommended in the *Kingston DRI* is implemented in the Uptown Stockade area (LOS D conditions or better on all approaches).

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the Pearl Street/Wall Street intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that Pearl Street would be the major street and a stop sign would be installed on the Wall Street approach. The results of the sight distance evaluation are summarized in Table 9.

Table 9 – Sight Distance Evaluation (feet)

Pearl Street/Wall Street		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from Wall Street (D_L)	Crossing Maneuver from Wall Street		Left Turn from Wall Street		Left Turn from Pearl Street (D_S)	SSD_{EB}	SSD_{WB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
Pearl St/ Wall St	Available	85 [250]	85 [250]	50 [135]	85 [250]	50 [135]	>300	>300	>400
	Recommended[3]	290	290	290	335	335	245	175	175

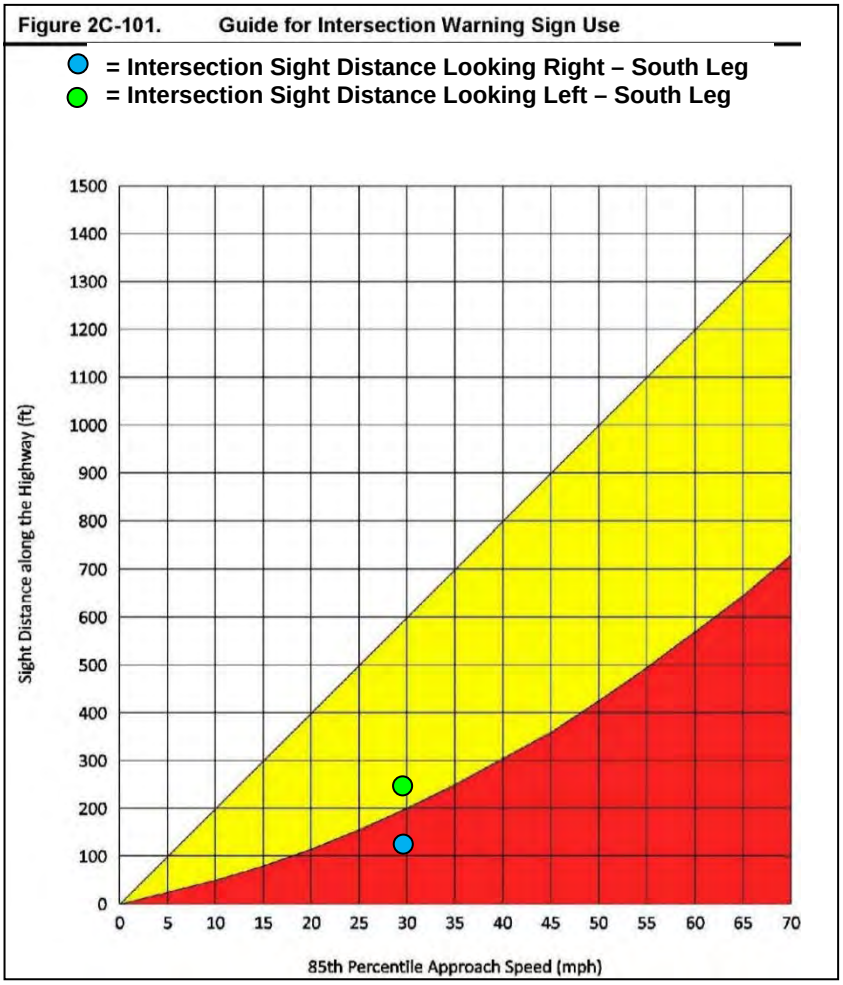
1. Intersection sight distance is measured at 14.5 feet back from Pearl Street at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on Pearl Street.
3. Sight distance measurements are compared to AASHTO recommended distances for a 30-mph operating speed on Pearl Street.
XX [XX] = Available sight distance [Available sight distance without on-street parking]

The sight distance analysis on Pearl Street shows that the available stopping sight distance and the available intersection sight distance looking straight to make left turns from Pearl Street exceed AASHTO guidelines for the 30-mph operating speed. The analysis also shows that the sight distance looking left and right from the south leg of Wall Street do not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left or right turn from Wall Street or to cross Pearl Street if cars are parked on the street. If parked cars are not present and do not impede sight lines, the available sight distance looking left improves from approximately 85 to 250 feet; however, the sight distance looking right would only improve from approximately 50 to 135 feet due to obstructed sight lines associated with a building on the corner. The available sight lines looking left and right from the south leg of Wall Street are illustrated below in Photographs 1 and 2.

Photograph 1 – Sight distance looking left (D_L) from the south leg of Wall Street

Photograph 2 – Sight distance looking right (D_R) from the south leg of Wall Street

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of “Intersection Warning” signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking right from the south leg of Wall Street is critically limited due to the building on the corner. At a minimum, an “Intersection Warning” sign is recommended if the two-way stop control condition were implemented.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 10 summarizes which of the criteria are met for the Pearl Street/Wall Street intersection.

Table 10 – All-Way Stop Criteria

Pearl Street/Wall Street	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	Yes

Table 10 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the Pearl Street/Wall Street intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the Pearl Street/Wall Street intersection should be removed and replaced with all-way stop control due to limited sight lines. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the northbound Wall Street approach and the eastbound and westbound Pearl Street approaches. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. Stop ahead signs (W3-1) with flags should be placed on each approach. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD. On-street parking should be set back for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

Attachment E
Pearl Street/Fair Street Assessment

Traffic Signal Removal Assessment
City of Kingston, New York

Fair Street/Pearl Street Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the Fair Street/Pearl Street intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum traffic and safety warrants to justify their continued operation.

Roadways Serving the Study Area

Fair Street is classified as an urban major collector and provides provides southbound travel from Schwenk Drive to Greenkill Avenue. Fair Street is a 30 to 32 foot wide roadway that allows one-way traffic in the southbound direction. Metered parking is provided on the east side of the road north of Pearl Street and on both sides of the road south of Pearl Street. The city speed limit is 30 mph and land uses along Fair Street near Pearl Street include the *Ulster County Office Building,* the *James United Methodist Church,* the *Fair Street Church,* and commercial land uses.

Pearl Street is classified as an urban major collector and provides east-west travel from Ringtop Road to Clinton Avenue. Pearl Street is a 30 foot wide roadway that allows two-way traffic and metered on-street parking on the south side of the road. The city speed limit it is 30 mph and land uses along Pearl Street near Fair Street generally include commercial and some residential land uses and *St. Joseph's School*.

Study Area Intersection

The Fair Street/Pearl Street intersection is a four-leg intersection controlled by a pre-timed traffic signal control. Fair Street is a one-way road in the southbound direction. Each approach provides a single lane for shared travel movements on all approaches.

Pedestrian/Bicycle Accommodations

Sidewalks exist on both sides of Fair Street and Pearl Street. There are marked crosswalks on all approaches of the study area intersection. Table 1 summarizes the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

Fair Street/ Pearl Street Intersection	Fair Street NB Approach		Fair Street SB Approach		Pearl Street EB Approach		Pearl Street WB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	1	0	1	0	4	1	4	0	10	1
8:00 to 9:00 a.m.	3	0	3	0	6	0	11	0	23	0
9:00 to 10:00 a.m.	3	1	5	0	19	1	10	1	37	2
10:00 to 11:00 a.m.	12	0	9	0	27	0	20	0	68	0
11:00 a.m. to 12:00 p.m.	21	0	8	0	22	1	18	0	69	3
12:00 to 1:00 p.m.	5	0	17	0	23	0	29	0	74	0
1:00 to 2:00 p.m.	9	2	7	0	18	0	31	0	65	2
2:00 to 3:00 p.m.	5	0	12	0	20	1	28	2	65	2
3:00 to 4:00 p.m.	12	0	11	0	16	1	18	0	57	1
4:00 to 5:00 p.m.	8	0	2	0	17	0	20	0	47	0
5:00 to 6:00 p.m.	15	0	4	0	13	0	30	0	62	0
6:00 to 7:00 p.m.	3	0	2	0	9	0	13	0	27	0
Total	97	3	81	0	194	5	232	3	604	11

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches in an urban setting is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type											Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Right Turn	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total
Fair Street/Pearl Street	6	2	2	0	2	1	1	1	1	0	0	3	1	0	0	**10**	**1.31**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were 10 total accidents at the Fair Street/Pearl Street intersection during the three year period, which results in an accident rate over two times the average accident rate when compared to similar intersections. Of the 10 accidents, two resulted in an injury while the remaining eight were either a property damage only accident or a non-reportable accident. Non reportable accidents are collisions that result in damage less than $1,000. There were no fatal accidents. The three accidents involving parked cars reported at this intersection were attributed to glare and passing too closely while the two backing accidents were the result of driver inattention and backing unsafely. The left-turn accident was attributed to inadequate lane markings while the right-turn accident was the result of a disregard for the traffic control. The overtaking accident was the result of vehicles limited visibility while the rear-end collision was the result of following too closely. The pedestrian collision occurred when a eastbound vehicle on Pearl Street failed to yield the right-of-way to a pedestrian in the crosswalk when attempting to make a left turn onto Fair Street. The predominant accident type at the study area intersection are collisions with parked cars (three total) and backing (two total); however, they are associated with driver error and not the result of geometric or operational issues with the intersection. An accident summary (TE-213 equivalent) at the Fair Street/Pearl Street intersection is included under Attachment M.

The removal of unwarranted traffic signals at intersections with high accident rates located in urban areas has been shown to decrease all types of accidents by 24 percent based on an assessment of 199 intersections, as noted in the *Desktop Reference for Crash Reduction Factors* published by the U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA).

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table 3 summarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A "Yes" under the "Signal Warrants Met?" column indicates that the criteria are satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment N.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]		Signal Warrants Met?			
	Pearl St EB/WB	Fair St SB	#1		#2	#3
			Cond. A	Cond. B		
7:00 AM	153	84	No	No	No	No
8:00 AM	312	144	No	No	No	No
9:00 AM	314	184	No	No	No	No
10:00 AM	302	188	No	No	No	No
11:00 AM	359	218	No	No	No	No
12:00 PM	324	239	No	No	No	No
1:00 PM	320	244	No	No	No	No
2:00 PM	350	238	No	No	No	No
3:00 PM	345	243	No	No	No	No
4:00 PM	342	254	No	No	No	No
5:00 PM	354	267	No	No	No	No
6:00 PM	228	144	No	No	No	No
Required Volumes	**Two Lane Major Street**		**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	One Lane Minor Street		**150**	**75**		
Overall Warrant Met?			**No**	**No**	**No**	**No**

[1] Volumes on Fair Street and Pearl Street as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the Fair Street/Pearl Street intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on Pearl Street[1]	Existing Pedestrian Volume Crossing Pearl Street[1]	Signal Warrant #4 Met?
7:00 AM	153	8	No
8:00 AM	312	17	No
9:00 AM	314	29	No
10:00 AM	302	47	No
11:00 AM	359	40	No
12:00 PM	324	52	No
1:00 PM	320	49	No
2:00 PM	350	48	No
3:00 PM	345	34	No
4:00 PM	342	37	No
5:00 PM	354	43	No
6:00 PM	228	22	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on Pearl Street and pedestrian volumes crossing Pearl Street as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell well short of the minimum 107 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the *St. Joseph's School* is located approximately 500-feet west of the intersection on Pearl Street; however, the school crossing warrant is not met since adequate gaps in vehicle traffic flow are provided on Pearl Street based on a review of the turning movement count data and the SimTraffic simulation.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

Fair Street/Pearl Street Intersection	Collision Severity				Collision Type								Signal Warrant #7 Met?
	Non-Reportable	Property Damage	Injury	Fatal	Overtaking	Right Turn	Rear-End	Backing	Parked Car	Pedestrian	Left-Turn	Total	
Jun 1, 2015 to May 31, 2016	1	2	0	0	0	1	0	1	1	0	0	**3**	No
Jun 1, 2016 to May 31, 2017	1	0	1	0	0	0	1	1	0	0	0	**2**	No
Jun 1, 2017 to May 31, 2018	4	0	1	0	1	0	0	0	2	1	1	**5**	No
Required Volumes	**Two-Lane Major Street**												**See Table 4C-1**
	Two-Lane Minor Street												
Overall Warrant Met?													**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on Pearl Street is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the Fair Street/Pearl Street intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control (existing conditions) – A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the southbound Fair Street approach.
- All-Way Stop Control – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Attachment O contains further detailed

descriptions of LOS criteria for signalized and unsignalized intersections and copies of the detailed level of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Fair Street/Pearl Street					
Existing	Pearl Street EB	TR	S	B (12.4)	B (12.8)
	Pearl Street WB	LT		B (12.1)	B (12.6)
	Fair Street SB	LTR		B (16.5)	C (20.7)
	Overall			B (13.8)	B (16.4)
Alternatives	Fair Street SB	LTR	TW	B (13)	C (22.2)
	Pearl Street EB	TR		A (0)	A (0)
	Pearl Street WB	LR		A (7.7)	A (7.8)
	Pearl Street EB	TR	AW	A (9.1)	B (10.7)
	Pearl Street WB	LT		A (9)	B (10.8)
	Fair Street SB	LTR		A (9.6)	B (14)
	Overall			A (9.2)	B (12.2)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the Fair Street/Pearl Street intersection indicates that all three traffic control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS C conditions or better on all approaches).

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal (Existing)	Two-Way Stop	All-Way Stop	Signal (Existing)	Two-Way Stop	All-Way Stop
Stops (#)	269	205	499	390	329	642
Fuel Consumed (gal)	4	3	5	6	6	7
CO Emissions (kg)	0.29	0.22	0.36	0.41	0.42	0.48
NOx Emissions (kg)	0.06	0.04	0.07	0.08	0.08	0.09
VOC Emissions (kg)	0.07	0.05	0.08	0.10	0.10	0.11

The analysis shows the following:

- The existing traffic signal and the two-way stop alternative are comparable in terms of emissions and fuel consumption; however, the all-way stop alternative increases the number of vehicle stops which creates a higher environmental/emission impacts associated with idling/braking/accelerating at the intersection.
- The two-way stop alternative has the lowest environmental/emissions impacts compared to the remaining two intersection control options.
- All traffic control alternatives are considered feasible.

Traffic Operations – Sensitivity Analysis

A review of the *Kingston Downtown Revitalization Initiative* (Kingston DRI) indicates that a transportation plan has been recommended to improve accessibility and circulation in the Uptown Stockade area. In general, the proposed improvements would reverse street directions along Wall Street and Fair Street in addition to some secondary streets such as John Street and Main Street. This improvement would impact at least four of the eight study area intersections. A sensitivity analysis was conducted to determine if the preferred traffic control alternatives would change if the proposed traffic pattern change was implemented. The existing traffic volumes were redistributed based on a review of the proposed *Kingston DRI* plan and are shown on Figure 4 and Figure 5. A level of service sensitivity analysis was conducted at the Fair Street/Pearl Street intersection similar to the assessment provided in section 3.0. Table 8 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 8 – Level of Service Kingston DRI Sensitivity Analysis Summary

	Intersection		Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Fair Street/Pearl Street					
Existing	Pearl Street EB	TR	S	A (4.1)	A (4.8)
	Pearl Street WB	LT		B (12.8)	B (13.6)
	Fair Street NB	LTR		C (25.8)	C (33.9)
		Overall		B (13.5)	B(18.0)
Alternatives	Pearl Street WB	L	TW	A (7.8)	A (8.0)
	Fair Street NB	LTR		C (17.9)	F (54.8)
	Pearl Street EB	TR	AW	B (11.6)	C (17.1)
	Pearl Street WB	LT		A (9.6)	B (12.5)
	Fair Street BB	LTR		B (11.1)	C (18.0)
		Overall		B (10.9)	C (16.3)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The sensitivity analysis indicates that the Fair Street/Pearl Street intersection will operate adequately during the AM and PM peak hours under all-way stop control and traffic signal control options if the proposed improvement plan recommended in the *Kingston DRI* is implemented in the Uptown Stockade area (LOS C conditions or better on all approaches). The sensitivity analysis also indicates that the northbound Fair Street approach will operate at LOS C/F during the AM and PM peak hours under stop control conditions; therefore, it is recommended that all-way stop control or traffic signal control be proposed at this intersection if the *Kingston DRI* is implemented in the Uptown Stockade area.

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the Fair Street/Pearl Street intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that Pearl Street would be the major street and a stop sign would be installed on the Fair Street approach. The results of the sight distance evaluation are summarized in Table 9.

Table 9 – Sight Distance Evaluation (feet)

Fair Street/Pearl Street		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from Fair Street (D_L)	Crossing Maneuver from Fair Street		Left Turn from Fair Street		Left Turn from Pearl Street (D_S)	SSD_{NB}	SSD_{SB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
Fair Street / Pearl Street **North Leg**	Available	335	335	140	335	140	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175

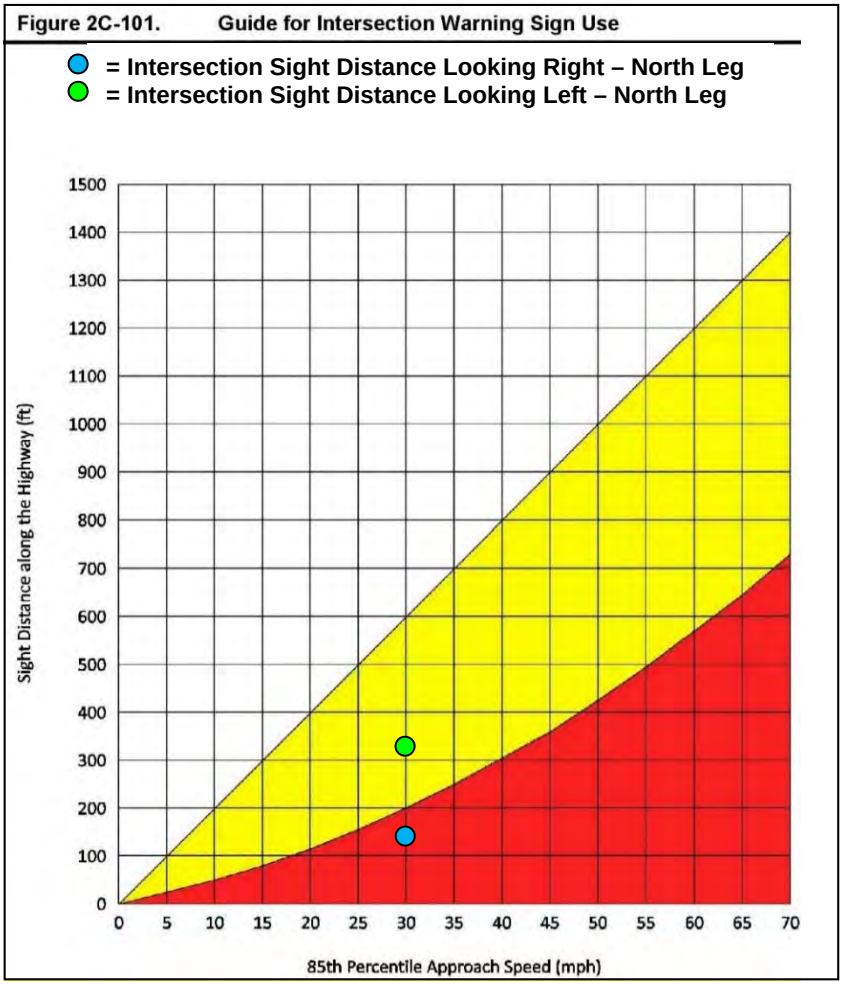
1. Intersection sight distance is measured at 14.5 feet back from Pearl Street at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on Pearl Street.
3. Sight distance measurements are compared to AASHTO recommended distances for a 30-mph operating speed on Pearl Street.

The sight distance analysis on Pearl Street shows that the available stopping sight distance and the available intersection sight distance looking straight to make left turns from Pearl Street onto the south leg of Fair Street exceed AASHTO guidelines for the 30-mph operating speed. The analysis also shows that the sight distance looking left from the north leg of Fair Street meets the AASHTO recommended guidelines for a 30-mph operating speed to make a left or right turn from Fair Street or to cross Pearl Street. In addition, the analysis shows that the sight distances looking right from the north leg of Fair Street does not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left from Fair Street or to cross Pearl Street due to a vegetation and a building. The available sight lines looking left and right from the north leg of Fair Street are illustrated below in Photographs 1 and 2

Photograph 1 – Sight distance looking left (D_L) from the north leg of Fair Street

Photograph 2 – Sight distance looking right (D_R) from the north leg of Fair Street

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of “Intersection Warning” signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking right from the north leg of Fair Street is critically limited due to the vegetation and building. At a minimum, an “Intersection Warning” sign is recommended if the two-way stop control condition were implemented.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 10 summarizes which of the criteria are met for the Fair Street/Pearl Street intersection.

Table 10 – All-Way Stop Criteria

Fair Street/Pearl Street	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	Yes

Table 10 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the Fair Street/Pearl Street intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the Fair Street/Pearl Street intersection should be removed and replaced with all-way stop control due to limited sight lines. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the eastbound and westbound Pearl Street approaches and the southbound Fair Street approach. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. Stop ahead signs (W3-1) with flags should be placed on each approach. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD. On-street parking should be set back for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

R1-1

R1-3P


W3-1

Attachment F
Clinton Avenue/St. James Street Street Assessment

Traffic Signal Removal Assessment
City of Kingston, New York

Clinton Avenue/St. James Street Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the Clinton Avenue/St. James Street intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum traffic and safety warrants to justify their continued operation.

Roadways Serving the Study Area

Clinton Avenue is classified as an urban major collector and provides north-south travel from Schwenk Drive to Barmann Avenue. Clinton Avenue is a 32 foot wide roadway that allows two-way traffic. On-street parking is allowed on the west side of the road and on the east side of the road north of St. James Street. The city speed limit is 30 mph and land uses along Clinton Avenue near St. James Street generally include residential land uses.

St. James Street is classified as an urban major collector and provides east-west travel from Wall Street to Route 32 (Broadway). St. James Street is a 28 to 37 foot wide roadway that allows two-way traffic and on-street parking on both sides of the road. The city speed limit it is 30 mph and land uses along St. James Street near Clinton Avenue generally include residential land uses and some commercial land uses.

Study Area Intersection

The Clinton Avenue/St. James Street intersection is a four-leg intersection that provides a single lane for shared travel movements on all approaches. A pre-timed traffic signal is provided at this intersection; however, it is currently operating under all-red flash control.

Pedestrian/Bicycle Accommodations

Sidewalks exist on both sides of Clinton Avenue and St James Street. There are no marked crosswalks on any approach of the study area intersection. Table 1 summarizes the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

Clinton Avenue/St. James Street Intersection	Clinton Ave NB Approach		Clinton Ave SB Approach		St James St Ave EB Approach		St James St WB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	2	0	12	0	2	0	1	0	17	0
8:00 to 9:00 a.m.	7	0	1	0	8	0	7	0	23	0
9:00 to 10:00 a.m.	2	0	3	0	7	0	3	0	15	1
10:00 to 11:00 a.m.	5	0	7	0	4	0	8	0	24	0
11:00 a.m. to 12:00 p.m.	3	0	4	0	7	0	9	0	23	0
12:00 to 1:00 p.m.	5	0	3	0	8	0	4	0	20	0
1:00 to 2:00 p.m.	11	0	0	0	7	0	7	0	25	0
2:00 to 3:00 p.m.	11	0	2	2	13	0	12	0	38	2
3:00 to 4:00 p.m.	3	0	6	0	12	0	7	1	28	1
4:00 to 5:00 p.m.	6	0	5	0	12	0	4	0	27	0
5:00 to 6:00 p.m.	11	0	13	0	13	0	5	0	42	0
6:00 to 7:00 p.m.	3	1	3	1	10	0	9	0	25	2
Total	69	1	59	3	103	0	76	1	307	5

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches in an urban setting is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type										Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total
Clinton Avenue/St. James Street	2	2	1	0	0	1	1	0	2	0	0	0	1	0	**5**	**0.83**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were five total accidents at the Clinton Avenue/St. James Street intersection during the three year period, which results in an accident rate slightly higher than the average accident rate when compared to similar intersections. Of the five accidents, one resulted in an injury while the remaining four were either a property damage only accident or a non-reportable accident. Non reportable accidents are collisions that result in damage less than $1,000. There were no fatal accidents and no pedestrian related collisions. The two right-angle accidents reported at this intersection were attributed to a disregard to the traffic signal control. The left-turn accident was the result of vehicles failing to yield the right-of-way while the rear end accident occurred due to driver inattention of a motorist traveling northbound. The injury accident occurred when a vehicle on St. James Street made a right-turn-on-red and struck a bicyclist traveling in the wrong lane/direction on Clinton Avenue. The predominant accident type at the study area intersection is right angle collisions (two total); however, they are associated with driver error and not the result of geometric or operational issues with the intersection. An accident summary (TE-213 equivalent) at the Clinton Avenue/St. James Street intersection is included under Attachment J.

The removal of unwarranted traffic signals at intersections with high accident rates located in urban areas has been shown to decrease all types of accidents by 24 percent based on an assessment of 199 intersections, as noted in the *Desktop Reference for Crash Reduction Factors* published by the U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA).

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table summarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A "Yes" under the "Signal Warrants Met?" column indicates that the criteria are satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment K.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]			Signal Warrants Met?			
	Clinton Ave NB/SB	St. James St		#1		#2	#3
		EB	WB	Cond. A	Cond. B		
7:00 AM	176	30	28	No	No	No	No
8:00 AM	199	50	40	No	No	No	No
9:00 AM	202	43	38	No	No	No	No
10:00 AM	192	58	54	No	No	No	No
11:00 AM	226	55	48	No	No	No	No
12:00 PM	204	51	78	No	No	No	No
1:00 PM	221	44	77	No	No	No	No
2:00 PM	289	70	50	No	No	No	No
3:00 PM	341	62	69	No	No	No	No
4:00 PM	317	64	68	No	No	No	No
5:00 PM	316	91	72	No	No	No	No
6:00 PM	165	34	52	No	No	No	No
Required Volumes	**Two Lane Major Street**			**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	Two Lane Minor Street			**150**	**75**		
Overall Warrant Met?				**No**	**No**	**No**	**No**

[1] Volumes on Clinton Avenue and St. James Street as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the Clinton Avenue/St. James Street intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on Clinton Avenue[1]	Existing Pedestrian Volume Crossing Clinton Avenue[1]	Signal Warrant #4 Met?
7:00 AM	176	14	No
8:00 AM	199	8	No
9:00 AM	202	5	No
10:00 AM	192	12	No
11:00 AM	226	7	No
12:00 PM	204	8	No
1:00 PM	221	11	No
2:00 PM	289	13	No
3:00 PM	341	9	No
4:00 PM	317	11	No
5:00 PM	316	24	No
6:00 PM	165	6	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on Clinton Avenue and pedestrian volumes crossing Clinton Avenue as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell well short of the minimum 107 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the *St. Joseph's School* is located approximately ¼ of a mile northwest of the intersection on Pearl Street; however, the school crossing warrant is not met since adequate gaps in vehicle traffic flow are provided on Clinton Avenue based on a review of the turning movement count data and the SimTraffic simulation.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

Clinton Avenue/ St. James Street Intersection	Collision Severity				Collision Type					Signal Warrant #7 Met?
	Non-Reportable	Property Damage	Injury	Fatal	Right Angle	Rear-End	Bicycle	Left-Turn	Total	
Jun 1, 2015 to May 31, 2016	0	1	1	0	1	0	1	0	**2**	No
Jun 1, 2016 to May 31, 2017	1	0	0	0	0	0	0	1	**1**	No
Jun 1, 2017 to May 31, 2018	1	1	0	0	1	1	0	0	**2**	No
Required Volumes	**Two-Lane Major Street**									**See Table 4C-1**
	Two-Lane Minor Street									
Overall Warrant Met?										**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on Clinton Avenue is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the Clinton Avenue/St. James Street intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control– A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the eastbound and westbound St. James Street approaches.
- All-Way Stop Control (existing conditions since the traffic signal is operating under all-red flash control) – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Attachment L contains further detailed descriptions

of LOS criteria for signalized and unsignalized intersections and copies of the detailed level of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Clinton Avenue/St James Street					
Existing	St James Street EB	LTR	AW	A (7.8)	A (8.8)
	St James Street WB	LTR		A (7.5)	A (8.3)
	Clinton Avenue NB	LTR		A (8.6)	A (9.7)
	Clinton Avenue SB	LTR		A (7.7)	A (9.2)
		Overall		A (8.1)	A (9.2)
Alternatives	St James Street EB	LTR	S	B (13.0)	B (13.6)
	St James Street WB	LTR		B (13.1)	B (13.6)
	Clinton Avenue NB	LTR		A (1.9)	A (2.2)
	Clinton Avenue SB	LTR		B (10.2)	B (11.3)
		Overall		A (7.1)	A (8.7)
	Clinton Avenue NB	LTR	TW	A (0.4)	A (0.7)
	Clinton Avenue SB	LTR		A (1.3)	A (0.9)
	St James Street EB	LTR		B (11)	B (14.4)
	St James Street WB	LTR		B (10.5)	A (11.6)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the Clinton Avenue/St. James Street intersection indicates that all three traffic control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS B conditions or better on all approaches).

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal	Two-Way Stop	All-Way Stop (Existing)	Signal	Two-Way Stop	All-Way Stop (Existing)
Stops (#)	359	122	305	438	212	485
Fuel Consumed (gal)	9	3	4	11	5	6
CO Emissions (kg)	0.64	0.20	0.29	0.77	0.32	0.45
NOx Emissions (kg)	0.12	0.04	0.06	0.15	0.06	0.09
VOC Emissions (kg)	0.15	0.05	0.07	0.18	0.07	0.11

The analysis shows the following:

- The existing all-way stop control and the two-way stop alternative are comparable in terms of emissions and fuel consumption. Reactivating the traffic signal will generally increase the number of vehicle stops which creates a higher environmental/emission impacts associated with idling/braking/accelerating at the intersection.
- The two-way stop alternative has the lowest environmental/emissions impacts compared to the remaining two intersection control options.
- All traffic control alternatives are considered feasible.

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the Clinton Avenue/St. James Street intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that Clinton Avenue would be the major street and a stop sign would be installed on each of the St. James Street approaches. The results of the sight distance evaluation are summarized in Table 8.

Table 8 – Sight Distance Evaluation (feet)

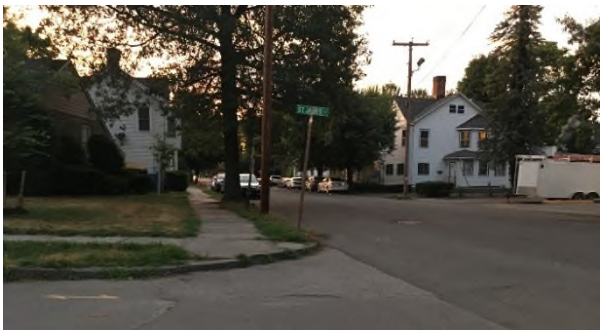
Clinton Avenue/ St. James Street		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from St. James St. (D_L)	Crossing Maneuver from St. James St.		Left Turn from St. James Street		Left Turn from Clinton Ave (D_S)	SSD_{NB}	SSD_{SB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
Clinton Avenue/ St. James Street **East Leg**	Available	165	165	150	165	150	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175
Clinton Avenue/ St. James Street **West Leg**	Available	140	140 [+335]	170	140 [+335]	170	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175

1. Intersection sight distance is measured at 14.5 feet back from Clinton Avenue at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on Clinton Avenue.
3. Sight distance measurements are compared to AASHTO recommended distances for a 30-mph operating speed on Clinton Avenue.
XX [YY] = Available Sight Distance Limited by On-Street Parking [Available Sight Distance without On-Street Parking]

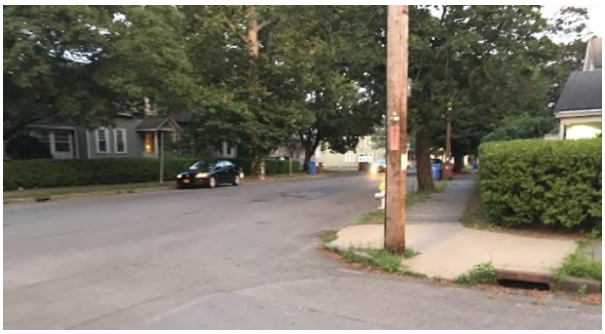
The sight distance analysis on Clinton Avenue shows that the available stopping sight distance and the available intersection sight distance looking straight to make left turns from Clinton Avenue on to both legs of St. James Street exceed AASHTO guidelines for the 30-mph operating speed. The analysis also shows that the sight distances looking left and right from the east and west legs of St. James Street do not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left or right turn from St. James Street or to cross Clinton Avenue due to cars parked on the street and also telephone/utility poles on the corners of the intersection. The available sight lines looking left and right from the east and west legs of St. James Street are illustrated below in Photographs 1 through 4.

Photograph 1 – Sight distance looking left (D_L) from the east leg of St. James Street

Photograph 2 – Sight distance looking right (D_R) from the east leg of St. James Street

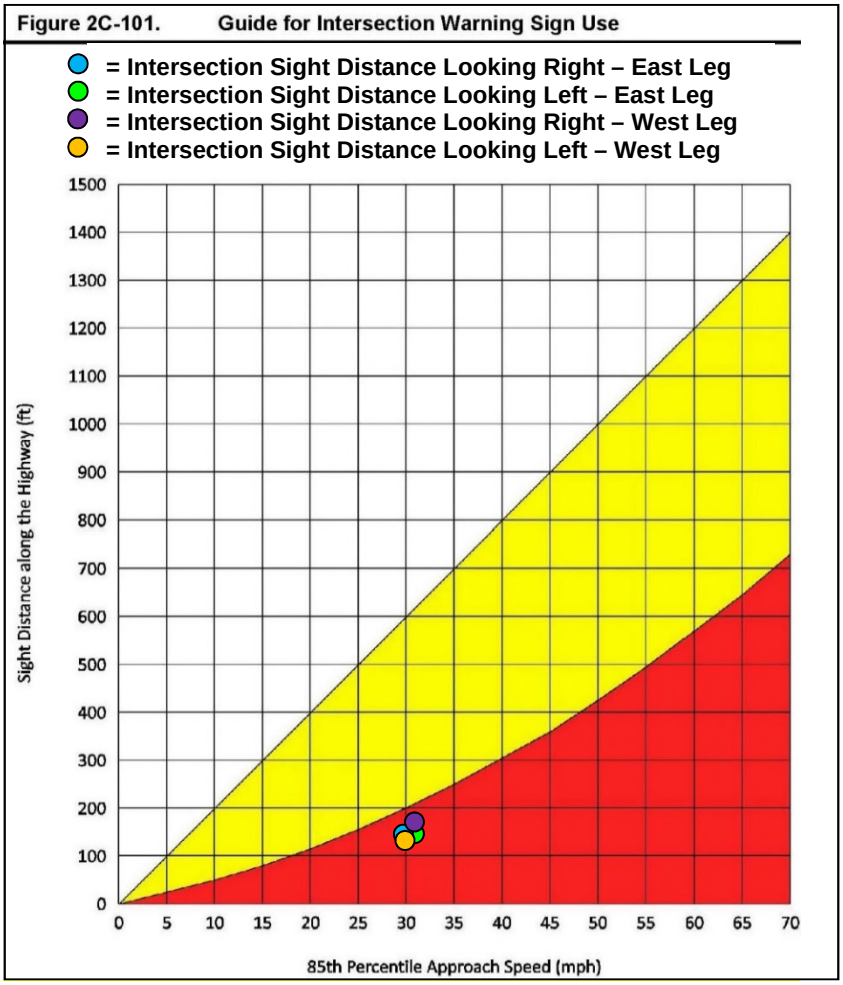


Photograph 3 – Sight distance looking left (D_L) from the west leg of St. James Street



Photograph 4 – Sight distance looking right (D_R) from the west leg of St. James Street

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of "Intersection Warning" signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking left and right from the east and west legs of St. James Street are critically limited. At a minimum, an "Intersection Warning" sign is recommended on each approach if the two-way stop control condition were implemented. It is noted that the available sight distance on some of the approaches could be mitigated if on-street parking was restricted near the intersection; however, it is anticipated that the City of Kingston would not consider limiting on-street parking in the vicinity of the intersection.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 9 summarizes which of the criteria are met for the Clinton Avenue/St. James Street intersection.

Table 9 – All-Way Stop Criteria

Clinton Avenue/ St. James Street	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	Yes

Table 9 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the Clinton Avenue/St. James Street intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the Clinton Avenue/St. James Street intersection should be removed and replaced with all-way stop control due to limited sight lines. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the eastbound and westbound St. James Street approaches and the northbound and southbound Clinton Avenue approaches. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. Stop ahead signs (W3-1) with flags should be placed on each approach. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD. On-street parking should be set back for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

Attachment G
Clinton Street/Franklin Street Assessment

Traffic Signal Removal Assessment
City of Kingston, New York

Clinton Avenue/Franklin Street Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the Clinton Avenue/Franklin Street intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum traffic and safety warrants to justify their continued operation.

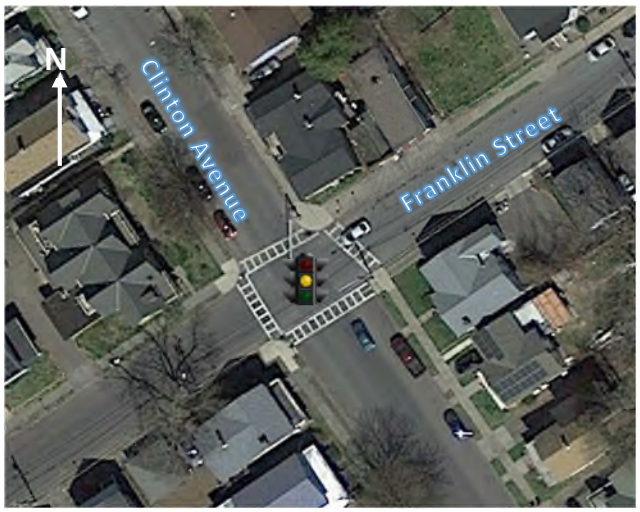
Roadways Serving the Study Area

Clinton Avenue is classified as an urban major collector and provides north-south travel from Schwenk Drive to Barmann Avenue. Clinton Avenue is a 32 to 42 foot wide roadway that allows two-way traffic and on-street parking on both sides of the road. The city speed limit is 30 mph and land uses along Clinton Avenue near Franklin Street include *Clinton Avenue United Methodist Church* and residential land uses.

Franklin Street is classified as an urban local road and provides east-west travel from Wall Street to Broadway. Franklin Street is a 30 to 32 foot wide roadway that allows two-way traffic and on-street parking on both sides of the road. The city speed limit it is 30 mph and land uses along Franklin Street near Clinton Avenue include *Kingston Library* and residential land uses.

Study Area Intersection

The Clinton Avenue/Franklin Street intersection is a four-leg intersection that provides a single lane for shared travel movements on all approaches. A pre-timed traffic signal is provided at this intersection; however, it is currently operating under all-red flash control.



Pedestrian/Bicycle Accommodations

Sidewalks exist on both sides of Clinton Avenue and Franklin Street. There are marked crosswalks on all approaches of the study area intersection. Table 1 summarizes the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

Clinton Avenue/ Franklin Street Intersection	Clinton Ave. NB Approach		Clinton Ave. SB Approach		Franklin St. EB Approach		Franklin St. WB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	5	0	11	0	14	0	8	0	38	0
8:00 to 9:00 a.m.	7	0	13	0	4	0	3	0	27	0
9:00 to 10:00 a.m.	3	0	9	0	6	0	1	0	19	0
10:00 to 11:00 a.m.	5	0	5	0	3	0	5	0	18	0
11:00 a.m. to 12:00 p.m.	5	0	1	0	2	0	7	0	15	0
12:00 to 1:00 p.m.	3	0	8	0	0	0	7	0	18	0
1:00 to 2:00 p.m.	6	0	10	0	3	0	7	0	26	0
2:00 to 3:00 p.m.	17	1	24	0	13	1	13	0	67	2
3:00 to 4:00 p.m.	22	0	70	1	9	0	15	3	116	4
4:00 to 5:00 p.m.	6	0	8	0	3	0	1	0	18	0
5:00 to 6:00 p.m.	9	0	7	0	11	0	10	4	37	4
6:00 to 7:00 p.m.	11	0	6	0	5	0	8	1	30	1
Total	99	1	172	1	73	1	85	8	429	11

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches is in an urban setting 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type										Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total
Clinton Avenue/Franklin Street	3	1	1	0	0	0	1	1	0	0	1	0	2	0	**5**	**0.80**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were five total accidents at the Clinton Avenue/Franklin Street intersection during the three year period, which results in an accident rate slightly higher than the average accident rate when compared to similar intersections. Of the five accidents, one resulted in an injury while the remaining four were either a property damage only accident or a non-reportable accident. Non reportable accidents are collisions that result in damage less than $1,000. There were no fatal accidents and no pedestrian related collisions. The rear-end accidents reported at this intersection were attributed to driver inattention or a disregard to the traffic signal control. The overtaking accident was the result of a disregard of the traffic control while the rear end accident occurred due to driver inattention of a motorist traveling eastbound. The collision with a parked car occurred due to improper lane usage. One of the bicycle accidents resulted in an injury and was the result of the bicyclist disregarding the traffic signal control. The non-reportable bicycle accident occurred when a westbound vehicle made a right-turn and struck the bicyclist as she was making a right-turn due to limited visibility. An accident summary (TE-213 equivalent) at the Clinton Avenue/Franklin Street intersection is included under Attachment J.

The removal of unwarranted traffic signals at intersections with high accident rates located in urban areas has been shown to decrease all types of accidents by 24 percent based on an assessment of 199 intersections, as noted in the *Desktop Reference for Crash Reduction Factors* published by the U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA).

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table 3 summarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A "Yes" under the "Signal Warrants Met?" column indicates that the criteria are satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment K.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]			Signal Warrants Met?			
	Clinton Ave NB/SB	Franklin St		#1		#2	#3
		EB	WB	Cond. A	Cond. B		
7:00 AM	146	44	56	No	No	No	No
8:00 AM	187	91	65	No	No	No	No
9:00 AM	183	74	45	No	No	No	No
10:00 AM	184	66	53	No	No	No	No
11:00 AM	194	49	35	No	No	No	No
12:00 PM	186	54	54	No	No	No	No
1:00 PM	186	72	71	No	No	No	No
2:00 PM	247	69	82	No	No	No	No
3:00 PM	295	89	95	No	No	No	No
4:00 PM	240	89	119	No	No	No	No
5:00 PM	257	81	90	No	No	No	No
6:00 PM	169	61	66	No	No	No	No
Required Volumes	**Two Lane Major Street**			**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	Two Lane Minor Street			**150**	**75**		
Overall Warrant Met?				**No**	**No**	**No**	**No**

[1] Volumes on Clinton Avenue and Main Street as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the Clinton Avenue/Franklin Street intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on Clinton Avenue[1]	Existing Pedestrian Volume Crossing Franklin Street[1]	Signal Warrant #4 Met?
7:00 AM	146	16	No
8:00 AM	187	20	No
9:00 AM	183	12	No
10:00 AM	184	10	No
11:00 AM	194	6	No
12:00 PM	186	11	No
1:00 PM	186	16	No
2:00 PM	247	41	No
3:00 PM	295	92	No
4:00 PM	240	14	No
5:00 PM	257	16	No
6:00 PM	169	17	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on Clinton Avenue and pedestrian volumes crossing Clinton Avenue as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell short of the minimum 107 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the *George Washington Elementary School* is located approximately ¼ of a mile southwest of the intersection on Washington Avenue; however, the school crossing warrant is not met since adequate gaps in vehicle traffic flow are provided on Clinton Avenue based on a review of the turning movement count data and the SimTraffic simulation.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

Clinton Avenue/ Franklin Street Intersection	Collision Severity				Collision Type				Signal Warrant #7 Met?
	Non-Reportable	Property Damage	Injury	Fatal	Overtaking	Bicycle	Rear-End	Total	
Jun 1, 2015 to May 31, 2016	2	0	0	0	1	1	0	**2**	No
Jun 1, 2016 to May 31, 2017	1	0	0	0	1	0	0	**1**	No
Jun 1, 2017 to May 31, 2018	0	1	1	0	0	1	1	**2**	No
Required Volumes	**Two-Lane Major Street**								**See Table 4C-1**
	Two-Lane Minor Street								
Overall Warrant Met?									**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on Clinton Avenue is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the Clinton Avenue/Franklin Street intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control – A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the eastbound and westbound Franklin Street approaches.
- All-Way Stop Control (existing conditions since the traffic signal is operating under all-red flash control) – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Attachment L contains further detailed descriptions

of LOS criteria for signalized and unsignalized intersections and copies of the detailed level of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Clinton Avenue/Franklin Street					
Existing	Franklin Street EB	LTR	AW	A (8)	A (8.7)
	Franklin Street WB	LTR		A (7.7)	A (8.5)
	Clinton Avenue NB	LTR		A (8.3)	A (8.5)
	Clinton Avenue SB	LTR		A (7.9)	A (8.7)
		Overall		A (8)	A (8.6)
Alternatives	Franklin Street EB	LTR	S	B (13.3)	B (13.2)
	Franklin Street WB	LTR		B (13.1)	B (14.0)
	Clinton Avenue NB	LTR		A (1.7)	A (1.8)
	Clinton Avenue SB	LTR		B (10.2)	A (1.9)
		Overall		A (9.0)	A (6.9)
	Clinton Avenue NB	LTR	TW	A (0.6)	A (0.4)
	Clinton Avenue SB	LTR		A (0.9)	A (1.3)
	Franklin Street EB	LTR		B (10.6)	B (12.3)
	Franklin Street WB	LTR		B (10.5)	B (12.2)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the Clinton Avenue/Franklin Street intersection indicates that all three traffic control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS B conditions or better on all approaches).

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal	Two-Way Stop	All-Way Stop (Existing)	Signal	Two-Way Stop	All-Way Stop (Existing)
Stops (#)	139	181	343	204	252	486
Fuel Consumed (gal)	3	3	4	5	5	6
CO Emissions (kg)	0.22	0.22	0.29	0.32	0.32	0.43
NOx Emissions (kg)	0.04	0.04	0.06	0.06	0.06	0.08
VOC Emissions (kg)	0.05	0.05	0.07	0.07	0.07	0.10

The analysis shows the following:

- The existing traffic signal and the two-way stop alternative are comparable in terms of emissions and fuel consumption; however, the all-way stop alternative increases the number of vehicle stops which creates a higher environmental/emission impacts associated with idling/braking/accelerating at the intersection.
- The traffic signal and two-way stop alternatives have the lowest environmental/emissions impacts compared to the all-way stop intersection control option.
- All traffic control alternatives are considered feasible.

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the Clinton Avenue/Franklin Street intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that Clinton Avenue would be the major street and a stop sign would be installed on the Franklin Street approaches. The results of the sight distance evaluation are summarized in Table 8.

Table 8 – Sight Distance Evaluation (feet)

Clinton Avenue/ Franklin Street		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from Franklin St. (D_L)	Crossing Maneuver from Franklin Street		Left Turn from Franklin Street		Left Turn from Clinton Ave (D_S)	SSD_{NB}	SSD_{SB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
Clinton Ave/ Franklin St **East Leg**	Available	85 [+335]	85 [+335]	60	85 [+335]	60	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175
Clinton Ave/ Franklin St **West Leg**	Available	60 [+335]	60 [+335]	55 [+335]	60 [+335]	55 [+335]	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175

1. Intersection sight distance is measured at 14.5 feet back from Clinton Avenue at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on Clinton Avenue.
3. Sight distance measurements are compared to AASHTO recommended distances for a 30-mph operating speed on Clinton Avenue.
XX [YY] = Available Sight Distance Limited by On-Street Parking [Available Sight Distance without On-Street Parking]

The sight distance analysis on Clinton Avenue shows that the available stopping sight distance and the available intersection sight distance looking straight to make left turns from Clinton Avenue on to both legs of Franklin Street exceed AASHTO guidelines for the 30-mph operating speed. The analysis also shows that the sight distances looking left and right from the east and west legs of Franklin Street do not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left or right turn from Franklin Street or to cross Clinton Avenue due possible cars parked on the street. The available sight lines looking left and right from the east and west legs of Franklin Street are illustrated below in Photographs 1 through 4

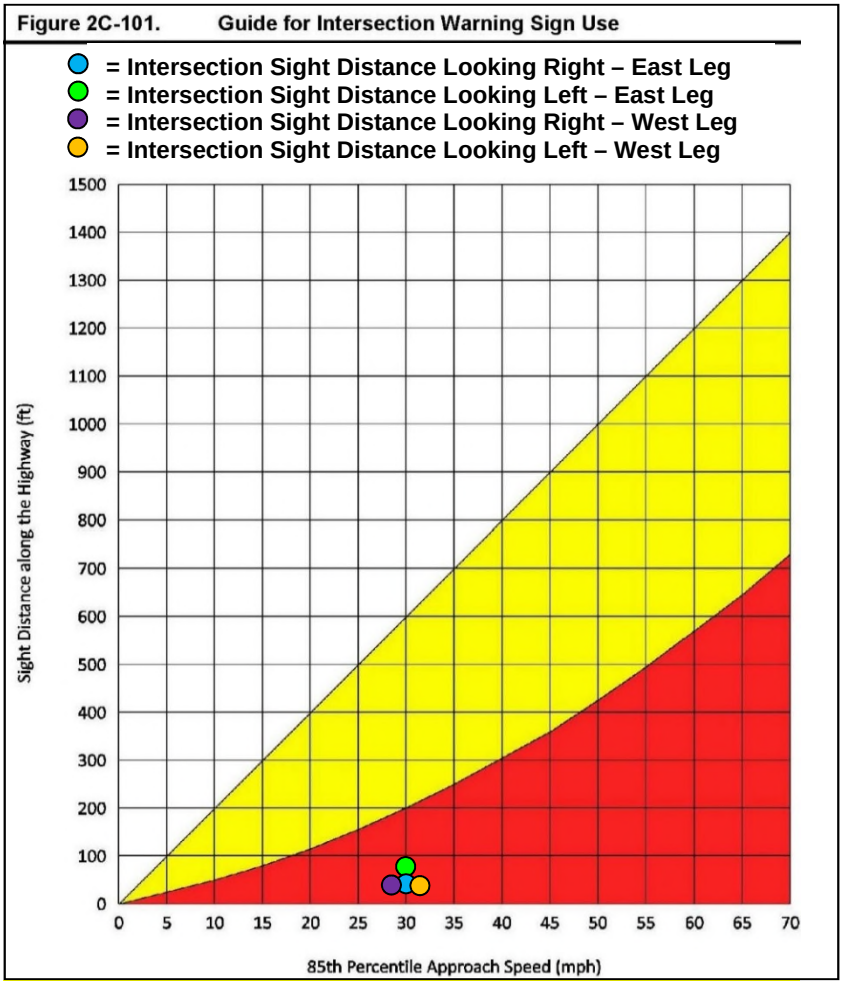
Photograph 1 – Sight distance looking left (D_L) from the west leg of Franklin Street

Photograph 2 – Sight distance looking right (D_R) from the west leg of Franklin Street

Photograph 3 – Sight distance looking left (D_L) from the east leg of Franklin Street

Photograph 4 – Sight distance looking right (D_R) from the east leg of Franklin Street

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of "Intersection Warning" signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking left and right from the east and west legs of Franklin Street would be critically limited by on-street parking. At a minimum, "Intersection Warning" signs are recommended on all approaches if the two-way stop control condition were implemented. It is noted that the available sight distance on several of the approaches could be mitigated if on-street parking was restricted near the intersection; however, it is anticipated that the City of Kingston would not consider limiting on-street parking in the vicinity of the intersection.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 9 summarizes which of the criteria are met for the Clinton Avenue/Franklin Street intersection.

Table 9 – All-Way Stop Criteria

Clinton Avenue/ Franklin Street	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	Yes

Table 9 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the Clinton Avenue/Franklin Street intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the Clinton Avenue/Franklin Street intersection should be removed and replaced with all-way stop control due to limited sight lines. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

R1-1

R1-3P


W3-1

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the eastbound and westbound Franklin Street approaches and the northbound and southbound Clinton Avenue approaches. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. Stop ahead signs (W3-1) with flags should be placed on each approach. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD. On-street parking should be set back for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

Attachment H
Clinton Street/Henry Street Assessment

Traffic Signal Removal Assessment
City of Kingston, New York

Clinton Avenue/Henry Street Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the Clinton Avenue/Henry Street intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum traffic and safety warrants to justify their continued operation.

Roadways Serving the Study Area

Clinton Avenue is classified as an urban major collector and provides north-south travel from Schwenk Drive to Barmann Avenue. Clinton Avenue is a 32 to 42 foot wide roadway that allows two-way traffic and on-street parking on both sides of the road. The city speed limit is 30 mph and land uses along Clinton Avenue near Henry Street include the *Metropolitan Knothole League Park* and residential land uses.

Henry Street is classified as an urban minor arterial and provides east-west travel from Wall Street to Broadway. Henry Street is a 36 to 38 foot wide roadway that allows two-way traffic and on-street parking on both sides of the road. The city speed limit it is 30 mph and land uses along Henry Street near Clinton Avenue generally include residential land uses.

Study Area Intersection

The Clinton Avenue/Henry Street intersection is a four-leg intersection that provides a single lane for shared travel movements on all approaches. A pre-timed traffic signal is provided at this intersection; however, it is currently operating under all-red flash control.

Pedestrian/Bicycle Accommodations

Sidewalks exist on both sides of Clinton Avenue and Henry Street. There are marked crosswalks on all approaches of the study area intersection. Table 1 summarizes the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

Clinton Avenue/ Henry Street Intersection	Clinton Ave. NB Approach		Clinton Ave. SB Approach		Henry St. EB Approach		Henry St. WB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	1	0	1	0	11	0	5	0	18	0
8:00 to 9:00 a.m.	26	3	19	0	1	1	4	0	50	4
9:00 to 10:00 a.m.	9	0	2	0	4	0	1	0	16	0
10:00 to 11:00 a.m.	7	2	4	0	1	0	7	0	19	2
11:00 a.m. to 12:00 p.m.	3	0	0	0	0	0	4	0	7	0
12:00 to 1:00 p.m.	2	1	1	0	0	0	2	0	5	1
1:00 to 2:00 p.m.	9	0	1	0	2	0	6	0	18	0
2:00 to 3:00 p.m.	12	0	9	0	5	0	6	0	32	0
3:00 to 4:00 p.m.	13	0	27	1	2	0	7	0	49	1
4:00 to 5:00 p.m.	9	0	3	1	7	1	10	2	29	4
5:00 to 6:00 p.m.	8	0	1	2	7	0	12	0	28	2
6:00 to 7:00 p.m.	3	2	6	2	7	0	3	0	19	4
Total	102	8	74	6	47	2	67	2	290	14

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches in an urban setting is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type										Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total
Clinton Avenue/Henry Street	2	1	1	0	0	1	0	0	2	0	0	0	0	1	**4**	**0.60**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were four total accidents at the Clinton Avenue/Henry Street intersection during the three year period, which results in an accident rate slightly higher than the average accident rate when compared to similar intersections. Of the four accidents, one resulted in an injury while the remaining three were either a property damage only accident or a non-reportable accident. Non reportable accidents are collisions that result in damage less than $1,000. There were no fatal accidents and no pedestrian related collisions. The two right-angle accidents reported at this intersection were attributed to driver inattention or a disregard to the traffic signal control. The left-turn accident was the result of a vehicle failing to yield the right-of-way. There was one accident with no detailed information provided. The predominant accident type at the study area intersection is right angle collisions (two total); however, they are associated with driver error and not the result of geometric or operational issues with the intersection. An accident summary (TE-213 equivalent) at the Clinton Avenue/Henry Street intersection is included under Attachment J.

The removal of unwarranted traffic signals at intersections with high accident rates located in urban areas has been shown to decrease all types of accidents by 24 percent based on an assessment of 199 intersections, as noted in the *Desktop Reference for Crash Reduction Factors* published by the U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA).

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table 3 summarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A "Yes" under the "Signal Warrants Met?" column indicates that the criteria are

satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment K.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]			Signal Warrants Met?			
	Clinton Ave NB/SB	Henry St		#1		#2	#3
		EB	WB	Cond. A	Cond. B		
7:00 AM	156	60	63	No	No	No	No
8:00 AM	229	79	105	No	No	No	No
9:00 AM	191	64	83	No	No	No	No
10:00 AM	188	48	60	No	No	No	No
11:00 AM	188	56	64	No	No	No	No
12:00 PM	222	62	63	No	No	No	No
1:00 PM	297	65	81	No	No	No	No
2:00 PM	245	89	102	No	No	No	No
3:00 PM	300	95	128	No	No	No	No
4:00 PM	266	76	109	No	No	No	No
5:00 PM	258	69	120	No	No	No	No
6:00 PM	180	43	88	No	No	No	No
Required Volumes	**Two Lane Major Street**			**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	Two Lane Minor Street			**150**	**75**		
Overall Warrant Met?				**No**	**No**	**No**	**No**

[1] Volumes on Clinton Avenue and Henry Street as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the Clinton Avenue/Henry Street intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on Clinton Avenue[1]	Existing Pedestrian Volume Crossing Henry Street[1]	Signal Warrant #4 Met?
7:00 AM	156	2	No
8:00 AM	229	45	No
9:00 AM	191	11	No
10:00 AM	188	11	No
11:00 AM	188	3	No
12:00 PM	222	3	No
1:00 PM	297	10	No
2:00 PM	245	21	No
3:00 PM	300	40	No
4:00 PM	266	12	No
5:00 PM	258	9	No
6:00 PM	180	9	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on Clinton and pedestrian volumes crossing Fair Street as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell well short of the minimum 107 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the *George Washington Elementary School* is located approximately ¼ of a mile west of the intersection on Wall Street; however, the school crossing warrant is not met since adequate gaps in vehicle traffic flow are provided on Clinton Avenue based on a review of the turning movement count data and the SimTraffic simulation.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

Clinton Avenue/ Henry Street Intersection	Collision Severity				Collision Type						Signal Warrant #7 Met?
	Non-Reportable	Property Damage	Injury	Fatal	Overtaking	Right Angle	Unknown	Fixed Object	Left-Turn	Total	
Jun 1, 2015 to May 31, 2016	1	1	0	0	0	1	1	0	0	**2**	No
Jun 1, 2016 to May 31, 2017	1	0	0	0	0	0	0	0	1	**1**	No
Jun 1, 2017 to May 31, 2018	0	0	1	0	0	1	0	0	0	**1**	No
Required Volumes	**Two-Lane Major Street**										**See Table 4C-1**
	Two-Lane Minor Street										
Overall Warrant Met?											**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on Clinton Avenue is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the Clinton Avenue/Henry Street intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control – A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the eastbound and westbound Henry Street approaches.
- All-Way Stop Control (existing conditions since the traffic signal is operating under all-red flash control) – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Attachment L contains further detailed descriptions of LOS criteria for signalized and unsignalized intersections and copies of the detailed level of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Clinton Avenue/Henry Street					
Existing	Henry Street EB	LTR	AW	A (8.3)	A (8.9)
	Henry Street WB	LTR		A (8.7)	A (9.8)
	Clinton Avenue NB	LTR		A (8.7)	A (9.6)
	Clinton Avenue SB	LTR		A (8.6)	A (9.7)
		Overall		A (8.6)	A (9.5)
Alternatives	Henry Street EB	LTR	S	B (13.6)	B (13.9)
	Henry Street WB	LTR		B (13.9)	B (14.7)
	Clinton Avenue NB	LTR		B (11.0)	B (11.5)
	Clinton Avenue SB	LTR		B (10.5)	A (2.1)
		Overall		B (12.2)	B (10.2)
	Clinton Avenue NB	LTR	TW	A (0.3)	A (0.6)
	Clinton Avenue SB	LTR		A (1.5)	A (2.1)
	Henry Street EB	LTR		B (11.7)	B (13.7)
	Henry Street WB	LTR		B (12.6)	C (16.1)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the Clinton Avenue/Henry Street intersection indicates that all three traffic control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS C conditions or better on all approaches).

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal	Two-Way Stop	All-Way Stop (Existing)	Signal	Two-Way Stop	All-Way Stop (Existing)
Stops (#)	220	243	426	289	292	524
Fuel Consumed (gal)	4	4	5	5	5	6
CO Emissions (kg)	0.29	0.27	0.36	0.38	0.34	0.45
NOx Emissions (kg)	0.06	0.05	0.07	0.07	0.07	0.09
VOC Emissions (kg)	0.07	0.06	0.08	0.09	0.08	0.10

The analysis shows the following:

- The existing traffic signal and the two-way stop alternative are comparable in terms of emissions and fuel consumption; however, the all-way stop alternative increases the number of vehicle stops which creates a higher environmental/emission impacts associated with idling/braking/accelerating at the intersection.
- The two-way stop alternative has the lowest environmental/emissions impacts compared to the remaining two intersection control options.
- All traffic control alternatives are considered feasible.

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the Clinton Avenue/Henry Street intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that Clinton Avenue would be the major street and a stop sign would be installed on the Henry Street approaches. The results of the sight distance evaluation are summarized in Table 8.

Table 8 – Sight Distance Evaluation (feet)

Clinton Avenue/ Henry Street		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from Henry St. (D_L)	Crossing Maneuver from Henry Street		Left Turn from Henry Street		Left Turn from Clinton Ave (D_S)	SSD_{NB}	SSD_{SB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
Clinton Avenue/ Henry Street **East Leg**	Available	85 [+335]	85 [+335]	120 [+335]	85 [+335]	120 [+335]	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175
Clinton Avenue/ Henry Street **West Leg**	Available	90 [+335]	90 [+335]	85 [+335]	90 [+335]	85 [+335]	>500	>500	>500
	Recommended[3]	290	290	290	335	335	245	175	175

1. Intersection sight distance is measured at 14.5 feet back from Clinton Avenue at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on Clinton Avenue.
3. Sight distance measurements are compared to AASHTO recommended distances for a 30-mph operating speed on Clinton Avenue.
XX [YY] = Available Sight Distance Limited by On-Street Parking [Available Sight Distance without On-Street Parking]

The sight distance analysis on Clinton Avenue shows that the available stopping sight distance and the available intersection sight distance looking straight to make left turns from Clinton Avenue on to both legs of Henry Street exceed AASHTO guidelines for the 30-mph operating speed. The analysis also shows that the sight distance looking left and right from the east and west legs of Henry Street Avenue do not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left or right turn from Henry Street or to cross Clinton Avenue due cars parked on the street. The available sight lines looking left and right from the east and west legs of Henry Street are illustrated below in Photographs 1 through 4.

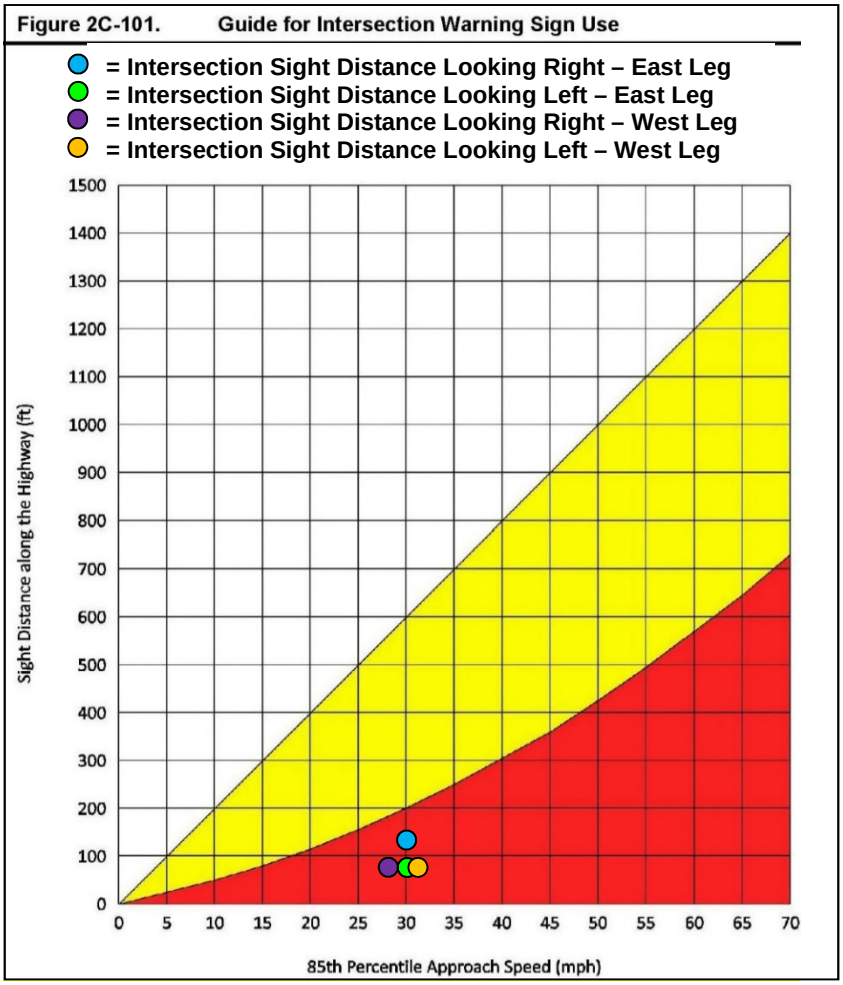
Photograph 1 – Sight distance looking left (D_L) from the east leg of Henry Street

Photograph 2 – Sight distance looking right (D_R) from the east leg of Henry Street

Photograph 3 – Sight distance looking left (D_L) from the west leg of Henry Street

Photograph 4 – Sight distance looking right (D_R) from the west leg of Henry Street

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of "Intersection Warning" signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking left and right from the east and west legs of henry Street is critically limited due to on-street parking. At a minimum, an "Intersection Warning" signs are recommended on all approaches if the two-way stop control condition were implemented. It is noted that the available sight distance could be mitigated if on-street parking was restricted near the intersection; however, it is anticipated that the City of Kingston would not consider limiting on-street parking in the vicinity of the intersection.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 9 summarizes which of the criteria are met for the Clinton Avenue/Henry Street intersection.

Table 9 – All-Way Stop Criteria

Clinton Avenue/ Henry Street	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	Yes

Table 9 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the Clinton Avenue/Henry Street intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the Clinton Avenue/Henry Street intersection should be removed and replaced with all-way stop control due to limited sight lines. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the eastbound and westbound Henry Street approaches and the northbound and southbound Clinton Avenue approaches. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. Stop-ahead (W3-1) with flags should be placed on each approach. The flags and stop-ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD. On-street parking should be set back for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

R1-1

R1-3P


W3-1

Attachment I
Fair Street/St. James Street

Traffic Signal Removal Assessment
City of Kingston, New York

Fair Street/St. James Street Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the Fair Street/St. James Street intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum warrants to justify their continued operation.

Roadways Serving the Study Area

Fair Street is classified as an urban major collector and provides southbound travel from Schwenk Drive to Greenkill Avenue. Fair Street is a 30 to 32 foot wide roadway that allows one-way traffic in the southbound direction. On-street parking is provided on both sides of the road north and south of St. James Street. The city speed limit is 30 mph and land uses along Fair Street near St. James Street include the *First Church of Christian Science,* and residential land uses.

St. James Street is classified as an urban major collector and provides east-west travel from Wall Street to Route 32 (Broadway). St. James Street is a 32 to 37 foot wide roadway that allows two-way traffic and on-street parking on both sides of the road. The city speed limit it is 30 mph and land uses along St. James Street near Fair Street generally include residential land uses.

Study Area Intersection

The Fair Street/St. James Street intersection is a four-leg intersection that provides a single lane for shared travel movements on the eastbound and westbound approach, and a one-way lane on the southbound approach. A pre-timed traffic signal is provided at this intersection.

Pedestrian/Bicycle Accommodations

Sidewalks exist on both sides of Fair Street and St. James Street. There are no marked crosswalks on any approaches of the study area intersection. Table 1 summarizes the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

Fair Street/ St. James Street Intersection	Fair Street NB Approach		Fair Street SB Approach		St. James Street EB Approach		St. James Street WB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	1	0	2	0	1	0	0	0	4	0
8:00 to 9:00 a.m.	4	0	3	0	0	0	1	0	8	0
9:00 to 10:00 a.m.	2	0	4	0	1	0	6	0	13	0
10:00 to 11:00 a.m.	3	0	8	0	3	0	6	0	20	0
11:00 a.m. to 12:00 p.m.	5	0	7	0	7	0	9	0	28	0
12:00 to 1:00 p.m.	10	0	5	0	4	0	8	0	27	0
1:00 to 2:00 p.m.	12	0	3	0	3	0	10	0	28	0
2:00 to 3:00 p.m.	3	0	5	0	7	1	7	1	22	2
3:00 to 4:00 p.m.	9	0	5	0	7	0	7	0	28	0
4:00 to 5:00 p.m.	4	0	8	0	5	0	9	0	26	0
5:00 to 6:00 p.m.	6	0	4	0	3	0	11	0	24	0
6:00 to 7:00 p.m.	7	0	2	0	5	0	11	0	25	0
Total	66	0	56	0	46	1	85	1	253	2

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches in an urban setting is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type											Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Right Turn	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total
Fair Street/St. James Street	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	**2**	**0.46**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were two total accidents at the Fair Street/St. James Street intersection during the three year period, which results in an accident rate below the average accident rate when compared to similar intersections. Of the two accidents, one resulted in an injury while the other was non-reportable. Non-reportable accidents are collisions that result in damage less than $1,000. The non-reportable accident reported at this intersection occurred when one vehicle failed to yield the right-of-way of another vehicle and struck the passenger side at a right angle. The bicyclist collision was attributed to alcohol use by the bicyclist, and occurred when a vehicle traveling eastbound on Fair Street was struck by the bicycle on the rear passenger side. The two accidents are associated with driver error and not the result of geometric or operational issues with the intersection. An accident summary (TE-213 equivalent) at the Fair Street/St. James Street intersection is included under Attachment M.

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table 3 summarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A "Yes" under the "Signal Warrants Met?" column indicates that the criteria are satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment N.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]			Signal Warrants Met?			
	Fair Street SB	St. James Street		#1		#2	#3
		EB	WB	Cond. A	Cond. B		
7:00 AM	64	39	15	No	No	No	No
8:00 AM	115	55	26	No	No	No	No
9:00 AM	102	40	13	No	No	No	No
10:00 AM	121	42	24	No	No	No	No
11:00 AM	104	53	28	No	No	No	No
12:00 PM	114	51	31	No	No	No	No
1:00 PM	141	57	37	No	No	No	No
2:00 PM	157	60	45	No	No	No	No
3:00 PM	175	49	44	No	No	No	No
4:00 PM	187	72	42	No	No	No	No
5:00 PM	197	81	38	No	No	No	No
6:00 PM	122	39	25	No	No	No	No
Required Volumes	**Two Lane Major Street**			**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	One Lane Minor Street			**150**	**75**		
Overall Warrant Met?				**No**	**No**	**No**	**No**

[1] Volumes on Fair Street and St. James Street as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the Fair Street/St. James Street intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on Fair Street[1]	Existing Pedestrian Volume Crossing Fair Street[1]	Signal Warrant #4 Met?
7:00 AM	64	1	No
8:00 AM	115	1	No
9:00 AM	102	7	No
10:00 AM	121	9	No
11:00 AM	104	16	No
12:00 PM	114	12	No
1:00 PM	141	13	No
2:00 PM	157	14	No
3:00 PM	175	14	No
4:00 PM	187	14	No
5:00 PM	197	14	No
6:00 PM	122	16	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on Fair Street and pedestrian volumes crossing Fair Street as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell well short of the minimum 107 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the *Fair Street Nursery School* and *St. Joseph's School* are located approximately 600 to 1,000-feet northwest of the intersection on Pearl Street; however, the school crossing warrant is not met since adequate gaps in vehicle traffic flow are provided on Clinton Avenue based on a review of the turning movement count data and the SimTraffic simulation.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

Fair Street/St. James Street Intersection	Collision Severity				Collision Type								Signal Warrant #7 Met?
	Non-Reportable	Property Damage	Injury	Fatal	Overtaking	Right Turn	Rear-End	Right Angle	Parked Car	Bicycle	Left-Turn	Total	
Jun 1, 2015 to May 31, 2016	1	0	0	0	0	0	0	1	0	0	0	**1**	No
Jun 1, 2016 to May 31, 2017	0	0	0	0	0	0	0	0	0	0	0	**0**	No
Jun 1, 2017 to May 31, 2018	0	0	1	0	0	0	0	0	0	1	0	**1**	No
Required Volumes	**Two-Lane Major Street**												**See Table 4C-1**
	Two-Lane Minor Street												
Overall Warrant Met?													**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on Fair Street is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the Fair Street/St James Street intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control (existing conditions) – A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the southbound Fair Street approach.
- All-Way Stop Control – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Attachment O contains further detailed descriptions of LOS criteria for signalized and unsignalized intersections and copies of the detailed level of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Fair Street/St. James Street					
Existing	St. James Street EB	TR	S	B (13.3)	B (13.8)
	St. James Street WB	LT		B (12.9)	B (13.2)
	Fair Street SB	LTR		B (14.2)	B (15.9)
		Overall		B (13.8)	B (15.0)
Alternatives	St. James Street WB	LT	TW	A (7.4)	A (7.4)
	Fair Street SB	LTR		A (9.2)	B (10.6)
	St. James Street EB	TR	AW	A (7.2)	A (8.1)
	St. James Street WB	LT		A (7.6)	A (8.1)
	Fair Street SB	LTR		A (7.6)	A (9.2)
		Overall		A (7.5)	A (8.8)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the Fair Street/St. James Street intersection indicates that all three traffic control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS B conditions or better on all approaches).

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal (Existing)	Two-Way Stop	All-Way Stop	Signal (Existing)	Two-Way Stop	All-Way Stop
Stops (#)	101	125	197	201	234	352
Fuel Consumed (gal)	2	2	2	4	4	4
CO Emissions (kg)	0.14	0.13	0.16	0.27	0.25	0.30
NOx Emissions (kg)	0.03	0.03	0.03	0.05	0.05	0.06
VOC Emissions (kg)	0.03	0.03	0.04	0.06	0.06	0.07

The analysis shows the following:

- The existing traffic signal and the two-way stop alternative are comparable in terms of emissions and fuel consumption; however, the all-way stop alternative increases the number of vehicle stops which creates a higher environmental/emission impacts associated with idling/braking/accelerating at the intersection.
- The two-way stop alternative has the lowest environmental/emissions impacts compared to the remaining two intersection control options.
- All traffic control alternatives are considered feasible.

Traffic Operations – Sensitivity Analysis

A review of the *Kingston Downtown Revitalization Initiative* (Kingston DRI) indicates that a transportation plan has been recommended to improve accessibility and circulation in the Uptown Stockade area. In general, the proposed improvements would reverse street directions along Wall Street and Fair Street in addition to some secondary streets such as John Street and Main Street. This improvement would impact at least five of the eleven study area intersections. A sensitivity analysis was conducted to determine if the preferred traffic control alternatives would change if the proposed traffic pattern change was implemented. The existing traffic volumes were redistributed based on a review of the proposed *Kingston DRI* plan and are shown on Figure 4 and Figure 5. A level of service sensitivity analysis was conducted at the Fair Street/St. James Street intersection similar to the assessment provided in section 3.0. Table 8 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 8 – Level of Service Kingston DRI Sensitivity Analysis Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Fair Street/St. James Street					
Existing	St. James Street EB	L~~TR~~	S	B (14.0)	B (14.4)
	St. James Street WB	R~~LT~~		B (14.0)	B (14.3)
	Fair Street NB	LTR		B (12.2)	B (13.7)
	Overall			B (12.7)	B (13.9)
Alternatives	St. James Street E~~W~~B	L	TW	A (7.3)	A (7.3)
	Fair Street NB	LTR		A (9.1)	B (10.2)
	St. James Street EB	TR	AW	A (7.5)	A (8.1)
	St. James Street WB	LT		A (7.1)	A (7.9)
	Fair Street NB	LTR		A (7.9)	A (9.3)
	Overall			A (7.7)	A (8.9)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The sensitivity analysis indicates that the Fair Street/St. James Street intersection will operate adequately during the AM and PM peak hours under all-way stop control and traffic signal control options if the proposed improvement plan recommended in the *Kingston DRI* is implemented in the Uptown Stockade area (LOS C conditions or better on all approaches). The sensitivity analysis also indicates that the northbound Fair Street approach will operate at LOS C/F during the AM and PM peak hours under stop control conditions; therefore, it is recommended that all-way stop control or traffic signal control be proposed at this intersection if the *Kingston DRI* is implemented in the Uptown Stockade area.

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the Fair Street/St. James Street intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that Fair Street would be the major street and a stop sign would be installed on the St James Street approaches. The results of the sight distance evaluation are summarized in Table 9.

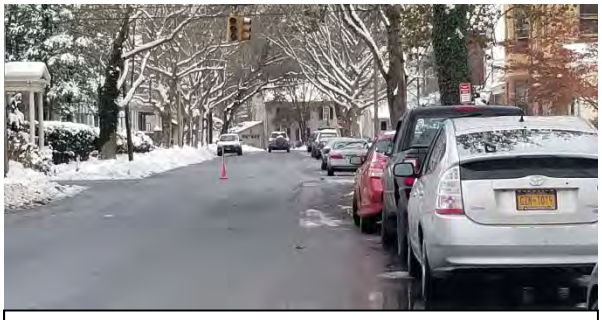
Table 9 – Sight Distance Evaluation (feet)

Fair Street/St. James Street		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from Fair Street (D_L)	Crossing Maneuver from Fair Street		Left Turn from Fair Street		Left Turn from St. James Street (D_S)	SSD_{EB}	SSD_{WB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
Fair Street / St. James Street **North Leg**	Available	45	45	50	45	50	375	350	350
	Recommended[3]	290	290	290	335	335	245	175	175

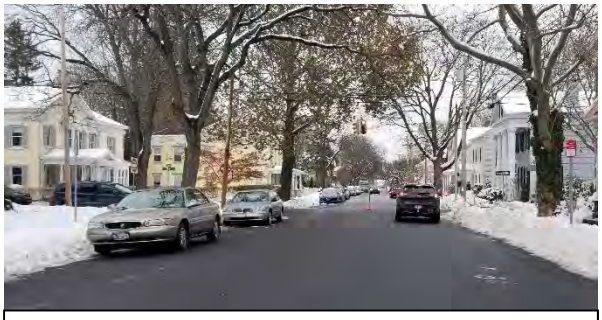
1. Intersection sight distance is measured at 14.5 feet back from St. James Street at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on St. James Street.
3. Sight distance measurements are compared to AASHTO recommended distances for a 30-mph operating speed on St. James Street.

The sight distance analysis on St. James Street shows that the available stopping sight distance for the east and west legs of the intersection along with the sight distance looking straight for westbound traffic

on St. James Street to make left turns onto Fair Street exceed the AASHTO recommended guidelines for a 30-mph operating speed. In addition, the analysis shows that the sight distances looking left and right from the north leg of Fair Street does not meet the AASHTO recommended guidelines for a 30-mph operating speed to make a left from Fair Street or to cross St. James Street due to on-street parking. The available sight lines looking back toward Fair Street for motorists looking left and right from the north leg of Fair Street are illustrated below in Photographs 1 and 2

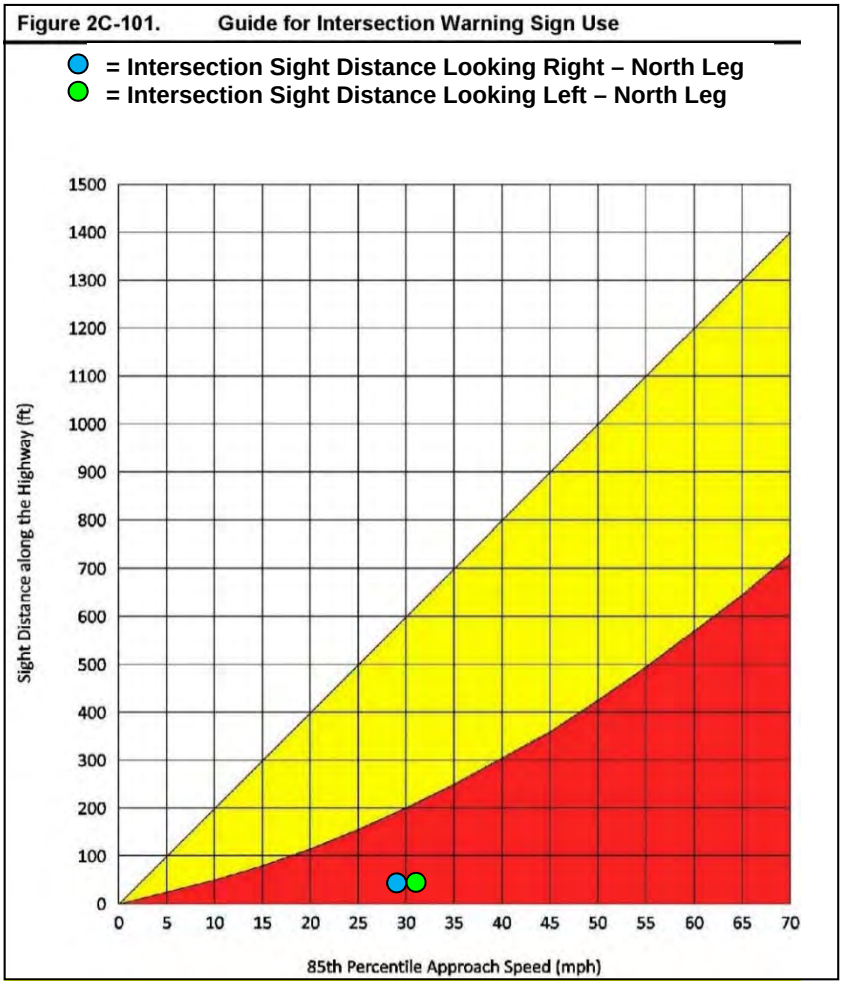


Photograph 1 – Sight distance looking back to toward Fair Street for Motorists Looking Left (D_L)



Photograph 2 – Sight distance looking back to toward Fair Street for Motorists Looking Right (D_R)

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of "Intersection Warning" signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking left and right from the north leg of Fair Street is critically limited due to on-street parking. At a minimum, "Intersection Warning" signs are recommended if the two-way stop control condition were implemented.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 10 summarizes which of the criteria are met for the Fair Street/St. James Street intersection.

Table 10 – All-Way Stop Criteria

Fair Street/St. James Street	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	Yes

Table 10 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the Fair Street/St. James Street intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the Fair Street/St. James Street intersection should be removed and replaced with all-way stop control due to limited sight lines. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the eastbound and westbound St. James Street approaches and the southbound Fair Street approach. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. Stop ahead signs (W3-1) with flags should be placed on each approach. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD. On-street parking should be set back for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

R1-1

R1-3P


W3-1

Attachment J
Foxhall Avenue/Grand Street/Shufeldt Street

Traffic Signal Removal Assessment
City of Kingston, New York

Foxhall Avenue/Grand Street/Shufeldt Street Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the Foxhall Avenue/Grand Street/Shufeldt Street intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum warrants to justify their continued operation.

Roadways Serving the Study Area

Foxhall Avenue is classified as an urban minor arterial and provides north-south travel from Albany Avenue to NY Route 32 (Broadway). Foxhall Avenue is a 28 to 30 foot wide roadway and allows two-way traffic. On-street parking is not permitted on either side of the road north or south of Grand Street and Shufeldt Street. The city speed limit is 30 mph and land uses along Foxhall Avenue near Grand Street and Shufeldt Street include a mix of comercial and residential land uses.

Grand Street is classified as an urban local road and provides east-west travel from Foxhall Avenue to NY Route 32 (Broadway). Grand Street is a 28 foot wide roadway that allows two-way traffic and on-street parking on the south side of the road near Foxhall Avenue. The city speed limit it is 30 mph and land uses along Grand Street near Foxhall Avenue generally include commercial and residential land uses.

Shufeld Street is classified as an urban local road and provides east-west travel from Foxhall Avenue to Clifton Avenue. Shufeldt Street is a 32 foot wide roadway that allows two-way traffic and on-street parking on both sides of the road. The city speed limit it is 30 mph and land uses along Shufeldt Street near Foxhall Avenue include primarily residential land uses.

Study Area Intersection

The Foxhall Avenue/Grand Street/Shufeldt Street intersection is a four-leg intersection that provides a single lane for shared travel movements on all approaches. A pre-timed traffic signal is provided at this intersection; however, it is currently operating under all-red flash control.

Pedestrian/Bicycle Accommodations

Sidewalks exist on both sides of Shufeldt Street, but only on the north side of Grand Street and the east side of Foxhall Avenue near the intersection. There are marked crosswalks on the east and west legs of the study area intersection. Table 1 summarizes the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

Foxhall Avenue/ Grand Street/ Shufeldt Street Intersection	Foxhall Avenue NB Approach		Foxhall Avenue SB Approach		Grand Street EB Approach		Shufeldt Street WB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	1	0	0	0	1	1	9	0	11	1
8:00 to 9:00 a.m.	0	0	1	0	0	0	1	0	2	0
9:00 to 10:00 a.m.	0	0	0	0	2	0	4	0	6	0
10:00 to 11:00 a.m.	0	0	0	0	3	0	2	0	5	0
11:00 a.m. to 12:00 p.m.	0	0	2	0	4	2	6	0	12	2
12:00 to 1:00 p.m.	2	0	1	0	2	0	1	0	6	0
1:00 to 2:00 p.m.	0	0	1	0	1	0	6	0	8	0
2:00 to 3:00 p.m.	0	0	1	0	9	1	9	0	19	1
3:00 to 4:00 p.m.	1	0	4	0	10	0	11	0	26	0
4:00 to 5:00 p.m.	0	0	2	0	3	1	3	0	8	1
5:00 to 6:00 p.m.	1	0	3	0	4	0	4	0	12	0
6:00 to 7:00 p.m.	0	0	0	0	1	1	1	1	2	2
Total	5	0	15	0	40	6	57	1	117	7

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches in an urban setting is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type								Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Rear-End	Sideswipe	Right-Angle	Fixed Object	Pedestrian	Bicycle	Other	Total	
Foxhall Avenue/Grand Street/Shufeldt Street	1	2	1	0	1	1	1	1	0	0	0	**4**	**0.48**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were four total accidents at the Foxhall Avenue/Grand Street/Shufeldt Street intersection during the three year period, which results in an accident rate slightly below the average accident rate when compared to similar intersections. Of the four accidents, one resulted in an injury, two resulted in property damage only, and one was non-reportable. Non-reportable accidents are collisions that result in damage less than $1,000. There were no fatal accidents. The accident involving a sideswipe occurred when a vehicle traveling north on Foxhall Avenue used their lane improperly and struck the side of a vehicle traveling south. The right angle accident occurred when a vehicle struck another vehicle while

backing up. The fixed object accident involved a vehicle hitting a light support/utility pole while the rear-end accident occurred when a distracted motorist failed to stop at a traffic light and struck the vehicle in front of them from behind. These accidents are associated with driver error and not the result of geometric or operational issues with the intersection. An accident summary (TE-213 equivalent) at the Foxhall Avenue/Grand Street/Shufeldt Street intersection is included under Attachment M.

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table 3 summarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A "Yes" under the "Signal Warrants Met?" column indicates that the criteria are satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment N.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]			Signal Warrants Met?			
	Foxhall Avenue NB/SB	Grand Street EB	Shufeldt Street WB	#1		#2	#3
				Cond. A	Cond. B		
7:00 AM	397	59	73	No	No	No	No
8:00 AM	319	67	63	No	No	No	No
9:00 AM	283	83	38	No	No	No	No
10:00 AM	254	68	24	No	No	No	No
11:00 AM	272	98	36	No	No	No	No
12:00 PM	377	121	42	No	No	No	No
1:00 PM	386	94	55	No	No	No	No
2:00 PM	417	111	60	No	No	No	No
3:00 PM	459	138	57	No	No	No	No
4:00 PM	423	145	48	No	No	No	No
5:00 PM	400	123	50	No	No	No	No
6:00 PM	381	82	37	No	No	No	No
Required Volumes	**Two Lane Major Street**			**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	One Lane Minor Street			**150**	**75**		
Overall Warrant Met?				**No**	**No**	**No**	**No**

[1] Volumes on Grand Street, Shufeldt Street and St. James as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the Foxhall Avenue/Grand Street/Shufeldt Street intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on Foxhall Avenue[1]	Existing Pedestrian Volume Crossing Foxhall Avenue[1]	Signal Warrant #4 Met?
7:00 AM	397	1	No
8:00 AM	319	1	No
9:00 AM	283	0	No
10:00 AM	254	0	No
11:00 AM	272	2	No
12:00 PM	377	3	No
1:00 PM	386	1	No
2:00 PM	417	1	No
3:00 PM	459	5	No
4:00 PM	423	2	No
5:00 PM	400	4	No
6:00 PM	381	0	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on Foxhall Avenue and pedestrian volumes crossing Foxhall Avenue as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell well short of the minimum 107 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the *Meagher Elementary School* is located approximately ¼ mile southeast of the intersection on Wynkoop Place; however, the school crossing warrant is not met since adequate gaps in vehicle traffic flow are provided on Foxhall Avenue based on a review of the turning movement count data and the SimTraffic simulation.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

Foxhall Avenue/Grand Street/Shufeldt Street Intersection	Collision Severity				Collision Type						Signal Warrant #7 Met?
	Non-Reportable	Property Damage	Injury	Fatal	Right Angle	Rear-End	Sideswipe	Fixed Object	Other	Total	
Jun 1, 2015 to May 31, 2016	1	1	0	0	1	0	0	0	1	**2**	No
Jun 1, 2016 to May 31, 2017	0	1	1	0	0	0	1	1	0	**2**	No
Jun 1, 2017 to May 31, 2018	0	0	0	0	0	0	0	0	0	**0**	No
Required Volumes	**Two-Lane Major Street**										**See Table 4C-1**
	Two-Lane Minor Street										
Overall Warrant Met?											**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on Foxhall Avenue is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the Foxhall Avenue/Grand Street/Shufeldt Street intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control – A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the eastbound Grand Street and westbound Shufeldt Street approaches.
- All-Way Stop Control (existing conditions since the traffic signal is operating under all-red flash control) – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Attachment O contains further detailed descriptions of LOS criteria for signalized and unsignalized intersections and copies of the detailed level

of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
Foxhall Avenue/Grand Street/Shufeldt Street					
Existing	Grand Street EB	LTR	AW	A (9.4)	B (10.6)
	Shufeldt Street WB	LTR		A (8.9)	A (9.0)
	Foxhall Avenue NB	LTR		B (10.4)	B (10.9)
	Foxhall Avenue SB	LTR		A (9.7)	B (10.5)
		Overall		A (9.8)	B (10.6)
Alternatives	Foxhall Avenue NB	LTR	TW	A (8.2)	A (0.0)
	Foxhall Avenue SB	LTR		A (7.6)	A (8.0)
	Grand Street EB	LTR		C (15.0)	C (19.2)
	Shufeldt Street WB	LTR		B (13.5)	B (13.9)
	Grand Street EB	LTR	S	B (15.3)	~~B~~B (17.2)
	Shufeldt Street WB	LTR		B (15.3)	B (14.8)
	Foxhall Avenue NB	LTR		A (9.6)	B (10.4)
	Foxhall Avenue SB	LTR		B (10.2)	A (10.0)
		Overall		B (11.3)	B (12.2)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the Foxhall Avenue/Grand Street/Shufeldt Street intersection indicates that all three traffic control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS C conditions or better on all approaches).

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal	Two-Way Stop	All-Way Stop (Existing)	Signal	Two-Way Stop	All-Way Stop (Existing)
Stops (#)	304	160	554	378	219	652
Fuel Consumed (gal)	5	4	6	7	5	8
CO Emissions (kg)	0.37	0.26	0.45	0.46	0.34	0..55
NOx Emissions (kg)	0.07	0.05	0.09	0.09	0.07	0.11
VOC Emissions (kg)	0.08	0.06	0.10	0.11	0.08	0.13

The analysis shows the following:

- The traffic signal and the two-way stop alternative are comparable in terms of emissions and fuel consumption; however, the existing all-way stop has a higher number of vehicle stops which creates a higher environmental/emission impacts associated with idling/braking/accelerating at the intersection.
- The two-way stop alternative has the lowest environmental/emissions impacts compared to the remaining two intersection control options.
- All traffic control alternatives are considered feasible.

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the Foxhall Avenue/Grand Street/Shufeldt Street intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that Foxhall Avenue would be the major street and a stop sign would be installed on the Grand Street and Shufeldt Street approaches. The results of the sight distance evaluation are summarized in Table 8.

Table 8 – Sight Distance Evaluation (feet)

Foxhall Avenue/ Grand Street/ Shufeldt Street		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from Grand St. / Shufeldt St. (D_L)	Crossing Maneuver from Shufeldt St/ Grand St		Left Turn from Shufeldt St/Grand St		Left Turn from Foxhall Ave (D_S)	SSD_{NB}	SSD_{SB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
Shufeldt St/ Foxhall Ave **East Leg**	Available	225	225	>350	225	>350	>350	>350	>350
	Recommended[3]	290	290	290	335	335	245	175	175
Grand St/ Foxhall Ave **West Leg**	Available	65	65	335	65	335	>350	>350	>350
	Recommended[3]	290	290	290	335	335	245	175	175

1. Intersection sight distance is measured at 14.5 feet back from Foxhall Avenue at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on Foxhall Avenue.
3. Sight distance measurements are compared to AASHTO recommended distances for a 30-mph operating speed on Foxhall Avenue.

The sight distance analysis indicates that the available stopping sight distance on Foxhall Avenue and the available intersection sight distance looking straight to make left turns from Foxhall Avenue to both Shufeldt Street and Grand Street exceed AASHTO guidelines for the 30-mph operating speed. The analysis also shows that the sight distance looking right from Grand Street and Shufeldt Street meet recommended AASHTO guidelines for a 30-mph operating speed to make a left turn or to cross Foxhall Avenue. The available intersection sight distance looking left to make a left or right turn from Grand Street and Shufeldt Street are limited by a building and fencing and do not meet recommended AASHTO guidelines for a 30-mph operating speed. The available sight lines looking left and right from Shufeldt Street are shown on Photographs 1 and 2 while the sight lines looking left and right from Grand Street are shown on Photographs 3 and 4.

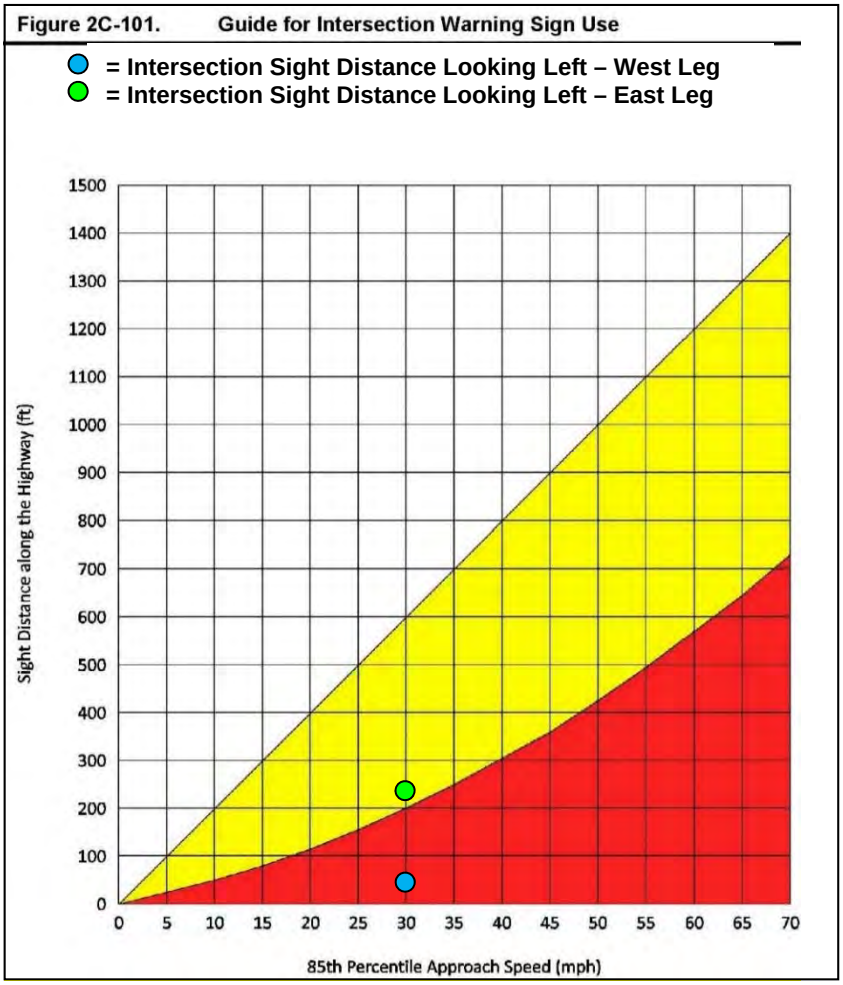
Photograph 1 – Sight distance looking left (D_L) from Shufeldt Street (east leg)

Photograph 2 – Sight distance looking right (D_R) from Shufeldt Street (east leg)

Photograph 3 – Sight distance looking left (D_L) from Grand Street (west leg)

Photograph 4 – Sight distance looking right (D_R) from Grand Street (west leg)

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of "Intersection Warning" signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking left from Grand Street is critically limited due to the building. At a minimum, an "Intersection Warning" sign is recommended if the two-way stop control condition were implemented.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 9 summarizes which of the criteria are met for the Foxhall Avenue/Grand Street/Shufeldt Street intersection.

Table 9 – All-Way Stop Criteria

Foxhall Avenue/Grand Street/Shufeldt Street	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	No

Table 9 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the Foxhall Avenue/Grand Street/Shufeldt Street intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the Foxhall Avenue/Grand Street/Shufeldt Street intersection should be removed and replaced with all-way stop control due to limited sight lines. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the eastbound and westbound Grand Street and Shufeldt Street approaches and the northbound and southbound Foxhall Avenue approaches. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection and available on-street parking. Stop ahead signs (W3-1) with flags should be placed on each approach. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD. On-street parking should be set back for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

Attachment K
East Chester Street/Lincoln Street

Traffic Signal Removal Assessment
City of Kingston, New York

East Chester Street/Lincoln Street Signal Warrant Assessment

1.0 Purpose and Existing Conditions

The purpose of this paper is to document the signal warrant and traffic control analysis completed for the East Chester Street/Lincoln Street intersection. The Ulster County Transportation Council (UCTC) initiated a comprehensive study to evaluate the potential removal of traffic signals at several intersections identified by the City of Kingston that may not meet the minimum warrants to justify their continued operation.

Roadways Serving the Study Area

East Chester Street is classified as an urban minor arterial and provides north-south travel from Broadway to US Route 9W. East Chester Street is a 22 to 28 foot wide roadway that allows two-way traffic. On-street parking is not permitted on either side of the road. The city speed limit is 30 mph and land uses along East Chester Street near Lincoln Street generally include commercial and some residential land uses.

Lincoln Street Avenue is classified as an urban local road and provides east-west travel from Hooker Street to Florence Street/Kachigian Street. Lincoln Street is a 23 to 27 foot wide roadway that allows two-way traffic. On-street parking is permitted on both sides of the road. The city speed limit it is 30 mph and land uses along Lincoln Street near East Chester Street generally include residential and commercial land uses.

Study Area Intersection

The East Chester Street/Lincoln Street intersection is a four-leg intersection controlled by a pre-timed traffic signal. Each approach provides a single lane for shared travel movements on all approaches.

Pedestrian/Bicycle Accommodations

Sidewalks exist only along the northwest quadrant of the intersection on the west side of East Chester Street and the north side of Lincoln Street. There are marked crosswalks on the east and west legs of the study area intersection. Table 1 summarizes of the peak hour pedestrian and bicycle activity observed during the turning movement count.

Table 1 – Pedestrian and Bicycle Activity Summary

East Chester Street/ Lincoln Street Intersection	East Chester St. NB Approach		East Chester St. SB Approach		Lincoln Street EB Approach		Lincoln Street WB Approach		Total	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00 to 8:00 a.m.	0	0	0	0	0	0	0	0	0	0
8:00 to 9:00 a.m.	0	0	0	0	0	0	0	0	0	0
9:00 to 10:00 a.m.	0	0	0	0	0	1	0	1	0	1
10:00 to 11:00 a.m.	0	0	0	0	0	0	0	0	0	0
11:00 a.m. to 12:00 p.m.	0	0	0	0	0	0	0	0	0	0
12:00 to 1:00 p.m.	0	0	1	0	0	0	0	0	1	0
1:00 to 2:00 p.m.	0	0	0	0	0	0	0	0	0	0
2:00 to 3:00 p.m.	0	1	0	0	0	0	0	0	0	1
3:00 to 4:00 p.m.	0	0	1	0	0	0	0	1	1	1
4:00 to 5:00 p.m.	0	0	0	0	0	0	0	0	0	0
5:00 to 6:00 p.m.	0	0	0	0	0	0	0	0	0	0
6:00 to 7:00 p.m.	0	1	0	0	0	0	0	1	0	2
Total	0	2	2	0	0	0	0	3	2	5

Accident Assessment

An accident analysis was performed at the study area intersection in accordance with NYSDOT Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersection. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at this intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 summarizes the predominant accident types for the intersection and also provides the intersection crash rate, which can be compared to the statewide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches in an urban setting is 0.52 accidents per million entering vehicles (ACC/MEV) and is used for comparison to the study area intersection. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets.

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type										Crash Rate (ACC/ MEV)
	Non-Reportable[1]	Property Damage	Injury	Fatal	Backing	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total
East Chester Street/Lincoln Street	1	1	2	0	0	1	2	0	1	0	0	0	0	0	**4**	**0.49**

[1] A non-reportable accident indicates no personal injuries occurred and property damages totaled less than $1,000.
MEV = Million Entering Vehicles

As shown in the table, there were four total accidents at the East Chester Street/Lincoln Street intersection during the three year period, which results in an accident rate of less than 1.5 times the statewide average for similar intersections (NYSDOT's threshold for requiring further study). . Of the four accidents, two resulted in injuries while the remaining two were a property damage only accident and a non-reportable accident. Non reportable accidents are collisions that result in damage less than $1,000. There were no fatal accidents and no pedestrian related collisions. The right-angle accident reported at this intersection was attributed to a disregard to the traffic signal control and a failure to yield to the right-of-way. The left-turn accident was the result of driver inexperience and a failure to yield to the right of

way. One of the rear end accidents occurred when a vehicle traveling south on East Chester Street failed to correctly judge their stopping distance and struck a vehicle from behind. The second rear-end accident occurred when a vehicle waiting to proceed northbound was struck from behind due to driver inattention and following too closely. The predominant accident type at the study area intersection is rear end collisions (two total); however, they are associated with driver error and not the result of geometric or operational issues with the intersection. An accident summary (TE-213 equivalent) at the East Chester Street/Lincoln Street intersection is included under Attachment M.

2.0 Signal Warrant Assessment

Detailed Signal Warrant Analysis

- Warrants 1, 2, and 3 – Table 3 summarizes the analysis of Warrants 1, 2, and 3 based on the traffic volume data. A "Yes" under the "Signal Warrants Met?" column indicates that the criteria are satisfied for that hour. The detailed evaluation for Warrants 1, 2, and 3 is included under Attachment N.

Table 3 – Summary of Signal Warrant Analysis – Existing (2019) Traffic Volume Conditions

Time Begin (1-hour period)	Existing Volumes[1]			Signal Warrants Met?			
	East Chester St. NB/SB	Lincoln Street		#1		#2	#3
		EB	WB	Cond. A	Cond. B		
7:00 AM	382	15	70	No	No	No	No
8:00 AM	320	22	65	No	No	No	No
9:00 AM	306	23	29	No	No	No	No
10:00 AM	318	17	36	No	No	No	No
11:00 AM	406	19	40	No	No	No	No
12:00 PM	425	26	45	No	No	No	No
1:00 PM	392	17	40	No	No	No	No
2:00 PM	487	29	48	No	No	No	No
3:00 PM	502	31	56	No	No	No	No
4:00 PM	545	31	48	No	No	No	No
5:00 PM	552	31	53	No	No	No	No
6:00 PM	410	31	47	No	No	No	No
Required Volumes	**Two Lane Major Street**			**500**	**750**	**See Figure 4C-1**	**See Figure 4C-3**
	Two Lane Minor Street			**150**	**75**		
Overall Warrant Met?				**No**	**No**	**No**	**No**

[1] Volumes on East Chester Street and Lincoln Street as per Tri-State turning movement count data.

Table 3 indicates that traffic volumes over the course of a typical day at the East Chester Street/ Lincoln Street intersection are not high enough under existing traffic volume conditions to meet the minimum traffic signal criteria for Warrants 1, 2, or 3.

- Warrant 4 – Pedestrians were observed during the 12-hour intersection turning movement counts. Table 4 summarizes the analysis of Warrant 4 using this data. A "Yes" under the "Signal Warrant #4 Met?" column indicates that the criteria are satisfied for that hour.

Table 4 – Summary of Signal Warrant 4 Analysis

Time Begin (1-hour period)	Existing Traffic Volume on East Chester Street[1]	Existing Pedestrian Volume Crossing East Chester Street[1]	Signal Warrant #4 Met?
7:00 AM	382	0	No
8:00 AM	320	0	No
9:00 AM	306	0	No
10:00 AM	318	0	No
11:00 AM	406	0	No
12:00 PM	425	0	No
1:00 PM	392	0	No
2:00 PM	487	1	No
3:00 PM	502	0	No
4:00 PM	545	0	No
5:00 PM	552	0	No
6:00 PM	410	1	No
Required Volumes	**Two Lane Major Street – Vehicles**		**See Figure 4C-7**
	Crossing Major Street – Pedestrians		
Overall Warrant Met?			**No**

1 Traffic volumes on East Chester Street and pedestrian volumes crossing East Chester Street as per Tri-State intersection turn movement count data.

Table 4 indicates that existing pedestrian volumes observed at the study intersection during the peak 12-hours of the day are not high enough to meet the minimum traffic signal criteria for Warrant 4. The existing traffic volumes and observed pedestrian volumes at the intersection fell well short of the minimum 75 pedestrian threshold associated with mainline traffic volumes during these peak periods. It is not anticipated that this intersection experiences heavy pedestrian usage during the remaining 12 hours of the day or that future pedestrian usage will increase to levels that would warrant the installation of a traffic signal; therefore, Warrant 4 is not satisfied under these conditions.

- Warrant 5 – It is noted that the this warrant is not met since the nearest school is located over ½ mile away from the East Chester Street/Lincoln Street intersection.

- Warrant 6 – The adjacent intersections are not part of a coordinated signal system; therefore, this warrant is not met since the installation of a traffic signal is not necessary to maintain adequate vehicle platooning.

- Warrant 7 – Table 5 summarizes accident data provided by NYSDOT for three years (2015 through 2018). A check mark under the "Signal Warrant #7 Met?" column indicates that the warrant is met.

Table 5 – Summary of Signal Warrant 7 Analysis

East Chester Street/Lincoln Street Intersection	Collision Severity				Collision Type						Signal Warrant #7 Met?
	Non-Reportable	Property Damage	Injury	Fatal	Overtaking	Right Angle	Rear-End	Fixed Object	Left-Turn	Total	
Jun 1, 2015 to May 31, 2016	1	0	0	0	0	0	1	0	0	**1**	No
Jun 1, 2016 to May 31, 2017	0	1	1	0	0	1	0	0	1	**2**	No
Jun 1, 2017 to May 31, 2018	0	0	1	0	0	0	1	0	0	**1**	No
Required Volumes	**Two-Lane Major Street**										**See Table 4C-1**
	Two-Lane Minor Street										
Overall Warrant Met?											**No**

Table 5 indicates that the number of accidents experienced at this intersection each year from 2015 to 2018 do not meet the minimum of five accidents required for the warrant and that the volume criteria on East Chester Street is not met for the eight hours required. This indicates that Warrant 7 is not satisfied under these conditions.

- Warrant 8 – Entering traffic volumes (as noted in Table 3) at this intersection will not exceed 1,000 vph during peak weekday or weekend time periods; therefore, this warrant will not be satisfied.

A review of the signal warrant criteria contained in the *2009* National MUTCD (NMUTCD) indicates that none of the eight warrants investigated meet the minimum criteria for the installation of a traffic signal at the East Chester Street/Lincoln Street intersection.

3.0 Existing Traffic Control and Potential Alternatives Assessment

An assessment of all three potential traffic control alternatives is provided for comparison purposes even though the re-installation of a traffic signal should not be pursued based on the traffic signal warrant evaluation provided.

Traffic Control Alternatives

The following intersection alternatives were reviewed to determine if this intersection will operate adequately under different forms of traffic control:

- Pre-timed Traffic Signal Control (existing conditions) – A traffic signal operating under a pre-timed signal cycle.
- Two-Way Stop Control – Install a stop sign on the eastbound and westbound Lincoln Street approaches.
- All-Way Stop Control – Install stop signs on all approaches.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made for each alternative using the Synchro software which automates the procedures contained in the *Highway Capacity Manual*. Levels of service range from A to F with LOS A conditions considered excellent with very little delay while LOS F generally represents conditions with very long delays. Attachment O contains further detailed descriptions of LOS criteria for signalized and unsignalized intersections and copies of the detailed level

of service reports. Table 6 shows the results of the Level of Service calculations for the AM and PM peak hours.

Table 6 – Level of Service Summary

Intersection			Control	Existing 2019	
				AM Peak Hour	PM Peak Hour
East Chester Street/Lincoln Street					
Existing	Lincoln Street EB	LTR	S	B (11.0)	B (11.1)
	Lincoln Street WB	LTR		B (11.6)	B (11.3)
	East Chester Street NB	LTR		B (13.2)	B (14.4)
	East Chester Street SB	LTR		B (13.8)	B (15.5)
		Overall		B (13.2)	B (14.6)
Alternatives	East Chester Street NB	L	TW	A (7.8)	A (7.9)
	East Chester Street SB	L		A (7.9)	A (8.0)
	Lincoln Street EB	LTR		B (12.4)	C (16.7)
	Lincoln Street WB	LTR		B (12.7)	B (14.0)
	Lincoln Street EB	LTR	AW	A (8.2)	A (9.1)
	Lincoln Street WB	LTR		A (9.0)	A (8.9)
	East Chester Street NB	LTR		A (9.5)	B (10.5)
	East Chester Street SB	LTR		B (10.3)	B (11.4)
		Overall		A (9.8)	B (10.7)

Key: X (Y.Y) = Level of Service (Delay, seconds per vehicle).
S, TW, AW = Signalized control, Two-way stop controlled, and All-way stop controlled intersections.
NB, SB, WB, EB = Northbound, Southbound, Westbound, Eastbound intersection approaches.
LTR = Left-turn, through, and/or right-turn movements.

The level of service analysis conducted at the East Chester Street/Lincoln Street intersection indicates that all three traffic control alternatives would provide adequate traffic operations during the AM and PM peak hours (LOS C conditions or better on all approaches).

Table 7 compares the alternatives to the existing conditions for several measures of effectiveness (MOEs) including the number of stops, fuel consumed, and vehicle emissions.

Table 7 – Measures of Effectiveness Comparison

Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
	Signal (Existing)	Two-Way Stop	All-Way Stop	Signal (Existing)	Two-Way Stop	All-Way Stop
Stops (#)	316	135	512	457	174	668
Fuel Consumed (gal)	5	3	6	7	4	8
CO Emissions (kg)	0.37	0.22	0.41	0.52	0.29	0.55
NOx Emissions (kg)	0.07	0.04	0.08	0.10	0.06	0.11
VOC Emissions (kg)	0.08	0.05	0.10	0.12	0.07	0.13

The analysis shows the following:

- The existing traffic signal and the all-way stop alternative are comparable in terms of emissions and fuel consumption; however, the two-way stop alternative decreases the number of vehicle stops which creates a lower environmental/emission impacts associated with idling/braking/accelerating at the intersection.
- The two-way stop alternative has the lowest environmental/emissions impacts compared to the remaining two intersection control options.
- All traffic control alternatives are considered feasible.

4.0 Two-Way Stop Control – Sight Distance Evaluation

In order to provide two-way stop control, adequate sight lines must be provided; therefore, a sight distance evaluation was completed at the East Chester Street/Lincoln Street intersection based on the criteria summarized in the *Traffic Signal Removal Assessment* memo. It is assumed that East Chester Street would be the major street and a stop sign would be installed on the Lincoln Street approaches. The results of the sight distance evaluation are summarized in Table 8.

Table 8 – Sight Distance Evaluation (feet)

East Chester Street/Lincoln Street		Intersection Sight Distance[1]						Stopping Sight Distance[2]	
		Right Turn from Lincoln Street (D_L)	Crossing Maneuver from Lincoln Street		Left Turn from Lincoln Street		Left Turn from East Chester St. (D_S)	SSD_{NB}	SSD_{SB}
			Looking Left (D_L)	Looking Right (D_R)	Looking Left (D_L)	Looking Right (D_R)			
East Chester St./Lincoln St. East Leg	Available	>450	>450	280	>450	280	>500	>500	>500
	Recommended[3]	385	445	445	385	385	325	275	275
East Chester St./Lincoln St. West Leg	Available	>450	>450	325	>450	325	>500	>500	>500
	Recommended[3]	385	445	445	385	385	325	275	275

1. Intersection sight distance is measured at 14.5 feet back from East Chester Street at an eye height and object height of 3.5 feet.
2. Stopping sight distance is measured at an eye height of 3.5 feet for a 2-foot object located in the path of vehicles on East Chester Street.
3. Sight distance measurements are compared to AASHTO recommended distances for a 40-mph operating speed on East Chester Street.

The sight distance assessment at the East Chester Street/Lincoln Street intersection indicates that the available stopping sight distance on East Chester Street, the available intersection sight distance looking straight to make left turns from East Chester Street on to both legs of Lincoln Street, and the available intersection sight distance to make a left turn from both legs of Lincoln Street exceed AASHTO guidelines for the 40-mph operating speed if snow banks are managed on each corner of the intersection. The available sight distance looking right from both legs of Lincoln Street do not meet the AASHTO recommended guidelines for a 40-mph operating speed to make a left turn from Lincoln Street due to vehicles parked in the adjacent parking lots. The available sight lines looking left and right from the east and west legs of Lincoln Street are illustrated below in Photographs 1 through 4.

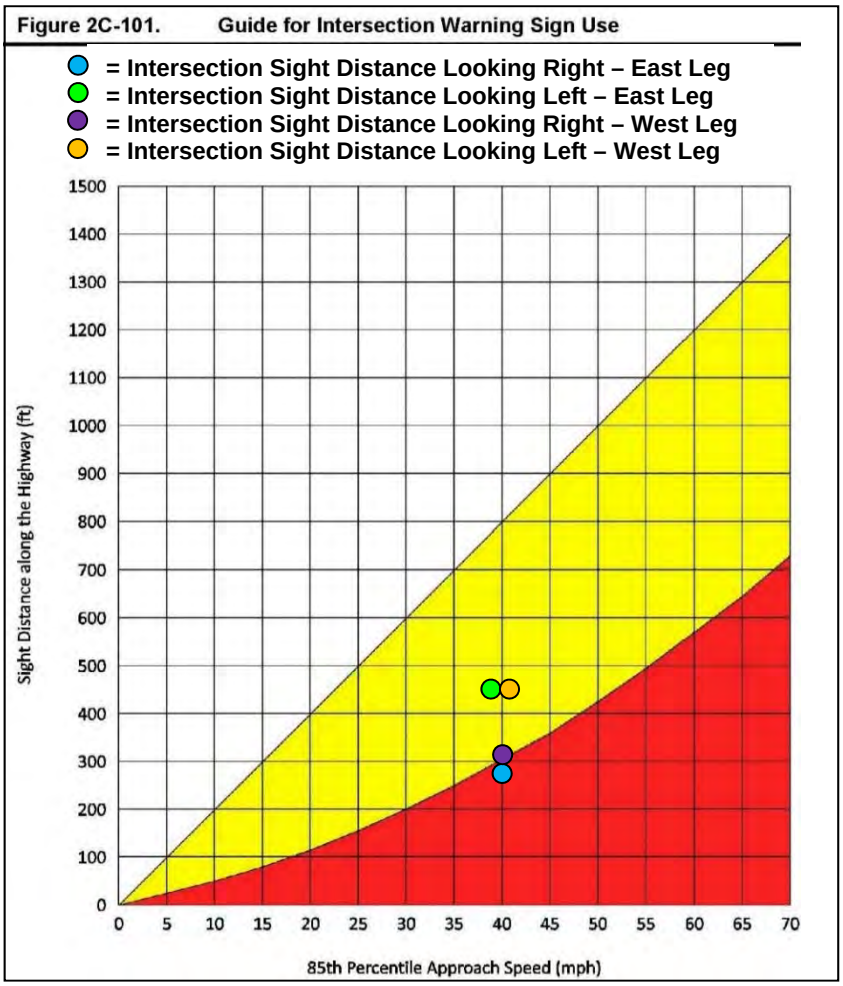
Photograph 1 – Sight distance looking left (D_L) from the east leg of Lincoln Street

Photograph 2 – Sight distance looking right (D_R) from the east leg of Lincoln Street

Photograph 3 – Sight distance looking left (D_L) from the west leg of Lincoln Street

Photograph 4 – Sight distance looking right (D_R) from the west leg of Lincoln Street

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the NMUTCD provides guidance for the installation of "Intersection Warning" signs as mitigation for sight distance. A review of Figure 2C-101 indicates that the available sight distance looking right from the east leg of Lincoln Street is critically limited due to parked vehicles in the adjacent parking lot. At a minimum, an "Intersection Warning" sign is recommended if the two-way stop control condition were implemented. It is noted that the available sight distance could be mitigated if parking within the parking lots was moved away from the street; however, these parking lots are small and this change would impact operations of the businesses and is not considered feasible.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

5.0 All-Way Stop Control – NMUTCD and NYS Supplement Guidance

The use of all-way stop control can be useful as a safety measure if certain traffic conditions exist such as limited visibility and the streets with similar characteristics among others. Safety concerns associated with all-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Installation of all-way stop control is determined by guidance from the NMUTCD and the NYS Supplement and as summarized in the *Traffic Signal Removal Assessment* memo. Table 9 summarizes which of the criteria are met for the East Chester Street/Lincoln Street intersection.

Table 9 – All-Way Stop Criteria

East Chester Street/ Lincoln Street	Condition Met?			
	A	B	C	D
Section 2B.07.04	NA	No	No	No
Section 2B.07.05	NA	No	Yes	No

Table 9 indicates that guidelines provided under Section 2B.07.05 are met for the provision of an all-way stop control condition at the East Chester Street/Lincoln Street intersection.

6.0 Conclusion/Recommendation

The intersection assessment indicates that the existing traffic signal at the East Chester Street/Lincoln Street intersection should be removed and replaced with all-way stop control due to limited sight lines. This intersection will provide adequate operations for vehicles, pedestrians, and bicycles after the traffic control change.

R1-1

R1-3P


W3-1

Based on a review of the NMUTCD and NYS Supplement guidelines, it is recommended that stop signs (R1-1) with supplemental "All-Way" plaques (R1-3P) be installed on the eastbound and westbound Lincoln Street approaches and on the northbound and southbound East Chester Street approaches. It is also recommended that additional stop signs be placed on the left-hand side of the streets as well due to the width of the intersection. Stop ahead signs (W3-1) with flags should be placed on each approach. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect. All signs should be installed in accordance with the NMUTCD.

Attachment L
Turning Movement Counts

Traffic Signal Removal Assessment
City of Kingston, New York

TRI-STATE TRAFFIC DATA

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Kingston, NY
Washington Ave & Linderman Ave
Wednesday, May 8, 2019
Location: 41.927234, -74.017933

Count Name: Washington Ave & Linderman Ave
Site Code:
Start Date: 05/08/2019
Page No: 1

Turning Movement Data

Start Time	Linderman Ave Eastbound							Linderman Ave Westbound							Washington Ave Northbound							Washington Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	3	2	1	2	0	1	8	0	6	0	1	0	0	7	7	29	1	0	0	0	37	1	33	1	0	0	0	35	87
7:15 AM	4	5	4	0	0	1	13	0	9	2	2	0	3	13	3	56	0	0	0	0	59	5	43	1	0	0	0	49	134
7:30 AM	1	8	4	3	0	0	16	1	5	6	2	0	0	14	1	59	0	0	0	0	60	2	56	3	0	0	0	61	151
7:45 AM	5	5	1	0	0	0	11	0	8	10	2	0	0	20	6	61	0	0	0	0	67	7	78	3	0	0	0	88	186
Hourly Total	13	20	10	5	0	2	48	1	28	18	7	0	3	54	17	205	1	0	0	0	223	15	210	8	0	0	0	233	558
8:00 AM	4	5	3	2	0	0	14	0	7	9	3	0	1	19	2	44	0	0	0	1	46	3	57	4	1	0	0	65	144
8:15 AM	3	5	0	0	0	0	8	2	7	3	2	0	3	14	2	48	0	0	0	0	50	4	69	4	0	0	0	77	149
8:30 AM	3	5	1	0	0	0	9	2	6	8	2	0	2	18	5	61	3	0	0	0	69	2	45	1	0	0	1	48	144
8:45 AM	1	6	1	2	0	2	10	1	9	7	2	0	1	19	3	62	3	0	0	0	68	2	60	2	0	0	0	64	161
Hourly Total	11	21	5	4	0	2	41	5	29	27	9	0	7	70	12	215	6	0	0	1	233	11	231	11	1	0	1	254	598
9:00 AM	1	4	2	1	0	1	8	1	3	7	1	0	0	12	2	51	1	0	0	2	54	4	54	1	2	0	0	61	135
9:15 AM	2	7	1	0	0	2	10	0	7	3	2	0	0	12	2	33	0	0	0	2	35	2	41	3	0	0	0	46	103
9:30 AM	5	2	3	0	0	0	10	0	8	8	1	0	1	17	1	49	0	0	0	0	50	6	43	2	0	0	3	51	128
9:45 AM	4	1	1	1	0	0	7	1	3	4	1	0	0	9	1	49	0	0	0	0	50	8	35	1	1	0	0	45	111
Hourly Total	12	14	7	2	0	3	35	2	21	22	5	0	1	50	6	182	1	0	0	4	189	20	173	7	3	0	3	203	477
10:00 AM	2	4	1	0	0	0	7	1	4	6	5	0	0	16	2	33	0	0	0	0	35	3	44	2	0	0	0	49	107
10:15 AM	1	3	1	0	0	0	5	1	7	3	1	0	0	12	5	30	0	0	0	0	35	2	36	3	1	0	0	42	94
10:30 AM	1	3	0	0	0	1	4	2	9	7	3	0	0	21	2	44	0	0	0	0	46	5	33	0	2	0	0	40	111
10:45 AM	5	2	1	0	0	0	8	1	4	2	0	0	2	7	4	39	2	0	0	0	45	6	43	2	0	0	0	51	111
Hourly Total	9	12	3	0	0	1	24	5	24	18	9	0	2	56	13	146	2	0	0	0	161	16	156	7	3	0	0	182	423
11:00 AM	2	4	0	0	0	0	6	0	3	5	0	0	2	8	3	44	0	0	0	0	47	2	31	0	2	0	0	35	96
11:15 AM	1	5	2	1	0	2	9	4	3	8	0	0	1	15	2	42	0	0	0	1	44	2	36	2	0	0	1	40	108
11:30 AM	4	5	2	3	0	1	14	1	3	3	1	0	0	8	1	40	1	1	0	2	43	2	47	2	0	0	1	51	116
11:45 AM	5	4	0	0	0	1	9	1	7	4	1	0	0	13	6	33	0	0	0	0	39	2	47	1	0	0	0	50	111
Hourly Total	12	18	4	4	0	4	38	6	16	20	2	0	3	44	12	159	1	1	0	3	173	8	161	5	2	0	2	176	431
12:00 PM	1	2	0	0	0	0	3	3	7	5	0	0	0	15	7	40	0	1	0	0	48	1	51	2	1	0	0	55	121
12:15 PM	1	2	4	0	0	0	7	1	7	5	1	0	1	14	3	39	0	0	0	0	42	4	49	2	0	0	0	55	118
12:30 PM	1	5	2	2	0	0	10	0	5	2	2	0	1	9	5	65	0	0	0	0	70	8	47	1	0	0	0	56	145
12:45 PM	2	4	1	1	0	1	8	1	8	3	2	0	1	14	7	41	1	0	0	0	49	0	66	2	0	0	0	68	139
Hourly Total	5	13	7	3	0	2	28	5	27	15	5	0	3	52	22	185	1	1	0	0	209	13	213	7	1	0	0	234	523
1:00 PM	0	4	1	0	0	1	5	0	8	3	2	0	1	13	1	48	0	0	0	2	49	2	53	2	2	0	0	59	126
1:15 PM	2	6	0	0	0	2	8	1	6	2	0	0	1	9	7	38	1	0	0	0	46	2	47	3	0	0	1	52	115
1:30 PM	2	5	1	2	0	3	10	2	6	4	1	0	0	13	2	40	0	0	0	2	42	2	50	5	0	0	0	57	122
1:45 PM	1	10	1	0	0	0	12	3	6	7	3	0	0	19	3	48	0	0	0	0	51	3	58	1	0	0	1	62	144
Hourly Total	5	25	3	2	0	6	35	6	26	16	6	0	2	54	13	174	1	0	0	4	188	9	208	11	2	0	2	230	507
2:00 PM	6	2	2	0	0	0	10	2	9	7	2	0	4	20	4	55	2	2	0	0	63	4	51	1	1	0	1	57	150
2:15 PM	4	5	0	0	0	1	9	1	9	11	6	0	3	27	9	57	0	1	0	2	67	4	46	3	0	0	1	53	156
2:30 PM	2	7	1	0	0	0	10	1	17	4	2	0	2	24	10	66	0	0	0	0	76	2	64	2	3	0	0	71	181
2:45 PM	4	3	1	1	0	1	9	2	12	6	4	0	2	24	7	56	0	1	0	0	64	12	76	2	1	0	1	91	188
Hourly Total	16	17	4	1	0	2	38	6	47	28	14	0	11	95	30	234	2	4	0	2	270	22	237	8	5	0	3	272	675
3:00 PM	3	0	4	0	0	2	7	1	12	9	1	0	2	23	12	78	3	0	0	0	93	6	68	1	0	0	4	75	198
3:15 PM	1	3	1	0	0	1	5	4	8	7	2	0	2	21	7	69	1	0	0	3	77	9	60	6	0	0	5	75	178
3:30 PM	5	4	0	0	0	1	9	2	10	4	3	0	0	19	8	64	0	0	0	0	72	3	77	1	0	0	0	81	181
3:45 PM	1	6	2	1	0	1	10	0	13	10	4	0	2	27	7	65	1	1	0	1	74	6	64	4	1	0	2	75	186
Hourly Total	10	13	7	1	0	5	31	7	43	30	10	0	6	90	34	276	5	1	0	4	316	24	269	12	1	0	11	306	743
4:00 PM	1	4	1	0	0	2	6	1	15	7	3	0	0	26	8	70	1	0	0	2	79	8	54	1	1	0	0	64	175
4:15 PM	2	7	2	0	0	0	11	3	18	6	4	0	0	31	5	64	0	0	0	0	69	5	50	4	0	0	1	59	170
4:30 PM	2	7	1	1	0	2	11	2	14	8	2	0	0	26	3	65	1	0	0	1	69	2	74	3	0	0	1	79	185
4:45 PM	3	2	2	0	0	2	7	2	10	3	2	0	0	17	6	79	2	0	0	0	87	1	75	3	0	0	0	79	190
Hourly Total	8	20	6	1	0	6	35	8	57	24	11	0	0	100	22	278	4	0	0	3	304	16	253	11	1	0	2	281	720
5:00 PM	6	7	0	0	0	0	13	2	16	3	2	0	0	23	8	64	2	0	0	1	74	3	77	5	1	0	0	86	196
5:15 PM	6	5	1	0	0	0	12	3	11	7	4	0	1	25	3	57	0	1	0	1	61	9	71	3	1	0	0	84	182
5:30 PM	3	4	1	0	0	0	8	2	7	6	3	0	2	18	5	51	0	0	0	0	56	5	75	5	0	0	0	85	167
5:45 PM	1	5	4	1	0	0	11	1	13	8	0	0	3	22	10	40	0	0	0	0	50	3	52	3	0	0	0	58	141
Hourly Total	16	21	6	1	0	0	44	8	47	24	9	0	6	88	26	212	2	1	0	2	241	20	275	16	2	0	0	313	686
6:00 PM	2	5	1	2	0	1	10	1	11	5	1	0	1	18	9	44	0	0	0	1	53	1	46	4	2	0	1	53	134
6:15 PM	2	5	4	0	0	0	11	0	15	1	1	0	0	17	5	25	2	0	0	1	32	4	38	3	0	0	1	45	105
6:30 PM	3	3	1	0	0	1	7	3	10	2	8	0	2	23	8	27	1	0	0	1	36	5	46	2	2	0	0	55	121
6:45 PM	2	4	1	1	0	0	8	1	16	5	1	0	0	23	5	31	0	1	0	1	37	5	37	1	0	0	0	43	111
Hourly Total	9	17	7	3	0	2	36	5	52	13	11	0	3	81	27	127	3	1	0	4	158	15	167	10	4	0	2	196	471

Grand Total	126	211	69	27	0	35	433	64	417	255	98	0	47	834	234	2393	29	9	0	27	2865	189	2553	113	25	0	26	2880	6612
Approach %	29.1	48.7	15.9	6.2	0.0	-	-	7.7	50.0	30.6	11.8	0.0	-	-	8.8	89.8	1.1	0.3	0.0	-	-	6.6	88.6	3.9	0.9	0.0	-	-	-
Total %	1.8	3.1	1.0	0.4	0.0	-	6.4	0.9	6.1	3.7	1.4	0.0	-	12.2	3.4	35.1	0.4	0.1	0.0	-	39.1	2.8	37.5	1.7	0.4	0.0	-	42.3	-
Lights	118	206	64	27	0	-	415	63	404	245	96	0	-	808	228	2239	28	9	0	-	2504	179	2397	110	24	0	-	2710	6437
% Lights	93.7	97.6	92.8	100.0	-	-	95.8	98.4	96.9	96.1	98.0	-	-	96.9	97.4	93.6	96.6	100.0	-	-	94.0	94.7	93.9	97.3	96.0	-	-	94.1	94.5
Buses	2	5	3	0	0	-	10	0	9	9	0	0	-	18	5	67	1	0	0	-	73	5	73	1	0	0	-	79	180
% Buses	1.6	2.4	4.3	0.0	-	-	2.3	0.0	2.2	3.5	0.0	-	-	2.2	2.1	2.8	3.4	0.0	-	-	2.7	2.6	2.9	0.9	0.0	-	-	2.7	2.6
Trucks	6	0	2	0	0	-	8	1	4	1	2	0	-	8	1	87	0	0	0	-	88	5	83	2	1	0	-	91	195
% Trucks	4.8	0.0	2.9	0.0	-	-	1.8	1.6	1.0	0.4	2.0	-	-	1.0	0.4	3.6	0.0	0.0	-	-	3.3	2.6	3.3	1.8	4.0	-	-	3.2	2.9
Bicycles on Crosswalk	-	-	-	-	-	2	-	-	-	-	-	-	6	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	5.7	-	-	-	-	-	-	12.8	-	-	-	-	-	-	3.7	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	33	-	-	-	-	-	-	41	-	-	-	-	-	-	26	-	-	-	-	-	-	26	-	-
% Pedestrians	-	-	-	-	-	94.3	-	-	-	-	-	-	87.2	-	-	-	-	-	-	96.3	-	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Linderman Ave Eastbound							Linderman Ave Westbound							Washington Ave Northbound							Washington Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:30 AM	1	8	4	3	0	0	16	1	5	6	2	0	0	14	1	59	0	0	0	0	60	2	56	3	0	0	0	61	151
7:45 AM	5	5	1	0	0	0	11	0	8	10	2	0	0	20	6	61	0	0	0	0	67	7	78	3	0	0	0	88	186
8:00 AM	4	5	3	2	0	0	14	0	7	9	3	0	1	19	2	44	0	0	0	1	46	3	57	4	1	0	0	65	144
8:15 AM	3	5	0	0	0	0	8	2	7	3	2	0	3	14	2	48	0	0	0	0	50	4	69	4	0	0	0	77	149
Total	13	23	8	5	0	0	49	3	27	28	9	0	4	67	11	212	0	0	0	1	223	16	260	14	1	0	0	291	630
Approach %	26.5	46.9	16.3	10.2	0.0	-	-	4.5	40.3	41.8	13.4	0.0	-	-	4.9	95.1	0.0	0.0	0.0	-	-	5.5	89.3	4.8	0.3	0.0	-	-	-
Total %	2.1	3.7	1.3	0.8	0.0	-	7.8	0.5	4.3	4.4	1.4	0.0	-	10.6	1.7	33.7	0.0	0.0	0.0	-	35.4	2.5	41.3	2.2	0.2	0.0	-	46.2	-
PHF	0.650	0.719	0.500	0.417	0.000	-	0.766	0.375	0.844	0.700	0.750	0.000	-	0.838	0.458	0.869	0.000	0.000	0.000	-	0.832	0.571	0.833	0.875	0.250	0.000	-	0.827	0.847
Lights	13	21	8	5	0	-	47	3	27	24	9	0	-	63	11	187	0	0	0	-	198	15	239	14	1	0	-	269	577
% Lights	100.0	91.3	100.0	100.0	-	-	95.9	100.0	100.0	85.7	100.0	-	-	94.0	100.0	88.2	-	-	-	-	88.8	93.8	91.9	100.0	100.0	-	-	92.4	91.6
Buses	0	2	0	0	0	-	2	0	0	4	0	0	-	4	0	17	0	0	0	-	17	1	12	0	0	0	-	13	36
% Buses	0.0	8.7	0.0	0.0	-	-	4.1	0.0	0.0	14.3	0.0	-	-	6.0	0.0	8.0	-	-	-	-	7.6	6.3	4.6	0.0	0.0	-	-	4.5	5.7
Trucks	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	8	0	0	0	-	8	0	9	0	0	0	-	9	17
% Trucks	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	3.8	-	-	-	-	3.6	0.0	3.5	0.0	0.0	-	-	3.1	2.7
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	4	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-

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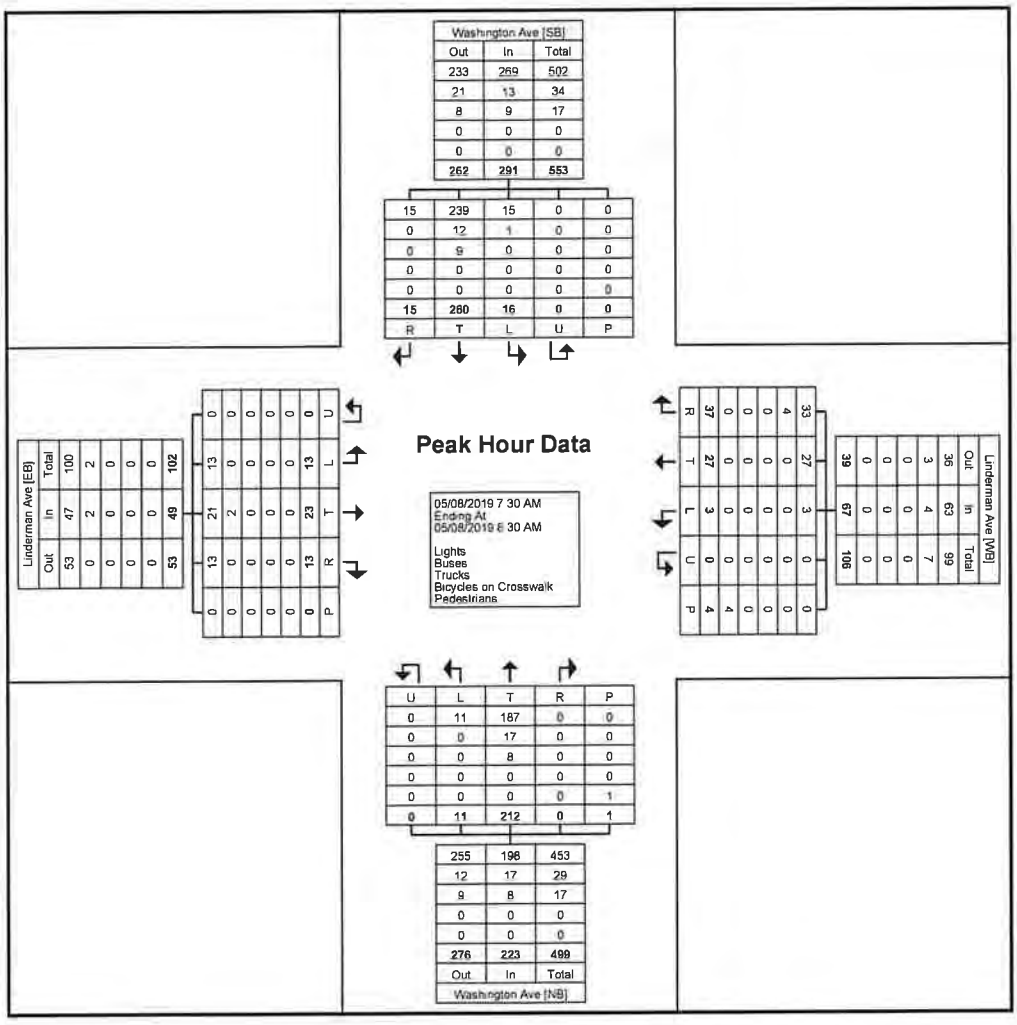
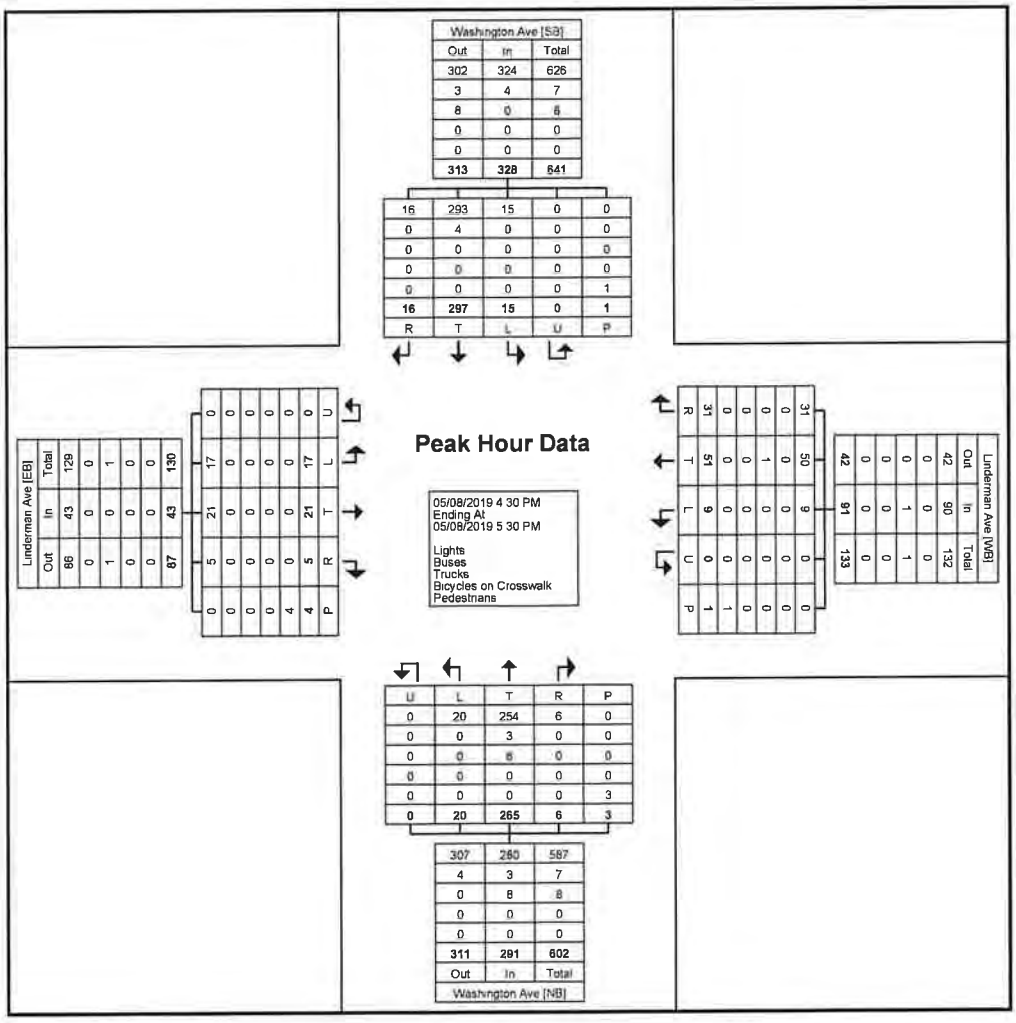


Turning Movement Peak Hour Data Plot (7:30 AM)

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Linderman Ave Eastbound							Linderman Ave Westbound							Washington Ave Northbound							Washington Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:30 PM	2	7	1	1	0	2	11	2	14	8	2	0	0	26	3	65	1	0	0	1	69	2	74	3	0	0	1	79	185
4:45 PM	3	2	2	0	0	2	7	2	10	3	2	0	0	17	6	79	2	0	0	0	87	1	75	3	0	0	0	79	190
5:00 PM	6	7	0	0	0	0	13	2	16	3	2	0	0	23	8	64	2	0	0	1	74	3	77	5	1	0	0	86	196
5:15 PM	6	5	1	0	0	0	12	3	11	7	4	0	1	25	3	57	0	1	0	1	61	9	71	3	1	0	0	84	182
Total	17	21	4	1	0	4	43	9	51	21	10	0	1	91	20	265	5	1	0	3	291	15	297	14	2	0	1	328	753
Approach %	39.5	48.8	9.3	2.3	0.0	-	-	9.9	56.0	23.1	11.0	0.0	-	-	6.9	91.1	1.7	0.3	0.0	-	-	4.6	90.5	4.3	0.6	0.0	-	-	-
Total %	2.3	2.8	0.5	0.1	0.0	-	5.7	1.2	6.8	2.8	1.3	0.0	-	12.1	2.7	35.2	0.7	0.1	0.0	-	38.6	2.0	39.4	1.9	0.3	0.0	-	43.6	-
PHF	0.708	0.750	0.500	0.250	0.000	-	0.827	0.750	0.797	0.656	0.625	0.000	-	0.875	0.625	0.939	0.625	0.250	0.000	-	0.836	0.417	0.964	0.700	0.500	0.000	-	0.953	0.960
Lights	17	21	4	1	0	-	43	9	50	21	10	0	-	90	20	254	5	1	0	-	280	15	293	14	2	0	-	324	737
% Lights	100.0	100.0	100.0	100.0	-	-	100.0	100.0	98.0	100.0	100.0	-	-	98.9	100.0	95.8	100.0	100.0	-	-	96.2	100.0	98.7	100.0	100.0	-	-	98.8	97.9
Buses	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	3	0	0	0	-	3	0	4	0	0	0	-	4	7
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.1	0.0	0.0	-	-	1.0	0.0	1.3	0.0	0.0	-	-	1.2	0.9
Trucks	0	0	0	0	0	-	0	0	1	0	0	0	-	1	0	8	0	0	0	-	8	0	0	0	0	0	-	0	9
% Trucks	0.0	0.0	0.0	0.0	-	-	0.0	0.0	2.0	0.0	0.0	-	-	1.1	0.0	3.0	0.0	0.0	-	-	2.7	0.0	0.0	0.0	0.0	-	-	0.0	1.2
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	-	1	-	-	-	-	-	-	3	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (4:30 PM)

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Kingston, NY
Washington Ave & Pearl St
Wednesday, May 8, 2019
Location: 41.930053, -74.020973

Count Name: Washington Ave & Pearl St
Site Code:
Start Date: 05/08/2019

Turning Movement Data

Start Time	Pearl St Eastbound							Pearl St Westbound							Washington Ave Northbound							Washington Ave Southbound							Int Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	1	11	2	0	0	0	14	0	3	3	1	0	1	7	0	36	1	0	0	0	37	7	33	1	0	0	0	41	99
7:15 AM	5	18	8	0	0	0	31	0	3	6	0	0	0	9	1	62	5	0	0	0	68	10	46	1	0	0	0	57	165
7:30 AM	7	20	9	0	0	0	36	1	3	10	0	0	2	14	1	74	2	0	0	0	77	12	53	4	0	0	2	69	196
7:45 AM	6	28	14	1	0	1	49	2	6	5	0	0	0	13	1	72	8	0	0	0	81	13	72	2	0	0	0	87	230
Hourly Total	19	77	33	1	0	1	130	3	15	24	1	0	3	43	3	244	16	0	0	0	263	42	204	8	0	0	2	254	690
8:00 AM	10	23	6	1	0	0	40	0	15	6	2	0	1	23	3	58	4	0	0	0	65	14	62	6	0	0	0	82	210
8:15 AM	1	21	10	1	0	0	33	0	9	5	0	0	0	14	3	47	2	0	0	0	52	20	66	1	1	0	1	88	187
8:30 AM	3	18	6	1	0	0	28	2	11	13	0	0	1	26	2	70	10	0	0	0	82	16	49	2	0	0	0	67	203
8:45 AM	4	44	6	0	0	1	54	1	8	5	0	0	0	14	1	66	7	0	0	0	74	25	60	1	0	0	1	86	228
Hourly Total	18	106	28	3	0	1	155	3	43	29	2	0	2	77	9	241	23	0	0	0	273	75	237	10	1	0	2	323	828
9:00 AM	1	13	2	0	0	0	16	0	9	12	1	0	1	22	1	56	3	1	0	0	61	19	57	1	0	0	2	77	176
9:15 AM	5	12	2	0	0	1	19	1	9	12	0	0	2	22	0	41	3	0	0	0	44	15	40	2	0	0	0	57	142
9:30 AM	4	9	3	0	0	0	16	1	8	5	3	0	2	17	3	62	2	1	0	2	68	12	64	0	0	0	1	76	177
9:45 AM	8	12	3	0	0	0	23	0	11	17	0	0	1	28	2	59	4	0	0	0	65	10	43	4	0	0	1	57	173
Hourly Total	18	46	10	0	0	1	74	2	37	46	4	0	6	89	6	218	12	2	0	2	238	56	204	7	0	0	4	267	668
10:00 AM	5	20	3	0	0	0	28	0	12	10	2	0	1	24	1	48	2	0	0	1	51	11	49	3	0	0	0	63	166
10:15 AM	2	8	1	0	0	2	11	5	7	9	4	0	0	25	0	37	4	0	0	2	41	12	45	2	0	0	1	59	136
10:30 AM	6	21	4	0	0	2	31	2	16	11	0	0	1	29	0	56	1	0	0	2	57	17	39	2	0	0	0	58	175
10:45 AM	3	14	2	0	0	0	19	2	7	16	0	0	2	25	0	46	1	0	0	0	47	10	57	2	0	0	1	69	160
Hourly Total	16	63	10	0	0	4	89	9	42	46	6	0	4	103	1	187	8	0	0	5	196	50	190	9	0	0	2	249	637
11:00 AM	2	11	1	0	0	0	14	4	12	18	0	0	4	34	2	51	4	0	0	0	57	12	31	1	0	0	1	44	149
11:15 AM	2	6	0	0	0	2	8	3	18	15	0	0	1	36	0	48	7	0	0	0	55	19	43	2	0	0	3	64	163
11:30 AM	0	12	3	0	0	0	15	6	10	20	0	0	1	36	3	48	1	0	0	3	52	10	43	2	0	0	1	55	158
11:45 AM	2	9	3	0	0	1	14	0	20	20	0	0	0	40	2	42	6	0	0	0	50	11	51	3	0	0	0	65	169
Hourly Total	6	38	7	0	0	3	51	13	60	73	0	0	6	146	7	189	18	0	0	3	214	52	168	8	0	0	5	228	639
12:00 PM	3	9	2	0	0	0	14	4	19	15	0	0	0	38	3	36	5	0	0	0	44	11	53	2	0	0	4	66	162
12:15 PM	2	16	3	3	0	0	24	2	14	12	0	0	2	28	5	51	0	0	0	1	56	7	48	5	2	0	0	62	170
12:30 PM	0	10	0	3	0	0	13	2	15	10	1	0	0	28	4	74	2	1	0	0	81	13	59	4	0	0	1	76	198
12:45 PM	4	16	3	0	0	0	23	0	14	20	0	0	2	34	3	48	4	0	0	0	55	13	65	2	0	0	0	80	192
Hourly Total	9	51	8	6	0	0	74	8	62	57	1	0	4	128	15	209	11	1	0	1	236	44	225	13	2	0	5	284	722
1:00 PM	4	13	7	1	0	1	25	3	20	13	0	0	2	36	2	52	1	1	0	4	56	14	58	0	0	0	3	72	189
1:15 PM	1	21	1	0	0	2	23	1	7	10	2	0	3	20	1	40	5	0	0	3	46	10	52	0	0	0	4	62	151
1:30 PM	3	17	2	0	0	2	22	5	10	11	1	0	0	27	0	48	2	0	0	1	50	9	56	4	0	0	1	69	168
1:45 PM	0	17	6	0	0	0	23	3	10	9	1	0	2	23	3	55	2	0	0	1	60	8	62	5	0	0	1	75	181
Hourly Total	8	68	16	1	0	5	93	12	47	43	4	0	7	106	6	195	10	1	0	9	212	41	228	9	0	0	9	278	689
2:00 PM	2	11	5	0	0	1	18	1	13	14	0	0	1	28	1	71	3	0	0	1	75	12	55	3	0	0	1	70	191
2:15 PM	0	13	3	0	0	0	16	2	16	17	1	0	0	36	2	69	3	0	0	0	74	18	55	2	0	0	1	75	201
2:30 PM	3	13	10	0	0	0	26	4	9	15	0	0	4	28	4	70	3	0	0	1	77	18	56	3	0	0	0	77	208
2:45 PM	2	18	9	0	0	0	29	1	16	19	0	0	3	36	1	70	6	0	0	0	77	12	84	5	0	0	0	101	243
Hourly Total	7	55	27	0	0	1	89	8	54	65	1	0	8	128	8	280	15	0	0	2	303	60	250	13	0	0	2	323	843
3:00 PM	3	13	11	0	0	1	27	1	20	18	3	0	3	42	4	85	10	0	0	0	99	11	63	2	0	0	0	76	244
3:15 PM	4	13	4	0	0	1	21	2	13	13	2	0	4	30	7	71	5	0	0	0	83	11	89	7	0	0	0	107	241
3:30 PM	0	20	6	0	0	1	26	3	15	15	2	0	1	35	3	75	4	0	0	0	82	13	70	4	0	0	1	87	230
3:45 PM	4	17	5	0	0	6	26	3	14	14	2	0	3	33	2	79	2	0	0	0	83	13	74	1	0	0	1	88	230
Hourly Total	11	63	26	0	0	9	100	9	62	60	9	0	11	140	16	310	21	0	0	0	347	48	296	14	0	0	2	358	945
4:00 PM	2	17	3	0	0	0	22	3	20	14	0	0	1	37	2	73	2	0	0	0	77	14	60	1	0	0	0	75	211
4:15 PM	3	16	2	2	0	0	23	5	23	13	0	0	0	41	1	85	3	0	0	0	89	6	55	2	1	0	0	64	217
4:30 PM	1	13	7	0	0	1	21	6	16	9	1	0	0	32	1	77	3	0	0	0	81	14	77	7	0	0	0	98	232
4:45 PM	0	18	5	1	0	0	24	5	23	17	0	0	0	45	3	90	3	0	0	2	96	7	69	2	0	0	0	78	243
Hourly Total	6	64	17	3	0	1	90	19	82	53	1	0	1	155	7	325	11	0	0	2	343	41	261	12	1	0	0	315	903
5:00 PM	3	15	4	0	0	0	22	6	35	23	2	0	2	66	3	78	4	0	0	1	85	13	95	3	0	0	3	111	284
5:15 PM	1	14	4	1	0	0	20	4	16	13	0	0	0	33	8	71	5	0	0	1	84	14	80	0	0	0	0	94	231
5:30 PM	6	17	3	0	0	1	26	5	18	14	0	0	0	37	1	58	3	0	0	2	62	22	73	6	0	0	1	101	226
5:45 PM	1	15	10	0	0	1	26	0	19	9	0	0	0	28	2	50	2	0	0	2	54	17	57	4	2	0	3	80	188
Hourly Total	11	61	21	1	0	2	94	15	88	59	2	0	2	164	14	257	14	0	0	6	285	66	305	13	2	0	7	386	929
6:00 PM	0	12	2	1	0	0	15	7	20	10	2	0	1	39	2	47	2	0	0	2	51	8	46	3	0	0	2	57	162
6:15 PM	4	21	1	1	0	2	27	1	10	10	1	0	0	22	3	27	1	0	0	2	31	7	54	0	0	0	0	61	141
6:30 PM	4	10	3	1	0	1	18	8	24	10	2	0	1	44	2	40	0	0	0	3	42	7	46	1	0	0	0	54	158
6:45 PM	1	7	4	0	0	0	12	1	18	5	0	0	0	24	0	42	4	0	0	1	46	7	44	1	0	0	0	52	134
Hourly Total	9	50	10	3	0	3	72	17	72	35	5	0	2	129	7	156	7	0	0	8	170	29	190	5	0	0	2	224	595

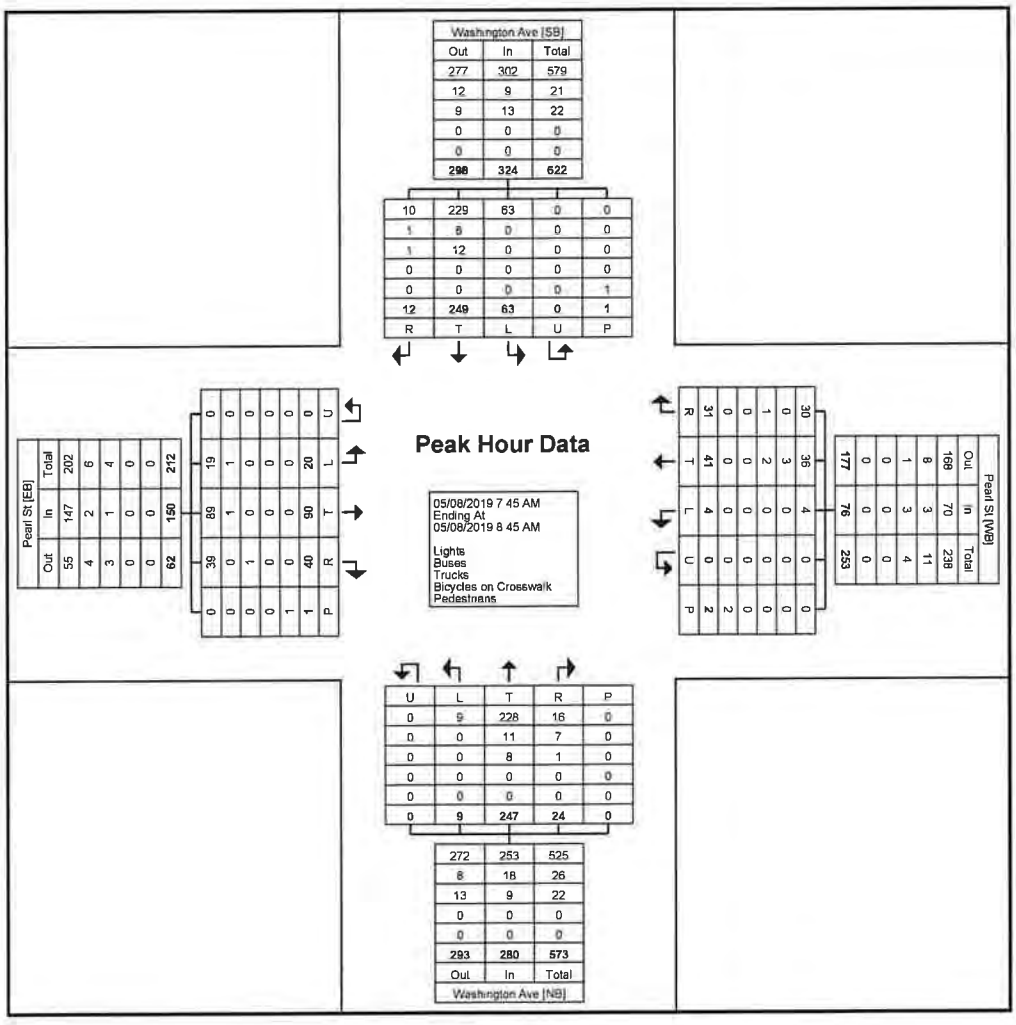
Grand Total	138	742	213	18	0	31	1111	118	664	590	36	0	56	1408	99	2811	166	4	0	38	3080	604	2758	121	6	0	42	3489	9088
Approach %	12.4	66.8	19.2	1.6	0.0	-	-	8.4	47.2	41.9	2.6	0.0	-	-	3.2	91.3	5.4	0.1	0.0	-	-	17.3	79.0	3.5	0.2	0.0	-	-	-
Total %	1.5	8.2	2.3	0.2	0.0	-	12.2	1.3	7.3	6.5	0.4	0.0	-	15.5	1.1	30.9	1.8	0.0	0.0	-	33.9	6.6	30.3	1.3	0.1	0.0	-	38.4	-
Lights	131	726	209	17	0	-	1083	116	647	579	36	0	-	1378	95	2658	145	4	0	-	2902	597	2585	112	5	0	-	3299	8662
% Lights	94.9	97.8	98.1	94.4	-	-	97.5	98.3	97.4	98.1	100.0	-	-	97.9	96.0	94.6	87.3	100.0	-	-	94.2	98.8	93.7	92.6	83.3	-	-	94.6	95.3
Buses	5	7	2	0	0	-	14	0	5	5	0	0	-	10	1	58	19	0	0	-	78	3	79	4	0	0	-	86	188
% Buses	3.6	0.9	0.9	0.0	-	-	1.3	0.0	0.8	0.8	0.0	-	-	0.7	1.0	2.1	11.4	0.0	-	-	2.5	0.5	2.9	3.3	0.0	-	-	2.5	2.1
Trucks	2	9	2	1	0	-	14	2	12	6	0	0	-	20	3	95	2	0	0	-	100	4	94	5	1	0	-	104	238
% Trucks	1.4	1.2	0.9	5.6	-	-	1.3	1.7	1.8	1.0	0.0	-	-	1.4	3.0	3.4	1.2	0.0	-	-	3.2	0.7	3.4	4.1	16.7	-	-	3.0	2.6
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	-	3.2	-	-	-	-	-	-	3.6	-	-	-	-	-	-	0.0	-	-	-	-	-	-	7.1	-	-
Pedestrians	-	-	-	-	-	30	-	-	-	-	-	-	54	-	-	-	-	-	-	38	-	-	-	-	-	-	39	-	-
% Pedestrians	-	-	-	-	-	96.8	-	-	-	-	-	-	96.4	-	-	-	-	-	-	100.0	-	-	-	-	-	-	92.9	-	-

Kingston, NY
Washington Ave & Pearl St
Wednesday, May 8, 2019
Location: 41.930053, -74.020973

Count Name: Washington Ave & Pearl St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (7:45 AM)

Start Time	Pearl St Eastbound							Pearl St Westbound							Washington Ave Northbound							Washington Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:45 AM	6	28	14	1	0	1	49	2	6	5	0	0	0	13	1	72	8	0	0	0	81	13	72	2	0	0	0	87	230
8:00 AM	10	23	6	1	0	0	40	0	15	6	2	0	1	23	3	58	4	0	0	0	65	14	62	6	0	0	0	82	210
8:15 AM	1	21	10	1	0	0	33	0	9	5	0	0	0	14	3	47	2	0	0	0	52	20	66	1	1	0	1	88	187
8:30 AM	3	18	6	1	0	0	28	2	11	13	0	0	1	26	2	70	10	0	0	0	82	16	49	2	0	0	0	67	203
Total	20	90	36	4	0	1	150	4	41	29	2	0	2	76	9	247	24	0	0	0	280	63	249	11	1	0	1	324	830
Approach %	13.3	60.0	24.0	2.7	0.0	-	-	5.3	53.9	38.2	2.6	0.0	-	-	3.2	88.2	8.6	0.0	0.0	-	-	19.4	76.9	3.4	0.3	0.0	-	-	-
Total %	2.4	10.8	4.3	0.5	0.0	-	18.1	0.5	4.9	3.5	0.2	0.0	-	9.2	1.1	29.8	2.9	0.0	0.0	-	33.7	7.6	30.0	1.3	0.1	0.0	-	39.0	-
PHF	0.500	0.804	0.643	1.000	0.000		0.765	0.500	0.683	0.558	0.250	0.000		0.731	0.750	0.858	0.600	0.000	0.000		0.854	0.788	0.865	0.458	0.250	0.000		0.920	0.902
Lights	19	89	36	3	0	-	147	4	36	28	2	0	-	70	9	228	16	0	0	-	253	63	229	10	0	0	-	302	772
% Lights	95.0	98.9	100.0	75.0	-	-	98.0	100.0	87.8	96.6	100.0	-	-	92.1	100.0	92.3	66.7	-	-	-	90.4	100.0	92.0	90.9	0.0	-	-	93.2	93.0
Buses	1	1	0	0	0	-	2	0	3	0	0	0	-	3	0	11	7	0	0	-	18	0	8	1	0	0	-	9	32
% Buses	5.0	1.1	0.0	0.0	-	-	1.3	0.0	7.3	0.0	0.0	-	-	3.9	0.0	4.5	29.2	-	-	-	6.4	0.0	3.2	9.1	0.0	-	-	2.8	3.9
Trucks	0	0	0	1	0	-	1	0	2	1	0	0	-	3	0	8	1	0	0	-	9	0	12	0	1	0	-	13	26
% Trucks	0.0	0.0	0.0	25.0	-	-	0.7	0.0	4.9	3.4	0.0	-	-	3.9	0.0	3.2	4.2	-	-	-	3.2	0.0	4.8	0.0	100.0	-	-	4.0	3.1
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



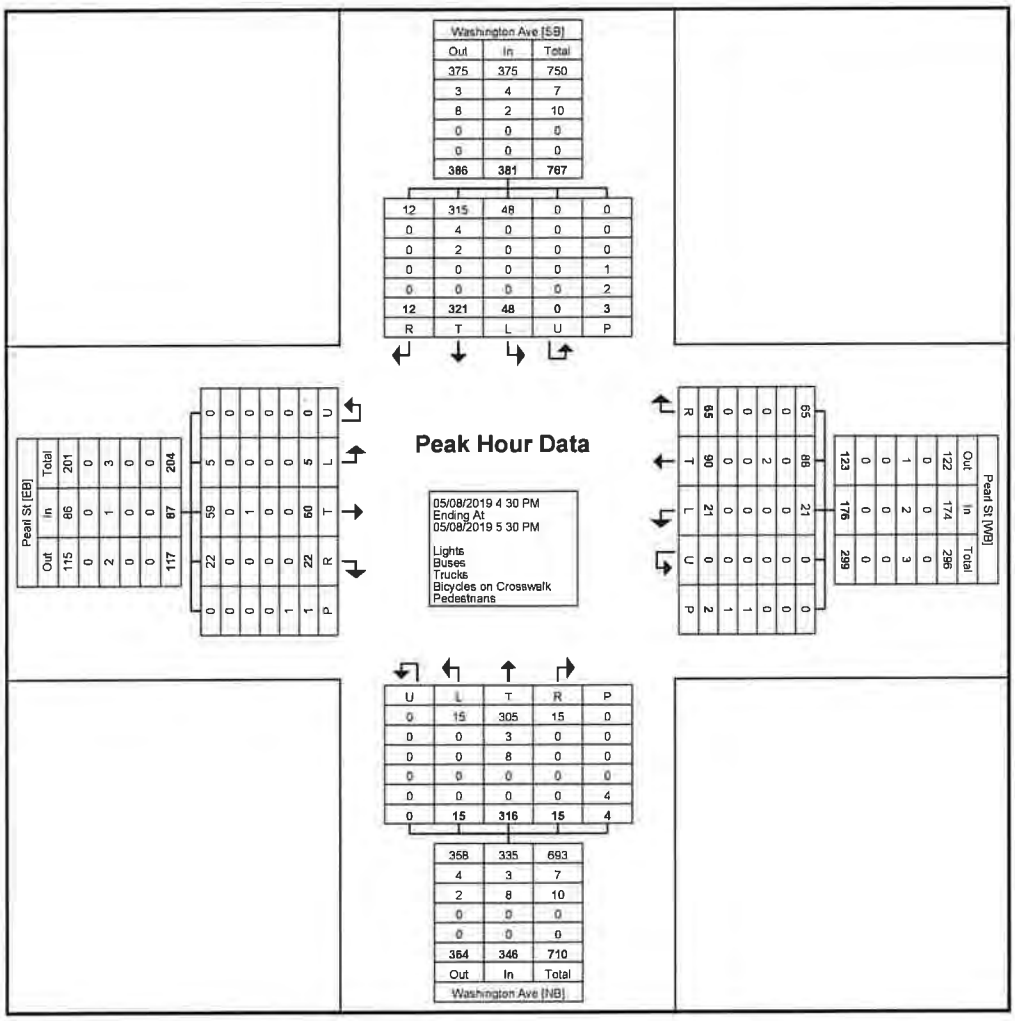
Turning Movement Peak Hour Data Plot (7:45 AM)

Kingston, NY
Washington Ave & Pearl St
Wednesday, May 8, 2019
Location: 41.930053, -74.020973

Count Name: Washington Ave & Pearl St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Pearl St Eastbound							Pearl St Westbound							Washington Ave Northbound							Washington Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:30 PM	1	13	7	0	0	1	21	6	16	9	1	0	0	32	1	77	3	0	0	0	81	14	77	7	0	0	0	98	232
4:45 PM	0	18	5	1	0	0	24	5	23	17	0	0	0	45	3	90	3	0	0	2	96	7	69	2	0	0	0	78	243
5:00 PM	3	15	4	0	0	0	22	6	35	23	2	0	2	66	3	78	4	0	0	1	85	13	95	3	0	0	3	111	284
5:15 PM	1	14	4	1	0	0	20	4	16	13	0	0	0	33	8	71	5	0	0	1	84	14	80	0	0	0	0	94	231
Total	5	60	20	2	0	1	87	21	90	62	3	0	2	176	15	316	15	0	0	4	346	48	321	12	0	0	3	381	990
Approach %	5.7	69.0	23.0	2.3	0.0	-	-	11.9	51.1	35.2	1.7	0.0	-	-	4.3	91.3	4.3	0.0	0.0	-	-	12.6	84.3	3.1	0.0	0.0	-	-	-
Total %	0.5	6.1	2.0	0.2	0.0	-	8.8	2.1	9.1	6.3	0.3	0.0	-	17.8	1.5	31.9	1.5	0.0	0.0	-	34.9	4.8	32.4	1.2	0.0	0.0	-	38.5	-
PHF	0.417	0.833	0.714	0.500	0.000	-	0.906	0.875	0.643	0.674	0.375	0.000	-	0.667	0.469	0.878	0.750	0.000	0.000	-	0.901	0.857	0.845	0.429	0.000	0.000	-	0.858	0.871
Lights	5	59	20	2	0	-	86	21	88	62	3	0	-	174	15	305	15	0	0	-	335	48	315	12	0	0	-	375	970
% Lights	100.0	98.3	100.0	100.0	-	-	98.9	100.0	97.8	100.0	100.0	-	-	98.9	100.0	96.5	100.0	-	-	-	96.8	100.0	98.1	100.0	-	-	-	98.4	98.0
Buses	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	3	0	0	0	-	3	0	4	0	0	0	-	4	7
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.9	0.0	-	-	-	0.9	0.0	1.2	0.0	-	-	-	1.0	0.7
Trucks	0	1	0	0	0	-	1	0	2	0	0	0	-	2	0	8	0	0	0	-	8	0	2	0	0	0	-	2	13
% Trucks	0.0	1.7	0.0	0.0	-	-	1.1	0.0	2.2	0.0	0.0	-	-	1.1	0.0	2.5	0.0	-	-	-	2.3	0.0	0.6	0.0	-	-	-	0.5	1.3
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	50.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	33.3	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	4	-	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	50.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	66.7	-	-



Turning Movement Peak Hour Data Plot (4:30 PM)

TRI-STATE TRAFFIC DATA

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Kingston, NY
Washington Ave & Main St
Wednesday, May 8, 2019
Location: 41.931166, -74.022173

Count Name: Washington Ave & Main St
Site Code:
Start Date: 05/08/2019
Page No: 1

Turning Movement Data

Start Time	Main St Eastbound							Main St Westbound							Washington Ave Northbound							Washington Ave Southbound							Int Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App Total	
7:00 AM	0	0	4	1	0	1	5	1	6	5	2	0	0	14	3	37	0	0	0	2	40	0	33	0	0	0	0	33	92
7:15 AM	2	0	2	2	0	1	6	4	9	7	3	0	3	23	0	68	0	0	0	1	68	0	48	1	0	0	0	49	146
7:30 AM	2	0	6	3	0	0	11	3	11	3	2	0	2	19	8	85	0	0	0	0	93	0	59	1	0	0	2	60	183
7:45 AM	1	0	6	4	0	1	11	2	6	8	2	0	2	18	3	79	0	0	0	2	82	0	75	0	0	0	1	75	186
Hourly Total	5	0	18	10	0	3	33	10	32	23	9	0	7	74	14	269	0	0	0	5	283	0	215	2	0	0	3	217	607
8:00 AM	4	0	4	1	0	0	9	5	6	14	0	0	4	25	1	73	0	0	0	0	74	0	71	4	0	0	2	75	183
8:15 AM	3	0	2	5	0	0	10	3	4	6	0	0	6	13	3	56	0	0	0	1	59	0	73	1	1	0	2	75	157
8:30 AM	6	0	6	0	0	0	12	2	4	5	2	0	1	13	5	82	0	0	0	2	87	0	53	2	0	0	0	55	167
8:45 AM	3	0	3	3	0	1	9	2	5	8	7	0	3	22	2	75	0	0	0	1	77	0	74	2	0	0	4	76	184
Hourly Total	16	0	15	9	0	1	40	12	19	33	9	0	14	73	11	286	0	0	0	4	297	0	271	9	1	0	11	281	691
9:00 AM	2	0	7	1	0	0	10	6	3	8	1	0	3	18	4	68	0	0	0	1	72	0	61	0	0	0	1	61	161
9:15 AM	0	0	2	5	0	2	7	2	11	15	0	0	3	28	4	58	0	0	0	0	62	0	50	0	1	0	0	51	148
9:30 AM	0	0	3	7	0	0	10	2	4	12	1	0	2	19	4	65	0	0	0	1	69	0	60	1	0	0	0	61	159
9:45 AM	3	0	4	3	0	0	10	5	15	10	2	0	9	32	1	80	0	0	0	2	81	0	46	1	0	0	0	47	170
Hourly Total	5	0	16	16	0	2	37	15	33	45	4	0	17	97	13	271	0	0	0	4	284	0	217	2	1	0	7	220	638
10:00 AM	2	0	3	2	0	0	7	4	8	13	0	0	2	25	2	63	0	0	0	0	65	0	52	2	0	0	0	54	151
10:15 AM	2	0	3	2	0	2	7	1	6	21	1	0	1	29	0	55	0	0	0	2	55	0	52	2	0	0	1	54	145
10:30 AM	2	0	6	2	0	0	10	0	6	12	1	0	2	19	0	76	0	0	0	0	76	0	55	2	0	0	2	57	162
10:45 AM	2	0	5	2	0	1	9	3	8	19	0	0	0	30	3	65	0	0	0	0	68	0	54	1	1	0	2	56	163
Hourly Total	8	0	17	8	0	3	33	8	28	65	2	0	5	103	5	259	0	0	0	2	264	0	213	7	1	0	5	221	621
11:00 AM	2	0	3	1	0	2	6	1	10	17	0	0	8	28	2	64	0	0	0	4	66	0	38	3	0	0	5	41	141
11:15 AM	1	0	4	0	0	0	5	3	9	18	0	0	6	30	2	62	0	0	0	0	64	0	51	5	0	0	3	56	155
11:30 AM	6	0	7	2	0	0	15	4	4	11	1	0	1	20	4	63	0	0	0	2	67	0	46	0	0	0	1	46	148
11:45 AM	1	0	2	1	0	1	4	2	7	14	4	0	2	27	1	63	0	0	0	1	64	0	58	3	0	0	1	61	156
Hourly Total	10	0	16	4	0	3	30	10	30	60	5	0	17	105	9	252	0	0	0	7	261	0	193	11	0	0	10	204	600
12:00 PM	4	0	6	1	0	0	11	6	13	10	3	0	1	32	3	51	0	0	0	1	54	0	54	0	0	0	1	54	151
12:15 PM	2	0	4	0	0	1	6	4	6	19	3	0	2	32	2	64	0	0	0	5	66	0	53	2	0	0	3	55	159
12:30 PM	3	0	6	2	0	0	11	6	11	13	2	0	0	32	1	80	0	0	0	0	81	0	59	3	0	0	7	62	186
12:45 PM	3	0	6	0	0	4	9	2	11	12	3	0	2	28	2	70	0	0	0	3	72	0	73	1	0	0	7	74	183
Hourly Total	12	0	22	3	0	5	37	18	41	54	11	0	5	124	8	265	0	0	0	9	273	0	239	6	0	0	18	245	679
1:00 PM	5	0	6	0	0	0	11	1	7	17	2	0	2	27	4	63	0	0	0	1	67	0	62	0	0	0	1	62	167
1:15 PM	3	0	5	0	0	2	8	4	17	14	1	0	3	36	2	48	0	0	0	1	50	0	55	1	0	0	2	56	150
1:30 PM	1	0	2	1	0	1	4	0	10	9	1	0	3	20	1	65	0	0	0	2	66	0	70	1	0	0	1	71	161
1:45 PM	2	0	5	1	0	1	8	2	12	12	1	0	2	27	3	58	0	0	0	2	61	0	67	2	0	0	0	69	165
Hourly Total	11	0	18	2	0	4	31	7	46	52	5	0	10	110	10	234	0	0	0	6	244	0	254	4	0	0	4	258	643
2:00 PM	3	0	5	0	0	0	8	2	14	9	0	0	4	25	1	87	0	0	0	0	88	0	62	0	1	0	2	63	184
2:15 PM	3	0	2	1	0	1	6	3	8	23	1	0	2	35	4	84	0	0	0	2	88	0	63	1	1	0	1	65	194
2:30 PM	1	0	8	0	0	0	9	5	9	25	0	0	6	39	3	87	0	0	0	1	90	0	67	0	0	0	1	67	205
2:45 PM	3	0	5	1	0	3	9	6	15	25	4	0	1	50	9	75	0	0	0	1	84	0	85	1	0	0	1	86	229
Hourly Total	10	0	20	2	0	4	32	16	46	82	5	0	15	149	17	333	0	0	0	4	350	0	277	2	2	0	5	281	812
3:00 PM	1	0	2	0	0	0	3	3	14	28	1	0	4	46	5	101	0	0	0	0	106	0	67	2	0	0	3	69	224
3:15 PM	0	0	5	0	0	0	5	4	14	12	4	0	4	34	2	88	0	0	0	4	90	0	92	6	0	0	1	98	227
3:30 PM	2	0	8	0	0	2	10	6	15	14	1	0	2	36	6	89	0	0	0	4	95	0	79	0	0	0	2	79	220
3:45 PM	2	0	4	1	0	6	7	5	14	13	2	0	6	34	5	96	0	0	0	0	101	0	84	1	0	0	1	85	227
Hourly Total	5	0	19	1	0	8	25	18	57	67	8	0	16	150	18	374	0	0	0	8	392	0	322	9	0	0	7	331	898
4:00 PM	1	0	8	1	0	1	10	2	16	28	1	0	2	47	2	90	0	0	0	2	92	0	67	1	0	0	1	68	217
4:15 PM	4	0	4	0	0	1	8	2	24	21	1	0	3	48	4	96	0	0	0	2	100	0	58	0	0	0	3	58	214
4:30 PM	4	0	6	0	0	2	10	2	20	19	2	0	1	43	4	76	0	0	0	0	80	0	90	0	0	0	2	90	223
4:45 PM	3	0	1	1	0	1	5	9	24	13	0	0	3	46	11	93	0	0	0	2	104	0	74	2	0	0	1	76	231
Hourly Total	12	0	19	2	0	5	33	15	84	81	4	0	9	184	21	355	0	0	0	6	376	0	289	3	0	0	7	292	885
5:00 PM	3	0	7	0	0	1	10	8	28	34	1	0	2	71	7	91	0	0	0	1	98	0	94	1	1	0	5	96	275
5:15 PM	2	0	10	5	0	2	17	9	20	18	0	0	0	47	7	91	0	0	0	1	98	0	74	2	0	0	0	76	238
5:30 PM	3	0	7	3	0	1	13	5	15	19	2	0	3	41	1	69	0	0	0	1	70	0	84	2	0	0	2	86	210
5:45 PM	0	0	4	1	0	0	5	4	21	16	2	0	2	43	1	64	0	0	0	2	65	0	71	1	0	0	1	72	185
Hourly Total	8	0	28	9	0	4	45	26	84	87	5	0	7	202	16	315	0	0	0	5	331	0	323	6	1	0	8	330	908
6:00 PM	4	0	8	4	0	0	16	2	12	15	4	0	3	33	4	52	0	0	0	1	56	0	46	1	0	0	0	47	152
6:15 PM	1	0	4	1	0	2	6	4	10	13	3	0	1	30	4	39	0	0	0	2	43	0	47	2	1	0	3	50	129
6:30 PM	2	0	6	1	0	3	9	2	19	6	2	0	1	29	2	54	0	0	0	5	56	0	47	1	0	0	1	48	142
6:45 PM	1	0	5	0	0	1	6	3	10	1	7	0	6	21	2	47	0	0	0	0	49	0	44	3	0	0	1	47	123
Hourly Total	8	0	23	6	0	6	37	11	51	35	16	0	11	113	12	192	0	0	0	8	204	0	184	7	1	0	5	192	546

Grand Total	110	0	231	72	0	48	413	166	551	684	83	0	133	1484	154	3405	0	0	0	68	3559	0	2987	68	7	0	90	3072	6528
Approach %	26.6	0.0	55.9	17.4	0.0	-	-	11.2	37.1	46.1	5.6	0.0	-	-	4.3	95.7	0.0	0.0	0.0	-	-	0.0	97.6	2.2	0.2	0.0	-	-	-
Total %	1.3	0.0	2.7	0.8	0.0	-	4.8	1.9	6.5	8.0	1.0	0.0	-	17.4	1.8	39.9	0.0	0.0	0.0	-	41.7	0.0	35.1	0.8	0.1	0.0	-	36.0	-
Lights	106	0	218	72	0	-	396	161	541	671	81	0	-	1454	149	3237	0	0	0	-	3386	0	2827	65	7	0	-	2899	8135
% Lights	96.4	-	94.4	100.0	-	-	95.9	97.0	98.2	98.1	97.6	-	-	98.0	96.8	95.1	-	-	-	-	95.1	-	94.3	95.6	100.0	-	-	94.4	95.4
Buses	0	0	6	0	0	-	6	2	9	8	0	0	-	19	4	64	0	0	0	-	68	0	75	0	0	0	-	75	168
% Buses	0.0	-	2.6	0.0	-	-	1.5	1.2	1.6	1.2	0.0	-	-	1.3	2.6	1.9	-	-	-	-	1.9	-	2.5	0.0	0.0	-	-	2.4	2.0
Trucks	4	0	7	0	0	-	11	3	1	5	2	0	-	11	1	104	0	0	0	-	105	0	95	3	0	0	-	98	225
% Trucks	3.6	-	3.0	0.0	-	-	2.7	1.8	0.2	0.7	2.4	-	-	0.7	0.6	3.1	-	-	-	-	3.0	-	3.2	4.4	0.0	-	-	3.2	2.6
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	6	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	4.5	-	-	-	-	-	-	1.5	-	-	-	-	-	-	1.1	-	-
Pedestrians	-	-	-	-	-	48	-	-	-	-	-	-	127	-	-	-	-	-	-	67	-	-	-	-	-	-	89	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	95.5	-	-	-	-	-	-	98.5	-	-	-	-	-	-	98.9	-	-

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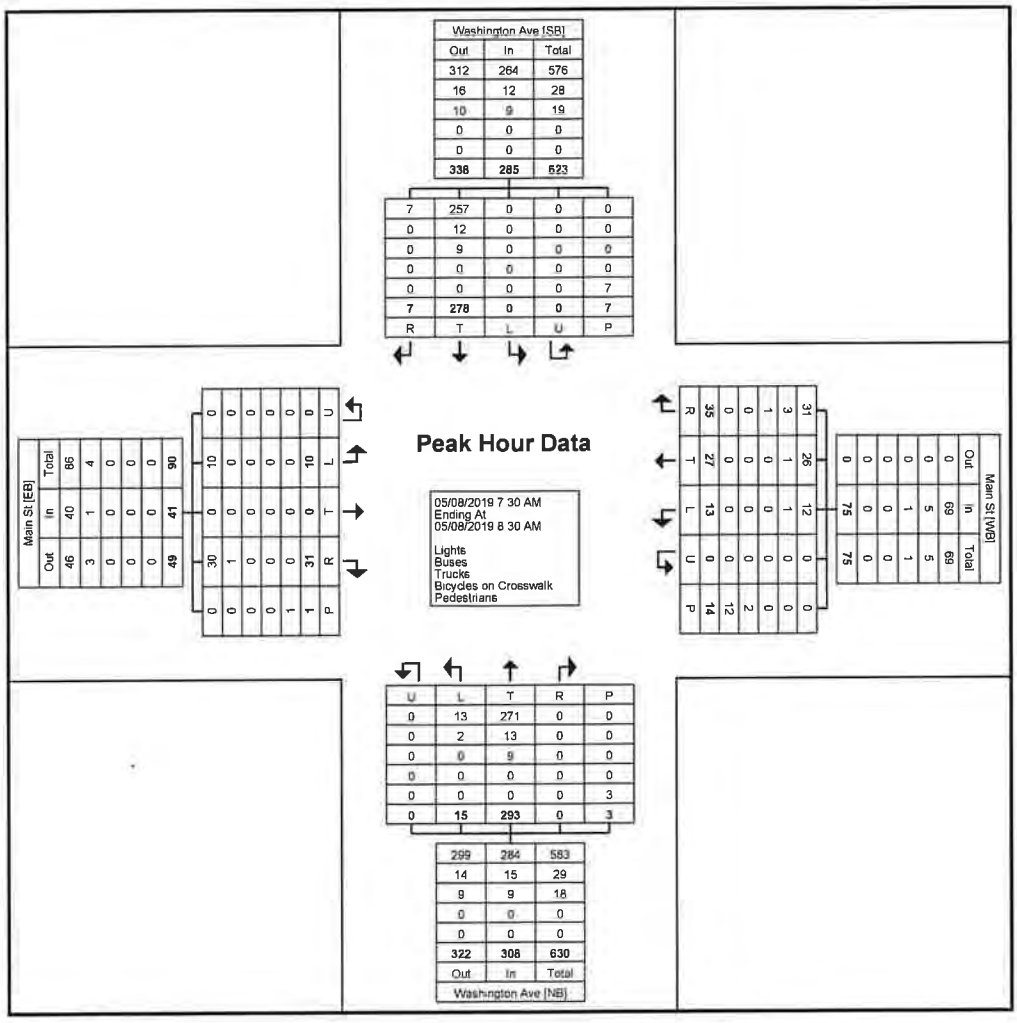
Kingston, NY
Washington Ave & Main St
Wednesday, May 8, 2019
Location: 41.931166, -74.022173

Count Name: Washington Ave & Main St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Main St Eastbound							Main St Westbound							Washington Ave Northbound							Washington Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:30 AM	2	0	6	3	0	0	11	3	11	3	2	0	2	19	8	85	0	0	0	0	93	0	59	1	0	0	2	60	183
7:45 AM	1	0	6	4	0	1	11	2	6	8	2	0	2	18	3	79	0	0	0	2	82	0	75	0	0	0	1	75	186
8:00 AM	4	0	4	1	0	0	9	5	6	14	0	0	4	25	1	73	0	0	0	0	74	0	71	4	0	0	2	75	183
8:15 AM	3	0	2	5	0	0	10	3	4	6	0	0	6	13	3	56	0	0	0	1	59	0	73	1	1	0	2	75	157
Total	10	0	18	13	0	1	41	13	27	31	4	0	14	75	15	293	0	0	0	3	308	0	278	6	1	0	7	285	709
Approach %	24.4	0.0	43.9	31.7	0.0	-	-	17.3	36.0	41.3	5.3	0.0	-	-	4.9	95.1	0.0	0.0	0.0	-	-	0.0	97.5	2.1	0.4	0.0	-	-	-
Total %	1.4	0.0	2.5	1.8	0.0	-	5.8	1.8	3.8	4.4	0.6	0.0	-	10.6	2.1	41.3	0.0	0.0	0.0	-	43.4	0.0	39.2	0.8	0.1	0.0	-	40.2	-
PHF	0.625	0.000	0.750	0.650	0.000	-	0.932	0.650	0.614	0.554	0.500	0.000	-	0.750	0.469	0.862	0.000	0.000	0.000	-	0.828	0.000	0.927	0.375	0.250	0.000	-	0.950	0.953
Lights	10	0	17	13	0	-	40	12	26	27	4	0	-	69	13	271	0	0	0	-	284	0	257	6	1	0	-	264	657
% Lights	100.0	-	94.4	100.0	-	-	97.6	92.3	96.3	87.1	100.0	-	-	92.0	86.7	92.5	-	-	-	-	92.2	-	92.4	100.0	100.0	-	-	92.6	92.7
Buses	0	0	1	0	0	-	1	1	1	3	0	0	-	5	2	13	0	0	0	-	15	0	12	0	0	0	-	12	33
% Buses	0.0	-	5.6	0.0	-	-	2.4	7.7	3.7	9.7	0.0	-	-	6.7	13.3	4.4	-	-	-	-	4.9	-	4.3	0.0	0.0	-	-	4.2	4.7
Trucks	0	0	0	0	0	-	0	0	0	1	0	0	-	1	0	9	0	0	0	-	9	0	9	0	0	0	-	9	19
% Trucks	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	3.2	0.0	-	-	1.3	0.0	3.1	-	-	-	-	2.9	-	3.2	0.0	0.0	-	-	3.2	2.7
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	14.3	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	12	-	-	-	-	-	-	3	-	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	85.7	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-



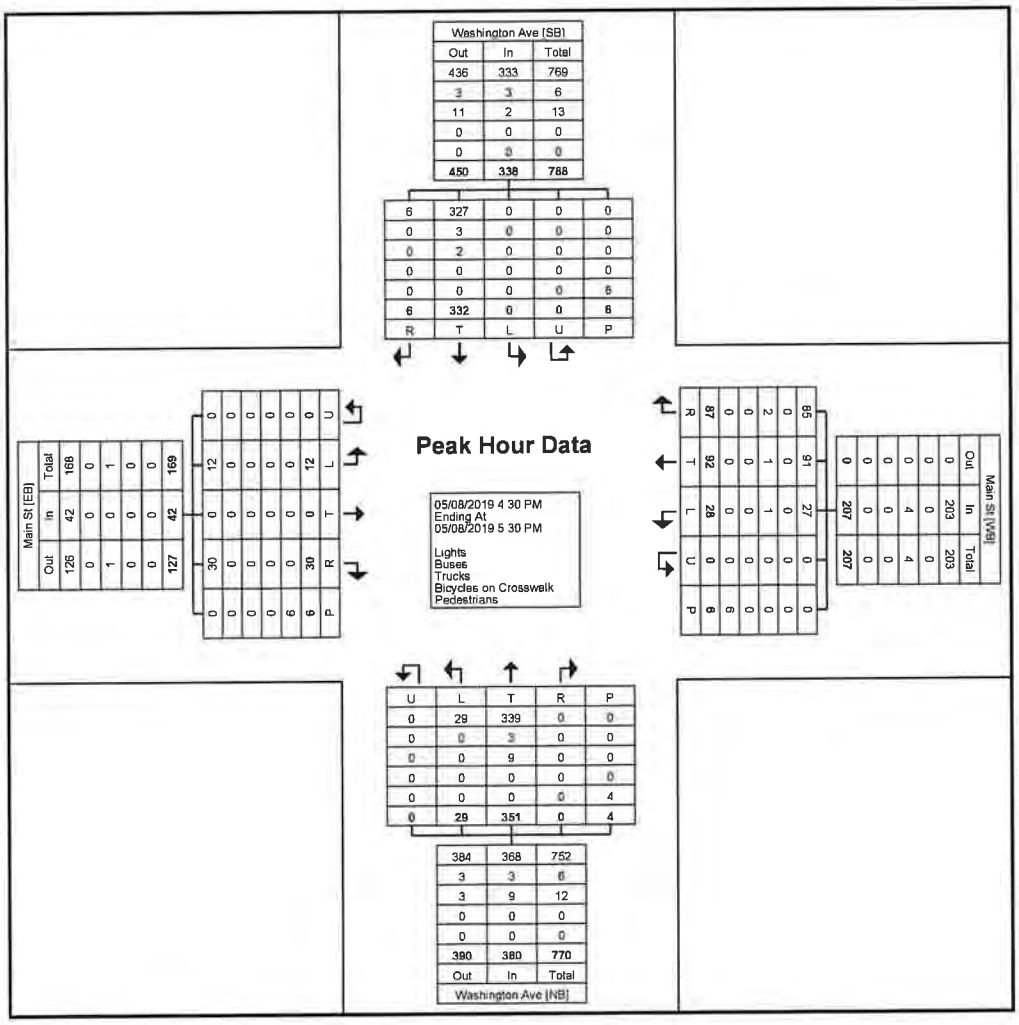
Turning Movement Peak Hour Data Plot (7:30 AM)

Kingston, NY
Washington Ave & Main St
Wednesday, May 8, 2019
Location: 41.931166, -74.022173

Count Name: Washington Ave & Main St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Main St Eastbound							Main St Westbound							Washington Ave Northbound							Washington Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:30 PM	4	0	6	0	0	2	10	2	20	19	2	0	1	43	4	76	0	0	0	0	80	0	90	0	0	0	2	90	223
4:45 PM	3	0	1	1	0	1	5	9	24	13	0	0	3	46	11	93	0	0	0	2	104	0	74	2	0	0	1	76	231
5:00 PM	3	0	7	0	0	1	10	8	28	34	1	0	2	71	7	91	0	0	0	1	98	0	94	1	1	0	5	96	275
5:15 PM	2	0	10	5	0	2	17	9	20	18	0	0	0	47	7	91	0	0	0	1	98	0	74	2	0	0	0	76	238
Total	12	0	24	6	0	6	42	28	92	84	3	0	6	207	29	351	0	0	0	4	380	0	332	5	1	0	8	338	967
Approach %	28.6	0.0	57.1	14.3	0.0	-	-	13.5	44.4	40.6	1.4	0.0	-	-	7.6	92.4	0.0	0.0	0.0	-	-	0.0	98.2	1.5	0.3	0.0	-	-	-
Total %	1.2	0.0	2.5	0.6	0.0	-	4.3	2.9	9.5	8.7	0.3	0.0	-	21.4	3.0	36.3	0.0	0.0	0.0	-	39.3	0.0	34.3	0.5	0.1	0.0	-	35.0	-
PHF	0.750	0.000	0.600	0.300	0.000	-	0.618	0.778	0.821	0.618	0.375	0.000	-	0.729	0.659	0.944	0.000	0.000	0.000	-	0.913	0.000	0.883	0.625	0.250	0.000	-	0.880	0.879
Lights	12	0	24	6	0	-	42	27	91	83	2	0	-	203	29	339	0	0	0	-	368	0	327	5	1	0	-	333	946
% Lights	100.0	-	100.0	100.0	-	-	100.0	96.4	98.9	98.8	66.7	-	-	98.1	100.0	96.6	-	-	-	-	96.8	-	98.5	100.0	100.0	-	-	98.5	97.8
Buses	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	3	0	0	0	-	3	0	3	0	0	0	-	3	6
% Buses	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.9	-	-	-	-	0.8	-	0.9	0.0	0.0	-	-	0.9	0.6
Trucks	0	0	0	0	0	-	0	1	1	1	1	0	-	4	0	9	0	0	0	-	9	0	2	0	0	0	-	2	15
% Trucks	0.0	-	0.0	0.0	-	-	0.0	3.6	1.1	1.2	33.3	-	-	1.9	0.0	2.6	-	-	-	-	2.4	-	0.6	0.0	0.0	-	-	0.6	1.6
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	6	-	-	-	-	-	-	6	-	-	-	-	-	-	4	-	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (4:30 PM)

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Kingston, NY
Wall St & Pearl St
Wednesday, May 8, 2019
Location: 41.931461, -74.018805

Count Name: Wall St & Pearl St
Site Code:
Start Date: 05/08/2019

Turning Movement Data

Start Time	Pearl St Eastbound					Pearl St Westbound					Wall St Northbound					Wall St Southbound		
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Peds	App. Total	Int. Total
7:00 AM	7	9	0	0	16	4	1	0	0	5	0	10	1	0	11	1	0	32
7:15 AM	7	26	0	1	33	10	2	0	2	12	2	17	3	0	22	2	0	67
7:30 AM	2	31	0	0	33	9	5	0	0	14	4	22	1	0	27	1	0	74
7:45 AM	10	40	0	1	50	10	1	0	2	11	2	35	4	1	41	0	0	102
Hourly Total	26	106	0	2	132	33	9	0	4	42	8	84	9	1	101	4	0	275
8:00 AM	15	40	0	0	55	18	5	0	0	23	3	33	26	0	62	4	0	140
8:15 AM	6	36	0	0	42	11	6	0	1	17	2	31	5	0	38	0	0	97
8:30 AM	15	36	0	2	51	20	4	0	0	24	1	24	8	1	33	0	0	108
8:45 AM	18	55	0	2	73	14	17	0	2	31	4	47	10	2	61	3	0	165
Hourly Total	54	167	0	4	221	63	32	0	9	95	10	135	49	3	194	7	0	510
9:00 AM	15	43	0	5	58	20	21	0	0	41	5	30	5	1	40	3	0	139
9:15 AM	11	31	0	2	42	19	19	0	4	38	3	28	4	0	35	1	0	115
9:30 AM	6	25	0	1	31	16	13	0	0	29	4	26	2	0	32	2	0	92
9:45 AM	9	38	0	4	47	27	23	0	3	50	3	26	6	2	35	4	0	132
Hourly Total	41	137	0	12	178	82	76	0	7	158	15	110	17	3	142	10	0	478
10:00 AM	13	34	0	4	47	24	15	0	2	39	4	16	3	1	23	2	0	109
10:15 AM	8	26	0	3	34	19	10	0	3	29	4	23	3	1	30	1	0	93
10:30 AM	7	37	0	4	44	30	18	0	3	48	2	24	4	2	30	2	0	122
10:45 AM	14	30	0	4	44	19	10	0	2	29	2	30	3	0	35	1	0	108
Hourly Total	42	127	0	15	169	92	53	0	10	145	12	93	13	4	118	6	0	432
11:00 AM	15	25	0	2	40	36	20	0	2	56	3	25	5	1	33	1	0	129
11:15 AM	6	37	0	2	43	26	17	0	1	43	8	27	9	1	44	3	0	130
11:30 AM	7	33	0	4	40	30	17	0	5	47	6	27	4	2	37	0	0	124
11:45 AM	9	31	0	5	40	38	17	0	11	55	5	24	2	5	31	2	0	126
Hourly Total	37	126	0	13	163	130	71	0	19	201	22	103	20	9	145	6	0	509
12:00 PM	5	35	0	3	40	22	18	0	2	40	7	40	3	0	50	4	0	130
12:15 PM	6	28	0	0	34	26	16	0	0	42	5	36	7	2	48	6	0	124
12:30 PM	6	34	0	0	40	18	20	0	0	38	8	33	0	2	41	3	0	119
12:45 PM	7	37	0	7	44	28	21	0	4	49	2	23	3	1	28	1	0	121
Hourly Total	24	134	0	10	158	94	75	0	6	169	22	132	13	5	167	14	0	494
1:00 PM	8	44	0	2	52	28	9	0	3	37	5	31	2	4	38	1	0	127
1:15 PM	7	41	0	3	48	17	15	0	5	32	4	24	6	0	34	5	0	114
1:30 PM	11	26	0	4	37	24	8	0	7	32	4	23	0	0	27	2	0	96
1:45 PM	9	31	0	2	40	25	22	0	6	47	3	28	4	0	35	5	0	122
Hourly Total	35	142	0	11	177	94	54	0	21	148	16	106	12	7	134	13	0	459
2:00 PM	6	37	0	3	43	24	16	0	3	40	4	42	5	2	51	5	0	134
2:15 PM	11	37	0	4	48	28	16	0	6	44	9	40	3	2	52	4	0	144
2:30 PM	5	37	0	2	42	20	15	0	3	35	7	32	2	3	41	2	0	118
2:45 PM	8	38	0	2	46	34	15	0	1	49	5	28	7	3	40	0	0	135
Hourly Total	30	149	0	11	179	106	62	0	13	168	25	142	17	10	184	11	0	531
3:00 PM	15	32	0	5	47	27	29	0	3	56	14	48	18	11	80	1	0	183
3:15 PM	9	33	0	2	42	23	13	0	7	36	8	45	2	3	55	4	0	133
3:30 PM	14	43	0	3	57	27	13	0	3	40	7	34	9	5	50	2	0	147
3:45 PM	12	39	0	6	51	27	10	0	4	37	10	43	3	2	56	3	0	144
Hourly Total	50	147	0	16	197	104	65	0	17	169	39	170	32	21	241	10	0	607
4:00 PM	9	42	0	0	51	26	17	0	0	43	10	28	7	0	45	0	0	139
4:15 PM	5	29	0	0	34	26	9	0	2	35	13	26	4	2	43	2	0	112
4:30 PM	9	40	0	8	49	25	12	0	5	37	8	38	5	0	51	1	0	137
4:45 PM	8	32	0	4	40	31	11	0	2	42	9	30	5	2	44	0	0	126
Hourly Total	31	143	0	26	174	108	49	0	9	157	40	122	21	4	183	3	0	514
5:00 PM	7	44	0	4	51	44	12	0	5	56	14	23	10	3	47	1	0	154
5:15 PM	8	41	0	2	49	28	5	0	0	33	3	28	4	0	35	2	0	117
5:30 PM	11	53	0	2	64	30	9	0	4	39	4	38	2	1	44	2	0	147
5:45 PM	12	40	0	2	52	21	16	0	21	37	8	32	4	8	44	8	0	133
Hourly Total	38	178	0	10	216	123	42	0	30	165	29	121	20	12	170	13	0	551
6:00 PM	6	27	0	0	33	27	7	0	2	34	10	18	1	1	29	2	0	96
6:15 PM	6	24	0	0	30	13	6	0	1	19	6	19	0	0	25	1	0	74
6:30 PM	2	25	0	1	27	34	7	0	0	41	5	19	1	2	25	0	0	93
6:45 PM	5	27	0	1	32	18	4	0	1	22	4	17	2	1	23	1	0	77
Hourly Total	19	103	0	2	122	92	24	0	4	116	25	73	4	4	102	4	0	340
Grand Total	427	1659	0	132	2086	1121	612	0	149	1733	263	1391	227	83	1881	101	0	5700

Approach %	20.5	79.5	0.0	-	-	64.7	35.3	0.0	-	-	14.0	74.0	12.1	-	-	-	-	-
Total %	7.5	29.1	0.0	-	36.6	19.7	10.7	0.0	-	30.4	4.6	24.4	4.0	-	33.0	-	0.0	-
Lights	411	1605	0	-	2016	1098	604	0	-	1700	255	1354	225	-	1834	-	0	5550
% Lights	96.3	96.7	-	-	96.6	97.8	98.7	-	-	98.1	97.0	97.3	99.1	-	97.5	-	-	97.4
Buses	11	38	0	-	49	9	2	0	-	11	2	15	1	-	18	-	0	78
% Buses	2.6	2.3	-	-	2.3	0.8	0.3	-	-	0.6	0.8	1.1	0.4	-	1.0	-	-	1.4
Trucks	5	16	0	-	21	16	6	0	-	22	6	22	1	-	29	-	0	72
% Trucks	1.2	1.0	-	-	1.0	1.4	1.0	-	-	1.3	2.3	1.6	0.4	-	1.5	-	-	1.3
Bicycles on Crosswalk	-	-	-	4	-	-	-	-	3	-	-	-	-	1	-	5	-	-
% Bicycles on Crosswalk	-	-	-	3.0	-	-	-	-	2.0	-	-	-	-	1.2	-	5.0	-	-
Pedestrians	-	-	-	128	-	-	-	-	146	-	-	-	-	82	-	96	-	-
% Pedestrians	-	-	-	97.0	-	-	-	-	98.0	-	-	-	-	98.8	-	95.0	-	-

TRI-STATE TRAFFIC DATA
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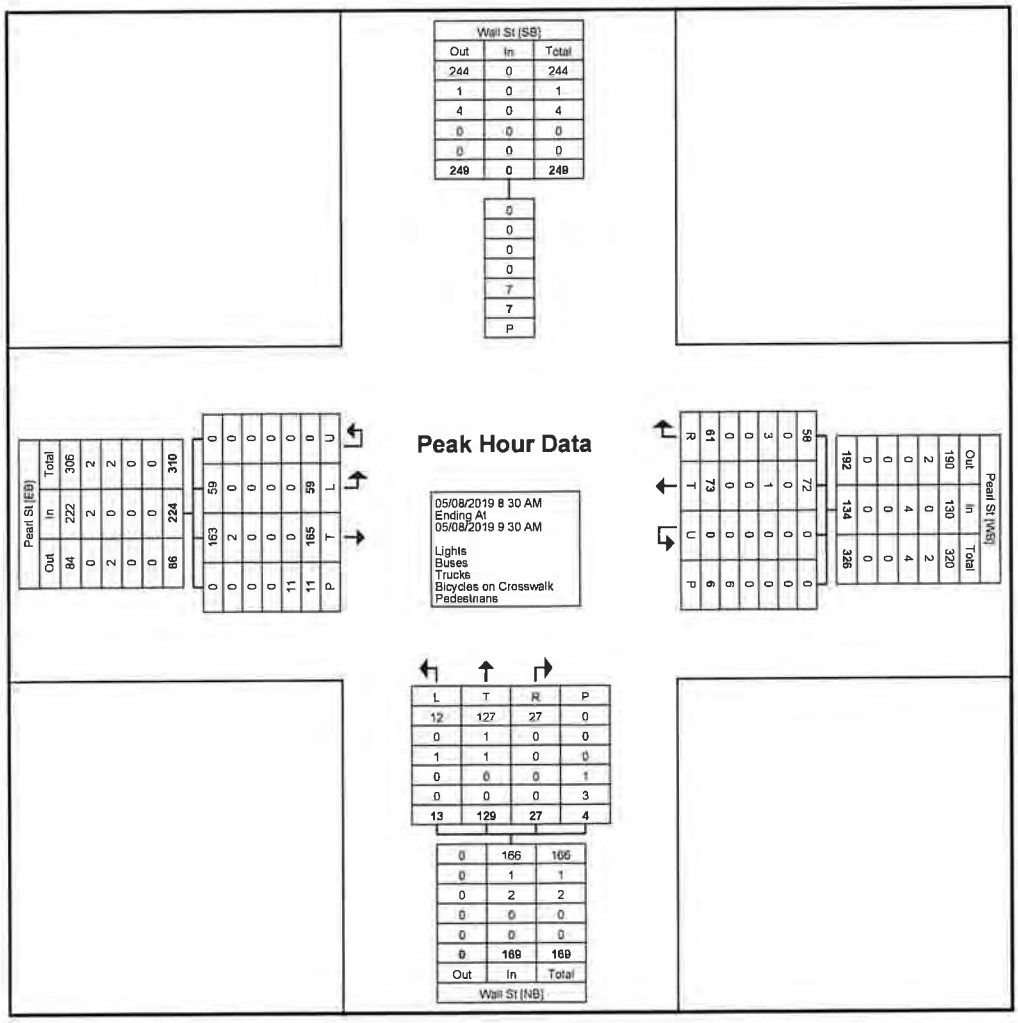
Kingston, NY
Wall St & Pearl St
Wednesday, May 8, 2019
Location: 41.931461, -74.018805

Count Name: Wall St & Pearl St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (8:30 AM)

Start Time	Pearl St Eastbound					Pearl St Westbound					Wall St Northbound					Wall St Southbound		Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Peds	App. Total	
8:30 AM	15	36	0	2	51	20	4	0	0	24	1	24	8	1	33	0	0	108
8:45 AM	18	55	0	2	73	14	17	0	2	31	4	47	10	2	61	3	0	165
9:00 AM	15	43	0	5	58	20	21	0	0	41	5	30	5	1	40	3	0	139
9:15 AM	11	31	0	2	42	19	19	0	4	38	3	28	4	0	35	1	0	115
Total	59	165	0	11	224	73	61	0	6	134	13	129	27	4	169	7	0	527
Approach %	26.3	73.7	0.0	-	-	54.5	45.5	0.0	-	-	7.7	76.3	16.0	-	-	-	-	-
Total %	11.2	31.3	0.0	-	42.5	13.9	11.6	0.0	-	25.4	2.5	24.5	5.1	-	32.1	-	0.0	-
PHF	0.819	0.750	0.000	-	0.767	0.913	0.726	0.000	-	0.817	0.650	0.686	0.675	-	0.693	-	0.000	0.798
Lights	59	163	0	-	222	72	58	0	-	130	12	127	27	-	166	-	0	518
% Lights	100.0	98.8	-	-	99.1	98.6	95.1	-	-	97.0	92.3	98.4	100.0	-	98.2	-	-	98.3
Buses	0	2	0	-	2	0	0	0	-	0	0	1	0	-	1	-	0	3
% Buses	0.0	1.2	-	-	0.9	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	0.6	-	-	0.6
Trucks	0	0	0	-	0	1	3	0	-	4	1	1	0	-	2	-	0	6
% Trucks	0.0	0.0	-	-	0.0	1.4	4.9	-	-	3.0	7.7	0.8	0.0	-	1.2	-	-	1.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	25.0	-	0.0	-	-
Pedestrians	-	-	-	11	-	-	-	-	6	-	-	-	-	3	-	7	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	75.0	-	100.0	-	-



Turning Movement Peak Hour Data Plot (8:30 AM)

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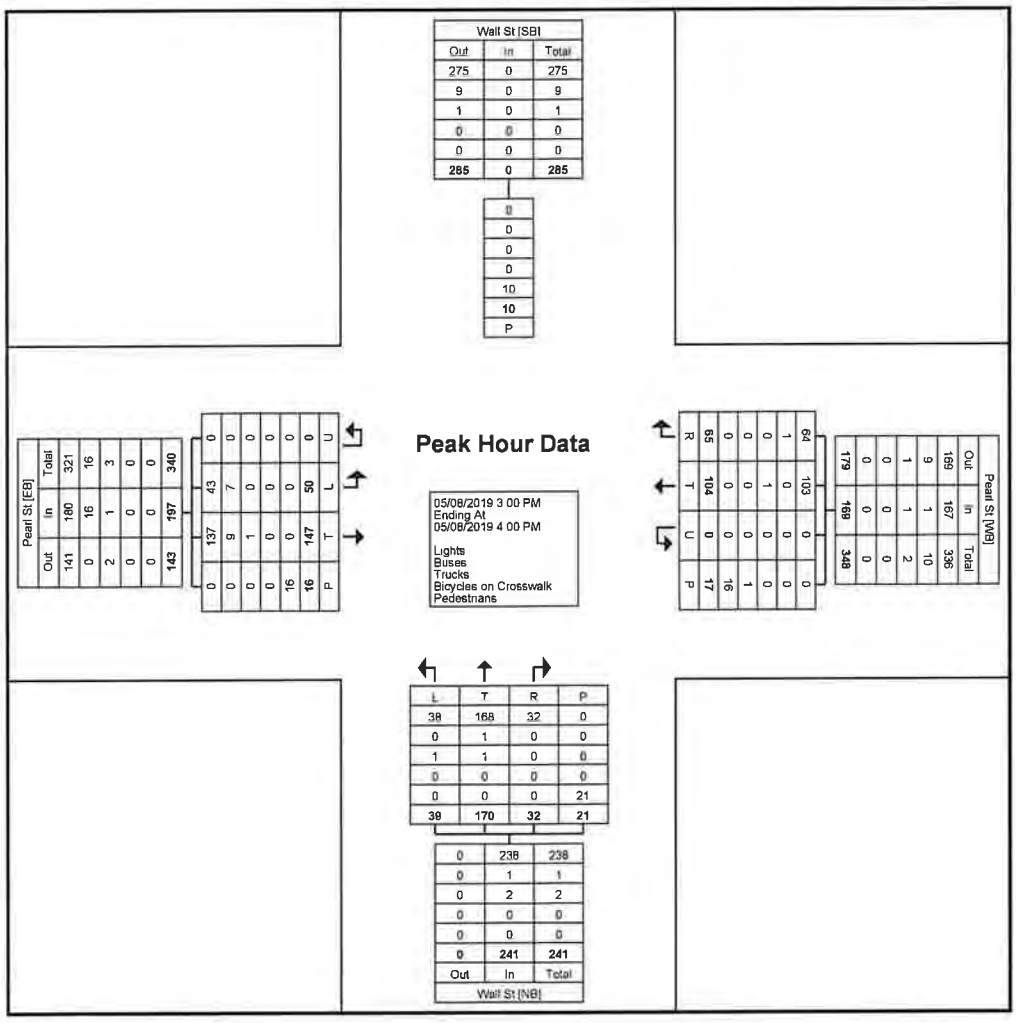
Kingston, NY
Wall St & Pearl St
Wednesday, May 8, 2019
Location: 41.931461, -74.018805

Count Name: Wall St & Pearl St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (3:00 PM)

Start Time	Pearl St Eastbound					Pearl St Westbound					Wall St Northbound					Wall St Southbound		
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Peds	App. Total	Int. Total
3:00 PM	15	32	0	5	47	27	29	0	3	56	14	48	18	11	80	1	0	183
3:15 PM	9	33	0	2	42	23	13	0	7	36	8	45	2	3	55	4	0	133
3:30 PM	14	43	0	3	57	27	13	0	3	40	7	34	9	5	50	2	0	147
3:45 PM	12	39	0	6	51	27	10	0	4	37	10	43	3	2	56	3	0	144
Total	50	147	0	16	197	104	65	0	17	169	39	170	32	21	241	10	0	607
Approach %	25.4	74.6	0.0	-	-	61.5	38.5	0.0	-	-	16.2	70.5	13.3	-	-	-	-	-
Total %	8.2	24.2	0.0	-	32.5	17.1	10.7	0.0	-	27.8	6.4	28.0	5.3	-	39.7	-	0.0	-
PHF	0.833	0.855	0.000	-	0.864	0.963	0.560	0.000	-	0.754	0.696	0.885	0.444	-	0.753	-	0.000	0.829
Lights	43	137	0	-	180	103	64	0	-	167	38	168	32	-	238	-	0	585
% Lights	86.0	93.2	-	-	91.4	99.0	98.5	-	-	98.8	97.4	98.8	100.0	-	98.8	-	-	96.4
Buses	7	9	0	-	16	0	1	0	-	1	0	1	0	-	1	-	0	18
% Buses	14.0	6.1	-	-	8.1	0.0	1.5	-	-	0.6	0.0	0.6	0.0	-	0.4	-	-	3.0
Trucks	0	1	0	-	1	1	0	0	-	1	1	1	0	-	2	-	0	4
% Trucks	0.0	0.7	-	-	0.5	1.0	0.0	-	-	0.6	2.6	0.6	0.0	-	0.8	-	-	0.7
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	5.9	-	-	-	-	0.0	-	0.0	-	-
Pedestrians	-	-	-	16	-	-	-	-	16	-	-	-	-	21	-	10	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	94.1	-	-	-	-	100.0	-	100.0	-	-



Turning Movement Peak Hour Data Plot (3:00 PM)

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Kingston, NY
Fair St & Pearl St
Wednesday, May 8, 2019
Location: 41.93196, -74.017497

Count Name: Fair St & Pearl St
Site Code:
Start Date: 05/08/2019
Page No: 1

Turning Movement Data

Start Time	Pearl St Eastbound						Pearl St Westbound					Fair St Northbound		Fair St Southbound						Int Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:00 AM	11	0	1	0	1	12	0	4	0	0	4	0	0	7	7	0	1	0	15	31
7:15 AM	23	2	3	0	0	28	0	10	0	1	10	0	0	5	8	0	0	0	13	51
7:30 AM	30	2	0	0	3	32	2	13	0	1	15	0	0	11	20	3	0	0	34	81
7:45 AM	41	0	1	0	1	42	1	9	0	2	10	1	0	11	9	0	2	1	22	74
Hourly Total	105	4	5	0	5	114	3	36	0	4	39	1	0	34	44	3	3	1	84	237
8:00 AM	53	6	0	0	1	59	2	21	0	1	23	0	0	16	19	3	0	1	38	120
8:15 AM	37	3	0	0	2	40	4	15	0	2	19	1	0	16	21	1	0	0	38	97
8:30 AM	34	3	1	0	1	38	2	27	0	2	29	1	0	18	11	3	0	0	32	99
8:45 AM	60	6	0	0	2	66	7	31	0	0	38	1	0	16	15	4	1	2	36	140
Hourly Total	184	18	1	0	6	203	15	94	0	11	109	3	0	66	66	11	1	3	144	456
9:00 AM	40	2	0	0	3	42	6	36	0	4	42	1	0	24	15	3	1	1	43	127
9:15 AM	34	3	0	0	5	37	3	42	0	2	45	0	0	18	22	4	0	2	44	126
9:30 AM	28	1	0	0	0	29	4	21	0	4	25	0	0	27	21	4	0	0	52	106
9:45 AM	37	1	0	0	3	38	8	48	0	0	56	3	0	25	18	2	0	1	45	139
Hourly Total	139	7	0	0	20	146	21	147	0	10	168	4	0	94	76	13	1	5	184	498
10:00 AM	30	5	1	0	11	36	3	36	0	3	39	5	0	21	15	3	1	5	40	115
10:15 AM	28	5	1	0	0	34	7	24	0	3	31	2	0	33	13	4	1	1	51	116
10:30 AM	38	4	1	0	2	43	3	44	0	4	47	0	0	20	19	2	1	0	42	132
10:45 AM	34	3	1	0	5	38	7	27	0	10	34	7	0	30	22	3	0	3	55	127
Hourly Total	130	17	4	0	27	151	20	131	0	20	151	12	0	104	69	12	3	9	188	490
11:00 AM	24	4	1	0	6	29	9	54	0	6	63	4	0	41	10	3	1	2	55	147
11:15 AM	33	6	0	1	5	40	6	45	0	4	51	13	0	37	16	4	1	1	58	149
11:30 AM	39	3	1	0	5	43	6	40	0	5	46	3	0	29	19	4	0	3	52	141
11:45 AM	35	2	0	0	7	37	2	49	0	5	51	1	0	30	20	2	1	2	53	141
Hourly Total	131	15	2	1	23	149	23	188	0	20	211	21	0	137	65	13	3	8	218	578
12:00 PM	36	3	1	0	7	40	2	41	0	14	43	1	0	28	29	2	3	7	62	145
12:15 PM	39	1	1	0	4	41	3	34	0	4	37	2	0	33	19	0	1	6	53	131
12:30 PM	32	3	0	0	1	35	5	36	0	1	41	0	0	35	27	6	0	3	68	144
12:45 PM	38	0	1	0	11	39	1	47	0	10	48	2	0	33	15	4	4	1	56	143
Hourly Total	145	7	3	0	23	155	11	158	0	29	169	5	0	129	90	12	8	17	239	563
1:00 PM	47	4	1	0	3	52	9	38	0	10	47	3	0	36	25	3	0	3	64	163
1:15 PM	42	0	0	0	5	42	5	28	0	6	33	1	0	32	31	1	0	3	64	139
1:30 PM	29	4	0	0	7	33	5	25	0	6	30	3	0	35	23	3	1	1	62	125
1:45 PM	31	6	1	0	3	38	3	42	0	9	45	4	0	32	20	2	0	0	54	137
Hourly Total	149	14	2	0	18	165	22	133	0	31	155	11	0	135	99	9	1	7	244	564
2:00 PM	40	4	1	0	4	45	10	42	0	13	52	2	0	30	23	4	2	4	59	156
2:15 PM	36	6	1	0	7	43	7	38	0	6	45	1	0	23	20	8	0	2	51	139
2:30 PM	37	2	0	0	6	39	7	34	0	5	41	0	0	33	28	1	0	1	62	142
2:45 PM	35	5	0	0	4	40	7	38	0	5	45	2	0	31	32	2	1	5	66	151
Hourly Total	148	17	2	0	21	167	31	152	0	29	183	5	0	117	103	15	3	12	238	588
3:00 PM	52	6	2	0	6	60	3	53	0	4	56	1	0	40	18	4	0	1	62	178
3:15 PM	27	3	2	0	3	32	6	32	0	1	38	4	0	33	27	2	0	1	62	132
3:30 PM	45	4	1	0	5	50	6	31	0	8	37	4	0	28	18	6	1	7	53	140
3:45 PM	37	3	1	0	3	41	2	29	0	5	31	3	0	30	32	3	1	2	66	138
Hourly Total	161	16	6	0	17	183	17	145	0	18	162	12	0	131	95	15	2	11	243	588
4:00 PM	53	4	2	0	6	59	6	40	0	1	46	1	0	27	28	5	3	0	63	168
4:15 PM	27	2	0	0	4	29	9	35	0	6	44	2	0	30	21	2	0	1	53	126
4:30 PM	33	5	5	0	2	43	6	32	0	10	38	2	0	32	37	5	0	0	74	155
4:45 PM	35	6	2	0	5	43	3	37	0	3	40	3	0	29	30	5	0	1	64	147
Hourly Total	148	17	9	0	17	174	24	144	0	20	168	8	0	118	116	17	3	2	254	596
5:00 PM	43	3	0	0	3	46	6	50	0	10	56	5	0	44	51	6	1	2	102	204
5:15 PM	44	3	0	0	3	47	7	28	0	6	35	5	0	32	22	0	0	0	54	136
5:30 PM	47	9	0	0	0	56	2	34	0	3	36	0	0	26	31	2	2	0	61	153
5:45 PM	38	2	1	0	7	41	3	34	0	9	37	5	0	20	27	3	0	2	50	128
Hourly Total	172	17	1	0	13	190	18	146	0	30	164	15	0	122	131	11	3	4	267	621
6:00 PM	34	2	1	0	0	37	4	33	0	2	37	0	0	21	24	4	1	0	50	124
6:15 PM	24	0	0	0	4	24	2	15	0	1	17	0	0	9	9	3	3	0	24	65
6:30 PM	20	0	0	0	1	20	2	35	0	5	37	2	0	10	12	2	1	0	25	82
6:45 PM	28	2	0	0	4	30	5	21	0	5	26	1	0	25	19	1	0	2	45	101
Hourly Total	106	4	1	0	9	111	13	104	0	13	117	3	0	65	64	10	5	2	144	372
Grand Total	1718	153	36	1	199	1908	218	1578	0	235	1796	100	0	1252	1018	141	36	61	2447	6151

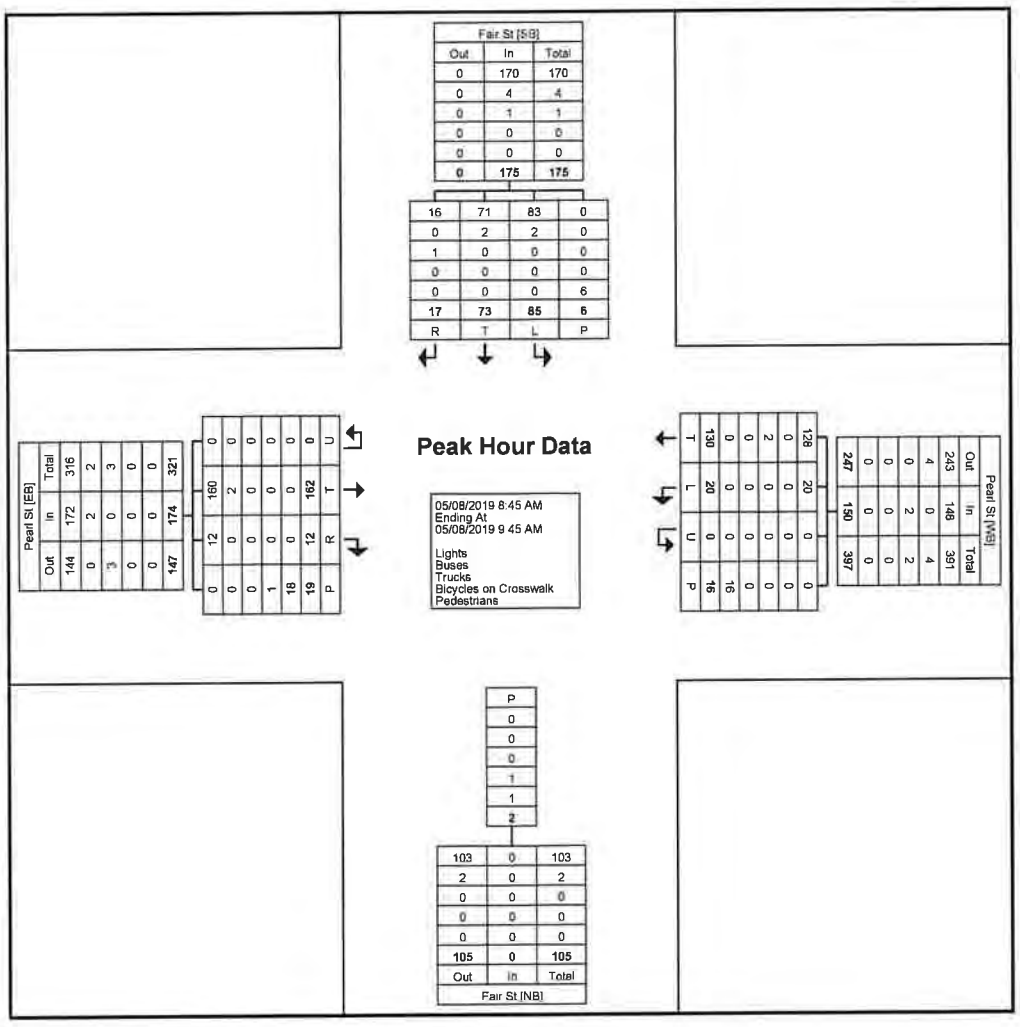
Approach %	90.0	8.0	1.9	0.1	-	-	12.1	87.9	0.0	-	-	-	-	51.2	41.6	5.8	1.5	-	-	-
Total %	27.9	2.5	0.6	0.0	-	31.0	3.5	25.7	0.0	-	29.2	-	0.0	20.4	16.6	2.3	0.6	-	39.8	-
Lights	1669	148	33	1	-	1851	216	1550	0	-	1766	-	0	1205	993	139	35	-	2372	5989
% Lights	97.1	96.7	91.7	100.0	-	97.0	99.1	98.2	-	-	98.3	-	-	96.2	97.5	98.6	97.2	-	96.9	97.4
Buses	31	4	3	0	-	38	0	9	0	-	9	-	0	35	8	1	0	-	44	91
% Buses	1.8	2.6	8.3	0.0	-	2.0	0.0	0.6	-	-	0.5	-	-	2.8	0.8	0.7	0.0	-	1.8	1.5
Trucks	18	1	0	0	-	19	2	19	0	-	21	-	0	12	17	1	1	-	31	71
% Trucks	1.0	0.7	0.0	0.0	-	1.0	0.9	1.2	-	-	1.2	-	-	1.0	1.7	0.7	2.8	-	1.3	1.2
Bicycles on Crosswalk	-	-	-	-	5	-	-	-	-	3	-	3	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	2.5	-	-	-	-	1.3	-	3.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	194	-	-	-	-	232	-	97	-	-	-	-	-	81	-	-
% Pedestrians	-	-	-	-	97.5	-	-	-	-	98.7	-	97.0	-	-	-	-	-	100.0	-	-

Kingston, NY
Fair St & Pearl St
Wednesday, May 8, 2019
Location: 41.93196, -74.017497

Count Name: Fair St & Pearl St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (8:45 AM)

Start Time	Pearl St Eastbound						Pearl St Westbound					Fair St Northbound		Fair St Southbound						Int Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
8:45 AM	60	6	0	0	2	66	7	31	0	6	38	1	0	16	15	4	1	2	36	140
9:00 AM	40	2	0	0	3	42	6	36	0	4	42	1	0	24	15	3	1	1	43	127
9:15 AM	34	3	0	0	5	37	3	42	0	2	45	0	0	18	22	4	0	2	44	126
9:30 AM	28	1	0	0	9	29	4	21	0	4	25	0	0	27	21	4	0	1	52	106
Total	162	12	0	0	19	174	20	130	0	16	150	2	0	85	73	15	2	6	175	499
Approach %	93.1	6.9	0.0	0.0	-	-	13.3	86.7	0.0	-	-	-	-	48.6	41.7	8.6	1.1	-	-	-
Total %	32.5	2.4	0.0	0.0	-	34.9	4.0	26.1	0.0	-	30.1	-	0.0	17.0	14.6	3.0	0.4	-	35.1	-
PHF	0.675	0.500	0.000	0.000	-	0.659	0.714	0.774	0.000	-	0.833	-	0.000	0.787	0.830	0.938	0.500	-	0.841	0.891
Lights	160	12	0	0	-	172	20	128	0	-	148	-	0	83	71	15	1	-	170	490
% Lights	98.8	100.0	-	-	-	98.9	100.0	98.5	-	-	98.7	-	-	97.6	97.3	100.0	50.0	-	97.1	98.2
Buses	2	0	0	0	-	2	0	0	0	-	0	-	0	2	2	0	0	-	4	6
% Buses	1.2	0.0	-	-	-	1.1	0.0	0.0	-	-	0.0	-	-	2.4	2.7	0.0	0.0	-	2.3	1.2
Trucks	0	0	0	0	-	0	0	2	0	-	2	-	0	0	0	0	1	-	1	3
% Trucks	0.0	0.0	-	-	-	0.0	0.0	1.5	-	-	1.3	-	-	0.0	0.0	0.0	50.0	-	0.6	0.6
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	0	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	5.3	-	-	-	-	0.0	-	50.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	18	-	-	-	-	16	-	1	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	94.7	-	-	-	-	100.0	-	50.0	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (8:45 AM)

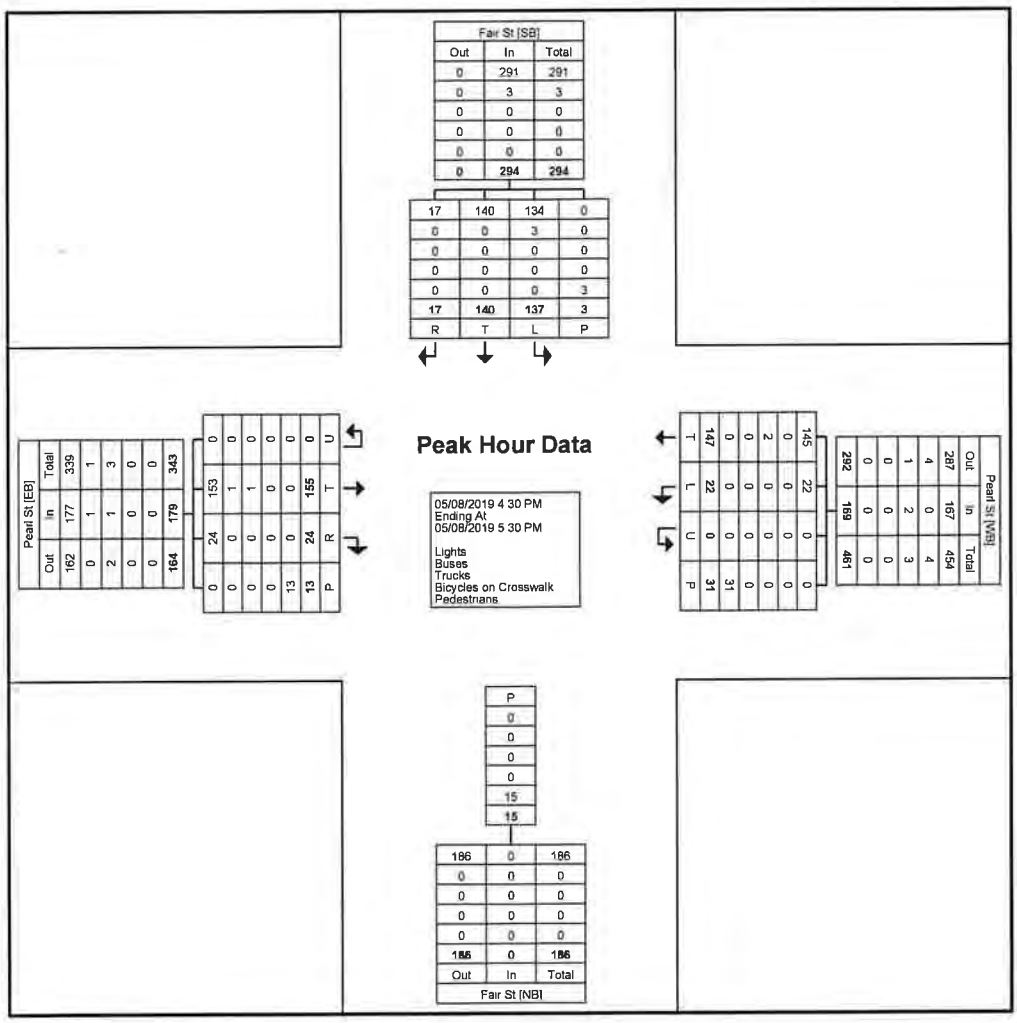
TRI-STATE TRAFFIC DATA
www.TSTData.com
184 Baker Rd
Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Kingston, NY
Fair St & Pearl St
Wednesday, May 8, 2019
Location: 41.93196, -74.017497

Count Name: Fair St & Pearl St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Pearl St Eastbound						Pearl St Westbound					Fair St Northbound		Fair St Southbound						Int. Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
4:30 PM	33	5	5	0	2	43	6	32	0	10	38	2	0	32	37	5	0	0	74	155
4:45 PM	35	6	2	0	5	43	3	37	0	3	40	3	0	29	30	5	0	1	64	147
5:00 PM	43	3	0	0	3	46	6	50	0	10	56	5	0	44	51	6	1	2	102	204
5:15 PM	44	3	0	0	3	47	7	28	0	8	35	5	0	32	22	0	0	0	54	136
Total	155	17	7	0	13	179	22	147	0	31	169	15	0	137	140	16	1	3	294	642
Approach %	86.6	9.5	3.9	0.0	-	-	13.0	87.0	0.0	-	-	-	-	46.6	47.6	5.4	0.3	-	-	-
Total %	24.1	2.6	1.1	0.0	-	27.9	3.4	22.9	0.0	-	26.3	-	0.0	21.3	21.8	2.5	0.2	-	45.8	-
PHF	0.881	0.708	0.350	0.000	-	0.952	0.786	0.735	0.000	-	0.754	-	0.000	0.778	0.686	0.667	0.250	-	0.721	0.787
Lights	153	17	7	0	-	177	22	145	0	-	167	-	0	134	140	16	1	-	291	635
% Lights	98.7	100.0	100.0	-	-	98.9	100.0	98.6	-	-	98.8	-	-	97.8	100.0	100.0	100.0	-	99.0	98.9
Buses	1	0	0	0	-	1	0	0	0	-	0	-	0	3	0	0	0	-	3	4
% Buses	0.6	0.0	0.0	-	-	0.6	0.0	0.0	-	-	0.0	-	-	2.2	0.0	0.0	0.0	-	1.0	0.6
Trucks	1	0	0	0	-	1	0	2	0	-	2	-	0	0	0	0	0	-	0	3
% Trucks	0.6	0.0	0.0	-	-	0.6	0.0	1.4	-	-	1.2	-	-	0.0	0.0	0.0	0.0	-	0.0	0.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	0.0	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	13	-	-	-	-	31	-	15	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	100.0	-	100.0	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (4:30 PM)

TRI-STATE TRAFFIC DATA
www.TSTData.com
184 Baker Rd
Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Kingston, NY
Clinton Ave & James St
Wednesday, May 8, 2019
Location: 41.931108, -74.013891

Count Name: Clinton Ave & St James St
Site Code:
Start Date: 05/08/2019

Turning Movement Data

Start Time	St James St Eastbound							St James St Westbound							Clinton Ave Northbound							Clinton Ave Southbound							Int Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	0	3	2	0	0	0	5	0	1	2	0	0	0	3	0	19	3	0	0	1	22	0	8	1	0	0	1	9	39
7:15 AM	2	5	1	2	0	0	10	1	1	4	0	0	0	6	0	26	1	0	0	0	27	2	8	1	0	0	10	11	54
7:30 AM	1	7	2	1	0	1	11	0	3	4	2	0	0	9	3	37	3	0	0	0	43	2	11	0	0	0	0	13	76
7:45 AM	0	3	1	0	0	1	4	2	1	4	3	0	1	10	1	32	0	0	0	1	33	1	16	1	0	0	1	18	65
Hourly Total	3	18	6	3	0	2	30	3	6	14	5	0	1	28	4	114	7	0	0	2	125	5	43	3	0	0	12	51	234
8:00 AM	3	4	3	1	0	1	11	1	3	4	2	0	2	10	1	25	1	0	0	3	27	1	13	1	0	0	0	15	63
8:15 AM	5	5	2	1	0	3	13	3	0	1	2	0	3	6	2	34	0	0	0	1	36	0	12	1	0	0	0	13	68
8:30 AM	2	6	4	1	0	3	13	0	2	5	0	0	2	7	2	34	0	0	0	1	36	2	10	1	0	0	1	13	69
8:45 AM	4	8	1	0	0	1	13	3	6	3	5	1	0	18	2	41	0	1	0	2	44	5	9	1	0	0	0	15	90
Hourly Total	14	23	10	3	0	8	50	7	11	13	9	1	7	41	7	134	1	1	0	7	143	8	44	4	0	0	1	56	290
9:00 AM	3	5	3	0	0	2	11	1	6	4	3	0	1	14	1	25	2	1	0	0	29	1	15	1	1	0	1	18	72
9:15 AM	1	8	0	0	0	0	9	1	1	2	3	0	0	7	3	29	3	0	0	1	35	3	9	1	0	0	0	13	64
9:30 AM	1	7	2	2	0	1	12	1	3	5	3	0	2	12	2	33	1	1	0	1	37	2	14	1	2	0	0	19	80
9:45 AM	1	7	0	3	0	4	11	0	2	3	0	0	0	5	0	26	5	0	0	0	31	1	17	2	0	0	2	20	67
Hourly Total	6	27	5	5	0	7	43	3	12	14	9	0	3	38	6	113	11	2	0	2	132	7	55	5	3	0	3	70	283
10:00 AM	3	8	4	2	0	1	17	4	3	3	1	0	1	11	2	15	3	1	0	1	21	1	20	1	0	0	1	22	71
10:15 AM	5	5	5	0	0	0	15	1	8	1	0	0	3	10	4	26	1	1	0	1	32	1	13	2	0	0	0	16	73
10:30 AM	3	4	1	1	0	0	9	6	6	4	1	0	0	17	0	30	2	0	0	1	32	0	16	0	0	0	3	16	74
10:45 AM	4	8	5	0	0	3	17	2	3	11	0	0	4	16	2	27	1	0	0	2	30	1	22	0	0	0	3	23	86
Hourly Total	15	25	15	3	0	4	58	13	20	19	2	0	8	54	8	98	7	2	0	5	115	3	71	3	0	0	7	77	304
11:00 AM	4	4	3	1	0	3	12	2	4	3	3	0	2	12	6	30	2	0	0	1	38	4	18	0	0	0	0	22	84
11:15 AM	3	5	1	0	0	1	9	5	5	4	1	0	2	15	1	15	2	0	0	0	18	4	10	2	1	0	2	17	59
11:30 AM	5	15	2	0	0	0	22	1	3	5	4	0	0	13	2	30	4	2	0	1	38	1	23	2	0	0	1	26	99
11:45 AM	2	6	2	2	0	3	12	2	1	3	2	0	5	8	3	37	3	0	0	1	43	2	19	1	2	0	1	24	87
Hourly Total	14	30	8	3	0	7	55	10	13	15	10	0	9	48	12	112	11	2	0	3	137	11	70	5	3	0	4	89	329
12:00 PM	4	5	2	0	0	2	11	3	5	8	2	0	0	18	2	22	1	0	0	2	25	1	16	3	0	0	1	20	74
12:15 PM	5	7	3	0	0	4	15	3	3	17	1	0	0	24	1	25	0	0	0	3	26	4	25	1	0	0	0	30	95
12:30 PM	2	10	3	0	0	1	15	7	6	10	4	0	3	27	2	25	3	0	0	0	30	2	14	1	0	0	0	17	89
12:45 PM	4	3	3	0	0	1	10	1	2	3	3	0	1	9	3	36	1	0	0	0	40	3	10	3	0	0	2	16	75
Hourly Total	15	25	11	0	0	8	51	14	16	38	10	0	4	78	8	108	5	0	0	5	121	10	65	8	0	0	3	83	333
1:00 PM	3	10	4	0	0	2	17	6	7	7	4	0	1	24	3	25	1	0	0	3	29	2	18	1	0	0	0	21	91
1:15 PM	4	6	1	0	0	1	11	3	6	5	5	0	0	19	1	30	5	0	0	2	36	2	22	2	0	0	0	26	92
1:30 PM	3	2	2	0	0	1	7	2	3	4	4	0	6	13	2	26	1	0	0	4	29	2	23	2	1	0	0	28	77
1:45 PM	1	7	1	0	0	3	9	8	4	6	3	0	0	21	2	25	2	0	0	2	29	2	19	2	0	0	0	23	82
Hourly Total	11	25	8	0	0	7	44	19	20	22	16	0	7	77	8	106	9	0	0	11	123	8	82	7	1	0	0	98	342
2:00 PM	4	10	1	1	0	2	16	2	4	4	2	0	0	12	3	37	0	0	0	1	40	1	13	2	1	0	0	17	85
2:15 PM	5	11	2	3	0	5	21	2	2	3	1	0	3	8	3	47	1	0	0	8	51	3	31	3	0	0	0	37	117
2:30 PM	1	13	4	1	0	4	19	1	9	4	3	0	6	17	4	36	0	1	0	0	41	0	26	1	0	0	4	27	104
2:45 PM	1	11	2	0	0	2	14	2	3	3	5	0	3	13	5	47	0	0	0	2	52	4	19	1	0	0	0	24	103
Hourly Total	11	45	9	5	0	13	70	7	18	14	11	0	12	50	15	167	1	1	0	11	184	8	89	7	1	0	4	105	409
3:00 PM	5	6	1	3	0	4	15	4	9	4	3	0	0	20	6	43	4	0	0	1	53	2	23	0	2	0	0	27	115
3:15 PM	6	9	1	2	0	3	18	3	0	5	4	0	2	12	3	37	2	0	0	0	42	3	28	2	2	0	3	35	107
3:30 PM	2	11	0	3	0	2	16	2	4	7	11	0	2	24	4	45	1	0	0	1	50	4	34	3	1	0	0	42	132
3:45 PM	6	4	1	2	0	3	13	1	7	2	3	0	4	13	3	60	1	0	0	1	64	2	21	4	1	0	3	28	118
Hourly Total	19	30	3	10	0	12	62	10	20	18	21	0	8	69	16	185	8	0	0	3	209	11	106	9	6	0	6	132	472
4:00 PM	2	7	0	6	0	0	15	2	4	2	9	0	2	17	5	47	0	0	0	0	52	4	26	4	0	0	4	34	118
4:15 PM	3	5	0	1	0	6	9	2	2	7	7	0	1	18	5	48	1	1	0	2	55	4	27	2	0	0	1	33	115
4:30 PM	3	12	3	2	0	4	20	1	7	5	6	1	0	20	4	30	2	3	0	3	39	3	33	1	1	1	0	39	118
4:45 PM	5	12	0	3	0	2	20	1	4	8	1	0	1	14	5	32	0	0	0	1	37	6	21	0	2	0	0	29	100
Hourly Total	13	36	3	12	0	12	64	6	17	22	23	1	4	69	19	157	3	4	0	6	183	17	107	7	3	1	5	135	451
5:00 PM	4	24	3	2	0	4	33	3	6	7	7	0	1	23	3	41	0	2	0	2	46	4	43	1	3	0	1	51	153
5:15 PM	1	13	1	2	0	5	17	1	7	6	2	0	0	16	2	29	3	2	0	2	36	5	29	3	1	0	4	38	107
5:30 PM	2	13	4	2	0	2	21	2	5	7	5	0	2	19	3	45	3	2	0	3	53	6	18	1	0	0	6	25	118
5:45 PM	3	14	1	2	0	2	20	2	1	10	1	0	2	14	6	28	2	2	0	4	38	4	23	1	1	0	2	29	101
Hourly Total	10	64	9	8	0	13	91	8	19	30	15	0	5	72	14	143	8	8	0	11	173	19	113	6	5	0	13	143	479
6:00 PM	5	3	1	0	0	4	9	3	9	5	5	0	2	22	3	27	1	0	0	1	31	1	13	0	0	0	0	14	76
6:15 PM	1	6	2	0	0	1	9	2	1	3	1	0	6	7	3	15	0	0	0	2	18	2	18	1	0	0	3	21	55
6:30 PM	2	2	4	0	0	3	8	2	3	4	4	0	0	13	1	13	2	1	0	1	17	1	12	2	0	0	1	15	53
6:45 PM	3	5	0	0	0	2	8	1	5	2	2	0	1	10	0	22	2	1	0	0	25	0	19	5	0	0	0	24	67
Hourly Total	11	16	7	0	0	10	34	8	18	14	12	0	9	52	7	77	5	2	0	4	91	4	62	8	0	0	4	74	251

Grand Total	142	364	94	52	0	103	652	108	190	233	143	2	77	676	124	1514	76	22	0	70	1736	111	907	72	22	1	62	1113	4177
Approach %	21.8	55.8	14.4	8.0	0.0	-	-	16.0	28.1	34.5	21.2	0.3	-	-	7.1	87.2	4.4	1.3	0.0	-	-	10.0	81.5	6.5	2.0	0.1	-	-	-
Total %	3.4	8.7	2.3	1.2	0.0	-	15.6	2.6	4.5	5.6	3.4	0.0	-	16.2	3.0	36.2	1.8	0.5	0.0	-	41.6	2.7	21.7	1.7	0.5	0.0	-	26.6	-
Lights	139	353	93	52	0	-	637	105	183	227	136	2	-	653	116	1428	71	22	0	-	1637	110	859	72	21	1	-	1063	3990
% Lights	97.9	97.0	98.9	100.0	-	-	97.7	97.2	96.3	97.4	95.1	100.0	-	96.6	93.5	94.3	93.4	100.0	-	-	94.3	99.1	94.7	100.0	95.5	100.0	-	95.5	95.5
Buses	0	4	1	0	0	-	5	2	3	1	4	0	-	10	3	58	4	0	0	-	65	0	32	0	0	0	-	32	112
% Buses	0.0	1.1	1.1	0.0	-	-	0.8	1.9	1.6	0.4	2.8	0.0	-	1.5	2.4	3.8	5.3	0.0	-	-	3.7	0.0	3.5	0.0	0.0	0.0	-	2.9	2.7
Trucks	3	7	0	0	0	-	10	1	4	5	3	0	-	13	5	28	1	0	0	-	34	1	16	0	1	0	-	18	75
% Trucks	2.1	1.9	0.0	0.0	-	-	1.5	0.9	2.1	2.1	2.1	0.0	-	1.9	4.0	1.8	1.3	0.0	-	-	2.0	0.9	1.8	0.0	4.5	0.0	-	1.6	1.8
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	1.3	-	-	-	-	-	-	1.4	-	-	-	-	-	-	4.8	-	-
Pedestrians	-	-	-	-	-	103	-	-	-	-	-	-	76	-	-	-	-	-	-	69	-	-	-	-	-	-	59	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	98.7	-	-	-	-	-	-	98.6	-	-	-	-	-	-	95.2	-	-

Kingston, NY
Clinton Ave & James St
Wednesday, May 8, 2019
Location: 41.931108, -74.013891

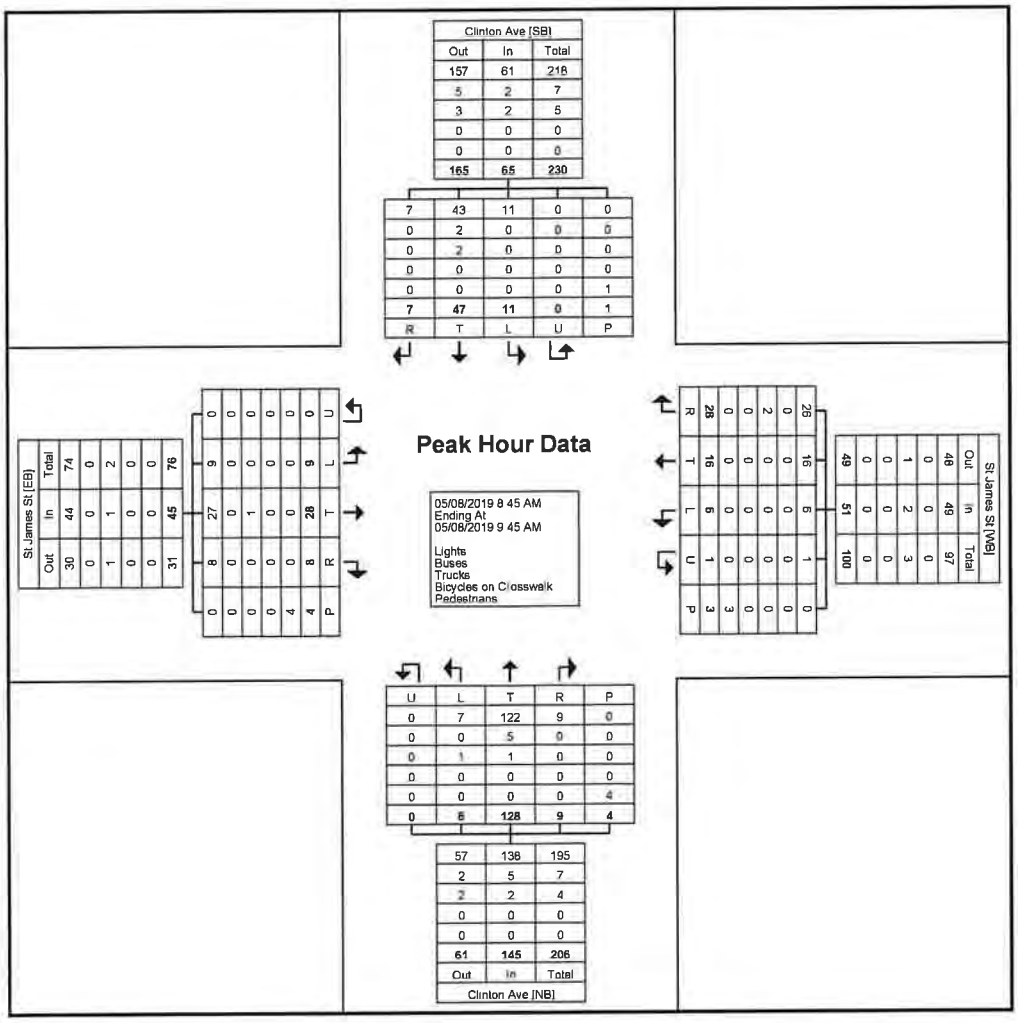
Count Name: Clinton Ave & St James St
Site Code:
Start Date: 05/08/2019
Page No: 4

Turning Movement Peak Hour Data (8:45 AM)

Start Time	St James St Eastbound							St James St Westbound							Clinton Ave Northbound							Clinton Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
8:45 AM	4	8	1	0	0	1	13	3	6	3	5	1	0	18	2	41	0	1	0	2	44	5	9	1	0	0	0	15	90
9:00 AM	3	5	3	0	0	2	11	1	6	4	3	0	1	14	1	25	2	1	0	0	29	1	15	1	1	0	1	18	72
9:15 AM	1	8	0	0	0	0	9	1	1	2	3	0	0	7	3	29	3	0	0	1	35	3	9	1	0	0	0	13	64
9:30 AM	1	7	2	2	0	1	12	1	3	5	3	0	2	12	2	33	1	1	0	1	37	2	14	1	2	0	0	19	80
Total	9	28	6	2	0	4	45	6	16	14	14	1	3	51	8	128	6	3	0	4	145	11	47	4	3	0	1	65	306
Approach %	20.0	62.2	13.3	4.4	0.0	-	-	11.8	31.4	27.5	27.5	2.0	-	-	5.5	88.3	4.1	2.1	0.0	-	-	16.9	72.3	6.2	4.6	0.0	-	-	-
Total %	2.9	9.2	2.0	0.7	0.0	-	14.7	2.0	5.2	4.6	4.6	0.3	-	16.7	2.6	41.8	2.0	1.0	0.0	-	47.4	3.6	15.4	1.3	1.0	0.0	-	21.2	-
PHF	0.563	0.875	0.500	0.250	0.000	-	0.865	0.500	0.667	0.700	0.700	0.250	-	0.708	0.667	0.780	0.500	0.750	0.000	-	0.824	0.550	0.783	1.000	0.375	0.000	-	0.855	0.850
Lights	9	27	6	2	0	-	44	6	16	13	13	1	-	49	7	122	6	3	0	-	138	11	43	4	3	0	-	61	292
% Lights	100.0	96.4	100.0	100.0	-	-	97.8	100.0	100.0	92.9	92.9	100.0	-	96.1	87.5	95.3	100.0	100.0	-	-	95.2	100.0	91.5	100.0	100.0	-	-	93.8	95.4
Buses	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	5	0	0	0	-	5	0	2	0	0	0	-	2	7
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	3.9	0.0	0.0	-	-	3.4	0.0	4.3	0.0	0.0	-	-	3.1	2.3
Trucks	0	1	0	0	0	-	1	0	0	1	1	0	-	2	1	1	0	0	0	-	2	0	2	0	0	0	-	2	7
% Trucks	0.0	3.6	0.0	0.0	-	-	2.2	0.0	0.0	7.1	7.1	0.0	-	3.9	12.5	0.8	0.0	0.0	-	-	1.4	0.0	4.3	0.0	0.0	-	-	3.1	2.3
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	-	3	-	-	-	-	-	-	4	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-

Kingston, NY
Clinton Ave & James St
Wednesday, May 8, 2019
Location: 41.931108, -74.013891

Count Name: Clinton Ave & St James St
Site Code:
Start Date: 05/08/2019
Page No: 5



Turning Movement Peak Hour Data Plot (8:45 AM)

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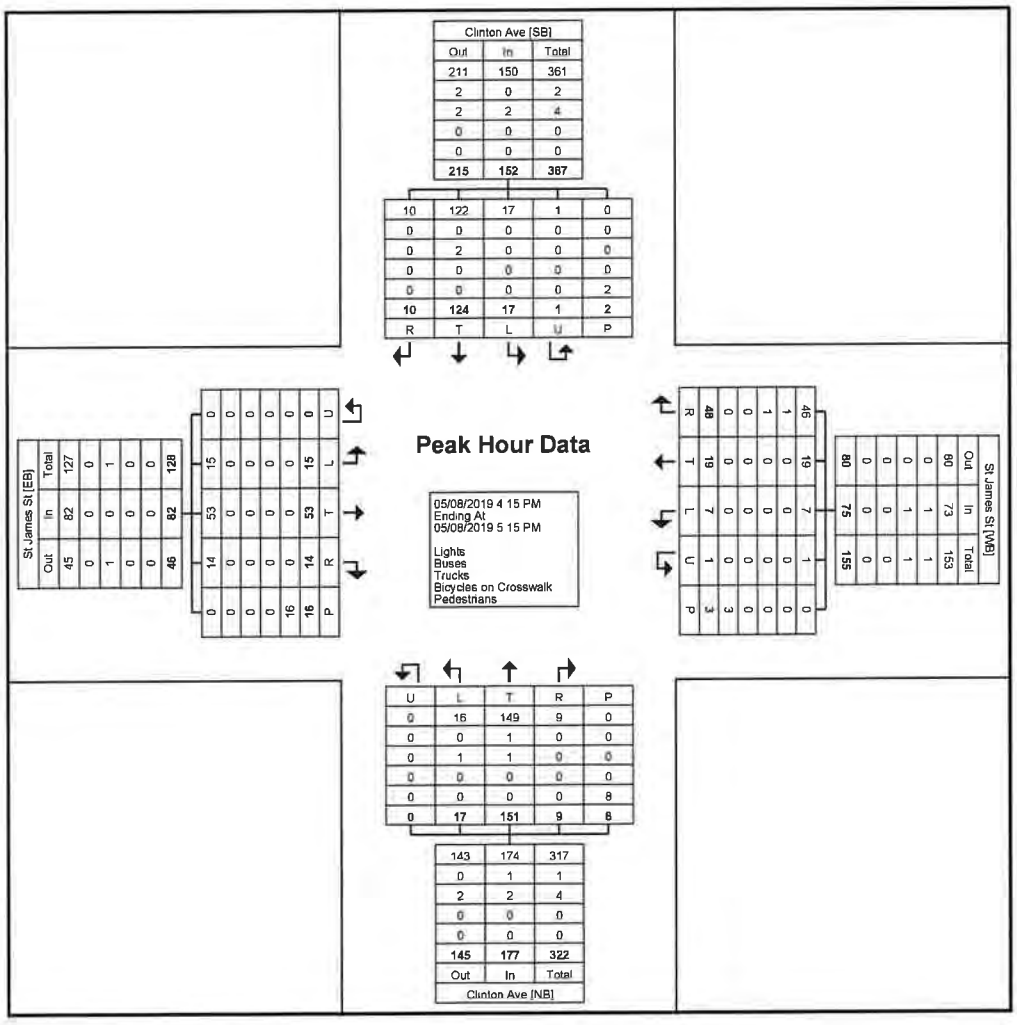
Kingston, NY
Clinton Ave & James St
Wednesday, May 8, 2019
Location: 41.931108, -74.013891

Count Name: Clinton Ave & St James St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (4:15 PM)

Start Time	St James St Eastbound							St James St Westbound							Clinton Ave Northbound							Clinton Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:15 PM	3	5	0	1	0	6	9	2	2	7	7	0	1	18	5	48	1	1	0	2	55	4	27	2	0	0	1	33	115
4:30 PM	3	12	3	2	0	4	20	1	7	5	6	1	0	20	4	30	2	3	0	3	39	3	33	1	1	1	0	39	118
4:45 PM	5	12	0	3	0	2	20	1	4	8	1	0	1	14	5	32	0	0	0	1	37	6	21	0	2	0	0	29	100
5:00 PM	4	24	3	2	0	4	33	3	6	7	7	0	1	23	3	41	0	2	0	2	46	4	43	1	3	0	1	51	153
Total	15	53	6	8	0	16	82	7	19	27	21	1	3	75	17	151	3	6	0	8	177	17	124	4	6	1	2	152	486
Approach %	18.3	64.6	7.3	9.8	0.0	-	-	9.3	25.3	36.0	28.0	1.3	-	-	9.6	85.3	1.7	3.4	0.0	-	-	11.2	81.6	2.6	3.9	0.7	-	-	-
Total %	3.1	10.9	1.2	1.6	0.0	-	16.9	1.4	3.9	5.6	4.3	0.2	-	15.4	3.5	31.1	0.6	1.2	0.0	-	36.4	3.5	25.5	0.8	1.2	0.2	-	31.3	-
PHF	0.750	0.552	0.500	0.667	0.000	-	0.621	0.583	0.679	0.844	0.750	0.250	-	0.815	0.850	0.786	0.375	0.500	0.000	-	0.805	0.708	0.721	0.500	0.500	0.250	-	0.745	0.794
Lights	15	53	6	8	0	-	82	7	19	26	20	1	-	73	16	149	3	6	0	-	174	17	122	4	6	1	-	150	479
% Lights	1000	100.0	100.0	100.0	-	-	100.0	100.0	100.0	96.3	95.2	100.0	-	97.3	94.1	98.7	100.0	100.0	-	-	98.3	100.0	98.4	100.0	100.0	100.0	-	98.7	98.6
Buses	0	0	0	0	0	-	0	0	0	0	1	0	-	1	0	1	0	0	0	-	1	0	0	0	0	0	-	0	2
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	4.8	0.0	-	1.3	0.0	0.7	0.0	0.0	-	-	0.6	0.0	0.0	0.0	0.0	0.0	-	0.0	0.4
Trucks	0	0	0	0	0	-	0	0	0	1	0	0	-	1	1	1	0	0	0	-	2	0	2	0	0	0	-	2	5
% Trucks	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	3.7	0.0	0.0	-	1.3	5.9	0.7	0.0	0.0	-	-	1.1	0.0	1.6	0.0	0.0	0.0	-	1.3	1.0
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	16	-	-	-	-	-	-	3	-	-	-	-	-	-	8	-	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (4:15 PM)

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Kingston, NY
Clinton Ave & Franklin St
Wednesday, May 8, 2019
Location: 41.928862, -74.011753

Count Name: Clinton Ave & Franklin St
Site Code:
Start Date: 05/08/2019
Page No: 1

Turning Movement Data

Start Time	Franklin St Eastbound							Franklin St Westbound							Clinton Ave Northbound							Clinton Ave Southbound							Int Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App Total	
7:00 AM	1	2	0	0	0	3	3	0	5	3	0	0	2	8	0	12	3	0	0	0	15	2	11	1	0	0	4	14	40
7:15 AM	1	8	2	3	0	10	14	1	6	5	2	0	4	14	0	22	1	1	0	5	24	5	7	0	0	0	6	12	64
7:30 AM	3	8	1	0	0	1	12	0	8	4	4	0	0	16	0	23	1	1	0	0	25	2	18	2	1	0	0	23	76
7:45 AM	3	7	2	3	0	0	15	0	10	7	1	0	2	18	1	17	1	1	0	0	20	3	10	0	0	0	1	13	66
Hourly Total	8	25	5	6	0	14	44	1	29	19	7	0	8	56	1	74	6	3	0	5	84	12	46	3	1	0	11	62	246
8:00 AM	1	12	5	4	0	0	22	2	10	3	1	0	0	16	2	19	1	0	0	1	22	3	22	2	0	0	0	27	87
8:15 AM	2	13	2	2	0	0	19	1	11	2	1	0	2	15	2	24	1	1	0	0	28	3	15	3	1	0	9	22	84
8:30 AM	2	15	2	3	0	2	22	2	11	1	2	0	0	16	4	20	2	0	0	4	26	3	14	3	0	0	2	20	84
8:45 AM	4	13	10	1	0	2	28	0	11	6	1	0	1	18	0	26	3	1	0	2	30	1	11	0	0	0	2	12	88
Hourly Total	9	53	19	10	0	4	91	5	43	12	5	0	3	65	8	89	7	2	0	7	106	10	62	8	1	0	13	81	343
9:00 AM	1	13	1	3	0	1	18	0	9	3	1	0	1	13	1	21	4	0	0	1	26	1	19	2	0	0	2	22	79
9:15 AM	3	7	5	0	0	3	15	0	9	4	1	0	0	14	2	24	3	0	0	0	29	2	8	2	0	0	2	12	70
9:30 AM	4	17	3	2	0	0	26	2	2	5	0	0	0	9	2	21	0	0	0	2	23	6	12	2	0	0	3	20	78
9:45 AM	3	10	1	1	1	2	16	3	6	0	0	0	0	9	1	21	2	1	0	0	25	3	19	4	0	0	2	26	76
Hourly Total	11	47	10	6	1	6	75	5	26	12	2	0	1	45	6	87	9	1	0	3	103	12	58	10	0	0	9	80	303
10:00 AM	1	9	2	2	0	1	14	5	9	2	0	0	1	16	0	10	1	0	0	3	11	4	22	0	1	0	2	27	68
10:15 AM	1	16	2	0	0	0	19	1	10	4	0	0	1	15	0	21	2	1	0	2	24	3	15	2	0	0	0	20	78
10:30 AM	1	16	2	2	0	1	21	1	6	2	0	0	2	9	1	18	1	1	0	0	21	4	17	3	0	0	2	24	75
10:45 AM	0	7	4	1	0	1	12	1	8	4	0	0	1	13	0	24	1	1	0	0	26	9	18	3	1	0	1	31	82
Hourly Total	3	48	10	5	0	3	66	8	33	12	0	0	5	53	1	73	5	3	0	5	82	20	72	8	2	0	5	102	303
11:00 AM	1	10	0	3	0	0	14	2	4	1	1	0	0	8	3	23	0	0	0	1	26	3	15	2	2	0	0	22	70
11:15 AM	2	11	2	0	0	0	15	1	4	0	1	0	3	6	0	9	3	0	0	0	12	3	17	3	0	0	0	23	56
11:30 AM	1	10	2	0	0	1	13	1	6	3	2	0	1	12	1	29	2	0	0	1	32	3	20	0	1	0	0	24	81
11:45 AM	1	5	0	1	0	1	7	3	6	0	0	0	3	9	0	23	2	1	0	3	26	5	22	2	0	0	1	29	71
Hourly Total	5	36	4	4	0	2	49	7	20	4	4	0	7	35	4	84	7	1	0	5	96	14	74	7	3	0	1	98	278
12:00 PM	3	11	0	1	0	0	15	1	12	2	0	0	1	15	1	17	0	3	0	0	21	3	15	4	1	0	3	23	74
12:15 PM	2	5	0	0	0	0	7	4	8	2	0	0	0	14	1	13	2	1	0	0	17	1	28	1	0	0	3	30	68
12:30 PM	1	5	3	3	0	0	12	4	4	4	1	0	4	13	1	17	2	0	0	2	20	3	18	4	0	0	0	25	70
12:45 PM	2	14	3	1	0	0	20	4	4	4	0	0	2	12	1	24	2	1	0	1	28	3	13	5	1	0	2	22	82
Hourly Total	8	35	6	5	0	0	54	13	28	12	1	0	7	54	4	71	6	5	0	3	86	10	74	14	2	0	8	100	294
1:00 PM	0	9	2	2	0	0	13	2	11	3	2	0	2	18	0	16	2	1	0	3	19	4	21	1	0	0	5	26	76
1:15 PM	0	15	0	1	0	1	16	2	9	2	4	0	0	17	0	15	1	1	0	1	17	6	20	1	0	0	0	27	77
1:30 PM	3	14	3	3	0	1	23	5	8	2	2	0	3	17	0	14	0	1	0	1	15	5	23	4	1	0	1	33	88
1:45 PM	1	14	4	1	0	1	20	2	12	4	1	0	2	19	2	11	4	1	0	1	18	3	21	5	2	0	4	31	88
Hourly Total	4	52	9	7	0	3	72	11	40	11	9	0	7	71	2	56	7	4	0	6	69	18	85	11	3	0	10	117	329
2:00 PM	3	10	1	2	0	3	16	6	8	4	0	0	3	18	1	24	3	0	0	4	28	7	12	4	0	0	9	23	85
2:15 PM	1	6	2	1	0	3	10	4	10	2	5	0	5	21	2	27	2	0	0	2	31	0	33	3	0	0	1	36	98
2:30 PM	2	14	2	1	0	6	19	1	16	1	1	0	4	19	1	28	5	2	0	6	36	9	21	1	0	0	5	31	105
2:45 PM	0	19	4	1	0	2	24	2	14	3	5	0	1	24	3	35	2	2	0	6	42	4	16	0	0	0	9	20	110
Hourly Total	6	49	9	5	0	14	69	13	48	10	11	0	13	82	7	114	12	4	0	18	137	20	82	8	0	0	24	110	398
3:00 PM	2	21	9	5	0	1	37	3	12	2	3	0	0	20	4	37	6	0	0	5	47	2	25	3	1	0	5	31	135
3:15 PM	4	14	1	1	0	3	20	3	9	6	4	0	2	22	4	21	3	0	0	11	28	6	27	3	0	0	45	36	106
3:30 PM	0	9	1	4	0	1	14	3	10	2	9	0	1	24	1	29	3	0	0	3	33	7	32	4	1	0	13	44	115
3:45 PM	4	9	1	4	0	4	18	4	12	5	8	0	15	29	3	40	1	1	0	2	45	5	23	3	0	0	8	31	123
Hourly Total	10	53	12	14	0	9	89	13	43	15	24	0	16	95	12	127	13	1	0	22	153	20	107	13	2	0	71	142	479
4:00 PM	2	20	0	4	0	2	26	8	14	7	6	0	1	35	2	23	1	2	0	0	28	5	28	3	2	0	2	38	127
4:15 PM	4	18	3	2	0	1	27	6	14	5	7	0	0	32	1	19	1	3	0	3	24	9	25	3	0	0	1	37	120
4:30 PM	2	15	4	1	0	0	22	5	16	6	3	0	0	30	1	19	0	2	0	2	22	4	33	2	0	0	3	39	113
4:45 PM	0	12	1	1	0	0	14	3	11	7	1	0	0	22	0	22	0	1	0	1	23	3	24	1	1	0	2	29	88
Hourly Total	8	65	8	8	0	3	89	22	55	25	17	0	1	119	4	83	2	8	0	6	97	21	110	9	3	0	8	143	448
5:00 PM	2	16	1	3	0	4	22	1	15	5	4	0	0	25	1	24	1	1	0	3	27	4	45	8	1	0	3	58	132
5:15 PM	5	14	1	4	0	0	24	4	10	5	1	0	14	20	1	18	0	1	0	2	20	4	30	3	0	0	3	37	101
5:30 PM	1	7	1	4	0	4	13	2	13	7	1	0	0	23	3	25	7	1	0	2	36	2	24	4	1	0	1	31	103
5:45 PM	1	14	2	5	0	3	22	5	12	3	2	0	0	22	3	15	2	1	0	2	21	3	22	2	0	0	0	27	92
Hourly Total	9	51	5	16	0	11	81	12	50	20	8	0	14	90	8	82	10	4	0	9	104	13	121	17	2	0	7	153	428
6:00 PM	3	12	1	1	0	0	17	0	11	1	0	0	1	12	0	16	4	0	0	4	20	6	16	0	2	0	0	24	73
6:15 PM	3	11	2	1	0	5	17	3	8	4	0	0	2	15	2	11	1	1	0	0	15	5	22	3	1	0	1	31	78
6:30 PM	1	9	3	1	0	0	14	5	9	1	0	0	5	15	3	12	1	1	0	3	17	2	14	1	3	0	3	20	66
6:45 PM	1	11	1	0	0	0	13	4	12	8	0	0	1	24	3	20	2	0	0	4	25	4	18	2	1	0	2	25	87
Hourly Total	8	43	7	3	0	5	61	12	40	14	0	0	9	66	8	59	8	2	0	11	77	17	70	6	7	0	6	100	304

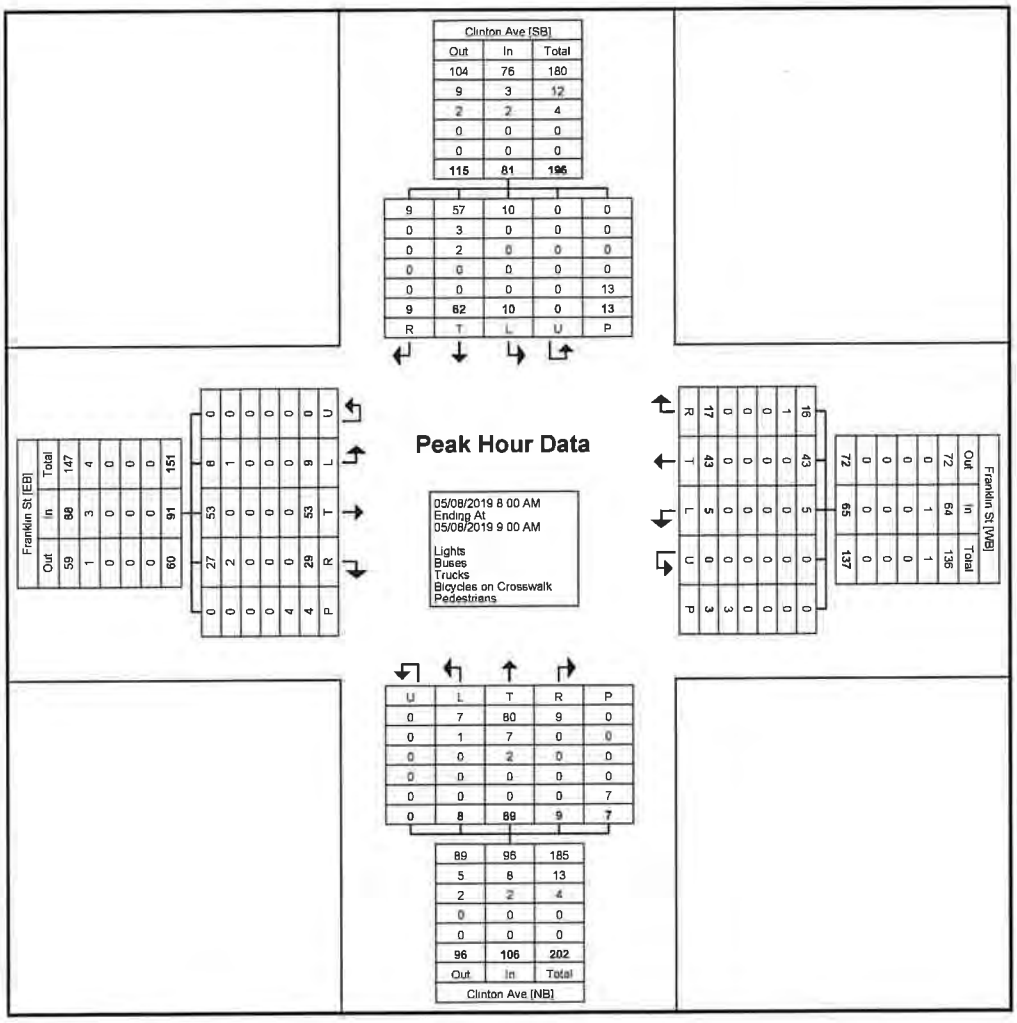
Grand Total	89	557	104	89	1	74	840	122	455	166	88	0	93	831	65	999	92	38	0	100	1194	187	961	114	26	0	173	1288	4153
Approach %	10.6	66.3	12.4	10.6	0.1	-	-	14.7	54.8	20.0	10.6	0.0	-	-	5.4	83.7	7.7	3.2	0.0	-	-	14.5	74.6	8.9	2.0	0.0	-	-	-
Total %	2.1	13.4	2.5	2.1	0.0	-	20.2	2.9	11.0	4.0	2.1	0.0	-	20.0	1.6	24.1	2.2	0.9	0.0	-	28.8	4.5	23.1	2.7	0.6	0.0	-	31.0	-
Lights	83	550	100	84	1	-	818	119	447	158	87	0	-	811	63	929	90	38	0	-	1120	185	913	114	25	0	-	1237	3986
% Lights	93.3	98.7	96.2	94.4	100.0	-	97.4	97.5	98.2	95.2	98.9	-	-	97.6	96.9	93.0	97.8	100.0	-	-	93.8	98.9	95.0	100.0	96.2	-	-	96.0	96.0
Buses	4	1	2	5	0	-	12	2	4	5	1	0	-	12	1	50	0	0	0	-	51	1	32	0	1	0	-	34	109
% Buses	4.5	0.2	1.9	5.6	0.0	-	1.4	1.6	0.9	3.0	1.1	-	-	1.4	1.5	5.0	0.0	0.0	-	-	4.3	0.5	3.3	0.0	3.8	-	-	2.6	2.6
Trucks	2	6	2	0	0	-	10	1	4	3	0	0	-	8	1	20	2	0	0	-	23	1	16	0	0	0	-	17	58
% Trucks	2.2	1.1	1.9	0.0	0.0	-	1.2	0.8	0.9	1.8	0.0	-	-	1.0	1.5	2.0	2.2	0.0	-	-	1.9	0.5	1.7	0.0	0.0	-	-	1.3	1.4
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	-	8	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	1.4	-	-	-	-	-	-	8.6	-	-	-	-	-	-	1.0	-	-	-	-	-	-	0.6	-	-
Pedestrians	-	-	-	-	-	73	-	-	-	-	-	-	85	-	-	-	-	-	-	99	-	-	-	-	-	-	172	-	-
% Pedestrians	-	-	-	-	-	98.6	-	-	-	-	-	-	91.4	-	-	-	-	-	-	99.0	-	-	-	-	-	-	99.4	-	-

Kingston, NY
Clinton Ave & Franklin St
Wednesday, May 8, 2019
Location: 41.928862, -74.011753

Count Name: Clinton Ave & Franklin St
Site Code:
Start Date: 05/08/2019
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Franklin St Eastbound							Franklin St Westbound							Clinton Ave Northbound							Clinton Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
8:00 AM	1	12	5	4	0	0	22	2	10	3	1	0	0	16	2	19	1	0	0	1	22	3	22	2	0	0	0	27	87
8:15 AM	2	13	2	2	0	0	19	1	11	2	1	0	2	15	2	24	1	1	0	0	28	3	15	3	1	0	9	22	84
8:30 AM	2	15	2	3	0	2	22	2	11	1	2	0	0	16	4	20	2	0	0	4	26	3	14	3	0	0	2	20	84
8:45 AM	4	13	10	1	0	2	28	0	11	6	1	0	1	18	0	26	3	1	0	2	30	1	11	0	0	0	2	12	88
Total	9	53	19	10	0	4	91	5	43	12	5	0	3	65	8	89	7	2	0	7	106	10	62	8	1	0	13	81	343
Approach %	9.9	58.2	20.9	11.0	0.0		-	7.7	66.2	18.5	7.7	0.0		-	7.5	84.0	6.6	1.9	0.0		-	12.3	76.5	9.9	1.2	0.0		-	-
Total %	2.6	15.5	5.5	2.9	0.0		26.5	1.5	12.5	3.5	1.5	0.0		19.0	2.3	25.9	2.0	0.6	0.0		30.9	2.9	18.1	2.3	0.3	0.0		23.6	-
PHF	0.563	0.883	0.475	0.625	0.000		0.813	0.625	0.977	0.500	0.625	0.000		0.903	0.500	0.856	0.583	0.500	0.000		0.883	0.833	0.705	0.667	0.250	0.000		0.750	0.974
Lights	8	53	18	9	0		88	5	43	11	5	0		64	7	80	7	2	0		96	10	57	8	1	0		76	324
% Lights	88.9	100.0	94.7	90.0	-		96.7	100.0	100.0	91.7	100.0	-		98.5	87.5	89.9	100.0	100.0	-		90.6	100.0	91.9	100.0	100.0	-		93.8	94.5
Buses	1	0	1	1	0		3	0	0	1	0	0		1	1	7	0	0	0		8	0	3	0	0	0		3	15
% Buses	11.1	0.0	5.3	10.0	-		3.3	0.0	0.0	8.3	0.0	-		1.5	12.5	7.9	0.0	0.0	-		7.5	0.0	4.8	0.0	0.0	-		3.7	4.4
Trucks	0	0	0	0	0		0	0	0	0	0	0		0	0	2	0	0	0		2	0	2	0	0	0		2	4
% Trucks	0.0	0.0	0.0	0.0	-		0.0	0.0	0.0	0.0	0.0	-		0.0	0.0	2.2	0.0	0.0	-		1.9	0.0	3.2	0.0	0.0	-		2.5	1.2
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	-	3	-	-	-	-	-	-	7	-	-	-	-	-	-	13	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (8:00 AM)

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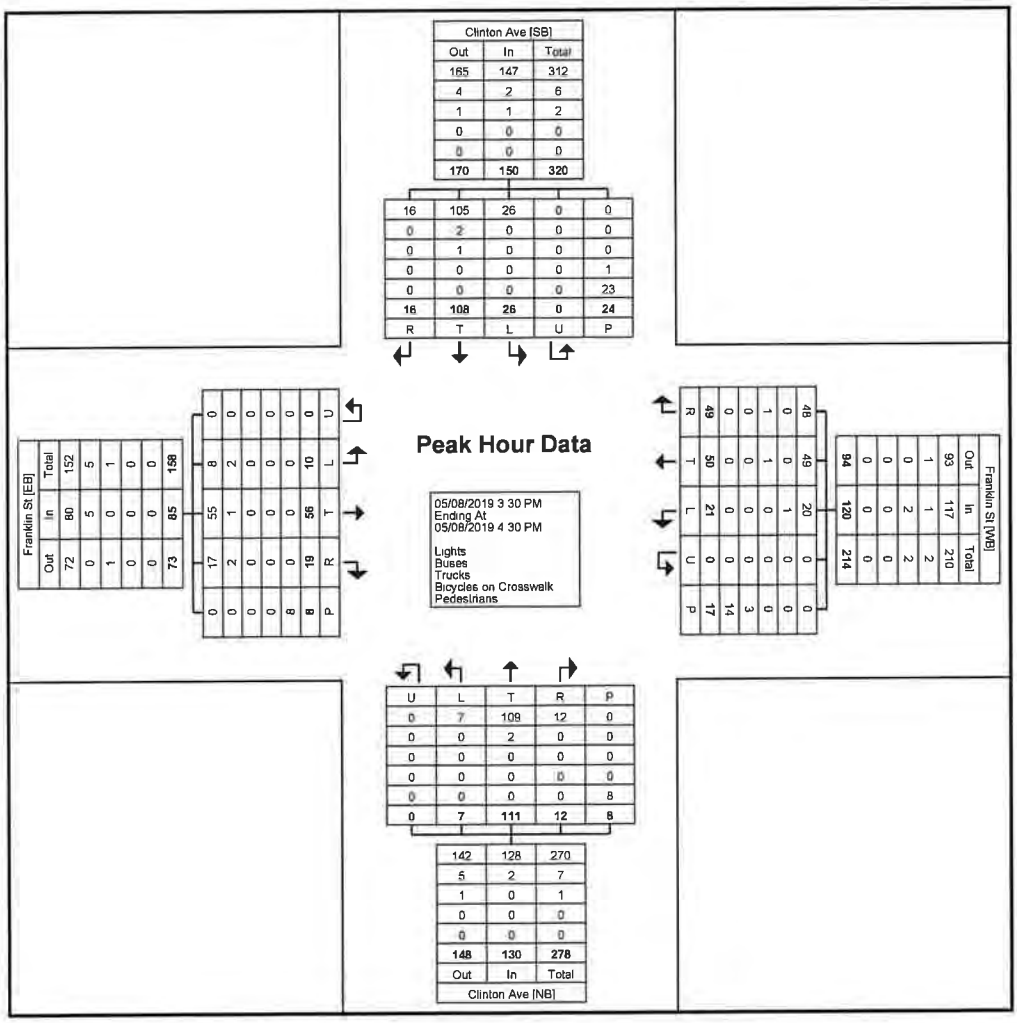
Kingston, NY
Clinton Ave & Franklin St
Wednesday, May 8, 2019
Location: 41.928862, -74.011753

Count Name: Clinton Ave & Franklin St
Site Code:
Start Date: 05/08/2019
Page No: 8

Turning Movement Peak Hour Data (3:30 PM)

Start Time	Franklin St Eastbound							Franklin St Westbound							Clinton Ave Northbound							Clinton Ave Southbound							Int Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
3:30 PM	0	9	1	4	0	1	14	3	10	2	9	0	1	24	1	29	3	0	0	3	33	7	32	4	1	0	13	44	115
3:45 PM	4	9	1	4	0	4	18	4	12	5	8	0	15	29	3	40	1	1	0	2	45	5	23	3	0	0	8	31	123
4:00 PM	2	20	0	4	0	2	26	8	14	7	6	0	1	35	2	23	1	2	0	0	28	5	28	3	2	0	2	38	127
4:15 PM	4	18	3	2	0	1	27	6	14	5	7	0	0	32	1	19	1	3	0	3	24	9	25	3	0	0	1	37	120
Total	10	56	5	14	0	8	85	21	50	19	30	0	17	120	7	111	6	6	0	8	130	26	108	13	3	0	24	150	485
Approach %	11.8	65.9	5.9	16.5	0.0	-	-	17.5	41.7	15.8	25.0	0.0	-	-	5.4	85.4	4.6	4.6	0.0	-	-	17.3	72.0	8.7	2.0	0.0	-	-	-
Total %	2.1	11.5	1.0	2.9	0.0	-	17.5	4.3	10.3	3.9	6.2	0.0	-	24.7	1.4	22.9	1.2	1.2	0.0	-	26.8	5.4	22.3	2.7	0.6	0.0	-	30.9	-
PHF	0.625	0.700	0.417	0.875	0.000	-	0.787	0.656	0.893	0.679	0.833	0.000	-	0.857	0.583	0.694	0.500	0.500	0.000	-	0.722	0.722	0.844	0.813	0.375	0.000	-	0.852	0.955
Lights	8	55	4	13	0	-	80	20	49	18	30	0	-	117	7	109	6	6	0	-	128	26	105	13	3	0	-	147	472
% Lights	80.0	98.2	80.0	92.9	-	-	94.1	95.2	98.0	94.7	100.0	-	-	97.5	100.0	98.2	100.0	100.0	-	-	98.5	100.0	97.2	100.0	100.0	-	-	98.0	97.3
Buses	2	1	1	1	0	-	5	1	0	0	0	0	-	1	0	2	0	0	0	-	2	0	2	0	0	0	-	2	10
% Buses	20.0	1.8	20.0	7.1	-	-	5.9	4.8	0.0	0.0	0.0	-	-	0.8	0.0	1.8	0.0	0.0	-	-	1.5	0.0	1.9	0.0	0.0	-	-	1.3	2.1
Trucks	0	0	0	0	0	-	0	0	1	1	0	0	-	2	0	0	0	0	0	-	0	0	1	0	0	0	-	1	3
% Trucks	0.0	0.0	0.0	0.0	-	-	0.0	0.0	2.0	5.3	0.0	-	-	1.7	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.9	0.0	0.0	-	-	0.7	0.6
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	3	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	17.6	-	-	-	-	-	-	0.0	-	-	-	-	-	-	4.2	-	-
Pedestrians	-	-	-	-	-	8	-	-	-	-	-	-	14	-	-	-	-	-	-	8	-	-	-	-	-	-	23	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	82.4	-	-	-	-	-	-	100.0	-	-	-	-	-	-	95.8	-	-



Turning Movement Peak Hour Data Plot (3:30 PM)

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Kingston, NY
Clinton Ave & Henry St
Wednesday, May 8, 2019
Location: 41.92755, -74.010551

Count Name: Clinton Ave & Henry St
Site Code:
Start Date: 05/08/2019
Page No: 1

Turning Movement Data

Start Time	Henry St Eastbound							Henry St Westbound							Clinton Ave Northbound							Clinton Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	2	10	2	0	0	1	14	2	5	2	0	0	2	9	3	13	4	0	0	0	20	1	7	2	0	0	0	10	53
7:15 AM	0	9	1	0	0	9	10	4	2	1	0	0	1	7	1	18	8	1	0	1	28	1	9	1	0	0	0	11	56
7:30 AM	0	18	4	0	0	1	22	2	11	7	0	0	0	20	4	19	6	0	0	0	29	4	21	0	0	0	1	25	96
7:45 AM	2	10	2	0	0	0	14	3	19	4	1	0	2	27	1	14	0	2	1	0	18	5	11	0	0	0	0	16	75
Hourly Total	4	47	9	0	0	11	60	11	37	14	1	0	5	63	9	64	18	3	1	1	95	11	48	3	0	0	1	62	280
8:00 AM	0	8	1	1	0	1	10	4	15	2	0	0	0	21	1	17	4	0	0	1	22	9	22	1	0	0	0	32	85
8:15 AM	0	13	3	3	0	0	19	3	15	1	4	0	0	23	2	24	6	0	0	9	32	4	10	1	4	0	5	19	93
8:30 AM	0	16	2	1	0	0	19	2	29	1	1	0	3	33	3	25	7	1	0	8	36	5	16	4	0	0	9	25	113
8:45 AM	5	21	3	2	0	1	31	6	21	1	0	0	1	28	6	26	4	3	0	11	39	8	14	2	0	0	4	24	122
Hourly Total	5	58	9	7	0	2	79	15	80	5	5	0	4	105	12	92	21	4	0	29	129	26	62	8	4	0	19	100	413
9:00 AM	1	14	2	3	0	0	20	6	18	3	0	0	0	27	1	18	5	2	0	9	26	1	19	3	1	0	0	24	97
9:15 AM	1	14	1	1	0	3	17	5	9	2	1	0	1	17	6	24	4	1	0	0	35	2	10	1	0	0	0	13	82
9:30 AM	1	7	0	2	0	0	10	1	13	1	1	0	0	16	3	21	4	0	0	0	28	5	12	0	0	0	0	17	71
9:45 AM	1	9	7	0	0	1	17	3	14	4	2	0	0	23	3	18	1	2	0	0	24	3	19	2	0	0	2	24	88
Hourly Total	4	44	10	6	0	4	64	15	54	10	4	0	1	83	13	81	14	5	0	9	113	11	60	6	1	0	2	78	338
10:00 AM	1	6	0	0	0	1	7	1	16	0	1	0	2	18	2	9	5	3	0	0	19	8	23	2	0	0	1	33	77
10:15 AM	2	12	2	1	0	0	17	2	3	3	0	0	0	8	2	18	2	0	0	1	22	1	13	0	1	0	0	15	62
10:30 AM	1	5	1	0	0	0	7	7	5	3	1	0	4	16	4	17	6	0	0	3	27	2	19	0	1	0	2	22	72
10:45 AM	1	12	3	1	0	0	17	3	11	2	2	0	1	18	3	20	4	0	0	5	27	1	21	1	0	0	1	23	85
Hourly Total	5	35	6	2	0	1	48	13	35	8	4	0	7	60	11	64	17	3	0	9	95	12	76	3	2	0	4	93	296
11:00 AM	1	10	2	0	0	0	13	3	9	5	0	0	1	17	3	20	1	1	0	1	25	4	16	0	0	0	0	20	75
11:15 AM	0	14	1	0	0	0	15	5	10	1	3	0	1	19	1	10	1	0	0	0	12	2	17	1	0	0	0	20	66
11:30 AM	3	5	1	1	0	0	10	1	6	1	3	0	1	11	2	24	4	0	0	1	30	3	17	3	0	1	0	24	75
11:45 AM	3	10	4	1	0	0	18	3	11	1	2	0	1	17	2	21	4	1	0	1	28	4	20	1	0	0	0	25	88
Hourly Total	7	39	8	2	0	0	56	12	36	8	8	0	4	64	8	75	10	2	0	3	95	13	70	5	0	1	0	89	304
12:00 PM	1	11	6	0	0	0	18	1	5	5	0	0	0	11	3	15	6	1	0	2	25	4	16	0	0	0	0	20	74
12:15 PM	1	16	1	0	0	0	18	3	12	0	1	0	0	16	4	15	4	1	0	0	24	6	18	1	0	0	0	25	83
12:30 PM	1	10	2	1	0	0	14	0	9	0	1	0	1	10	3	17	3	0	0	0	23	3	27	2	0	0	1	32	79
12:45 PM	1	8	2	1	0	0	12	4	16	5	1	0	1	26	2	20	5	1	0	1	28	5	13	1	0	0	0	19	85
Hourly Total	4	45	11	2	0	0	62	8	42	10	3	0	2	63	12	67	18	3	0	3	100	18	74	4	0	0	1	96	321
1:00 PM	1	9	2	0	0	2	12	4	10	2	2	0	1	18	4	9	4	0	0	1	17	5	20	2	0	0	0	27	74
1:15 PM	1	8	6	0	0	0	15	4	7	1	2	0	3	14	5	16	6	0	0	2	27	0	18	0	0	0	1	18	74
1:30 PM	0	9	4	0	0	0	13	3	13	2	1	0	2	19	2	11	5	0	0	1	18	5	20	4	0	0	0	29	79
1:45 PM	1	19	5	0	0	0	25	6	22	0	2	0	0	30	3	13	7	0	0	5	23	4	23	2	0	0	0	29	107
Hourly Total	3	45	17	0	0	2	65	17	52	5	7	0	6	81	14	49	22	0	0	9	85	14	81	8	0	0	1	103	334
2:00 PM	2	32	3	0	0	2	37	1	15	3	1	0	2	20	4	17	4	3	0	2	28	7	15	1	0	0	0	23	108
2:15 PM	1	16	2	0	0	0	19	4	13	3	2	0	0	22	4	24	4	0	0	2	32	1	29	1	0	0	1	31	104
2:30 PM	3	9	5	4	0	3	21	5	20	2	2	0	4	29	3	28	6	1	0	[illegible]	38	7	20	1	1	0	0	29	117
2:45 PM	4	10	2	3	0	0	19	3	24	3	1	0	0	31	9	32	7	2	0	1	50	9	10	1	0	0	8	20	120
Hourly Total	10	67	12	7	0	5	96	13	72	11	6	0	6	102	20	101	21	6	0	12	148	24	74	4	1	0	9	103	449
3:00 PM	2	27	4	6	0	1	39	5	26	2	3	0	0	36	4	40	3	2	0	4	49	12	24	3	1	0	11	40	164
3:15 PM	3	18	4	1	0	1	26	5	19	2	4	0	2	30	3	20	6	2	0	0	31	7	23	1	1	0	0	32	119
3:30 PM	1	8	1	3	0	0	13	5	17	2	2	0	3	26	2	27	4	3	0	2	36	9	25	0	1	0	9	35	110
3:45 PM	0	12	1	4	0	0	17	11	17	5	3	0	2	36	3	37	5	1	0	1	46	9	20	0	2	0	2	31	130
Hourly Total	6	65	10	14	0	2	95	26	79	11	12	0	7	128	12	124	18	8	0	13	162	37	92	4	5	0	28	138	523
4:00 PM	0	18	1	1	0	2	20	3	13	7	0	0	10	23	1	17	4	3	0	1	25	5	34	0	0	0	2	39	107
4:15 PM	0	12	0	1	0	3	13	1	21	1	5	0	1	28	4	20	2	2	0	4	28	10	25	5	0	0	0	40	109
4:30 PM	1	16	2	6	0	0	25	7	23	2	1	0	0	33	4	20	1	4	0	2	29	11	32	1	0	0	0	44	131
4:45 PM	3	13	2	0	0	3	18	4	19	1	1	0	1	25	4	17	6	2	0	2	29	9	21	1	1	2	2	34	106
Hourly Total	4	59	5	8	0	8	76	15	76	11	7	0	12	109	13	74	13	11	0	9	111	35	112	7	1	2	4	157	453
5:00 PM	0	13	1	3	0	1	17	7	26	4	3	0	0	40	5	19	2	0	0	2	26	6	36	2	1	0	1	45	128
5:15 PM	0	15	1	3	0	2	19	8	17	1	1	0	9	27	1	18	6	4	0	1	29	3	35	1	0	0	0	39	114
5:30 PM	5	11	3	2	0	3	21	7	14	2	3	0	0	26	2	26	5	1	0	3	34	8	20	0	0	0	1	28	109
5:45 PM	1	7	2	2	0	1	12	5	18	1	3	0	3	27	3	17	4	1	0	2	25	4	26	2	0	0	1	32	96
Hourly Total	6	46	7	10	0	7	69	27	75	8	10	0	12	120	11	80	17	6	0	8	114	21	117	5	1	0	3	144	447
6:00 PM	0	7	4	1	0	0	12	9	17	1	0	0	0	27	2	17	4	0	0	2	23	5	12	1	0	0	1	18	80
6:15 PM	2	8	2	0	0	6	12	4	15	3	1	0	0	23	3	12	0	1	0	0	16	2	20	2	0	0	5	24	75
6:30 PM	0	3	2	0	0	0	5	4	7	6	1	0	2	18	3	15	3	1	1	1	23	4	20	0	1	0	2	25	71
6:45 PM	1	10	0	3	0	1	14	4	11	4	1	0	1	20	3	17	9	0	0	2	29	6	15	2	0	0	0	23	86
Hourly Total	3	28	8	4	0	7	43	21	50	14	3	0	3	88	11	61	16	2	1	5	91	17	67	5	1	0	8	90	312

Grand Total	61	578	112	62	0	49	813	193	688	115	70	0	69	1086	146	932	205	53	2	110	1338	239	933	62	16	3	80	1253	4470
Approach %	7.5	71.1	13.8	7.6	0.0	-	-	18.1	64.5	10.8	6.6	0.0	-	-	10.9	69.7	15.3	4.0	0.1	-	-	19.1	74.5	4.9	1.3	0.2	-	-	-
Total %	1.4	12.9	2.5	1.4	0.0	-	18.2	4.3	15.4	2.6	1.6	0.0	-	23.8	3.3	20.9	4.6	1.2	0.0	-	29.9	5.3	20.9	1.4	0.4	0.1	-	28.0	-
Lights	61	554	110	62	0	-	787	177	661	108	67	0	-	1013	139	868	182	48	2	-	1239	221	891	60	15	3	-	1190	4229
% Lights	100.0	95.8	98.2	100.0	-	-	96.8	91.7	96.1	93.9	95.7	-	-	95.0	95.2	93.1	88.8	90.6	100.0	-	92.6	92.5	95.5	96.8	93.8	100.0	-	95.0	94.6
Buses	0	13	2	0	0	-	15	5	11	3	3	0	-	22	0	43	5	2	0	-	50	16	24	2	0	0	-	42	129
% Buses	0.0	2.2	1.8	0.0	-	-	1.8	2.6	1.6	2.6	4.3	-	-	2.1	0.0	4.6	2.4	3.8	0.0	-	3.7	6.7	2.6	3.2	0.0	0.0	-	3.4	2.9
Trucks	0	11	0	0	0	-	11	11	16	4	0	0	-	31	7	21	18	3	0	-	49	2	18	0	1	0	-	21	112
% Trucks	0.0	1.9	0.0	0.0	-	-	1.4	5.7	2.3	3.5	0.0	-	-	2.9	4.8	2.3	8.8	5.7	0.0	-	3.7	0.8	1.9	0.0	6.3	0.0	-	1.7	2.5
Bicycles on Crosswalk	-	-	-	-	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-	8	-	-	-	-	-	-	6	-	-
% Bicycles on Crosswalk	-	-	-	-	-	4.1	-	-	-	-	-	-	2.9	-	-	-	-	-	-	7.3	-	-	-	-	-	-	7.5	-	-
Pedestrians	-	-	-	-	-	47	-	-	-	-	-	-	67	-	-	-	-	-	-	102	-	-	-	-	-	-	74	-	-
% Pedestrians	-	-	-	-	-	95.9	-	-	-	-	-	-	97.1	-	-	-	-	-	-	92.7	-	-	-	-	-	-	92.5	-	-

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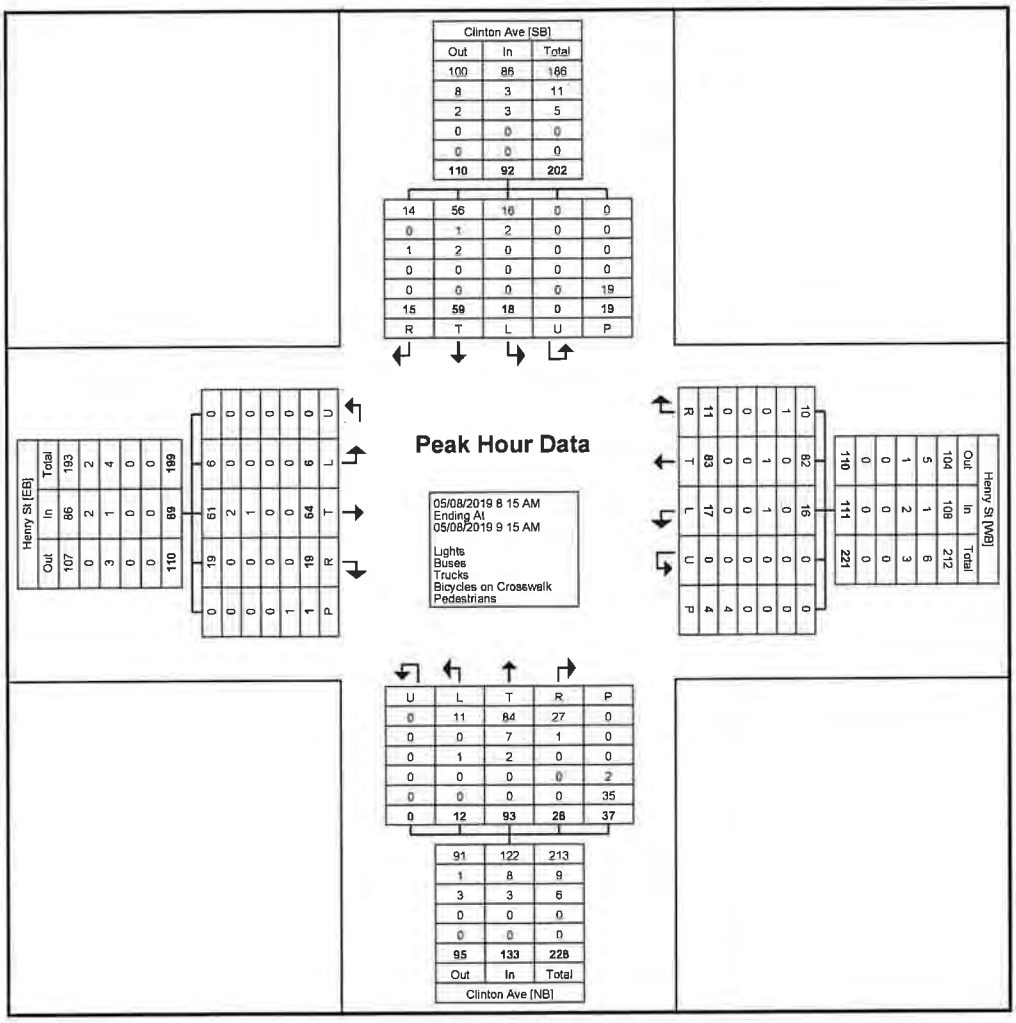
Kingston, NY
Clinton Ave & Henry St
Wednesday, May 8, 2019
Location: 41.92755, -74.010551

Count Name: Clinton Ave & Henry St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (8:15 AM)

Start Time	Henry St Eastbound							Henry St Westbound							Clinton Ave Northbound							Clinton Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
8:15 AM	0	13	3	3	0	0	19	3	15	1	4	0	0	23	2	24	6	0	0	9	32	4	10	1	4	0	6	19	93
8:30 AM	0	16	2	1	0	0	19	2	29	1	1	0	3	33	3	25	7	1	0	8	36	5	16	4	0	0	9	25	113
8:45 AM	5	21	3	2	0	1	31	6	21	1	0	0	1	28	6	26	4	3	0	11	39	8	14	2	0	0	4	24	122
9:00 AM	1	14	2	3	0	0	20	6	18	3	0	0	0	27	1	18	5	2	0	9	26	1	19	3	1	0	0	24	97
Total	6	64	10	9	0	1	89	17	83	6	5	0	4	111	12	93	22	6	0	37	133	18	59	10	5	0	19	92	425
Approach %	6.7	71.9	11.2	10.1	0.0	-	-	15.3	74.8	5.4	4.5	0.0	-	-	9.0	69.9	16.5	4.5	0.0	-	-	19.6	64.1	10.9	5.4	0.0	-	-	-
Total %	1.4	15.1	2.4	2.1	0.0	-	20.9	4.0	19.5	1.4	1.2	0.0	-	26.1	2.8	21.9	5.2	1.4	0.0	-	31.3	4.2	13.9	2.4	1.2	0.0	-	21.6	-
PHF	0.300	0.762	0.833	0.750	0.000	-	0.718	0.708	0.716	0.500	0.313	0.000	-	0.841	0.500	0.894	0.786	0.500	0.000	-	0.853	0.563	0.776	0.625	0.313	0.000	-	0.920	0.871
Lights	6	61	10	9	0	-	86	16	82	6	4	0	-	108	11	84	22	5	0	-	122	16	56	10	4	0	-	86	402
% Lights	1000	95.3	100.0	100.0	-	-	96.6	94.1	98.8	100.0	80.0	-	-	97.3	91.7	90.3	100.0	83.3	-	-	91.7	88.9	94.9	100.0	80.0	-	-	93.5	94.6
Buses	0	2	0	0	0	-	2	0	0	0	1	0	-	1	0	7	0	1	0	-	8	2	1	0	0	0	-	3	14
% Buses	0.0	3.1	0.0	0.0	-	-	2.2	0.0	0.0	0.0	20.0	-	-	0.9	0.0	7.5	0.0	16.7	-	-	6.0	11.1	1.7	0.0	0.0	-	-	3.3	3.3
Trucks	0	1	0	0	0	-	1	1	1	0	0	0	-	2	1	2	0	0	0	-	3	0	2	0	1	0	-	3	9
% Trucks	0.0	1.6	0.0	0.0	-	-	1.1	5.9	1.2	0.0	0.0	-	-	1.8	8.3	2.2	0.0	0.0	-	-	2.3	0.0	3.4	0.0	20.0	-	-	3.3	2.1
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	5.4	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	4	-	-	-	-	-	-	35	-	-	-	-	-	-	19	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	94.6	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (8:15 AM)

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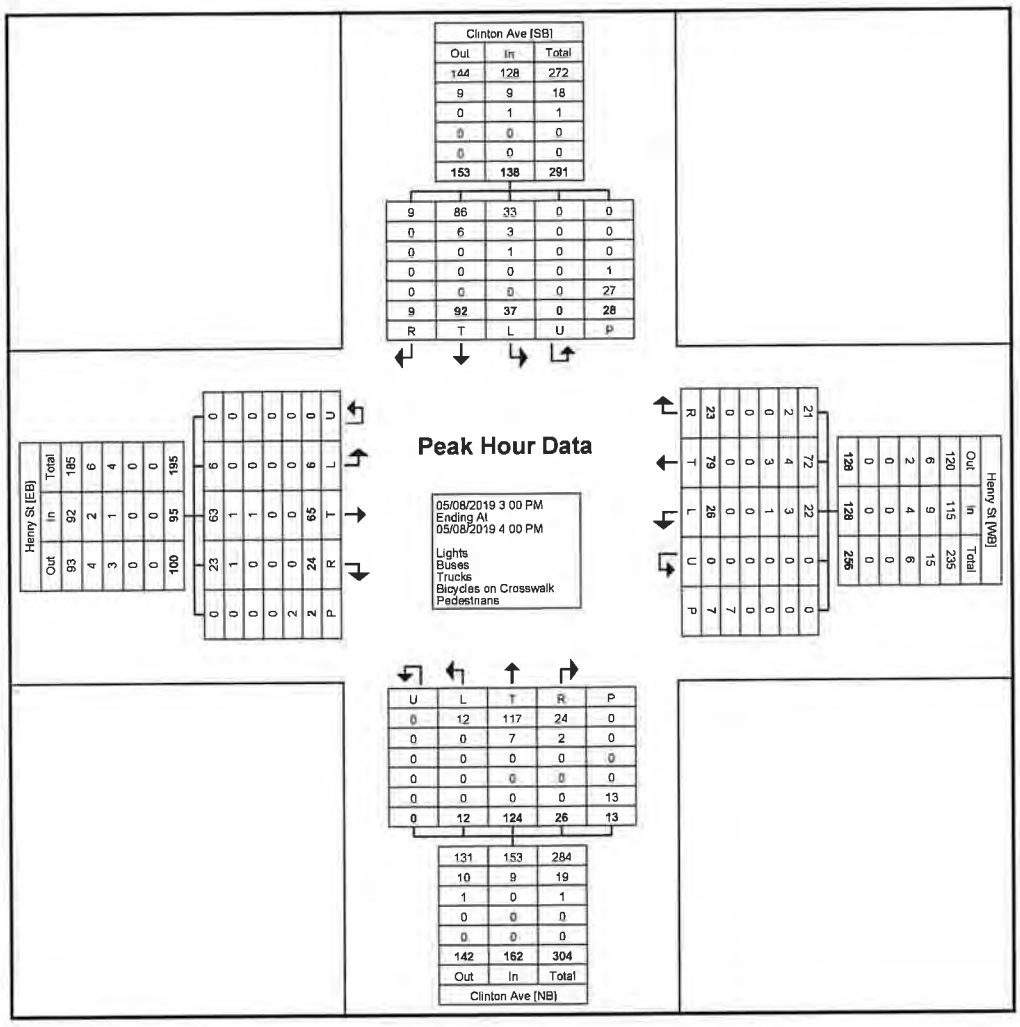
Kingston, NY
Clinton Ave & Henry St
Wednesday, May 8, 2019
Location: 41 92755, -74 010551

Count Name: Clinton Ave & Henry St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (3:00 PM)

Start Time	Henry St Eastbound							Henry St Westbound							Clinton Ave Northbound							Clinton Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
3:00 PM	2	27	4	6	0	1	39	5	26	2	3	0	0	36	4	40	3	2	0	4	49	12	24	3	1	0	11	40	164
3:15 PM	3	18	4	1	0	1	26	5	19	2	4	0	2	30	3	20	6	2	0	6	31	7	23	1	1	0	6	32	119
3:30 PM	1	8	1	3	0	0	13	5	17	2	2	0	3	26	2	27	4	3	0	2	36	9	25	0	1	0	9	35	110
3:45 PM	0	12	1	4	0	0	17	11	17	5	3	0	2	36	3	37	5	1	0	1	46	9	20	0	2	0	2	31	130
Total	6	65	10	14	0	2	95	26	79	11	12	0	7	128	12	124	18	8	0	13	162	37	92	4	5	0	26	138	523
Approach %	6.3	68.4	10.5	14.7	0.0	-	-	20.3	61.7	8.6	9.4	0.0	-	-	7.4	76.5	11.1	4.9	0.0	-	-	26.8	66.7	2.9	3.6	0.0	-	-	-
Total %	1.1	12.4	1.9	2.7	0.0	-	18.2	5.0	15.1	2.1	2.3	0.0	-	24.5	2.3	23.7	3.4	1.5	0.0	-	31.0	7.1	17.6	0.8	1.0	0.0	-	26.4	-
PHF	0.500	0.602	0.625	0.583	0.000	-	0.609	0.591	0.760	0.550	0.750	0.000	-	0.889	0.750	0.775	0.750	0.667	0.000	-	0.827	0.771	0.920	0.333	0.625	0.000	-	0.863	0.797
Lights	6	63	9	14	0	-	92	22	72	10	11	0	-	115	12	117	17	7	0	-	153	33	86	4	5	0	-	128	488
% Lights	100.0	96.9	90.0	100.0	-	-	96.8	84.6	91.1	90.9	91.7	-	-	89.8	100.0	94.4	94.4	87.5	-	-	94.4	89.2	93.5	100.0	100.0	-	-	92.8	93.3
Buses	0	1	1	0	0	-	2	3	4	1	1	0	-	9	0	7	1	1	0	-	9	3	6	0	0	0	-	9	29
% Buses	0.0	1.5	10.0	0.0	-	-	2.1	11.5	5.1	9.1	8.3	-	-	7.0	0.0	5.6	5.6	12.5	-	-	5.6	8.1	6.5	0.0	0.0	-	-	6.5	5.5
Trucks	0	1	0	0	0	-	1	1	3	0	0	0	-	4	0	0	0	0	0	-	0	1	0	0	0	0	-	1	6
% Trucks	0.0	1.5	0.0	0.0	-	-	1.1	3.8	3.8	0.0	0.0	-	-	3.1	0.0	0.0	0.0	0.0	-	-	0.0	2.7	0.0	0.0	0.0	-	-	0.7	1.1
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	3.6	-	-
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	-	7	-	-	-	-	-	-	13	-	-	-	-	-	-	27	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	96.4	-	-



Turning Movement Peak Hour Data Plot (3:00 PM)

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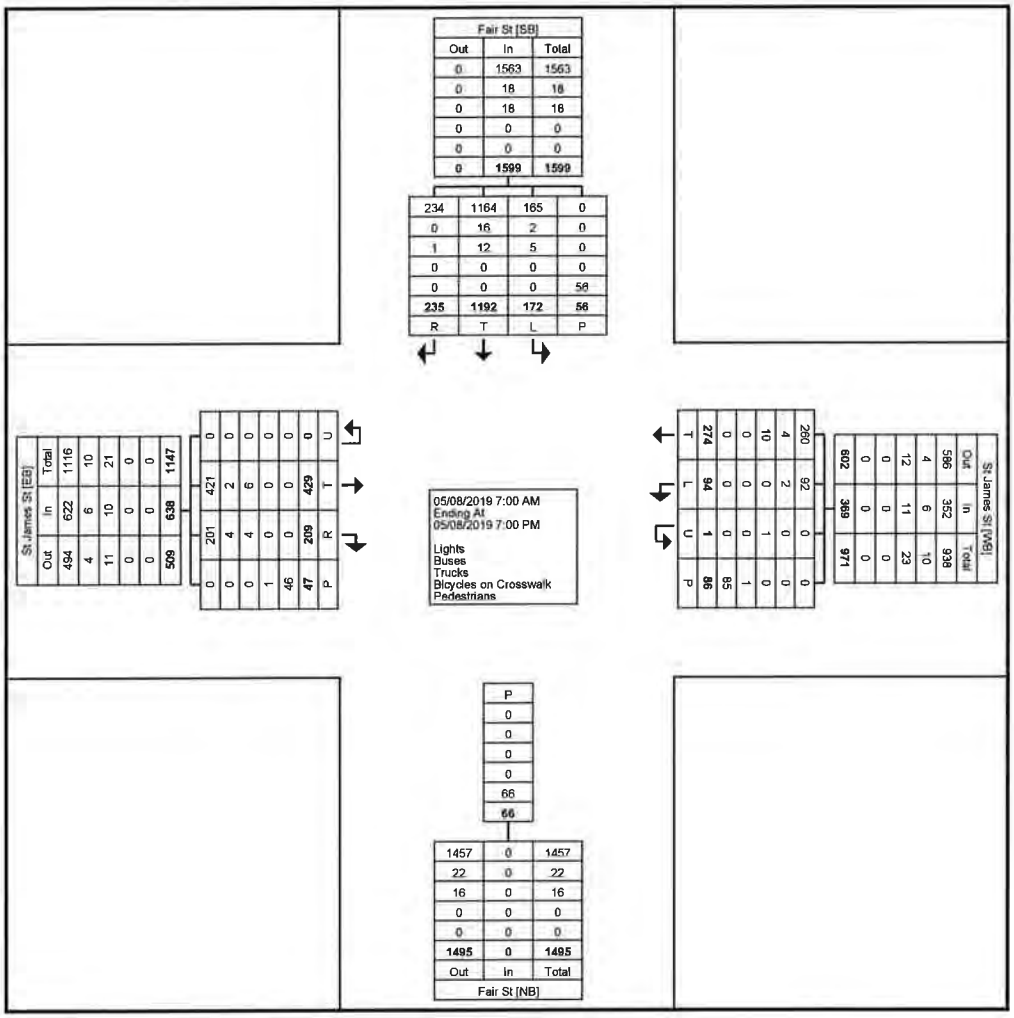
Kingston, NY
Fair St & James St
Wednesday, May 8, 2019
Location: 41.9302, -74.016357

Count Name: Fair St & St James St
Site Code:
Start Date: 05/08/2019

Turning Movement Data

Start Time	St James St Eastbound						St James St Westbound					Fair St Northbound		Fair St Southbound						Int. Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:00 AM	5	3	0	0	0	8	1	1	0	0	2	0	0	1	7	2	0	0	10	20
7:15 AM	6	6	1	0	1	13	2	1	0	0	3	0	0	3	8	1	1	2	13	29
7:30 AM	5	2	0	0	0	7	3	2	0	0	5	0	0	6	21	0	0	0	27	39
7:45 AM	5	6	0	0	0	11	2	3	0	0	5	1	0	1	11	2	0	0	14	30
Hourly Total	21	17	1	0	1	39	8	7	0	0	15	1	0	11	47	5	1	2	64	118
8:00 AM	9	2	0	0	0	11	3	2	0	0	5	2	0	3	26	6	0	0	35	51
8:15 AM	8	4	0	0	0	12	2	2	0	0	4	0	0	6	24	4	0	1	34	50
8:30 AM	9	5	0	0	0	14	5	4	0	0	9	1	0	2	17	3	0	1	22	45
8:45 AM	9	6	3	0	0	18	3	5	0	1	8	1	0	0	20	2	2	1	24	50
Hourly Total	35	17	3	0	0	55	13	13	0	1	26	4	0	11	87	15	2	3	115	196
9:00 AM	9	1	2	0	0	12	1	4	0	1	5	0	0	0	19	2	0	1	21	38
9:15 AM	5	1	1	0	0	7	0	4	0	1	4	1	0	2	24	7	0	0	33	44
9:30 AM	6	3	0	0	1	9	0	2	0	4	2	0	0	3	22	2	0	2	27	38
9:45 AM	9	3	0	0	0	12	1	1	0	0	2	1	0	4	14	3	0	1	21	35
Hourly Total	29	8	3	0	1	40	2	11	0	6	13	2	0	9	79	14	0	4	102	155
10:00 AM	11	2	0	0	1	13	1	5	0	2	6	2	0	8	15	3	0	1	26	45
10:15 AM	10	1	0	0	1	11	1	9	0	0	10	0	0	3	20	4	1	2	28	49
10:30 AM	8	1	1	0	1	10	3	2	0	1	5	0	0	1	24	10	0	3	35	50
10:45 AM	8	0	0	0	0	8	0	3	0	3	3	1	0	3	21	7	1	2	32	43
Hourly Total	37	4	1	0	3	42	5	19	0	6	24	3	0	15	80	24	2	8	121	187
11:00 AM	10	4	0	0	2	14	0	10	0	2	10	2	0	2	13	6	0	1	21	45
11:15 AM	6	5	0	0	0	11	3	4	0	2	7	2	0	4	19	1	1	5	25	43
11:30 AM	10	6	1	0	4	17	3	3	0	3	6	0	0	3	28	6	1	1	38	61
11:45 AM	7	4	0	0	1	11	2	3	0	2	5	1	0	2	17	1	0	0	20	36
Hourly Total	33	19	1	0	7	53	8	20	0	9	28	5	0	11	77	14	2	7	104	185
12:00 PM	8	4	1	0	1	13	2	11	0	3	13	0	0	1	28	2	1	0	32	58
12:15 PM	6	2	3	0	0	11	1	1	0	2	2	0	0	2	20	3	1	1	26	39
12:30 PM	10	4	2	0	0	16	1	9	0	2	10	4	0	3	28	5	1	2	37	63
12:45 PM	9	2	0	0	3	11	1	5	0	1	6	6	0	1	16	1	1	2	19	36
Hourly Total	33	12	6	0	4	51	5	26	0	8	31	10	0	7	92	11	4	5	114	196
1:00 PM	11	6	0	0	0	17	3	8	0	2	11	5	0	4	30	3	1	1	38	66
1:15 PM	7	4	0	0	0	11	1	6	1	2	8	4	0	4	29	4	0	1	37	56
1:30 PM	7	6	1	0	2	14	5	5	0	3	10	1	0	0	27	6	0	0	33	57
1:45 PM	8	6	1	0	1	15	3	6	0	3	9	2	0	1	28	4	0	1	33	57
Hourly Total	33	22	2	0	3	57	12	25	1	10	38	12	0	9	114	17	1	3	141	236
2:00 PM	14	0	0	0	3	14	3	9	0	3	12	0	0	3	27	2	1	3	33	59
2:15 PM	17	0	0	0	1	17	1	6	0	3	7	2	0	3	29	5	0	1	37	61
2:30 PM	13	1	2	0	2	16	4	8	0	1	12	0	0	5	31	2	0	1	38	66
2:45 PM	10	2	1	0	2	13	2	12	0	1	14	1	0	8	31	6	4	0	49	76
Hourly Total	54	3	3	0	8	60	10	35	0	8	45	3	0	19	118	15	5	5	157	262
3:00 PM	10	3	2	0	0	15	4	15	0	0	19	0	0	2	28	9	0	2	39	73
3:15 PM	8	2	0	0	3	10	1	4	0	1	5	2	0	8	34	8	1	3	51	66
3:30 PM	12	2	2	0	4	16	1	7	0	5	8	4	0	4	24	6	0	0	34	58
3:45 PM	6	1	1	0	0	8	2	10	0	1	12	3	0	8	36	7	0	0	51	71
Hourly Total	36	8	5	0	7	49	8	36	0	7	44	9	0	22	122	30	1	5	175	268
4:00 PM	9	2	4	0	0	15	0	10	0	0	10	0	0	7	30	6	1	1	44	69
4:15 PM	9	5	4	0	1	18	0	7	0	1	7	1	0	6	27	3	0	2	36	61
4:30 PM	10	5	4	0	3	19	4	7	0	5	11	2	0	6	48	3	0	3	57	87
4:45 PM	14	6	0	0	1	20	4	10	0	3	14	1	0	6	35	6	3	2	50	84
Hourly Total	42	18	12	0	5	72	8	34	0	9	42	4	0	25	140	18	4	8	187	301
5:00 PM	19	4	7	0	0	30	3	8	0	3	11	2	0	7	51	7	2	2	67	108
5:15 PM	12	4	2	0	0	18	2	8	0	3	10	1	0	4	36	3	2	0	45	73
5:30 PM	12	2	3	0	2	17	2	5	0	2	7	1	0	8	29	4	2	2	43	67
5:45 PM	11	3	2	0	1	16	3	7	0	3	10	2	0	5	31	4	2	0	42	68
Hourly Total	54	13	14	0	3	81	10	28	0	11	38	6	0	24	147	18	8	4	197	316
6:00 PM	1	2	2	0	0	5	1	8	0	4	9	2	0	4	30	1	0	0	35	49
6:15 PM	10	6	2	0	4	18	1	3	0	3	4	4	0	1	21	5	1	2	28	50
6:30 PM	7	3	1	0	0	11	2	4	0	1	6	0	0	1	14	3	1	0	19	36
6:45 PM	4	0	1	0	1	5	1	5	0	3	6	1	0	3	24	11	2	0	40	51
Hourly Total	22	11	6	0	5	39	5	20	0	11	25	7	0	9	89	20	4	2	122	186
Grand Total	429	152	57	0	47	638	94	274	1	86	369	66	0	172	1192	201	34	56	1599	2606

Approach %	67.2	23.8	8.9	0.0	-	-	25.5	74.3	0.3	-	-	-	-	10.8	74.5	12.6	2.1	-	-	-
Total %	16.5	5.8	2.2	0.0	-	24.5	3.6	10.5	0.0	-	14.2	-	0.0	6.6	45.7	7.7	1.3	-	61.4	-
Lights	421	147	54	0	-	622	92	260	0	-	352	-	0	165	1164	200	34	-	1563	2537
% Lights	98.1	96.7	94.7	-	-	97.5	97.9	94.9	0.0	-	95.4	-	-	95.9	97.7	99.5	100.0	-	97.7	97.4
Buses	2	3	1	0	-	6	2	4	0	-	6	-	0	2	16	0	0	-	18	30
% Buses	0.5	2.0	1.8	-	-	0.9	2.1	1.5	0.0	-	1.6	-	-	1.2	1.3	0.0	0.0	-	1.1	1.2
Trucks	6	2	2	0	-	10	0	10	1	-	11	-	0	5	12	1	0	-	18	39
% Trucks	1.4	1.3	3.5	-	-	1.6	0.0	3.6	100.0	-	3.0	-	-	2.9	1.0	0.5	0.0	-	1.1	1.5
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	1	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	2.1	-	-	-	-	1.2	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	46	-	-	-	-	85	-	66	-	-	-	-	-	56	-	-
% Pedestrians	-	-	-	-	97.9	-	-	-	-	98.8	-	100.0	-	-	-	-	-	100.0	-	-



Turning Movement Data Plot

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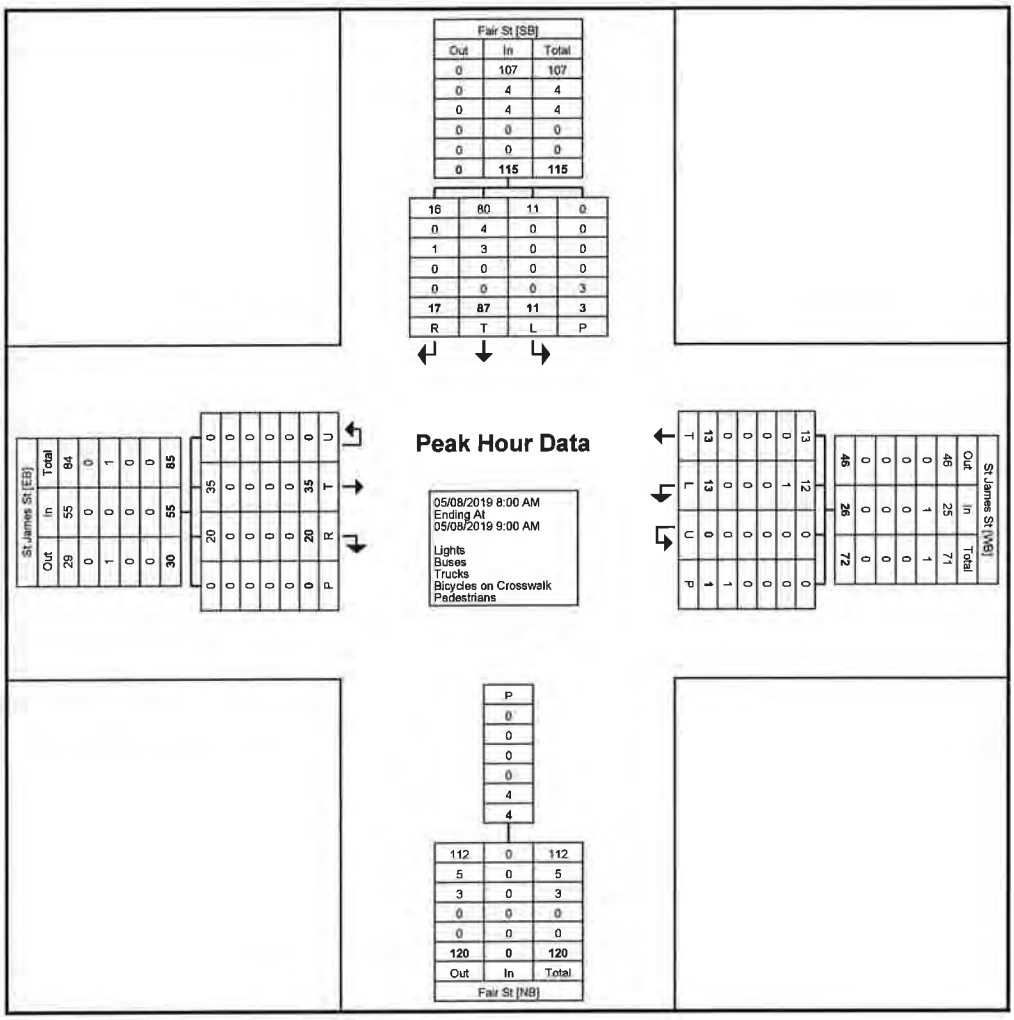
Kingston, NY
Fair St & James St
Wednesday, May 8, 2019
Location: 41.9302, -74.016357

Count Name: Fair St & St James St
Site Code:
Start Date: 05/08/2019
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	St James St Eastbound						St James St Westbound					Fair St Northbound		Fair St Southbound						Int Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
8:00 AM	9	2	0	0	0	11	3	2	0	0	5	2	0	3	26	6	0	0	35	51
8:15 AM	8	4	0	0	0	12	2	2	0	0	4	0	0	6	24	4	0	1	34	50
8:30 AM	9	5	0	0	0	14	5	4	0	0	9	1	0	2	17	3	0	1	22	45
8:45 AM	9	6	3	0	0	18	3	5	0	1	8	1	0	0	20	2	2	1	24	50
Total	35	17	3	0	0	55	13	13	0	1	26	4	0	11	87	15	2	3	115	196
Approach %	63.6	30.9	5.5	0.0	-	-	50.0	50.0	0.0	-	-	-	-	9.6	75.7	13.0	1.7	-	-	-
Total %	17.9	8.7	1.5	0.0	-	28.1	6.6	6.6	0.0	-	13.3	-	0.0	5.6	44.4	7.7	1.0	-	58.7	-
PHF	0.972	0.708	0.250	0.000	-	0.764	0.650	0.650	0.000	-	0.722	-	0.000	0.458	0.837	0.625	0.250	-	0.821	0.961
Lights	35	17	3	0	-	55	12	13	0	-	25	-	0	11	80	14	2	-	107	187
% Lights	100.0	100.0	100.0	-	-	100.0	92.3	100.0	-	-	96.2	-	-	100.0	92.0	93.3	100.0	-	93.0	95.4
Buses	0	0	0	0	-	0	1	0	0	-	1	-	0	0	4	0	0	-	4	5
% Buses	0.0	0.0	0.0	-	-	0.0	7.7	0.0	-	-	3.8	-	-	0.0	4.6	0.0	0.0	-	3.5	2.6
Trucks	0	0	0	0	-	0	0	0	0	-	0	-	0	0	3	1	0	-	4	4
% Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	-	-	0.0	3.4	6.7	0.0	-	3.5	2.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0.0	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	1	-	4	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	100.0	-	100.0	-	-	-	-	-	100.0	-	-



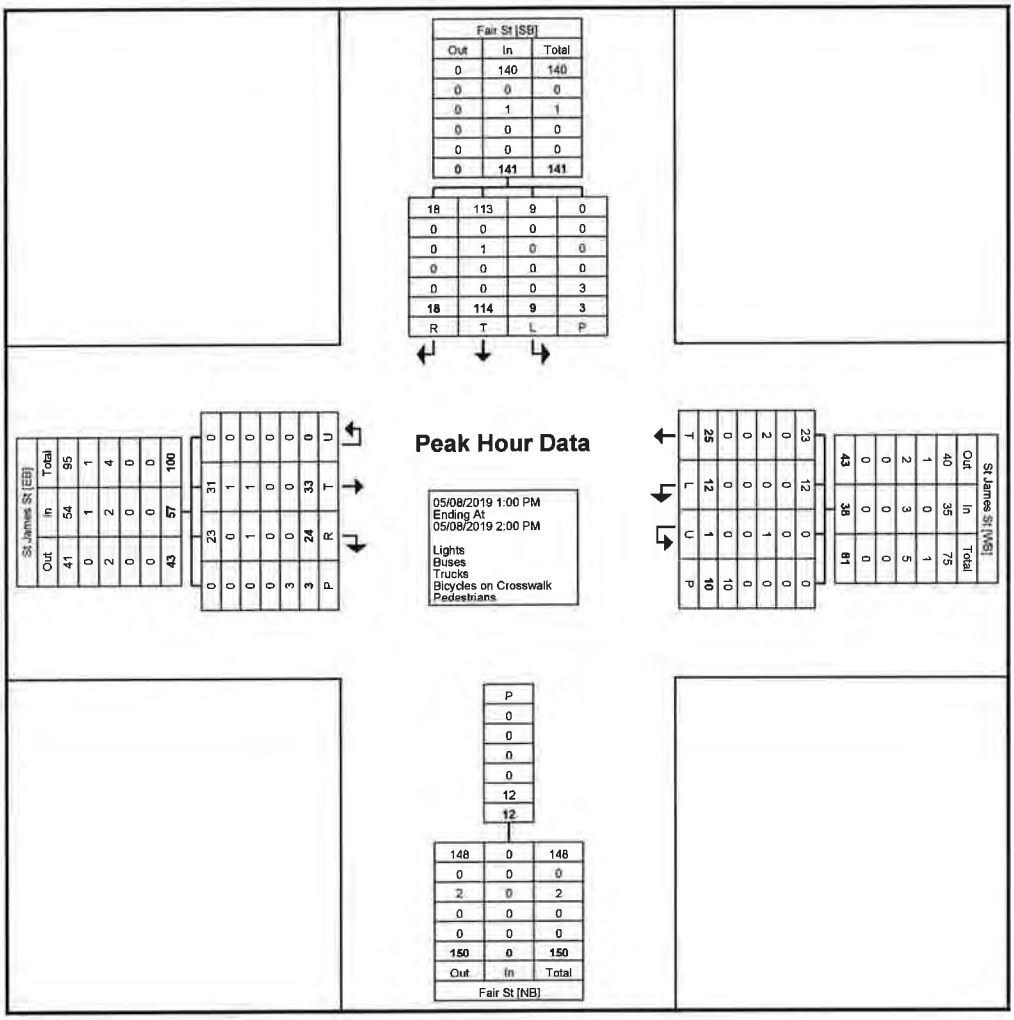
Turning Movement Peak Hour Data Plot (8:00 AM)

Kingston, NY
Fair St & James St
Wednesday, May 8, 2019
Location: 41.9302, -74.016357

Count Name: Fair St & St James St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (1:00 PM)

Start Time	St James St Eastbound						St James St Westbound					Fair St Northbound		Fair St Southbound						Int. Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
1:00 PM	11	6	0	0	0	17	3	8	0	2	11	5	0	4	30	3	1	1	38	66
1:15 PM	7	4	0	0	0	11	1	6	1	2	8	4	0	4	29	4	0	1	37	56
1:30 PM	7	6	1	0	2	14	5	5	0	3	10	1	0	0	27	6	0	0	33	57
1:45 PM	8	6	1	0	1	15	3	6	0	3	9	2	0	1	28	4	0	1	33	57
Total	33	22	2	0	3	57	12	25	1	10	38	12	0	9	114	17	1	3	141	236
Approach %	57.9	38.6	3.5	0.0	-	-	31.6	65.8	2.6	-	-	-	-	6.4	80.9	12.1	0.7	-	-	-
Total %	14.0	9.3	0.8	0.0	-	24.2	5.1	10.6	0.4	-	16.1	-	0.0	3.8	48.3	7.2	0.4	-	59.7	-
PHF	0.750	0.917	0.500	0.000		0.838	0.600	0.781	0.250	-	0.864	-	0.000	0.563	0.950	0.708	0.250	-	0.928	0.894
Lights	31	21	2	0		54	12	23	0		35	-	0	9	113	17	1	-	140	229
% Lights	93.9	95.5	100.0	-		94.7	100.0	92.0	0.0	-	92.1	-	-	100.0	99.1	100.0	100.0	-	99.3	97.0
Buses	1	0	0	0	-	1	0	0	0	-	0	-	0	0	0	0	0	-	0	1
% Buses	3.0	0.0	0.0	-	-	1.8	0.0	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.4
Trucks	1	1	0	0	-	2	0	2	1	-	3	-	0	0	1	0	0	-	1	6
% Trucks	3.0	4.5	0.0	-	-	3.5	0.0	8.0	100.0	-	7.9	-	-	0.0	0.9	0.0	0.0	-	0.7	2.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	0.0	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	10	-	12	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	100.0	-	100.0	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (1:00 PM)

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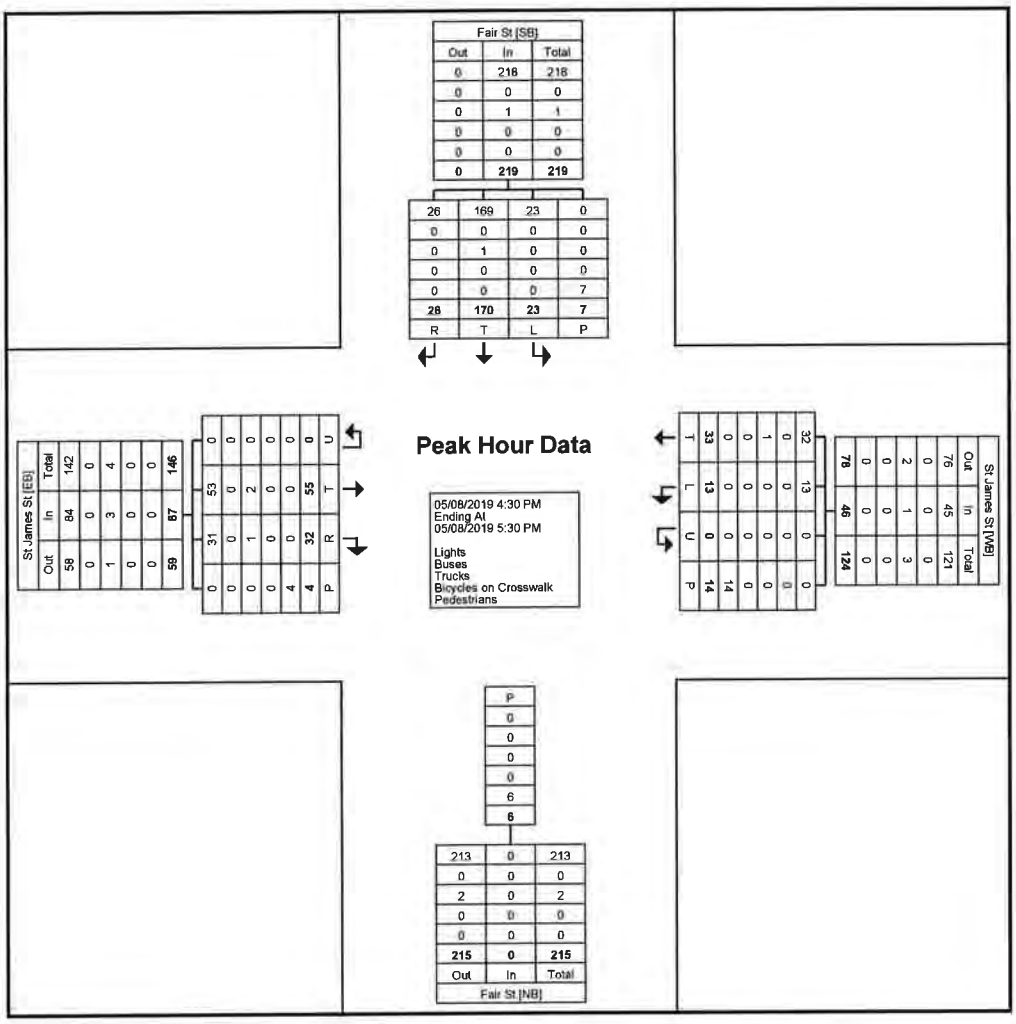
Kingston, NY
Fair St & James St
Wednesday, May 8, 2019
Location: 41.9302, -74.016357

Count Name: Fair St & St James St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (4:30 PM)

Start Time	St James St Eastbound						St James St Westbound					Fair St Northbound		Fair St Southbound					
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Int. Total
4:30 PM	10	5	4	0	3	19	4	7	0	5	11	2	0	6	48	3	0	3	57	87
4:45 PM	14	6	0	0	1	20	4	10	0	3	14	1	0	6	35	6	3	2	50	84
5:00 PM	19	4	7	0	0	30	3	8	0	3	11	2	0	7	51	7	2	2	67	108
5:15 PM	12	4	2	0	0	18	2	8	0	3	10	1	0	4	36	3	2	0	45	73
Total	55	19	13	0	4	87	13	33	0	14	46	6	0	23	170	19	7	7	219	352
Approach %	63.2	21.8	14.9	0.0	-	-	28.3	71.7	0.0	-	-	-	-	10.5	77.6	8.7	3.2	-	-	-
Total %	15.6	5.4	3.7	0.0	-	24.7	3.7	9.4	0.0	-	13.1	-	0.0	6.5	48.3	5.4	2.0	-	62.2	-
PHF	0.724	0.792	0.464	0.000		0.725	0.813	0.825	0.000		0.821		0.000	0.821	0.833	0.679	0.583		0.817	0.815
Lights	53	19	12	0	-	84	13	32	0	-	45	-	0	23	169	19	7	-	218	347
% Lights	96.4	100.0	92.3	-	-	96.6	100.0	97.0	-	-	97.8	-	-	100.0	99.4	100.0	100.0	-	99.5	98.6
Buses	0	0	0	0	-	0	0	0	0	-	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Trucks	2	0	1	0	-	3	0	1	0	-	1	-	0	0	1	0	0	-	1	5
% Trucks	3.6	0.0	7.7	-	-	3.4	0.0	3.0	-	-	2.2	-	-	0.0	0.6	0.0	0.0	-	0.5	1.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	0.0	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	14	-	6	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	100.0	-	100.0	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (4:30 PM)

Kingston, NY
Fair St & James St
Wednesday, May 8, 2019
Location: 41.9302, -74.016357

Count Name: Fair St & St James St
Site Code:
Start Date: 05/08/2019
Page No: 10

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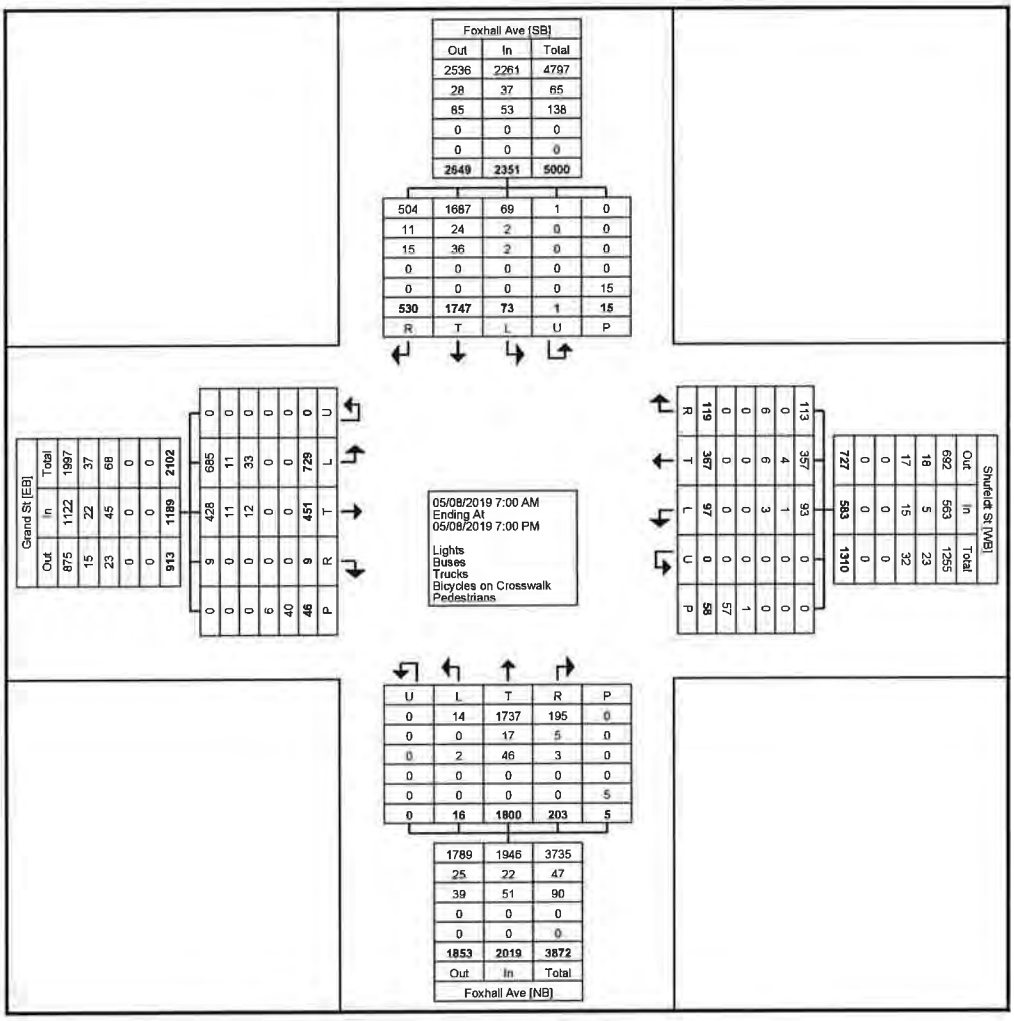
Kingston, NY
Foxhall Ave & Grand St
Wednesday, May 8, 2019
Location: 41.932312, -73.996235

Count Name: Foxhall Ave & Grand St & Shufeldt St
Site Code:
Start Date: 05/08/2019
Page No: 1

Turning Movement Data

Start Time	Grand St Eastbound							Shufeldt St Westbound							Foxhall Ave Northbound							Foxhall Ave Southbound							Int Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	7	3	0	0	0	0	10	2	4	0	0	0	1	6	0	21	1	0	0	0	22	1	30	6	0	0	0	37	75
7:15 AM	12	2	0	0	0	1	14	3	20	0	0	0	6	23	1	36	4	0	0	0	41	3	53	13	0	0	0	69	147
7:30 AM	11	8	0	0	0	1	19	4	15	1	1	0	2	21	1	53	2	0	0	0	56	0	48	16	0	0	0	64	160
7:45 AM	9	7	0	0	0	0	16	3	14	6	0	0	0	23	0	47	3	0	0	1	50	1	40	16	1	0	0	58	147
Hourly Total	39	20	0	0	0	2	59	12	53	7	1	0	9	73	2	157	10	0	0	1	169	5	171	51	1	0	0	228	529
8:00 AM	8	5	1	0	0	0	14	0	10	3	2	0	0	15	1	29	4	0	0	0	34	0	29	6	0	0	0	35	98
8:15 AM	9	10	0	0	0	0	19	2	10	4	1	0	0	17	0	28	1	0	0	0	29	3	27	12	0	0	1	42	107
8:30 AM	9	5	0	0	0	0	14	2	7	1	2	0	1	12	1	39	5	0	0	0	45	0	31	7	0	0	0	38	109
8:45 AM	10	10	0	0	0	0	20	1	16	2	0	0	0	19	0	46	1	0	0	0	47	3	24	22	0	0	0	49	135
Hourly Total	36	30	1	0	0	0	67	5	43	10	5	0	1	63	2	142	11	0	0	0	155	6	111	47	0	0	1	164	449
9:00 AM	13	8	0	0	0	0	21	0	9	2	1	0	0	12	0	26	5	0	0	0	31	0	26	11	0	0	0	37	101
9:15 AM	12	4	0	0	0	0	16	3	6	4	1	0	2	14	0	41	4	0	0	0	45	1	21	13	0	0	0	35	110
9:30 AM	12	4	0	0	0	0	16	1	4	2	0	0	0	7	0	25	3	0	0	0	28	1	35	9	0	0	0	45	96
9:45 AM	20	10	0	0	0	2	30	0	3	2	0	0	2	5	0	28	4	0	0	0	32	1	20	9	1	0	0	31	98
Hourly Total	57	26	0	0	0	2	83	4	22	10	2	0	4	38	0	120	16	0	0	0	136	3	102	42	1	0	0	148	405
10:00 AM	9	6	0	0	0	0	15	1	7	0	0	0	1	8	1	27	3	0	0	0	31	2	16	5	0	0	0	23	77
10:15 AM	15	4	0	1	0	1	20	0	5	1	2	0	1	8	0	34	2	0	0	0	36	1	39	9	0	0	0	49	113
10:30 AM	14	10	0	0	0	0	24	0	2	0	2	0	0	4	0	25	1	1	0	0	27	1	16	7	0	0	0	24	79
10:45 AM	7	2	0	0	0	2	9	1	2	1	0	0	0	4	0	33	5	2	0	0	40	0	17	7	0	0	0	24	77
Hourly Total	45	22	0	1	0	3	68	2	16	2	4	0	2	24	1	119	11	3	0	0	134	4	88	28	0	0	0	120	346
11:00 AM	18	10	0	1	0	1	29	2	7	0	1	0	1	10	0	23	3	0	0	0	26	0	23	7	0	0	1	30	95
11:15 AM	13	4	0	0	0	2	17	1	3	2	1	0	2	7	1	26	3	0	0	0	30	0	32	15	0	0	0	47	101
11:30 AM	20	10	0	0	0	2	30	2	2	2	3	0	3	9	1	38	3	0	0	0	42	1	20	5	0	0	1	26	107
11:45 AM	16	6	0	0	0	1	22	2	7	1	0	0	0	10	0	34	6	0	0	0	40	2	21	7	1	0	0	31	103
Hourly Total	67	30	0	1	0	6	98	7	19	5	5	0	6	36	2	121	15	0	0	0	138	3	96	34	1	0	2	134	406
12:00 PM	18	10	2	0	0	0	30	2	7	0	0	0	0	9	1	38	0	0	0	0	39	2	44	14	0	0	0	60	138
12:15 PM	18	9	0	0	0	0	27	1	3	1	2	0	0	7	1	43	4	1	0	0	49	1	46	7	0	1	1	55	138
12:30 PM	22	13	0	0	0	1	35	6	7	2	0	0	0	15	0	17	6	0	0	2	23	0	39	12	0	0	0	51	124
12:45 PM	18	11	0	0	0	1	29	1	9	1	0	0	1	11	1	41	4	0	0	0	46	2	43	10	0	0	0	55	141
Hourly Total	76	43	2	0	0	2	121	10	26	4	2	0	1	42	3	139	14	1	0	2	157	5	172	43	0	1	1	221	541
1:00 PM	9	11	1	0	0	1	21	0	7	1	1	0	1	9	1	27	4	0	0	0	32	2	37	19	0	0	0	58	120
1:15 PM	16	7	0	0	0	0	23	4	11	2	0	0	0	17	0	44	7	1	0	0	52	1	38	14	0	0	0	53	145
1:30 PM	25	9	0	0	0	0	34	2	8	3	0	0	1	13	0	40	4	1	0	0	45	3	38	10	0	0	0	51	143
1:45 PM	11	5	0	0	0	0	16	1	12	3	0	0	4	16	0	33	5	0	0	0	38	0	43	14	0	0	1	57	127
Hourly Total	61	32	1	0	0	1	94	7	38	9	1	0	6	55	1	144	20	2	0	0	167	6	156	57	0	0	1	219	535
2:00 PM	13	11	0	0	0	0	24	3	11	3	0	0	1	17	0	34	3	0	0	0	37	2	44	10	0	0	1	56	134
2:15 PM	17	15	0	0	0	5	32	3	9	3	1	0	5	16	1	52	4	0	0	0	57	1	44	12	1	0	0	58	163
2:30 PM	19	6	0	0	0	3	25	4	9	3	1	0	2	17	0	44	5	1	0	0	50	2	33	19	0	0	0	54	146
2:45 PM	21	9	0	0	0	2	30	2	6	1	1	0	1	10	0	46	5	0	0	0	51	2	38	14	0	0	0	54	145
Hourly Total	70	41	0	0	0	10	111	12	35	10	3	0	9	60	1	176	17	1	0	0	195	7	159	55	1	0	1	222	588
3:00 PM	20	13	0	0	0	5	33	3	11	1	0	0	2	15	1	57	8	0	0	0	66	1	38	6	0	0	1	45	159
3:15 PM	23	14	0	0	0	0	37	5	8	0	0	0	2	13	0	54	5	0	0	0	59	1	49	14	0	0	0	64	173
3:30 PM	12	18	0	0	0	4	30	3	9	3	2	0	4	17	0	61	9	0	0	1	70	2	39	9	0	0	2	50	167
3:45 PM	24	14	0	0	0	1	38	1	8	2	1	0	3	12	0	45	5	0	0	0	50	3	41	11	0	0	1	55	155
Hourly Total	79	59	0	0	0	10	138	12	36	6	3	0	11	57	1	217	27	0	0	1	245	7	167	40	0	0	4	214	654
4:00 PM	27	23	0	0	0	1	50	0	7	0	0	0	1	7	0	55	7	0	0	0	62	3	32	14	0	0	1	49	168
4:15 PM	16	15	0	0	0	1	31	4	10	3	0	0	1	17	0	44	5	0	0	0	49	3	52	13	0	0	1	68	165
4:30 PM	22	16	0	0	0	1	38	1	8	3	0	0	1	12	0	40	5	0	0	0	45	2	40	10	1	0	0	53	148
4:45 PM	15	11	0	0	0	1	26	4	5	3	0	0	0	12	0	41	4	0	0	0	45	2	40	9	1	0	0	52	135
Hourly Total	80	65	0	0	0	4	145	9	30	9	0	0	3	48	0	180	21	0	0	0	201	10	164	46	2	0	2	222	616
5:00 PM	18	16	0	0	0	1	34	2	6	3	1	0	1	12	0	43	2	0	0	0	45	2	63	11	0	0	0	76	167
5:15 PM	17	17	0	0	0	1	34	2	11	2	0	0	1	15	0	30	6	0	0	0	36	2	44	11	0	0	1	57	142
5:30 PM	24	12	1	0	0	1	37	2	4	5	0	0	2	11	2	30	5	0	0	1	37	1	47	11	0	0	2	59	144
5:45 PM	12	5	1	0	0	1	18	5	6	1	0	0	0	12	0	41	2	2	0	0	45	2	32	11	0	0	0	45	120
Hourly Total	71	50	2	0	0	4	123	11	27	11	1	0	4	50	2	144	15	2	0	1	163	7	186	44	0	0	3	237	573
6:00 PM	13	12	0	0	0	1	25	2	6	1	1	0	1	10	0	35	4	0	0	0	39	1	41	10	0	0	0	52	126
6:15 PM	15	7	0	0	0	1	22	0	1	1	2	0	1	4	0	36	5	0	0	0	41	2	44	11	0	0	0	57	124
6:30 PM	12	9	0	0	0	0	21	2	10	1	0	0	0	13	0	31	2	2	0	0	35	4	44	8	0	0	0	56	125
6:45 PM	8	5	1	0	0	0	14	2	5	0	3	0	0	10	1	39	4	0	0	0	44	3	46	8	0	0	0	57	125
Hourly Total	48	33	1	0	0	2	82	6	22	3	6	0	2	37	1	141	15	2	0	0	159	10	175	37	0	0	0	222	500

Grand Total	729	451	7	2	0	46	1189	97	367	86	33	0	58	583	16	1800	192	11	0	5	2019	73	1747	524	6	1	15	2351	6142
Approach %	61.3	37.9	0.6	0.2	0.0	-	-	16.6	63.0	14.8	5.7	0.0	-	-	0.8	89.2	9.5	0.5	0.0	-	-	3.1	74.3	22.3	0.3	0.0	-	-	-
Total %	11.9	7.3	0.1	0.0	0.0	-	19.4	1.6	6.0	1.4	0.5	0.0	-	9.5	0.3	29.3	3.1	0.2	0.0	-	32.9	1.2	28.4	8.5	0.1	0.0	-	38.3	-
Lights	685	428	7	2	0	-	1122	93	357	82	31	0	-	563	14	1737	184	11	0	-	1946	69	1687	498	6	1	-	2261	5892
% Lights	94.0	94.9	100.0	100.0	-	-	94.4	95.9	97.3	95.3	93.9	-	-	96.6	87.5	96.5	95.8	100.0	-	-	96.4	94.5	96.6	95.0	100.0	100.0	-	96.2	95.9
Buses	11	11	0	0	0	-	22	1	4	0	0	0	-	5	0	17	5	0	0	-	22	2	24	11	0	0	-	37	86
% Buses	1.5	2.4	0.0	0.0	-	-	1.9	1.0	1.1	0.0	0.0	-	-	0.9	0.0	0.9	2.6	0.0	-	-	1.1	2.7	1.4	2.1	0.0	0.0	-	1.6	1.4
Trucks	33	12	0	0	0	-	45	3	6	4	2	0	-	15	2	46	3	0	0	-	51	2	36	15	0	0	-	53	164
% Trucks	4.5	2.7	0.0	0.0	-	-	3.8	3.1	1.6	4.7	6.1	-	-	2.6	12.5	2.6	1.6	0.0	-	-	2.5	2.7	2.1	2.9	0.0	0.0	-	2.3	2.7
Bicycles on Crosswalk	-	-	-	-	-	6	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	13.0	-	-	-	-	-	-	1.7	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	40	-	-	-	-	-	-	57	-	-	-	-	-	-	5	-	-	-	-	-	-	15	-	-
% Pedestrians	-	-	-	-	-	87.0	-	-	-	-	-	-	98.3	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-



Turning Movement Data Plot

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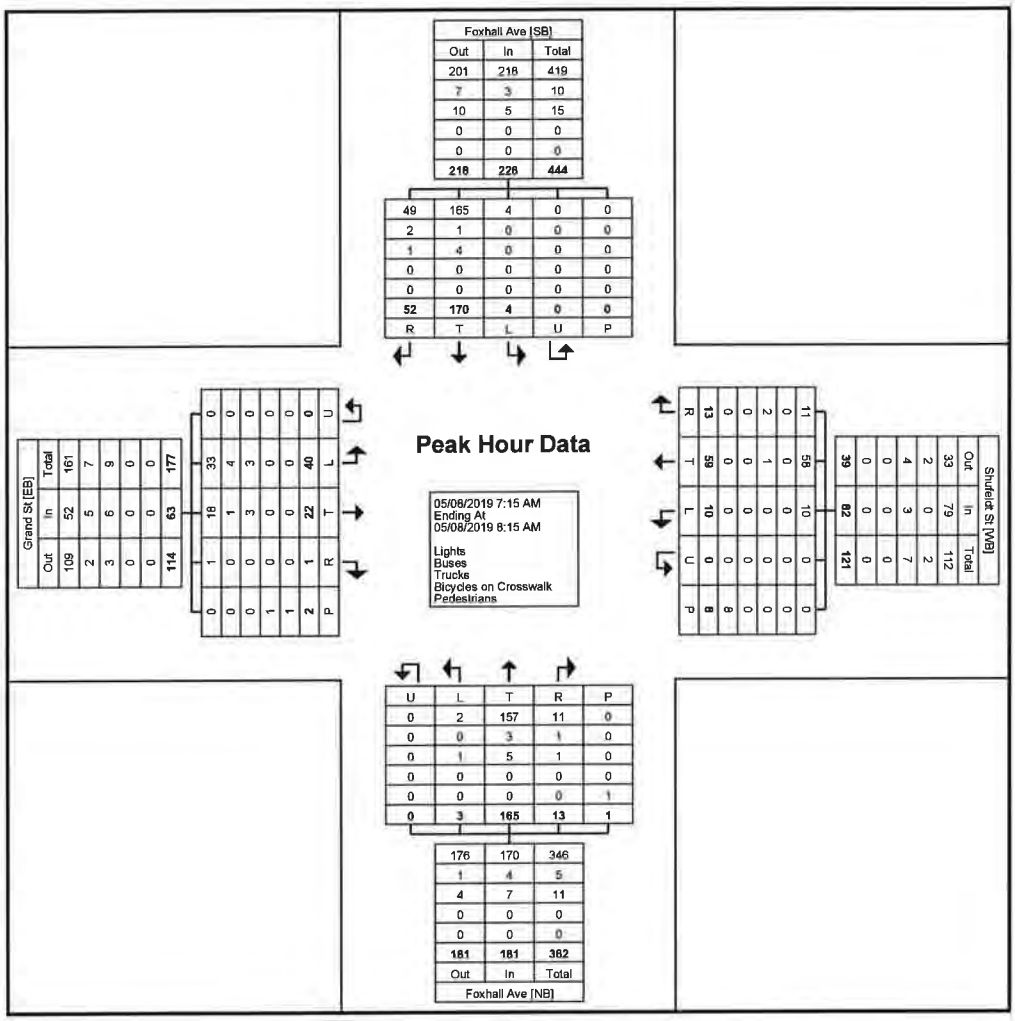
Kingston, NY
Foxhall Ave & Grand St
Wednesday, May 8, 2019
Location: 41.932312, -73.996235

Count Name: Foxhall Ave & Grand St & Shufeldt St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Grand St Eastbound							Shufeldt St Westbound							Foxhall Ave Northbound							Foxhall Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:15 AM	12	2	0	0	0	1	14	3	20	0	0	0	6	23	1	36	4	0	0	0	41	3	53	13	0	0	0	69	147
7:30 AM	11	8	0	0	0	1	19	4	15	1	1	0	2	21	1	53	2	0	0	0	56	0	48	16	0	0	0	64	160
7:45 AM	9	7	0	0	0	0	16	3	14	6	0	0	0	23	0	47	3	0	0	1	50	1	40	16	1	0	0	58	147
8:00 AM	8	5	1	0	0	0	14	0	10	3	2	0	0	15	1	29	4	0	0	0	34	0	29	6	0	0	0	35	98
Total	40	22	1	0	0	2	63	10	59	10	3	0	8	82	3	165	13	0	0	1	181	4	170	51	1	0	0	226	552
Approach %	63.5	34.9	1.6	0.0	0.0	-	-	12.2	72.0	12.2	3.7	0.0	-	-	1.7	91.2	7.2	0.0	0.0	-	-	1.8	75.2	22.6	0.4	0.0	-	-	-
Total %	7.2	4.0	0.2	0.0	0.0	-	11.4	1.8	10.7	1.8	0.5	0.0	-	14.9	0.5	29.9	2.4	0.0	0.0	-	32.8	0.7	30.8	9.2	0.2	0.0	-	40.9	-
PHF	0.833	0.688	0.250	0.000	0.000	-	0.829	0.625	0.738	0.417	0.375	0.000	-	0.891	0.750	0.778	0.813	0.000	0.000	-	0.808	0.333	0.802	0.797	0.250	0.000	-	0.819	0.863
Lights	33	18	1	0	0	-	52	10	58	8	3	0	-	79	2	157	11	0	0	-	170	4	165	48	1	0	-	218	519
% Lights	82.5	81.8	100.0	-	-	-	82.5	100.0	98.3	80.0	100.0	-	-	96.3	66.7	95.2	84.6	-	-	-	93.9	100.0	97.1	94.1	100.0	-	-	96.5	94.0
Buses	4	1	0	0	0	-	5	0	0	0	0	0	-	0	0	3	1	0	0	-	4	0	1	2	0	0	-	3	12
% Buses	10.0	4.5	0.0	-	-	-	7.9	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.8	7.7	-	-	-	2.2	0.0	0.6	3.9	0.0	-	-	1.3	2.2
Trucks	3	3	0	0	0	-	6	0	1	2	0	0	-	3	1	5	1	0	0	-	7	0	4	1	0	0	-	5	21
% Trucks	7.5	13.6	0.0	-	-	-	9.5	0.0	1.7	20.0	0.0	-	-	3.7	33.3	3.0	7.7	-	-	-	3.9	0.0	2.4	2.0	0.0	-	-	2.2	3.8
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	50.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	8	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	50.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-



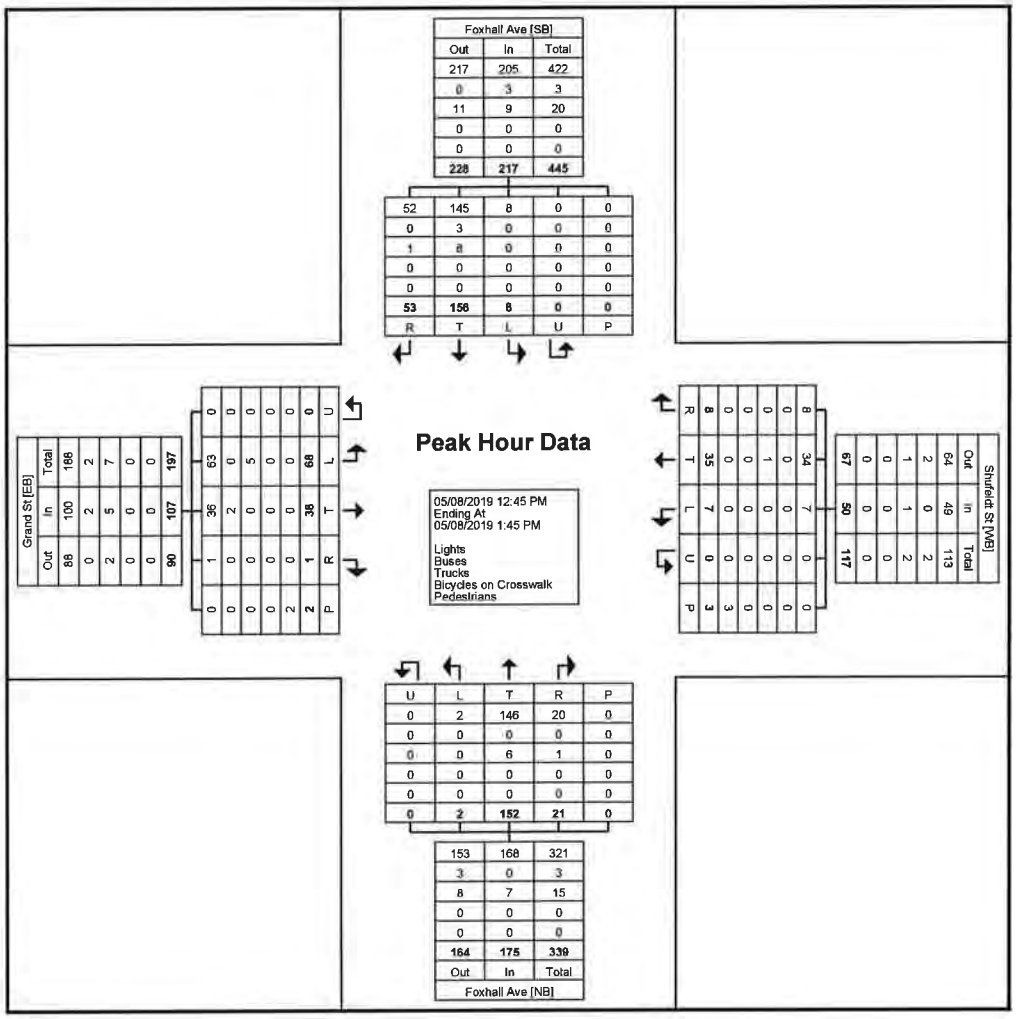
Turning Movement Peak Hour Data Plot (7:15 AM)

Kingston, NY
Foxhall Ave & Grand St
Wednesday, May 8, 2019
Location: 41.932312, -73.996235

Count Name: Foxhall Ave & Grand St & Shufeldt St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (12:45 PM)

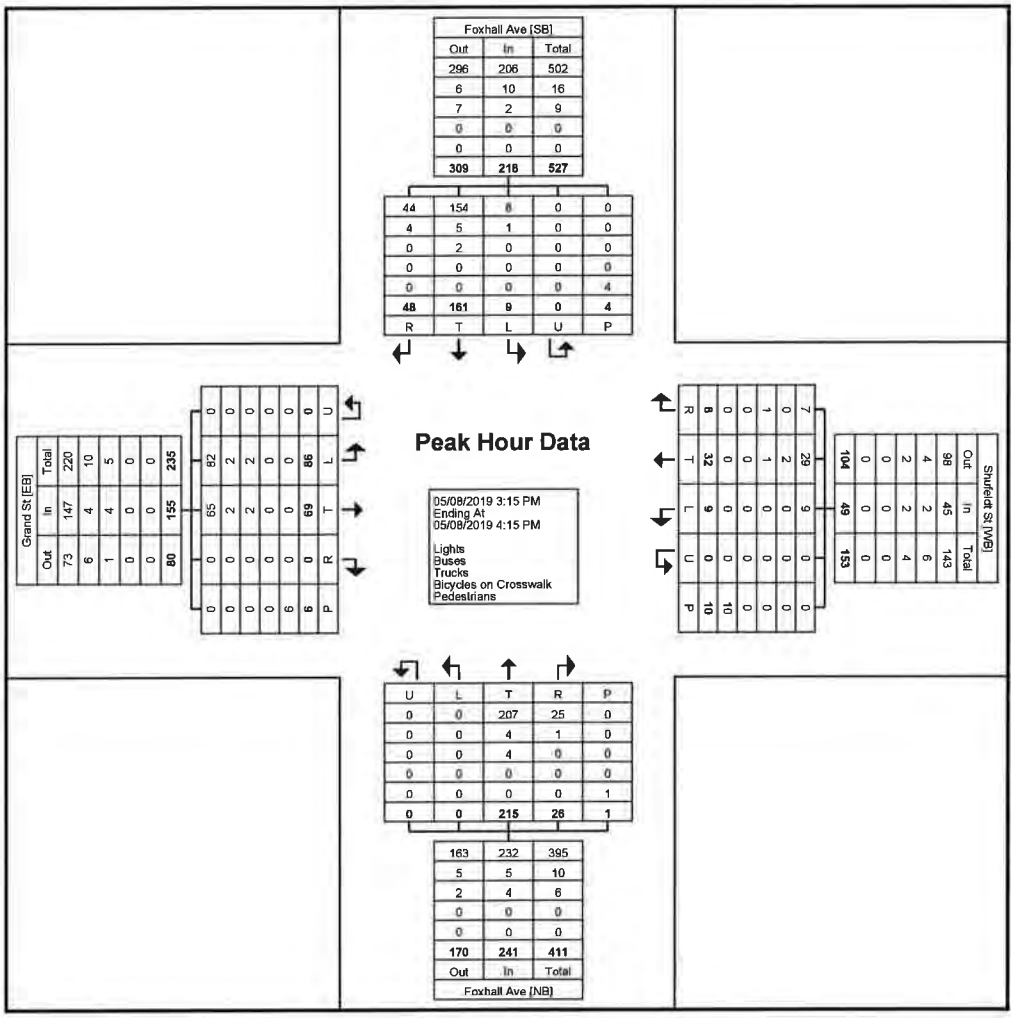
Start Time	Grand St Eastbound							Shufeldt St Westbound							Foxhall Ave Northbound							Foxhall Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
12:45 PM	18	11	0	0	0	1	29	1	9	1	0	0	1	11	1	41	4	0	0	0	46	2	43	10	0	0	0	55	141
1:00 PM	9	11	1	0	0	1	21	0	7	1	1	0	1	9	1	27	4	0	0	0	32	2	37	19	0	0	0	58	120
1:15 PM	16	7	0	0	0	0	23	4	11	2	0	0	0	17	0	44	7	1	0	0	52	1	38	14	0	0	0	53	145
1:30 PM	25	9	0	0	0	0	34	2	8	3	0	0	1	13	0	40	4	1	0	0	45	3	38	10	0	0	0	51	143
Total	68	38	1	0	0	2	107	7	35	7	1	0	3	50	2	152	19	2	0	0	175	8	156	53	0	0	0	217	549
Approach %	63.6	35.5	0.9	0.0	0.0	-	-	14.0	70.0	14.0	2.0	0.0	-	-	1.1	86.9	10.9	1.1	0.0	-	-	3.7	71.9	24.4	0.0	0.0	-	-	-
Total %	12.4	6.9	0.2	0.0	0.0	-	19.5	1.3	6.4	1.3	0.2	0.0	-	9.1	0.4	27.7	3.5	0.4	0.0	-	31.9	1.5	28.4	9.7	0.0	0.0	-	39.5	-
PHF	0.680	0.864	0.250	0.000	0.000	-	0.787	0.438	0.795	0.583	0.250	0.000	-	0.735	0.500	0.864	0.679	0.500	0.000	-	0.841	0.667	0.907	0.697	0.000	0.000	-	0.935	0.947
Lights	63	36	1	0	0	-	100	7	34	7	1	0	-	49	2	146	18	2	0	-	168	8	145	52	0	0	-	205	522
% Lights	92.6	94.7	100.0	-	-	-	93.5	100.0	97.1	100.0	100.0	-	-	98.0	100.0	96.1	94.7	100.0	-	-	96.0	100.0	92.9	98.1	-	-	-	94.5	95.1
Buses	0	2	0	0	0	-	2	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	3	0	0	0	-	3	5
% Buses	0.0	5.3	0.0	-	-	-	1.9	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.9	0.0	-	-	-	1.4	0.9
Trucks	5	0	0	0	0	-	5	0	1	0	0	0	-	1	0	6	1	0	0	-	7	0	8	1	0	0	-	9	22
% Trucks	7.4	0.0	0.0	-	-	-	4.7	0.0	2.9	0.0	0.0	-	-	2.0	0.0	3.9	5.3	0.0	-	-	4.0	0.0	5.1	1.9	-	-	-	4.1	4.0
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	-	3	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (12:45 PM)

Turning Movement Peak Hour Data (3:15 PM)

Start Time	Grand St Eastbound							Shufeldt St Westbound							Foxhall Ave Northbound							Foxhall Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
3:15 PM	23	14	0	0	0	0	37	5	8	0	0	0	2	13	0	54	5	0	0	0	59	1	49	14	0	0	0	64	173
3:30 PM	12	18	0	0	0	4	30	3	9	3	2	0	4	17	0	61	9	0	0	1	70	2	39	9	0	0	2	50	167
3:45 PM	24	14	0	0	0	1	38	1	8	2	1	0	3	12	0	45	5	0	0	0	50	3	41	11	0	0	1	55	155
4:00 PM	27	23	0	0	0	1	50	0	7	0	0	0	1	7	0	55	7	0	0	0	62	3	32	14	0	0	1	49	168
Total	86	69	0	0	0	6	155	9	32	5	3	0	10	49	0	215	26	0	0	1	241	9	161	48	0	0	4	218	663
Approach %	55.5	44.5	0.0	0.0	0.0	-	-	18.4	65.3	10.2	6.1	0.0	-	-	0.0	89.2	10.8	0.0	0.0	-	-	4.1	73.9	22.0	0.0	0.0	-	-	-
Total %	13.0	10.4	0.0	0.0	0.0	-	23.4	1.4	4.8	0.8	0.5	0.0	-	7.4	0.0	32.4	3.9	0.0	0.0	-	36.3	1.4	24.3	7.2	0.0	0.0	-	32.9	-
PHF	0.796	0.750	0.000	0.000	0.000	-	0.775	0.450	0.889	0.417	0.375	0.000	-	0.721	0.000	0.881	0.722	0.000	0.000	-	0.861	0.750	0.821	0.857	0.000	0.000	-	0.852	0.958
Lights	82	65	0	0	0	-	147	9	29	4	3	0	-	45	0	207	25	0	0	-	232	8	154	44	0	0	-	206	630
% Lights	95.3	94.2	-	-	-	-	94.8	100.0	90.6	80.0	100.0	-	-	91.8	-	96.3	96.2	-	-	-	96.3	88.9	95.7	91.7	-	-	-	94.5	95.0
Buses	2	2	0	0	0	-	4	0	2	0	0	0	-	2	0	4	1	0	0	-	5	1	5	4	0	0	-	10	21
% Buses	2.3	2.9	-	-	-	-	2.6	0.0	6.3	0.0	0.0	-	-	4.1	-	1.9	3.8	-	-	-	2.1	11.1	3.1	8.3	-	-	-	4.6	3.2
Trucks	2	2	0	0	0	-	4	0	1	1	0	0	-	2	0	4	0	0	0	-	4	0	2	0	0	0	-	2	12
% Trucks	2.3	2.9	-	-	-	-	2.6	0.0	3.1	20.0	0.0	-	-	4.1	-	1.9	0.0	-	-	-	1.7	0.0	1.2	0.0	-	-	-	0.9	1.8
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	6	-	-	-	-	-	-	10	-	-	-	-	-	-	1	-	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (3:15 PM)

Kingston, NY
Foxhall Ave & Grand St
Wednesday, May 8, 2019
Location: 41.932312, -73.996235

Count Name: Foxhall Ave & Grand St & Shufeldt St
Site Code:
Start Date: 05/08/2019
Page No: 10

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Kingston, NY
E.Chester St & Lincoln St
Wednesday, May 8, 2019
Location: 41.936876, -73.985628

Count Name: E Chester St & Lincoln St
Site Code:
Start Date: 05/08/2019

Turning Movement Data

Start Time	Lincoln St Eastbound							Lincoln St Westbound							E Chester St Northbound							E Chester St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	0	1	0	1	0	0	2	1	4	1	0	0	0	6	0	25	0	0	0	2	25	0	25	0	0	0	0	25	58
7:15 AM	2	1	1	1	0	0	5	5	13	6	1	0	0	25	1	32	2	0	0	0	35	4	56	1	0	0	0	61	126
7:30 AM	1	1	1	0	0	0	3	8	3	5	0	0	1	16	0	48	1	1	0	0	50	3	62	2	0	0	0	67	136
7:45 AM	1	2	0	2	0	0	5	2	9	10	2	0	0	23	1	52	3	0	0	0	56	5	54	2	2	0	0	63	147
Hourly Total	4	5	2	4	0	0	15	16	29	22	3	0	1	70	2	157	6	1	0	2	166	12	197	5	2	0	0	216	467
8:00 AM	0	2	0	0	0	0	2	2	1	5	3	0	0	11	3	44	0	0	0	0	47	6	33	2	0	0	0	41	101
8:15 AM	3	4	0	0	0	0	7	0	2	9	1	0	0	12	2	36	0	0	0	0	38	1	34	0	0	0	0	35	92
8:30 AM	0	2	1	2	0	0	5	0	7	10	2	0	0	19	2	42	1	0	0	0	45	4	40	1	0	0	0	45	114
8:45 AM	4	2	1	1	0	1	8	4	8	7	4	0	0	23	0	31	0	0	0	0	31	6	31	1	0	0	0	38	100
Hourly Total	7	10	2	3	0	1	22	6	18	31	10	0	0	65	7	153	1	0	0	0	161	17	138	4	0	0	0	159	407
9:00 AM	1	1	0	3	0	0	5	1	0	4	0	0	3	5	1	36	2	0	0	0	39	1	26	1	1	0	0	29	78
9:15 AM	0	4	2	0	0	0	6	0	3	4	3	0	0	10	1	30	0	0	0	0	31	4	37	0	0	0	0	41	88
9:30 AM	1	2	1	0	0	0	4	1	1	5	1	0	0	8	0	32	1	0	0	0	33	3	41	0	0	0	0	44	89
9:45 AM	2	5	1	0	0	0	8	2	0	1	3	0	0	6	0	39	2	0	0	0	41	4	42	2	0	0	0	48	103
Hourly Total	4	12	4	3	0	0	23	4	4	14	7	0	3	29	2	137	5	0	0	0	144	12	146	3	1	0	0	162	358
10:00 AM	2	2	1	0	0	0	5	1	3	5	1	0	0	10	0	39	2	0	0	0	41	6	45	0	0	0	0	51	107
10:15 AM	1	1	0	1	0	0	3	1	2	7	0	0	0	10	2	40	1	0	0	0	43	6	37	1	0	0	0	44	100
10:30 AM	2	1	1	0	0	0	4	2	2	5	0	0	0	9	1	34	0	0	0	0	35	4	25	0	0	0	0	29	77
10:45 AM	1	3	1	0	0	0	5	1	2	2	2	0	0	7	3	34	0	0	0	0	37	4	34	0	0	0	0	38	87
Hourly Total	6	7	3	1	0	0	17	5	9	19	3	0	0	36	6	147	3	0	0	0	156	20	141	1	0	0	0	162	371
11:00 AM	1	1	1	0	0	0	3	1	2	3	1	0	0	7	1	36	0	0	0	0	37	7	49	0	0	0	0	56	103
11:15 AM	1	1	1	0	0	0	3	2	3	2	0	0	0	7	2	51	0	0	0	0	53	0	52	1	0	0	0	53	116
11:30 AM	4	3	2	0	0	0	9	6	2	4	3	0	0	15	5	55	0	1	0	0	61	7	37	0	0	0	0	44	129
11:45 AM	2	0	2	0	0	0	4	0	2	6	3	0	0	11	1	46	3	0	0	0	50	4	43	5	0	0	0	52	117
Hourly Total	8	5	6	0	0	0	19	9	9	15	7	0	0	40	9	188	3	1	0	0	201	18	181	6	0	0	0	205	465
12:00 PM	3	1	2	1	0	0	7	1	3	6	2	0	2	12	2	45	0	1	0	0	48	4	44	1	0	0	0	49	116
12:15 PM	2	2	0	0	0	0	4	3	3	2	1	0	0	9	2	50	2	0	0	0	54	9	57	1	1	0	1	68	135
12:30 PM	3	4	0	0	0	0	7	2	4	2	2	0	0	10	2	35	1	0	0	2	38	11	43	1	0	0	0	55	110
12:45 PM	2	5	0	1	0	0	8	0	5	9	0	0	1	14	0	50	4	0	0	0	54	8	50	1	0	0	0	59	135
Hourly Total	10	12	2	2	0	0	26	6	15	19	5	0	3	45	6	180	7	1	0	2	194	32	194	4	1	0	1	231	496
1:00 PM	0	1	1	0	0	0	2	0	6	2	1	0	0	9	1	40	2	0	0	0	43	7	51	3	1	0	0	62	116
1:15 PM	1	0	1	1	0	0	3	0	5	0	0	0	3	5	3	41	1	1	0	0	46	15	39	4	0	0	0	58	112
1:30 PM	2	0	2	1	0	0	5	2	8	2	2	0	0	14	4	35	2	0	0	1	41	5	47	0	0	0	0	52	112
1:45 PM	1	2	1	3	0	0	7	2	3	3	4	0	0	12	0	34	0	0	0	0	34	8	48	0	0	0	0	56	109
Hourly Total	4	3	5	5	0	0	17	4	22	7	7	0	3	40	8	150	5	1	0	1	164	35	185	7	1	0	0	228	449
2:00 PM	2	3	2	1	0	0	8	2	1	2	1	0	0	6	0	53	0	2	0	4	55	2	54	0	0	0	0	56	125
2:15 PM	4	5	1	0	0	0	10	1	5	3	4	0	0	13	2	59	3	1	0	0	65	5	54	2	1	0	0	62	150
2:30 PM	1	0	0	0	0	0	1	1	5	3	8	0	0	17	3	52	2	0	0	0	57	10	48	2	0	0	0	60	135
2:45 PM	5	4	1	0	0	0	10	2	3	1	6	0	0	12	0	65	3	1	0	0	69	8	47	8	0	0	0	63	154
Hourly Total	12	12	4	1	0	0	29	6	14	9	19	0	0	48	5	229	8	4	0	4	246	25	203	12	1	0	0	241	564
3:00 PM	1	5	1	1	0	0	8	1	7	8	0	0	0	16	1	60	0	0	1	0	62	2	48	0	0	0	0	50	136
3:15 PM	0	3	4	0	0	0	7	0	4	11	0	0	0	15	1	57	1	0	0	0	59	10	46	1	0	0	0	57	138
3:30 PM	4	4	0	2	0	0	10	1	3	10	0	0	1	14	3	55	1	0	0	0	59	5	68	6	0	0	0	79	162
3:45 PM	2	3	1	0	0	0	6	2	2	7	0	0	1	11	1	69	3	0	0	1	73	12	49	2	1	0	1	64	154
Hourly Total	7	15	6	3	0	0	31	4	16	36	0	0	2	56	6	241	5	0	1	1	253	29	211	9	1	0	1	250	590
4:00 PM	3	3	2	0	0	0	8	2	1	6	2	0	0	11	4	58	1	0	0	0	63	11	54	0	0	0	0	65	147
4:15 PM	4	4	0	0	0	0	8	2	5	3	2	0	0	12	2	63	1	0	0	0	66	13	61	3	0	0	0	77	163
4:30 PM	2	7	0	0	0	0	9	1	3	6	0	0	0	10	0	68	3	0	0	0	71	7	57	2	0	0	0	66	156
4:45 PM	0	5	0	1	0	0	6	1	4	9	1	0	0	15	0	58	2	1	0	0	61	9	66	1	0	0	0	76	158
Hourly Total	9	19	2	1	0	0	31	6	13	24	5	0	0	48	6	247	7	1	0	0	261	40	238	6	0	0	0	284	624
5:00 PM	2	3	2	1	0	0	8	5	2	3	2	0	0	12	2	68	2	0	0	0	72	16	80	3	0	0	0	99	191
5:15 PM	3	3	0	2	0	0	8	1	2	4	3	0	0	10	2	53	1	0	0	0	56	7	51	4	0	0	0	62	136
5:30 PM	3	4	1	0	0	0	8	2	3	7	2	0	0	14	3	54	1	0	0	0	58	9	57	0	0	0	0	66	146
5:45 PM	0	3	4	0	0	0	7	2	3	8	4	0	1	17	0	61	0	1	0	0	62	8	63	4	2	0	0	77	163
Hourly Total	8	13	7	3	0	0	31	10	10	22	11	0	1	53	7	236	4	1	0	0	248	40	251	11	2	0	0	304	636
6:00 PM	3	4	0	1	0	0	8	3	2	7	4	0	1	16	5	38	2	0	0	0	45	9	65	1	2	0	0	77	146
6:15 PM	5	3	1	1	0	0	10	0	5	3	2	0	0	10	2	34	4	0	0	1	40	5	48	0	1	0	0	54	114
6:30 PM	1	3	2	1	0	0	7	3	4	5	0	0	0	12	0	29	1	0	0	0	30	8	55	4	0	0	0	67	116
6:45 PM	2	2	2	0	0	0	6	4	1	2	2	0	0	9	1	37	3	0	0	0	41	4	51	1	0	0	0	56	112
Hourly Total	11	12	5	3	0	0	31	10	12	17	8	0	1	47	8	138	10	0	0	1	156	26	219	6	3	0	0	254	488

Grand Total	90	125	48	29	0	1	292	86	171	235	85	0	14	577	72	2203	64	10	1	11	2350	306	2304	74	12	0	2	2696	5915
Approach %	30.8	42.8	16.4	9.9	0.0	-	-	14.9	29.6	40.7	14.7	0.0	-	-	3.1	93.7	2.7	0.4	0.0	-	-	11.4	85.5	2.7	0.4	0.0	-	-	-
Total %	1.5	2.1	0.8	0.5	0.0	-	4.9	1.5	2.9	4.0	1.4	0.0	-	9.8	1.2	37.2	1.1	0.2	0.0	-	39.7	5.2	39.0	1.3	0.2	0.0	-	45.6	-
Lights	88	122	47	29	0	-	286	79	170	226	81	0	-	556	68	2140	61	10	1	-	2280	297	2215	68	12	0	-	2592	5714
% Lights	97.8	97.6	97.9	100.0	-	-	97.9	91.9	99.4	96.2	95.3	-	-	96.4	94.4	97.1	95.3	100.0	100.0	-	97.0	97.1	96.1	91.9	100.0	-	-	96.1	96.6
Buses	0	2	1	0	0	-	3	3	1	7	4	0	-	15	1	32	2	0	0	-	35	5	48	3	0	0	-	56	109
% Buses	0.0	1.6	2.1	0.0	-	-	1.0	3.5	0.6	3.0	4.7	-	-	2.6	1.4	1.5	3.1	0.0	0.0	-	1.5	1.6	2.1	4.1	0.0	-	-	2.1	1.8
Trucks	2	1	0	0	0	-	3	4	0	2	0	0	-	6	3	31	1	0	0	-	35	4	41	3	0	0	-	48	92
% Trucks	2.2	0.8	0.0	0.0	-	-	1.0	4.7	0.0	0.9	0.0	-	-	1.0	4.2	1.4	1.6	0.0	0.0	-	1.5	1.3	1.8	4.1	0.0	-	-	1.8	1.6
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	3	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	21.4	-	-	-	-	-	-	18.2	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	11	-	-	-	-	-	-	9	-	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	78.6	-	-	-	-	-	-	81.8	-	-	-	-	-	-	100.0	-	-

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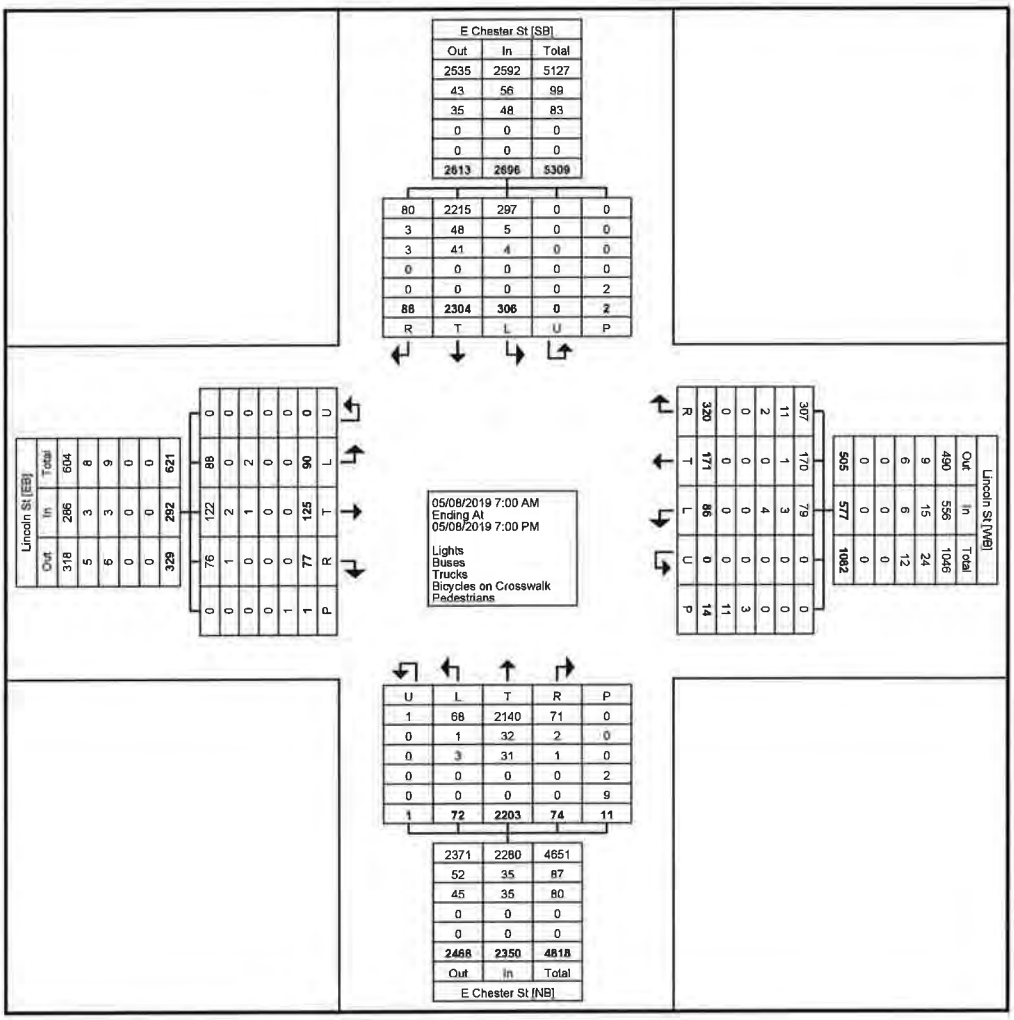


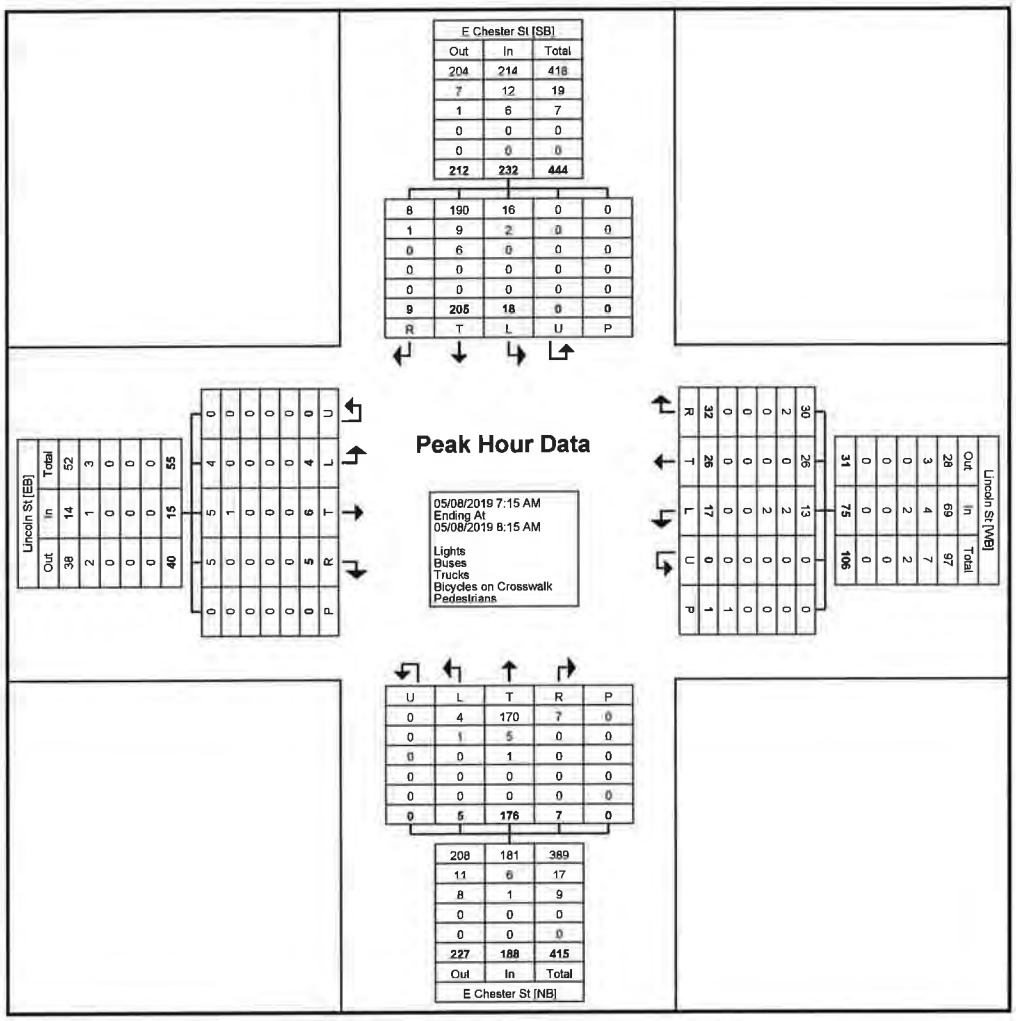
Turning Movement Data Plot

Kingston, NY
E.Chester St & Lincoln St
Wednesday, May 8, 2019
Location: 41.936876, -73.985628

Count Name: E Chester St & Lincoln St
Site Code:
Start Date: 05/08/2019
Page No: 4

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Lincoln St Eastbound							Lincoln St Westbound							E Chester St Northbound							E Chester St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:15 AM	2	1	1	1	0	0	5	5	13	6	1	0	0	25	1	32	2	0	0	0	35	4	56	1	0	0	0	61	126
7:30 AM	1	1	1	0	0	0	3	8	3	5	0	0	1	16	0	48	1	1	0	0	50	3	62	2	0	0	0	67	136
7:45 AM	1	2	0	2	0	0	5	2	9	10	2	0	0	23	1	52	3	0	0	0	56	5	54	2	2	0	0	63	147
8:00 AM	0	2	0	0	0	0	2	2	1	5	3	0	0	11	3	44	0	0	0	0	47	6	33	2	0	0	0	41	101
Total	4	6	2	3	0	0	15	17	26	26	6	0	1	75	5	176	6	1	0	0	188	18	205	7	2	0	0	232	510
Approach %	26.7	40.0	13.3	20.0	0.0	-	-	22.7	34.7	34.7	8.0	0.0	-	-	2.7	93.6	3.2	0.5	0.0	-	-	7.8	88.4	3.0	0.9	0.0	-	-	-
Total %	0.8	1.2	0.4	0.6	0.0	-	2.9	3.3	5.1	5.1	1.2	0.0	-	14.7	1.0	34.5	1.2	0.2	0.0	-	36.9	3.5	40.2	1.4	0.4	0.0	-	45.5	-
PHF	0.500	0.750	0.500	0.375	0.000	-	0.750	0.531	0.500	0.650	0.500	0.000	-	0.750	0.417	0.846	0.500	0.250	0.000	-	0.839	0.750	0.827	0.875	0.250	0.000	-	0.866	0.867
Lights	4	5	2	3	0	-	14	13	26	24	6	0	-	69	4	170	6	1	0	-	181	16	190	6	2	0	-	214	478
% Lights	100.0	83.3	100.0	100.0	-	-	93.3	76.5	100.0	92.3	100.0	-	-	92.0	80.0	96.6	100.0	100.0	-	-	96.3	88.9	92.7	85.7	100.0	-	-	92.2	93.7
Buses	0	1	0	0	0	-	1	2	0	2	0	0	-	4	1	5	0	0	0	-	6	2	9	1	0	0	-	12	23
% Buses	0.0	16.7	0.0	0.0	-	-	6.7	11.8	0.0	7.7	0.0	-	-	5.3	20.0	2.8	0.0	0.0	-	-	3.2	11.1	4.4	14.3	0.0	-	-	5.2	4.5
Trucks	0	0	0	0	0	-	0	2	0	0	0	0	-	2	0	1	0	0	0	-	1	0	6	0	0	0	-	6	9
% Trucks	0.0	0.0	0.0	0.0	-	-	0.0	11.8	0.0	0.0	0.0	-	-	2.7	0.0	0.6	0.0	0.0	-	-	0.5	0.0	2.9	0.0	0.0	-	-	2.6	1.8
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (7:15 AM)

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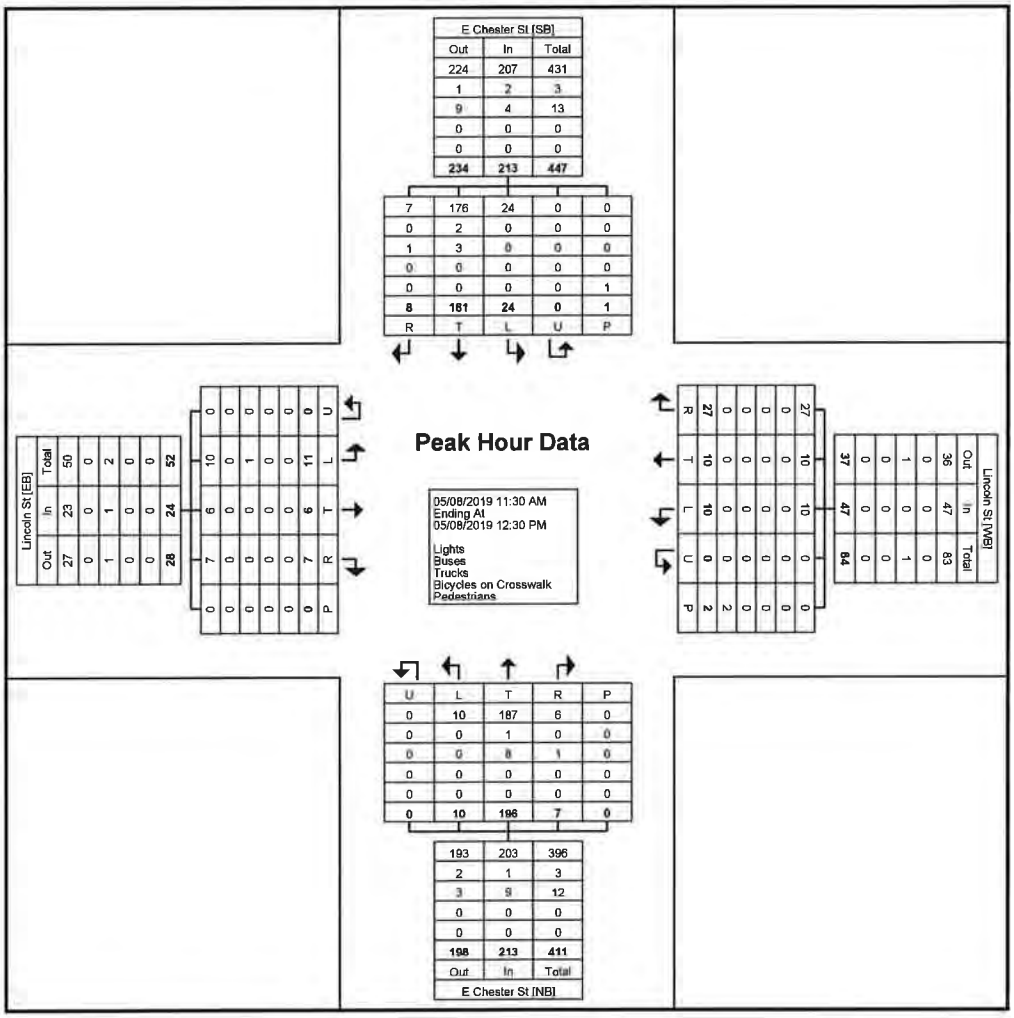
Kingston, NY
E.Chester St & Lincoln St
Wednesday, May 8, 2019
Location: 41.936876, -73.985628

Count Name: E Chester St & Lincoln St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (11:30 AM)

Start Time	Lincoln St Eastbound							Lincoln St Westbound							E Chester St Northbound							E Chester St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
11:30 AM	4	3	2	0	0	0	9	6	2	4	3	0	0	15	5	55	0	1	0	0	61	7	37	0	0	0	0	44	129
11:45 AM	2	0	2	0	0	0	4	0	2	6	3	0	0	11	1	46	3	0	0	0	50	4	43	5	0	0	0	52	117
12:00 PM	3	1	2	1	0	0	7	1	3	6	2	0	2	12	2	45	0	1	0	0	48	4	44	1	0	0	0	49	116
12:15 PM	2	2	0	0	0	0	4	3	3	2	1	0	0	9	2	50	2	0	0	0	54	9	57	1	1	0	1	68	135
Total	11	6	6	1	0	0	24	10	10	18	9	0	2	47	10	196	5	2	0	0	213	24	181	7	1	0	1	213	497
Approach %	45.8	25.0	25.0	4.2	0.0	-	-	21.3	21.3	38.3	19.1	0.0	-	-	4.7	92.0	2.3	0.9	0.0	-	-	11.3	85.0	3.3	0.5	0.0	-	-	-
Total %	2.2	1.2	1.2	0.2	0.0	-	4.8	2.0	2.0	3.6	1.8	0.0	-	9.5	2.0	39.4	1.0	0.4	0.0	-	42.9	4.8	36.4	1.4	0.2	0.0	-	42.9	-
PHF	0.688	0.500	0.750	0.250	0.000	-	0.667	0.417	0.833	0.750	0.750	0.000	-	0.783	0.500	0.891	0.417	0.500	0.000	-	0.873	0.667	0.794	0.350	0.250	0.000	-	0.783	0.920
Lights	10	6	6	1	0	-	23	10	10	18	9	0	-	47	10	187	4	2	0	-	203	24	176	6	1	0	-	207	480
% Lights	90.9	100.0	100.0	100.0	-	-	95.8	100.0	100.0	100.0	100.0	-	-	100.0	100.0	95.4	80.0	100.0	-	-	95.3	100.0	97.2	85.7	100.0	-	-	97.2	96.6
Buses	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	1	0	0	0	-	1	0	2	0	0	0	-	2	3
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	0.0	-	-	0.5	0.0	1.1	0.0	0.0	-	-	0.9	0.6
Trucks	1	0	0	0	0	-	1	0	0	0	0	0	-	0	0	8	1	0	0	-	9	0	3	1	0	0	-	4	14
% Trucks	9.1	0.0	0.0	0.0	-	-	4.2	0.0	0.0	0.0	0.0	-	-	0.0	0.0	4.1	20.0	0.0	-	-	4.2	0.0	1.7	14.3	0.0	-	-	1.9	2.8
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (11:30 AM)

TRI-STATE TRAFFIC DATA
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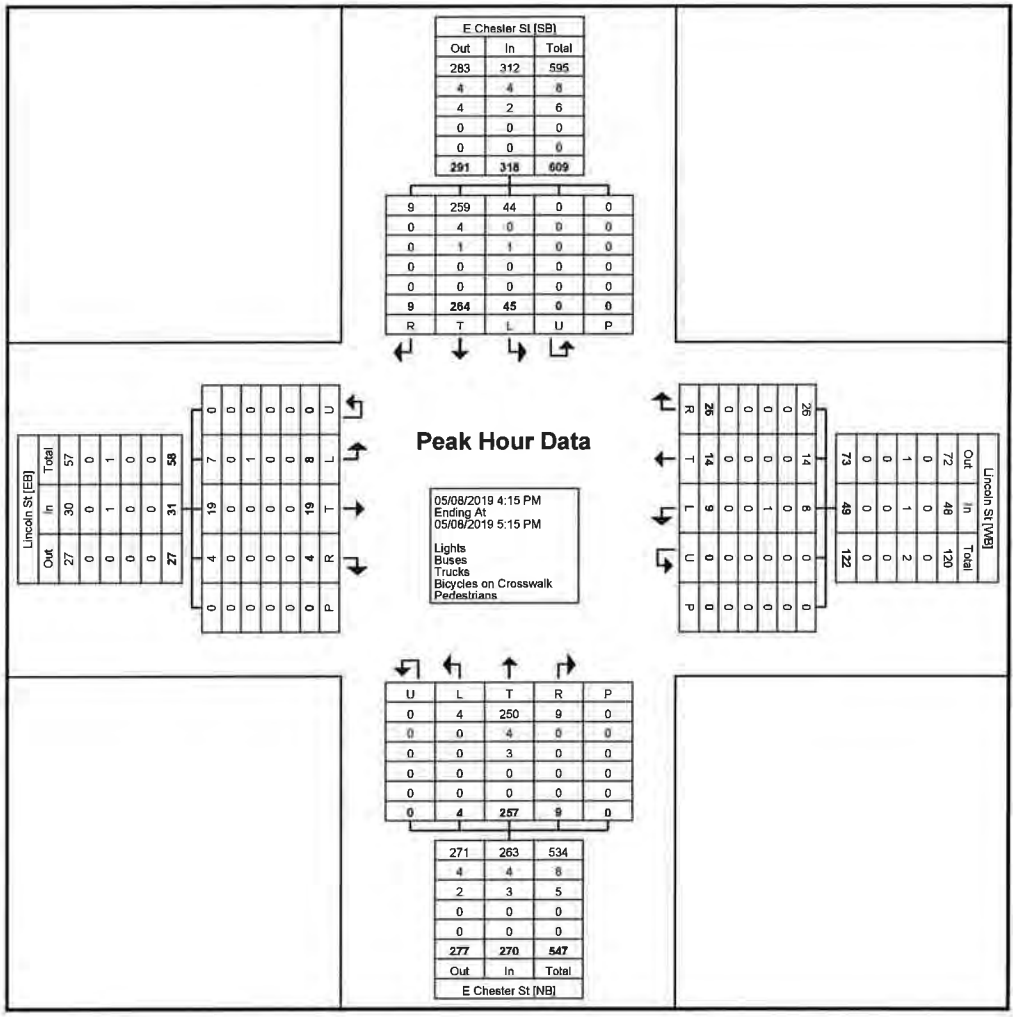
Kingston, NY
E.Chester St & Lincoln St
Wednesday, May 8, 2019
Location: 41.936876, -73.985628

Count Name: E Chester St & Lincoln St
Site Code:
Start Date: 05/08/2019

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Lincoln St Eastbound							Lincoln St Westbound							E Chester St Northbound							E Chester St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:15 PM	4	4	0	0	0	0	8	2	5	3	2	0	0	12	2	63	1	0	0	0	66	13	61	3	0	0	0	77	163
4:30 PM	2	7	0	0	0	0	9	1	3	6	0	0	0	10	0	68	3	0	0	0	71	7	57	2	0	0	0	66	156
4:45 PM	0	5	0	1	0	0	6	1	4	9	1	0	0	15	0	58	2	1	0	0	61	9	66	1	0	0	0	76	158
5:00 PM	2	3	2	1	0	0	8	5	2	3	2	0	0	12	2	68	2	0	0	0	72	16	80	3	0	0	0	99	191
Total	8	19	2	2	0	0	31	9	14	21	5	0	0	49	4	257	8	1	0	0	270	45	264	9	0	0	0	318	668
Approach %	25.8	61.3	6.5	6.5	0.0	-	-	18.4	28.6	42.9	10.2	0.0	-	-	1.5	95.2	3.0	0.4	0.0	-	-	14.2	83.0	2.8	0.0	0.0	-	-	-
Total %	1.2	2.8	0.3	0.3	0.0	-	4.6	1.3	2.1	3.1	0.7	0.0	-	7.3	0.6	38.5	1.2	0.1	0.0	-	40.4	6.7	39.5	1.3	0.0	0.0	-	47.6	-
PHF	0.500	0.679	0.250	0.500	0.000	-	0.861	0.450	0.700	0.583	0.625	0.000	-	0.817	0.500	0.945	0.667	0.250	0.000	-	0.938	0.703	0.825	0.750	0.000	0.000	-	0.803	0.874
Lights	7	19	2	2	0	-	30	8	14	21	5	0	-	48	4	250	8	1	0	-	263	44	259	9	0	0	-	312	653
% Lights	87.5	100.0	100.0	100.0	-	-	96.8	88.9	100.0	100.0	100.0	-	-	98.0	100.0	97.3	100.0	100.0	-	-	97.4	97.8	98.1	100.0	-	-	-	98.1	97.8
Buses	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	4	0	0	0	-	4	0	4	0	0	0	-	4	8
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.6	0.0	0.0	-	-	1.5	0.0	1.5	0.0	-	-	-	1.3	1.2
Trucks	1	0	0	0	0	-	1	1	0	0	0	0	-	1	0	3	0	0	0	-	3	1	1	0	0	0	-	2	7
% Trucks	12.5	0.0	0.0	0.0	-	-	3.2	11.1	0.0	0.0	0.0	-	-	2.0	0.0	1.2	0.0	0.0	-	-	1.1	2.2	0.4	0.0	-	-	-	0.6	1.0
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (4:15 PM)

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Attachment M
Accident Summary

Traffic Signal Removal Assessment
City of Kingston, New York

STUDY NO.: 118-064 P.I.N. INVENTORY NO.	ROUTE NO. or STREET NAME: VARIOUS AT INTERSECTION WITH / OR BETWEEN: VARIOUS	COUNTY: ULSTER MUNICIPALITY: C/O KINGSTON BY: MDN DATE: 06/19/2019

NO. OF MONTHS 36 Begin Date: 6/1/2015 End Date: 5/31/2018	LIGHT CONDITIONS (LC) 1. Daylight 2. Dawn 3. Dusk 4. Dark Road Lighted 5. Dark Road Unlighted	ROADWAY CHARACTER (RC) 1. Straight & Level 2. Straight & Grade 3. Straight at Hillcrest 4. Curve & Level 5. Curve & Grade 6. Curve at Hillcrest	ROADWAY SURFACE CONDITION (RSC) 1. Dry 2. Wet 3. Muddy 4. Snow/Ice 5. Slush 10. Other	WEATHER (WEA) 1. Clear 2. Cloudy 3. Rain 4. Snow 5. Sleet/Hail/Freezing Rain 6. Fog/Smog/Smoke 10. Other

NO	CASE	DATE	TIME	# OF VEH	SEV	LC	RC	RSC	WEA	CONTRIB FACTORS		DESCRIPTION	INTERSECTION
68	35924626	9/30/2015	16:32	1	NR	1	1	1	1	69, YY	BICYCLIST	The operator of vehicle 1 was making a right hand turn on to clinton avenue when the bicyclist was making a right turn as well. The truck struck the cyclist and knocked her off of her bike. She denied medical attention at the scene and went back home. -	Clinton-Franklin
164	36148450	3/19/2016	13:13	2	NR	1	1	1	1	17, 19, YY	OVERTAKING	Vehicle 1 was stopped at the light at franklin and clinton, intending to go straight, southwest, on franklin. Vehicle 2 passed vehicle 1 on the driver's side, hitting the front quarter panel, and tearing the front bumper cover off the car. The operator of vehicle 1 tried to get vehicle 2's license plate but was unable to catch it. This officer responded to the corner of Pine and St. James where the owner of vehicle 1 stopped and called in the accident.	Clinton-Franklin
161	36429512	10/12/2016	12:29	2	NR	1	1	1	1	13, YY	OVERTAKING (PARKED)	Witness reported a grey Toyota Solara operated by a black male struck vehicle 1 and left the scene. Officers were able to locate a grey Toyota Solara on Green Street. The operator of vehicle 2 after investigation, admitted to being the operator of the vehicle and leaving the scene of the accident. - WITNESS 1 SORIANO, PEDRO V 14 SOUTH PINE STREET KINGSTON NY 12401 Tickets Issued: DENNIS S THOMAS Driver of vehicle number (2) tickets: Ticket Number: K123668Z2D Violation: 5091 Ticket Number: K123668ZCK Violation: 1128A Ticket Number: K123668ZH6 Violation: 6001A Ticket Number: K123668ZK2 Violation: 5112A4;	Clinton-Franklin
72	37069031	1/4/2018	09:14	2	PDO	1	1	4	4	04, 66, YY	REAR END	Both vehicle 1 and vehicle 2 traveling in easterly direction on Clinton Ave. Vehicle 1 was stopped at red light on Clinton Ave. at Franklin St when he was struck in rear by Vehicle 2 traveling behind vehicle 1. Vehicle 2 then left scene and was located several blocks from the accident scene. Operator vehicle 2 stated he was in fact driving vehicle 2 at time of accident and that he did not have a license. Subsequent UTT's issued. No injuries reported at this time.	Clinton-Franklin
203	37398019	9/29/2017	19:49	1	INJURY	4	1	1	1	13, 17, YY	BICYCLIST	Bicycle Operator stated he did not stop as he entered the intersection, and he did not have the green light to proceed through.No damage to vehicle.Bicycle Operator stated he had a sore shoulder. EMS was requested. He refused medical attention.	Clinton-Franklin
249	35980102	11/21/2015	15:33	4	NR	1	1	1	1	04, 17, YY	RIGHT ANGLE	V2 was traveling south on Henry street and stated she had a green light at the intersection of clinton ave. V2 was traveling west on Clinton ave. and failed to stop at red light at intersection of Henry Street. V1 struck V2 in the intersection of Henry street at Clinton ave. V3 was a witness vehicle that was stopped at red light facing east on clinton ave at henry street. who also stated that V1 passed the red light. - PLEASANT VALLEY NY 12569 8459028395	Clinton-Henry
320	36012965	11/23/2015	16:00	2	PDO	Z	Z	Z	Z	XX	UNKNOWN		Clinton-Henry

65	36571930	1/17/2017	09:53	2	NR	1	1	1	2	07, YY	LEFT TURN (WITH OTHER CAR)	V-1 AND V-2 WERE BOTH STOPPED FOR A SOLID RED TRAFFIC LIGHT ON CLINTON AVENUE AT HENRY STREET. BOTH VEHICLES WERE FACING EACH OTHER AND ACROSS THE INTERSECTION FROM EACH OTHER. THE TRAFFIC LIGHT TURNED A SOLID GREEN . V-1 PROCEEDED STRAIGHT ON CLINTON AVENUE . V-2 FAILED TO YIELD TO V-1 GOING STRAIGHT AND MADE A LEFT TURN ONTO HENRY STREET. THE TWO VEHICLES COLLIDED IN THE INTERSECTION.	Clinton-Henry
247	37260159	4/27/2018	16:08	2	INJURY	1	1	2	3	04, YY	RIGHT ANGLE		Clinton-Henry
110	35911800	10/7/2015	10:20	1	INJURY	1	1	1	2	04, 14, YY	BICYCLIST	V-1 WAS STOPPED AT A SOLID RED LIGHT ON ST. JAMES STREET AT CLINTON AVENUE. OPERATOR OF V-1 WAS ATTEMPTING TO MAKE A RIGHT TURN ON RED FROM ST. JAMES STREET ONTO CLINTON AVENUE. V-2, THE BICYCLIST, WAS TRAVELING ON THE LEFT SIDE OF THE ROAD AGAINST TRAFFIC ON CLINTON AVENUE APPROACHING ST. JAMES STREET. THE OPERATOR OF V-1 CHECKED FOR APPROACHING TRAFFIC TO HIS LEFT ON CLINTON AVENUE. WHEN HE DIDN'T SEE ANY TRAFFIC APPROACHING FROM HIS LEFT HE STARTED TO MAKE HIS RIGHT TURN ON RED. V-2 WAS CROSSING IN FRONT OF V-1 FROM V-1'S RIGHT. V-1 BUMPED V-2. THE RIDER OF .V-2 WAS KNOCKED TO THE GROUND AND SUFFERED ROAD RASH TO HIS RIGHT ELBOW AREA	Clinton-St James
30	36224798	5/23/2016	10:59	2	PDO	1	1	1	1	04, 17, YY	RIGHT ANGLE	OPERATOR OF V-1 STATED THAT THE TRAFFIC LIGHT HAD JUST TURNED GREEN AS HE WAS APPROACHING ST JAMES ST ON CLINTON AVE. V-1 ENTERED THE INTERSECTION AND V-2, WHICH WAS TRAVELING ON ST JAMES ST, ENTERED THE INTERSECTION AND WAS CROSSING IN FRONT OF V-1. V-1 WAS UNABLE TO STOP FOR V-2 AND V-2 WAS STRUCK IN THE LEFT REAR TIRE AREA BY V-1. OPERATOR OF V-2 STATED THAT SHE WAS FOLLOWING A LINE OF CARS AND SHE THOUGHT THAT HER LIGHT WAS GREEN. WHEN SHE ENTERED THE INTERSECTION SHE WAS STRUCK BY V-1. THE WITNESS STATED THAT SHE HEARD THE CRASH AND LOOKED AT THE VEHICLES THAT WERE INVOLVED. WHERE SHE WAS SHE COULD SEE THE TRAFFIC LIGHT FACING ST JAMES ST AND FACING CLINTON AVE. SHE STATED THAT THE TRAFFIC LIGHT FACING THE DIRECTION THAT V-1 WAS COMING FROM WAS A GREEN SIGNAL AND THE TRAFFIC LIGHT IN THE DIRECTION THAT V-2 WAS COMING FROM WAS A RED SIGNAL. -	Clinton-St James
207	36255730	6/10/2016	09:41	2	NR	1	1	1	1	07, YY	LEFT TURN (AGAINST OTHER CAR)	vehicle #1 proceeding thru intersection having right of way, when vehicle #2 attempted to make left turn from clinton avenue onto saint james street and struck vehicle # 1 causing minor damage to both vehicles. no injuries were observed or reported to this report writer who was on accident scene.	Clinton-St James
111	36928380	10/12/2017	14:40	2	NR	1	1	1	1	04, YY	REAR END	both vehicles traveling in northerly direction on Clinton Ave. Vehicle 1 was stopped at red light on Clinton Ave. at St. James St. Vehicle 2 traveling behind vehicle 1 stopping for light struck vehicle 1 in rear. No injuries reported at this time.	Clinton-St James
69	37284645	5/10/2018	15:00	2	PDO	1	1	1	2	04, 17, YY	RIGHT ANGLE	ON THE ABOVE DATE, TIME, AND LOCATION, VEHICLE 1 WAS TRAVELING WEST ON ST JAMES ST APPROACHING CLINTON AVE. HE STATES HE LOOKED AWAY AND DIDNT SEE THE TRAFFIC SIGNAL TURN RED AND DROVE THROUGH THE INTERSECTION. VEHICLE 2 WAS TRAVELING SOUTH ON CLINTON AVE AND DROVE THROUGH THE INTERSECTION OF CLINTON AVE AS VEHICLE 1 RAN THE RED LIGHT AND THEY COLLIDED AT A RIGHT ANGLE. NO INJURIES REPORTED AT SCENE.	Clinton-St James
61	35879009	9/10/2015	12:12	2	NR	1	1	1	1	04, YY	RIGHT ANGLE (BACKING)	Driver of Veh 1 was backing on Pearl St attempting to enter a parking lot, Veh 2 was traveling on Pearl St and attempted to make a left into the same parking lot. The left rear portion of Veh 1 struck the front left portion of Veh 2. No injuries reported on scene	Fair-Pearl
276	36075502	1/19/2016	11:22	3	PDO	1	1	1	1	18, 62, YY	PARKED	Vehicle #1 was traveling Southwest on Pearl St. and turned left onto Fair St. Vehicle #1 struck the left rear bumper of Vehicle #2 and pushed Vehicle #2 into the trailer hitch on the rear of Vehicle #3. Vehicle #2 and #3 were both legally parked at the curb on Fair St. facing Southeast. Driver #1 states he was affected by the sun's glare as he made the turn and turned too wide.	Fair-Pearl

196	36255688	5/31/2016	17:16	2	PDO	1	1	1	1	17, 18, YY	RIGHT TURN (WITH OTHER CAR)		Fair-Pearl
242	36337265	8/11/2016	07:54	2	NR	1	1	1	1	03, 17, YY	OVERTAKING (BACKING)	Vehicle 1 made a right turn from Pearl St onto Fair St, traveling the wrong way on a one way street. Driver of vehicle 1 then realized he was traveling the wrong way on a one street. Vehicle 1 then backed up and struck vehicle 2, which was stopped at the traffic signal on Fair St at Pearl St. Driver of vehicle 1 stated that he was following directions on his gps prior to the accident. No injuries were reported at the scene.	Fair-Pearl
316	36612792	2/10/2017	18:02	2	INJURY	4	1	5	2	09, 66, YY	REAR END	V2 stopped at the red light on Fair St at Pearl St and was struck from behind by V1. The registered owners of both vehicles were the operators and the passenger in V2 complained of neck pain. The passenger in V2 declined medical attention at the scene and stated she was not going to go to the hospital at the time when she left the scene still in V2.	Fair-Pearl
233	36771597	6/13/2017	11:47	1	INJURY	1	1	1	1	07, YY	PEDESTRIAN	Vehicle # 1 was on Fair st , attempting to make a left turn onto Pearl St. ,on a green light. Pedestrian was crossing Pearl st heading to Fair st. , in a marked crosswalk with no signal. Driver # 1 states she thought that pedestrian bent over in the crosswalk to pick something up, thats why she didn't see her. Pedestrian states that she did not bend over to pick anything up. Vehicle # 1 struck pedestrian at low speed, in the crosswalk. No damage to vehicle # 1.	Fair-Pearl
317	36908848	9/27/2017	13:45	2	NR	1	1	1	1	29, YY	RIGHT ANGLE (PARKED)	vehicle #1 parked unoccupied when operator of vehicle #2 states he was exiting and struck vehicle #1 causing damage to both vehicles. no injuries observed or reported to this report writer on accident scene.	Fair-Pearl
275	37260158	4/23/2018	11:52	2	NR	1	1	1	1	62, YY	REAR END (PARKED)	Vehicle #1 parked unoccupied, when operator of vehicle #2 was backing and had the glare of the sun in his eyes and vehicles made contact. No damage to vehicle #1, minor damage to vehicle #1. No injuries observed or reported to this report writer on scene.	Fair-Pearl
150	37260167	4/27/2018	16:13	2	NR	1	1	2	3	13, 69, YY	OVERTAKING	Vehicle 1 was traveling east on Pearl Street. The operator attempted to make a left turn onto Fair Street from Pearl Street. He realized it was a one-way street and corrected back onto Pearl Street resulting in a collision with Vehicle 2, which was also east on Pearl Street. The operator of Vehicle 1 states he checked his mirrors prior to going back onto Pearl Street but they were fogged due to the rain.	Fair-Pearl
98	37299731	5/14/2018	08:25	2	NR	1	1	1	2	63, YY	LEFT TURN (AGAINST OTHER CAR)	Both vehicle #1 and vehicle #2 on Fair Street which is a one way street. Both drivers in disagreement as to who was at fault, driver vehicle #1 states she was going straight on Fair street thru light when struck by vehicle #2, vehicle #2 states he was on left side of road attempting to make left turn when vehicle #1 struck his vehicle. There are no designated lane markings at this intersection. no injuries were reported or observed by this report writer who was on accident scene.	Fair-Pearl
8	35817668	7/25/2015	16:28	2	INJURY	1	1	1	1	04, YY	REAR END	Operator of vehicle one was stopped in traffic as well as vehicle two. Operator of vehicle one thought vehicle two was proceeding into the intersection and struck vehicle two in the rear.	Wall-Pearl
100	35903200	9/25/2015	11:03	2	NR	1	1	1	1	04, YY	REAR END	Vehicle 2 was stopped in traffic on Pearl St and was struck from behind by vehicle 1. Vehicle 1 then left the scene for unknown reason(s) last seen traveling south on Green St. Vehicle 1 was later located. Driver of vehicle 1 stated that he left the scene because he knew his drivers license was suspended.	Wall-Pearl
238	36003266	12/5/2015	19:12	2	INJURY	4	1	1	1	07, 17, YY	RIGHT ANGLE	V1's registered owner and operator was stopped at the red light at the intersection of Wall and Pearl Street, then proceeded to disregard the red light and continue on Wall Street. As a result of failing to observe V2 coming through the green light on Pearl and Wall street, V2 struck V1. The impact of the collision pushed V1 into Central Hudson Utility Pole. Central Hudson staff reports no damage to pole. V1's operator complaining of neck pain on scene, transported to Kingston Hospital for further evaluation.	Wall-Pearl

195	36291085	7/2/2016	11:29	2	INJURY	1	1	1	1	04, YY	REAR END		Wall-Pearl
243	36452867	10/28/2016	13:14	2	INJURY	1	1	1	1	17, YY	LEFT TURN (WITH OTHER CAR)	V-1 WAS TRAVELING STRAIGHT ON PEARL STREET AND HAD A SOLID GREEN TRAFFIC LIGHT. V-2 WAS ATTEMPTING TO MAKE A LEFT TURN FROM WALL STREET ONTO PEARL STREET AND HAD A SOLID RED TRAFFIC LIGHT. V-2 PASSED THE SOLID RED TRAFFIC LIGHT AND ENTERED THE INTERSECTION IN THE PATH OF V-1 AND WAS STRUCK BY V-1.	Wall-Pearl
97	36872463	8/30/2017	13:18	2	INJURY	1	1	1	1	04, 69, YY	REAR END	Vehicle 2 was stopped at the traffic signal on Pearl St at Wall St. The light turned green, and vehicle 2 began to move. Vehicle 2 was then struck from behind by vehicle 1. Driver of vehicle 1 stated that he did not see vehicle 2 due to the apparatus on the front of the truck.	Wall-Pearl
311	36877372	9/4/2017	15:39	2	NR	1	1	1	1	04, YY	REAR END	Operator of V1 stated that she thought the light was green, and she reached down to grab something in her car. At which time her vehicle came into contact with V2.	Wall-Pearl
60	36979231	11/12/2017	15:23	2	INJURY	1	1	1	1	04, 05, YY	REAR END	Vehicle 2 was stopped at the red light on Pearl Street at Wall Street. Vehicle 1 rear-ended Vehicle 2. Vehicle 1 backed up in an attempt to flee the scene, struck a tree, and then traveled on Pearl Street toward Washington Avenue. Witnesses state the operator was a white female.	Wall-Pearl
272	36348671	8/6/2016	18:10	2	NR	1	1	1	1	04, YY	RIGHT ANGLE	ON THE ABOVE DATE, TIME, AND LOCATION, VEHICLE 1 WAS TRAVELING NORTH ON WASHINGTON AVE AND APPROACHED LINDERMAN AVE. VEHICLE 2 WAS TRAVELING WEST ON LINDERMAN AVE AND APPROACHED WASHINGTON AVE. V2 STATES THAT HE STOPPED AT THE FLASHING RED LIGHT AND PROCEEDED THROUGH THE INTERSECTION AND V1 DIDNT STOP AT THE FLASHING RED. V1 STATED THE SAME AND HE STRUCK V2 AT A RIGHT ANGLE. NO INJURIES REPORTED ON SCENE.	Washington-Linderman
271	36500120	11/29/2016	07:53	2	INJURY	1	1	2	3	07, YY	LEFT TURN (WITH OTHER CAR)	Vehicle 1 was traveling east on Washington Ave. Vehicle 2 was traveling west on Washington Ave. Both vehicles stopped at the flashing red traffic signal on Washington Ave at Linderman Ave. Vehicle 1 was attempting to make a left turn from Washington Ave onto Linderman Ave, vehicle 2 was going straight through the intersection. Both vehicles entered the intersection at the same time, when collision occurred.	Washington-Linderman
6	36825171	7/21/2017	17:20	2	PDO	1	1	1	2	07, YY	OVERTAKING		Washington-Linderman
143	36909558	9/30/2017	19:43	2	PDO	4	1	1	2	04, 17, YY	RIGHT ANGLE	ON THE ABOVE DATE, TIME, AND LOCATION, VEHICLE 1 WAS TRAVELING EAST ON LINDERMAN AVE AND CAME TO THE TRAFFIC SIGNAL AT WASHINGTON AVE. VEHICLE 2 WAS TRAVELING NORTH ON WASHINGTON AVE AND HAD THE GREEN LIGHT AT LINDERMAN AVE AND DROVE THROUGH THE INTERSECTION. OPERATOR OF VEHICLE 1 STATED THAT HE DID NOT STOP AT THE RED LIGHT AND WENT THROUGH THE INTERSECTION CAUSING A COLLISION WITH VEHICLE 2. NO INJURIES REPORTED ON SCENE. ALL PARTIES SIGNED OFF ON MEDICAL ATTENTION WITH THE AMBULANCE.	Washington-Linderman
94	36970921	11/3/2017	08:03	2	PDO	1	1	1	2	09, YY	REAR END	Vehicle # 1 was stopped in traffic on Washinton Ave at the intersection of Linderman Ave. Vehicle # 2 was behind vehicle # 1 in traffic. Vehicle # 2 thought vehicle # 1 was moving and began to move also , crashing into the rear of vehicle # 1.	Washington-Linderman
93	37095323	1/17/2018	09:37	1	PDO	1	1	4	4	66, YY	SIGN POST	Vehicle # 1 was attempting to make a right turn from Washington Ave onto Linderman Ave. Vehicle # 1 slid on icy roads and crashed into a sign post and then into a fence.	Washington-Linderman
4	35859337	7/31/2015	17:42	2	INJURY	1	1	1	1	04, 60, YY	UNKNOWN		Washington-Main
139	36011597	12/10/2015	17:20	2	NR	5	1	1	1	04, YY	OVERTAKING (PARKED)	Veh 1 legally parked. Mirror struck by unknown vehicle which continued on.	Washington-Main
138	36452873	11/2/2016	18:40	2	NR	4	1	1	2	04, YY	REAR END	ON THE ABOVE DATE, TIME, AND LOCATION, VEHICLE 2 WAS STOPPED IN TRAFFIC ON WASHINGTON AVE AT MAIN ST. VEHICLE 1 WAS TRAVELING DOWN WASHINGTON AVE AND TURNED HIS HEAD AND WHEN HE LOOKED BACK HE SAW TRAFFIC STOPPED AND DIDNT STOP IN TIME AND REAR ENDED VEHICLE 2. NO DAMAGE SEEN ON VEHICLE 2. NO INJURIES	Washington-Main
188	36974086	11/9/2017	14:44	2	PDO	1	1	1	2	04, YY	OVERTAKING (PARKED)	vehicle #1 parked unoccupied when vehicle #2 approaching intersection side swiped vehicle # 1 causing damage to both vehicles. Perry's towing responded for vehicle #2 at owners request.	Washington-Main

57	36255718	6/11/2016	10:09	2	NR	1	1	2	3	04, 09, YY	REAR END	V2 was stopped in traffic facing north west on Washington Ave. V1 was traveling straight ahead on Washington Ave directly behind V2. V1's front end struck V2's rear end causing damage to both vehicles.	Washington-Main
3	37170693	2/27/2018	08:48	2	NR	1	1	1	1	04, YY	OVERTAKING (PARKED)	Vehicle 1 was traveling east on Washington Ave. Vehicle 1 then struck the drivers side view mirror of vehicle 2, which was legally parked and unattended at curb on Washington Ave.	Washington-Main
237	35764416	6/16/2015	13:47	2	NR	1	1	1	2	13, YY	OVERTAKING	Vehicle # 2 was behind a tow truck that was picking up a car on Pearl st @ Washington ave. Driver # 2 states that when the light turned green he started to go around the tow truck. Vehicle # 1 states that he thought the vehicles infront of him were parked with the tow truck and proceeded to pass them on the left. Vehicle # 1 caused vehicle # 2 to crash into the front passenger side of vehicle # 1. Witness states that vehicle # 1 was behind her at the light and did pass several cars on the left.	Washington-Pearl
146	36147341	3/23/2016	15:26	2	PDO	1	1	1	2	04, YY	REAR END	ON THE ABOVE DATE, TIME, AND LOCATION, VEHICLE 2 WAS TRAVELING SOUTH ON WASHINGTON AVE AND STOPPED AT THE RED LIGHT AT PEARL ST. VEHICLE 1 WAS TRAVELING SOUTH ON WASHINGTON AVE AND BENT DOWN TO PICK SOMETHING UP AND WHEN SHE LOOKED UP SHE SAW TRAFFIC STOPPED AND REAR ENDED VEHICLE 2. NO INJURIES REPORTED ON SCENE.	Washington-Pearl
23	36224778	5/22/2016	14:44	2	NR	1	1	1	1	07, 17, YY	RIGHT ANGLE	V2 was traveling south west on St James St through the intersection of Fair St. V1 was traveling south east on Fair St through the same intersection when V1's front end struck V2's rear passengers side causing damage to both vehicles. V1 had a red signal and V2 had a green signal at the time of the accident. V2 was moved to the side of St James St and legally parked. V2 operator was contacting V2's registered owner to contact Triple A regarding a tow. Unknown what tow was contacted. Tow was not contacted by the police department.	Fair-St. James
202	36953640	10/25/2017	20:30	1	INJURY	4	1	1	1	02, 14, YY	BICYCLIST	Veh 1 was traveling on Fair st through a Green Light when he was struck on the passenger side of the vehicle by a cyclist who ran a red light. In interviewing the cyclist he admitted on his own free will that he had just consumed 3 Cans of "Four Loko" malt beverage and approximately Half a bottle of Vodka.	Fair-St. James
77	36547579	12/15/2016	0:00	1	PDO	3	1	1	1	XX	LIGHT SUPPORT/UTILITY POLE		Grand-Foxhall-Shufeldt
258	36312377	7/25/2016	17:44	2	INJURY	1	1	2	3	13, YY	SIDESWIPE	V1 OFF-SCENE UPON PATROL ARRIVAL. V2 OPERATOR ON-SCENE UPON PATROL ARRIVAL AND INTERVIEWED. V2 OPERATOR STATED THAT SHE WAS TRAVELING DOWN FOXHALL AVENUE IN A SOUTHEASTERLY DIRECTION WHEN SHE SEEN A GREY PICK-UP TRUCK TRAVELING HEAD-ON TOWARDS HER IN A NORTHWESTERLY	Grand-Foxhall-Shufeldt
121	35807240	7/16/2015	16:25	3	PDO	1	1	1	1	04, 09, YY	OTHER	V1 failed to stop for the traffic light due to a distraction caused by passenger 1 in V1. Operator of V1 states her and the passenger were having a verbal argument. V2 and V3 were both stopped at the red light at the intersection of Foxhall and Grand Street. V1 struck the rear of V2 which pushed V2 into the rear of V3. No	Grand-Foxhall-Shufeldt
331	36147349	3/19/2016	14:27	2	NR	1	1	1	1	03, 62, YY	RIGHT ANGLE	Vehicle #2 was stopped at a red light on Foxhall Avenue. The operator of Vehicle #1 attempted to back out of a driveway onto Foxhall Ave, while doing so, struck Vehicle #2 causing minor damage to both vehicles. No injuries were reported.	Grand-Foxhall-Shufeldt
54	36414776	10/4/2016	11:42	2	INJURY	1	1	1	2	07, 17, yy	RIGHT ANGLE		East Chester-Lincoln
265	35755689	6/10/2015	16:12	2	NR	1	1	1	1	04, YY	REAR END	v2 was stopped in traffic at the red light on east chester street at lincoln street facing southeast. v1 was also traveling southeast on east chester street. d1 stated she failed to judge stopping distance and struck v2 causing damage. no injuries	East Chester-Lincoln

266	36391769	9/19/2016	17:12	2	PDO	1	2	1	2	05, 07, YY	TURN (AGAINST OTHER	operator of veh #1 believed he had time to make left turn from E. Chester St onto Lincoln St and turned into the path of veh #2 which was proceeding straight on E. Chester St causing the collision.	East Chester-Lincoln
267	37044215	12/19/2017	7:56	2	INJURY	1	1	2	2	04, 09, YY	REAR END	Vehicle two was stopped at a red light on East Chester St @ Lincoln, when it was struck from behind by Vehicle one, which was traveling north on East Chester St. Operator Vehicle two complaint of pain/headache, will seek medical evaluation as necessary.	East Chester-Lincoln

Attachment N
Signal Warrant Analysis

Traffic Signal Removal Assessment
City of Kingston, New York

Project:	Kingston Traffic Signal Warrants																					
Intersection	Washington Ave/Linderman Ave																					
Date:	7/30/2019																					
Analyst:	MDN																					
	Select your lane configuration																					
			4																			
	Main 1, Side 1		1																			
													arrant 1									arrant 1
			3				100% (a)						80% (b)				100%(a)					80%(b)
							500						400				750					600
							150						120				75					60
	Add your volumes																					
Hour	Washington	Linderman	Linderman																			Conditi
Beginning	NB/SB	EB	WB				100%						80%						100%			
				Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall			
12:00 AM																						
1:00 AM																						
2:00 AM																						
3:00 AM																						
4:00 AM																						
5:00 AM																						
6:00 AM																						
7:00 AM	456	48	54					Y														
8:00 AM	487	41	70					Y													Y	
9:00 AM	392	35	50																			
10:00 AM	343	24	56																			
11:00 AM	349	38	44																			
12:00 PM	443	28	52					Y														
1:00 PM	418	35	54					Y														
2:00 PM	542	38	95	Y				Y						Y							Y	
3:00 PM	622	31	90	Y				Y						Y		Y		Y	1			
4:00 PM	585	35	100	Y				Y						Y				Y				
5:00 PM	554	44	88	Y				Y						Y				Y				
6:00 PM	354	36	81											Y				Y				
7:00 PM																						
8:00 PM																						
9:00 PM																						
10:00 PM																						
11:00 PM																						
		Hours Met					0				0				0							1
		Required					8				8				8							8
		Warrant Met?					No				No				No							No

NOTES:

(a) Basic minimum hourly volume.

(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.

(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.

(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated commun

Reference:	Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition
	New York State Supplement to the MUTCD
Checked:	AMM, KWW on 10/21/2016

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

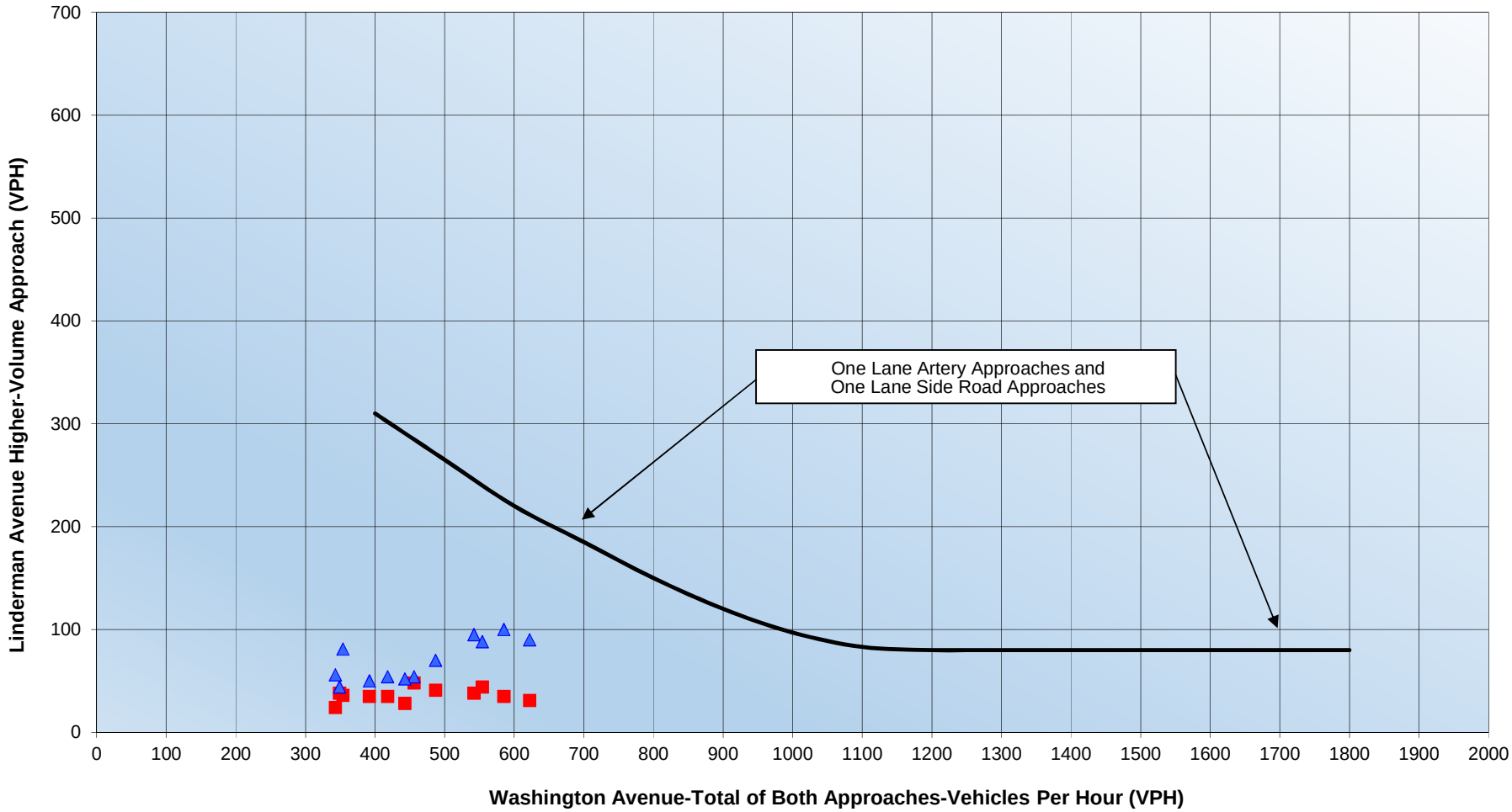
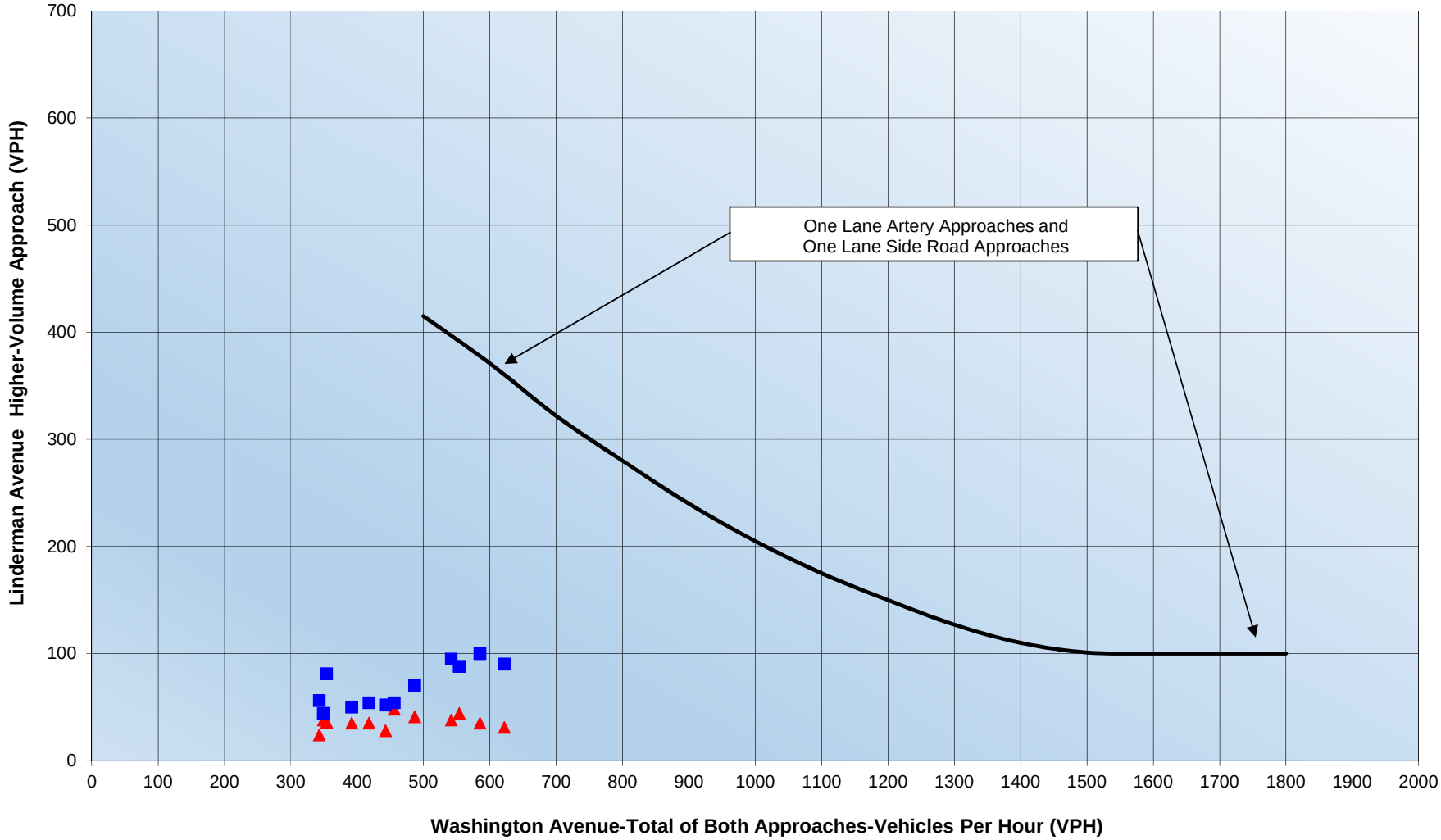


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Project:	Kingston Traffic Signal Warrants																			
Intersection	Washington Ave/Pearl St																			
Date:	7/30/2019																			
Analyst:	MDN																			
	Select your lane configuration																			
	Main 1, Side 1			4																
				1																
													arrant 1							arrant 1
				3				100% (a)					80% (b)				100%(a)			80%(b)
								500					400				750			600
								150					120				75			60
	Add your volumes																			
Hour	Washington	Pearl St	Pearl St					Condition A												Conditi
Beginning	NB/SB	EB	WB					100%				80%				100%				80%			
				Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall
12:00 AM																				
1:00 AM																				
2:00 AM																				
3:00 AM																				
4:00 AM																				
5:00 AM																				
6:00 AM																				
7:00 AM	517	130	43	Y				Y	Y		1		Y				Y			
8:00 AM	596	155	77	Y	Y		1	Y	Y		1		Y	Y			Y	Y		
9:00 AM	505	74	89	Y				Y						Y			Y	Y		
10:00 AM	445	89	103					Y					Y	Y			Y	Y		
11:00 AM	442	51	146					Y		Y	1			Y				Y		
12:00 PM	520	74	128	Y				Y		Y	1			Y			Y	Y		
1:00 PM	490	93	106					Y					Y	Y			Y	Y		
2:00 PM	626	89	128	Y				Y		Y	1		Y	Y		Y	Y	Y		1
3:00 PM	705	100	140	Y				Y		Y	1		Y	Y		Y	Y	Y		1
4:00 PM	658	90	155	Y		Y	1	Y		Y	1		Y	Y		Y	Y	Y		1
5:00 PM	671	94	164	Y		Y	1	Y		Y	1		Y	Y		Y	Y	Y		1
6:00 PM	394	72	129							Y				Y			Y	Y		
7:00 PM																				
8:00 PM																				
9:00 PM																				
10:00 PM																				
11:00 PM																				
		Hours Met					3				8				0				4	
		Required					8				8				8				8	
		Warrant Met?					No				No				No				No	

NOTES:

(a) Basic minimum hourly volume.

(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.

(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.

(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated communit

Reference: Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition

New York State Supplement to the MUTCD

Checked: AMM, KWW on 10/21/2016

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

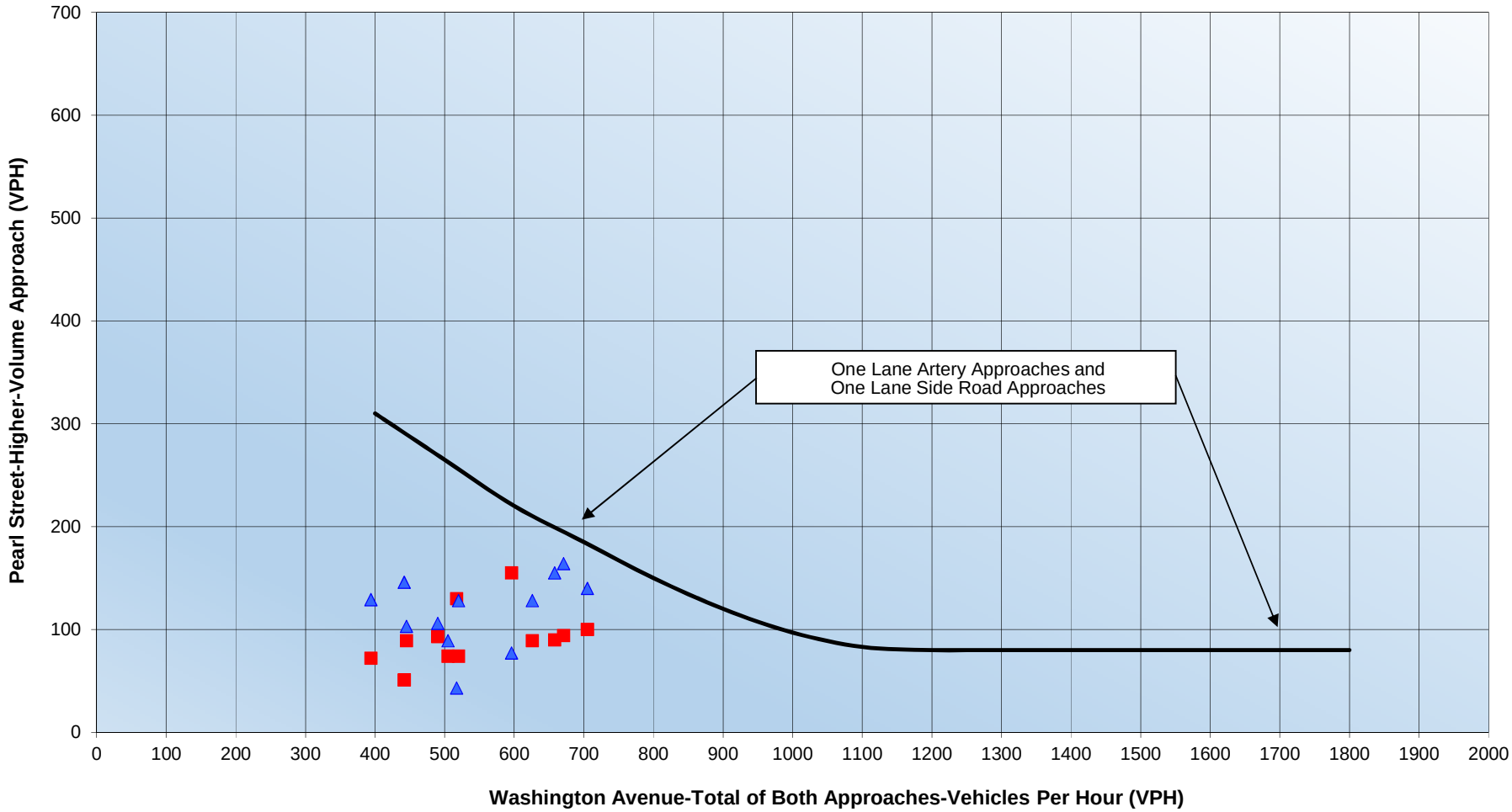
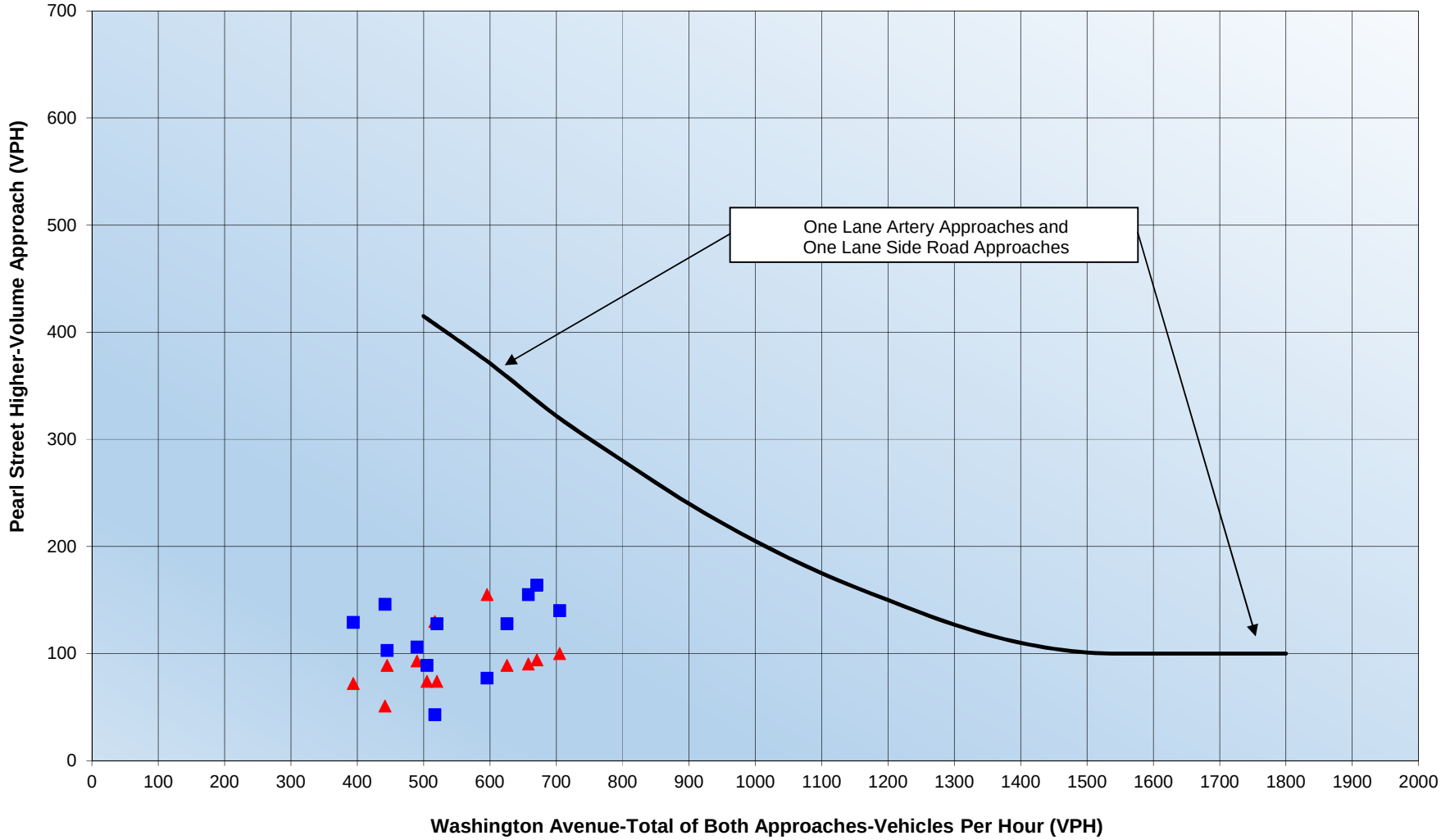


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Project:	Kingston Traffic Signal Warrants																					
Intersection	Washington Ave/Main Street																					
Date:	8/7/2019																					
Analyst:	MPF																					
	Select your lane configuration																					
			4																			
	Main 1, Side 1		1																			
			3				100% (a)					80% (b)				100%(a)					80%(b)	
							500					400				750					600	
							150					120				75					60	
	Add your volumes																					
Hour	Washington	Main St	Main St																			
Beginning	NB/SB	EB	WB																			
				Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall			
12:00 AM																						
1:00 AM																						
2:00 AM																						
3:00 AM																						
4:00 AM																						
5:00 AM																						
6:00 AM																						
7:00 AM	500	33	74	Y				Y													Y	
8:00 AM	578	40	73	Y				Y													Y	
9:00 AM	504	37	97	Y				Y						Y							Y	
10:00 AM	485	33	103					Y						Y							Y	
11:00 AM	465	30	105					Y						Y							Y	
12:00 PM	518	37	124	Y				Y		Y	1			Y							Y	
1:00 PM	502	31	110	Y				Y						Y							Y	
2:00 PM	631	32	149	Y				Y		Y	1			Y						Y	Y	1
3:00 PM	723	25	150	Y		Y	1	Y		Y	1			Y						Y	Y	1
4:00 PM	668	33	184	Y		Y	1	Y		Y	1			Y						Y	Y	1
5:00 PM	570	45	202	Y		Y	1	Y		Y	1			Y							Y	
6:00 PM	396	37	113											Y							Y	
7:00 PM																						
8:00 PM																						
9:00 PM																						
10:00 PM																						
11:00 PM																						
		Hours Met					3				5				0						3	
		Required					8				8				8						8	
		Warrant Met?					No				No				No						No	

NOTES:

(a) Basic minimum hourly volume.

(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.

(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.

(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated commun

Reference: Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition

New York State Supplement to the MUTCD

Checked: AMM, KWW on 10/21/2016

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

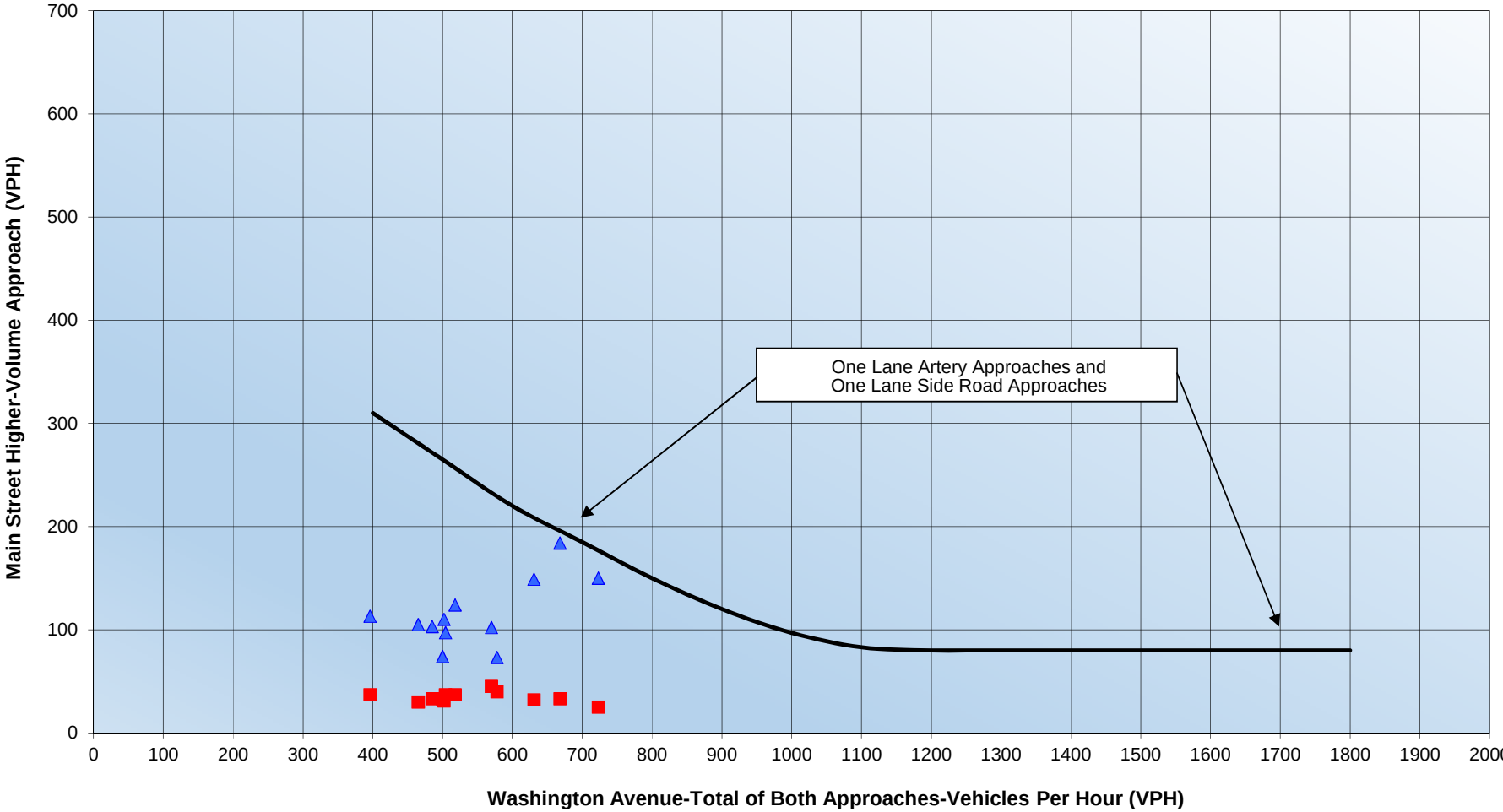
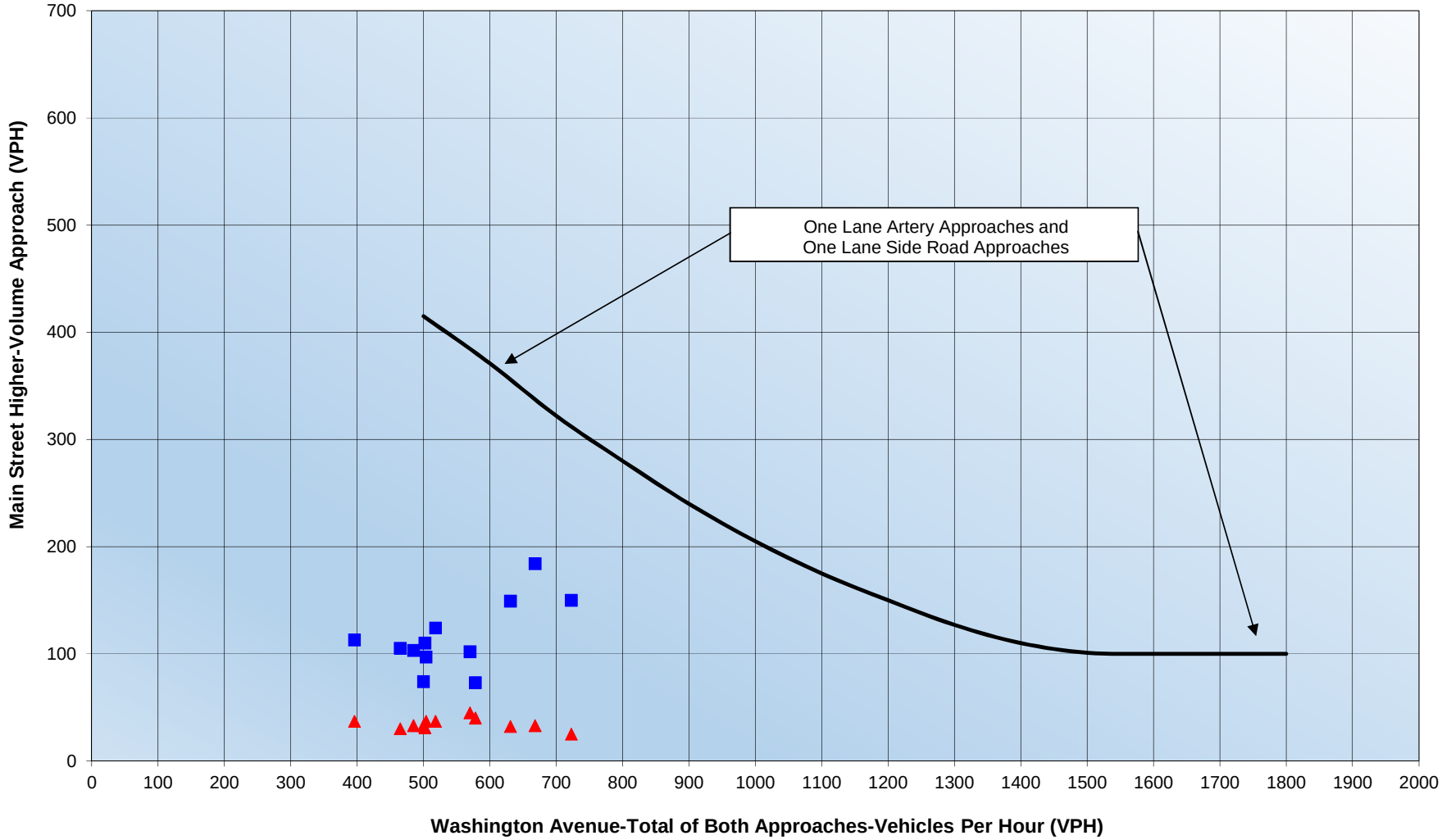


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Project:	Kingston Traffic Signal Warrants																					
Intersection	Pearl St/Wall St																					
Date:	6/19/2019																					
Analyst:	MDN																					
	Select your lane configuration																					
			4																			
	Main 1, Side 1		1																			
			3				100% (a)					arrant 1 80% (b)				100%(a)						arrant 1 80%(b)
							500					400				750						600
							150					120				75						60
	Add your volumes																					
Hour	Pearl St	Wall St	Side				Condition A															Conditi
Beginning	EB/WB	NB	Street 2				100%				80%				100%				80%			
							Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall
12:00 AM																						
1:00 AM																						
2:00 AM																						
3:00 AM																						
4:00 AM																						
5:00 AM																						
6:00 AM																						
7:00 AM	174	101														Y				Y		
8:00 AM	316	194						Y				Y				Y				Y		
9:00 AM	336	142										Y				Y				Y		
10:00 AM	314	118														Y				Y		
11:00 AM	364	145										Y				Y				Y		
12:00 PM	327	167						Y				Y				Y				Y		
1:00 PM	325	134										Y				Y				Y		
2:00 PM	347	184						Y				Y				Y				Y		
3:00 PM	366	241						Y				Y				Y				Y		
4:00 PM	331	183						Y				Y				Y				Y		
5:00 PM	381	170						Y				Y				Y				Y		
6:00 PM	238	102														Y				Y		
7:00 PM																						
8:00 PM																						
9:00 PM																						
10:00 PM																						
11:00 PM																						
		Hours Met								0				0				0				0
		Required								8				8				8				8
		Warrant Met?								No				No				No				No
NOTES:																						
(a) Basic minimum hourly volume.																						
(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.																						
(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.																						
(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated commun																						
Reference:	Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition																					
	New York State Supplement to the MUTCD																					
Checked:	AMM, KWW on 10/21/2016																					

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

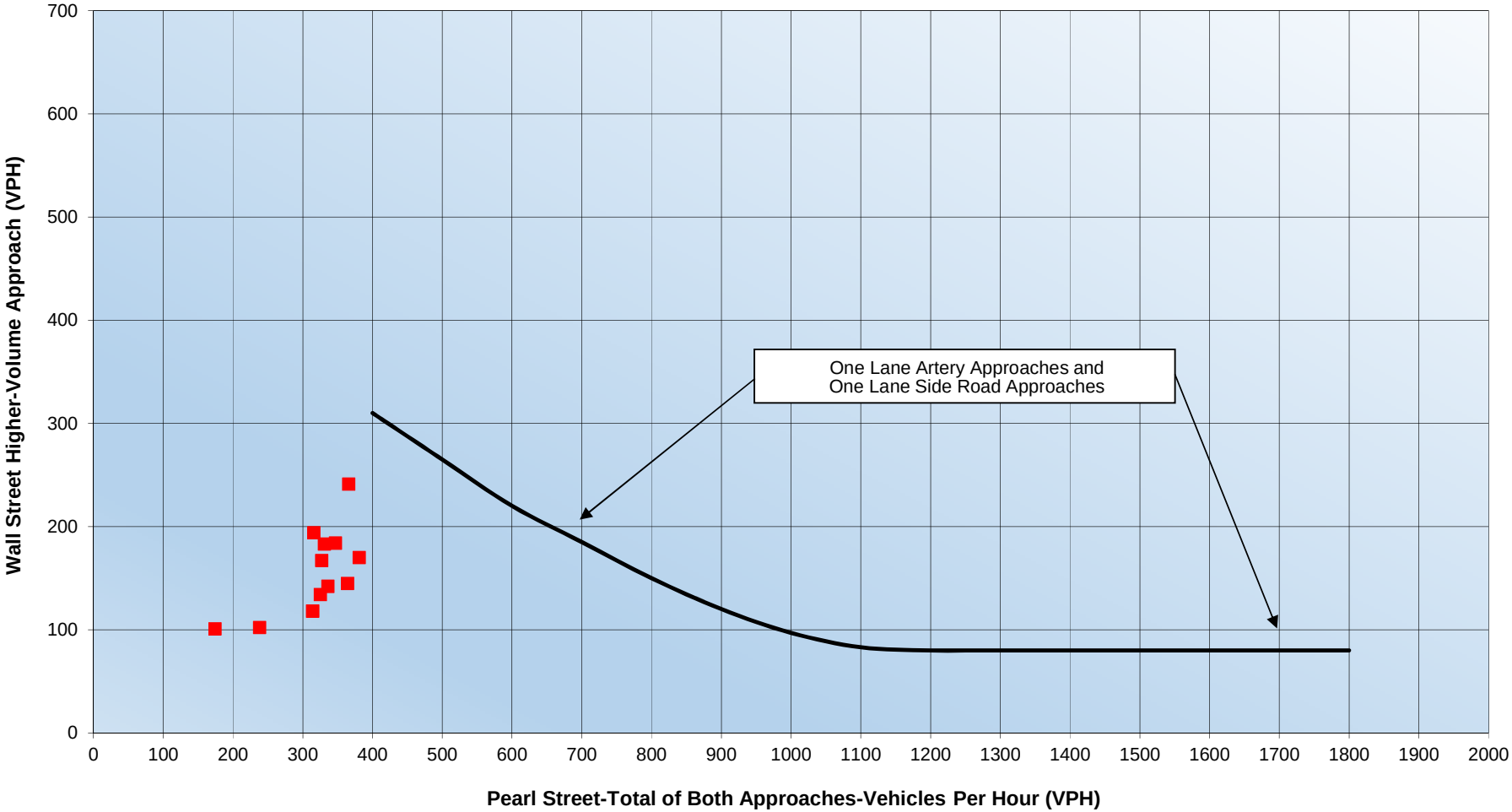
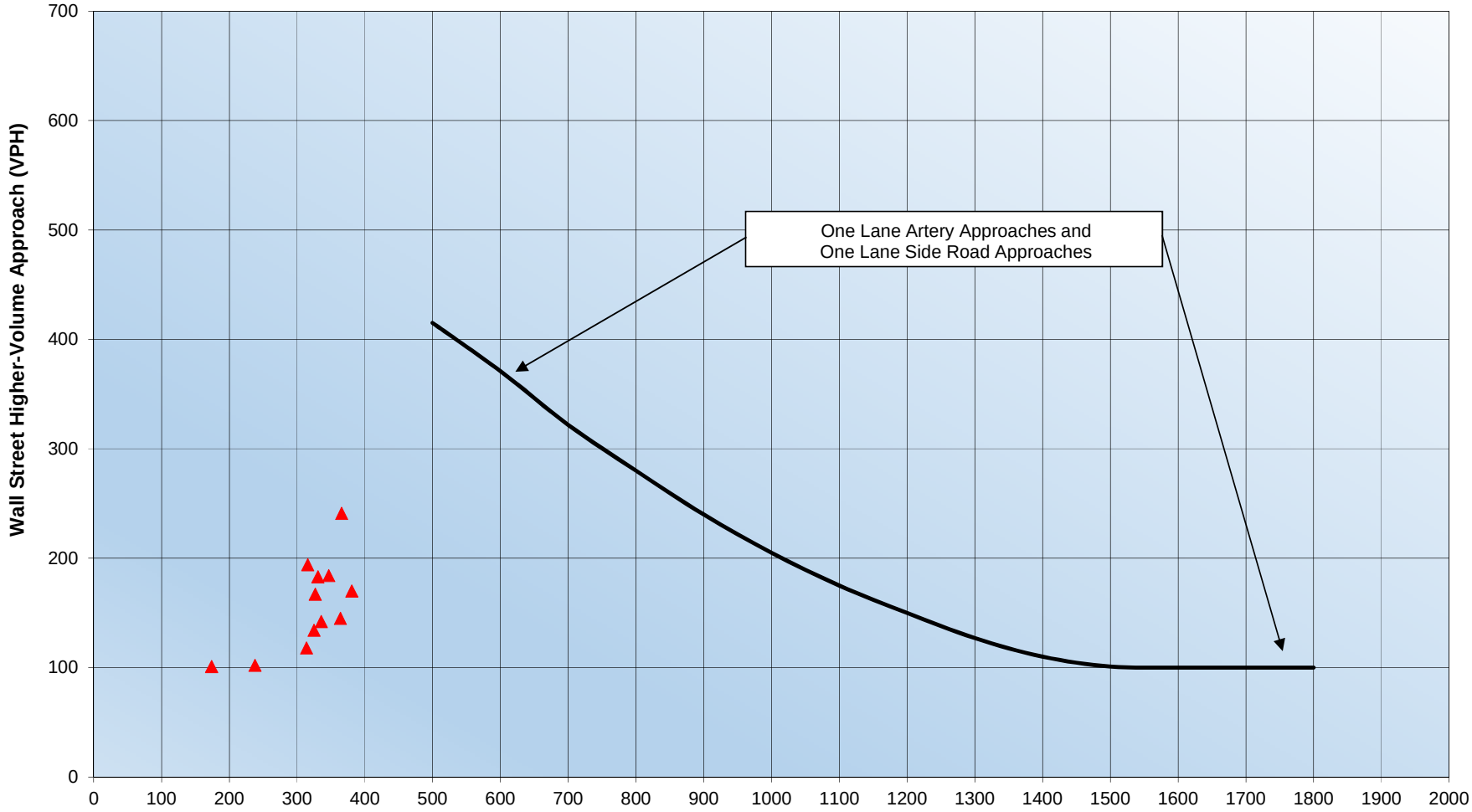


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Project:	Kingston Traffic Signal Warrants																					
Intersection	Fair St/Pearl St																					
Date:	8/2/2019																					
Analyst:	MPF																					
	Select your lane configuration																					
			4																			
	Main 1, Side 1		1																			
			3				100% (a)					80% (b)				100%(a)					80%(b)	
							500					400				750					600	
							150					120				75					60	
	Add your volumes																					
Hour	Pearl St	Side	Fair St				Condition A														Conditi	
Beginning	EB/WB	Street 1	SB				100%				80%				100%				80%			
				Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall			
12:00 AM																						
1:00 AM																						
2:00 AM																						
3:00 AM																						
4:00 AM																						
5:00 AM																						
6:00 AM																						
7:00 AM	153	0	84											Y								
8:00 AM	312	0	144							Y				Y				Y				
9:00 AM	314	0	184			Y				Y				Y				Y				
10:00 AM	302	0	188			Y				Y				Y				Y				
11:00 AM	359	0	218			Y				Y				Y				Y				
12:00 PM	324	0	239			Y				Y				Y				Y				
1:00 PM	320	0	244			Y				Y				Y				Y				
2:00 PM	350	0	238			Y				Y				Y				Y				
3:00 PM	345	0	243			Y				Y				Y				Y				
4:00 PM	342	0	254			Y				Y				Y				Y				
5:00 PM	354	0	267			Y				Y				Y				Y				
6:00 PM	228	0	144							Y				Y								
7:00 PM																						
8:00 PM																						
9:00 PM																						
10:00 PM																						
11:00 PM																						
		Hours Met					0				0				0						0	
		Required					8				8				8						8	
		Warrant Met?					No				No				No						No	
NOTES:																						
(a) Basic minimum hourly volume.																						
(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.																						
(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.																						
(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated commun																						
Reference:	Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition																					
	New York State Supplement to the MUTCD																					
Checked:	AMM, KWW on 10/21/2016																					

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

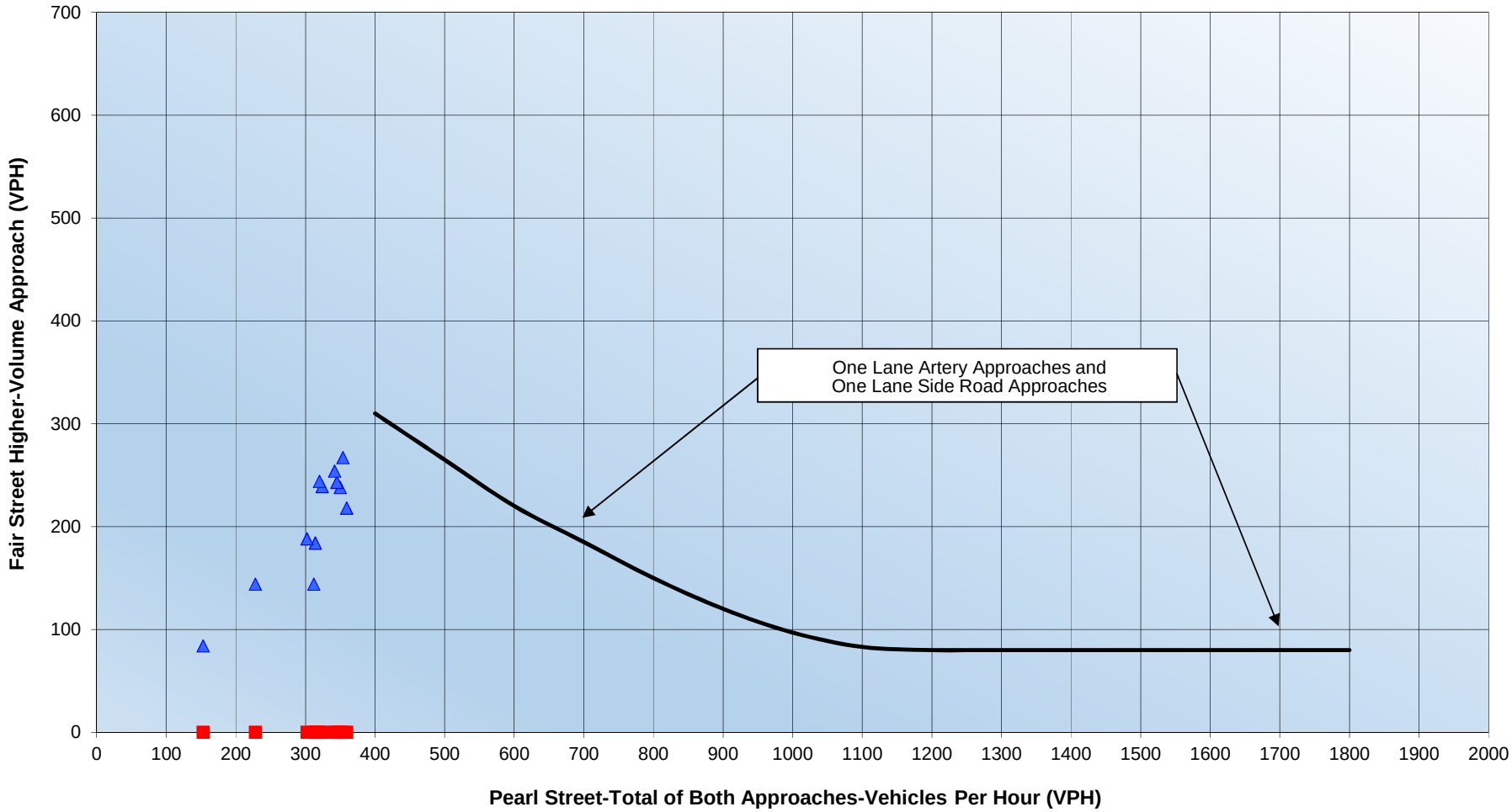
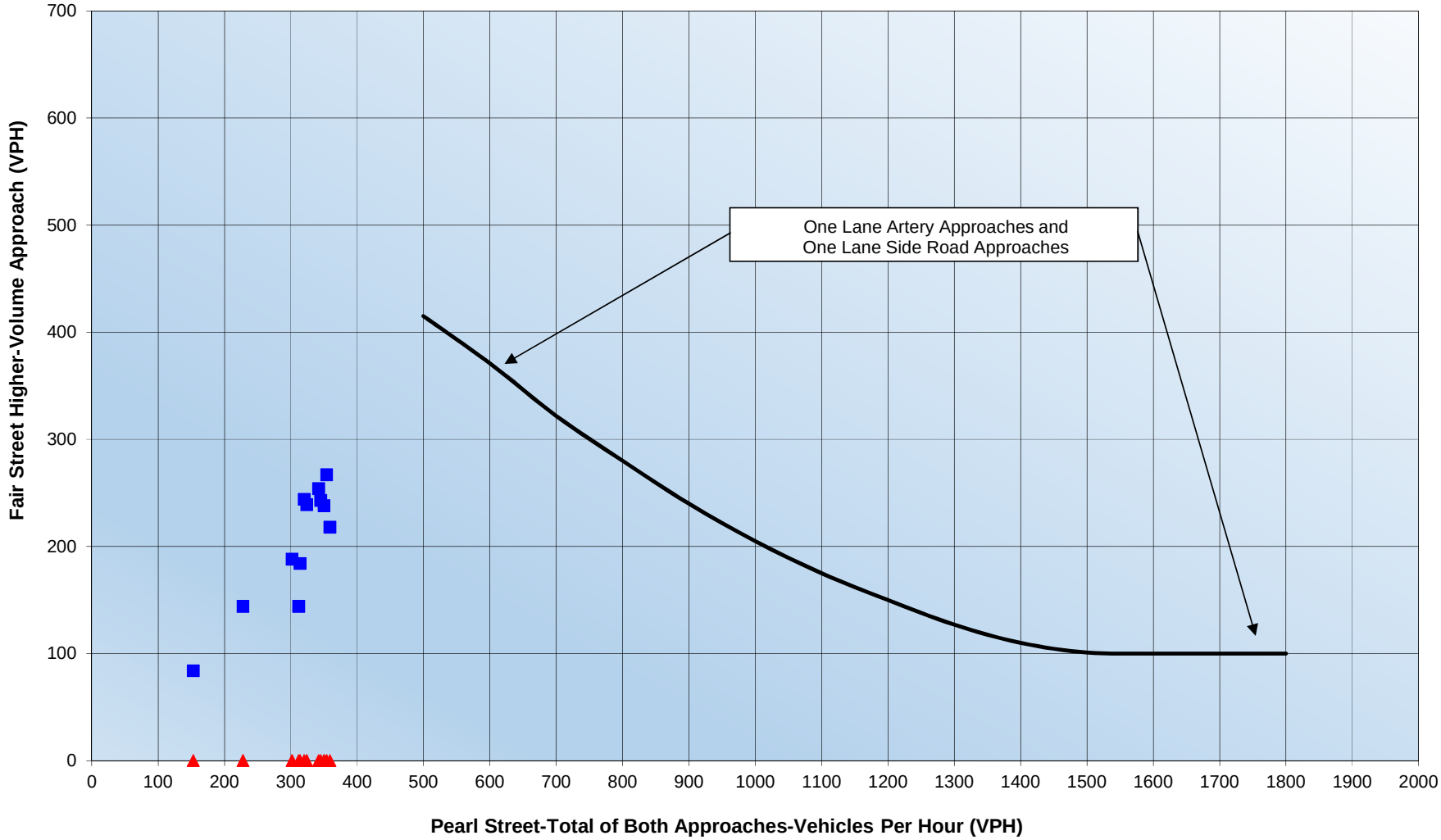


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Project:	Kingston Traffic Signal Warrants																					
Intersection	Clinton Ave/ St. James St																					
Date:	8/22/2019																					
Analyst:	MPF																					
	Select your lane configuration																					
	Main 1, Side 1			4																		
				1																		
													arrant 1									arrant 1
				3				100% (a)					80% (b)				100%(a)					80%(b)
								500					400				750					600
								150					120				75					60
	Add your volumes																					
Hour	Clinton	St. James S	St. James S					Condition A														Conditi
Beginning	NB/SB	EB	WB					100%				80%				100%				80%		
								Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall
12:00 AM																						
1:00 AM																						
2:00 AM																						
3:00 AM																						
4:00 AM																						
5:00 AM																						
6:00 AM																						
7:00 AM	176	30	28																			
8:00 AM	199	50	40																			
9:00 AM	202	43	38																			
10:00 AM	192	58	54																			
11:00 AM	226	55	48																			
12:00 PM	204	51	78															Y				Y	
1:00 PM	221	44	77															Y				Y	
2:00 PM	289	70	50																		Y		
3:00 PM	341	62	69																		Y	Y	
4:00 PM	317	64	68																		Y	Y	
5:00 PM	316	91	72														Y				Y	Y	
6:00 PM	165	34	52																				
7:00 PM																							
8:00 PM																							
9:00 PM																							
10:00 PM																							
11:00 PM																							
		Hours Met									0				0				0				0
		Required									8				8				8				8
		Warrant Met?									No				No				No				No
NOTES:																							
(a) Basic minimum hourly volume.																							
(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.																							
(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.																							
(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated communit																							
Reference:	Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition																						
	New York State Supplement to the MUTCD																						
Checked:	AMM, KWW on 10/21/2016																						

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

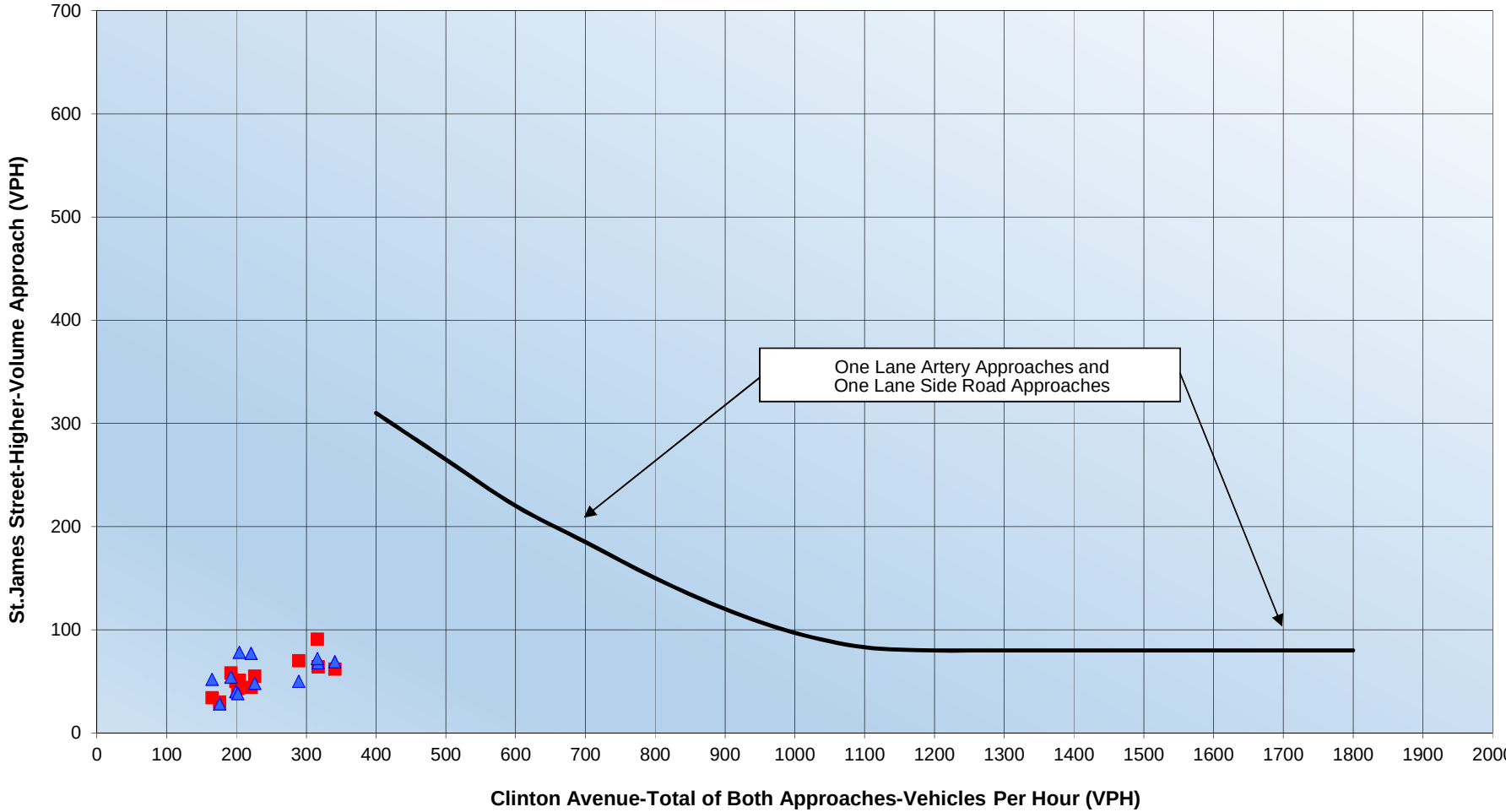
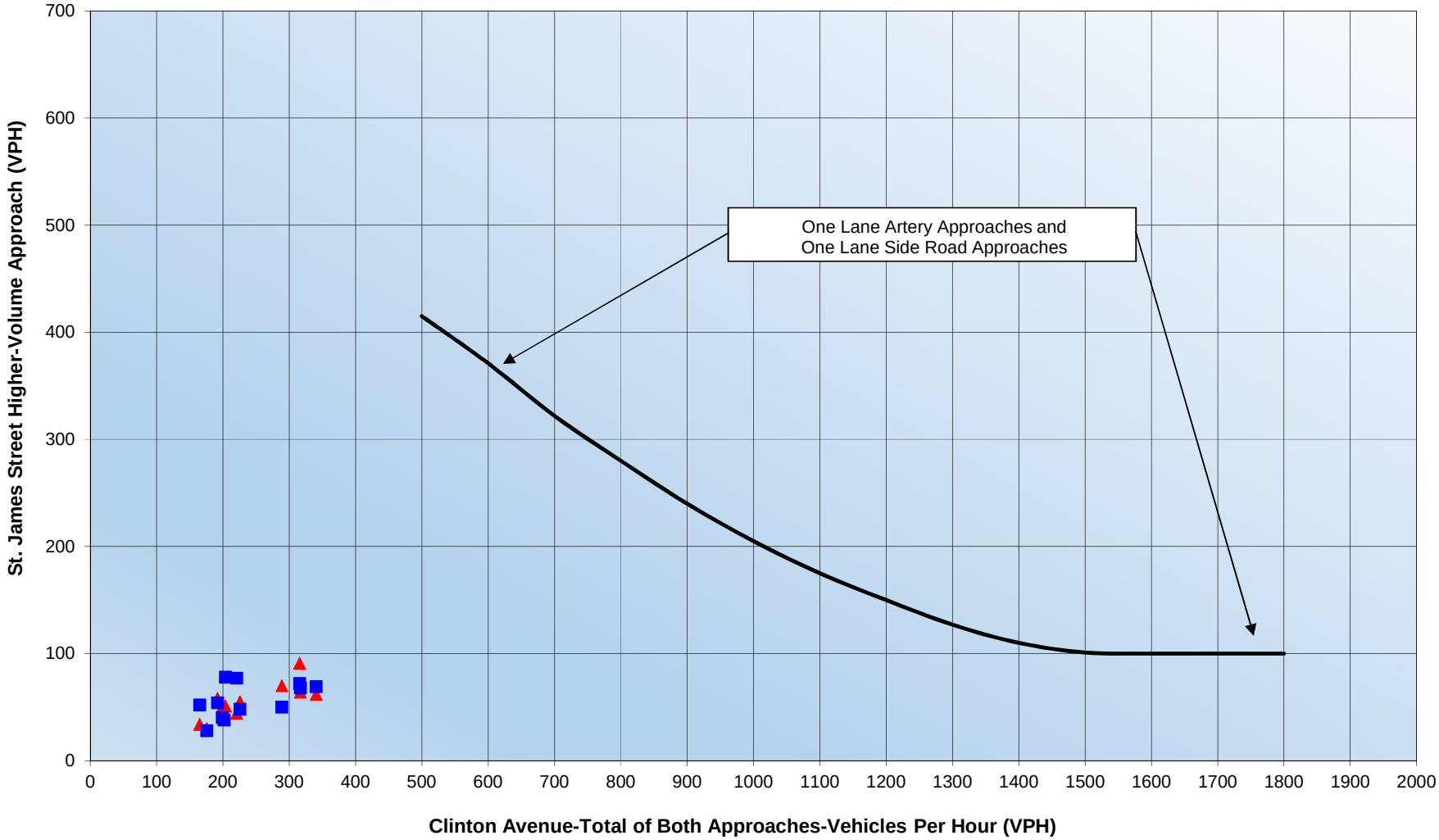


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Creighton Manning

Project:__________

Calculated By:__________
Calculated Date:__________
Checked By:__________
Checked Date: __________

Project:	Kingston Traffic Signal Warrants
Intersection	Clinton Ave/Franklin St
Date:	8/22/2019
Analyst:	MPF

Select your lane configuration

Main 1, Side 1 | 4 | 1 | 3

	arrant 1		arrant 1
100% (a)	80% (b)	100%(a)	80%(b)
500	400	750	600
150	120	75	60

Add your volumes

Hour	Clinton	Franklin St	Franklin St	Condition A												Conditi			
Beginning	NB/SB	EB	WB	100%				80%				100%				80%			
				Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall
12:00 AM																			
1:00 AM																			
2:00 AM																			
3:00 AM																			
4:00 AM																			
5:00 AM																			
6:00 AM																			
7:00 AM	146	44	56																
8:00 AM	187	91	65										Y				Y	Y	
9:00 AM	183	74	45														Y		
10:00 AM	184	66	53														Y		
11:00 AM	194	49	35																
12:00 PM	186	54	54																
1:00 PM	186	72	71														Y	Y	
2:00 PM	247	69	82											Y			Y	Y	
3:00 PM	295	89	95										Y	Y			Y	Y	
4:00 PM	240	89	119										Y	Y			Y	Y	
5:00 PM	257	81	90										Y	Y			Y	Y	
6:00 PM	169	61	66														Y	Y	
7:00 PM																			
8:00 PM																			
9:00 PM																			
10:00 PM																			
11:00 PM																			
		Hours Met					0				0				0				0
		Required					8				8				8				8
		Warrant Met?					No				No				No				No

NOTES:
(a) Basic minimum hourly volume.
(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.
(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.
(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated commun

Reference: Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition
New York State Supplement to the MUTCD
Checked: AMM, KWW on 10/21/2016

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

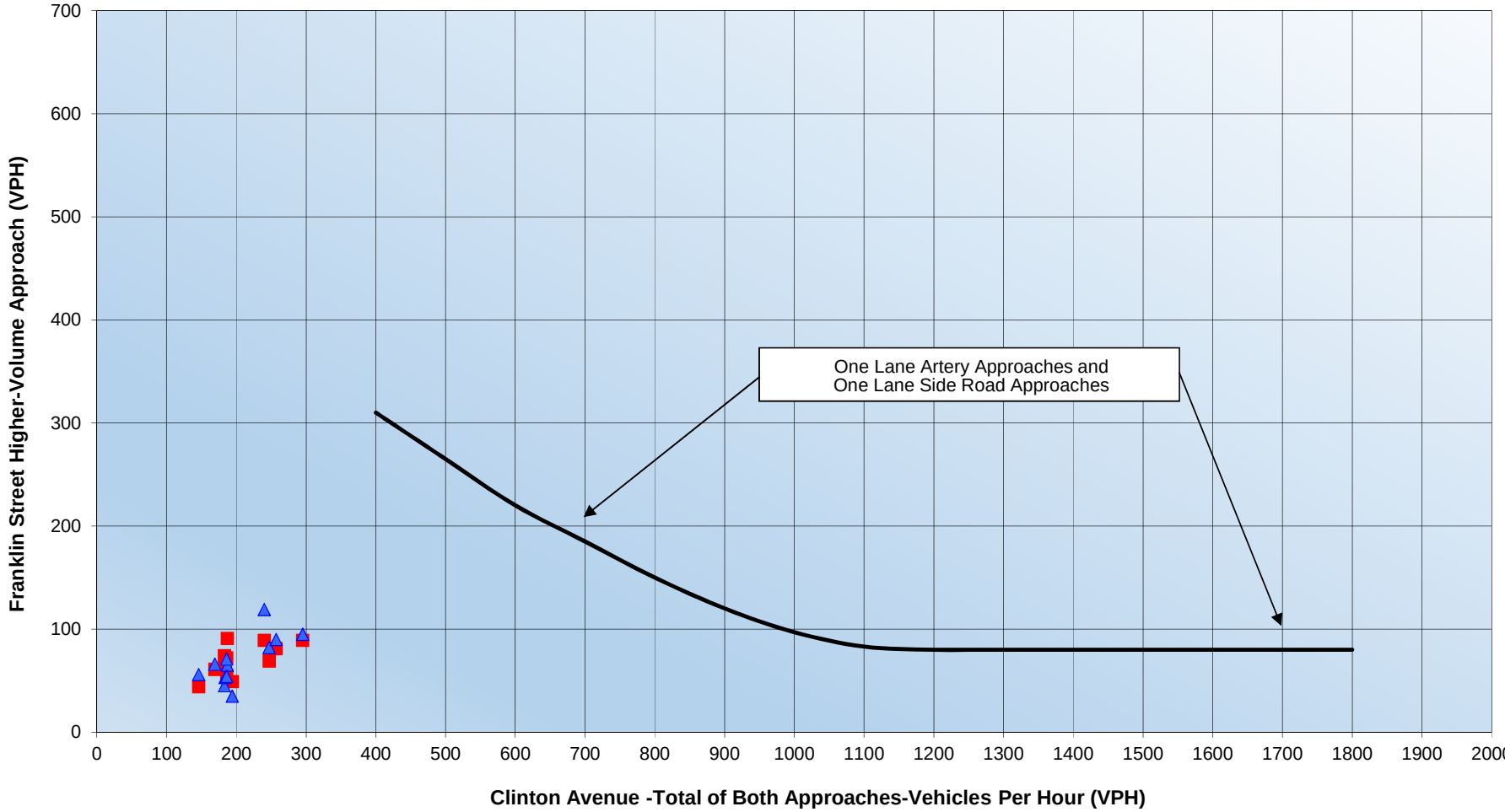
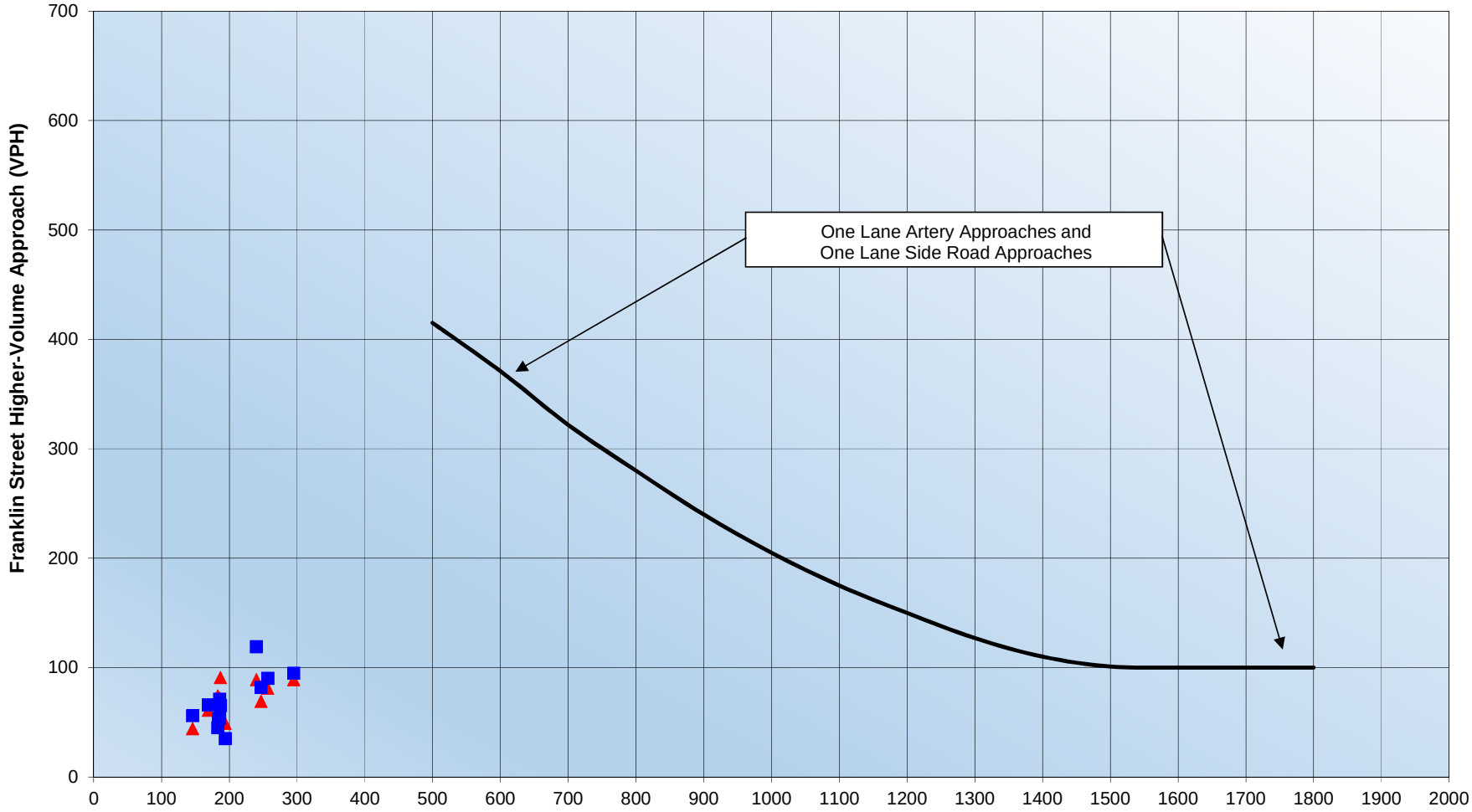


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Project:	Kingston Traffic Signal Warrants																							
Intersection	Clinton Ave/Henry Street																							
Date:	8/5/2019																							
Analyst:	MPF																							
	Select your lane configuration																							
			4																					
	Main 1, Side 1		1																					
													arrant 1,											arrant 1
			3				100% (a)						80% (b)	56% (d)				100%(a)						80%(b)
							500						400	280				750						600
							150						120	84				75						60
	Add your volumes																							
Hour	Clinton Ave	Henry St	Henry St				Condition A																	Conditi
Beginning	NB/SB	EB	WB				100%				80%				56%	100%				80%				
				Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Overa	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall				
12:00 AM																								
1:00 AM																								
2:00 AM																								
3:00 AM																								
4:00 AM																								
5:00 AM																								
6:00 AM																								
7:00 AM	156	60	63																			Y	Y	
8:00 AM	229	79	105											Y	Y							Y	Y	
9:00 AM	191	64	83												Y							Y	Y	
10:00 AM	188	48	60																				Y	
11:00 AM	188	56	64																				Y	
12:00 PM	222	62	63																			Y	Y	
1:00 PM	297	65	81												Y							Y	Y	
2:00 PM	245	89	102											Y	Y							Y	Y	
3:00 PM	300	95	128							Y		1		Y	Y							Y	Y	
4:00 PM	266	76	109											Y	Y							Y	Y	
5:00 PM	258	69	120							Y					Y							Y	Y	
6:00 PM	180	43	88												Y								Y	
7:00 PM																								
8:00 PM																								
9:00 PM																								
10:00 PM																								
11:00 PM																								
		Hours Met					0				0	1				0								0
		Required					8				8	8				8								8
		Warrant Met?					No				No	No				No								No
NOTES:																								
(a) Basic minimum hourly volume.																								
(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.																								
(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.																								
(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated community with																								
Reference:	Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition																							
	New York State Supplement to the MUTCD																							
Checked:	AMM, KWW on 10/21/2016																							

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

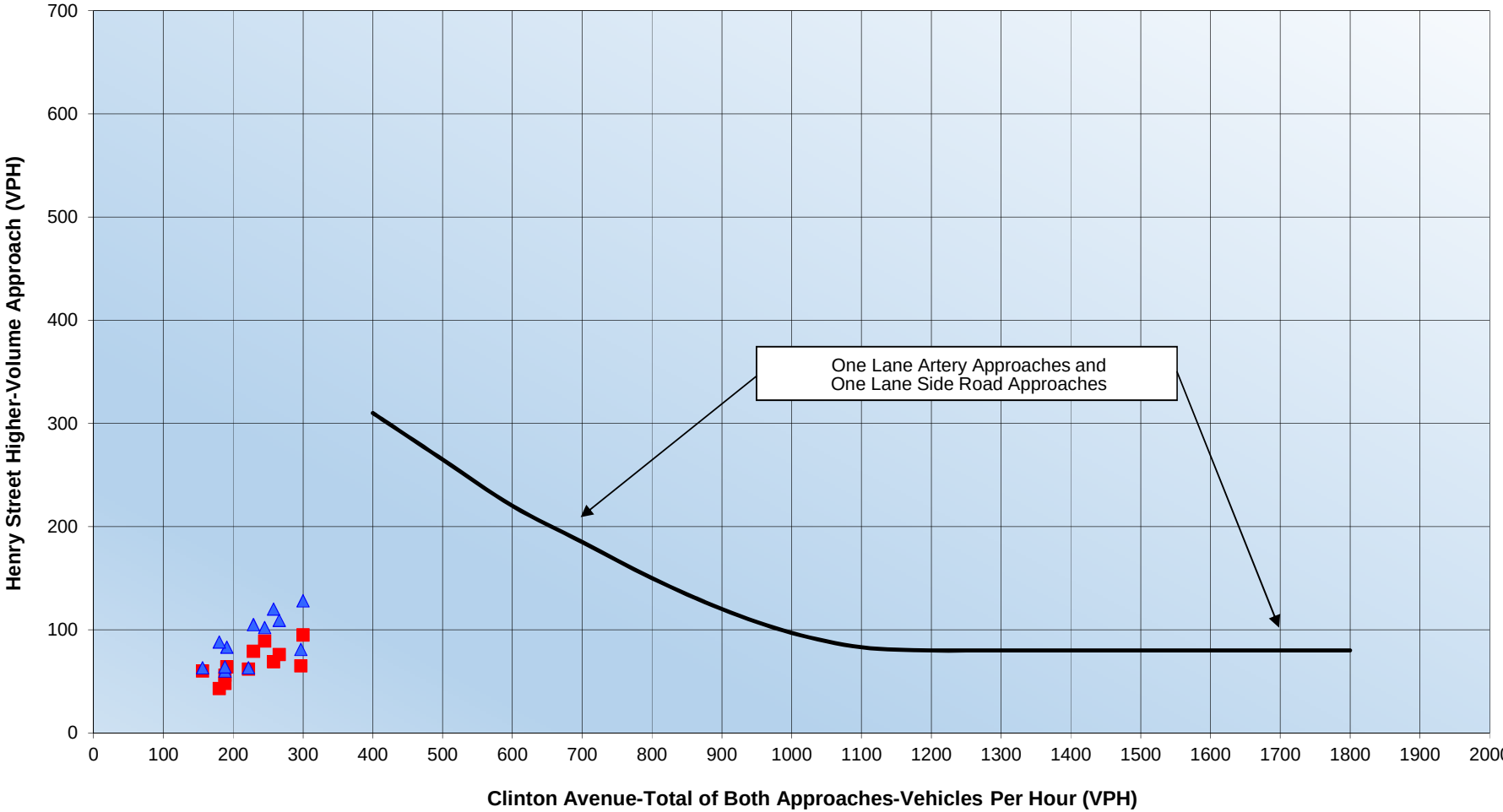
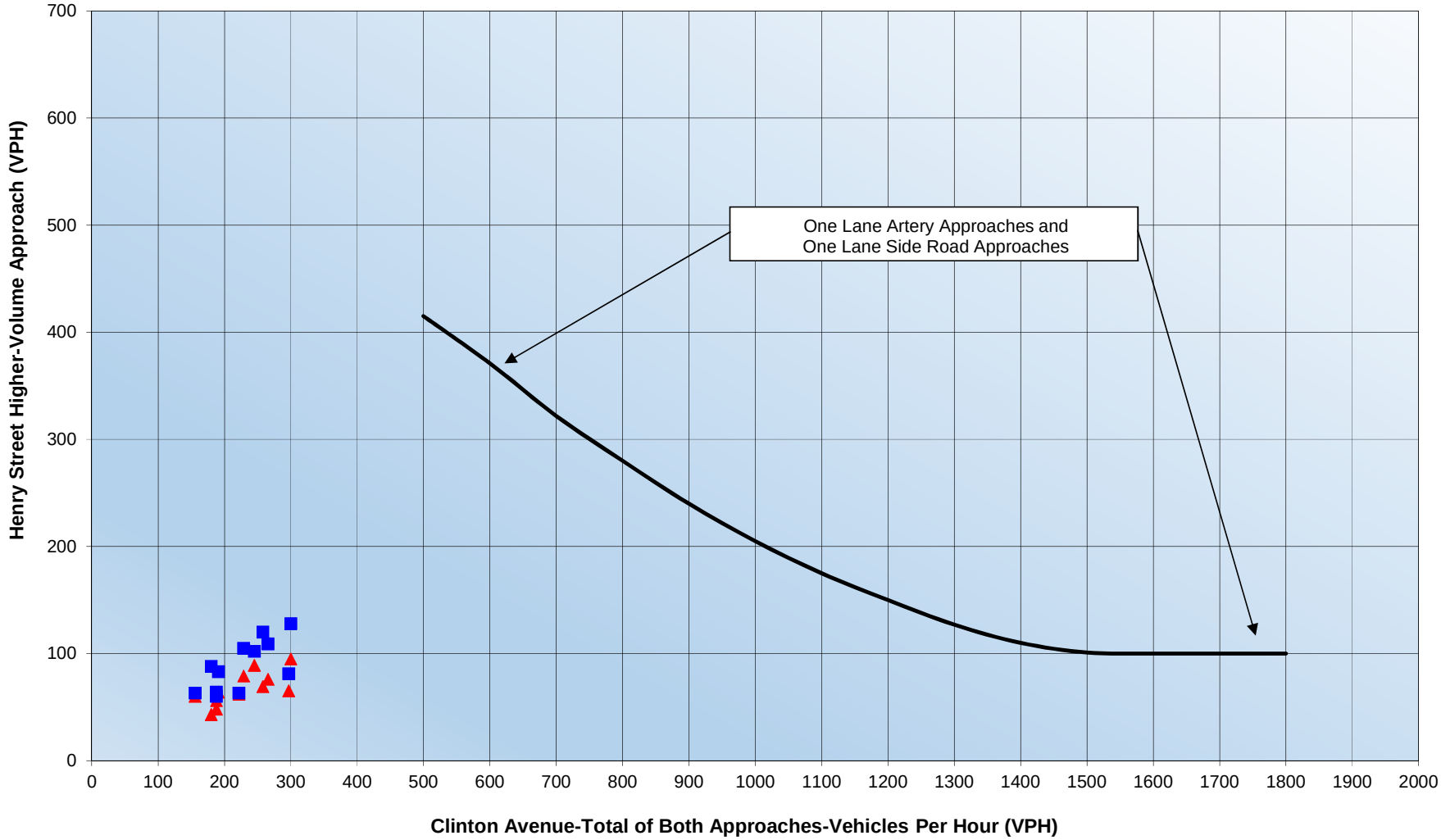


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Project:	Kingston Traffic Signal Warrants																					
Intersection	Fair St/St James St																					
Date:	10/15/2019																					
Analyst:	MPF																					
	Select your lane configuration																					
	Main 1, Side 1			4																		
				1																		
													arrant 1									arrant 1
				3				100% (a)					80% (b)				100%(a)					80%(b)
								500					400				750					600
								150					120				75					60
	Add your volumes																					
Hour	Fair St	St James S	St James S					Condition A														Conditi
Beginning	SB	EB	WB					100%				80%				100%				80%		
								Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall
12:00 AM																						
1:00 AM																						
2:00 AM																						
3:00 AM																						
4:00 AM																						
5:00 AM																						
6:00 AM																						
7:00 AM	64	39	15																			
8:00 AM	115	55	26																			
9:00 AM	102	40	13																			
10:00 AM	121	42	24																			
11:00 AM	104	53	28																			
12:00 PM	114	51	31																			
1:00 PM	141	57	37																			
2:00 PM	157	60	45																		Y	
3:00 PM	175	49	44																			
4:00 PM	187	72	42																		Y	
5:00 PM	197	81	38														Y				Y	
6:00 PM	122	39	25																			
7:00 PM																						
8:00 PM																						
9:00 PM																						
10:00 PM																						
11:00 PM																						
		Hours Met									0				0				0			0
		Required									8				8				8			8
		Warrant Met?									No				No				No			No
NOTES:																						
(a) Basic minimum hourly volume.																						
(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.																						
(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.																						
(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated community																						
Reference:	Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition																					
	New York State Supplement to the MUTCD																					
Checked:	AMM, KWW on 10/21/2016																					

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

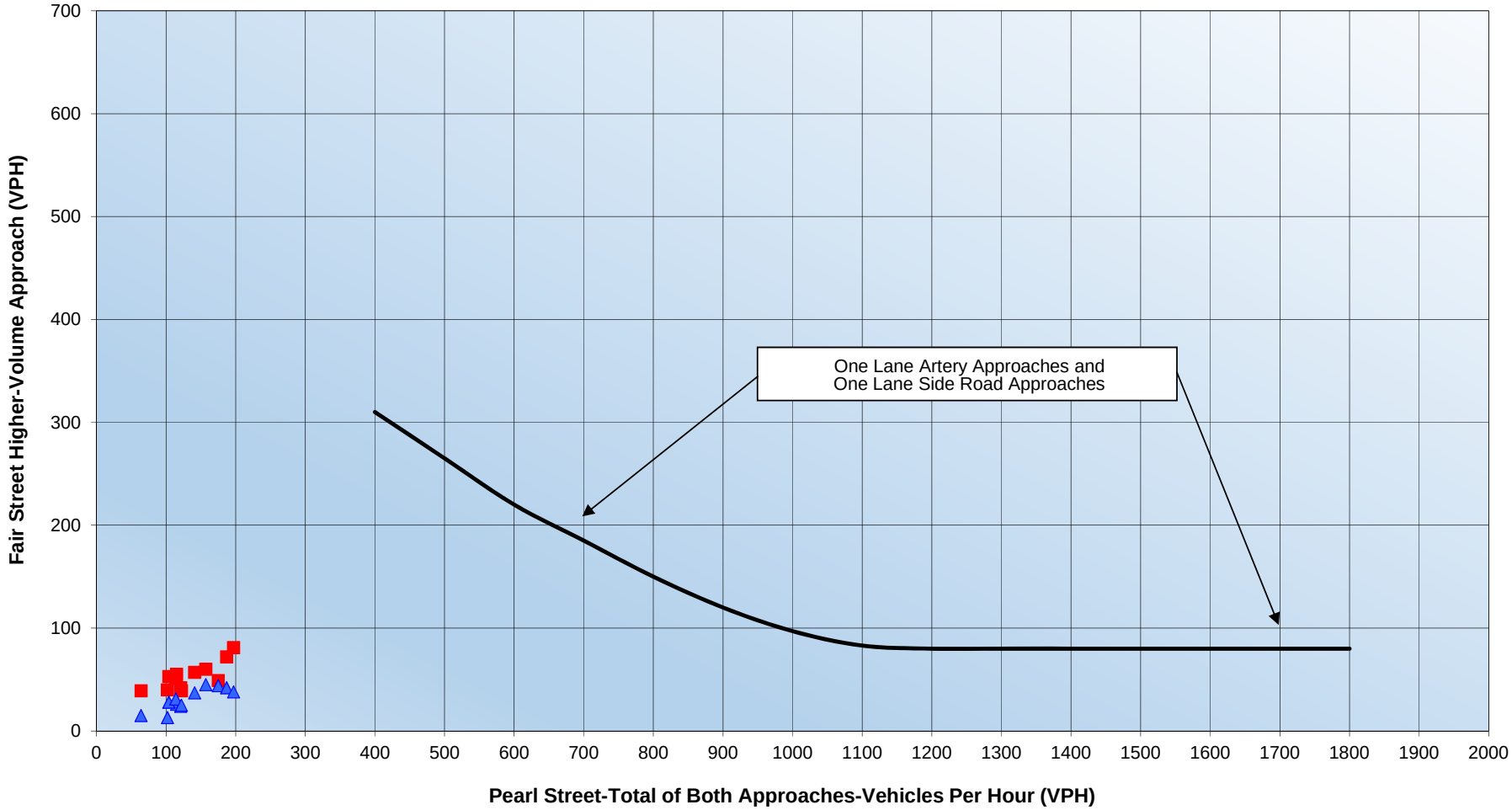
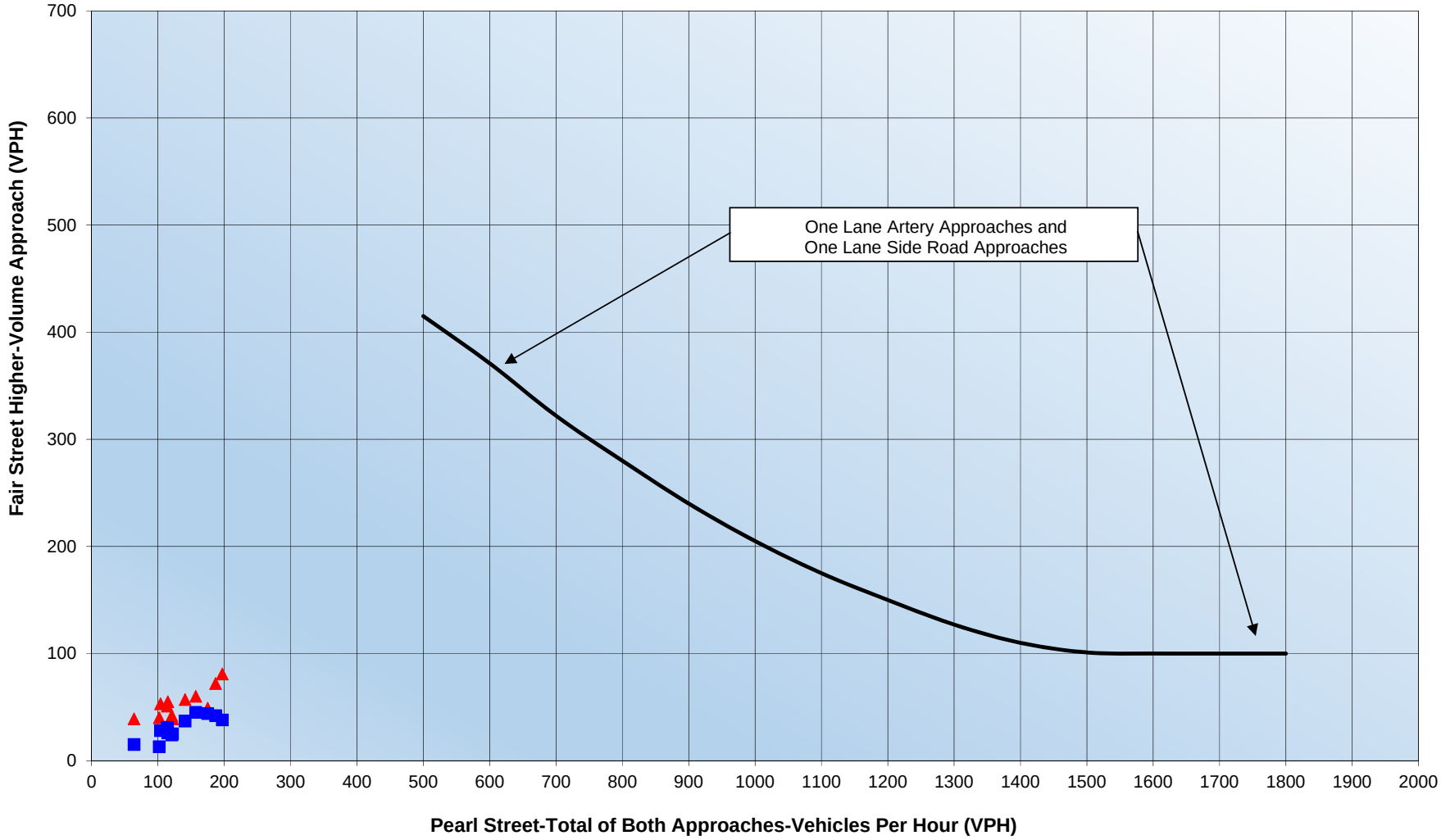


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Project:	Kingston Traffic Signal Warrants																					
Intersection	Foxhall Ave/Grand St/Shufeldt St																					
Date:	10/15/2019																					
Analyst:	MPF																					
	Select your lane configuration																					
			4																			
	Main 1, Side 1		1																			
													arrant 1									arrant 1
			3				100% (a)						80% (b)				100%(a)					80%(b)
							500						400				750					600
							150						120				75					60
	Add your volumes																					
Hour	Foxhall Ave	Grand St	Shufeldt St	Condition A																		Conditio
Beginning	NB/SB	EB	WB	100%				80%				100%				80%						
				Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall			
12:00 AM																						
1:00 AM																						
2:00 AM																						
3:00 AM																						
4:00 AM																						
5:00 AM																						
6:00 AM																						
7:00 AM	397	59	73															Y				
8:00 AM	319	67	63														Y	Y				
9:00 AM	283	83	38										Y				Y					
10:00 AM	254	68	24														Y					
11:00 AM	272	98	36										Y				Y					
12:00 PM	377	121	42						Y				Y				Y					
1:00 PM	386	94	55										Y				Y					
2:00 PM	417	111	60					Y					Y				Y	Y				
3:00 PM	459	138	57					Y	Y		1		Y				Y					
4:00 PM	423	145	48					Y	Y		1		Y				Y					
5:00 PM	400	123	50					Y	Y		1		Y				Y					
6:00 PM	381	82	37										Y				Y					
7:00 PM																						
8:00 PM																						
9:00 PM																						
10:00 PM																						
11:00 PM																						
		Hours Met					0				3				0							0
		Required					8				8				8							8
		Warrant Met?					No				No				No							No
NOTES:																						
(a) Basic minimum hourly volume.																						
(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.																						
(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.																						
(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated community																						
Reference:	Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition																					
	New York State Supplement to the MUTCD																					
Checked:	AMM, KWW on 10/21/2016																					

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

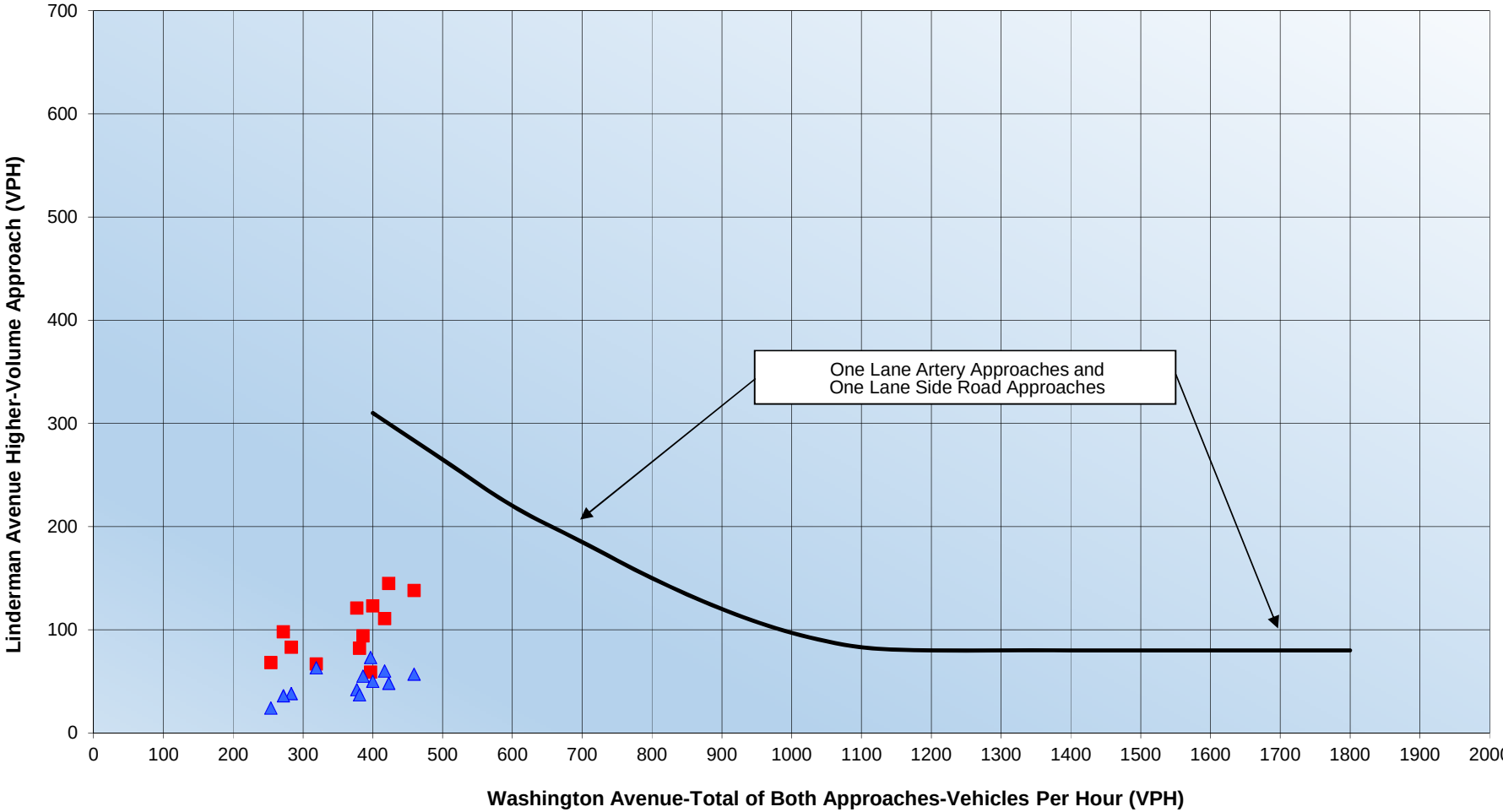
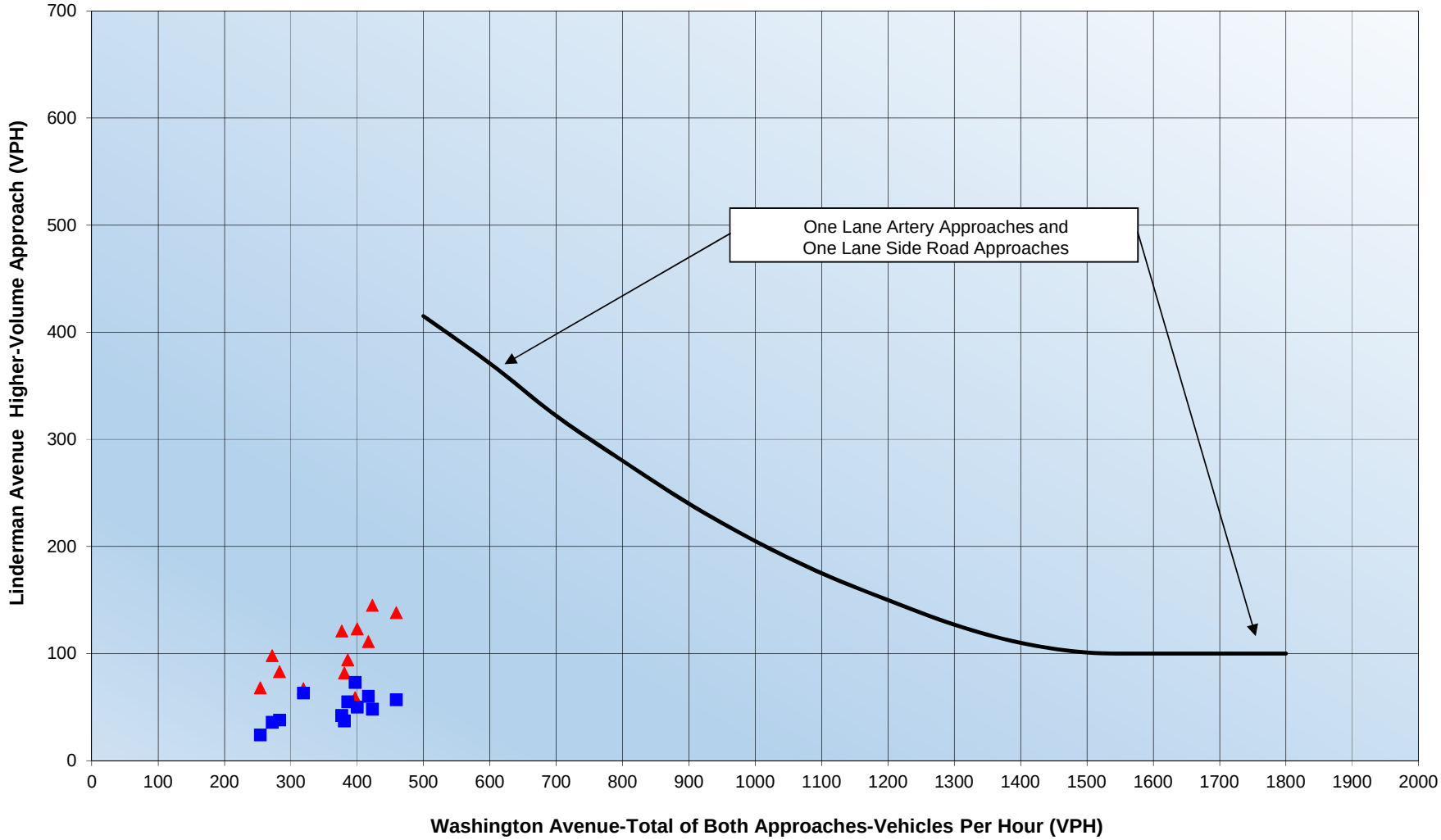


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Project:	Kingston Traffic Signal Warrants																					
Intersection	Lincoln St/E Chester St																					
Date:	10/15/2019																					
Analyst:	MPF																					
	Select your lane configuration																					
			4																			
	Main 1, Side 1		1																			
													arrant 1									arrant 1
			3				100% (a)						80% (b)				100%(a)					80%(b)
							500						400				750					600
							150						120				75					60
	Add your volumes																					
Hour	E Chester	Lincoln St	Lincoln St	Condition A																		Conditi
Beginning	NB/SB	EB	WB	100%				80%				100%				80%						
				Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall	Main	SS 1	SS 2	Overall			
12:00 AM																						
1:00 AM																						
2:00 AM																						
3:00 AM																						
4:00 AM																						
5:00 AM																						
6:00 AM																						
7:00 AM	382	15	70															Y				
8:00 AM	320	22	65															Y				
9:00 AM	306	23	29																			
10:00 AM	318	17	36																			
11:00 AM	406	19	40					Y														
12:00 PM	425	26	45					Y														
1:00 PM	392	17	40																			
2:00 PM	487	29	48					Y														
3:00 PM	502	31	56	Y				Y														
4:00 PM	545	31	48	Y				Y														
5:00 PM	552	31	53	Y				Y														
6:00 PM	410	31	47					Y														
7:00 PM																						
8:00 PM																						
9:00 PM																						
10:00 PM																						
11:00 PM																						
		Hours Met					0				0				0							0
		Required					8				8				8							8
		Warrant Met?					No				No				No							No
NOTES:																						
(a) Basic minimum hourly volume.																						
(b) Used for combination of Conditions A and B after adequate trial of other remedial measures.																						
(c) May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.																						
(d) May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major street speed exceeds 40 mph or in an isolated community																						
Reference:	Federal Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition																					
	New York State Supplement to the MUTCD																					
Checked:	AMM, KWW on 10/21/2016																					

Figure 4C-1
Four-Hour Vehicular Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes

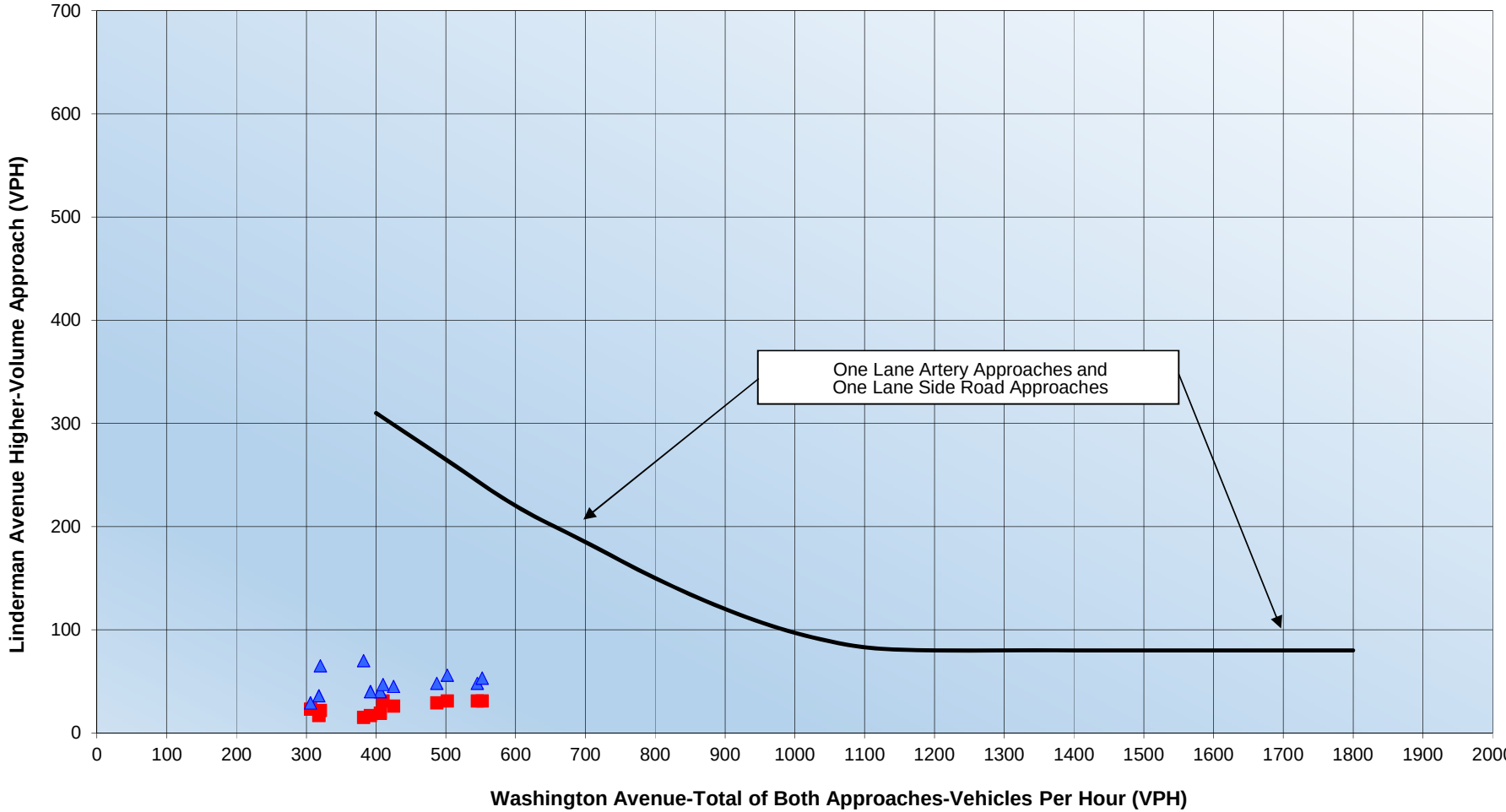
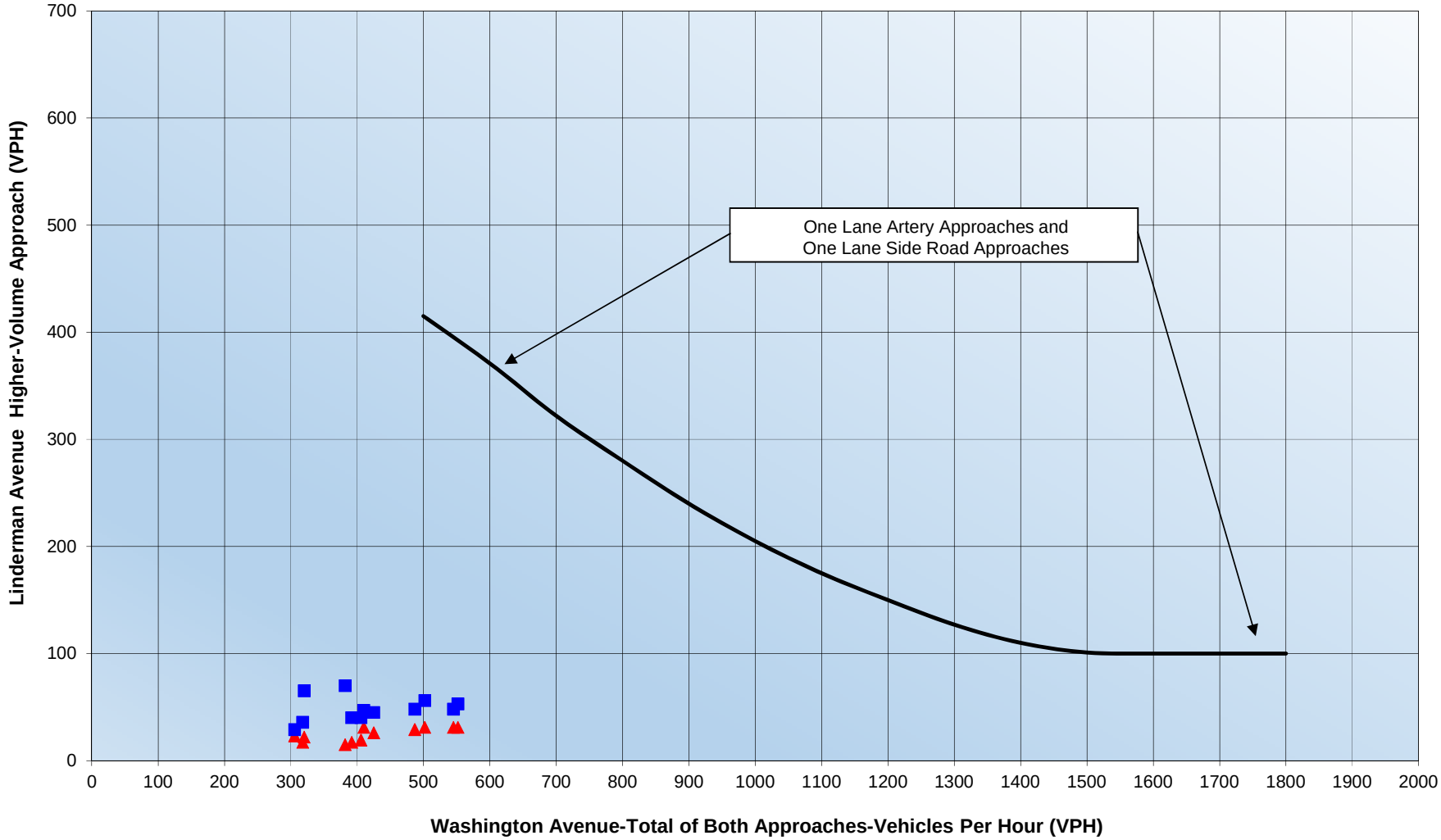


Figure 4C-3
Peak Hour Volume Warrant
Source: Federal MUTCD
Existing 2019 Traffic Volumes



Attachment O
Level of Service Calculations

Traffic Signal Removal Assessment
City of Kingston, New York

LOS Definitions

The following is an excerpt from the Highway Capacity Manual, 6th Edition (HCM).

Level of Service for Signalized Intersections

Level of Service (LOS) can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay alone is used to characterize LOS for the entire intersection or an approach. Control delay *and* volume-to-capacity (v/c) ratio are used to characterize LOS for a lane group. Delay quantifies the increase in travel time due to traffic signal control. It is also a surrogate measure of driver discomfort and fuel consumption. The v/c ratio quantifies the degree to which a phase's capacity is utilized by a lane group. The following paragraphs describe each LOS.

LOS A describes operations with a control delay of 10 s/veh or less and a v/c ratio no greater than 1.0. This level is typically assigned when the v/c ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B describes operations with control delay between 10 and 20 s/veh and a v/c ratio no greater than 1.0. This level is typically assigned when the v/c ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C describes operations with control delay between 20 and 35 s/veh and a v/c ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D describes operations with control delay between 35 and 55 s/veh and a v/c ratio no greater than 1.0. This level is typically assigned when the v/c ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E describes operations with control delay between 55 and 80 s/veh and a v/c ratio no greater than 1.0. This level is typically assigned when the v/c ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F describes operations with control delay exceeding 80 s/veh or a v/c ratio greater than 1.0. This level is typically assigned when the v/c ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

A lane group can incur a delay less than 80 s/veh when the v/c ratio exceeds 1.0. This condition typically occurs when the cycle length is short, the signal progression is favorable, or both. As a result, both the delay and v/c ratio are considered when lane group LOS is established. A ratio of 1.0 or more indicates that cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80 s/veh represents failure from a delay perspective).

Average control delay and queue length at roundabout controlled intersections are calculated using SIDRA Intersection. The physical geometry such as entry lane width and approach flare, and traffic volume at the roundabout are factors that influence the intersection’s performance. The average delay reported using SIDRA Intersection is based on the signalized HCM Method of Delay for Level-of-Service.

Level of Service Criteria for Unsignalized Intersections

Level of service (LOS) for Two-Way Stop-Controlled (TWSC) intersections is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns by using criteria given in Exhibit 20-2. LOS is not defined for the intersection as a whole or for major-street approaches for three primary reasons: (a) major-street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles at a typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay for all vehicles; and (c) the resulting low delay can mask important LOS deficiencies for minor movements. LOS F is assigned to the movement if the volume-to-capacity (v/c) ratio for the movement exceeds 1.0, regardless of the control delay.

The LOS criteria for TWSC intersections are somewhat different from the criteria used in Chapter 18 for signalized intersections, primarily because user perceptions differ among transportation facility types. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will present greater delay than an unsignalized intersection. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable than they are at signals, which can reduce users' delay tolerance.

The LOS criteria for All-Way Stop-Controlled (AWSC) intersections are given in Exhibit 21-8. LOS F is assigned if the v/c ratio of a lane exceeds 1.0, regardless of the control delay. For assessment of LOS at the approach and intersection levels, LOS is based solely on control delay.

Exhibits 20-2/21-8:
Level-of-Service Criteria for Stop Controlled Intersections

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio	
	v/c ≤ 1.0	v/c ≥ 1.0
10.0	A	F
>10.0 and ≤ 15.0	B	F
>15.0 and ≤ 25.0	C	F
>25.0 and ≤ 35.0	D	F
>35.0 and ≤ 50.0	E	F
>50.0	F	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	13	23	13	3	27	37	11	212	0	16	260	15
Future Volume (veh/h)	13	23	13	3	27	37	11	212	0	16	260	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.89	1.00	1.00	1.00	0.89
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1884	1884	1884	1806	1806	1806	1853	1853	1853
Adj Flow Rate, veh/h	15	27	9	4	32	33	13	249	0	19	306	17
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	4	4	4	6	6	6	11	11	11	8	8	8
Cap, veh/h	192	320	93	69	249	235	74	759	0	79	727	39
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.48	0.48	0.00	0.48	0.48	0.48
Sat Flow, veh/h	361	991	290	23	771	728	27	1569	0	36	1502	80
Grp Volume(v), veh/h	51	0	0	69	0	0	262	0	0	342	0	0
Grp Sat Flow(s),veh/h/ln	1642	0	0	1522	0	0	1596	0	0	1619	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.2	0.0	0.0	2.0	0.0	0.0	5.4	0.0	0.0	8.4	0.0	0.0
Prop In Lane	0.29		0.18	0.06		0.48	0.05		0.00	0.06		0.05
Lane Grp Cap(c), veh/h	605	0	0	552	0	0	833	0	0	845	0	0
V/C Ratio(X)	0.08	0.00	0.00	0.12	0.00	0.00	0.31	0.00	0.00	0.40	0.00	0.00
Avail Cap(c_a), veh/h	605	0	0	552	0	0	833	0	0	845	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.6	0.0	0.0	14.9	0.0	0.0	9.7	0.0	0.0	10.4	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.7	0.0	0.0	2.1	0.0	0.0	2.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.9	0.0	0.0	15.4	0.0	0.0	10.6	0.0	0.0	11.9	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		51			69			262			342	
Approach Delay, s/veh		14.9			15.4			10.6			11.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	36.0	26.0	36.0	26.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	30.0	20.0	30.0	20.0
Max Q Clear Time (g_c+I1), s	7.4	3.2	10.4	4.0
Green Ext Time (p_c), s	1.5	0.2	2.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	23	13	3	27	37	11	212	0	16	260	15
Future Vol, veh/h	13	23	13	3	27	37	11	212	0	16	260	15
Conflicting Peds, #/hr	0	0	0	1	0	4	0	0	1	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	4	0	0	6	11	0	11	0	6	8	0
Mvmt Flow	15	27	15	4	32	44	13	249	0	19	306	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	670	632	316	654	641	257	324	0	0	253	0	0
Stage 1	353	353	-	279	279	-	-	-	-	-	-	-
Stage 2	317	279	-	375	362	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.54	6.2	7.1	6.56	6.31	4.1	-	-	4.16	-	-
Critical Hdwy Stg 1	6.1	5.54	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.54	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.036	3.3	3.5	4.054	3.399	2.2	-	-	2.254	-	-
Pot Cap-1 Maneuver	373	395	729	383	388	760	1247	-	-	1289	-	-
Stage 1	668	627	-	732	673	-	-	-	-	-	-	-
Stage 2	698	676	-	650	618	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	320	382	728	345	375	753	1247	-	-	1283	-	-
Mov Cap-2 Maneuver	320	382	-	345	375	-	-	-	-	-	-	-
Stage 1	660	616	-	720	662	-	-	-	-	-	-	-
Stage 2	616	665	-	597	607	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.1	13.2	0.4	0.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1247	-	-	413	516	1283	-	-
HCM Lane V/C Ratio	0.01	-	-	0.14	0.153	0.015	-	-
HCM Control Delay (s)	7.9	0	-	15.1	13.2	7.8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.5	0	-	-

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	23	13	3	27	37	11	212	0	16	260	15
Future Vol, veh/h	13	23	13	3	27	37	11	212	0	16	260	15
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	0	4	0	0	6	11	0	11	0	6	8	0
Mvmt Flow	15	27	15	4	32	44	13	249	0	19	306	18
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.9	8.7	10.1	11.3
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	27%	4%	5%
Vol Thru, %	95%	47%	40%	89%
Vol Right, %	0%	27%	55%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	223	49	67	291
LT Vol	11	13	3	16
Through Vol	212	23	27	260
RT Vol	0	13	37	15
Lane Flow Rate	262	58	79	342
Geometry Grp	1	1	1	1
Degree of Util (X)	0.338	0.085	0.11	0.44
Departure Headway (Hd)	4.644	5.286	5.036	4.626
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	771	673	706	777
Service Time	2.693	3.359	3.107	2.672
HCM Lane V/C Ratio	0.34	0.086	0.112	0.44
HCM Control Delay	10.1	8.9	8.7	11.3
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	1.5	0.3	0.4	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	17	21	5	9	51	31	20	265	6	15	297	16
Future Volume (veh/h)	17	21	5	9	51	31	20	265	6	15	297	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.89	1.00	1.00	0.89
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1961	1961	1961	1914	1914	1914	1961	1961	1961
Adj Flow Rate, veh/h	18	22	0	9	53	23	21	276	6	16	309	16
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	1	1	1	4	4	4	1	1	1
Cap, veh/h	288	324	0	88	360	142	86	769	16	75	778	39
Arrive On Green	0.32	0.32	0.00	0.32	0.32	0.32	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	633	1005	0	73	1115	441	48	1588	33	30	1608	81
Grp Volume(v), veh/h	40	0	0	85	0	0	303	0	0	341	0	0
Grp Sat Flow(s),veh/h/ln	1637	0	0	1629	0	0	1670	0	0	1719	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.0	0.0	2.3	0.0	0.0	6.9	0.0	0.0	7.8	0.0	0.0
Prop In Lane	0.45		0.00	0.11		0.27	0.07		0.02	0.05		0.05
Lane Grp Cap(c), veh/h	612	0	0	590	0	0	870	0	0	892	0	0
V/C Ratio(X)	0.07	0.00	0.00	0.14	0.00	0.00	0.35	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	612	0	0	590	0	0	870	0	0	892	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.5	0.0	0.0	15.0	0.0	0.0	10.0	0.0	0.0	10.3	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	0.0	0.0	1.1	0.0	0.0	1.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.9	0.0	0.0	2.5	0.0	0.0	2.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.7	0.0	0.0	15.5	0.0	0.0	11.1	0.0	0.0	11.5	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		40			85			303			341	
Approach Delay, s/veh		14.7			15.5			11.1			11.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	36.0	26.0	36.0	26.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	30.0	20.0	30.0	20.0
Max Q Clear Time (g_c+I1), s	8.9	2.9	9.8	4.3
Green Ext Time (p_c), s	1.8	0.1	2.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	21	5	9	51	31	20	265	6	15	297	16
Future Vol, veh/h	17	21	5	9	51	31	20	265	6	15	297	16
Conflicting Peds, #/hr	0	0	4	0	0	1	0	0	3	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	0	2	2	1	2	2	4	2	2	1	2
Mvmt Flow	18	22	5	9	53	32	21	276	6	16	309	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	716	678	323	691	683	283	327	0	0	285	0	0
Stage 1	351	351	-	324	324	-	-	-	-	-	-	-
Stage 2	365	327	-	367	359	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.5	6.22	7.12	6.51	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.5	-	6.12	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.5	-	6.12	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4	3.318	3.518	4.009	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	345	377	718	359	373	756	1233	-	-	1277	-	-
Stage 1	666	636	-	688	651	-	-	-	-	-	-	-
Stage 2	654	651	-	653	629	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	284	362	714	328	358	753	1232	-	-	1273	-	-
Mov Cap-2 Maneuver	284	362	-	328	358	-	-	-	-	-	-	-
Stage 1	652	626	-	672	636	-	-	-	-	-	-	-
Stage 2	562	636	-	613	619	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17	15.7	0.5	0.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1232	-	-	344	431	1273	-	-
HCM Lane V/C Ratio	0.017	-	-	0.13	0.22	0.012	-	-
HCM Control Delay (s)	8	0	-	17	15.7	7.9	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.8	0	-	-

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	21	5	9	51	31	20	265	6	15	297	16
Future Vol, veh/h	17	21	5	9	51	31	20	265	6	15	297	16
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	0	2	2	1	2	2	4	2	2	1	2
Mvmt Flow	18	22	5	9	53	32	21	276	6	16	309	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.1	9.2	10.8	11.3
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	40%	10%	5%
Vol Thru, %	91%	49%	56%	91%
Vol Right, %	2%	12%	34%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	291	43	91	328
LT Vol	20	17	9	15
Through Vol	265	21	51	297
RT Vol	6	5	31	16
Lane Flow Rate	303	45	95	342
Geometry Grp	1	1	1	1
Degree of Util (X)	0.395	0.069	0.139	0.439
Departure Headway (Hd)	4.692	5.557	5.275	4.63
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	764	638	674	772
Service Time	2.746	3.648	3.356	2.683
HCM Lane V/C Ratio	0.397	0.071	0.141	0.443
HCM Control Delay	10.8	9.1	9.2	11.3
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	1.9	0.2	0.5	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	20	90	40	4	41	31	9	247	24	63	249	12
Future Volume (veh/h)	20	90	40	4	41	31	9	247	24	63	249	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1781	1781	1781	1752	1752	1752	1796	1796	1796
Adj Flow Rate, veh/h	22	100	40	4	46	32	10	274	27	70	277	12
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	8	8	8	10	10	10	7	7	7
Cap, veh/h	85	314	113	55	260	170	58	814	78	184	690	28
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	118	1194	430	21	986	645	18	1546	149	243	1312	54
Grp Volume(v), veh/h	162	0	0	82	0	0	311	0	0	359	0	0
Grp Sat Flow(s),veh/h/ln	1742	0	0	1652	0	0	1712	0	0	1608	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.0	2.9	0.0	0.0	7.9	0.0	0.0	9.2	0.0	0.0
Prop In Lane	0.14		0.25	0.05		0.39	0.03		0.09	0.19		0.03
Lane Grp Cap(c), veh/h	512	0	0	484	0	0	950	0	0	903	0	0
V/C Ratio(X)	0.32	0.00	0.00	0.17	0.00	0.00	0.33	0.00	0.00	0.40	0.00	0.00
Avail Cap(c_a), veh/h	512	0	0	484	0	0	950	0	0	903	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.7	0.0	0.0	21.7	0.0	0.0	10.4	0.0	0.0	10.7	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	0.8	0.0	0.0	0.9	0.0	0.0	1.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	1.2	0.0	0.0	2.9	0.0	0.0	3.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.3	0.0	0.0	22.5	0.0	0.0	11.3	0.0	0.0	12.0	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	A
Approach Vol, veh/h		162			82			311			359	
Approach Delay, s/veh		24.3			22.5			11.3			12.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		28.0		48.0		28.0		48.0				
Change Period (Y+Rc), s		8.0		8.0		8.0		8.0				
Max Green Setting (Gmax), s		20.0		40.0		20.0		40.0				
Max Q Clear Time (g_c+I1), s		7.6		11.2		4.9		9.9				
Green Ext Time (p_c), s		0.6		2.5		0.3		2.0				

Intersection Summary		
HCM 6th Ctrl Delay		14.9
HCM 6th LOS		B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	90	40	4	41	31	9	247	24	63	249	12
Future Vol, veh/h	20	90	40	4	41	31	9	247	24	63	249	12
Conflicting Peds, #/hr	0	0	1	0	0	2	0	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	8	2	2	10	2	2	7	2
Mvmt Flow	22	100	44	4	46	34	10	274	27	70	277	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	775	746	286	805	739	290	291	0	0	301	0	0
Stage 1	425	425	-	308	308	-	-	-	-	-	-	-
Stage 2	350	321	-	497	431	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.58	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.072	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	315	342	753	301	338	749	1271	-	-	1260	-	-
Stage 1	607	586	-	702	650	-	-	-	-	-	-	-
Stage 2	666	652	-	555	573	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	251	316	752	202	313	748	1270	-	-	1260	-	-
Mov Cap-2 Maneuver	251	316	-	202	313	-	-	-	-	-	-	-
Stage 1	601	547	-	696	644	-	-	-	-	-	-	-
Stage 2	584	646	-	398	535	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.4	16.6	0.3	1.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1270	-	-	359	395	1260	-	-
HCM Lane V/C Ratio	0.008	-	-	0.464	0.214	0.056	-	-
HCM Control Delay (s)	7.9	0	-	23.4	16.6	8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	2.4	0.8	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	90	40	4	41	31	9	247	24	63	249	12
Future Vol, veh/h	20	90	40	4	41	31	9	247	24	63	249	12
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	8	2	2	10	2	2	7	2
Mvmt Flow	22	100	44	4	46	34	10	274	27	70	277	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.7	9.7	12.2	13.5
HCM LOS	B	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	13%	5%	19%
Vol Thru, %	88%	60%	54%	77%
Vol Right, %	9%	27%	41%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	280	150	76	324
LT Vol	9	20	4	63
Through Vol	247	90	41	249
RT Vol	24	40	31	12
Lane Flow Rate	311	167	84	360
Geometry Grp	1	1	1	1
Degree of Util (X)	0.444	0.263	0.135	0.514
Departure Headway (Hd)	5.143	5.673	5.751	5.135
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	700	632	622	702
Service Time	3.179	3.717	3.802	3.169
HCM Lane V/C Ratio	0.444	0.264	0.135	0.513
HCM Control Delay	12.2	10.7	9.7	13.5
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	2.3	1.1	0.5	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	5	60	22	21	90	65	15	316	15	48	321	12
Future Volume (veh/h)	5	60	22	21	90	65	15	316	15	48	321	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1856	1856	1856	1870	1870	1870
Adj Flow Rate, veh/h	6	69	20	24	103	73	17	363	17	55	369	13
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	1	1	1	1	1	1	3	3	3	2	2	2
Cap, veh/h	59	364	100	81	260	165	66	897	41	129	812	27
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	34	1385	378	107	987	629	31	1705	78	143	1543	52
Grp Volume(v), veh/h	95	0	0	200	0	0	397	0	0	437	0	0
Grp Sat Flow(s),veh/h/ln	1797	0	0	1723	0	0	1814	0	0	1737	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	7.2	0.0	0.0	9.9	0.0	0.0	11.1	0.0	0.0
Prop In Lane	0.06		0.21	0.12		0.36	0.04		0.04	0.13		0.03
Lane Grp Cap(c), veh/h	523	0	0	506	0	0	1004	0	0	968	0	0
V/C Ratio(X)	0.18	0.00	0.00	0.39	0.00	0.00	0.40	0.00	0.00	0.45	0.00	0.00
Avail Cap(c_a), veh/h	523	0	0	506	0	0	1004	0	0	968	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.8	0.0	0.0	23.3	0.0	0.0	10.9	0.0	0.0	11.1	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	2.3	0.0	0.0	1.2	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	3.2	0.0	0.0	3.9	0.0	0.0	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.5	0.0	0.0	25.6	0.0	0.0	12.0	0.0	0.0	12.7	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	A
Approach Vol, veh/h		95			200			397			437	
Approach Delay, s/veh		22.5			25.6			12.0			12.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	28.0	48.0	28.0	48.0
Change Period (Y+Rc), s	8.0	8.0	8.0	8.0
Max Green Setting (Gmax), s	20.0	40.0	20.0	40.0
Max Q Clear Time (g_c+I1), s	5.1	13.1	9.2	11.9
Green Ext Time (p_c), s	0.3	3.1	0.8	2.7

Intersection Summary	
HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	9.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	60	22	21	90	65	15	316	15	48	321	12
Future Vol, veh/h	5	60	22	21	90	65	15	316	15	48	321	12
Conflicting Peds, #/hr	0	0	1	0	0	2	0	0	4	0	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	1	2	2	1	2	2	3	2	2	2	2
Mvmt Flow	6	69	25	24	103	75	17	363	17	55	369	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	986	907	380	944	906	378	386	0	0	384	0	0
Stage 1	489	489	-	410	410	-	-	-	-	-	-	-
Stage 2	497	418	-	534	496	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.51	6.22	7.12	6.51	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.51	-	6.12	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.51	-	6.12	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.009	3.318	3.518	4.009	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	227	277	667	242	277	669	1172	-	-	1174	-	-
Stage 1	561	551	-	619	597	-	-	-	-	-	-	-
Stage 2	555	592	-	530	547	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	129	254	664	173	254	665	1169	-	-	1170	-	-
Mov Cap-2 Maneuver	129	254	-	173	254	-	-	-	-	-	-	-
Stage 1	549	516	-	605	584	-	-	-	-	-	-	-
Stage 2	397	579	-	415	513	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.6	36.8	0.4	1
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1169	-	-	282	307	1170	-	-
HCM Lane V/C Ratio	0.015	-	-	0.355	0.659	0.047	-	-
HCM Control Delay (s)	8.1	0	-	24.6	36.8	8.2	0	-
HCM Lane LOS	A	A	-	C	E	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.5	4.3	0.1	-	-

Intersection	
Intersection Delay, s/veh	17.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	60	22	21	90	65	15	316	15	48	321	12
Future Vol, veh/h	5	60	22	21	90	65	15	316	15	48	321	12
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	1	2	2	1	2	2	3	2	2	2	2
Mvmt Flow	6	69	25	24	103	75	17	363	17	55	369	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.2	12.8	17.8	19.7
HCM LOS	B	B	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	6%	12%	13%
Vol Thru, %	91%	69%	51%	84%
Vol Right, %	4%	25%	37%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	346	87	176	381
LT Vol	15	5	21	48
Through Vol	316	60	90	321
RT Vol	15	22	65	12
Lane Flow Rate	398	100	202	438
Geometry Grp	1	1	1	1
Degree of Util (X)	0.629	0.185	0.354	0.676
Departure Headway (Hd)	5.693	6.666	6.307	5.663
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	640	539	573	644
Service Time	3.693	4.696	4.331	3.663
HCM Lane V/C Ratio	0.622	0.186	0.353	0.68
HCM Control Delay	17.8	11.2	12.8	19.7
HCM Lane LOS	C	B	B	C
HCM 95th-tile Q	4.4	0.7	1.6	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	31	13	27	35	15	293	0	0	278	7
Future Volume (veh/h)	10	0	31	13	27	35	15	293	0	0	278	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	0.99		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1841	1841	1841	1781	1781	0	0	1781	1781
Adj Flow Rate, veh/h	11	0	27	14	28	34	16	308	0	0	293	7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	4	4	4	8	8	0	0	8	8
Cap, veh/h	208	36	423	142	270	281	73	795	0	0	799	19
Arrive On Green	0.38	0.00	0.38	0.38	0.38	0.38	0.46	0.46	0.00	0.00	0.46	0.46
Sat Flow, veh/h	354	94	1100	198	703	730	33	1723	0	0	1732	41
Grp Volume(v), veh/h	38	0	0	76	0	0	324	0	0	0	0	300
Grp Sat Flow(s),veh/h/ln	1548	0	0	1631	0	0	1757	0	0	0	0	1774
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1
Cycle Q Clear(g_c), s	0.9	0.0	0.0	1.9	0.0	0.0	7.8	0.0	0.0	0.0	0.0	7.1
Prop In Lane	0.29		0.71	0.18		0.45	0.05		0.00	0.00		0.02
Lane Grp Cap(c), veh/h	667	0	0	693	0	0	869	0	0	0	0	819
V/C Ratio(X)	0.06	0.00	0.00	0.11	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.37
Avail Cap(c_a), veh/h	667	0	0	693	0	0	869	0	0	0	0	819
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	0.0	0.0	12.9	0.0	0.0	11.5	0.0	0.0	0.0	0.0	11.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.7	0.0	0.0	3.0	0.0	0.0	0.0	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.8	0.0	0.0	13.2	0.0	0.0	12.7	0.0	0.0	0.0	0.0	12.6
LnGrp LOS	B	A	A	B	A	A	B	A	A	A	A	B
Approach Vol, veh/h		38			76			324			300	
Approach Delay, s/veh		12.8			13.2			12.7			12.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.0		30.0		35.0		30.0				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		30.0		25.0		30.0		25.0				
Max Q Clear Time (g_c+I1), s		9.8		2.9		9.1		3.9				
Green Ext Time (p_c), s		1.9		0.1		1.7		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰			↱	
Traffic Vol, veh/h	10	0	31	13	27	35	15	293	0	0	278	7
Future Vol, veh/h	10	0	31	13	27	35	15	293	0	0	278	7
Conflicting Peds, #/hr	0	0	6	0	0	6	0	0	4	0	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	6	8	4	13	13	8	0	0	8	0
Mvmt Flow	11	0	33	14	28	37	16	308	0	0	293	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	684	645	311	659	648	314	308	0	-	-	-	0
Stage 1	305	305	-	340	340	-	-	-	-	-	-	-
Stage 2	379	340	-	319	308	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.26	7.18	6.54	6.33	4.23	-	-	-	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.18	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.18	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.354	3.572	4.036	3.417	2.317	-	-	-	-	-
Pot Cap-1 Maneuver	365	393	720	369	387	701	1193	-	0	0	-	-
Stage 1	709	666	-	662	636	-	-	-	0	0	-	-
Stage 2	647	643	-	680	657	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	318	384	710	346	378	697	1184	-	-	-	-	-
Mov Cap-2 Maneuver	318	384	-	346	378	-	-	-	-	-	-	-
Stage 1	693	661	-	651	626	-	-	-	-	-	-	-
Stage 2	572	633	-	645	652	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	14.2	0.4	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1184	-	546	471	-	-
HCM Lane V/C Ratio	0.013	-	0.079	0.168	-	-
HCM Control Delay (s)	8.1	0	12.2	14.2	-	-
HCM Lane LOS	A	A	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	0.6	-	-

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	31	13	27	35	15	293	0	0	278	7
Future Vol, veh/h	10	0	31	13	27	35	15	293	0	0	278	7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	0	6	8	4	13	13	8	0	0	8	0
Mvmt Flow	11	0	33	14	28	37	16	308	0	0	293	7
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.5	9.1	11.4	10.8
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	24%	17%	0%
Vol Thru, %	95%	0%	36%	98%
Vol Right, %	0%	76%	47%	2%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	308	41	75	285
LT Vol	15	10	13	0
Through Vol	293	0	27	278
RT Vol	0	31	35	7
Lane Flow Rate	324	43	79	300
Geometry Grp	1	1	1	1
Degree of Util (X)	0.431	0.061	0.116	0.393
Departure Headway (Hd)	4.786	5.065	5.296	4.71
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	749	700	672	762
Service Time	2.835	3.144	3.37	2.759
HCM Lane V/C Ratio	0.433	0.061	0.118	0.394
HCM Control Delay	11.4	8.5	9.1	10.8
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	2.2	0.2	0.4	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	0	30	28	92	87	29	351	0	0	332	6
Future Volume (veh/h)	12	0	30	28	92	87	29	351	0	0	332	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1885	1885	1885	1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h	14	0	27	32	105	96	33	399	0	0	377	7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0	1	1	1	4	4	0	0	2	2
Cap, veh/h	239	34	383	114	334	270	92	789	0	0	845	16
Arrive On Green	0.38	0.00	0.38	0.38	0.38	0.38	0.46	0.46	0.00	0.00	0.46	0.46
Sat Flow, veh/h	428	89	995	132	870	702	70	1710	0	0	1830	34
Grp Volume(v), veh/h	41	0	0	233	0	0	432	0	0	0	0	384
Grp Sat Flow(s),veh/h/ln	1512	0	0	1704	0	0	1779	0	0	0	0	1864
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
Cycle Q Clear(g_c), s	1.0	0.0	0.0	6.1	0.0	0.0	10.7	0.0	0.0	0.0	0.0	9.1
Prop In Lane	0.34		0.66	0.14		0.41	0.08		0.00	0.00		0.02
Lane Grp Cap(c), veh/h	656	0	0	719	0	0	881	0	0	0	0	860
V/C Ratio(X)	0.06	0.00	0.00	0.32	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.45
Avail Cap(c_a), veh/h	656	0	0	719	0	0	881	0	0	0	0	860
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	0.0	0.0	14.2	0.0	0.0	12.3	0.0	0.0	0.0	0.0	11.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.2	0.0	0.0	2.0	0.0	0.0	0.0	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.4	0.0	0.0	4.3	0.0	0.0	0.0	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.8	0.0	0.0	15.4	0.0	0.0	14.3	0.0	0.0	0.0	0.0	13.5
LnGrp LOS	B	A	A	B	A	A	B	A	A	A	A	B
Approach Vol, veh/h		41			233			432			384	
Approach Delay, s/veh		12.8			15.4			14.3			13.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.0		30.0		35.0		30.0				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		30.0		25.0		30.0		25.0				
Max Q Clear Time (g_c+I1), s		12.7		3.0		11.1		8.1				
Green Ext Time (p_c), s		2.6		0.2		2.2		1.2				

Intersection Summary		
HCM 6th Ctrl Delay		14.2
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰			↱	
Traffic Vol, veh/h	12	0	30	28	92	87	29	351	0	0	332	6
Future Vol, veh/h	12	0	30	28	92	87	29	351	0	0	332	6
Conflicting Peds, #/hr	0	0	6	0	0	6	0	0	4	0	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	4	1	2	0	4	0	0	2	0
Mvmt Flow	14	0	34	32	105	99	33	399	0	0	377	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	962	854	395	869	857	405	392	0	-	-	-	0
Stage 1	389	389	-	465	465	-	-	-	-	-	-	-
Stage 2	573	465	-	404	392	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.14	6.51	6.22	4.1	-	-	-	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.14	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.14	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.536	4.009	3.318	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	237	298	659	270	296	646	1178	-	0	0	-	-
Stage 1	639	612	-	574	565	-	-	-	0	0	-	-
Stage 2	508	566	-	619	608	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	137	285	650	247	283	642	1169	-	-	-	-	-
Mov Cap-2 Maneuver	137	285	-	247	283	-	-	-	-	-	-	-
Stage 1	612	607	-	553	545	-	-	-	-	-	-	-
Stage 2	333	546	-	583	603	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.5	31.8	0.6	0
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1169	-	314	361	-	-
HCM Lane V/C Ratio	0.028	-	0.152	0.652	-	-
HCM Control Delay (s)	8.2	0	18.5	31.8	-	-
HCM Lane LOS	A	A	C	D	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	4.4	-	-

Intersection	
Intersection Delay, s/veh	15.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰			↱	
Traffic Vol, veh/h	12	0	30	28	92	87	29	351	0	0	332	6
Future Vol, veh/h	12	0	30	28	92	87	29	351	0	0	332	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	0	0	4	1	2	0	4	0	0	2	0
Mvmt Flow	14	0	34	32	105	99	33	399	0	0	377	7
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.9	12.8	17.8	15.9
HCM LOS	A	B	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	29%	14%	0%
Vol Thru, %	92%	0%	44%	98%
Vol Right, %	0%	71%	42%	2%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	380	42	207	338
LT Vol	29	12	28	0
Through Vol	351	0	92	332
RT Vol	0	30	87	6
Lane Flow Rate	432	48	235	384
Geometry Grp	1	1	1	1
Degree of Util (X)	0.646	0.083	0.389	0.582
Departure Headway (Hd)	5.385	6.241	5.96	5.457
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	669	568	600	657
Service Time	3.441	4.339	4.03	3.518
HCM Lane V/C Ratio	0.646	0.085	0.392	0.584
HCM Control Delay	17.8	9.9	12.8	15.9
HCM Lane LOS	C	A	B	C
HCM 95th-tile Q	4.7	0.3	1.8	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	165	0	0	73	61	13	129	27	0	0	0
Future Volume (veh/h)	59	165	0	0	73	61	13	129	27	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.88	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1885	1885	0	0	1856	1856	1900	1870	1900			
Adj Flow Rate, veh/h	74	206	0	0	91	76	16	161	34			
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80			
Percent Heavy Veh, %	1	1	0	0	3	3	0	2	0			
Cap, veh/h	201	523	0	0	313	262	63	637	135			
Arrive On Green	0.38	0.38	0.00	0.00	0.38	0.38	0.46	0.46	0.46			
Sat Flow, veh/h	341	1359	0	0	815	680	137	1381	292			
Grp Volume(v), veh/h	280	0	0	0	0	167	211	0	0			
Grp Sat Flow(s),veh/h/ln	1700	0	0	0	0	1495	1810	0	0			
Q Serve(g_s), s	1.8	0.0	0.0	0.0	0.0	5.0	4.6	0.0	0.0			
Cycle Q Clear(g_c), s	7.2	0.0	0.0	0.0	0.0	5.0	4.6	0.0	0.0			
Prop In Lane	0.26		0.00	0.00		0.46	0.08		0.16			
Lane Grp Cap(c), veh/h	724	0	0	0	0	575	835	0	0			
V/C Ratio(X)	0.39	0.00	0.00	0.00	0.00	0.29	0.25	0.00	0.00			
Avail Cap(c_a), veh/h	724	0	0	0	0	575	835	0	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	14.5	0.0	0.0	0.0	0.0	13.9	10.7	0.0	0.0			
Incr Delay (d2), s/veh	1.6	0.0	0.0	0.0	0.0	1.3	0.7	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.0	0.0	0.0	1.7	1.8	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.0	0.0	0.0	0.0	0.0	15.1	11.4	0.0	0.0			
LnGrp LOS	B	A	A	A	A	B	B	A	A			
Approach Vol, veh/h		280			167			211				
Approach Delay, s/veh		16.0			15.1			11.4				
Approach LOS		B			B			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		35.0		30.0				30.0				
Change Period (Y+Rc), s		5.0		5.0				5.0				
Max Green Setting (Gmax), s		30.0		25.0				25.0				
Max Q Clear Time (g_c+I1), s		6.6		9.2				7.0				
Green Ext Time (p_c), s		1.2		1.5				0.8				
Intersection Summary												
HCM 6th Ctrl Delay			14.3									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	165	0	0	73	61	13	129	27	0	0	0
Future Vol, veh/h	59	165	0	0	73	61	13	129	27	0	0	0
Conflicting Peds, #/hr	0	0	11	0	0	6	0	0	4	0	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	1	2	2	3	2	2	2	2	2	2	2
Mvmt Flow	74	206	0	0	91	76	16	161	34	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	173	0	-	-	-	0	483	527	210
Stage 1	-	-	-	-	-	-	354	354	-
Stage 2	-	-	-	-	-	-	129	173	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1404	-	0	0	-	-	542	456	830
Stage 1	-	-	0	0	-	-	710	630	-
Stage 2	-	-	0	0	-	-	897	756	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1404	-	-	-	-	-	509	0	827
Mov Cap-2 Maneuver	-	-	-	-	-	-	509	0	-
Stage 1	-	-	-	-	-	-	667	0	-
Stage 2	-	-	-	-	-	-	897	0	-

Approach	EB	WB	NB
HCM Control Delay, s	2	0	12.6
HCM LOS			B

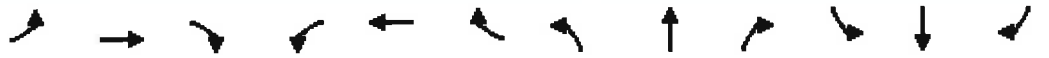
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	687	1404	-	-	-
HCM Lane V/C Ratio	0.307	0.053	-	-	-
HCM Control Delay (s)	12.6	7.7	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	1.3	0.2	-	-	-

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	165	0	0	73	61	13	129	27	0	0	0
Future Vol, veh/h	59	165	0	0	73	61	13	129	27	0	0	0
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles, %	2	1	2	2	3	2	2	2	2	2	2	2
Mvmt Flow	74	206	0	0	91	76	16	161	34	0	0	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.5	8.8	9.9
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	8%	26%	0%
Vol Thru, %	76%	74%	54%
Vol Right, %	16%	0%	46%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	169	224	134
LT Vol	13	59	0
Through Vol	129	165	73
RT Vol	27	0	61
Lane Flow Rate	211	280	168
Geometry Grp	1	1	1
Degree of Util (X)	0.286	0.366	0.211
Departure Headway (Hd)	4.878	4.708	4.54
Convergence, Y/N	Yes	Yes	Yes
Cap	733	762	787
Service Time	2.927	2.753	2.589
HCM Lane V/C Ratio	0.288	0.367	0.213
HCM Control Delay	9.9	10.5	8.8
HCM Lane LOS	A	B	A
HCM 95th-tile Q	1.2	1.7	0.8



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	147	0	0	104	65	39	170	32	0	0	0
Future Volume (veh/h)	50	147	0	0	104	65	39	170	32	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.98	1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.88	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1767	1767	0	0	1885	1885	1900	1885	1900			
Adj Flow Rate, veh/h	60	177	0	0	125	78	47	205	39			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	9	9	0	0	1	1	0	1	0			
Cap, veh/h	182	488	0	0	362	226	136	592	113			
Arrive On Green	0.38	0.38	0.00	0.00	0.38	0.38	0.46	0.46	0.46			
Sat Flow, veh/h	293	1269	0	0	941	587	294	1282	244			
Grp Volume(v), veh/h	237	0	0	0	0	203	291	0	0			
Grp Sat Flow(s),veh/h/ln	1562	0	0	0	0	1528	1820	0	0			
Q Serve(g_s), s	0.6	0.0	0.0	0.0	0.0	6.1	6.7	0.0	0.0			
Cycle Q Clear(g_c), s	6.7	0.0	0.0	0.0	0.0	6.1	6.7	0.0	0.0			
Prop In Lane	0.25		0.00	0.00		0.38	0.16		0.13			
Lane Grp Cap(c), veh/h	670	0	0	0	0	588	840	0	0			
V/C Ratio(X)	0.35	0.00	0.00	0.00	0.00	0.35	0.35	0.00	0.00			
Avail Cap(c_a), veh/h	670	0	0	0	0	588	840	0	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	14.2	0.0	0.0	0.0	0.0	14.2	11.2	0.0	0.0			
Incr Delay (d2), s/veh	1.5	0.0	0.0	0.0	0.0	1.6	1.1	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	0.0	0.0	2.2	2.6	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	0.0	0.0	0.0	0.0	15.8	12.3	0.0	0.0			
LnGrp LOS	B	A	A	A	A	B	B	A	A			
Approach Vol, veh/h		237			203			291				
Approach Delay, s/veh		15.7			15.8			12.3				
Approach LOS		B			B			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		35.0		30.0				30.0				
Change Period (Y+Rc), s		5.0		5.0				5.0				
Max Green Setting (Gmax), s		30.0		25.0				25.0				
Max Q Clear Time (g_c+I1), s		8.7		8.7				8.1				
Green Ext Time (p_c), s		1.7		1.2				1.0				
Intersection Summary												
HCM 6th Ctrl Delay			14.4									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↑			↔				
Traffic Vol, veh/h	50	147	0	0	104	65	39	170	32	0	0	0
Future Vol, veh/h	50	147	0	0	104	65	39	170	32	0	0	0
Conflicting Peds, #/hr	0	0	16	0	0	17	0	0	21	0	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	9	2	2	1	2	2	1	2	2	2	2
Mvmt Flow	60	177	0	0	125	78	47	205	39	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	220	0	-	-	-	0	461	517	198
Stage 1	-	-	-	-	-	-	297	297	-
Stage 2	-	-	-	-	-	-	164	220	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.51	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.51	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.009	3.318
Pot Cap-1 Maneuver	1349	-	0	0	-	-	559	464	843
Stage 1	-	-	0	0	-	-	754	669	-
Stage 2	-	-	0	0	-	-	865	723	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1349	-	-	-	-	-	532	0	826
Mov Cap-2 Maneuver	-	-	-	-	-	-	532	0	-
Stage 1	-	-	-	-	-	-	717	0	-
Stage 2	-	-	-	-	-	-	865	0	-

Approach	EB	WB	NB
HCM Control Delay, s	2	0	15.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	634	1349	-	-	-
HCM Lane V/C Ratio	0.458	0.045	-	-	-
HCM Control Delay (s)	15.4	7.8	0	-	-
HCM Lane LOS	C	A	A	-	-
HCM 95th %tile Q(veh)	2.4	0.1	-	-	-

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	147	0	0	104	65	39	170	32	0	0	0
Future Vol, veh/h	50	147	0	0	104	65	39	170	32	0	0	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	9	2	2	1	2	2	1	2	2	2	2
Mvmt Flow	60	177	0	0	125	78	47	205	39	0	0	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.5	9.5	11.2
HCM LOS	B	A	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	16%	25%	0%
Vol Thru, %	71%	75%	62%
Vol Right, %	13%	0%	38%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	241	197	169
LT Vol	39	50	0
Through Vol	170	147	104
RT Vol	32	0	65
Lane Flow Rate	290	237	204
Geometry Grp	1	1	1
Degree of Util (X)	0.397	0.327	0.267
Departure Headway (Hd)	4.92	4.967	4.725
Convergence, Y/N	Yes	Yes	Yes
Cap	726	719	753
Service Time	2.987	3.036	2.794
HCM Lane V/C Ratio	0.399	0.33	0.271
HCM Control Delay	11.2	10.5	9.5
HCM Lane LOS	B	B	A
HCM 95th-tile Q	1.9	1.4	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	162	12	20	130	0	0	0	0	85	73	17
Future Volume (veh/h)	0	162	12	20	130	0	0	0	0	85	73	17
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	0.98		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1885	1885	1885	1885	0				1900	1856	1900
Adj Flow Rate, veh/h	0	182	5	22	146	0				96	82	18
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89				0.89	0.89	0.89
Percent Heavy Veh, %	0	1	1	1	1	0				0	3	0
Cap, veh/h	0	786	22	121	719	0				309	264	58
Arrive On Green	0.00	0.43	0.43	0.43	0.43	0.00				0.35	0.35	0.35
Sat Flow, veh/h	0	1825	50	136	1670	0				872	745	164
Grp Volume(v), veh/h	0	0	187	168	0	0				196	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1875	1805	0	0				1781	0	0
Q Serve(g_s), s	0.0	0.0	4.1	0.0	0.0	0.0				5.2	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	4.1	3.6	0.0	0.0				5.2	0.0	0.0
Prop In Lane	0.00		0.03	0.13		0.00				0.49		0.09
Lane Grp Cap(c), veh/h	0	0	808	840	0	0				630	0	0
V/C Ratio(X)	0.00	0.00	0.23	0.20	0.00	0.00				0.31	0.00	0.00
Avail Cap(c_a), veh/h	0	0	808	840	0	0				630	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	11.7	11.6	0.0	0.0				15.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.7	0.5	0.0	0.0				1.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	1.7	1.5	0.0	0.0				2.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	12.4	12.1	0.0	0.0				16.5	0.0	0.0
LnGrp LOS	A	A	B	B	A	A				B	A	A
Approach Vol, veh/h		187			168						196	
Approach Delay, s/veh		12.4			12.1						16.5	
Approach LOS		B			B						B	

Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				35.0		30.0		35.0				
Change Period (Y+Rc), s				7.0		7.0		7.0				
Max Green Setting (Gmax), s				28.0		23.0		28.0				
Max Q Clear Time (g_c+I1), s				6.1		7.2		5.6				
Green Ext Time (p_c), s				1.0		0.9		0.9				

Intersection Summary		
HCM 6th Ctrl Delay	13.8	
HCM 6th LOS	B	

Intersection												
Int Delay, s/veh	4.9											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱			↰						↕	
Traffic Vol, veh/h	0	162	12	20	130	0	0	0	0	85	73	17
Future Vol, veh/h	0	162	12	20	130	0	0	0	0	85	73	17
Conflicting Peds, #/hr	0	0	19	0	0	16	0	0	2	0	0	6
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	1	2	2	1	2	2	2	2	2	3	2
Mvmt Flow	0	182	13	22	146	0	0	0	0	96	82	19

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	214	0	0	379	404	152
Stage 1	-	-	-	-	-	-	190	190	-
Stage 2	-	-	-	-	-	-	189	214	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.53	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.53	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.027	3.318
Pot Cap-1 Maneuver	0	-	-	1356	-	0	623	534	894
Stage 1	0	-	-	-	-	0	842	741	-
Stage 2	0	-	-	-	-	0	843	724	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1356	-	-	612	0	889
Mov Cap-2 Maneuver	-	-	-	-	-	-	612	0	-
Stage 1	-	-	-	-	-	-	842	0	-
Stage 2	-	-	-	-	-	-	828	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1	13
HCM LOS			B

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1356	-	646
HCM Lane V/C Ratio	-	-	0.017	-	0.304
HCM Control Delay (s)	-	-	7.7	0	13
HCM Lane LOS	-	-	A	A	B
HCM 95th %tile Q(veh)	-	-	0.1	-	1.3

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	162	12	20	130	0	0	0	0	85	73	17
Future Vol, veh/h	0	162	12	20	130	0	0	0	0	85	73	17
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	1	2	2	1	2	2	2	2	2	3	2
Mvmt Flow	0	182	13	22	146	0	0	0	0	96	82	19
Number of Lanes	0	1	0	0	1	0	0	0	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9.1	9	9.6
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	13%	49%
Vol Thru, %	93%	87%	42%
Vol Right, %	7%	0%	10%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	174	150	175
LT Vol	0	20	85
Through Vol	162	130	73
RT Vol	12	0	17
Lane Flow Rate	196	169	197
Geometry Grp	1	1	1
Degree of Util (X)	0.248	0.219	0.263
Departure Headway (Hd)	4.567	4.679	4.811
Convergence, Y/N	Yes	Yes	Yes
Cap	786	767	745
Service Time	2.601	2.714	2.848
HCM Lane V/C Ratio	0.249	0.22	0.264
HCM Control Delay	9.1	9	9.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1	0.8	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	155	24	22	147	0	0	0	0	137	140	17
Future Volume (veh/h)	0	155	24	22	147	0	0	0	0	137	140	17
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1885	1885	1885	1885	0				1900	1885	1900
Adj Flow Rate, veh/h	0	196	21	28	186	0				173	177	21
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79				0.79	0.79	0.79
Percent Heavy Veh, %	0	1	1	1	1	0				0	1	0
Cap, veh/h	0	720	77	121	718	0				301	308	37
Arrive On Green	0.00	0.43	0.43	0.43	0.43	0.00				0.35	0.35	0.35
Sat Flow, veh/h	0	1671	179	135	1666	0				850	870	103
Grp Volume(v), veh/h	0	0	217	214	0	0				371	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1850	1801	0	0				1824	0	0
Q Serve(g_s), s	0.0	0.0	4.9	0.0	0.0	0.0				10.7	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	4.9	4.7	0.0	0.0				10.7	0.0	0.0
Prop In Lane	0.00		0.10	0.13		0.00				0.47		0.06
Lane Grp Cap(c), veh/h	0	0	797	838	0	0				645	0	0
V/C Ratio(X)	0.00	0.00	0.27	0.26	0.00	0.00				0.57	0.00	0.00
Avail Cap(c_a), veh/h	0	0	797	838	0	0				645	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	11.9	11.9	0.0	0.0				17.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.8	0.7	0.0	0.0				3.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.0	2.0	0.0	0.0				4.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	12.8	12.6	0.0	0.0				20.7	0.0	0.0
LnGrp LOS	A	A	B	B	A	A				C	A	A
Approach Vol, veh/h		217			214						371	
Approach Delay, s/veh		12.8			12.6						20.7	
Approach LOS		B			B						C	

Timer - Assigned Phs		4		6		8						
Phs Duration (G+Y+Rc), s		35.0		30.0		35.0						
Change Period (Y+Rc), s		7.0		7.0		7.0						
Max Green Setting (Gmax), s		28.0		23.0		28.0						
Max Q Clear Time (g_c+I1), s		6.9		12.7		6.7						
Green Ext Time (p_c), s		1.2		1.6		1.2						

Intersection Summary												
HCM 6th Ctrl Delay		16.4										
HCM 6th LOS		B										

Intersection	
Int Delay, s/veh	10.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	155	24	22	147	0	0	0	0	137	140	17
Future Vol, veh/h	0	155	24	22	147	0	0	0	0	137	140	17
Conflicting Peds, #/hr	0	0	13	0	0	31	0	0	15	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	2	1	2	2	1	2	2	2	2	2	1	2
Mvmt Flow	0	196	30	28	186	0	0	0	0	173	177	22

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	239	0	0	453	481	189
Stage 1	-	-	-	-	-	-	242	242	-
Stage 2	-	-	-	-	-	-	211	239	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.51	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.51	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.009	3.318
Pot Cap-1 Maneuver	0	-	-	1328	-	0	565	486	853
Stage 1	0	-	-	-	-	0	798	707	-
Stage 2	0	-	-	-	-	0	824	709	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1328	-	-	551	0	851
Mov Cap-2 Maneuver	-	-	-	-	-	-	551	0	-
Stage 1	-	-	-	-	-	-	798	0	-
Stage 2	-	-	-	-	-	-	804	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1	22.2
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1328	-	573
HCM Lane V/C Ratio	-	-	0.021	-	0.649
HCM Control Delay (s)	-	-	7.8	0	22.2
HCM Lane LOS	-	-	A	A	C
HCM 95th %tile Q(veh)	-	-	0.1	-	4.7

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	155	24	22	147	0	0	0	0	137	140	17
Future Vol, veh/h	0	155	24	22	147	0	0	0	0	137	140	17
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	1	2	2	1	2	2	2	2	2	1	2
Mvmt Flow	0	196	30	28	186	0	0	0	0	173	177	22
Number of Lanes	0	1	0	0	1	0	0	0	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	10.7	10.8	14
HCM LOS	B	B	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	13%	47%
Vol Thru, %	87%	87%	48%
Vol Right, %	13%	0%	6%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	179	169	294
LT Vol	0	22	137
Through Vol	155	147	140
RT Vol	24	0	17
Lane Flow Rate	227	214	372
Geometry Grp	1	1	1
Degree of Util (X)	0.327	0.317	0.535
Departure Headway (Hd)	5.198	5.333	5.18
Convergence, Y/N	Yes	Yes	Yes
Cap	691	674	700
Service Time	3.227	3.363	3.18
HCM Lane V/C Ratio	0.329	0.318	0.531
HCM Control Delay	10.7	10.8	14
HCM Lane LOS	B	B	B
HCM 95th-tile Q	1.4	1.4	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	9	28	8	6	16	28	8	128	9	11	47	7
Future Volume (veh/h)	9	28	8	6	16	28	8	128	9	11	47	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.95	0.96		0.95	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1914	1914	1914	1976	1976	1976	1899	1899	1899	1853	1853	1853
Adj Flow Rate, veh/h	11	33	9	7	19	33	9	151	11	13	55	8
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	4	4	4	0	0	0	5	5	5	8	8	8
Cap, veh/h	152	405	100	98	220	324	71	699	49	146	545	74
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.92	0.92	0.92	0.46	0.46	0.46
Sat Flow, veh/h	221	1052	260	92	572	843	29	1515	106	176	1181	160
Grp Volume(v), veh/h	53	0	0	59	0	0	171	0	0	76	0	0
Grp Sat Flow(s),veh/h/ln	1533	0	0	1507	0	0	1649	0	0	1516	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.3	0.0	0.0	1.6	0.0	0.0	0.6	0.0	0.0	1.7	0.0	0.0
Prop In Lane	0.21		0.17	0.12		0.56	0.05		0.06	0.17		0.11
Lane Grp Cap(c), veh/h	657	0	0	641	0	0	820	0	0	765	0	0
V/C Ratio(X)	0.08	0.00	0.00	0.09	0.00	0.00	0.21	0.00	0.00	0.10	0.00	0.00
Avail Cap(c_a), veh/h	657	0	0	641	0	0	820	0	0	765	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	12.7	0.0	0.0	12.8	0.0	0.0	1.4	0.0	0.0	9.9	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.0	0.0	0.0	13.1	0.0	0.0	1.9	0.0	0.0	10.2	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	B	A	A
Approach Vol, veh/h		53			59			171			76	
Approach Delay, s/veh		13.0			13.1			1.9			10.2	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	30.0	35.0	30.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	25.0	30.0	25.0
Max Q Clear Time (g_c+I1), s	2.6	3.3	3.7	3.6
Green Ext Time (p_c), s	1.0	0.2	0.4	0.2

Intersection Summary	
HCM 6th Ctrl Delay	7.1
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	28	8	6	16	28	8	128	9	11	47	7
Future Vol, veh/h	9	28	8	6	16	28	8	128	9	11	47	7
Conflicting Peds, #/hr	19	0	37	37	0	19	1	0	4	4	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	4	0	0	0	7	13	5	0	0	8	0
Mvmt Flow	11	33	9	7	19	33	9	151	11	13	55	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	306	270	97	322	269	180	64	0	0	166	0	0
Stage 1	86	86	-	179	179	-	-	-	-	-	-	-
Stage 2	220	184	-	143	90	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.54	6.2	7.1	6.5	6.27	4.23	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.54	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.54	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.036	3.3	3.5	4	3.363	2.317	-	-	2.2	-	-
Pot Cap-1 Maneuver	650	633	965	635	641	850	1471	-	-	1424	-	-
Stage 1	927	820	-	827	755	-	-	-	-	-	-	-
Stage 2	787	744	-	865	824	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	586	618	918	565	626	825	1469	-	-	1417	-	-
Mov Cap-2 Maneuver	586	618	-	565	626	-	-	-	-	-	-	-
Stage 1	920	811	-	817	746	-	-	-	-	-	-	-
Stage 2	714	735	-	775	815	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11	10.5	0.4	1.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1469	-	-	649	713	1417	-	-
HCM Lane V/C Ratio	0.006	-	-	0.082	0.083	0.009	-	-
HCM Control Delay (s)	7.5	0	-	11	10.5	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.3	0	-	-

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	28	8	6	16	28	8	128	9	11	47	7
Future Vol, veh/h	9	28	8	6	16	28	8	128	9	11	47	7
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	0	4	0	0	0	7	13	5	0	0	8	0
Mvmt Flow	11	33	9	7	19	33	9	151	11	13	55	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	7.5	8.6	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	20%	12%	17%
Vol Thru, %	88%	62%	32%	72%
Vol Right, %	6%	18%	56%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	45	50	65
LT Vol	8	9	6	11
Through Vol	128	28	16	47
RT Vol	9	8	28	7
Lane Flow Rate	171	53	59	76
Geometry Grp	1	1	1	1
Degree of Util (X)	0.206	0.066	0.069	0.091
Departure Headway (Hd)	4.347	4.463	4.213	4.303
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	814	806	854	836
Service Time	2.438	2.47	2.22	2.315
HCM Lane V/C Ratio	0.21	0.066	0.069	0.091
HCM Control Delay	8.6	7.8	7.5	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.2	0.2	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	15	53	14	7	19	48	17	151	9	17	124	10
Future Volume (veh/h)	15	53	14	7	19	48	17	151	9	17	124	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1976	1976	1976	1976	1976	1976	1961	1961	1961	1945	1945	1945
Adj Flow Rate, veh/h	19	67	18	9	24	61	22	191	11	22	157	13
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	2	2	2
Cap, veh/h	140	438	107	86	181	382	99	696	38	109	656	51
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.92	0.92	0.92	0.46	0.46	0.46
Sat Flow, veh/h	193	1140	279	66	471	992	83	1507	82	103	1422	111
Grp Volume(v), veh/h	104	0	0	94	0	0	224	0	0	192	0	0
Grp Sat Flow(s),veh/h/ln	1611	0	0	1529	0	0	1672	0	0	1637	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.6	0.0	0.0	2.6	0.0	0.0	0.9	0.0	0.0	4.5	0.0	0.0
Prop In Lane	0.18		0.17	0.10		0.65	0.10		0.05	0.11		0.07
Lane Grp Cap(c), veh/h	685	0	0	649	0	0	833	0	0	817	0	0
V/C Ratio(X)	0.15	0.00	0.00	0.14	0.00	0.00	0.27	0.00	0.00	0.23	0.00	0.00
Avail Cap(c_a), veh/h	685	0	0	649	0	0	833	0	0	817	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.1	0.0	0.0	13.1	0.0	0.0	1.4	0.0	0.0	10.6	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.5	0.0	0.0	0.8	0.0	0.0	0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.9	0.0	0.0	0.4	0.0	0.0	1.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	0.0	0.0	13.6	0.0	0.0	2.2	0.0	0.0	11.3	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	B	A	A
Approach Vol, veh/h		104			94			224			192	
Approach Delay, s/veh		13.6			13.6			2.2			11.3	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	30.0	35.0	30.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	25.0	30.0	25.0
Max Q Clear Time (g_c+I1), s	2.9	4.6	6.5	4.6
Green Ext Time (p_c), s	1.3	0.5	1.1	0.4

Intersection Summary	
HCM 6th Ctrl Delay	8.7
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	53	14	7	19	48	17	151	9	17	124	10
Future Vol, veh/h	15	53	14	7	19	48	17	151	9	17	124	10
Conflicting Peds, #/hr	2	0	8	8	0	2	16	0	3	3	0	16
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	0	0	0	0	0	4	6	1	0	0	2	0
Mvmt Flow	19	67	18	9	24	61	22	191	11	22	157	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	509	473	188	502	474	202	186	0	0	205	0	0
Stage 1	224	224	-	244	244	-	-	-	-	-	-	-
Stage 2	285	249	-	258	230	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.24	4.16	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.336	2.254	-	-	2.2	-	-
Pot Cap-1 Maneuver	478	493	859	483	492	834	1365	-	-	1378	-	-
Stage 1	783	722	-	764	708	-	-	-	-	-	-	-
Stage 2	727	704	-	751	718	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	404	463	833	403	462	829	1337	-	-	1373	-	-
Mov Cap-2 Maneuver	404	463	-	403	462	-	-	-	-	-	-	-
Stage 1	752	695	-	746	692	-	-	-	-	-	-	-
Stage 2	636	688	-	645	691	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	11.6	0.7	0.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1337	-	-	487	636	1373	-	-
HCM Lane V/C Ratio	0.016	-	-	0.213	0.147	0.016	-	-
HCM Control Delay (s)	7.7	0	-	14.4	11.6	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.8	0.5	0	-	-

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	53	14	7	19	48	17	151	9	17	124	10
Future Vol, veh/h	15	53	14	7	19	48	17	151	9	17	124	10
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	0	0	0	0	0	4	6	1	0	0	2	0
Mvmt Flow	19	67	18	9	24	61	22	191	11	22	157	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.8	8.3	9.7	9.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	18%	9%	11%
Vol Thru, %	85%	65%	26%	82%
Vol Right, %	5%	17%	65%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	177	82	74	151
LT Vol	17	15	7	17
Through Vol	151	53	19	124
RT Vol	9	14	48	10
Lane Flow Rate	224	104	94	191
Geometry Grp	1	1	1	1
Degree of Util (X)	0.292	0.142	0.121	0.245
Departure Headway (Hd)	4.684	4.919	4.635	4.619
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	764	726	769	774
Service Time	2.731	2.974	2.69	2.668
HCM Lane V/C Ratio	0.293	0.143	0.122	0.247
HCM Control Delay	9.7	8.8	8.3	9.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.2	0.5	0.4	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	53	29	5	43	17	8	89	9	10	62	9
Future Volume (veh/h)	9	53	29	5	43	17	8	89	9	10	62	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1976	1976	1976	1976	1976	1976	1822	1822	1822	1853	1853	1853
Adj Flow Rate, veh/h	9	55	30	5	44	18	8	92	9	10	64	9
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	10	10	10	8	8	8
Cap, veh/h	91	448	224	77	444	169	82	642	60	112	592	78
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.92	0.92	0.92	0.46	0.46	0.46
Sat Flow, veh/h	79	1165	583	46	1153	441	48	1391	129	107	1283	169
Grp Volume(v), veh/h	94	0	0	67	0	0	109	0	0	83	0	0
Grp Sat Flow(s),veh/h/ln	1826	0	0	1640	0	0	1568	0	0	1560	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0	1.7	0.0	0.0	0.4	0.0	0.0	1.9	0.0	0.0
Prop In Lane	0.10		0.32	0.07		0.27	0.07		0.08	0.12		0.11
Lane Grp Cap(c), veh/h	763	0	0	690	0	0	783	0	0	782	0	0
V/C Ratio(X)	0.12	0.00	0.00	0.10	0.00	0.00	0.14	0.00	0.00	0.11	0.00	0.00
Avail Cap(c_a), veh/h	763	0	0	690	0	0	783	0	0	782	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.0	0.0	0.0	12.8	0.0	0.0	1.4	0.0	0.0	9.9	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.6	0.0	0.0	0.2	0.0	0.0	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	0.0	0.0	13.1	0.0	0.0	1.7	0.0	0.0	10.2	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	B	A	A
Approach Vol, veh/h		94			67			109			83	
Approach Delay, s/veh		13.3			13.1			1.7			10.2	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	30.0	35.0	30.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	25.0	30.0	25.0
Max Q Clear Time (g_c+I1), s	2.4	4.1	3.9	3.7
Green Ext Time (p_c), s	0.6	0.4	0.4	0.3

Intersection Summary	
HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	53	29	5	43	17	8	89	9	10	62	9
Future Vol, veh/h	9	53	29	5	43	17	8	89	9	10	62	9
Conflicting Peds, #/hr	13	0	7	7	0	13	4	0	3	3	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	11	0	7	0	0	6	13	10	0	0	8	0
Mvmt Flow	9	55	30	5	44	18	8	92	9	10	64	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	250	213	80	254	213	113	77	0	0	104	0	0
Stage 1	93	93	-	116	116	-	-	-	-	-	-	-
Stage 2	157	120	-	138	97	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.5	6.27	7.1	6.5	6.26	4.23	-	-	4.1	-	-
Critical Hdwy Stg 1	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.363	3.5	4	3.354	2.317	-	-	2.2	-	-
Pot Cap-1 Maneuver	685	688	966	703	688	929	1455	-	-	1500	-	-
Stage 1	892	822	-	894	803	-	-	-	-	-	-	-
Stage 2	824	800	-	870	819	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	619	674	953	625	674	911	1449	-	-	1495	-	-
Mov Cap-2 Maneuver	619	674	-	625	674	-	-	-	-	-	-	-
Stage 1	883	813	-	886	796	-	-	-	-	-	-	-
Stage 2	746	793	-	774	810	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	10.5	0.6	0.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1449	-	-	736	719	1495	-	-
HCM Lane V/C Ratio	0.006	-	-	0.127	0.093	0.007	-	-
HCM Control Delay (s)	7.5	0	-	10.6	10.5	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.3	0	-	-

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	53	29	5	43	17	8	89	9	10	62	9
Future Vol, veh/h	9	53	29	5	43	17	8	89	9	10	62	9
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	11	0	7	0	0	6	13	10	0	0	8	0
Mvmt Flow	9	55	30	5	44	18	8	92	9	10	64	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	7.7	8.3	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	10%	8%	12%
Vol Thru, %	84%	58%	66%	77%
Vol Right, %	8%	32%	26%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	106	91	65	81
LT Vol	8	9	5	10
Through Vol	89	53	43	62
RT Vol	9	29	17	9
Lane Flow Rate	109	94	67	84
Geometry Grp	1	1	1	1
Degree of Util (X)	0.138	0.116	0.08	0.101
Departure Headway (Hd)	4.543	4.435	4.309	4.348
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	791	811	833	827
Service Time	2.557	2.45	2.327	2.363
HCM Lane V/C Ratio	0.138	0.116	0.08	0.102
HCM Control Delay	8.3	8	7.7	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.4	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	10	56	19	21	50	49	7	111	12	26	108	16
Future Volume (veh/h)	10	56	19	21	50	49	7	111	12	26	108	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.97	0.97		0.97	0.98		0.98	0.98		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1945	1945	1945	1945	1945	1945	1945	1945	1945	1930	1930	1930
Adj Flow Rate, veh/h	10	58	20	22	52	51	7	116	12	27	112	17
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	3	3	3
Cap, veh/h	101	497	158	131	278	237	71	692	69	151	563	79
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.92	0.92	0.92	0.92	0.92	0.92
Sat Flow, veh/h	103	1292	410	171	723	616	28	1500	149	186	1220	172
Grp Volume(v), veh/h	88	0	0	125	0	0	135	0	0	156	0	0
Grp Sat Flow(s),veh/h/ln	1806	0	0	1510	0	0	1677	0	0	1579	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.0	0.0	0.0	3.4	0.0	0.0	0.5	0.0	0.0	0.6	0.0	0.0
Prop In Lane	0.11		0.23	0.18		0.41	0.05		0.09	0.17		0.11
Lane Grp Cap(c), veh/h	756	0	0	646	0	0	832	0	0	794	0	0
V/C Ratio(X)	0.12	0.00	0.00	0.19	0.00	0.00	0.16	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	756	0	0	646	0	0	832	0	0	794	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	12.9	0.0	0.0	13.4	0.0	0.0	1.4	0.0	0.0	1.4	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.7	0.0	0.0	0.4	0.0	0.0	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	1.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	0.0	0.0	14.0	0.0	0.0	1.8	0.0	0.0	1.9	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		88			125			135			156	
Approach Delay, s/veh		13.2			14.0			1.8			1.9	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	30.0	35.0	30.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	25.0	30.0	25.0
Max Q Clear Time (g_c+I1), s	2.5	4.0	2.6	5.4
Green Ext Time (p_c), s	0.7	0.4	0.9	0.6

Intersection Summary	
HCM 6th Ctrl Delay	6.9
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	56	19	21	50	49	7	111	12	26	108	16
Future Vol, veh/h	10	56	19	21	50	49	7	111	12	26	108	16
Conflicting Peds, #/hr	24	0	8	8	0	24	8	0	17	17	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	20	2	11	5	2	2	0	2	0	0	3	0
Mvmt Flow	10	58	20	22	52	51	7	116	13	27	113	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	396	344	138	377	346	164	138	0	0	146	0	0
Stage 1	184	184	-	154	154	-	-	-	-	-	-	-
Stage 2	212	160	-	223	192	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.52	6.31	7.15	6.52	6.22	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.3	5.52	-	6.15	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.3	5.52	-	6.15	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.68	4.018	3.399	3.545	4.018	3.318	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	533	579	887	575	577	881	1458	-	-	1448	-	-
Stage 1	778	747	-	841	770	-	-	-	-	-	-	-
Stage 2	751	766	-	773	742	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	437	548	870	492	546	838	1445	-	-	1421	-	-
Mov Cap-2 Maneuver	437	548	-	492	546	-	-	-	-	-	-	-
Stage 1	767	725	-	821	752	-	-	-	-	-	-	-
Stage 2	633	748	-	673	720	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	12.2	0.4	1.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1445	-	-	579	623	1421	-	-
HCM Lane V/C Ratio	0.005	-	-	0.153	0.201	0.019	-	-
HCM Control Delay (s)	7.5	0	-	12.3	12.2	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.7	0.1	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	56	19	21	50	49	7	111	12	26	108	16
Future Vol, veh/h	10	56	19	21	50	49	7	111	12	26	108	16
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	20	2	11	5	2	2	0	2	0	0	3	0
Mvmt Flow	10	58	20	22	52	51	7	116	13	27	113	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	8.5	8.5	8.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	12%	17%	17%
Vol Thru, %	85%	66%	42%	72%
Vol Right, %	9%	22%	41%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	130	85	120	150
LT Vol	7	10	21	26
Through Vol	111	56	50	108
RT Vol	12	19	49	16
Lane Flow Rate	135	89	125	156
Geometry Grp	1	1	1	1
Degree of Util (X)	0.171	0.122	0.158	0.197
Departure Headway (Hd)	4.549	4.955	4.562	4.54
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	788	722	785	789
Service Time	2.582	2.991	2.597	2.572
HCM Lane V/C Ratio	0.171	0.123	0.159	0.198
HCM Control Delay	8.5	8.7	8.5	8.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.4	0.6	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	6	64	19	17	83	11	12	93	28	18	59	15
Future Volume (veh/h)	6	64	19	17	83	11	12	93	28	18	59	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1899	1899	1899	1961	1961	1961	1822	1822	1822	1899	1899	1899
Adj Flow Rate, veh/h	7	74	22	20	95	13	14	107	32	21	68	17
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	5	5	5	1	1	1	10	10	10	5	5	5
Cap, veh/h	74	465	130	123	502	63	92	525	147	167	490	113
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	38	1209	339	153	1306	165	68	1137	318	218	1062	244
Grp Volume(v), veh/h	103	0	0	128	0	0	153	0	0	106	0	0
Grp Sat Flow(s),veh/h/ln	1586	0	0	1624	0	0	1523	0	0	1524	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.7	0.0	0.0	3.3	0.0	0.0	3.8	0.0	0.0	2.4	0.0	0.0
Prop In Lane	0.07		0.21	0.16		0.10	0.09		0.21	0.20		0.16
Lane Grp Cap(c), veh/h	669	0	0	689	0	0	763	0	0	770	0	0
V/C Ratio(X)	0.15	0.00	0.00	0.19	0.00	0.00	0.20	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	669	0	0	689	0	0	763	0	0	770	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.2	0.0	0.0	13.3	0.0	0.0	10.5	0.0	0.0	10.1	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.6	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	1.3	0.0	0.0	1.3	0.0	0.0	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	0.0	0.0	13.9	0.0	0.0	11.0	0.0	0.0	10.5	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		103			128			153			106	
Approach Delay, s/veh		13.6			13.9			11.0			10.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	30.0	35.0	30.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	25.0	30.0	25.0
Max Q Clear Time (g_c+I1), s	5.8	4.7	4.4	5.3
Green Ext Time (p_c), s	0.8	0.5	0.5	0.6

Intersection Summary	
HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	64	19	17	83	11	12	93	28	18	59	15
Future Vol, veh/h	6	64	19	17	83	11	12	93	28	18	59	15
Conflicting Peds, #/hr	28	0	13	13	0	28	2	0	7	7	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	5	0	6	1	10	8	10	4	11	5	7
Mvmt Flow	7	74	22	20	95	13	14	107	32	21	68	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	354	295	92	338	287	158	87	0	0	146	0	0
Stage 1	121	121	-	158	158	-	-	-	-	-	-	-
Stage 2	233	174	-	180	129	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.16	6.51	6.3	4.18	-	-	4.21	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.16	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.16	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.554	4.009	3.39	2.272	-	-	2.299	-	-
Pot Cap-1 Maneuver	605	611	971	608	624	867	1472	-	-	1383	-	-
Stage 1	888	790	-	835	769	-	-	-	-	-	-	-
Stage 2	775	749	-	813	791	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	494	588	953	513	600	829	1468	-	-	1371	-	-
Mov Cap-2 Maneuver	494	588	-	513	600	-	-	-	-	-	-	-
Stage 1	876	775	-	819	754	-	-	-	-	-	-	-
Stage 2	636	735	-	696	776	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	12.6	0.7	1.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1468	-	-	632	601	1371	-	-
HCM Lane V/C Ratio	0.009	-	-	0.162	0.212	0.015	-	-
HCM Control Delay (s)	7.5	0	-	11.8	12.6	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.8	0	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	64	19	17	83	11	12	93	28	18	59	15
Future Vol, veh/h	6	64	19	17	83	11	12	93	28	18	59	15
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	0	5	0	6	1	10	8	10	4	11	5	7
Mvmt Flow	7	74	22	20	95	13	14	107	32	21	68	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.3	8.7	8.7	8.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	7%	15%	20%
Vol Thru, %	70%	72%	75%	64%
Vol Right, %	21%	21%	10%	16%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	133	89	111	92
LT Vol	12	6	17	18
Through Vol	93	64	83	59
RT Vol	28	19	11	15
Lane Flow Rate	153	102	128	106
Geometry Grp	1	1	1	1
Degree of Util (X)	0.195	0.129	0.167	0.14
Departure Headway (Hd)	4.6	4.556	4.708	4.753
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	780	786	762	754
Service Time	2.631	2.59	2.741	2.786
HCM Lane V/C Ratio	0.196	0.13	0.168	0.141
HCM Control Delay	8.7	8.3	8.7	8.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.4	0.6	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	6	65	24	26	79	23	12	124	26	37	92	9
Future Volume (veh/h)	6	65	24	26	79	23	12	124	26	37	92	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1930	1930	1930	1837	1837	1837	1884	1884	1884	1868	1868	1868
Adj Flow Rate, veh/h	8	81	30	32	99	29	15	155	32	46	115	11
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	3	3	3	9	9	9	6	6	6	7	7	7
Cap, veh/h	73	445	155	143	385	102	83	596	117	214	486	43
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.46	0.46	0.46	0.92	0.92	0.92
Sat Flow, veh/h	37	1158	403	199	1001	266	50	1292	253	311	1054	93
Grp Volume(v), veh/h	119	0	0	160	0	0	202	0	0	172	0	0
Grp Sat Flow(s),veh/h/ln	1598	0	0	1466	0	0	1595	0	0	1458	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.2	0.0	0.0	4.6	0.0	0.0	5.0	0.0	0.0	0.7	0.0	0.0
Prop In Lane	0.07		0.25	0.20		0.18	0.07		0.16	0.27		0.06
Lane Grp Cap(c), veh/h	674	0	0	630	0	0	796	0	0	743	0	0
V/C Ratio(X)	0.18	0.00	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.23	0.00	0.00
Avail Cap(c_a), veh/h	674	0	0	630	0	0	796	0	0	743	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.3	0.0	0.0	13.7	0.0	0.0	10.8	0.0	0.0	1.4	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	1.0	0.0	0.0	0.8	0.0	0.0	0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	1.6	0.0	0.0	1.7	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.9	0.0	0.0	14.7	0.0	0.0	11.5	0.0	0.0	2.1	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	A	A	A	A
Approach Vol, veh/h		119			160			202			172	
Approach Delay, s/veh		13.9			14.7			11.5			2.1	
Approach LOS		B			B			B			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	30.0	35.0	30.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	25.0	30.0	25.0
Max Q Clear Time (g_c+I1), s	7.0	5.2	2.7	6.6
Green Ext Time (p_c), s	1.1	0.6	1.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	10.2
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	65	24	26	79	23	12	124	26	37	92	9
Future Vol, veh/h	6	65	24	26	79	23	12	124	26	37	92	9
Conflicting Peds, #/hr	28	0	13	13	0	28	2	0	7	7	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	0	3	4	15	9	6	0	6	8	11	7	0
Mvmt Flow	8	81	30	33	99	29	15	155	33	46	115	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	509	440	136	490	429	207	128	0	0	195	0	0
Stage 1	215	215	-	209	209	-	-	-	-	-	-	-
Stage 2	294	225	-	281	220	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.53	6.24	7.25	6.59	6.26	4.1	-	-	4.21	-	-
Critical Hdwy Stg 1	6.1	5.53	-	6.25	5.59	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.53	-	6.25	5.59	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.027	3.336	3.635	4.081	3.354	2.2	-	-	2.299	-	-
Pot Cap-1 Maneuver	478	510	907	468	508	823	1470	-	-	1326	-	-
Stage 1	792	723	-	764	716	-	-	-	-	-	-	-
Stage 2	719	716	-	698	708	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	359	479	890	370	478	787	1466	-	-	1314	-	-
Mov Cap-2 Maneuver	359	479	-	370	478	-	-	-	-	-	-	-
Stage 1	781	693	-	749	702	-	-	-	-	-	-	-
Stage 2	568	702	-	563	679	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.7	16.1	0.6	2.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1466	-	-	530	483	1314	-	-
HCM Lane V/C Ratio	0.01	-	-	0.224	0.331	0.035	-	-
HCM Control Delay (s)	7.5	0	-	13.7	16.1	7.8	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.9	1.4	0.1	-	-

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	65	24	26	79	23	12	124	26	37	92	9
Future Vol, veh/h	6	65	24	26	79	23	12	124	26	37	92	9
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles, %	0	3	4	15	9	6	0	6	8	11	7	0
Mvmt Flow	8	81	30	33	99	29	15	155	33	46	115	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.9	9.8	9.6	9.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	6%	20%	27%
Vol Thru, %	77%	68%	62%	67%
Vol Right, %	16%	25%	18%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	162	95	128	138
LT Vol	12	6	26	37
Through Vol	124	65	79	92
RT Vol	26	24	23	9
Lane Flow Rate	202	119	160	172
Geometry Grp	1	1	1	1
Degree of Util (X)	0.267	0.161	0.229	0.242
Departure Headway (Hd)	4.744	4.893	5.152	5.052
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	751	727	691	706
Service Time	2.808	2.968	3.223	3.12
HCM Lane V/C Ratio	0.269	0.164	0.232	0.244
HCM Control Delay	9.6	8.9	9.8	9.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.1	0.6	0.9	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	35	20	13	13	0	0	0	0	11	87	17
Future Volume (veh/h)	0	35	20	13	13	0	0	0	0	11	87	17
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	1.00				1.00	0.90	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1976	1976	1976	1976	0				1976	1853	1976
Adj Flow Rate, veh/h	0	36	21	14	14	0				11	91	18
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0				0	8	0
Cap, veh/h	0	421	246	384	364	0				59	490	97
Arrive On Green	0.00	0.40	0.40	0.40	0.40	0.00				0.40	0.40	0.40
Sat Flow, veh/h	0	1053	614	768	909	0				148	1225	242
Grp Volume(v), veh/h	0	0	57	28	0	0				120	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1668	1677	0	0				1615	0	0
Q Serve(g_s), s	0.0	0.0	1.5	0.0	0.0	0.0				3.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	1.5	0.6	0.0	0.0				3.4	0.0	0.0
Prop In Lane	0.00		0.37	0.50		0.00				0.09		0.15
Lane Grp Cap(c), veh/h	0	0	667	748	0	0				646	0	0
V/C Ratio(X)	0.00	0.00	0.09	0.04	0.00	0.00				0.19	0.00	0.00
Avail Cap(c_a), veh/h	0	0	667	748	0	0				646	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	13.0	12.8	0.0	0.0				13.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.3	0.1	0.0	0.0				0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.6	0.3	0.0	0.0				1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	13.3	12.9	0.0	0.0				14.2	0.0	0.0
LnGrp LOS	A	A	B	B	A	A				B	A	A
Approach Vol, veh/h		57			28						120	
Approach Delay, s/veh		13.3			12.9						14.2	
Approach LOS		B			B						B	

Timer - Assigned Phs		4		6		8			
Phs Duration (G+Y+Rc), s		35.0		35.0		35.0			
Change Period (Y+Rc), s		7.0		7.0		7.0			
Max Green Setting (Gmax), s		28.0		28.0		28.0			
Max Q Clear Time (g_c+I1), s		3.5		5.4		2.6			
Green Ext Time (p_c), s		0.2		0.6		0.1			

Intersection Summary		
HCM 6th Ctrl Delay	13.8	
HCM 6th LOS	B	

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	35	20	13	13	0	0	0	0	11	87	17
Future Vol, veh/h	0	35	20	13	13	0	0	0	0	11	87	17
Conflicting Peds, #/hr	0	0	0	0	0	1	0	0	4	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	8	0	0	0	0	0	0	8	7
Mvmt Flow	0	36	21	14	14	0	0	0	0	11	91	18

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	57	0	0	89	99	17
Stage 1	-	-	-	-	-	-	42	42	-
Stage 2	-	-	-	-	-	-	47	57	-
Critical Hdwy	-	-	-	4.18	-	-	6.4	6.58	6.27
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.58	-
Follow-up Hdwy	-	-	-	2.272	-	-	3.5	4.072	3.363
Pot Cap-1 Maneuver	0	-	-	1510	-	0	917	780	1048
Stage 1	0	-	-	-	-	0	986	848	-
Stage 2	0	-	-	-	-	0	981	836	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1510	-	-	909	0	1044
Mov Cap-2 Maneuver	-	-	-	-	-	-	909	0	-
Stage 1	-	-	-	-	-	-	986	0	-
Stage 2	-	-	-	-	-	-	972	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	3.7	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1510	-	986
HCM Lane V/C Ratio	-	-	0.009	-	0.121
HCM Control Delay (s)	-	-	7.4	0	9.2
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0.4

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	35	20	13	13	0	0	0	0	11	87	17
Future Vol, veh/h	0	35	20	13	13	0	0	0	0	11	87	17
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	0	0	0	8	0	0	0	0	0	0	8	7
Mvmt Flow	0	36	21	14	14	0	0	0	0	11	91	18
Number of Lanes	0	1	0	0	1	0	0	0	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.2	7.6	7.6
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	50%	10%
Vol Thru, %	64%	50%	76%
Vol Right, %	36%	0%	15%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	55	26	115
LT Vol	0	13	11
Through Vol	35	13	87
RT Vol	20	0	17
Lane Flow Rate	57	27	120
Geometry Grp	1	1	1
Degree of Util (X)	0.062	0.033	0.132
Departure Headway (Hd)	3.911	4.39	3.976
Convergence, Y/N	Yes	Yes	Yes
Cap	907	809	898
Service Time	1.971	2.452	2.014
HCM Lane V/C Ratio	0.063	0.033	0.134
HCM Control Delay	7.2	7.6	7.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.1	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	55	32	13	33	0	0	0	0	23	170	26
Future Volume (veh/h)	0	55	32	13	33	0	0	0	0	23	170	26
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		1.00				1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1914	1914	1930	1930	0				1976	1961	1976
Adj Flow Rate, veh/h	0	67	39	16	40	0				28	207	32
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82				0.82	0.82	0.82
Percent Heavy Veh, %	0	4	4	3	3	0				0	1	0
Cap, veh/h	0	453	263	227	538	0				80	591	91
Arrive On Green	0.00	0.40	0.40	0.40	0.40	0.00				0.40	0.40	0.40
Sat Flow, veh/h	0	1131	659	401	1344	0				200	1477	228
Grp Volume(v), veh/h	0	0	106	56	0	0				267	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1790	1745	0	0				1905	0	0
Q Serve(g_s), s	0.0	0.0	2.6	0.0	0.0	0.0				6.8	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	2.6	1.3	0.0	0.0				6.8	0.0	0.0
Prop In Lane	0.00		0.37	0.29		0.00				0.10		0.12
Lane Grp Cap(c), veh/h	0	0	716	764	0	0				762	0	0
V/C Ratio(X)	0.00	0.00	0.15	0.07	0.00	0.00				0.35	0.00	0.00
Avail Cap(c_a), veh/h	0	0	716	764	0	0				762	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	13.4	13.0	0.0	0.0				14.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.4	0.2	0.0	0.0				1.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	1.1	0.5	0.0	0.0				3.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	13.8	13.2	0.0	0.0				15.9	0.0	0.0
LnGrp LOS	A	A	B	B	A	A				B	A	A
Approach Vol, veh/h		106			56						267	
Approach Delay, s/veh		13.8			13.2						15.9	
Approach LOS		B			B						B	

Timer - Assigned Phs		4		6		8						
Phs Duration (G+Y+Rc), s		35.0		35.0		35.0						
Change Period (Y+Rc), s		7.0		7.0		7.0						
Max Green Setting (Gmax), s		28.0		28.0		28.0						
Max Q Clear Time (g_c+I1), s		4.6		8.8		3.3						
Green Ext Time (p_c), s		0.5		1.5		0.2						

Intersection Summary												
HCM 6th Ctrl Delay		15.0										
HCM 6th LOS		B										

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	55	32	13	33	0	0	0	0	23	170	26
Future Vol, veh/h	0	55	32	13	33	0	0	0	0	23	170	26
Conflicting Peds, #/hr	7	0	6	6	0	7	14	0	4	4	0	14
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	4	0	0	3	0	0	0	0	0	1	0
Mvmt Flow	0	67	39	16	40	0	0	0	0	28	207	32

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	112	0	0	163	184	54
Stage 1	-	-	-	-	-	-	72	72	-
Stage 2	-	-	-	-	-	-	91	112	-
Critical Hdwy	-	-	-	4.1	-	-	6.4	6.51	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.51	-
Follow-up Hdwy	-	-	-	2.2	-	-	3.5	4.009	3.3
Pot Cap-1 Maneuver	0	-	-	1490	-	0	832	712	1019
Stage 1	0	-	-	-	-	0	956	837	-
Stage 2	0	-	-	-	-	0	938	805	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1490	-	-	823	0	1001
Mov Cap-2 Maneuver	-	-	-	-	-	-	823	0	-
Stage 1	-	-	-	-	-	-	956	0	-
Stage 2	-	-	-	-	-	-	928	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	2.1	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1490	-	909
HCM Lane V/C Ratio	-	-	0.011	-	0.294
HCM Control Delay (s)	-	-	7.4	0	10.6
HCM Lane LOS	-	-	A	A	B
HCM 95th %tile Q(veh)	-	-	0	-	1.2

Intersection	
Intersection Delay, s/veh	8.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	55	32	13	33	0	0	0	0	23	170	26
Future Vol, veh/h	0	55	32	13	33	0	0	0	0	23	170	26
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	0	4	0	0	3	0	0	0	0	0	1	0
Mvmt Flow	0	67	39	16	40	0	0	0	0	28	207	32
Number of Lanes	0	1	0	0	1	0	0	0	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.1	8.1	9.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	28%	11%
Vol Thru, %	63%	72%	78%
Vol Right, %	37%	0%	12%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	87	46	219
LT Vol	0	13	23
Through Vol	55	33	170
RT Vol	32	0	26
Lane Flow Rate	106	56	267
Geometry Grp	1	1	1
Degree of Util (X)	0.13	0.073	0.315
Departure Headway (Hd)	4.417	4.682	4.24
Convergence, Y/N	Yes	Yes	Yes
Cap	813	766	852
Service Time	2.438	2.704	2.24
HCM Lane V/C Ratio	0.13	0.073	0.313
HCM Control Delay	8.1	8.1	9.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.4	0.2	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	40	22	1	10	59	13	3	165	13	4	170	52
Future Volume (veh/h)	40	22	1	10	59	13	3	165	13	4	170	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1633	1633	1633	1870	1870	1870	1826	1826	1826	1856	1856	1856
Adj Flow Rate, veh/h	47	26	1	12	69	15	3	192	15	5	198	60
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	18	18	18	2	2	2	5	5	5	3	3	3
Cap, veh/h	344	167	6	100	444	88	63	805	62	65	659	196
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	778	527	18	103	1403	279	5	1666	129	8	1364	406
Grp Volume(v), veh/h	74	0	0	96	0	0	210	0	0	263	0	0
Grp Sat Flow(s),veh/h/ln	1323	0	0	1784	0	0	1800	0	0	1778	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.0	0.0	0.0	2.3	0.0	0.0	4.1	0.0	0.0	5.4	0.0	0.0
Prop In Lane	0.64		0.01	0.12		0.16	0.01		0.07	0.02		0.23
Lane Grp Cap(c), veh/h	517	0	0	632	0	0	931	0	0	920	0	0
V/C Ratio(X)	0.14	0.00	0.00	0.15	0.00	0.00	0.23	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	517	0	0	632	0	0	931	0	0	920	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.7	0.0	0.0	14.8	0.0	0.0	9.1	0.0	0.0	9.4	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.5	0.0	0.0	0.6	0.0	0.0	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	1.0	0.0	0.0	1.5	0.0	0.0	2.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.3	0.0	0.0	15.3	0.0	0.0	9.6	0.0	0.0	10.2	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	B	A	A
Approach Vol, veh/h		74			96			210			263	
Approach Delay, s/veh		15.3			15.3			9.6			10.2	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	25.0	35.0	25.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	29.0	19.0	29.0	19.0
Max Q Clear Time (g_c+I1), s	6.1	4.0	7.4	4.3
Green Ext Time (p_c), s	1.2	0.3	1.5	0.3

Intersection Summary	
HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	22	1	10	59	13	3	165	13	4	170	52
Future Vol, veh/h	40	22	1	10	59	13	3	165	13	4	170	52
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	17	18	0	0	2	20	33	5	15	0	3	6
Mvmt Flow	47	26	1	12	69	15	3	192	15	5	198	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	486	451	228	458	474	200	258	0	0	207	0	0
Stage 1	238	238	-	206	206	-	-	-	-	-	-	-
Stage 2	248	213	-	252	268	-	-	-	-	-	-	-
Critical Hdwy	7.27	6.68	6.2	7.1	6.52	6.4	4.43	-	-	4.1	-	-
Critical Hdwy Stg 1	6.27	5.68	-	6.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.27	5.68	-	6.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.653	4.162	3.3	3.5	4.018	3.48	2.497	-	-	2.2	-	-
Pot Cap-1 Maneuver	468	481	816	516	489	797	1146	-	-	1376	-	-
Stage 1	733	680	-	801	731	-	-	-	-	-	-	-
Stage 2	724	697	-	757	687	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	407	478	816	492	486	797	1146	-	-	1376	-	-
Mov Cap-2 Maneuver	407	478	-	492	486	-	-	-	-	-	-	-
Stage 1	731	677	-	799	729	-	-	-	-	-	-	-
Stage 2	641	695	-	724	684	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	13.5	0.1	0.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1146	-	-	433	519	1376	-	-
HCM Lane V/C Ratio	0.003	-	-	0.169	0.184	0.003	-	-
HCM Control Delay (s)	8.2	0	-	15	13.5	7.6	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.7	0	-	-

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	22	1	10	59	13	3	165	13	4	170	52
Future Vol, veh/h	40	22	1	10	59	13	3	165	13	4	170	52
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	17	18	0	0	2	20	33	5	15	0	3	6
Mvmt Flow	47	26	1	12	69	15	3	192	15	5	198	60
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.4	8.9	10.4	9.7
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	63%	12%	2%
Vol Thru, %	91%	35%	72%	75%
Vol Right, %	7%	2%	16%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	181	63	82	226
LT Vol	3	40	10	4
Through Vol	165	22	59	170
RT Vol	13	1	13	52
Lane Flow Rate	210	73	95	263
Geometry Grp	1	1	1	1
Degree of Util (X)	0.302	0.113	0.134	0.327
Departure Headway (Hd)	5.158	5.564	5.06	4.479
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	695	640	704	799
Service Time	3.211	3.637	3.129	2.527
HCM Lane V/C Ratio	0.302	0.114	0.135	0.329
HCM Control Delay	10.4	9.4	8.9	9.7
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.3	0.4	0.5	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	69	0	9	32	8	0	215	26	9	151	48
Future Volume (veh/h)	86	69	0	9	32	8	0	215	26	9	151	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1767	1767	1767	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	100	80	0	10	37	9	0	250	30	10	176	56
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	6	6	6	9	9	9	4	4	4	4	4	4
Cap, veh/h	333	240	0	124	383	84	0	779	94	73	639	196
Arrive On Green	0.32	0.32	0.00	0.32	0.32	0.32	0.00	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	756	757	0	168	1209	264	0	1612	193	22	1323	405
Grp Volume(v), veh/h	180	0	0	56	0	0	0	0	280	242	0	0
Grp Sat Flow(s),veh/h/ln	1512	0	0	1641	0	0	0	0	1806	1750	0	0
Q Serve(g_s), s	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.3	0.0	0.0	1.4	0.0	0.0	0.0	0.0	5.7	4.9	0.0	0.0
Prop In Lane	0.56		0.00	0.18		0.16	0.00		0.11	0.04		0.23
Lane Grp Cap(c), veh/h	572	0	0	590	0	0	0	0	873	908	0	0
V/C Ratio(X)	0.31	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.32	0.27	0.00	0.00
Avail Cap(c_a), veh/h	572	0	0	590	0	0	0	0	873	908	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.7	0.0	0.0	14.5	0.0	0.0	0.0	0.0	9.5	9.3	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.0	0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.0	0.5	0.0	0.0	0.0	0.0	2.1	1.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	0.0	14.8	0.0	0.0	0.0	0.0	10.4	10.0	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	A	A	B	A	A	A
Approach Vol, veh/h		180			56			280			242	
Approach Delay, s/veh		17.2			14.8			10.4			10.0	
Approach LOS		B			B			B			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	25.0	35.0	25.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	29.0	19.0	29.0	19.0
Max Q Clear Time (g_c+I1), s	7.7	7.3	6.9	3.4
Green Ext Time (p_c), s	1.6	0.7	1.4	0.2

Intersection Summary	
HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	86	69	0	9	32	8	0	215	26	9	151	48
Future Vol, veh/h	86	69	0	9	32	8	0	215	26	9	151	48
Conflicting Peds, #/hr	10	0	6	6	0	10	0	0	1	0	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	5	6	0	0	9	20	0	4	4	11	4	8
Mvmt Flow	100	80	0	10	37	9	0	250	30	10	176	56

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	526	509	214	536	522	276	236	0	0	281	0	0
Stage 1	228	228	-	266	266	-	-	-	-	-	-	-
Stage 2	298	281	-	270	256	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.56	6.2	7.1	6.59	6.4	4.1	-	-	4.21	-	-
Critical Hdwy Stg 1	6.15	5.56	-	6.1	5.59	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.56	-	6.1	5.59	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.054	3.3	3.5	4.081	3.48	2.2	-	-	2.299	-	-
Pot Cap-1 Maneuver	458	461	831	459	449	722	1343	-	-	1231	-	-
Stage 1	768	708	-	744	676	-	-	-	-	-	-	-
Stage 2	704	671	-	740	683	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	414	455	823	392	443	714	1338	-	-	1230	-	-
Mov Cap-2 Maneuver	414	455	-	392	443	-	-	-	-	-	-	-
Stage 1	765	699	-	743	675	-	-	-	-	-	-	-
Stage 2	650	670	-	645	674	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.2	13.9	0	0.3
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1338	-	-	431	461	1230	-	-
HCM Lane V/C Ratio	-	-	-	0.418	0.124	0.009	-	-
HCM Control Delay (s)	0	-	-	19.2	13.9	8	0	-
HCM Lane LOS	A	-	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	2	0.4	0	-	-

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	86	69	0	9	32	8	0	215	26	9	151	48
Future Vol, veh/h	86	69	0	9	32	8	0	215	26	9	151	48
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	5	6	0	0	9	20	0	4	4	11	4	8
Mvmt Flow	100	80	0	10	37	9	0	250	30	10	176	56
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.6	9	10.9	10.5
HCM LOS	B	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	55%	18%	4%
Vol Thru, %	89%	45%	65%	73%
Vol Right, %	11%	0%	16%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	241	155	49	208
LT Vol	0	86	9	9
Through Vol	215	69	32	151
RT Vol	26	0	8	48
Lane Flow Rate	280	180	57	242
Geometry Grp	1	1	1	1
Degree of Util (X)	0.377	0.276	0.087	0.332
Departure Headway (Hd)	4.842	5.512	5.483	4.938
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	734	656	657	718
Service Time	2.935	3.512	3.489	3.035
HCM Lane V/C Ratio	0.381	0.274	0.087	0.337
HCM Control Delay	10.9	10.6	9	10.5
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	1.8	1.1	0.3	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	4	6	5	17	26	32	5	176	7	18	205	9
Future Volume (veh/h)	4	6	5	17	26	32	5	176	7	18	205	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1714	1714	1714	1976	1976	1976	1796	1796	1796	1856	1856	1856
Adj Flow Rate, veh/h	5	7	4	20	30	31	6	202	8	21	236	9
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	0	0	0	7	7	7	3	3	3
Cap, veh/h	229	299	150	203	304	268	67	679	26	89	674	24
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	375	748	375	320	760	669	13	1697	66	61	1685	61
Grp Volume(v), veh/h	16	0	0	81	0	0	216	0	0	266	0	0
Grp Sat Flow(s),veh/h/ln	1498	0	0	1748	0	0	1776	0	0	1808	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	0.0	0.0	1.7	0.0	0.0	5.0	0.0	0.0	6.1	0.0	0.0
Prop In Lane	0.31		0.25	0.25		0.38	0.03		0.04	0.08		0.03
Lane Grp Cap(c), veh/h	678	0	0	774	0	0	772	0	0	788	0	0
V/C Ratio(X)	0.02	0.00	0.00	0.10	0.00	0.00	0.28	0.00	0.00	0.34	0.00	0.00
Avail Cap(c_a), veh/h	678	0	0	774	0	0	772	0	0	788	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.9	0.0	0.0	11.3	0.0	0.0	12.3	0.0	0.0	12.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.3	0.0	0.0	0.9	0.0	0.0	1.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.7	0.0	0.0	1.9	0.0	0.0	2.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.0	0.0	0.0	11.6	0.0	0.0	13.2	0.0	0.0	13.8	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		16			81			216			266	
Approach Delay, s/veh		11.0			11.6			13.2			13.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		30.0		30.0		30.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		24.0		24.0		24.0		24.0				
Max Q Clear Time (g_c+I1), s		7.0		2.4		8.1		3.7				
Green Ext Time (p_c), s		1.1		0.0		1.4		0.3				

Intersection Summary												
HCM 6th Ctrl Delay			13.2									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	6	5	17	26	32	5	176	7	18	205	9
Future Vol, veh/h	4	6	5	17	26	32	5	176	7	18	205	9
Conflicting Peds, #/hr	0	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	17	0	23	0	8	11	7	14	20	3	0
Mvmt Flow	5	7	6	20	30	37	6	202	8	21	236	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	536	505	241	508	506	207	246	0	0	210	0	0
Stage 1	283	283	-	218	218	-	-	-	-	-	-	-
Stage 2	253	222	-	290	288	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.67	6.2	7.33	6.5	6.28	4.21	-	-	4.3	-	-
Critical Hdwy Stg 1	6.1	5.67	-	6.33	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.67	-	6.33	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.153	3.3	3.707	4	3.372	2.299	-	-	2.38	-	-
Pot Cap-1 Maneuver	459	449	803	443	472	818	1269	-	-	1261	-	-
Stage 1	728	651	-	739	726	-	-	-	-	-	-	-
Stage 2	756	693	-	675	677	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	409	438	803	427	461	817	1269	-	-	1261	-	-
Mov Cap-2 Maneuver	409	438	-	427	461	-	-	-	-	-	-	-
Stage 1	724	639	-	735	722	-	-	-	-	-	-	-
Stage 2	688	690	-	650	664	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.4	12.7	0.2	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1269	-	-	505	554	1261	-	-
HCM Lane V/C Ratio	0.005	-	-	0.034	0.156	0.016	-	-
HCM Control Delay (s)	7.8	0	-	12.4	12.7	7.9	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.1	-	-

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	6	5	17	26	32	5	176	7	18	205	9
Future Vol, veh/h	4	6	5	17	26	32	5	176	7	18	205	9
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	0	17	0	23	0	8	11	7	14	20	3	0
Mvmt Flow	5	7	6	20	30	37	6	202	8	21	236	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	9	9.5	10.3
HCM LOS	A	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	27%	23%	8%
Vol Thru, %	94%	40%	35%	88%
Vol Right, %	4%	33%	43%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	188	15	75	232
LT Vol	5	4	17	18
Through Vol	176	6	26	205
RT Vol	7	5	32	9
Lane Flow Rate	216	17	86	267
Geometry Grp	1	1	1	1
Degree of Util (X)	0.279	0.024	0.125	0.352
Departure Headway (Hd)	4.647	5.018	5.235	4.747
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	774	710	683	757
Service Time	2.678	3.071	3.28	2.775
HCM Lane V/C Ratio	0.279	0.024	0.126	0.353
HCM Control Delay	9.5	8.2	9	10.3
HCM Lane LOS	A	A	A	B
HCM 95th-tile Q	1.1	0.1	0.4	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	8	19	4	9	14	26	4	257	9	45	264	9
Future Volume (veh/h)	8	19	4	9	14	26	4	257	9	45	264	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1976	1976	1976	1976	1976	1976	1856	1856	1856	1870	1870	1870
Adj Flow Rate, veh/h	9	22	3	10	16	24	5	295	10	52	303	9
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0	0	0	0	3	3	3	2	2	2
Cap, veh/h	221	516	64	166	268	335	64	709	24	129	623	17
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	364	1290	160	236	671	837	7	1773	59	151	1556	43
Grp Volume(v), veh/h	34	0	0	50	0	0	310	0	0	364	0	0
Grp Sat Flow(s),veh/h/ln	1813	0	0	1743	0	0	1839	0	0	1751	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.6	0.0	0.0	1.0	0.0	0.0	7.3	0.0	0.0	8.7	0.0	0.0
Prop In Lane	0.26		0.09	0.20		0.48	0.02		0.03	0.14		0.02
Lane Grp Cap(c), veh/h	801	0	0	769	0	0	797	0	0	769	0	0
V/C Ratio(X)	0.04	0.00	0.00	0.07	0.00	0.00	0.39	0.00	0.00	0.47	0.00	0.00
Avail Cap(c_a), veh/h	801	0	0	769	0	0	797	0	0	769	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	11.0	0.0	0.0	11.1	0.0	0.0	13.0	0.0	0.0	13.4	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.2	0.0	0.0	1.4	0.0	0.0	2.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.4	0.0	0.0	3.0	0.0	0.0	3.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.1	0.0	0.0	11.3	0.0	0.0	14.4	0.0	0.0	15.5	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		34			50			310			364	
Approach Delay, s/veh		11.1			11.3			14.4			15.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	30.0	30.0	30.0	30.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	24.0	24.0	24.0	24.0
Max Q Clear Time (g_c+I1), s	9.3	2.6	10.7	3.0
Green Ext Time (p_c), s	1.6	0.1	1.9	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.6
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	19	4	9	14	26	4	257	9	45	264	9
Future Vol, veh/h	8	19	4	9	14	26	4	257	9	45	264	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	12	0	0	11	0	0	0	3	0	2	2	0
Mvmt Flow	9	22	5	10	16	30	5	295	10	52	303	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	745	727	308	736	727	300	313	0	0	305	0	0
Stage 1	412	412	-	310	310	-	-	-	-	-	-	-
Stage 2	333	315	-	426	417	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.5	6.2	7.21	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.22	5.5	-	6.21	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.5	-	6.21	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4	3.3	3.599	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	318	353	737	324	353	744	1259	-	-	1256	-	-
Stage 1	598	598	-	681	663	-	-	-	-	-	-	-
Stage 2	660	659	-	589	595	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	282	334	737	293	334	744	1259	-	-	1256	-	-
Mov Cap-2 Maneuver	282	334	-	293	334	-	-	-	-	-	-	-
Stage 1	595	568	-	678	660	-	-	-	-	-	-	-
Stage 2	615	656	-	535	565	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.7	14	0.1	1.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1259	-	-	342	455	1256	-	-
HCM Lane V/C Ratio	0.004	-	-	0.104	0.124	0.041	-	-
HCM Control Delay (s)	7.9	0	-	16.7	14	8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0.1	-	-

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	19	4	9	14	26	4	257	9	45	264	9
Future Vol, veh/h	8	19	4	9	14	26	4	257	9	45	264	9
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	12	0	0	11	0	0	0	3	0	2	2	0
Mvmt Flow	9	22	5	10	16	30	5	295	10	52	303	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.1	8.9	10.5	11.4
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	26%	18%	14%
Vol Thru, %	95%	61%	29%	83%
Vol Right, %	3%	13%	53%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	270	31	49	318
LT Vol	4	8	9	45
Through Vol	257	19	14	264
RT Vol	9	4	26	9
Lane Flow Rate	310	36	56	366
Geometry Grp	1	1	1	1
Degree of Util (X)	0.39	0.056	0.084	0.46
Departure Headway (Hd)	4.529	5.668	5.356	4.531
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	791	628	665	793
Service Time	2.567	3.739	3.423	2.567
HCM Lane V/C Ratio	0.392	0.057	0.084	0.462
HCM Control Delay	10.5	9.1	8.9	11.4
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	1.9	0.2	0.3	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	20	70	40	9	87	66	9	247	24	63	236	12
Future Volume (veh/h)	20	70	40	9	87	66	9	247	24	63	236	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1781	1781	1781	1752	1752	1752	1796	1796	1796
Adj Flow Rate, veh/h	22	78	40	10	97	71	10	274	27	70	262	12
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	8	8	8	10	10	10	7	7	7
Cap, veh/h	93	282	128	59	251	173	58	814	78	191	678	29
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	145	1072	487	34	954	656	18	1546	149	255	1289	56
Grp Volume(v), veh/h	140	0	0	178	0	0	311	0	0	344	0	0
Grp Sat Flow(s),veh/h/ln	1703	0	0	1644	0	0	1713	0	0	1600	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	4.8	0.0	0.0	6.7	0.0	0.0	7.9	0.0	0.0	8.7	0.0	0.0
Prop In Lane	0.16		0.29	0.06		0.40	0.03		0.09	0.20		0.03
Lane Grp Cap(c), veh/h	503	0	0	483	0	0	950	0	0	899	0	0
V/C Ratio(X)	0.28	0.00	0.00	0.37	0.00	0.00	0.33	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	503	0	0	483	0	0	950	0	0	899	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.4	0.0	0.0	23.1	0.0	0.0	10.4	0.0	0.0	10.6	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.0	0.9	0.0	0.0	1.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	0.0	2.8	0.0	0.0	2.9	0.0	0.0	3.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.8	0.0	0.0	25.3	0.0	0.0	11.3	0.0	0.0	11.8	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	A
Approach Vol, veh/h		140			178			311			344	
Approach Delay, s/veh		23.8			25.3			11.3			11.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		28.0		48.0		28.0		48.0				
Change Period (Y+Rc), s		8.0		8.0		8.0		8.0				
Max Green Setting (Gmax), s		20.0		40.0		20.0		40.0				
Max Q Clear Time (g_c+I1), s		6.8		10.7		8.7		9.9				
Green Ext Time (p_c), s		0.6		2.4		0.7		2.0				

Intersection Summary												
HCM 6th Ctrl Delay			15.8									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	70	40	9	87	66	9	247	24	63	236	12
Future Vol, veh/h	20	70	40	9	87	66	9	247	24	63	236	12
Conflicting Peds, #/hr	0	0	1	0	0	2	0	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	8	2	2	10	2	2	7	2
Mvmt Flow	22	78	44	10	97	73	10	274	27	70	262	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	805	731	271	779	724	290	276	0	0	301	0	0
Stage 1	410	410	-	308	308	-	-	-	-	-	-	-
Stage 2	395	321	-	471	416	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.58	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.072	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	301	349	768	313	345	749	1287	-	-	1260	-	-
Stage 1	619	595	-	702	650	-	-	-	-	-	-	-
Stage 2	630	652	-	573	582	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	196	323	767	227	319	748	1286	-	-	1260	-	-
Mov Cap-2 Maneuver	196	323	-	227	319	-	-	-	-	-	-	-
Stage 1	613	555	-	696	644	-	-	-	-	-	-	-
Stage 2	478	646	-	433	543	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.3	20.9	0.3	1.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1286	-	-	350	404	1260	-	-
HCM Lane V/C Ratio	0.008	-	-	0.413	0.446	0.056	-	-
HCM Control Delay (s)	7.8	0	-	22.3	20.9	8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	2	2.2	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	70	40	9	87	66	9	247	24	63	236	12
Future Vol, veh/h	20	70	40	9	87	66	9	247	24	63	236	12
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	8	2	2	10	2	2	7	2
Mvmt Flow	22	78	44	10	97	73	10	274	27	70	262	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.8	11.1	13.1	14.2
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	15%	6%	20%
Vol Thru, %	88%	54%	54%	76%
Vol Right, %	9%	31%	41%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	280	130	162	311
LT Vol	9	20	9	63
Through Vol	247	70	87	236
RT Vol	24	40	66	12
Lane Flow Rate	311	144	180	346
Geometry Grp	1	1	1	1
Degree of Util (X)	0.466	0.237	0.287	0.519
Departure Headway (Hd)	5.397	5.901	5.746	5.404
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	666	605	621	663
Service Time	3.454	3.97	3.815	3.457
HCM Lane V/C Ratio	0.467	0.238	0.29	0.522
HCM Control Delay	13.1	10.8	11.1	14.2
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.5	0.9	1.2	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	5	45	22	34	147	106	15	316	15	48	293	12
Future Volume (veh/h)	5	45	22	34	147	106	15	316	15	48	293	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1856	1856	1856	1870	1870	1870
Adj Flow Rate, veh/h	6	52	20	39	169	120	17	363	17	55	337	13
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	1	1	1	1	1	1	3	3	3	2	2	2
Cap, veh/h	63	335	119	86	253	165	66	898	41	137	795	29
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	45	1272	454	127	962	628	31	1706	78	158	1510	55
Grp Volume(v), veh/h	78	0	0	328	0	0	397	0	0	405	0	0
Grp Sat Flow(s),veh/h/ln	1770	0	0	1717	0	0	1815	0	0	1723	0	0
Q Serve(g_s), s	0.0	0.0	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.5	0.0	0.0	13.1	0.0	0.0	9.9	0.0	0.0	10.0	0.0	0.0
Prop In Lane	0.08		0.26	0.12		0.37	0.04		0.04	0.14		0.03
Lane Grp Cap(c), veh/h	517	0	0	505	0	0	1005	0	0	961	0	0
V/C Ratio(X)	0.15	0.00	0.00	0.65	0.00	0.00	0.40	0.00	0.00	0.42	0.00	0.00
Avail Cap(c_a), veh/h	517	0	0	505	0	0	1005	0	0	961	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.6	0.0	0.0	25.4	0.0	0.0	10.9	0.0	0.0	10.9	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	6.4	0.0	0.0	1.2	0.0	0.0	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	6.0	0.0	0.0	3.9	0.0	0.0	4.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	0.0	0.0	31.7	0.0	0.0	12.0	0.0	0.0	12.3	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	A
Approach Vol, veh/h		78			328			397			405	
Approach Delay, s/veh		22.2			31.7			12.0			12.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	28.0	48.0	28.0	48.0
Change Period (Y+Rc), s	8.0	8.0	8.0	8.0
Max Green Setting (Gmax), s	20.0	40.0	20.0	40.0
Max Q Clear Time (g_c+I1), s	4.5	12.0	15.1	11.9
Green Ext Time (p_c), s	0.3	2.8	0.9	2.7

Intersection Summary	
HCM 6th Ctrl Delay	18.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	26.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	45	22	34	147	106	15	316	15	48	293	12
Future Vol, veh/h	5	45	22	34	147	106	15	316	15	48	293	12
Conflicting Peds, #/hr	0	0	1	0	0	2	0	0	4	0	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	1	2	2	1	2	2	3	2	2	2	2
Mvmt Flow	6	52	25	39	169	122	17	363	17	55	337	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1010	875	348	904	874	378	354	0	0	384	0	0
Stage 1	457	457	-	410	410	-	-	-	-	-	-	-
Stage 2	553	418	-	494	464	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.51	6.22	7.12	6.51	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.51	-	6.12	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.51	-	6.12	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.009	3.318	3.518	4.009	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	218	289	695	258	289	669	1205	-	-	1174	-	-
Stage 1	583	569	-	619	597	-	-	-	-	-	-	-
Stage 2	517	592	-	557	565	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	83	266	692	199	266	665	1202	-	-	1170	-	-
Mov Cap-2 Maneuver	83	266	-	199	266	-	-	-	-	-	-	-
Stage 1	571	534	-	605	584	-	-	-	-	-	-	-
Stage 2	294	579	-	456	531	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.5	90.7	0.3	1.1
HCM LOS	C	F		

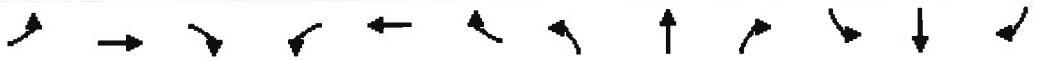
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1202	-	-	276	325	1170	-	-
HCM Lane V/C Ratio	0.014	-	-	0.3	1.015	0.047	-	-
HCM Control Delay (s)	8	0	-	23.5	90.7	8.2	0	-
HCM Lane LOS	A	A	-	C	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.2	11.4	0.1	-	-

Intersection	
Intersection Delay, s/veh	19.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	45	22	34	147	106	15	316	15	48	293	12
Future Vol, veh/h	5	45	22	34	147	106	15	316	15	48	293	12
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	1	2	2	1	2	2	3	2	2	2	2
Mvmt Flow	6	52	25	39	169	122	17	363	17	55	337	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.6	17.9	21.1	21.8
HCM LOS	B	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	7%	12%	14%
Vol Thru, %	91%	62%	51%	83%
Vol Right, %	4%	31%	37%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	346	72	287	353
LT Vol	15	5	34	48
Through Vol	316	45	147	293
RT Vol	15	22	106	12
Lane Flow Rate	398	83	330	406
Geometry Grp	1	1	1	1
Degree of Util (X)	0.676	0.164	0.581	0.69
Departure Headway (Hd)	6.118	7.124	6.339	6.125
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	589	501	567	588
Service Time	4.173	5.205	4.395	4.181
HCM Lane V/C Ratio	0.676	0.166	0.582	0.69
HCM Control Delay	21.1	11.6	17.9	21.8
HCM Lane LOS	C	B	C	C
HCM 95th-tile Q	5.1	0.6	3.7	5.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	20	31	0	0	0	15	328	0	0	278	7
Future Volume (veh/h)	10	20	31	0	0	0	15	328	0	0	278	7
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99				0.99		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				1781	1781	0	0	1781	1781
Adj Flow Rate, veh/h	11	21	27				16	345	0	0	293	7
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0				8	8	0	0	8	8
Cap, veh/h	124	237	305				72	798	0	0	799	19
Arrive On Green	0.38	0.38	0.38				0.46	0.46	0.00	0.00	0.46	0.46
Sat Flow, veh/h	323	617	793				30	1729	0	0	1732	41
Grp Volume(v), veh/h	59	0	0				361	0	0	0	0	300
Grp Sat Flow(s),veh/h/ln	1734	0	0				1759	0	0	0	0	1774
Q Serve(g_s), s	1.4	0.0	0.0				0.0	0.0	0.0	0.0	0.0	7.1
Cycle Q Clear(g_c), s	1.4	0.0	0.0				8.9	0.0	0.0	0.0	0.0	7.1
Prop In Lane	0.19		0.46				0.04		0.00	0.00		0.02
Lane Grp Cap(c), veh/h	667	0	0				870	0	0	0	0	819
V/C Ratio(X)	0.09	0.00	0.00				0.42	0.00	0.00	0.00	0.00	0.37
Avail Cap(c_a), veh/h	667	0	0				870	0	0	0	0	819
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	12.7	0.0	0.0				11.8	0.0	0.0	0.0	0.0	11.3
Incr Delay (d2), s/veh	0.3	0.0	0.0				1.5	0.0	0.0	0.0	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0				3.4	0.0	0.0	0.0	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.0	0.0	0.0				13.3	0.0	0.0	0.0	0.0	12.6
LnGrp LOS	B	A	A				B	A	A	A	A	B
Approach Vol, veh/h		59						361			300	
Approach Delay, s/veh		13.0						13.3			12.6	
Approach LOS		B						B			B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	35.0	30.0	35.0
Change Period (Y+Rc), s	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	25.0	30.0
Max Q Clear Time (g_c+I1), s	10.9	3.4	9.1
Green Ext Time (p_c), s	2.1	0.2	1.7

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↰			↱	
Traffic Vol, veh/h	10	20	31	0	0	0	15	328	0	0	278	7
Future Vol, veh/h	10	20	31	0	0	0	15	328	0	0	278	7
Conflicting Peds, #/hr	0	0	6	0	0	6	0	0	4	0	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	6	8	4	13	13	8	0	0	8	0
Mvmt Flow	11	21	33	0	0	0	16	345	0	0	293	7

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	682	682	311	308	0	-	-	-	0
Stage 1	305	305	-	-	-	-	-	-	-
Stage 2	377	377	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.26	4.23	-	-	-	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.354	2.317	-	-	-	-	-
Pot Cap-1 Maneuver	419	375	720	1193	-	0	0	-	-
Stage 1	752	666	-	-	-	0	0	-	-
Stage 2	698	619	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	405	0	710	1184	-	-	-	-	-
Mov Cap-2 Maneuver	405	0	-	-	-	-	-	-	-
Stage 1	733	0	-	-	-	-	-	-	-
Stage 2	692	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1184	-	600	-	-
HCM Lane V/C Ratio	0.013	-	0.107	-	-
HCM Control Delay (s)	8.1	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	20	31	0	0	0	15	328	0	0	278	7
Future Vol, veh/h	10	20	31	0	0	0	15	328	0	0	278	7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	0	6	8	4	13	13	8	0	0	8	0
Mvmt Flow	11	21	33	0	0	0	16	345	0	0	293	7
Number of Lanes	0	1	0	0	0	0	0	1	0	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.7	11.6	10.4
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	4%	16%	0%
Vol Thru, %	96%	33%	98%
Vol Right, %	0%	51%	2%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	343	61	285
LT Vol	15	10	0
Through Vol	328	20	278
RT Vol	0	31	7
Lane Flow Rate	361	64	300
Geometry Grp	1	1	1
Degree of Util (X)	0.463	0.091	0.381
Departure Headway (Hd)	4.615	5.105	4.577
Convergence, Y/N	Yes	Yes	Yes
Cap	780	700	786
Service Time	2.642	3.152	2.605
HCM Lane V/C Ratio	0.463	0.091	0.382
HCM Control Delay	11.6	8.7	10.4
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2.5	0.3	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	15	30	0	0	0	29	392	0	0	332	6
Future Volume (veh/h)	12	15	30	0	0	0	29	392	0	0	332	6
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99				1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h	14	17	27				33	445	0	0	377	7
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0				4	4	0	0	2	2
Cap, veh/h	160	195	309				88	795	0	0	845	16
Arrive On Green	0.38	0.38	0.38				0.46	0.46	0.00	0.00	0.46	0.46
Sat Flow, veh/h	417	506	804				63	1722	0	0	1830	34
Grp Volume(v), veh/h	58	0	0				478	0	0	0	0	384
Grp Sat Flow(s),veh/h/ln	1727	0	0				1785	0	0	0	0	1864
Q Serve(g_s), s	1.4	0.0	0.0				0.0	0.0	0.0	0.0	0.0	9.1
Cycle Q Clear(g_c), s	1.4	0.0	0.0				12.3	0.0	0.0	0.0	0.0	9.1
Prop In Lane	0.24		0.47				0.07		0.00	0.00		0.02
Lane Grp Cap(c), veh/h	664	0	0				883	0	0	0	0	860
V/C Ratio(X)	0.09	0.00	0.00				0.54	0.00	0.00	0.00	0.00	0.45
Avail Cap(c_a), veh/h	664	0	0				883	0	0	0	0	860
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	12.7	0.0	0.0				12.7	0.0	0.0	0.0	0.0	11.9
Incr Delay (d2), s/veh	0.3	0.0	0.0				2.4	0.0	0.0	0.0	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0				5.0	0.0	0.0	0.0	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.0	0.0	0.0				15.1	0.0	0.0	0.0	0.0	13.5
LnGrp LOS	B	A	A				B	A	A	A	A	B
Approach Vol, veh/h		58						478			384	
Approach Delay, s/veh		13.0						15.1			13.5	
Approach LOS		B						B			B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	35.0	30.0	35.0
Change Period (Y+Rc), s	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	25.0	30.0
Max Q Clear Time (g_c+I1), s	14.3	3.4	11.1
Green Ext Time (p_c), s	2.8	0.2	2.2

Intersection Summary	
HCM 6th Ctrl Delay	14.3
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↰			↱	
Traffic Vol, veh/h	12	15	30	0	0	0	29	392	0	0	332	6
Future Vol, veh/h	12	15	30	0	0	0	29	392	0	0	332	6
Conflicting Peds, #/hr	0	0	6	0	0	6	0	0	4	0	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	4	1	2	0	4	0	0	2	0
Mvmt Flow	14	17	34	0	0	0	33	445	0	0	377	7

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	900	900	395	392	0	-	-	-	0
Stage 1	389	389	-	-	-	-	-	-	-
Stage 2	511	511	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	-	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	312	280	659	1178	-	0	0	-	-
Stage 1	689	612	-	-	-	0	0	-	-
Stage 2	606	540	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	295	0	650	1169	-	-	-	-	-
Mov Cap-2 Maneuver	295	0	-	-	-	-	-	-	-
Stage 1	657	0	-	-	-	-	-	-	-
Stage 2	601	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.6	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1169	-	484	-	-
HCM Lane V/C Ratio	0.028	-	0.134	-	-
HCM Control Delay (s)	8.2	0	13.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	15	30	0	0	0	29	392	0	0	332	6
Future Vol, veh/h	12	15	30	0	0	0	29	392	0	0	332	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	0	0	4	1	2	0	4	0	0	2	0
Mvmt Flow	14	17	34	0	0	0	33	445	0	0	377	7
Number of Lanes	0	1	0	0	0	0	0	1	0	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.2	14.1	12
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	7%	21%	0%
Vol Thru, %	93%	26%	98%
Vol Right, %	0%	53%	2%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	421	57	338
LT Vol	29	12	0
Through Vol	392	15	332
RT Vol	0	30	6
Lane Flow Rate	478	65	384
Geometry Grp	1	1	1
Degree of Util (X)	0.598	0.099	0.491
Departure Headway (Hd)	4.501	5.476	4.601
Convergence, Y/N	Yes	Yes	Yes
Cap	799	650	780
Service Time	2.539	3.548	2.642
HCM Lane V/C Ratio	0.598	0.1	0.492
HCM Control Delay	14.1	9.2	12
HCM Lane LOS	B	A	B
HCM 95th-tile Q	4.1	0.3	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	212	12	20	155	0	0	0	0	85	73	17
Future Volume (veh/h)	0	212	12	20	155	0	0	0	0	85	73	17
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1885	1885	1856	1856	0				1900	1856	1900
Adj Flow Rate, veh/h	0	265	15	25	194	0				106	91	21
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80				0.80	0.80	0.80
Percent Heavy Veh, %	0	1	1	3	3	0				0	3	0
Cap, veh/h	0	679	38	101	647	0				399	343	79
Arrive On Green	0.00	0.38	0.38	0.77	0.77	0.00				0.46	0.46	0.46
Sat Flow, veh/h	0	1766	100	101	1682	0				865	743	171
Grp Volume(v), veh/h	0	0	280	219	0	0				218	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1865	1783	0	0				1780	0	0
Q Serve(g_s), s	0.0	0.0	7.1	0.0	0.0	0.0				4.9	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	7.1	2.3	0.0	0.0				4.9	0.0	0.0
Prop In Lane	0.00		0.05	0.11		0.00				0.49		0.10
Lane Grp Cap(c), veh/h	0	0	717	748	0	0				821	0	0
V/C Ratio(X)	0.00	0.00	0.39	0.29	0.00	0.00				0.27	0.00	0.00
Avail Cap(c_a), veh/h	0	0	717	748	0	0				821	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	14.5	4.9	0.0	0.0				10.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.6	1.0	0.0	0.0				0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.0	0.9	0.0	0.0				1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	16.1	5.9	0.0	0.0				11.5	0.0	0.0
LnGrp LOS	A	A	B	A	A	A				B	A	A
Approach Vol, veh/h		280			219						218	
Approach Delay, s/veh		16.1			5.9						11.5	
Approach LOS		B			A						B	

Timer - Assigned Phs		4		6		8						
Phs Duration (G+Y+Rc), s		30.0		35.0		30.0						
Change Period (Y+Rc), s		5.0		5.0		5.0						
Max Green Setting (Gmax), s		25.0		30.0		25.0						
Max Q Clear Time (g_c+I1), s		9.1		6.9		4.3						
Green Ext Time (p_c), s		1.4		1.2		1.2						

Intersection Summary												
HCM 6th Ctrl Delay		11.6										
HCM 6th LOS		B										

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	212	12	20	155	0	0	0	0	85	73	17
Future Vol, veh/h	0	212	12	20	155	0	0	0	0	85	73	17
Conflicting Peds, #/hr	0	0	11	0	0	6	0	0	4	0	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	1	2	2	3	2	2	2	2	2	3	2
Mvmt Flow	0	265	15	25	194	0	0	0	0	106	91	21

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	291	0	0	517	535	201
Stage 1	-	-	-	-	-	-	244	244	-
Stage 2	-	-	-	-	-	-	273	291	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.53	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.53	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.027	3.318
Pot Cap-1 Maneuver	0	-	-	1271	-	0	518	450	840
Stage 1	0	-	-	-	-	0	797	702	-
Stage 2	0	-	-	-	-	0	773	670	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1271	-	-	507	0	834
Mov Cap-2 Maneuver	-	-	-	-	-	-	507	0	-
Stage 1	-	-	-	-	-	-	797	0	-
Stage 2	-	-	-	-	-	-	756	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.9	16.1
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1271	-	542
HCM Lane V/C Ratio	-	-	0.02	-	0.404
HCM Control Delay (s)	-	-	7.9	0	16.1
HCM Lane LOS	-	-	A	A	C
HCM 95th %tile Q(veh)	-	-	0.1	-	1.9

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	212	12	20	155	0	0	0	0	85	73	17
Future Vol, veh/h	0	212	12	20	155	0	0	0	0	85	73	17
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles, %	2	1	2	2	3	2	2	2	2	2	3	2
Mvmt Flow	0	265	15	25	194	0	0	0	0	106	91	21
Number of Lanes	0	1	0	0	1	0	0	0	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	10.5	10	10.5
HCM LOS	B	A	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	11%	49%
Vol Thru, %	95%	89%	42%
Vol Right, %	5%	0%	10%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	224	175	175
LT Vol	0	20	85
Through Vol	212	155	73
RT Vol	12	0	17
Lane Flow Rate	280	219	219
Geometry Grp	1	1	1
Degree of Util (X)	0.368	0.296	0.312
Departure Headway (Hd)	4.727	4.864	5.127
Convergence, Y/N	Yes	Yes	Yes
Cap	756	733	696
Service Time	2.786	2.928	3.196
HCM Lane V/C Ratio	0.37	0.299	0.315
HCM Control Delay	10.5	10	10.5
HCM Lane LOS	B	A	B
HCM 95th-tile Q	1.7	1.2	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	173	24	22	237	0	0	0	0	137	140	17
Future Volume (veh/h)	0	173	24	22	237	0	0	0	0	137	140	17
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1767	1767	1885	1885	0				1900	1885	1900
Adj Flow Rate, veh/h	0	208	29	27	286	0				165	169	20
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83				0.83	0.83	0.83
Percent Heavy Veh, %	0	9	9	1	1	0				0	1	0
Cap, veh/h	0	582	81	90	676	0				392	402	48
Arrive On Green	0.00	0.38	0.38	0.77	0.77	0.00				0.46	0.46	0.46
Sat Flow, veh/h	0	1512	211	77	1757	0				850	870	103
Grp Volume(v), veh/h	0	0	237	313	0	0				354	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1723	1834	0	0				1823	0	0
Q Serve(g_s), s	0.0	0.0	6.4	0.0	0.0	0.0				8.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	6.4	3.7	0.0	0.0				8.4	0.0	0.0
Prop In Lane	0.00		0.12	0.09		0.00				0.47		0.06
Lane Grp Cap(c), veh/h	0	0	663	766	0	0				841	0	0
V/C Ratio(X)	0.00	0.00	0.36	0.41	0.00	0.00				0.42	0.00	0.00
Avail Cap(c_a), veh/h	0	0	663	766	0	0				841	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	14.3	5.0	0.0	0.0				11.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.5	1.6	0.0	0.0				1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.5	1.4	0.0	0.0				3.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	15.8	6.7	0.0	0.0				13.2	0.0	0.0
LnGrp LOS	A	A	B	A	A	A				B	A	A
Approach Vol, veh/h		237			313						354	
Approach Delay, s/veh		15.8			6.7						13.2	
Approach LOS		B			A						B	

Timer - Assigned Phs		4		6		8						
Phs Duration (G+Y+Rc), s		30.0		35.0		30.0						
Change Period (Y+Rc), s		5.0		5.0		5.0						
Max Green Setting (Gmax), s		25.0		30.0		25.0						
Max Q Clear Time (g_c+I1), s		8.4		10.4		5.7						
Green Ext Time (p_c), s		1.2		2.1		1.8						

Intersection Summary	
HCM 6th Ctrl Delay	11.6
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	11.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	173	24	22	237	0	0	0	0	137	140	17
Future Vol, veh/h	0	173	24	22	237	0	0	0	0	137	140	17
Conflicting Peds, #/hr	0	0	16	0	0	17	0	0	21	0	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	9	2	2	1	2	2	1	2	2	1	2
Mvmt Flow	0	208	29	27	286	0	0	0	0	165	169	20

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	253	0	0	563	593	296
Stage 1	-	-	-	-	-	-	340	340	-
Stage 2	-	-	-	-	-	-	223	253	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.51	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.51	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.009	3.318
Pot Cap-1 Maneuver	0	-	-	1312	-	0	487	420	743
Stage 1	0	-	-	-	-	0	721	641	-
Stage 2	0	-	-	-	-	0	814	700	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1312	-	-	475	0	736
Mov Cap-2 Maneuver	-	-	-	-	-	-	475	0	-
Stage 1	-	-	-	-	-	-	721	0	-
Stage 2	-	-	-	-	-	-	794	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.7	28.7
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1312	-	494
HCM Lane V/C Ratio	-	-	0.02	-	0.717
HCM Control Delay (s)	-	-	7.8	0	28.7
HCM Lane LOS	-	-	A	A	D
HCM 95th %tile Q(veh)	-	-	0.1	-	5.7

Intersection	
Intersection Delay, s/veh	13.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	173	24	22	237	0	0	0	0	137	140	17
Future Vol, veh/h	0	173	24	22	237	0	0	0	0	137	140	17
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	9	2	2	1	2	2	1	2	2	1	2
Mvmt Flow	0	208	29	27	286	0	0	0	0	165	169	20
Number of Lanes	0	1	0	0	1	0	0	0	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	11.6	13	14.7
HCM LOS	B	B	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	8%	47%
Vol Thru, %	88%	92%	48%
Vol Right, %	12%	0%	6%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	197	259	294
LT Vol	0	22	137
Through Vol	173	237	140
RT Vol	24	0	17
Lane Flow Rate	237	312	354
Geometry Grp	1	1	1
Degree of Util (X)	0.362	0.465	0.537
Departure Headway (Hd)	5.496	5.361	5.462
Convergence, Y/N	Yes	Yes	Yes
Cap	655	671	659
Service Time	3.534	3.395	3.494
HCM Lane V/C Ratio	0.362	0.465	0.537
HCM Control Delay	11.6	13	14.7
HCM Lane LOS	B	B	B
HCM 95th-tile Q	1.6	2.5	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	220	0	0	119	61	69	129	27	0	0	0
Future Volume (veh/h)	59	220	0	0	119	61	69	129	27	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1885	1885	0	0	1885	1885	1900	1870	1900			
Adj Flow Rate, veh/h	66	247	0	0	134	69	78	145	30			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	1	1	0	0	1	1	0	2	0			
Cap, veh/h	180	631	0	0	502	258	167	311	64			
Arrive On Green	0.86	0.86	0.00	0.00	0.43	0.43	0.12	0.12	0.12			
Sat Flow, veh/h	262	1465	0	0	1164	600	473	879	182			
Grp Volume(v), veh/h	313	0	0	0	0	203	253	0	0			
Grp Sat Flow(s),veh/h/ln	1726	0	0	0	0	1764	1533	0	0			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	4.8	10.0	0.0	0.0			
Cycle Q Clear(g_c), s	2.2	0.0	0.0	0.0	0.0	4.8	10.0	0.0	0.0			
Prop In Lane	0.21		0.00	0.00		0.34	0.31		0.12			
Lane Grp Cap(c), veh/h	811	0	0	0	0	760	542	0	0			
V/C Ratio(X)	0.39	0.00	0.00	0.00	0.00	0.27	0.47	0.00	0.00			
Avail Cap(c_a), veh/h	811	0	0	0	0	760	542	0	0			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	2.7	0.0	0.0	0.0	0.0	11.9	23.0	0.0	0.0			
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.0	0.0	0.9	2.9	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.0	0.0	1.9	4.4	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.1	0.0	0.0	0.0	0.0	12.8	25.8	0.0	0.0			
LnGrp LOS	A	A	A	A	A	B	C	A	A			
Approach Vol, veh/h		313			203			253				
Approach Delay, s/veh		4.1			12.8			25.8				
Approach LOS		A			B			C				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		30.0		35.0				35.0				
Change Period (Y+Rc), s		7.0		7.0				7.0				
Max Green Setting (Gmax), s		23.0		28.0				28.0				
Max Q Clear Time (g_c+I1), s		12.0		4.2				6.8				
Green Ext Time (p_c), s		1.0		1.9				1.1				
Intersection Summary												
HCM 6th Ctrl Delay			13.5									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	220	0	0	119	61	69	129	27	0	0	0
Future Vol, veh/h	59	220	0	0	119	61	69	129	27	0	0	0
Conflicting Peds, #/hr	0	0	19	0	0	16	0	0	2	0	0	6
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	1	2	2	1	2	2	2	2	2	3	2
Mvmt Flow	66	247	0	0	134	69	78	145	30	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	219	0	-	-	-	0	548	598	249
Stage 1	-	-	-	-	-	-	379	379	-
Stage 2	-	-	-	-	-	-	169	219	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1350	-	0	0	-	-	497	416	790
Stage 1	-	-	0	0	-	-	692	615	-
Stage 2	-	-	0	0	-	-	861	722	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1350	-	-	-	-	-	469	0	788
Mov Cap-2 Maneuver	-	-	-	-	-	-	469	0	-
Stage 1	-	-	-	-	-	-	653	0	-
Stage 2	-	-	-	-	-	-	861	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.7	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	529	1350	-	-	-
HCM Lane V/C Ratio	0.478	0.049	-	-	-
HCM Control Delay (s)	17.9	7.8	0	-	-
HCM Lane LOS	C	A	A	-	-
HCM 95th %tile Q(veh)	2.6	0.2	-	-	-

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	220	0	0	119	61	69	129	27	0	0	0
Future Vol, veh/h	59	220	0	0	119	61	69	129	27	0	0	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	1	2	2	1	2	2	2	2	2	3	2
Mvmt Flow	66	247	0	0	134	69	78	145	30	0	0	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	11.6	9.6	11.1
HCM LOS	B	A	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	31%	21%	0%
Vol Thru, %	57%	79%	66%
Vol Right, %	12%	0%	34%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	225	279	180
LT Vol	69	59	0
Through Vol	129	220	119
RT Vol	27	0	61
Lane Flow Rate	253	313	202
Geometry Grp	1	1	1
Degree of Util (X)	0.36	0.425	0.268
Departure Headway (Hd)	5.121	4.882	4.765
Convergence, Y/N	Yes	Yes	Yes
Cap	695	730	746
Service Time	3.199	2.951	2.841
HCM Lane V/C Ratio	0.364	0.429	0.271
HCM Control Delay	11.1	11.6	9.6
HCM Lane LOS	B	B	A
HCM 95th-tile Q	1.6	2.1	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	260	0	0	143	65	111	170	32	0	0	0
Future Volume (veh/h)	50	260	0	0	143	65	111	170	32	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.98		1.00	1.00		0.96	1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1885	1885	0	0	1885	1885	1900	1885	1900			
Adj Flow Rate, veh/h	63	329	0	0	181	82	141	215	41			
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79			
Percent Heavy Veh, %	1	1	0	0	1	1	0	1	0			
Cap, veh/h	144	676	0	0	522	237	194	296	56			
Arrive On Green	0.86	0.86	0.00	0.00	0.43	0.43	0.12	0.12	0.12			
Sat Flow, veh/h	184	1569	0	0	1213	549	548	835	159			
Grp Volume(v), veh/h	392	0	0	0	0	263	397	0	0			
Grp Sat Flow(s),veh/h/ln	1754	0	0	0	0	1762	1542	0	0			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	6.5	16.1	0.0	0.0			
Cycle Q Clear(g_c), s	3.2	0.0	0.0	0.0	0.0	6.5	16.1	0.0	0.0			
Prop In Lane	0.16		0.00	0.00		0.31	0.36		0.10			
Lane Grp Cap(c), veh/h	820	0	0	0	0	759	546	0	0			
V/C Ratio(X)	0.48	0.00	0.00	0.00	0.00	0.35	0.73	0.00	0.00			
Avail Cap(c_a), veh/h	820	0	0	0	0	759	546	0	0			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	2.8	0.0	0.0	0.0	0.0	12.4	25.7	0.0	0.0			
Incr Delay (d2), s/veh	2.0	0.0	0.0	0.0	0.0	1.3	8.2	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.0	0.0	2.5	7.8	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.8	0.0	0.0	0.0	0.0	13.6	33.9	0.0	0.0			
LnGrp LOS	A	A	A	A	A	B	C	A	A			
Approach Vol, veh/h		392			263			397				
Approach Delay, s/veh		4.8			13.6			33.9				
Approach LOS		A			B			C				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		30.0		35.0				35.0				
Change Period (Y+Rc), s		7.0		7.0				7.0				
Max Green Setting (Gmax), s		23.0		28.0				28.0				
Max Q Clear Time (g_c+I1), s		18.1		5.2				8.5				
Green Ext Time (p_c), s		1.1		2.5				1.5				
Intersection Summary												
HCM 6th Ctrl Delay			18.0									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	21.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	260	0	0	143	65	111	170	32	0	0	0
Future Vol, veh/h	50	260	0	0	143	65	111	170	32	0	0	0
Conflicting Peds, #/hr	0	0	13	0	0	31	0	0	15	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	2	1	2	2	1	2	2	1	2	2	1	2
Mvmt Flow	63	329	0	0	181	82	141	215	41	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	294	0	-	-	-	0	677	749	344
Stage 1	-	-	-	-	-	-	455	455	-
Stage 2	-	-	-	-	-	-	222	294	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.51	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.51	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.009	3.318
Pot Cap-1 Maneuver	1268	-	0	0	-	-	418	342	699
Stage 1	-	-	0	0	-	-	639	570	-
Stage 2	-	-	0	0	-	-	815	671	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1268	-	-	-	-	-	393	0	689
Mov Cap-2 Maneuver	-	-	-	-	-	-	393	0	-
Stage 1	-	-	-	-	-	-	600	0	-
Stage 2	-	-	-	-	-	-	815	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.3	0	54.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	435	1268	-	-	-
HCM Lane V/C Ratio	0.911	0.05	-	-	-
HCM Control Delay (s)	54.8	8	0	-	-
HCM Lane LOS	F	A	A	-	-
HCM 95th %tile Q(veh)	10	0.2	-	-	-

Intersection	
Intersection Delay, s/veh	16.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	260	0	0	143	65	111	170	32	0	0	0
Future Vol, veh/h	50	260	0	0	143	65	111	170	32	0	0	0
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	1	2	2	1	2	2	1	2	2	1	2
Mvmt Flow	63	329	0	0	181	82	141	215	41	0	0	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	17.1	12.5	18
HCM LOS	C	B	C

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	35%	16%	0%
Vol Thru, %	54%	84%	69%
Vol Right, %	10%	0%	31%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	313	310	208
LT Vol	111	50	0
Through Vol	170	260	143
RT Vol	32	0	65
Lane Flow Rate	396	392	263
Geometry Grp	1	1	1
Degree of Util (X)	0.629	0.61	0.408
Departure Headway (Hd)	5.711	5.599	5.574
Convergence, Y/N	Yes	Yes	Yes
Cap	630	644	642
Service Time	3.762	3.657	3.638
HCM Lane V/C Ratio	0.629	0.609	0.41
HCM Control Delay	18	17.1	12.5
HCM Lane LOS	C	C	B
HCM 95th-tile Q	4.4	4.1	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	31	0	0	13	13	0	119	15	0	0	0
Future Volume (veh/h)	5	31	0	0	13	13	0	119	15	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.90	1.00	0.90	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1976	1976	0	0	1976	1976	1976	1853	1976			
Adj Flow Rate, veh/h	5	32	0	0	14	14	0	124	16			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	0	0	0	0	0	0	0	8	0			
Cap, veh/h	112	632	0	0	288	288	0	623	80			
Arrive On Green	0.35	0.35	0.00	0.00	0.35	0.35	0.00	0.43	0.43			
Sat Flow, veh/h	140	1787	0	0	815	815	0	1446	187			
Grp Volume(v), veh/h	37	0	0	0	0	28	0	0	140			
Grp Sat Flow(s),veh/h/ln	1926	0	0	0	0	1630	0	0	1633			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	3.5			
Cycle Q Clear(g_c), s	0.8	0.0	0.0	0.0	0.0	0.7	0.0	0.0	3.5			
Prop In Lane	0.14		0.00	0.00		0.50	0.00		0.11			
Lane Grp Cap(c), veh/h	745	0	0	0	0	577	0	0	703			
V/C Ratio(X)	0.05	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.20			
Avail Cap(c_a), veh/h	745	0	0	0	0	577	0	0	703			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00			
Uniform Delay (d), s/veh	13.8	0.0	0.0	0.0	0.0	13.8	0.0	0.0	11.5			
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.0	0.0	0.3	0.0	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0	12.2			
LnGrp LOS	B	A	A	A	A	B	A	A	B			
Approach Vol, veh/h		37			28			140				
Approach Delay, s/veh		14.0			14.0			12.2				
Approach LOS		B			B			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		35.0		30.0				30.0				
Change Period (Y+Rc), s		7.0		7.0				7.0				
Max Green Setting (Gmax), s		28.0		23.0				23.0				
Max Q Clear Time (g_c+I1), s		5.5		2.8				2.7				
Green Ext Time (p_c), s		0.7		0.1				0.1				
Intersection Summary												
HCM 6th Ctrl Delay			12.7									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↑↱			↔				
Traffic Vol, veh/h	5	31	0	0	13	13	0	119	15	0	0	0
Future Vol, veh/h	5	31	0	0	13	13	0	119	15	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	1	0	0	4	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	8	0	8	0	8	7	0	8	7
Mvmt Flow	5	32	0	0	14	14	0	124	16	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	29	0	-	-	-	0	63	71	36
Stage 1	-	-	-	-	-	-	42	42	-
Stage 2	-	-	-	-	-	-	21	29	-
Critical Hdwy	4.1	-	-	-	-	-	6.4	6.58	6.27
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.58	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.5	4.072	3.363
Pot Cap-1 Maneuver	1597	-	0	0	-	-	948	808	1022
Stage 1	-	-	0	0	-	-	986	848	-
Stage 2	-	-	0	0	-	-	1007	859	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1597	-	-	-	-	-	945	0	1017
Mov Cap-2 Maneuver	-	-	-	-	-	-	945	0	-
Stage 1	-	-	-	-	-	-	983	0	-
Stage 2	-	-	-	-	-	-	1007	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	1017	1597	-	-	-
HCM Lane V/C Ratio	0.137	0.003	-	-	-
HCM Control Delay (s)	9.1	7.3	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.5	0	-	-	-

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	31	0	0	13	13	0	119	15	0	0	0
Future Vol, veh/h	5	31	0	0	13	13	0	119	15	0	0	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	0	0	0	8	0	8	0	8	7	0	8	7
Mvmt Flow	5	32	0	0	14	14	0	124	16	0	0	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.5	7.1	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	0%	14%	0%
Vol Thru, %	89%	86%	50%
Vol Right, %	11%	0%	50%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	134	36	26
LT Vol	0	5	0
Through Vol	119	31	13
RT Vol	15	0	13
Lane Flow Rate	140	38	27
Geometry Grp	1	1	1
Degree of Util (X)	0.158	0.044	0.029
Departure Headway (Hd)	4.08	4.194	3.873
Convergence, Y/N	Yes	Yes	Yes
Cap	878	845	912
Service Time	2.111	2.266	1.95
HCM Lane V/C Ratio	0.159	0.045	0.03
HCM Control Delay	7.9	7.5	7.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.6	0.1	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	53	0	0	33	13	0	220	25	0	0	0
Future Volume (veh/h)	5	53	0	0	33	13	0	220	25	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1914	1914	0	0	1930	1930	1976	1961	1976			
Adj Flow Rate, veh/h	6	65	0	0	40	16	0	268	30			
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82			
Percent Heavy Veh, %	4	4	0	0	3	3	0	1	0			
Cap, veh/h	82	646	0	0	462	185	0	745	83			
Arrive On Green	0.35	0.35	0.00	0.00	0.35	0.35	0.00	0.43	0.43			
Sat Flow, veh/h	62	1827	0	0	1307	523	0	1729	193			
Grp Volume(v), veh/h	71	0	0	0	0	56	0	0	298			
Grp Sat Flow(s),veh/h/ln	1889	0	0	0	0	1830	0	0	1922			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	6.8			
Cycle Q Clear(g_c), s	1.6	0.0	0.0	0.0	0.0	1.3	0.0	0.0	6.8			
Prop In Lane	0.08		0.00	0.00		0.29	0.00		0.10			
Lane Grp Cap(c), veh/h	729	0	0	0	0	647	0	0	828			
V/C Ratio(X)	0.10	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.36			
Avail Cap(c_a), veh/h	729	0	0	0	0	647	0	0	828			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00			
Uniform Delay (d), s/veh	14.1	0.0	0.0	0.0	0.0	14.0	0.0	0.0	12.5			
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	1.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.0	0.0	0.6	0.0	0.0	2.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.4	0.0	0.0	0.0	0.0	14.3	0.0	0.0	13.7			
LnGrp LOS	B	A	A	A	A	B	A	A	B			
Approach Vol, veh/h		71			56			298				
Approach Delay, s/veh		14.4			14.3			13.7				
Approach LOS		B			B			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		35.0		30.0				30.0				
Change Period (Y+Rc), s		7.0		7.0				7.0				
Max Green Setting (Gmax), s		28.0		23.0				23.0				
Max Q Clear Time (g_c+I1), s		8.8		3.6				3.3				
Green Ext Time (p_c), s		1.7		0.3				0.2				
Intersection Summary												
HCM 6th Ctrl Delay			13.9									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	53	0	0	33	13	0	220	25	0	0	0
Future Vol, veh/h	5	53	0	0	33	13	0	220	25	0	0	0
Conflicting Peds, #/hr	7	0	6	6	0	7	14	0	4	4	0	14
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	4	0	0	3	0	0	1	0	0	0	0
Mvmt Flow	6	65	0	0	40	16	0	268	30	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	63	0	-	-	-	0	139	140	69
Stage 1	-	-	-	-	-	-	77	77	-
Stage 2	-	-	-	-	-	-	62	63	-
Critical Hdwy	4.1	-	-	-	-	-	6.4	6.51	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.51	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.5	4.009	3.3
Pot Cap-1 Maneuver	1553	-	0	0	-	-	859	753	1000
Stage 1	-	-	0	0	-	-	951	833	-
Stage 2	-	-	0	0	-	-	966	844	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1553	-	-	-	-	-	840	0	995
Mov Cap-2 Maneuver	-	-	-	-	-	-	840	0	-
Stage 1	-	-	-	-	-	-	947	0	-
Stage 2	-	-	-	-	-	-	949	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.6	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	995	1553	-	-	-
HCM Lane V/C Ratio	0.3	0.004	-	-	-
HCM Control Delay (s)	10.2	7.3	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	1.3	0	-	-	-

Intersection	
Intersection Delay, s/veh	8.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	53	0	0	33	13	0	220	25	0	0	0
Future Vol, veh/h	5	53	0	0	33	13	0	220	25	0	0	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	0	4	0	0	3	0	0	1	0	0	0	0
Mvmt Flow	6	65	0	0	40	16	0	268	30	0	0	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.1	7.9	9.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	0%	9%	0%
Vol Thru, %	90%	91%	72%
Vol Right, %	10%	0%	28%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	245	58	46
LT Vol	0	5	0
Through Vol	220	53	33
RT Vol	25	0	13
Lane Flow Rate	299	71	56
Geometry Grp	1	1	1
Degree of Util (X)	0.338	0.091	0.071
Departure Headway (Hd)	4.074	4.65	4.533
Convergence, Y/N	Yes	Yes	Yes
Cap	869	775	794
Service Time	2.168	2.653	2.536
HCM Lane V/C Ratio	0.344	0.092	0.071
HCM Control Delay	9.3	8.1	7.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.5	0.3	0.2

Date: March 31, 2020

To: Ulster County Transportation Council

From: Mark Nadolny and Mark A. Sargent, P.E.

Project: City of Kingston Traffic Signal Warrant Evaluation
Ulster County, New York

Re: Traffic Signal Removal Plan

As part of the *City of Kingston Traffic Signal Warrant Evaluation* study (RFP-UC18-025) prepared for the Ulster County Transportation Council (UCTC), the effectiveness of traffic signals at several intersections identified by the City of Kingston were evaluated to determine if the minimum traffic signal warrants were met to justify their continued operation. This study concluded that several traffic signals should be removed. The purpose of this Memorandum is to summarize the traffic signal removal process using the steps provided by the U.S. Department of Transportation Federal Highway Administration (FHWA) in the *Manual on Uniform Traffic Control Devices, 2009 Edition* (National MUTCD).

As per the *National MUTCD* (Section 4B.02 – Basis of Installation or Removal of Traffic Control Signals)*, "a careful analysis of traffic operations, pedestrian and bicyclist needs, and other factors at a large number of signalized and unsignalized locations, coupled with engineering judgment, has provided a series of signal warrants, that define the minimum conditions under which installing traffic control signals might be justified. Engineering judgment should be applied in the review of operating traffic control signals to determine whether the type of installation and the timing program meet the current requirements of all forms of traffic. If changes in traffic patterns eliminate the need for a traffic control signal, consideration should be given to removing it and replacing it with appropriate alternative traffic control devices."*

The following 11 study area intersections (see Figure 1) located in the City of Kingston were shown to not meet the minimum traffic signal warrants and are therefore subject to the removal process:

1. Washington Avenue/Linderman Avenue (Pre-Timed Traffic Signal)
2. Washington Avenue/Pearl Street (Pre-Timed Traffic Signal)
3. Washington Avenue/Main Street (Traffic Signal set to Flash)
4. Wall Street/Pearl Street (Pre-Timed Traffic Signal)
5. Fair Street/Pearl Street (Pre-Timed Traffic Signal)
6. Clinton Avenue/St. James Street (Traffic Signal set to Flash)
7. Clinton Avenue/Franklin Street (Traffic Signal set to Flash)
8. Clinton Avenue/Henry Street (Traffic Signal set to Flash)
9. Fair Street/St. James Street (Pre-Timed Traffic Signal)
10. Foxhall Avenue/Grand Street/Shufeldt Street (Traffic Signal set to Flash)
11. East Chester Street/Lincoln Street (Traffic Signal set to Flash)

Section 4B.02 of the *National MUTCD* establishes the process to remove traffic signals and states that if an engineering study finds the traffic control signal is no longer justified and a decision has been made to remove the signal, then the following steps should be taken:

A) *Determine the appropriate traffic control to be used after removal of the signal.*

Discussion: Detailed assessment of the 11 study area intersections has identified the recommended traffic control as detailed in the *Traffic Signal Removal Assessment Tech Memo* dated February 4, 2020.

B) *Remove any sight-distance restrictions as necessary.*

Discussion: The *Tech Memo* recommends that all-way stop control be installed at intersections where sight line limitations cannot be mitigated and that on-street parking be set back from the crosswalk for sight distance (20-foot minimum/50-foot desirable) per *AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities*, 2004.

C) *Inform the public of the removal study.*

Discussion: The City's normal press release process should be used including newspaper notification to the general public. The City should also reach out directly to businesses, institutions, and residents located in close proximity to the intersection under evaluation as per the City's public notice criteria. Temporary "SIGNAL UNDER STUDY FOR REMOVAL" signs or Variable Message Signs (VMS) should be posted 30 days prior to the removal of the signal and through the evauatuon period.

D) *Flash or cover the signal heads for a minimum of 90 days, and install the appropriate stop control or other traffic control devices.*

Discussion: Following the installation of required traffic control signs and road markings, a minimum evaluation period of 90 days should be utilized to assess impact on traffic flow. Suggested data includes:

- Spot observations of queuing and delay during peaks
- Observations of compliance with the new traffic control
- Cataloging public input

Compliance at one or two existing stop-sign controlled intersections (control sites) should be included for comparison purposes. The City website could also be used to allow public feedback.

E) *Remove the signal if the engineering data collected during the removal study period confirms that the signal is no longer needed.*

Discussion: The removal of the traffic signal will be based on acceptable results from the observation period. The City will need to develop design plans sufficient for a contractor to remove the existing traffic signals and install the new traffic control. In rare instances based on a review of the data collected during the evaluation period, the signal poles, controller cabinet, and related cables/wiring may remain in place for one year after removal of the signal heads for continued analysis.

<u>Design Considerations</u>:

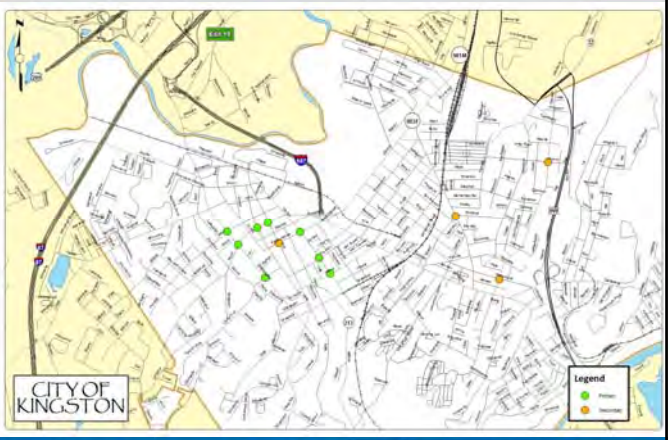

W3-1

The 90 day evaluation period may include a flashing period for part or all of the 90 day evaluation. Although not required, it is suggested that the traffic signal be set to flash for 30 days and then covered. The flashing configuration will reflect either a four-way or two-way stop. Stop signs will be installed prior to the start of the 90 day evaluation period. This will include "STOP AHEAD" signs (W3-1) with flags some distance before the intersection. The distance prior to the stop-sign should be based on Table NY2C-4 "Guidelines for Advanced Placement of Warning Signs" found in the *New York Supplement to the Manual on Uniform Traffic Control Devices*. The flags and stop ahead signs should be removed no later than six months after the regulation has been in effect.

Public Meeting

Traffic Signal Warrant Evaluation

City of Kingston



November 19, 2019

Purpose of Tonight's Public Meeting?

- Introduce study
- Hear concerns and ideas
- Obtain input on preliminary Alternatives

Project Understanding/Objectives

- Provide a uniform and objective approach
- Evaluate Existing and Future Conditions
- Identify traffic signals that do not meet traffic and safety warrants
- Provide safe, efficient, and reliable traffic mobility

Project Objective

- Evaluate the **effectiveness of traffic signals** at several intersections identified by the City of Kingston that may not meet the **minimum traffic and safety warrants** to justify their continued operation.

Signal Removal – Frequently Asked Questions

- Why would conditions change that would warrant the removal of traffic signals?
  - Lack of traffic engineering expertise
  - Demographic change in the area
  - Altered traffic patterns
  - Updated warrants that are based on a more modern understanding of traffic operation

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Signal Removal – Frequently Asked Questions

- What are the disadvantages of maintaining unwarranted traffic signals?
  - Create unnecessary intersection delay
  - Operational and maintenance costs ($5,500 per year)
  - Reroute traffic to less-appropriate roads
  - Promote disrespect for traffic control devices
  - Result in higher crash rates
  - Unavailable replacement parts
  - Air quality issues associated with idling traffic

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Technical Advisory Committee (TAC)

- UCTC
- City of Kingston Engineer
- City of Kingston DPW Superintendent
- City of Kingston Director of Communications/ Engagement
- FHWA Transportation Safety Engineer

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Project History/Schedule

- ✓Project awarded – August 2018
- ✓Bi-Weekly progress updates and monthly conference calls scheduled
- ✓TAC Meeting #1 –September 12, 2018
  - ✓Project on hold due to construction by CHGE in City of Kingston – October 2018
- ✓Project Restart – May 2019
- ✓TAC Meeting #2 – October 4, 2019
- ✓Kingston Public Safety Meeting – October 23, 2019
- Public Meeting – November 19, 2019
- Respond to public comments – December 2019
- Finalize Report – January/February 2020

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Study Area

- 8 Primary Study Intersections
  - Detailed assessment
    - Washington Avenue/Linderman Avenue (Pre-Timed Signal)
    - Washington Avenue/Pearl Street (Pre-Timed Signal)
    - Washington Avenue/Main Street (Signal set to Flash)
    - Wall Street/Pearl Street (Pre-Timed Signal)
    - Fair Street/Pearl Street (Pre-Timed Signal)
    - Clinton Avenue/St. James Street (Signal set to Flash)
    - Clinton Avenue/Franklin Street (Signal set to Flash)
    - Clinton Avenue/Henry Street (Signal set to Flash)

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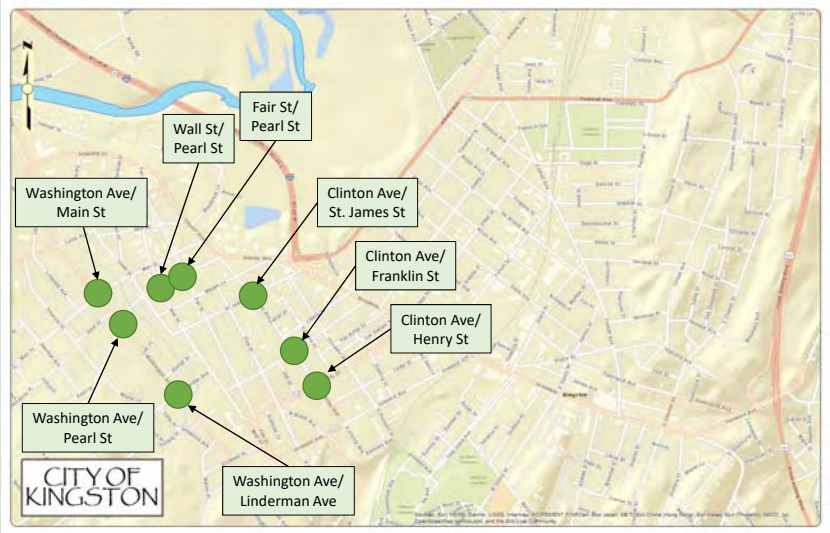
Study Area – 8 Primary Intersections



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Study Area

- 4 Secondary Study Intersections
  - Preliminary assessment completed
    - Hasbrouck Avenue/E. Chester Street
    - Grand Street/Scufeldt Street/Foxhall Avenue
    - East Chester Street/Lincoln Street
    - Fair Street/St James Street

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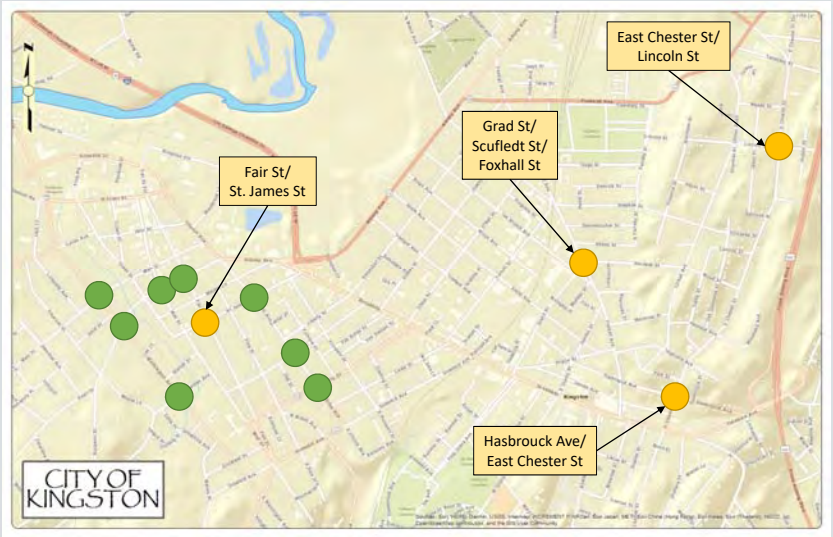
Study Area – 4 Secondary Intersections



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Existing Conditions

- Automatic Traffic Recorder (ATR) Review
  - Segment evaluation
  - Speed assessment (85th% speed = 20 to 30-mph)
  - Daily traffic volumes (identify peak time period)

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Existing Conditions

- Turning Movement Count (TMC) Review
  - Record video of all 12 intersections
  - Intersection counts from 7:00 a.m. to 7:00 p.m. (12 hours)
  - Passenger cars, trucks, buses, bikes, pedestrians

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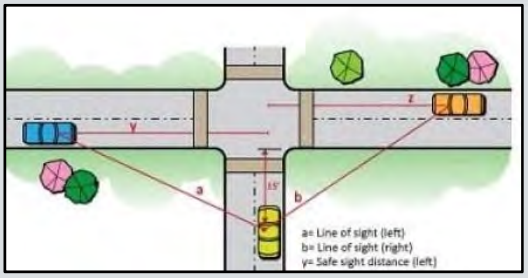
Existing Conditions

- Signal Timing
- Pedestrian Accommodations
- Available Sight Distance
- Site Photos



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Existing Conditions – Crash Summary

Intersection	Collision Type												Crash Rate (ACC/MEV)
	Backing	Right Turn	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total	
Washington Ave/Linderman Ave	0	0	1	1	1	2	1	0	0	0	0	**6**	0.69
Washington Ave/Pearl St	0	0	0	1	1	0	0	0	0	0	0	**2**	0.17
Washington Ave/Main St	0	0	0	2	0	0	0	3	0	0	1	**6**	0.52
Wall St/Pearl St	0	0	1	6	0	1	0	0	0	0	0	**8**	1.00
Fair St/Pearl St	2	1	1	1	1	0	0	3	1	0	0	**10**	1.31
Clinton Ave/St. James St	0	0	1	1	0	2	0	0	0	1	0	**5**	0.83
Clinton Ave/Franklin St	0	0	0	1	1	0	0	1	0	2	0	**5**	0.80
Clinton Ave/Henry St	0	0	1	0	0	2	0	0	0	0	1	**4**	0.60
Total	**2**	**1**	**5**	**13**	**4**	**7**	**1**	**7**	**1**	**3**	**2**	**46**	

- Statewide Average Rate = 0.52 MEV

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Existing Conditions – Accident Summary

- Resources provided by FHWA indicates that the **removal** of **unwarranted traffic signals** at intersections with **high accident** rates located in urban areas has been shown to **decrease** all types of **accidents by 24 percent** based on an assessment of 199 intersections

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Volume Development

- Peak commuter time periods
  - 7:30 to 8:30 a.m.
  - 4:30 to 5:30 p.m.
- Uptown Stockade Area Transportation Plan
  - Alternative that would change one-way orientation of some streets in the City of Kingston
  - Redistributed traffic at study intersections for potential modifications to local streets (4 of 8 intersections reviewed)

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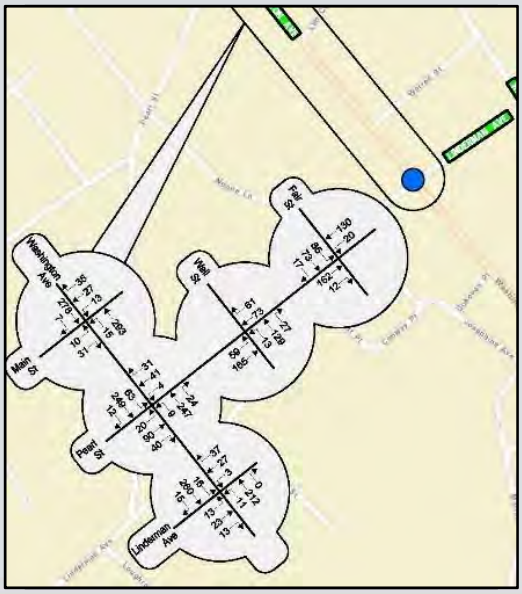
Volume Development



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Traffic Signal Warrant Assessment

- A **warrant** is a condition that an intersection must meet to justify **traffic signal** installation. The National MUTCD specifies the minimum criteria that must be met in order for a traffic signal to be justified.
  - Warrant 1 – Eight-Hour Vehicular Volume
  - Warrant 2 – Four-Hour Vehicular Volume
  - Warrant 3 – Peak Hour
  - Warrant 4 – Pedestrian Volume
  - Warrant 5 – School Crossing
  - Warrant 6 – Coordinated Signal System
  - Warrant 7 – Crash Experience
  - Warrant 8 – Rodway System

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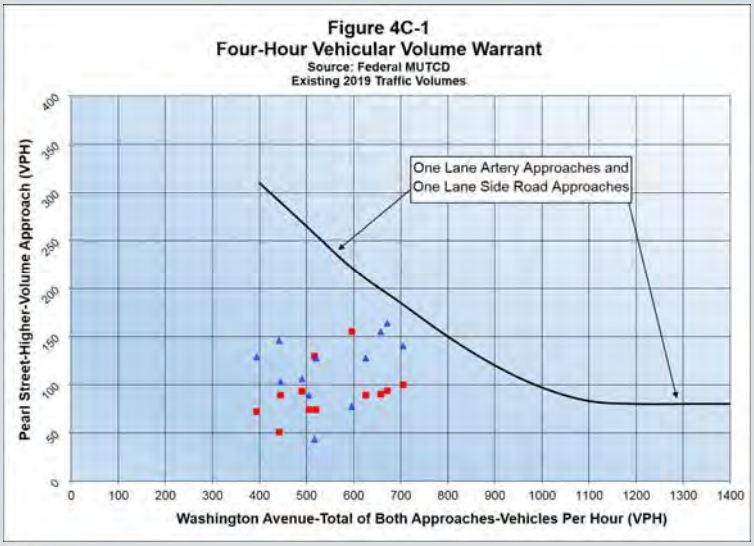
Traffic Signal Warrant Assessment



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Traffic Signal Warrant Assessment

Intersection	Signal Warrant Satisfied?								At Least One Warrant Met?
	#1	#2	#3	#4	#5	#6	#7	#8	
Washington Ave/Linderman Ave	No	No	No	No	No	No	No	No	No
Washington Ave/Pearl St	No	No	No	No	No	No	No	No	No
Washington Ave/Main St	No	No	No	No	No	No	No	No	No
Wall St/Pearl St	No	No	No	No	No	No	No	No	No
Fair St/Pearl St	No	No	No	No	No	No	No	No	No
Clinton Ave/Henry St	No	No	No	No	No	No	No	No	No
Clinton Ave/Franklin St	No	No	No	No	No	No	No	No	No
Clinton Ave/St. James St	No	No	No	No	No	No	No	No	No

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Traffic Control Alternatives

- Pre-timed Traffic Signal Control – A pre-timed traffic signal without vehicle detection
- Two-Way Stop Control – Stop sign control on the minor street approaches.
- All-Way Stop Control – Stop signs on all approaches.

Intersection	Does Traffic Control Provide Adequate Operations?		
	Traffic Signal	Two-Way Stop	All Way Stop
Washington Ave/ Linderman Ave	Yes	Yes	Yes
Washington Ave/Pearl St	Yes	No	Yes
Washington Ave/Main St	Yes	Yes	Yes
Fair St/Pearl St	Yes	Yes	Yes
Wall St/Pearl St	Yes	Yes	Yes
Clinton Ave/Henry St	Yes	Yes	Yes
Clinton Ave/Franklin St	Yes	Yes	Yes
Clinton Ave/St. James St	Yes	Yes	Yes

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Traffic Control Alternatives - Modeling

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Traffic Control Alternatives - Modeling

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Traffic Control Alternatives - Modeling

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Results

- The eight intersections do not meet any signal warrants.
- It is recommended that all eight traffic signals be replaced with all-way stop control due to sight distance limitations (vegetation, fencing, on-street parking, etc.)

Next Steps

- The removal of unwarranted traffic signals in the City of Kingston will:
  - Mitigate unnecessary intersection delay
  - Reduce operational and maintenance costs
  - Minimize traffic rerouting to alternate roadways
  - Minimize traffic control device disrespect
  - Reduce crash rates
  - Help facilitate Uptown Stockade Area Transportation Plan if progressed

Next Steps

- Incorporate public comments into the draft report
- Develop detailed signal removal procedure based on **National MUTCD guidelines**
  - Remove sight distance restrictions
  - Inform public of removal study
  - Flash or cover signal heads
  - Install appropriate traffic control
  - Remove the signal and monitor intersection

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Next Steps

- Incorporate public comments into the draft report
- Develop detailed signal removal procedure based on **National MUTCD guidelines**
- If it is determined that one or more signals should remain, a detailed intersection optimization plan will be developed
  - Pedestrian clearance, yellow/red time, equipment upgrades, signing, curb modifications, etc.)
- Provide final report to the City of Kingston and UCTC – presentation if requested

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QUESTIONS?

Contact Info

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City of Kingston
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https://ulstercountyny.gov/transportation-council/active-studies/kingston-traffic-signal

Meeting Summary
Public Information Meeting
Kingston Signals Warrant Evaluation
November 19, 2019

A public information meeting for the *Kingston Signals Warrant Evaluation* study was held from 6:30 to 8:00 p.m. on Tuesday, November 19, 2019, at the *Ulster County Restorative Justice Community Empowerment Center* (733 Broadway, Kingston, NY). The meeting was advertised using the City' typical press release notice process and was attended by four residents, along with representatives of the Ulster County Transportation Council (UCTC), Mayor Steve Noble, the City Engineer, the City DPW Supervisor, and representatives of Creighton Manning (CM). The meeting began with a general overview of the project by UCTC Senior Transportation Planner Brian Slack. Mayor Noble then briefly introduced the project and welcomed the attendees, at which point Mark Nadolny of CM provided a presentation detailing the specifics of the project. See Attachment A for the PowerPoint presentation.

Photograph #1 – Presentation Setup

The purpose of the meeting was to introduce the study to the public, discuss any questions or concerns from Kingston residents, and obtain input on preliminary alternatives.

Meeting attendees were encouraged to provide input, ask questions, and offer comments during and after the presentation. A drop-box along with Comment Forms and fact sheets were provided at the entrance of the meeting room where attendees could drop off written comments for further input. Attendees were encouraged to provide comments via email and informed that materials from the meeting would be made available online at:

https://ulstercountyny.gov/transportation-council/active-studies/kingston-traffic-signal.

1. **Open Forum Question/Comment Session**

   The following questions specifically related to the *Kingston Signal Warrant Evaluation* project were discussed during and after the presentation:

   Question: Many drivers in residential areas of Kingston already have trouble obeying stop signs. Will adding more increase safety hazards, particularly for pedestrians?

   Response: There has been a recent enforcement campaign conducted in City of Kingston to address these types of violations. Education can help. The New York State Governor's Traffic Safety Committee is actively broadcasting public service announcements about pedestrian safety.

   Question: Will the proposed stop signs have reflective strip installed on the posts?

   Response: Reflective strips on stop signs can be installed to increase conspicuity. The City of Kingston Engineer indicted that they review roadway traffic volumes when considering installation. The draft report recommends that stop signs be installed on both sides of the roadway to ensure visibility. The City and project team will review each location to determine if reflective strips are needed during design.

Question: Are there any studies that tell us how safe a signalized intersection is for pedestrians compared to an intersection with stop signs?

Response: Comment noted. CM will research available literature on this topic and incorporate into the final report.

Question: If the data shows that the existing signals are not justified, why were they installed in the first place?

Response: Many signals in the City of Kington were installed the 1950s and 1960s as "legacy signals." It is possible that the City of Kingston installed some traffic signals at locations where they were not warranted based on requests from local residents.

2. <u>Written comments</u>

Six written comments were received as of this summary (December 3, 2019) which is two weeks after the public meeting and the deadline for comments noted on the Comment Form. They are summarized below.

Comment #1 – Jim Kent (11/27/19) – It is gratifying to see that someone is finally doing something about at least some of the grotesquely stupid traffic lights in at least part of Kingston. The lights that your study has identified to be replaced by stop signs are all winners—make them go away, and then move on to other ones, some of which are even stupider.

My personal favorite is the one at Millers Lane and Lucas Avenue, which was replaced for a while by a blinking red light. During that interval, traffic moved more quickly and more safely along both of those streets. Everyone was much more careful in that intersection when the timed light was off: Nobody was racing through the intersection to beat the light or making unsafe and illegal right turns from Millers Lane onto Lucas Avenue; and as a bonus nobody was sitting around burning petrol for no reason.

Over a longish career in public policy analysis and program evaluation, I get it that the number of traffic lights in a small town is a big status symbol for the local traffic engineers when they go to conferences with their fellow wizards, with the installation of expensive "smart" lights an added frisson. However, compared to four-way stop signs, red-yellow-green lights are very often--and maybe almost always-- much less safe, much more wasteful of petrol and time, and much less helpful for air quality. So this study is a good first step.

(Sooner or later, somebody might wish to notice that the installation of the smart light at Washington Avenue at the stadium has made rush-minute blockages worse rather than better. This is what happens when local engineers do things for status rather than functional reasons and then don't check to see whether the ostensible benefits actually accrue, which they often don't. The problem there could be easily resolved by a stringently enforced "don't block the box" penalty. However, even if there were such an ordinance, enforcement would not happen since the Kingston Police Department believes traffic and parking enforcement to be beneath its dignity—another small-town problem.)

To be more nearly fair, though, one ought not expect a single study to remedy all the problems of provincialism. The proposed changes are an excellent step in the right direction, despite the resistance of the Olde Guys who oppose any change. A good example is the recent letter to the Freeman from someone called "Dr. Bruno F. Battistoli" (whose doctorate is in journalism, not

related to the issue at hand). He says the lights should be retained because some people run stop signs; he knows this because he has seen it happen. This is true, but some people also run red lights, and most people do neither, and anecdotes are not a firm basis for public policy decisions. So go ahead and get rid of those lights recommended by your study.
Then do some more studies, because lights run up electricity bills and they need to be maintained and replaced fairly often, none of which occurs with stop signs.

Response: It is agreed that the traffic signals can be removed based on a review of detailed traffic signal warrants and operating conditions. It is anticipated that UCTC and the City of Kingston will continue to review the existing traffic signal inventory to determine if other locations do not meet minimum traffic signal warrant criteria.

Comment #2 – Lynn Rittenhouse (11/28/19) – I live on Linderman Ave. A few years ago, the traffic light at Linderman & Washington Ave. WAS changed to a blinking red.

The results were cars constantly running through the stop signal, so much so that the Kingston police monitored the intersection for a while. Check with them!!! In just a short time they caught 6 cars running the light IN ONE DAY.

When the police were dealing with an accident on Linderman, a policeman directing traffic at the intersection was heard screaming "STOP" several times, and was almost hit by a car making a turn. Things finally settled down when the light was changed back to a Red/Yellow/Green signal.

The Linderman/Washington intersection is also a school crossing area. NO, I don't think the current traffic system should be changed! There is just too much traffic on Washington Ave.

Response: The temporary condition you experienced occurred when the existing traffic signal fell into emergency flash operation. This unforeseen condition and the lack of all-way stop signs may have contributed to the behaviors cited. The removal of traffic signals within the City will be conducted based on a detailed plan that is consistent with Section 4B.02 of the MUTCD and includes:

- **Informing the public of the signal removal.**
- **Covering the signal heads for a minimum of 90 days and installing the appropriate stop control.**
- **Removing the signal if operations are consistent with the study that confirmed that the signal was no longer needed.**

Providing this advanced notice and providing appropriate traffic control will minimize a disregard for the traffic signal control. In addition, the detailed traffic analysis indicates that adequate operations will be provided with the implementation of all-way stop control at this intersection. It is noted that an all-way stop control intersection will provide adequate gaps in traffic to allow pedestrians to cross each leg of the intersection.

Comment #3 – Denise Giardullo (11/28/19) – I read the article in the Daily Freeman this morning about the traffic signal study. There was also a photograph of the Wall and North Front Street intersection.

Personally I think the removal of the traffic light at that intersection was a terrible decision. In a perfect world, with little traffic it might have worked. I have driven down Wall Street many times, needing to make a left turn, only to have a big delivery truck blocking my sight. It is extremely

difficult to make a left turn there with a flashing signal, since it is impossible to see if there is a vehicle driving on North Front Street heading toward Fair Street.

I like traffic lights, and as an older driver, think more lights, not less, are needed.

I also liked it when there was a temporary light on Route 28 near Hurley Mountain Road. I could come to the light and make a left across the highway. Without the light I will not cross over. Again, in a perfect world it would be easy to do. But drivers now drive bigger cars, go faster, talk on their phones, and do not always pay attention.

*Replacing traffic signals with four way stops is going backwards. If there were no lights, four way stops, would be the f*irst step.

Response: The Wall Street/North Front Street intersection was not one of the intersections reviewed as part of this traffic signal study. In addition, it is noted that each of the traffic signals recommended for removal would be replaced with an all-way stop control condition; therefore, all drivers would be provided a gap in traffic in order to make protected left-turn movements at each of these locations. Two-way stop control was not recommended at the study area intersections due to similar sight line limitations noted in the comment.

Comment #4 – Karen Miller (11/28/19) – I have a personal interest as an Uptown resident. After reading over the copy of the draft report from the study, I think it only makes sense to go forward with the study recommendations that all eight locations, the flashing signals should be removed and replaced with four-way stops. I have spoken to you in the past, about how I found the flashing signals very confusing.

Response: Comment noted.

Comment #5 – Mona Moore (12/2/19) – As a greater Kingston resident for over 30 years, I feel that only Broadway, Ulster Avenue, and 9W need three-light traffic signals at busy intersections. There also may be a couple of exceptions at other particularly heavily trafficked intersections. The rest of the streets, including Washington Avenue, would benefit from four-way stop signs. Not only would it keep the speed of the cars down because they would have to stop every few blocks, it would also decrease the time for the cars waiting to take their turn to enter the intersection. Maintenance and replacement of regular and blinking single lights is costly and unnecessary. One person going around every week or two to check that the stop signs have not been damaged or vandalized would be sufficient. Please consider my opinion when making your decision for the Ulster County Transportation Council.

Response: Comment noted.

Comment #6 – Dr. Bruno F. Battistoli (11/30/19) – I read your comments today in the Freeman regarding proposed changes in traffic signals and rules at the intersections of North Front Street and Hurley Avenue with Washington Avenue. I wanted to bring to your attention a letter to the editor I wrote to the Freeman, which they published in its entirety on Monday, Nov. 28, regarding the recommendations of the County Transportation Council to eliminate eight traffic lights in the City.

I addressed two of those lights in my letter: the intersections of Pearl Street and Main Street with Washington Avenue. The letter details my opposition to the removal of these lights and their

replacement with stop signs. I have enclosed a copy of my letter to the Freeman, as well as a copy of the original article, for your information (see attached).

I hope you will consider my observations when making your decision on these intersections. I believe there are serious public safety issues that the County's recommendations fail to recognize.

11/28/19 Letter Don't Replace Traffic Lights with Stop Signs

In an article on October 27, the Freeman reported that members of the Ulster County Transportation Council have advised the Kingston Common Council to remove eight traffic lights in the city and replace them with stop signs. Using federal guidelines in a reverse engineering exercise, the County representatives argued that traffic at those intersections is insufficient to warrant traffic lights, and that the units in place are old and would be expensive to repair or replace.

I would like to address two of the intersections in question: Washington and Main Street, and Washington and Pearl Street. Both of those intersections have "No Right Tum on Red" signs because of limited visibility for traffic crossing Washington Avenue. Both intersections have significant vehicular and pedestrian traffic.

What the County representatives fail to take into account are the prevailing driving practices in Kingston. Many of our drivers treat stop signs as a request rather than an order, making every approach to a four-way stop an adventure. Who will yield? Who will barrel through? You never know.

This was brought home to me this summer, when I watched in amazement as a woman driving east on Main Street toward Washington Avenue in a late-model SUV went through three consecutive stop signs at about 30 mph in broad daylight without ever touching her brakes. The claim of the County representatives that accidents will be reduced by removing traffic lights doesn't hold water with experienced Kingston drivers. The Common Council should reconsider.

Response: It was recommended that all-way stop control be installed at the Main Street and Pearl Street intersections located on Washington Avenue due to sight distance limitations such as on-street parking and landscaping; therefore, this addresses the limited visibility condition at these locations noted above. In addition, the design of appropriate traffic control should not be based on the expectation that local users will not obey vehicle traffic and safety laws. The modified traffic control conditions will be properly designed and signed so that users can clearly identify the all-way stop control that will replaced unwarranted traffic signals that motorists may disregard since they are unnecessary at these locations.

The public meeting concluded with an invitation for meeting attendees to stay involved in the study through coordination with the project team, and a brief discussion of other projects that UCTC is working on in the area.