TRAFFIC STUDY

THE VUE

OLD ORCHARD STREET
TOWN OF NORTH CASTLE, NEW YORK

Prepared for: **JMF Properties**
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JMC Project **15147**

Date: February 12, 2016

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I. INTRODUCTION

This Traffic Study has been prepared to assess existing conditions as well as future traffic operations in association with the proposed residential development known as The Vue. The property is located on the north side of Old Orchard Street, east of NY Route 22, in the Town of North Castle, NY. The location of the site is illustrated on the figures included in Appendix B.

The site is proposed to be developed to construct two residential buildings with parking garage underneath. The two buildings will provide a total of 200 high end apartment units with extensive amenities.

Access to and from the site is proposed via two driveways connecting to Old Orchard Street. The main driveway is located to the east and will provide access to the majority of the proposed parking. The secondary driveway will provide access to the lower level of the proposed parking garage.

II. EXISTING CONDITIONS

A. Existing Roadway Network

JMC performed field reconnaissance at the site and adjoining roadway network in order to gather existing conditions data. The field work included a determination of lane widths, striping, horizontal and vertical alignments, signs, speed limits, pedestrian activities, traffic flows, on street parking, sidewalks, curbing, etc.

NY Route 22 is a state highway which generally traverses in a north/south direction. The functional classification by the NYSDOT of NY Route 22 is a principal arterial other within an urban area. Within the study area, it is an undivided highway providing two lanes in each direction. On-street parking is prohibited on both sides of the highway. It has a posted speed limit of 50 mph which reduces to 35 mph in the southern portion of the study area.

North Broadway connects to the Bronx River Parkway ramps just south of the Kensico Dam. North Broadway is a county road between the Bronx River Parkway and NY Route 22. North Broadway provides one travel lane in each direction. Parking is permitted on the east side of the street from Hillandale Avenue to Clove Road. The roadway has a posted speed limit of 30 mph.

Old Orchard Street traverses east from its intersection with NY Route 22 and turns south and heads west to its southern intersection with NY Route 22 located north of Interstate 287. Old Orchard Street is a Town roadway within the study area. It generally provides one travel lane in each direction. The roadway has a posted speed limit of 30 mph and on-street parking is prohibited on both sides of the street within the study area.

Hillandale Avenue is an east/west Town road which intersects with Washington Avenue North in the west and terminates at a dead end in the east. It generally provides one travel lane in each direction. The roadway has a posted speed limit of 30 mph and on-street parking is prohibited on both sides of the street within the study area.

In order to evaluate the changes in traffic associated with the proposed redevelopment, the following intersections have been analyzed:

1. NY Route 22 & North Broadway
2. NY Route 22 & Hillandale Avenue
3. NY Route 22 & Old Orchard Street
4. Old Orchard Street & Site Driveway B
5. Old Orchard Street & Site Driveway A

The intersection of NY Route 22 and North Broadway is a signalized four-legged intersection, with the two northern roadway segments being a "Y"-type alignment. The NY Route 22 northbound approach provides a 10 foot wide thru lane, with shared left turns and a 10 foot wide right turn lane to proceed onto to NY Route 22. The NY Route 22 southbound approach provides two 10 foot wide thru lanes to proceed onto to NY Route 22 with shared

right turns into the Sir John's Plaza. North Broadway provides a single 11 foot wide southbound thru lane with shared right turn movements. The Sir John's Plaza driveway serves as the west leg of the intersection providing an 11 foot wide left turn lane and a 30 foot long, 11 foot wide right turn lane. Right turns on red are permitted from the Sir John's Plaza driveway. Turning movements from NY Route 22 southbound onto the North Broadway southbound are prohibited and the same restriction is applicable for the reverse movement.

Hillandale Avenue intersects NY Route 22 at a signalized four-way intersection. The NY Route 22 approaches provide a two 10 foot wide thru lanes with shared turning movements in both directions except the northbound left turn movement is prohibited. Hillandale Avenue eastbound provides a single 16 foot wide thru lane with shared left turning movements. Hillandale Avenue westbound provides a single 11 foot wide thru lane with shared left and right turns. The Hillandale Avenue approaches prohibit right turns on red.

The intersection of NY Route 22 and North Broadway is a signalized four-legged intersection. The NY Route 22 approaches provide a two 10 foot wide thru lanes with shared turning movements in both directions. The Old Orchard Street approach provides a 12 foot wide lane with shared turning movements. The St. Christopher's driveway provides a 9 foot wide lane with shared turning movements. Right turns on red are prohibited on all approaches.

The site driveways intersect Old Orchard Street at two separate unsignalized T-type intersections. The main driveway (Driveway A) provides a 15 foot wide approach lane and access to the front of the residential buildings as well as the majority of the proposed parking. The second driveway (Driveway B) provides a 12 foot wide approach lane to the lower level of the parking garage. Old Orchard Street provides a 10 foot wide lane for both approaches at each intersection. All approach lanes provides shared turning movements with no turning restrictions.

B. Existing Volumes

Manual traffic counts were performed in order to quantify and analyze existing peak hour volumes as well as to establish base conditions for projecting future operations. The counts included pedestrian activities and truck traffic.

Traffic counts were conducted from 7:00 – 9:00 AM and 4:00 – 6:00 PM on Thursday, January 21, 2015 for all the studied intersections. The manual traffic count sheets have been included in Appendix C which depict the number of vehicles, trucks and pedestrians counted at the studied intersections. The peak hour volumes occurred between 7:30-8:30 AM during the weekday morning and 5:00-6:00 PM during the weekday afternoon. The volumes are shown on Figures 1 and 2 "2016 Existing Volumes". All figures are included in Appendix B.

C. Intersection Analysis Methodology

The intersections have been analyzed based on the methodologies of the 2010 Highway Capacity Manual. Information derived from the manual relative to the level of service criteria is provided below.

1. Level-of-Service Criteria for Signalized Intersections

Levels of Service (LOS) for signalized intersections are defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during ideal conditions: in the absence of traffic control, in the absence of geometric delay, in the absence of any incidents, and when there are no other vehicles on the road. Only the portion of total delay attributed to the control facility is quantified. This delay is called control delay. Control delay includes the delays of initial deceleration, move-up time in

the queue, stops, and reacceleration. In this chapter, control delay may also be referred to as signal delay. Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a peak 15-minute analysis period. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the volume/capacity (*v/c)* ratio for the lane group in question.

LOS A describes operations with very low control delay, up to 10 seconds per vehicle. This level of services occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

LOS B describes operations which control delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.

LOS C describes operations with control delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

LOS D describes operations with control delay greater than 35 and up to 55 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high *v/c* ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LOS E describes operations with control delay greater than 55 and up to 80 seconds per vehicle. This level is considered by many agencies to be the limit of acceptable delay.

These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

LOS F describes operations with control delay in excess of 80 seconds per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when the arrival flow rates exceed the capacity of the intersection. It will also occur at high *v/c* ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

2. Level of Service for Unsignalized Intersections

The Levels of Service (LOS) for Two Way Stop Control (TWSC) and All Way Stop Control (AWSC) intersections are determined by the computed or measured control delay and are defined for each minor movement. LOS is not defined for the intersection as a whole for TWSC intersections. LOS criteria are presented below.

Unsignalized Level of Service Criteria	
Level of Service	**Delay Range (Seconds/Vehicle)**
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Average control delay less than 10 seconds/vehicle are defined as LOS A. Follow-up times of less than 5 seconds/vehicle have been measured when there is no conflicting traffic, so control delays of less than 10 seconds/vehicle are appropriate for low flow conditions.

The LOS criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers

expect different levels of performance from different kinds of transportation facilities. A number of driver behavior considerations combine to make delays at signalized intersections less onerous than delays at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, whereas drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at an unsignalized intersections versus that at signalized intersections. For these reasons, it is considered that the control delay threshold for any given LOS would be less for an unsignalized intersection than it would be for a signalized intersection.

D. Existing Operations

The intersection capacity analyses based on existing volumes and conditions are shown on Tables 2 and 3. The specific volume/capacity ratios, delay for average vehicle in seconds and the associated levels of service are summarized for each lane group on Tables 2 and 3. All tables are included in Appendix A.

During peak weekday morning hour, the NY Route 22 and North Broadway intersection operates at a level of service D. The North Broadway southbound approach operates over capacity at a level of service F. All other movements at the studied intersections operate at a level of service C or better during the peak weekday morning hour.

During peak weekday afternoon hour, the NY Route 22 and North Broadway intersection operates at a level of service D. The NY Route 22 northbound left/thru lane operates over capacity at a level of service F while the northbound approach operates at a level of service E. All other movements at the studied intersections operate at a level of service C or better during the peak weekday afternoon hour.

III. PROJECTED CONDITIONS

A. No-Build Volumes

In order to project future traffic increases to the 2024 design year (estimated time of completion plus 5 years), the existing volumes were increased by a general growth rate of 1% per year compounded annually. We reviewed the latest New York State Department of Transportation (NYSDOT) traffic volume report along NY Route 22. NYSDOT's count location is located along NY Route 22 south of its intersection with NY Route 120. The annual average daily traffic (AADT) for NY Route 22 based on the NYSDOT data in 2001 was 13,327 vehicles, 10,934 vehicles in 2011 and 10,880 vehicles in 2014. This report depicts a downward growth trend in the volume of traffic along NY Route 22. Our office is utilizing a 1% per year general growth rate to project traffic volumes in the project's design year. This growth rate will provides a conservative traffic analysis since the NYSDOT data depicts a reduction of projected traffic in the future. The NYSDOT count data is included in Appendix E. No other development volumes have been incorporated into this study. The resulting 2024 no-build volumes represent traffic operation in 2024 without the redevelopment of the site.

The no-build condition in this study incorporates the proposed traffic improvements to be constructed by the New York City Department of Environmental Protection (NYCDEP) as part of its previous closure of Kensico Road (over the dam). The improvements incorporate the construction of an additional 185 foot long North Broadway southbound thru lane at its intersection with NY Route 22. At the intersection of NY Route 22 and Hillandale Avenue, a pedestrian crossing with pedestrian signals will be installed on the north side of the intersection. Both intersections will receive traffic signal timing improvements.

Under no-build conditions, all turning movements are projected to operate at the same levels of service as experienced under existing conditions for both studied peak hours except for the movements at the intersection of NY Route 22 and North Broadway. During the weekday morning, the overall intersection delay is projected to improve to a level of service

B under the no-build condition. The NY Route 22 northbound left thru lane is projected to operate at a level of service A while the North Broadway southbound approach is projected to operate at a level of service B during the peak weekday morning hour. During the weekday afternoon, the eastbound left turn is projected to operate at a level of service D and the NY Route 22 southbound approach is projected to operate at a level of service D. The North Broadway approach delay is projected to improve to operate at a level of service A. All other movements under the no-build condition at the intersection of NY Route 22 and North Broadway are projected to operate at the same levels of service as experienced under existing conditions during both studied hours.

B. Build Volumes

The projected traffic associated with the proposed redevelopment is based on information published by the Institute of Transportation Engineers (ITE) in its publication "Trip Generation Manual, 9th Edition." Table 1 shows the traffic volumes associated with the proposed apartments. The redevelopment is projected to result in 20 entering trips and 82 exiting trips during the peak weekday morning hour as well as 83 entering trips and 45 exiting trips during the peak weekday afternoon hour based on ITE data. The actual generated peak hour volumes are expected to be lower than suggested in the ITE data since the development is anticipated to be occupied by a significant proportion of 'empty nesters' and other demographic groups that are less likely to commute to and from work during peak roadway hours.

The primary trips were routed through the intersections based on anticipated origin and destination trips. The primary for the redevelopment have been shown in the figures in Appendix B. Adding the redevelopment related traffic results in 2024 Build Volumes which reflect projected volumes after the completion of the redevelopment.

IV. FINDINGS & CONCLUSION

Intersection capacity analysis computed based on the Build Volumes indicate that the intersections will essentially operate at the same levels of service as projected for the No-Build Volumes. Projected operations with the proposed redevelopment are shown on Tables 2 and 3.

The levels of service projected under build conditions for all turning movements remain the same as projected under no-build conditions during both studied hours, except for the intersection of NY Route 22 and Old Orchard Street during the peak weekday AM hour. The overall intersection and the NY Route 22 southbound approach are projected to operate at a level of service B. All other movements at the intersection of NY Route 22 and Old Orchard Street during the peak weekday AM hour are projected to operate at the same levels of service as projected for no-build conditions. The site driveways are projected to operate at a level service A during both studied hours.

It is the professional opinion of JMC that the redevelopment of the site will not have a significant impact on traffic operations in the study area.

Respectfully submitted,

JMC Planning Engineering Landscape Architecture & Land Surveying PLLC

Richard J. Pearson, PE, PTOE
Senior Associate Principal

Marc Petroro, PE
Project Manager

APPENDIX A

TABLES

TABLE 1

PROPOSED DEVELOPMENT VOLUMES[1]

DESCRIPTION	PEAK WEEKDAY AM HOUR			PEAK WEEKDAY PM HOUR		
	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
a. Proposed 200 Unit Apartment Building (ITE Code 220)[2]	20	82	102	83	45	128

Notes:

(1) Trip Generation based on ITE (Institute of Transportation Engineers) Trip Generation Manual, 9th Edition.

(2) Apartments (ITE Code 220) are defined by ITE as rental dwelling units located within the same building with at least three other dwelling units.

TABLE 2

INTERSECTION OPERATIONS-PEAK WEEKDAY AM HOUR

INTERSECTION	APPROACH	LANE GROUP	2016 EXISTING			2024 NO BUILD(4)			2024 BUILD(4)		
			V/C(1)	DELAY(2)	LOS(3)	V/C(1)	DELAY(2)	LOS(3)	V/C(1)	DELAY(2)	LOS(3)
1. NYS Route 22 & North Broadway (Signalized)	EASTBOUND	LEFT	0.02	32.0	C	0.02	32.7	C	0.02	33.0	C
		RIGHT	-	-	-	-	-	-	-	-	-
		COMPOSITE	-	32.0	C	-	32.7	C	-	33.0	C
	NORTHBOUND	LEFT/THRU	0.56	12.9	B	0.42	9.7	A	0.42	10.0	A
		RIGHT	0.15	1.1	A	0.16	1.2	A	0.17	1.1	A
		COMPOSITE	-	9.1	A	-	6.9	A	-	7.0	A
	SOUTHBOUND	THRU/RIGHT	1.03	50.2	F	0.61	11.0	B	0.61	11.3	B
	SOUTHWESTBOUND	THRU/RIGHT	0.54	32.1	C	0.56	32.0	C	0.57	32.1	C
	INTERSECTION	COMPOSITE	-	35.6	D	-	12.7	B	-	13.0	B
2. NYS Route 22 & Hillandale Avenue (Signalized)	EASTBOUND	LEFT/THRU	0.16	24.6	C	0.17	24.6	C	0.17	24.6	C
	WESTBOUND	LEFT/THRU/ RIGHT	0.25	25.0	C	0.26	25.1	C	0.26	25.1	C
	NORTHBOUND	THRU/RIGHT	0.08	2.2	A	0.09	2.3	A	0.09	2.3	A
	SOUTHBOUND	LEFT/THRU/ RIGHT	0.13	2.4	A	0.14	2.5	A	0.15	2.5	A
	INTERSECTION	COMPOSITE	-	5.5	A	-	5.5	A	-	5.4	A
3. NYS Route 22 & Old Orchard Street (Signalized)	WESTBOUND	LEFT/RIGHT	0.37	29.7	C	0.39	29.8	C	0.57	34.1	C
	NORTHBOUND	THRU/RIGHT	0.25	5.9	A	0.27	6.1	A	0.33	9.6	A
	SOUTHBOUND	LEFT/THRU	0.31	6.3	A	0.34	6.6	A	0.42	10.4	B
	SOUTHWESTBOUND	LEFT/RIGHT	0.12	29.6	C	0.12	29.8	C	0.13	34.3	C
	INTERSECTION	COMPOSITE	-	8.0	A	-	8.3	A	-	13.1	B
4. Old Orchard Street & Site Driveway B (Unsignalized)	EASTBOUND	LEFT/THRU							0.00	7.6	A
	WESTBOUND	THRU/RIGHT		N/A			N/A		-	-	-
	SOUTHBOUND	LEFT/RIGHT							0.02	9.1	A
5. Old Orchard Street & Site Driveway A (Unsignalized)	EASTBOUND	LEFT/THRU							0.01	7.4	A
	WESTBOUND	THRU/RIGHT		N/A			N/A		-	-	-
	SOUTHBOUND	LEFT/RIGHT							0.07	9.0	A

Notes:

(1) V/C represents volume/capacity ratio

(2) Delay is average seconds delay per vehicle

(3) LOS represents level of service

(4) Improvements by NYCDEP have been incorporated in the analysis

TABLE 3

INTERSECTION OPERATIONS-PEAK WEEKDAY PM HOUR

INTERSECTION	APPROACH	LANE GROUP	2016 EXISTING			2024 NO BUILD(4)			2024 BUILD(4)		
			V/C(1)	DELAY(2)	LOS(3)	V/C(1)	DELAY(2)	LOS(3)	V/C(1)	DELAY(2)	LOS(3)
1. NYS Route 22 & North Broadway (Signalized)	EASTBOUND	LEFT	0.04	33.9	C	0.06	49.6	D	0.06	49.9	D
		RIGHT	0.07	0.6	A	0.09	0.9	A	0.09	0.9	A
		COMPOSITE	-	11.7	B	-	16.6	B	-	16.6	B
	NORTHBOUND	LEFT/THRU	1.09	74.2	F	1.07	68.7	F	1.08	70.0	F
		RIGHT	0.22	2.1	A	0.24	2.1	A	0.25	2.2	A
		COMPOSITE	-	59.8	E	-	55.4	E	-	55.8	E
	SOUTHBOUND	THRU/RIGHT	0.43	10.5	B	0.23	7.7	A	0.23	7.8	A
	SOUTHWESTBOUND	THRU/RIGHT	0.47	33.0	C	0.59	49.9	D	0.60	50.0	D
	INTERSECTION	COMPOSITE	-	45.5	D	-	43.9	D	-	44.3	D
2. NYS Route 22 & Hillandale Avenue (Signalized)	EASTBOUND	LEFT/THRU	0.18	25.0	C	0.19	25.0	C	0.19	25.0	C
	WESTBOUND	LEFT/THRU/ RIGHT	0.12	24.7	C	0.14	24.7	C	0.14	24.7	C
	NORTHBOUND	THRU/RIGHT	0.11	2.1	A	0.12	2.2	A	0.13	2.2	A
	SOUTHBOUND	LEFT/THRU/ RIGHT	0.10	2.1	A	0.10	2.1	A	0.11	2.2	A
	INTERSECTION	COMPOSITE	-	4.3	A	-	4.4	A	-	4.3	A
3. NYS Route 22 & Old Orchard Street (Signalized)	WESTBOUND	LEFT/RIGHT	0.25	28.6	C	0.28	28.9	C	0.41	30.2	C
	NORTHBOUND	THRU/RIGHT	0.23	4.4	A	0.25	4.6	A	0.30	6.1	A
	SOUTHBOUND	LEFT/THRU	0.24	4.5	A	0.26	4.7	A	0.33	6.3	A
	SOUTHWESTBOUND	LEFT/RIGHT	0.04	28.1	C	0.05	28.3	C	0.05	29.5	C
	INTERSECTION	COMPOSITE	-	5.6	A	-	5.8	A	-	8.0	A
4. Old Orchard Street & Site Driveway B (Unsignalized)	EASTBOUND	LEFT/THRU							0.02	7.4	A
	WESTBOUND	THRU/RIGHT		N/A			N/A		-	-	-
	SOUTHBOUND	LEFT/RIGHT							0.01	8.7	A
5. Old Orchard Street & Site Driveway A (Unsignalized)	EASTBOUND	LEFT/THRU							0.04	7.4	A
	WESTBOUND	THRU/RIGHT		N/A			N/A		-	-	-
	SOUTHBOUND	LEFT/RIGHT							0.04	8.7	A

Notes:

(1) V/C represents volume/capacity ratio

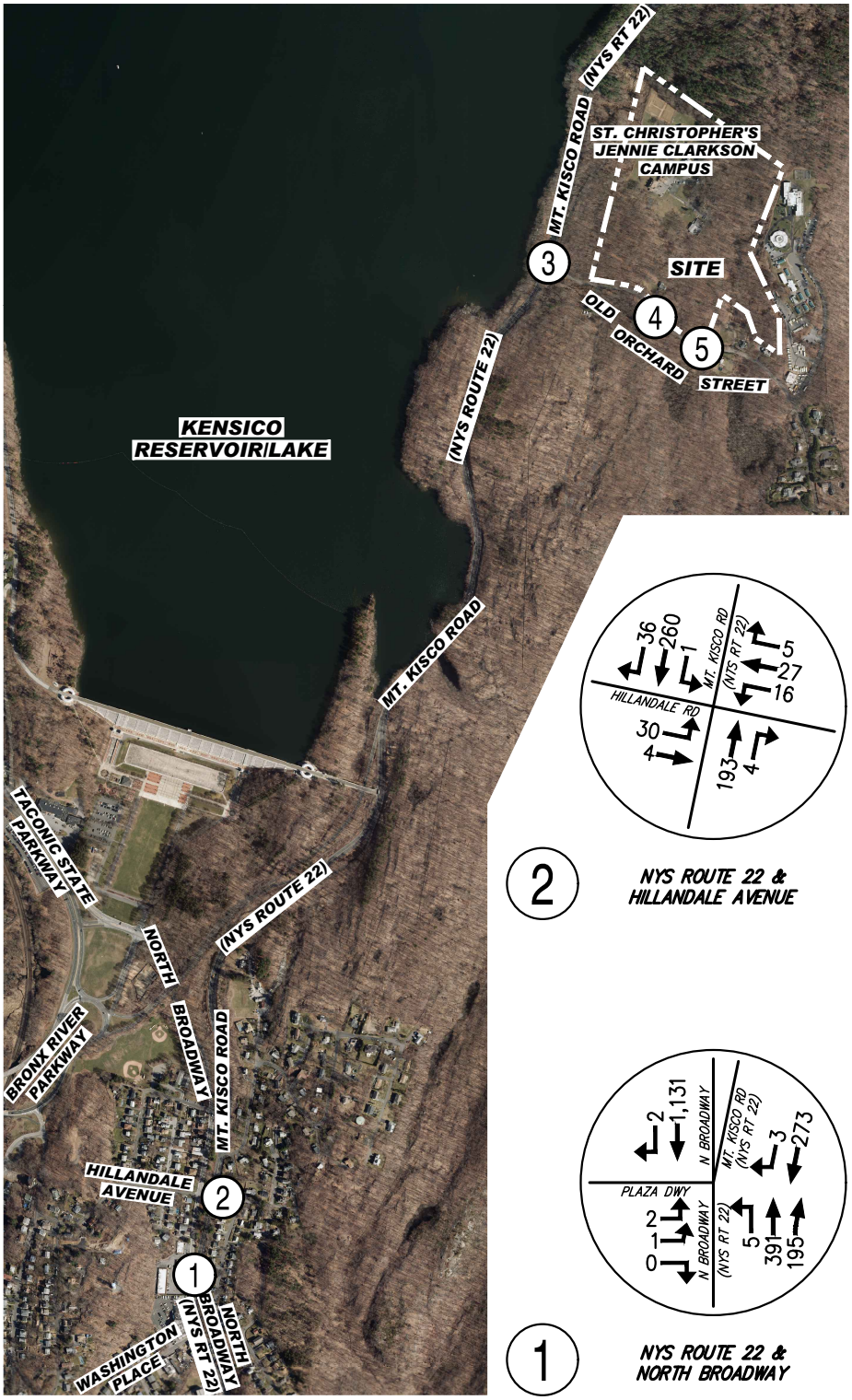
(2) Delay is average seconds delay per vehicle

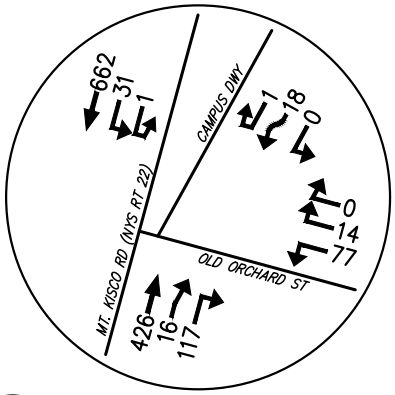
(3) LOS represents level of service

(4) Improvements by NYCDEP have been incorporated in the analysis

APPENDIX B

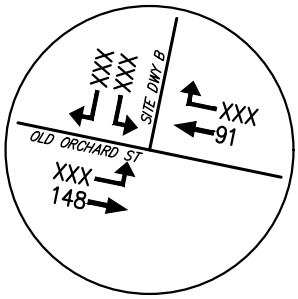
FIGURES





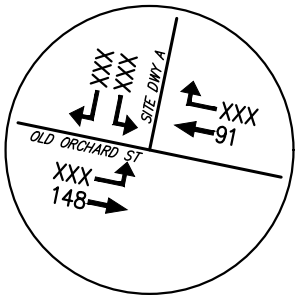
3 NYS ROUTE 22 & OLD ORCHARD STREET

2 NYS ROUTE 22 & HILLANDALE AVENUE



4 OLD ORCHARD STREET & SITE DRIVEWAY B

1 NYS ROUTE 22 & NORTH BROADWAY



5 OLD ORCHARD STREET & SITE DRIVEWAY A

THE VUE

1700 OLD ORCHARD STREET — TOWN OF NORTH CASTLE, NY 10504

2016 EXISTING VOLUMES

PEAK WEEKDAY AM HOUR (7:30 - 8:30)

DATE: 02/12/2016 — JMC PROJECT: 15147

FIGURE: 01 — SCALE: 1" = 1,250'

120 BEDFORD RD
ARMONK
NY 10504

(914) 273-5225
fax 273-2102

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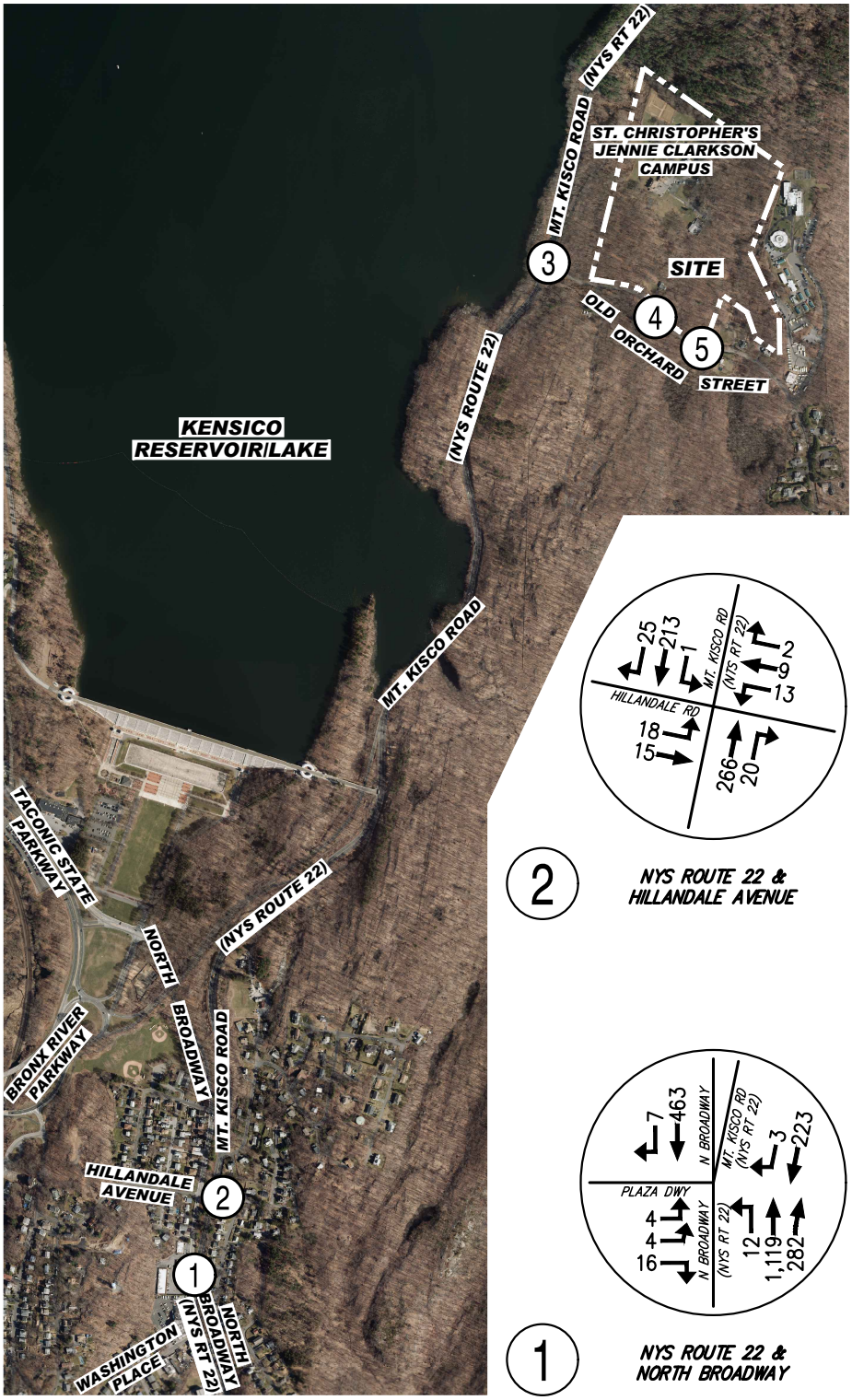
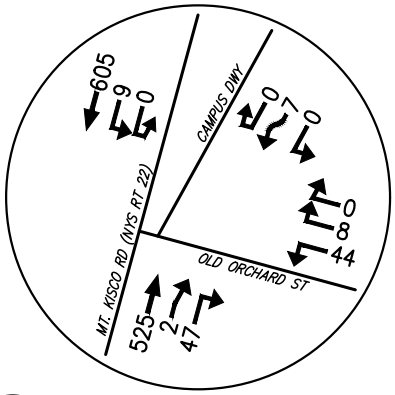
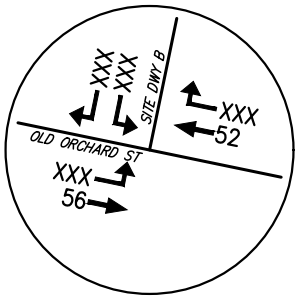
15147–TRAFFIC–FIG.dwg; TRAFFIC–FIGS.tab





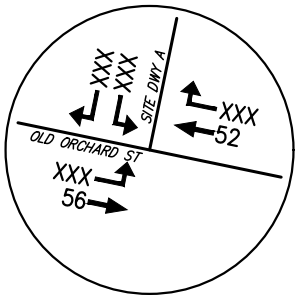
3 NYS ROUTE 22 & OLD ORCHARD STREET

2 NYS ROUTE 22 & HILLANDALE AVENUE



4 OLD ORCHARD STREET & SITE DRIVEWAY B

1 NYS ROUTE 22 & NORTH BROADWAY



5 OLD ORCHARD STREET & SITE DRIVEWAY A

THE VUE

1700 OLD ORCHARD STREET — TOWN OF NORTH CASTLE, NY 10504

2016 EXISTING VOLUMES

PEAK WEEKDAY PM HOUR (5:00 - 6:00)

DATE: 02/12/2016 — JMC PROJECT: 15147

FIGURE: 02 — SCALE: 1" = 1,250'

120 BEDFORD RD
ARMONK
NY 10504

(914) 273-5225
fax 273-2102

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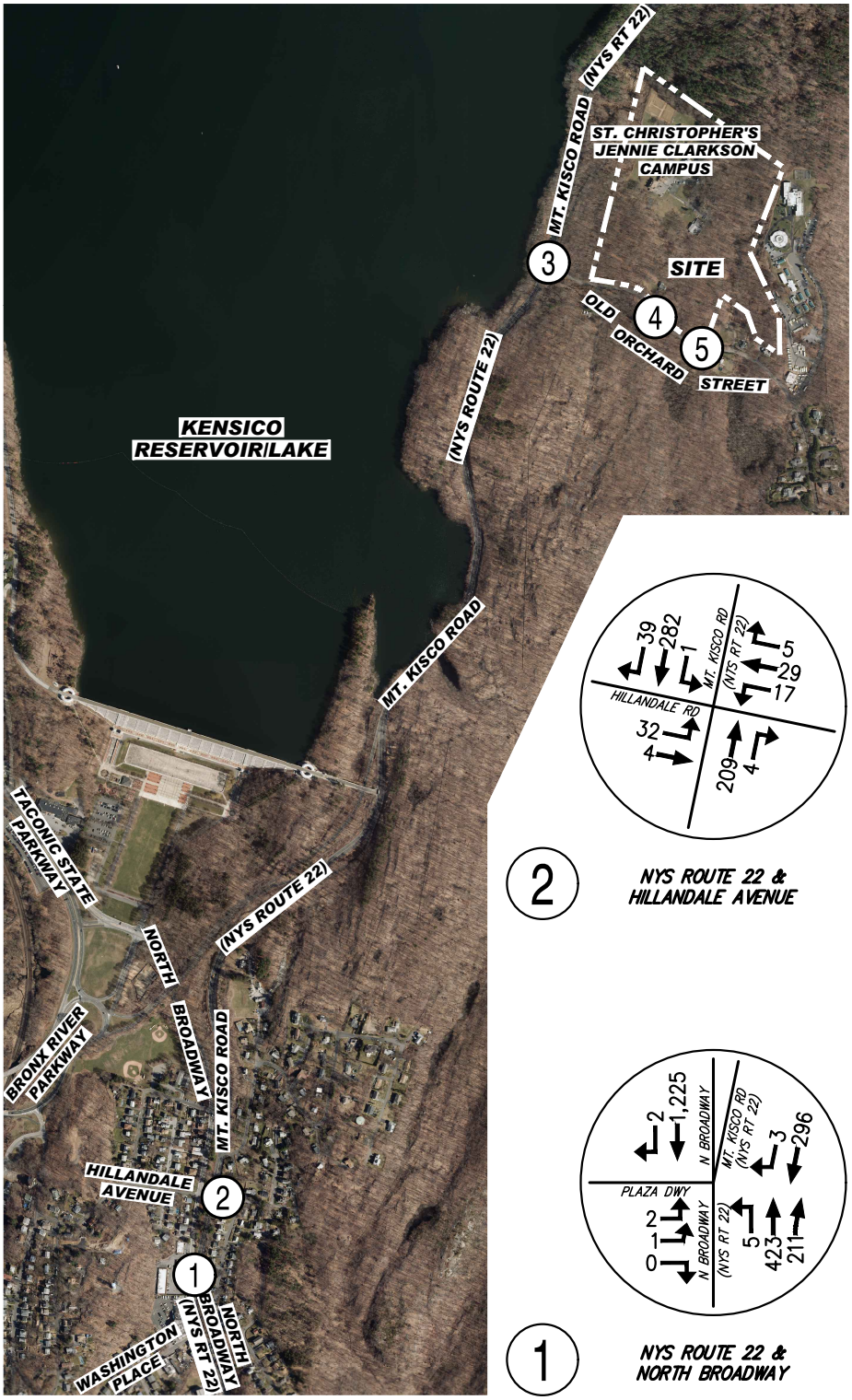
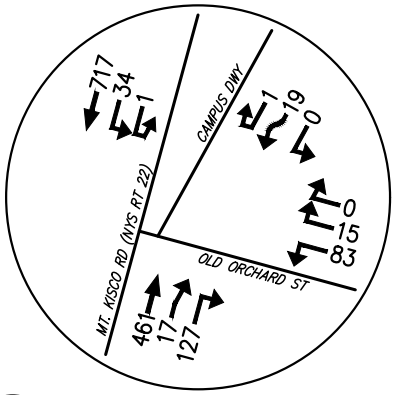
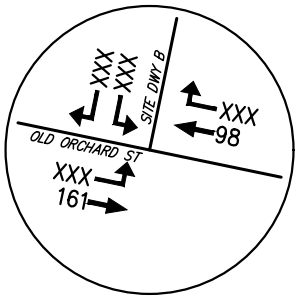
15147–TRAFFIC–FIG.dwg; TRAFFIC–FIGS.tab





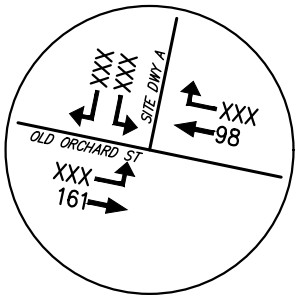
3 NYS ROUTE 22 & OLD ORCHARD STREET

2 NYS ROUTE 22 & HILLANDALE AVENUE



4 OLD ORCHARD STREET & SITE DRIVEWAY B

1 NYS ROUTE 22 & NORTH BROADWAY



5 OLD ORCHARD STREET & SITE DRIVEWAY A

THE VUE

1700 OLD ORCHARD STREET — TOWN OF NORTH CASTLE, NY 10504

2024 NO BUILD VOLUMES

PEAK WEEKDAY AM HOUR (7:30 - 8:30)

DATE: 02/12/2016 — JMC PROJECT: 15147

FIGURE: 03 — SCALE: 1" = 1,250'

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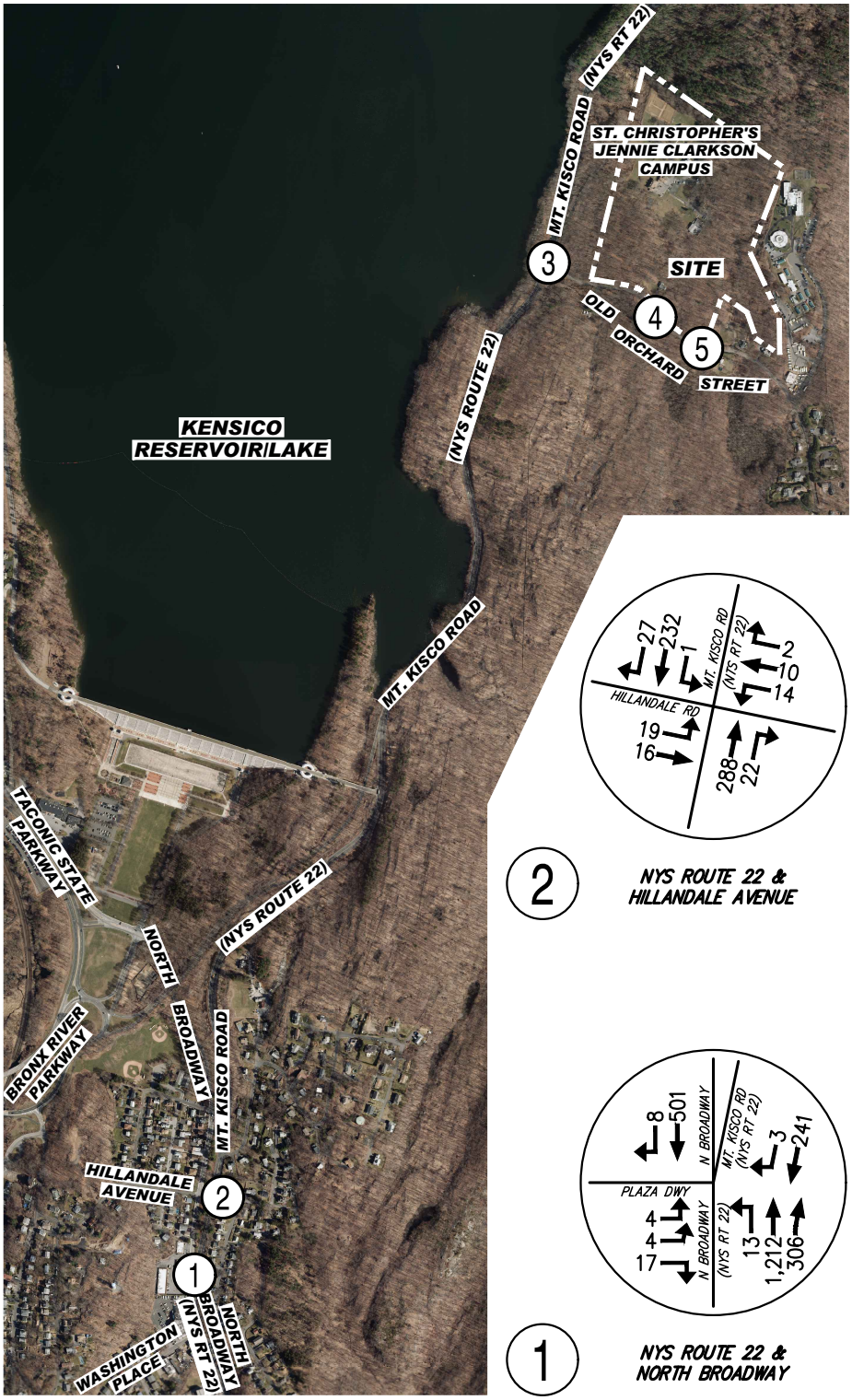
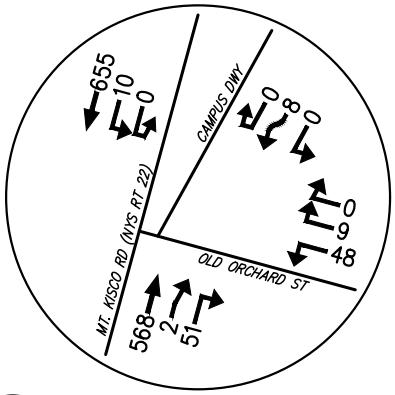
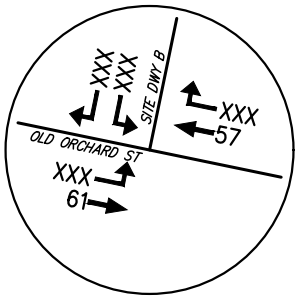
15147-TRAFFIC-FIG.dwg; TRAFFIC-FIGS.tab





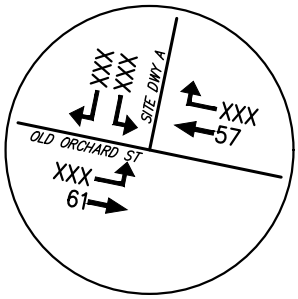
3 NYS ROUTE 22 & OLD ORCHARD STREET

2 NYS ROUTE 22 & HILLANDALE AVENUE



4 OLD ORCHARD STREET & SITE DRIVEWAY B

1 NYS ROUTE 22 & NORTH BROADWAY



5 OLD ORCHARD STREET & SITE DRIVEWAY A

THE VUE

1700 OLD ORCHARD STREET — TOWN OF NORTH CASTLE, NY 10504

2024 NO BUILD VOLUMES

PEAK WEEKDAY PM HOUR (5:00 - 6:00)

DATE: 02/12/2016 — JMC PROJECT: 15147

FIGURE: 04 — SCALE: 1" = 1,250'

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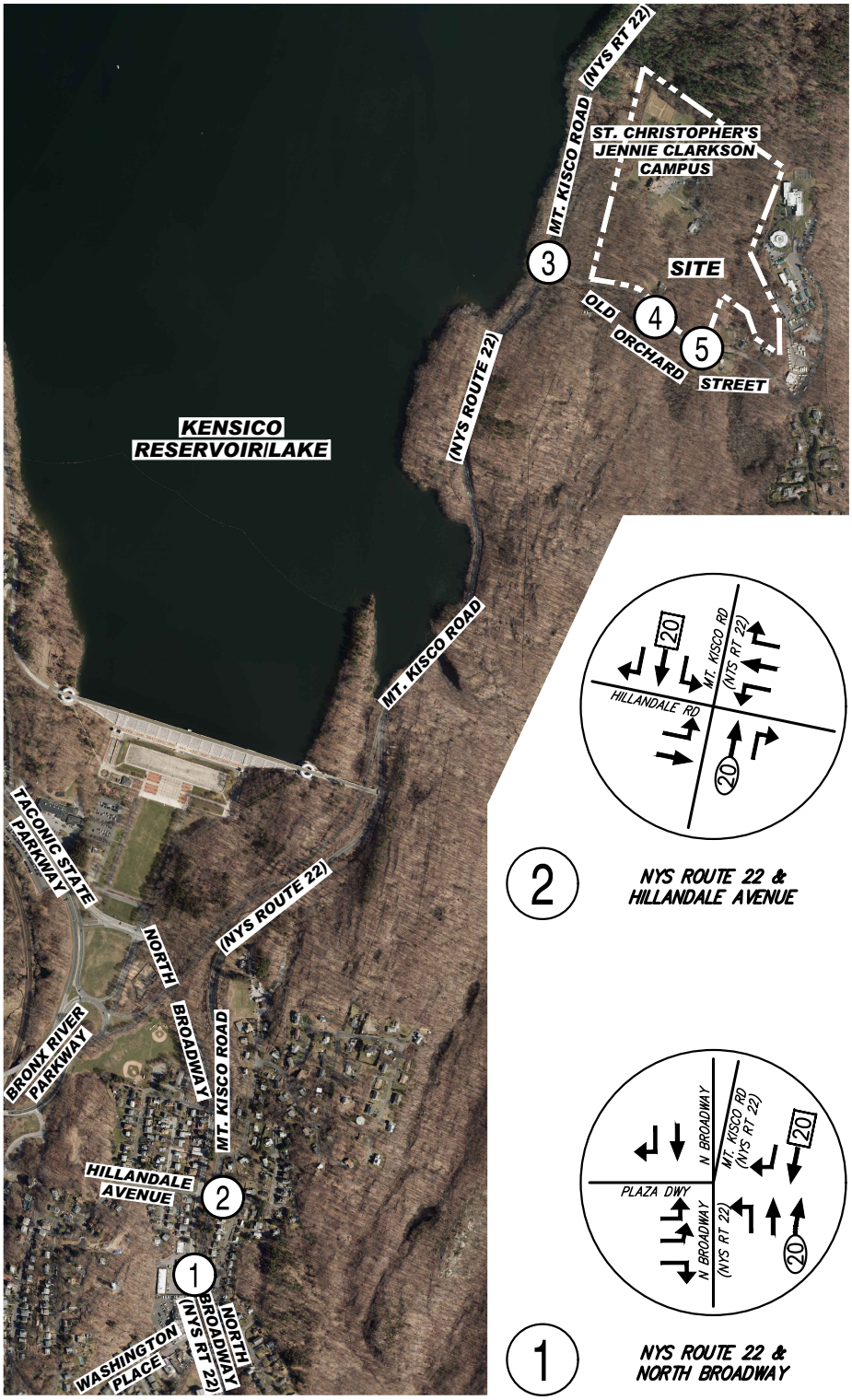
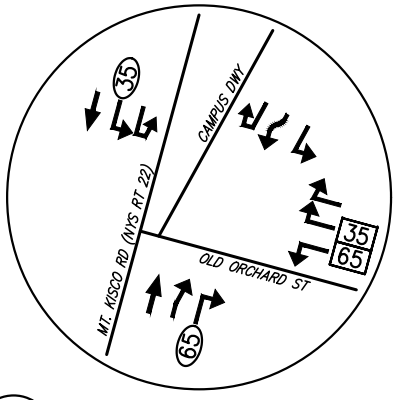
15147-TRAFFIC-FIG.dwg; TRAFFIC-FIGS.tab

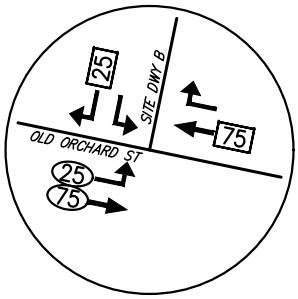




3 NYS ROUTE 22 & OLD ORCHARD STREET

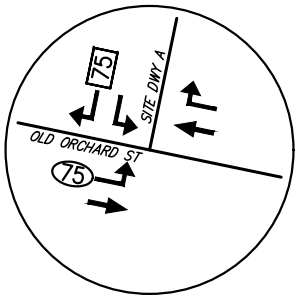
LEGEND
% ENTERING
% EXITING

2 NYS ROUTE 22 & HILLANDALE AVENUE



4 OLD ORCHARD STREET & SITE DRIVEWAY B

1 NYS ROUTE 22 & NORTH BROADWAY



5 OLD ORCHARD STREET & SITE DRIVEWAY A

THE VUE

1700 OLD ORCHARD STREET TOWN OF NORTH CASTLE, NY 10504

PRIMARY TRIP DISTRIBUTIONS

DATE: 02/12/2016 JMC PROJECT: 15147

FIGURE: 05 SCALE: 1" = 1,250'

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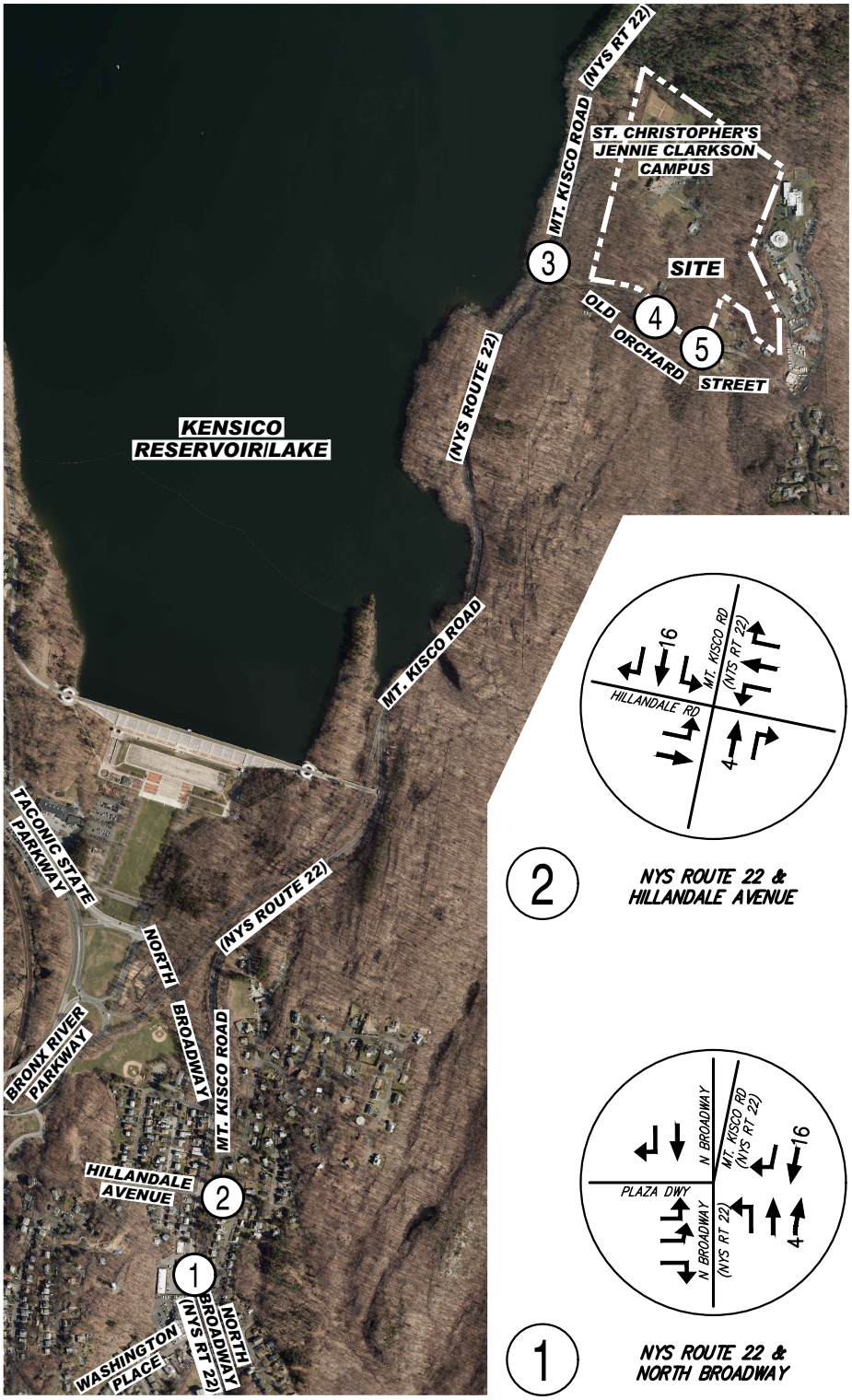
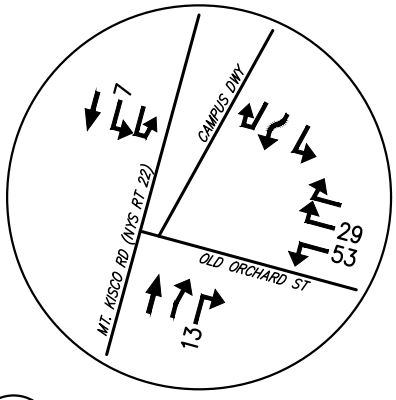
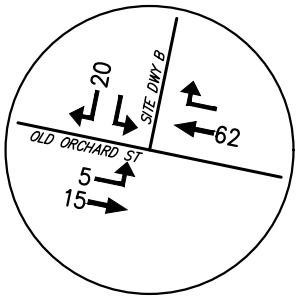
15147–TRAFFIC–FIG.dwg; TRAFFIC–FIGS.tab





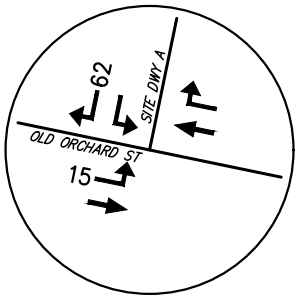
3 NYS ROUTE 22 & OLD ORCHARD STREET

2 NYS ROUTE 22 & HILLANDALE AVENUE



4 OLD ORCHARD STREET & SITE DRIVEWAY B

1 NYS ROUTE 22 & NORTH BROADWAY



5 OLD ORCHARD STREET & SITE DRIVEWAY A

THE VUE

1700 OLD ORCHARD STREET — TOWN OF NORTH CASTLE, NY 10504

PRIMARY VOLUMES

PEAK WEEKDAY AM HOUR

DATE: 02/12/2016 — JMC PROJECT: 15147

FIGURE: 06 — SCALE: 1" = 1,250'

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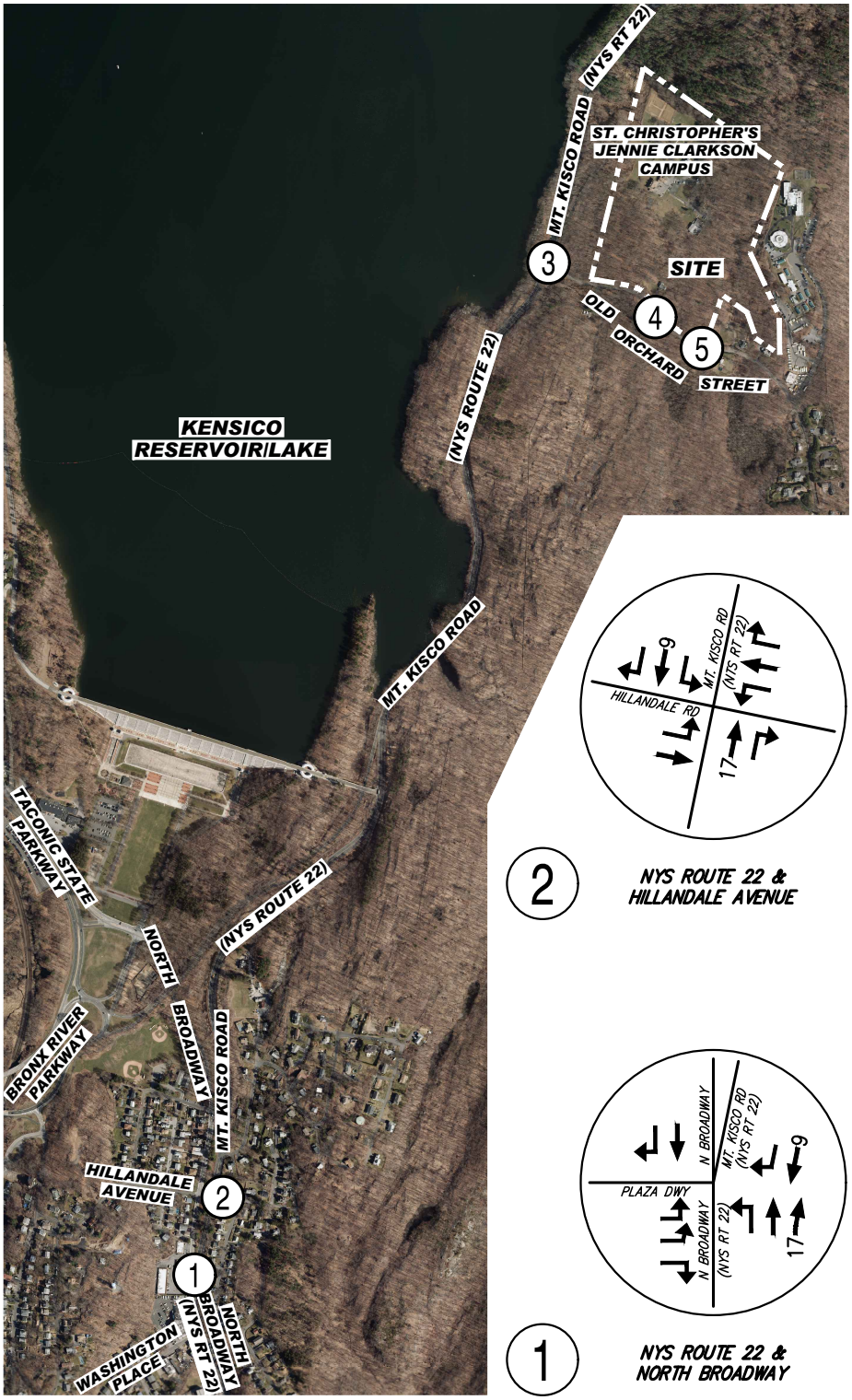
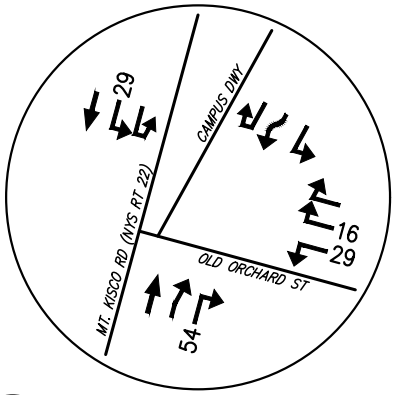
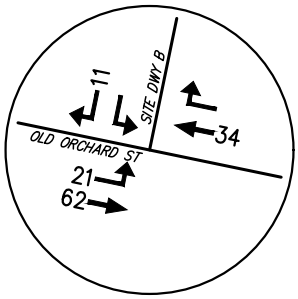
15147–TRAFFIC–FIG.dwg; TRAFFIC–FIGS.tab





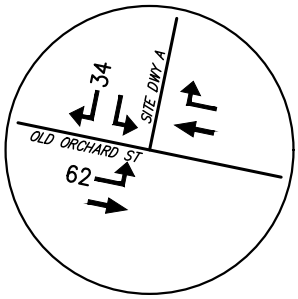
3 NYS ROUTE 22 & OLD ORCHARD STREET

2 NYS ROUTE 22 & HILLANDALE AVENUE



4 OLD ORCHARD STREET & SITE DRIVEWAY B

1 NYS ROUTE 22 & NORTH BROADWAY



5 OLD ORCHARD STREET & SITE DRIVEWAY A

THE VUE

1700 OLD ORCHARD STREET — TOWN OF NORTH CASTLE, NY 10504

PRIMARY VOLUMES

PEAK WEEKDAY PM HOUR

DATE: 02/12/2016 — JMC PROJECT: 15147

FIGURE: 07 — SCALE: 1" = 1,250'

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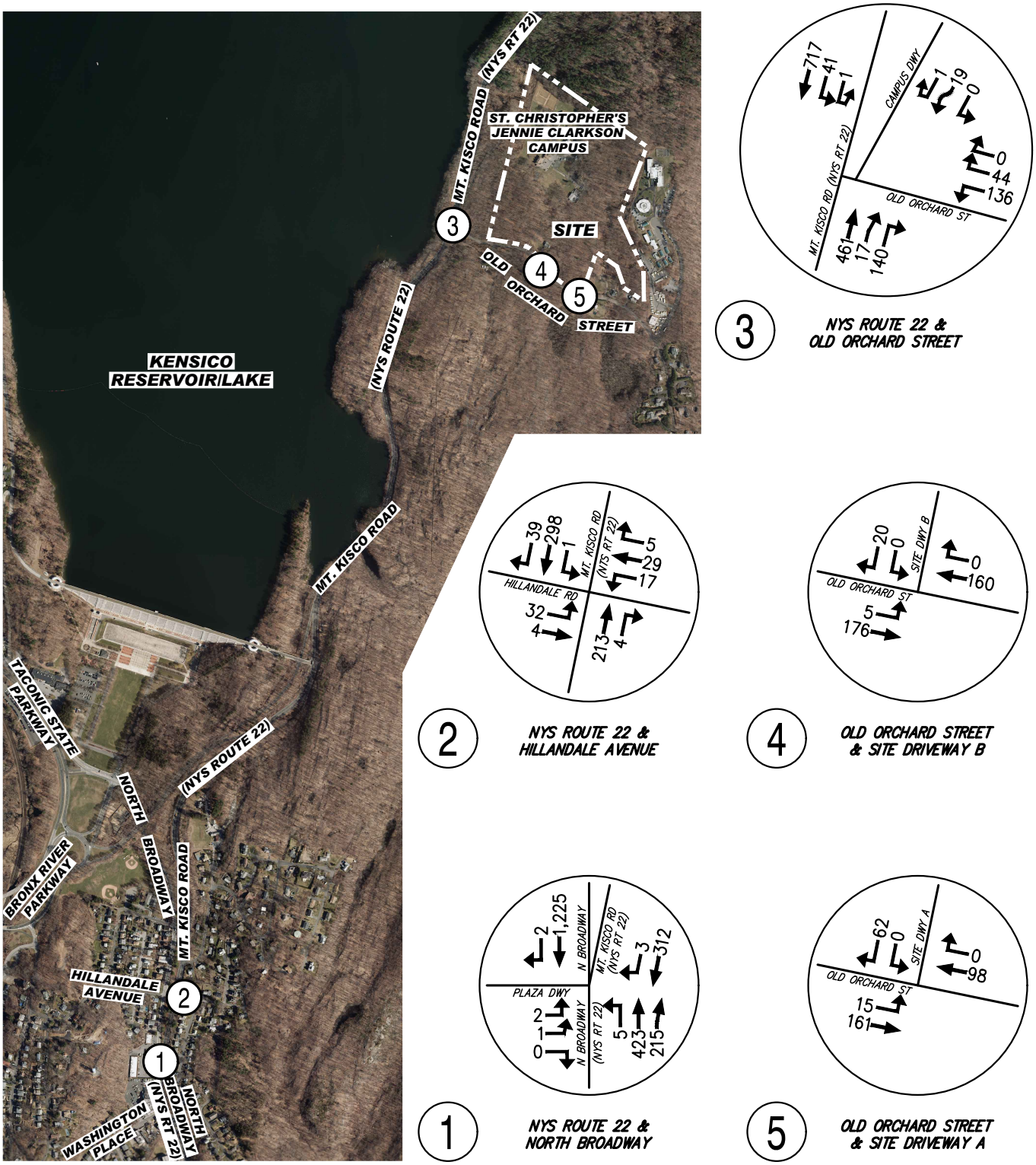

THE VUE

1700 OLD ORCHARD STREET — TOWN OF NORTH CASTLE, NY 10504

2024 BUILD VOLUMES

PEAK WEEKDAY AM HOUR (7:30 - 8:30)

DATE: 02/12/2016 — JMC PROJECT: 15147

FIGURE: 08 — SCALE: 1" = 1,250'

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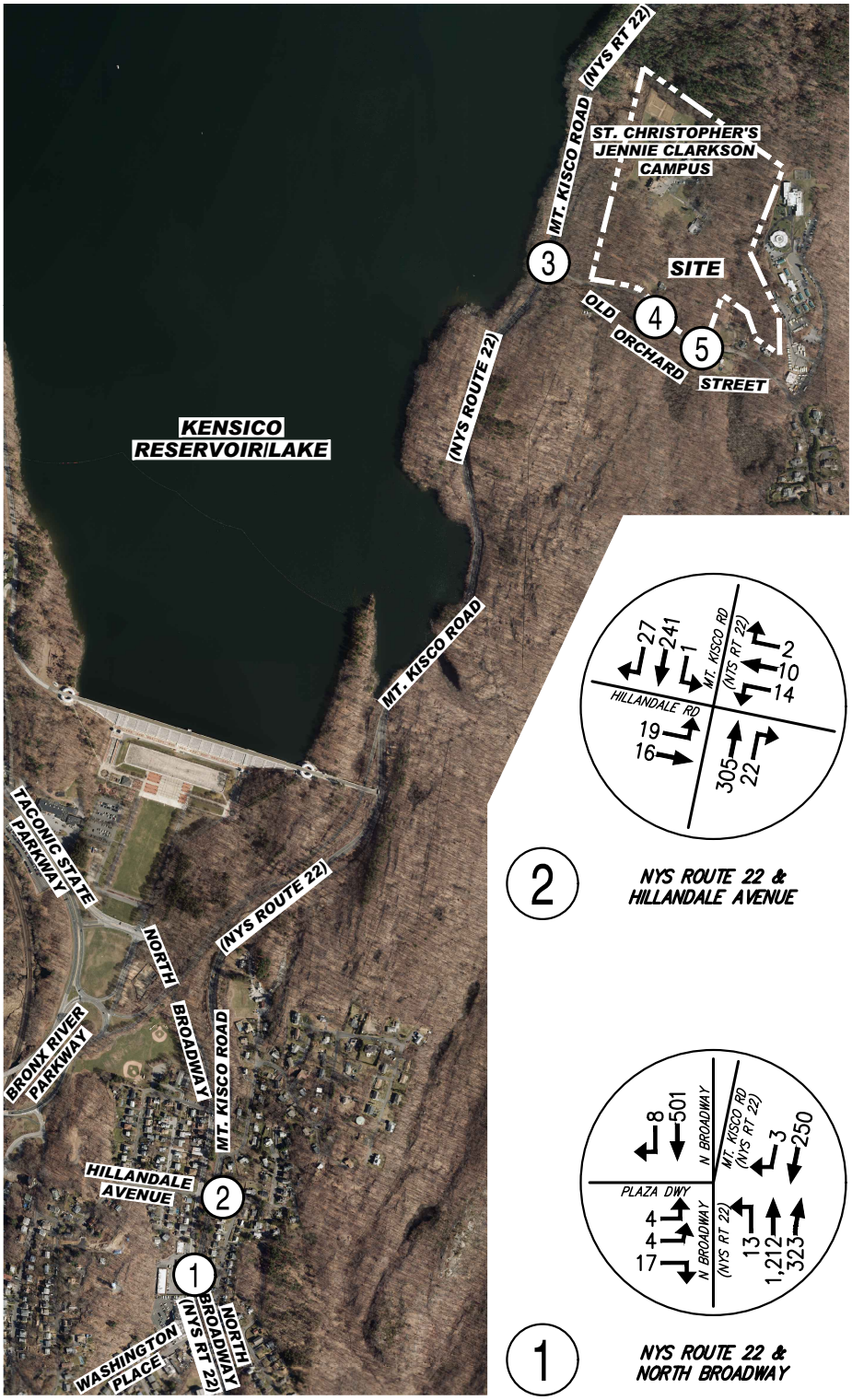
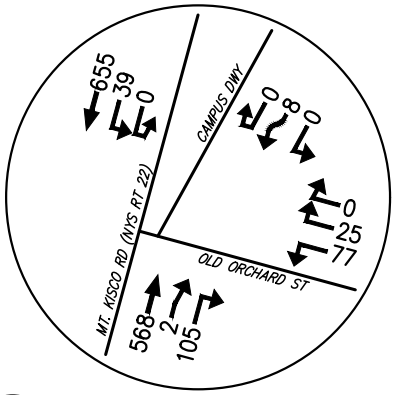
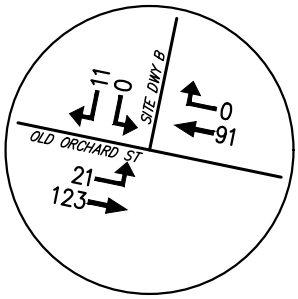
15147-TRAFFIC-FIG.dwg; TRAFFIC-FIGS.tab





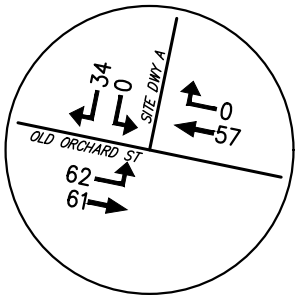
3 NYS ROUTE 22 & OLD ORCHARD STREET

2 NYS ROUTE 22 & HILLANDALE AVENUE



4 OLD ORCHARD STREET & SITE DRIVEWAY B

1 NYS ROUTE 22 & NORTH BROADWAY



5 OLD ORCHARD STREET & SITE DRIVEWAY A

THE VUE

1700 OLD ORCHARD STREET — TOWN OF NORTH CASTLE, NY 10504

2024 BUILD VOLUMES

PEAK WEEKDAY PM HOUR (5:00 - 6:00)

DATE: 02/12/2016 — JMC PROJECT: 15147

FIGURE: 08 — SCALE: 1" = 1,250'

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15147–TRAFFIC–FIG.dwg; TRAFFIC–FIGS.tab

APPENDIX C

TURNING MOVEMENT COUNTS

DATE:	1/21/2016	JOB NO:	15147
PERIOD:	7-9 AM & 4-6 PM	NAME:	MT
LOCATION:	North Broadway, Mt. Kisco Road, & Sir John's Plaza Driveway	INT #:	1

ENTER COUNT DATA ON THIS PAGE

TIME	CLASS	VEHICLE MOVEMENT												TOTAL VEHICLES	PEDESTRIAN MOVEMENT				TOTAL PEDS	INT. PHF
		1	2	3	4	5	6	7	8	9	10	11	12		A	B	C	D		
7:00 - 7:15 AM	TOTAL	0	135	1	40	1	0	2	0	3	2	59	32							
	TRUCK		3		1					1		2								
7:15 - 7:30 AM	TOTAL	0	334	3	115	1	0	2	0	6	4	133	66					1		
	TRUCK		8		2						1	1								
7:30 - 7:45 AM	TOTAL	0	600	3	174	4	0	2	0	10	7	223	113					1		
	TRUCK		6		2							1	2							
7:45 - 8:00 AM	TOTAL	0	876	3	252	4	0	3	1	14	8	332	161					2		
	TRUCK		3		3							6	1							
8:00 - 8:15 AM	TOTAL	0	1,169	4	310	4	0	4	1	15	9	431	214							
	TRUCK		5		2						1	1	3							
8:15 - 8:30 AM	TOTAL	0	1,465	5	388	4	0	4	1	16	9	524	261							
	TRUCK		7		5					1		5	5							
8:30 - 8:45 AM	TOTAL	0	1,734	8	457	5	0	6	2	19	10	638	292							
	TRUCK		4		4							6	3							
8:45 - 9:00 AM	TOTAL	0	2,029	9	515	6	0	7	3	20	15	744	336					1		
	TRUCK				4							6	4							
4:00 - 4:15 PM	TOTAL	0	100	0	41	1	0	1	0	10	1	109	71							
	TRUCK		4		1								2							
4:15 - 4:30 PM	TOTAL	0	199	0	78	2	0	3	1	15	10	450	117							
	TRUCK		3		1							3								
4:30 - 4:45 PM	TOTAL	0	323	0	127	2	0	4	2	17	14	711	187					1		
	TRUCK		2		1							4	1							
4:45 - 5:00 PM	TOTAL	0	427	1	177	2	0	6	2	22	15	1,007	252					1		
	TRUCK		3		2							3	1							
5:00 - 5:15 PM	TOTAL	0	537	2	238	3	0	8	2	26	19	1,269	329							
	TRUCK		1									2	1							
5:15 - 5:30 PM	TOTAL	0	659	6	289	5	0	9	3	28	22	1,555	398							
	TRUCK		2		1							1								
5:30 - 5:45 PM	TOTAL	0	773	8	355	5	0	10	4	33	25	1,831	459							
	TRUCK		2		4							2								
5:45 - 6:00 PM	TOTAL	0	890	8	398	5	0	10	6	38	27	2,126	534					1		
	TRUCK		1		1							2	1							

DATE:	1/21/2016	CALCULATIONS - DO NOT EDIT THIS SHEET	JOB NO:	15147
PERIOD:	7-9 AM & 4-6 PM		NAME:	MT
LOCATION:	North Broadway, Mt. Kisco Road, & Sir John's Plaza Driveway		INT #:	1

TIME	CLASS	VEHICLE MOVEMENT												TOTAL VEHICLES	PEDESTRIAN MOVEMENT				TOTAL PEDS	INT. PHF
		1	2	3	4	5	6	7	8	9	10	11	12		A	B	C	D		
7:00 - 7:15 AM	TOTAL	0	135	1	40	1	0	2	0	3	2	59	32	275						
	TRUCK	0	3	0	1	0	0	0	0	1	0	2	0		0	0	0	0	0	
7:15 - 7:30 AM	TOTAL	0	199	2	75	0	0	0	0	3	2	74	34	389						
	TRUCK	0	8	0	2	0	0	0	0	0	1	1	0		0	0	0	1	1	
7:30 - 7:45 AM	TOTAL	0	266	0	59	3	0	0	0	4	3	90	47	472						
	TRUCK	0	6	0	2	0	0	0	0	0	0	1	2		0	0	0	1	1	
7:45 - 8:00 AM	TOTAL	0	276	0	78	0	0	1	1	4	1	109	48	518						
	TRUCK	0	3	0	3	0	0	0	0	0	0	6	1		0	0	0	2	2	
8:00 - 8:15 AM	TOTAL	0	293	1	58	0	0	1	0	1	1	99	53	507						
	TRUCK	0	5	0	2	0	0	0	0	0	1	1	3		0	0	0	0	0	
8:15 - 8:30 AM	TOTAL	0	296	1	78	0	0	0	0	1	0	93	47	516						
	TRUCK	0	7	0	5	0	0	0	0	1	0	5	5		0	0	0	0	0	
8:30 - 8:45 AM	TOTAL	0	269	3	69	1	0	2	1	3	1	114	31	494						
	TRUCK	0	4	0	4	0	0	0	0	0	0	6	3		0	0	0	0	0	
8:45 - 9:00 AM	TOTAL	0	295	1	58	1	0	1	1	1	5	106	44	513						
	TRUCK	0	0	0	4	0	0	0	0	0	0	6	4		0	0	0	1	1	
4:00 - 4:15 PM	TOTAL	0	100	0	41	1	0	1	0	10	1	109	71	334						
	TRUCK	0	4	0	1	0	0	0	0	0	0	0	2		0	0	0	0	0	
4:15 - 4:30 PM	TOTAL	0	99	0	37	1	0	2	1	5	9	341	46	541						
	TRUCK	0	3	0	1	0	0	0	0	0	0	3	0		0	0	0	0	0	
4:30 - 4:45 PM	TOTAL	0	124	0	49	0	0	1	1	2	4	261	70	512						
	TRUCK	0	2	0	1	0	0	0	0	0	0	4	1		0	0	0	1	1	
4:45 - 5:00 PM	TOTAL	0	104	1	50	0	0	2	0	5	1	296	65	524						
	TRUCK	0	3	0	2	0	0	0	0	0	0	3	1		0	0	0	1	1	
5:00 - 5:15 PM	TOTAL	0	110	1	61	1	0	2	0	4	4	262	77	522						
	TRUCK	0	1	0	0	0	0	0	0	0	0	2	1		0	0	0	0	0	
5:15 - 5:30 PM	TOTAL	0	122	4	51	2	0	1	1	2	3	286	69	541						
	TRUCK	0	2	0	1	0	0	0	0	0	0	1	0		0	0	0	0	0	
5:30 - 5:45 PM	TOTAL	0	114	2	66	0	0	1	1	5	3	276	61	529						
	TRUCK	0	2	0	4	0	0	0	0	0	0	2	0		0	0	0	0	0	
5:45 - 6:00 PM	TOTAL	0	117	0	43	0	0	0	2	5	2	295	75	539						
	TRUCK	0	1	0	1	0	0	0	0	0	0	2	1		0	0	0	1	1	

DATE:	1/21/2016	JOB NO:	15147
PERIOD:	7-9 AM & 4-6 PM	NAME:	MT
LOCATION:	North Broadway, Mt. Kisco Road, & Sir John's Plaza Driveway	INT #:	1

PEAK HOUR MOVEMENTS & % HEAVY VEHICLES - DO NOT EDIT THIS SHEET

TIME	CLASS	VEHICLE MOVEMENT												TOTAL VEHICLES	PEDESTRIAN MOVEMENT				TOTAL PEDS	INT. PHF
		1	2	3	4	5	6	7	8	9	10	11	12		A	B	C	D		
7:00 - 8:00 AM	TOTAL	0	876	3	252	4	0	3	1	14	8	332	161	1,654						
	TRUCK	#####	2%	0%	3%	0%	#####	0%	0%	7%	13%	3%	2%		0	0	0	4	4	0.80
7:15 - 8:15 AM	TOTAL	0	1,034	3	270	3	0	2	1	12	7	372	182	1,886						
	TRUCK	#####	2%	0%	3%	0%	#####	0%	0%	0%	29%	2%	3%		0	0	0	4	4	0.91
7:30 - 8:30 AM	TOTAL	0	1,131	2	273	3	0	2	1	10	5	391	195	2,013						
	TRUCK	#####	2%	0%	4%	0%	#####	0%	0%	10%	20%	3%	6%		0	0	0	3	3	0.97
7:45 - 8:45 AM	TOTAL	0	1,134	5	283	1	0	4	2	9	3	415	179	2,035						
	TRUCK	#####	2%	0%	5%	0%	#####	0%	0%	11%	33%	4%	7%		0	0	0	2	2	0.98
8:00 - 9:00 AM	TOTAL	0	1,153	6	263	2	0	4	2	6	7	412	175	2,030						
	TRUCK	#####	1%	0%	6%	0%	#####	0%	0%	17%	14%	4%	9%		0	0	0	1	1	0.98
4:00 - 5:00 PM	TOTAL	0	427	1	177	2	0	6	2	22	15	1,007	252	1,911						
	TRUCK	#####	3%	0%	3%	0%	#####	0%	0%	0%	0%	1%	2%		0	0	0	2	2	0.88
4:15 - 5:15 PM	TOTAL	0	437	2	197	2	0	7	2	16	18	1,160	258	2,099						
	TRUCK	#####	2%	0%	2%	0%	#####	0%	0%	0%	0%	1%	1%		0	0	0	2	2	0.97
4:30 - 5:30 PM	TOTAL	0	460	6	211	3	0	6	2	13	12	1,105	281	2,099						
	TRUCK	#####	2%	0%	2%	0%	#####	0%	0%	0%	0%	1%	1%		0	0	0	2	2	0.97
4:45 - 5:45 PM	TOTAL	0	450	8	228	3	0	6	2	16	11	1,120	272	2,116						
	TRUCK	#####	2%	0%	3%	0%	#####	0%	0%	0%	0%	1%	1%		0	0	0	1	1	0.98
5:00 - 6:00 PM	TOTAL	0	463	7	221	3	0	4	4	16	12	1,119	282	2,131						
	TRUCK	#####	1%	0%	3%	0%	#####	0%	0%	0%	0%	1%	1%		0	0	0	1	1	0.98

1: N Broad SE - Hard Left
2: N Broad SE - Thru
3: N Broad SE - Right
4: Mt Kisco (Rt 22) SW - Thru
5: Mt Kisco (Rt 22) SW - Right
6: Mt Kisco (Rt 22) SW - Hard Right
7: Plaza Dwy EB - Left
8: Plaza Dwy EB - Thru
9: Plaza Dwy EB - Right
10: N Broad (Rt 22) NB - Hard Left
11: N Broad (Rt 22) NB - Slight Left
12: N Broad (Rt 22) NB - Thru

A: Cross N Broad NW side of Int
B: Cross Mt Kisco (Rt 22) NE side of Int
C: Cross N Broad (Rt 22) S side of Int
D: Cross Plaza Dwy West side of Int

DATE:	1/21/2016	JOB NO:	15147
PERIOD:	7-9 AM & 4-6 PM	NAME:	PL/DG
LOCATION:	Mt. Kisco Road (NYS Route 22) & Hillandale Road	INT #:	2

ENTER COUNT DATA ON THIS PAGE

TIME	CLASS	VEHICLE MOVEMENT												TOTAL VEHICLES	PEDESTRIAN MOVEMENT				TOTAL PEDS	INT. PHF
		1	2	3	4	5	6	7	8	9	10	11	12		A	B	C	D		
7:00 - 7:15 AM	TOTAL	0	1	7	8	34	0	0	32	0	3	2	0							
	TRUCK				1	1			1											
7:15 - 7:30 AM	TOTAL	0	2	11	16	87	0	0	64	0	11	7	0							
	TRUCK			1		1						1								
7:30 - 7:45 AM	TOTAL	0	2	17	28	142	0	0	106	2	11	15	1							
	TRUCK			1	1	1			2											
7:45 - 8:00 AM	TOTAL	0	4	25	35	209	1	0	149	2	15	23	3							
	TRUCK					5	1		4			1								
8:00 - 8:15 AM	TOTAL	0	6	35	41	270	1	0	209	2	22	28	3							
	TRUCK					3			4											
8:15 - 8:30 AM	TOTAL	0	6	41	52	333	1	1	252	4	26	34	5							
	TRUCK					5			6											
8:30 - 8:45 AM	TOTAL	0	9	48	57	404	1	2	289	5	29	36	5							
	TRUCK				1	8			2											
8:45 - 9:00 AM	TOTAL	0	11	54	64	467	1	2	332	5	31	39	6							
	TRUCK				1	5			2				1							
4:00 - 4:15 PM	TOTAL	0	2	4	3	36	1	0	69	2	0	7	2							
	TRUCK								1											
4:15 - 4:30 PM	TOTAL	0	6	13	6	80	2	1	114	4	2	8	3							
	TRUCK																			
4:30 - 4:45 PM	TOTAL	0	12	19	10	117	4	1	185	5	3	8	3							
	TRUCK																			
4:45 - 5:00 PM	TOTAL	0	17	25	15	167	6	1	246	7	4	11	3							
	TRUCK																			
5:00 - 5:15 PM	TOTAL	0	20	30	20	218	6	3	313	12	8	13	3							
	TRUCK																			
5:15 - 5:30 PM	TOTAL	1	22	33	25	272	7	5	378	16	11	14	4							
	TRUCK																			
5:30 - 5:45 PM	TOTAL	1	27	40	31	335	7	6	438	22	13	16	4							
	TRUCK								1											
5:45 - 6:00 PM	TOTAL	1	32	43	39	380	7	7	504	27	17	20	5							
	TRUCK								1											

DATE:	1/21/2016	CALCULATIONS - DO NOT EDIT THIS SHEET	JOB NO:	15147
PERIOD:	7-9 AM & 4-6 PM		NAME:	PL/DG
LOCATION:	Mt. Kisco Road (NYS Route 22) & Hillandale Road		INT #:	2

TIME	CLASS	VEHICLE MOVEMENT												TOTAL VEHICLES	PEDESTRIAN MOVEMENT				TOTAL PEDS	INT. PHF
		1	2	3	4	5	6	7	8	9	10	11	12		A	B	C	D		
7:00 - 7:15 AM	TOTAL	0	1	7	8	34	0	0	32	0	3	2	0	87						
	TRUCK	0	0	0	1	1	0	0	1	0	0	0	0		0	0	0	0	0	
7:15 - 7:30 AM	TOTAL	0	1	4	8	53	0	0	32	0	8	5	0	111						
	TRUCK	0	0	1	0	1	0	0	0	0	0	1	0		0	0	0	0	0	
7:30 - 7:45 AM	TOTAL	0	0	6	12	55	0	0	42	2	0	8	1	126						
	TRUCK	0	0	1	1	1	0	0	2	0	0	0	0		0	0	0	0	0	
7:45 - 8:00 AM	TOTAL	0	2	8	7	67	1	0	43	0	4	8	2	142						
	TRUCK	0	0	0	0	5	1	0	4	0	0	1	0		0	0	0	0	0	
8:00 - 8:15 AM	TOTAL	0	2	10	6	61	0	0	60	0	7	5	0	151						
	TRUCK	0	0	0	0	3	0	0	4	0	0	0	0		0	0	0	0	0	
8:15 - 8:30 AM	TOTAL	0	0	6	11	63	0	1	43	2	4	6	2	138						
	TRUCK	0	0	0	0	5	0	0	6	0	0	0	0		0	0	0	0	0	
8:30 - 8:45 AM	TOTAL	0	3	7	5	71	0	1	37	1	3	2	0	130						
	TRUCK	0	0	0	1	8	0	0	2	0	0	0	0		0	0	0	0	0	
8:45 - 9:00 AM	TOTAL	0	2	6	7	63	0	0	43	0	2	3	1	127						
	TRUCK	0	0	0	1	5	0	0	2	0	0	0	1		0	0	0	0	0	
4:00 - 4:15 PM	TOTAL	0	2	4	3	36	1	0	69	2	0	7	2	126						
	TRUCK	0	0	0	0	0	0	0	1	0	0	0	0		0	0	0	0	0	
4:15 - 4:30 PM	TOTAL	0	4	9	3	44	1	1	45	2	2	1	1	113						
	TRUCK	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	
4:30 - 4:45 PM	TOTAL	0	6	6	4	37	2	0	71	1	1	0	0	128						
	TRUCK	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	
4:45 - 5:00 PM	TOTAL	0	5	6	5	50	2	0	61	2	1	3	0	135						
	TRUCK	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	
5:00 - 5:15 PM	TOTAL	0	3	5	5	51	0	2	67	5	4	2	0	144						
	TRUCK	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	
5:15 - 5:30 PM	TOTAL	1	2	3	5	54	1	2	65	4	3	1	1	142						
	TRUCK	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	
5:30 - 5:45 PM	TOTAL	0	5	7	6	63	0	1	60	6	2	2	0	152						
	TRUCK	0	0	0	0	0	0	0	1	0	0	0	0		0	0	0	0	0	
5:45 - 6:00 PM	TOTAL	0	5	3	8	45	0	1	66	5	4	4	1	142						
	TRUCK	0	0	0	0	0	0	0	1	0	0	0	0		0	0	0	0	0	

DATE:	1/21/2016	JOB NO:	15147
PERIOD:	7-9 AM & 4-6 PM	NAME:	PL/DG
LOCATION:	Mt. Kisco Road (NYS Route 22) & Hillandale Road	INT #:	2

PEAK HOUR MOVEMENTS & % HEAVY VEHICLES - DO NOT EDIT THIS SHEET

TIME	CLASS	VEHICLE MOVEMENT												TOTAL VEHICLES	PEDESTRIAN MOVEMENT				TOTAL PEDS	INT. PHF
		1	2	3	4	5	6	7	8	9	10	11	12		A	B	C	D		
7:00 - 8:00 AM	TOTAL	0	4	25	35	209	1	0	149	2	15	23	3	466						
	TRUCK	#####	0%	8%	6%	4%	100%	#####	5%	0%	0%	9%	0%		0	0	0	0	0	0.82
7:15 - 8:15 AM	TOTAL	0	5	28	33	236	1	0	177	2	19	26	3	530						
	TRUCK	#####	0%	7%	3%	4%	100%	#####	6%	0%	0%	8%	0%		0	0	0	0	0	0.88
7:30 - 8:30 AM	TOTAL	0	4	30	36	246	1	1	188	4	15	27	5	557						
	TRUCK	#####	0%	3%	3%	6%	100%	0%	9%	0%	0%	4%	0%		0	0	0	0	0	0.92
7:45 - 8:45 AM	TOTAL	0	7	31	29	262	1	2	183	3	18	21	4	561						
	TRUCK	#####	0%	0%	3%	8%	100%	0%	9%	0%	0%	5%	0%		0	0	0	0	0	0.93
8:00 - 9:00 AM	TOTAL	0	7	29	29	258	0	2	183	3	16	16	3	546						
	TRUCK	#####	0%	0%	7%	8%	#####	0%	8%	0%	0%	0%	33%		0	0	0	0	0	0.90
4:00 - 5:00 PM	TOTAL	0	17	25	15	167	6	1	246	7	4	11	3	502						
	TRUCK	#####	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0	0	0	0	0	0.93
4:15 - 5:15 PM	TOTAL	0	18	26	17	182	5	3	244	10	8	6	1	520						
	TRUCK	#####	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0	0	0	0	0	0.90
4:30 - 5:30 PM	TOTAL	1	16	20	19	192	5	4	264	12	9	6	1	549						
	TRUCK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0	0	0	0	0	0.95
4:45 - 5:45 PM	TOTAL	1	15	21	21	218	3	5	253	17	10	8	1	573						
	TRUCK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0	0	0	0	0	0.94
5:00 - 6:00 PM	TOTAL	1	15	18	24	213	1	6	258	20	13	9	2	580						
	TRUCK	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%		0	0	0	0	0	0.95

1: Hillandale EB - Right (illegal)
2: Hillandale EB - Thru
3: Hillandale EB - Left
4: Rt 22 SB - Right
5: Rt 22 SB - Thru
6: Rt 22 SB - Left
7: Rt 22 NB - Left (illegal)
8: Rt 22 NB - Thru
9: Rt 22 NB - Right
10: Hillandale WB - Left
11: Hillandale WB - Thru
12: Hillandale WB - Right

A: Cross Hillandale West side of Int
B: Cross Rt 22 North side of Int
C: Cross Hillandale East side of Int
D: Cross Rt 22 South side of Int

DATE:	1/21/2016	JOB NO:	15147
PERIOD:	7-9 AM & 4-6 PM	NAME:	EK
LOCATION:	Mt. Kisco Road (NYS Route 22), Old Orchard Street, & 'A' Road	INT #:	3

ENTER COUNT DATA ON THIS PAGE

TIME	CLASS	VEHICLE MOVEMENT												TOTAL VEHICLES	PEDESTRIAN MOVEMENT				TOTAL PEDS	INT. PHF
		1	2	3	4	5	6	7	8	9	10	11	12		A	B	C	D		
7:00 - 7:15 AM	TOTAL	60	2	8	0	3	120	0	0	0	3	1	0							
	TRUCK			1			1													
7:15 - 7:30 AM	TOTAL	120	3	22	0	3	291	0	6	0	15	4	0							
	TRUCK						2													
7:30 - 7:45 AM	TOTAL	203	9	39	0	9	481	0	7	0	31	6	0							
	TRUCK	2					3				1									
7:45 - 8:00 AM	TOTAL	311	9	77	1	23	655	0	9	0	47	8	0							
	TRUCK	2					2													
8:00 - 8:15 AM	TOTAL	427	16	118	1	30	799	0	20	1	66	14	0							
	TRUCK	4					2													
8:15 - 8:30 AM	TOTAL	546	19	139	1	34	953	0	24	1	92	18	0							
	TRUCK	4					4													
8:30 - 8:45 AM	TOTAL	613	21	149	1	35	1,120	0	25	1	107	22	0							
	TRUCK	2					3													
8:45 - 9:00 AM	TOTAL	791	22	156	2	35	1,276	0	25	1	116	23	0							
	TRUCK	3					6													
4:00 - 4:15 PM	TOTAL	122	3	9	0	2	86	0	8	0	9	4	0							
	TRUCK	4					2													
4:15 - 4:30 PM	TOTAL	231	6	20	0	4	202	0	12	0	21	7	0							
	TRUCK						2													
4:30 - 4:45 PM	TOTAL	340	7	29	0	5	322	0	15	1	31	9	1							
	TRUCK	1		1			2													
4:45 - 5:00 PM	TOTAL	446	9	40	0	8	443	0	17	1	50	13	1							
	TRUCK	1					1		1											
5:00 - 5:15 PM	TOTAL	571	10	58	0	11	592	0	19	1	59	17	1							
	TRUCK	1				1	1				1									
5:15 - 5:30 PM	TOTAL	707	10	64	0	14	764	0	21	1	68	17	1							
	TRUCK						1													
5:30 - 5:45 PM	TOTAL	830	10	78	0	16	923	0	22	1	83	21	1							
	TRUCK						2													
5:45 - 6:00 PM	TOTAL	971	11	87	0	17	1,048	0	24	1	94	21	1							
	TRUCK	1					2													

DATE:	1/21/2016	CALCULATIONS - DO NOT EDIT THIS SHEET	JOB NO:	15147
PERIOD:	7-9 AM & 4-6 PM		NAME:	EK
LOCATION:	Mt. Kisco Road (NYS Route 22), Old Orchard Street, & 'A' Road		INT #:	3

TIME	CLASS	VEHICLE MOVEMENT												TOTAL VEHICLES	PEDESTRIAN MOVEMENT				TOTAL PEDS	INT. PHF
		1	2	3	4	5	6	7	8	9	10	11	12		A	B	C	D		
7:00 - 7:15 AM	TOTAL	60	2	8	0	3	120	0	0	0	3	1	0	197						
	TRUCK	0	0	1	0	0	1	0	0	0	0	0	0		0	0	0	0	0	
7:15 - 7:30 AM	TOTAL	60	1	14	0	0	171	0	6	0	12	3	0	267						
	TRUCK	0	0	0	0	0	2	0	0	0	0	0	0		0	0	0	0	0	
7:30 - 7:45 AM	TOTAL	83	6	17	0	6	190	0	1	0	16	2	0	321						
	TRUCK	2	0	0	0	0	3	0	0	0	1	0	0		0	0	0	0	0	
7:45 - 8:00 AM	TOTAL	108	0	38	1	14	174	0	2	0	16	2	0	355						
	TRUCK	2	0	0	0	0	2	0	0	0	0	0	0		0	0	0	0	0	
8:00 - 8:15 AM	TOTAL	116	7	41	0	7	144	0	11	1	19	6	0	352						
	TRUCK	4	0	0	0	0	2	0	0	0	0	0	0		0	0	0	0	0	
8:15 - 8:30 AM	TOTAL	119	3	21	0	4	154	0	4	0	26	4	0	335						
	TRUCK	4	0	0	0	0	4	0	0	0	0	0	0		0	0	0	0	0	
8:30 - 8:45 AM	TOTAL	67	2	10	0	1	167	0	1	0	15	4	0	267						
	TRUCK	2	0	0	0	0	3	0	0	0	0	0	0		0	0	0	0	0	
8:45 - 9:00 AM	TOTAL	178	1	7	1	0	156	0	0	0	9	1	0	353						
	TRUCK	3	0	0	0	0	6	0	0	0	0	0	0		0	0	0	0	0	
4:00 - 4:15 PM	TOTAL	122	3	9	0	2	86	0	8	0	9	4	0	243						
	TRUCK	4	0	0	0	0	2	0	0	0	0	0	0		0	0	0	0	0	
4:15 - 4:30 PM	TOTAL	109	3	11	0	2	116	0	4	0	12	3	0	260						
	TRUCK	0	0	0	0	0	2	0	0	0	0	0	0		0	0	0	0	0	
4:30 - 4:45 PM	TOTAL	109	1	9	0	1	120	0	3	1	10	2	1	257						
	TRUCK	1	0	1	0	0	2	0	0	0	0	0	0		0	0	0	0	0	
4:45 - 5:00 PM	TOTAL	106	2	11	0	3	121	0	2	0	19	4	0	268						
	TRUCK	1	0	0	0	0	1	0	1	0	0	0	0		0	0	0	0	0	
5:00 - 5:15 PM	TOTAL	125	1	18	0	3	149	0	2	0	9	4	0	311						
	TRUCK	1	0	0	0	1	1	0	0	0	1	0	0		0	0	0	0	0	
5:15 - 5:30 PM	TOTAL	136	0	6	0	3	172	0	2	0	9	0	0	328						
	TRUCK	0	0	0	0	0	1	0	0	0	0	0	0		0	0	0	0	0	
5:30 - 5:45 PM	TOTAL	123	0	14	0	2	159	0	1	0	15	4	0	318						
	TRUCK	0	0	0	0	0	2	0	0	0	0	0	0		0	0	0	0	0	
5:45 - 6:00 PM	TOTAL	141	1	9	0	1	125	0	2	0	11	0	0	290						
	TRUCK	1	0	0	0	0	2	0	0	0	0	0	0		0	0	0	0	0	

DATE:	1/21/2016	JOB NO:	15147
PERIOD:	7-9 AM & 4-6 PM	NAME:	EK
LOCATION:	Mt. Kisco Road (NYS Route 22), Old Orchard Street, & 'A' Road	INT #:	3

PEAK HOUR MOVEMENTS & % HEAVY VEHICLES - DO NOT EDIT THIS SHEET

TIME	CLASS	VEHICLE MOVEMENT												TOTAL VEHICLES	PEDESTRIAN MOVEMENT				TOTAL PEDS	INT. PHF
		1	2	3	4	5	6	7	8	9	10	11	12		A	B	C	D		
7:00 - 8:00 AM	TOTAL	311	9	77	1	23	655	0	9	0	47	8	0	1,140						
	TRUCK	1%	0%	1%	0%	0%	1%	#####	0%	#####	2%	0%	#####		0	0	0	0	0	0.80
7:15 - 8:15 AM	TOTAL	367	14	110	1	27	679	0	20	1	63	13	0	1,295						
	TRUCK	2%	0%	0%	0%	0%	1%	#####	0%	0%	2%	0%	#####		0	0	0	0	0	0.91
7:30 - 8:30 AM	TOTAL	426	16	117	1	31	662	0	18	1	77	14	0	1,363						
	TRUCK	3%	0%	0%	0%	0%	2%	#####	0%	0%	1%	0%	#####		0	0	0	0	0	0.96
7:45 - 8:45 AM	TOTAL	410	12	110	1	26	639	0	18	1	76	16	0	1,309						
	TRUCK	3%	0%	0%	0%	0%	2%	#####	0%	0%	0%	0%	#####		0	0	0	0	0	0.92
8:00 - 9:00 AM	TOTAL	480	13	79	1	12	621	0	16	1	69	15	0	1,307						
	TRUCK	3%	0%	0%	0%	0%	2%	#####	0%	0%	0%	0%	#####		0	0	0	0	0	0.93
4:00 - 5:00 PM	TOTAL	446	9	40	0	8	443	0	17	1	50	13	1	1,028						
	TRUCK	1%	0%	3%	#####	0%	2%	#####	6%	0%	0%	0%	0%		0	0	0	0	0	0.96
4:15 - 5:15 PM	TOTAL	449	7	49	0	9	506	0	11	1	50	13	1	1,096						
	TRUCK	1%	0%	2%	#####	11%	1%	#####	9%	0%	2%	0%	0%		0	0	0	0	0	0.88
4:30 - 5:30 PM	TOTAL	476	4	44	0	10	562	0	9	1	47	10	1	1,164						
	TRUCK	1%	0%	2%	#####	10%	1%	#####	11%	0%	2%	0%	0%		0	0	0	0	0	0.89
4:45 - 5:45 PM	TOTAL	490	3	49	0	11	601	0	7	0	52	12	0	1,225						
	TRUCK	0%	0%	0%	#####	9%	1%	#####	14%	#####	2%	0%	#####		0	0	0	0	0	0.93
5:00 - 6:00 PM	TOTAL	525	2	47	0	9	605	0	7	0	44	8	0	1,247						
	TRUCK	0%	0%	0%	#####	11%	1%	#####	0%	#####	2%	0%	#####		0	0	0	0	0	0.95

1: Rt 22 NB - Thru
2: Rt 22 NB - Right to 'A' Rd
3: Rt 22 NB - Right to Orchard EB
4: Rt 22 SB - Left to 'A' Rd
5: Rt 22 SB - Left to Orchard EB
6: Rt 22 SB - Thru
7: 'A' Rd SB - Left to Orchard EB
8: 'A' Rd SB - Right to Rt 22 SB
9: 'A' Rd SB - Right to Rt 22 NB
10: Orchard WB - Left to Rt 22 SB
11: Orchard WB - Right to Rt 22 NB
12: Orchard WB - Right to 'A' Rd

A:
B:
C:
D:

DATE:	1/21/2016
PERIOD:	7-9 AM & 4-6 PM

PEAK HOUR CALCULATIONS - DO NOT EDIT THIS SHEET

JOB NO:	15147
NAME:	JMC

TIME	CLASS	TOTAL INT. 1	TOTAL INT. 2	TOTAL INT. 3	TOTAL INT.	TOTAL INT.	TOTAL INT.	TOTAL INT.	TOTAL INT.	TOTAL
7:00 - 8:00 AM	TOTAL	1,654	466	1,140	0	0	0	0	0	3,260
	TRUCK									
7:15 - 8:15 AM	TOTAL	1,886	530	1,295	0	0	0	0	0	3,711
	TRUCK									
7:30 - 8:30 AM	TOTAL	2,013	557	1,363	0	0	0	0	0	3,933
	TRUCK									
7:45 - 8:45 AM	TOTAL	2,035	561	1,309	0	0	0	0	0	3,905
	TRUCK									
8:00 - 9:00 AM	TOTAL	2,030	546	1,307	0	0	0	0	0	3,883
	TRUCK									
4:00 - 5:00 PM	TOTAL	1,911	502	1,028	0	0	0	0	0	3,441
	TRUCK									
4:15 - 5:15 PM	TOTAL	2,099	520	1,096	0	0	0	0	0	3,715
	TRUCK									
4:30 - 5:30 PM	TOTAL	2,099	549	1,164	0	0	0	0	0	3,812
	TRUCK									
4:45 - 5:45 PM	TOTAL	2,116	573	1,225	0	0	0	0	0	3,914
	TRUCK									
5:00 - 6:00 PM	TOTAL	2,131	580	1,247	0	0	0	0	0	3,958
	TRUCK									

APPENDIX D

CAPACITY ANALYSES

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Volume (vph)	2	1	0	5	391	195	0	1131	2	273	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	11	10	10
Grade (%)		0%			1%			2%		-3%	
Storage Length (ft)		0	30	0		0	0		0	0	0
Storage Lanes		1	1	0		1	0		0	2	0
Taper Length (ft)		25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*1.00	*1.00
Ped Bike Factor					1.00			1.00			
Frt						0.850				0.998	
Flt Protected		0.950			0.999					0.953	
Satd. Flow (prot)	0	1745	1837	0	1674	1387	0	1783	0	3293	0
Flt Permitted		0.950			0.680					0.953	
Satd. Flow (perm)	0	1745	1837	0	1139	1387	0	1783	0	3293	0
Right Turn on Red			Yes			No			No		
Satd. Flow (RTOR)											
Link Speed (mph)		30			35			30		35	
Link Distance (ft)		161			816			491		600	
Travel Time (s)		3.7			15.9			11.2		11.7	
Confl. Peds. (#/hr)				3					3		
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
Heavy Vehicles (%)	0%	0%	0%	20%	3%	6%	0%	2%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	5	5	5	0	0	0	0	0
Adj. Flow (vph)	2	1	0	5	403	201	0	1166	2	281	3
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	3	0	0	408	201	0	1168	0	284	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)		11			0			0		20	
Link Offset(ft)		0			0			0		0	
Crosswalk Width(ft)		16			16			16		16	
Two way Left Turn Lane											
Headway Factor	1.04	1.04	1.04	1.10	1.13	1.13	1.06	1.06	1.06	1.07	1.07
Turning Speed (mph)	15	15	9	15		15	15		9	15	9
Number of Detectors	1	1	1	1	0	0		0		1	
Detector Template	Left	Left	Right	Left						Left	
Leading Detector (ft)	20	20	20	20	0	0		0		20	
Trailing Detector (ft)	0	0	0	0	0	0		0		0	
Detector 1 Position(ft)	0	0	0	0	0	0		0		0	
Detector 1 Size(ft)	20	20	20	20	6	20		6		20	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Turn Type	Perm	Prot	Perm	Perm	NA	pm+ov		NA		Prot	
Protected Phases		3			1	2		1		2	
Permitted Phases	3		3	1		1					

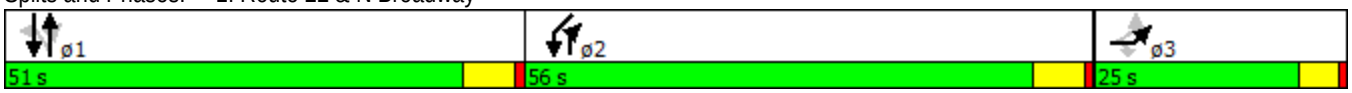
Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Detector Phase	3	3	3	1	1	2		1		2	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	
Minimum Split (s)	10.0	10.0	10.0	51.0	51.0	11.0		51.0		11.0	
Total Split (s)	25.0	25.0	25.0	51.0	51.0	56.0		51.0		56.0	
Total Split (%)	18.9%	18.9%	18.9%	38.6%	38.6%	42.4%		38.6%		42.4%	
Maximum Green (s)	20.0	20.0	20.0	45.0	45.0	50.0		45.0		50.0	
Yellow Time (s)	4.0	4.0	4.0	5.0	5.0	5.0		5.0		5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0		1.0		1.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0		0.0	
Total Lost Time (s)		5.0	5.0		6.0	6.0		6.0		6.0	
Lead/Lag				Lead	Lead	Lag		Lead		Lag	
Lead-Lag Optimize?				Yes	Yes	Yes		Yes		Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	3.0		5.0		3.0	
Recall Mode	None	None	None	Max	Max	None		Max		None	
Act Effct Green (s)		7.8			45.4	67.9		45.4		11.4	
Actuated g/C Ratio		0.11			0.64	0.95		0.64		0.16	
v/c Ratio		0.02			0.56	0.15		1.03		0.54	
Control Delay		32.0			12.9	1.1		50.2		32.1	
Queue Delay		0.0			0.0	0.0		0.0		0.0	
Total Delay		32.0			12.9	1.1		50.2		32.1	
LOS		C			B	A		D		C	
Approach Delay		32.0			9.1			50.2		32.1	
Approach LOS		C			A			D		C	
Queue Length 50th (ft)		1			76	0		404		55	
Queue Length 95th (ft)		10			266	38		#1034		107	
Internal Link Dist (ft)		81			736			411		520	
Turn Bay Length (ft)											
Base Capacity (vph)		495			727	1387		1138		2336	
Starvation Cap Reductn		0			0	0		0		0	
Spillback Cap Reductn		0			0	0		0		0	
Storage Cap Reductn		0			0	0		0		0	
Reduced v/c Ratio		0.01			0.56	0.14		1.03		0.12	

Intersection Summary	
Area Type: Other	
Cycle Length: 132	
Actuated Cycle Length: 71.1	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 35.6	Intersection LOS: D
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

* User Entered Value

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 22 & N Broadway



HCM 2010 Research does not support Non-NEMA phasing.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	4	0	16	27	5	0	193	4	1	260	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	11	11	11	10	10	10	10	10	10
Grade (%)		6%			-9%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00
Frt					0.987			0.997			0.982	
Flt Protected		0.957			0.984							
Satd. Flow (prot)	0	1947	0	0	1823	0	0	3249	0	0	3288	0
Flt Permitted		0.757			0.874						0.955	
Satd. Flow (perm)	0	1540	0	0	1619	0	0	3249	0	0	3140	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								4			32	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		221			205			600			766	
Travel Time (s)		5.0			4.7			11.7			14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	0%	0%	4%	0%	0%	9%	0%	100%	6%	3%
Adj. Flow (vph)	33	4	0	17	29	5	0	210	4	1	283	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	37	0	0	51	0	0	214	0	0	323	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.99	0.99	0.99	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1			1		1	1	
Detector Template	Left			Left						Left		
Leading Detector (ft)	20	30		20	30			6		20	6	
Trailing Detector (ft)	0	-10		0	-10			0		0	0	
Detector 1 Position(ft)	0	-10		0	-10			0		0	0	
Detector 1 Size(ft)	20	40		20	40			6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0			10.0		10.0	10.0	
Minimum Split (s)	25.0	25.0		25.0	25.0			46.0		46.0	46.0	
Total Split (s)	30.0	30.0		30.0	30.0			46.0		46.0	46.0	
Total Split (%)	39.5%	39.5%		39.5%	39.5%			60.5%		60.5%	60.5%	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	25.0	25.0		25.0	25.0			40.0		40.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Recall Mode	None	None		None	None			Max		Max	Max	
Act Effct Green (s)		7.4			7.4			48.3			48.3	
Actuated g/C Ratio		0.12			0.12			0.80			0.80	
v/c Ratio		0.20			0.26			0.08			0.13	
Control Delay		25.4			26.3			2.8			2.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		25.4			26.3			2.8			2.6	
LOS		C			C			A			A	
Approach Delay		25.4			26.3			2.8			2.6	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		12			16			9			13	
Queue Length 95th (ft)		35			43			20			27	
Internal Link Dist (ft)		141			125			520			686	
Turn Bay Length (ft)												
Base Capacity (vph)		642			675			2615			2533	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.06			0.08			0.08			0.13	

Intersection Summary	
Area Type: Other	
Cycle Length: 76	
Actuated Cycle Length: 60	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.26	
Intersection Signal Delay: 6.0	Intersection LOS: A
Intersection Capacity Utilization 22.5%	ICU Level of Service A
Analysis Period (min) 15	

* User Entered Value

Splits and Phases: 2: Route 22 & Hillandale Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	4	0	16	27	5	0	193	4	1	260	36
Number	7	4	14	3	8	18	5	2	12	1	6	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	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
Adj Sat Flow, veh/h/ln	1917	1867	0	1986	1941	1986	0	1746	1900	1900	1794	1900
Adj Flow Rate, veh/h	33	4	0	17	29	5	0	210	4	1	283	39
Adj No. of Lanes	0	1	0	0	1	0	0	2	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	4	4	4	0	9	9	6	6	6
Cap, veh/h	215	15	0	121	75	12	0	2498	47	67	2160	293
Arrive On Green	0.07	0.07	0.00	0.07	0.07	0.07	0.00	0.73	0.73	0.73	0.73	0.73
Sat Flow, veh/h	1341	219	0	497	1107	174	0	3415	65	1	2953	401
Grp Volume(v), veh/h	37	0	0	51	0	0	0	107	107	171	0	152
Grp Sat Flow(s),veh/h/ln	1561	0	0	1779	0	0	0	1746	1734	1793	0	1561
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.6
Cycle Q Clear(g_c), s	1.1	0.0	0.0	1.4	0.0	0.0	0.0	1.0	1.0	1.5	0.0	1.6
Prop In Lane	0.89		0.00	0.33		0.10	0.00		0.04	0.01		0.26
Lane Grp Cap(c), veh/h	230	0	0	208	0	0	0	1277	1269	1378	0	1142
V/C Ratio(X)	0.16	0.00	0.00	0.25	0.00	0.00	0.00	0.08	0.08	0.12	0.00	0.13
Avail Cap(c_a), veh/h	780	0	0	880	0	0	0	1277	1269	1378	0	1142
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	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.3	0.0	0.0	24.4	0.0	0.0	0.0	2.1	2.1	2.2	0.0	2.2
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.6	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.8	0.0	0.0	0.0	0.5	0.5	0.8	0.0	0.8
LnGrp Delay(d),s/veh	24.6	0.0	0.0	25.0	0.0	0.0	0.0	2.2	2.2	2.4	0.0	2.4
LnGrp LOS	C			C				A	A	A		A
Approach Vol, veh/h		37			51			214			323	
Approach Delay, s/veh		24.6			25.0			2.2			2.4	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		46.0		8.7		46.0		8.7
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		40.0		25.0		40.0		25.0
Max Q Clear Time (g_c+I1), s		3.0		3.1		3.6		3.4
Green Ext Time (p_c), s		1.3		0.2		1.3		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	5.5
HCM 2010 LOS	A

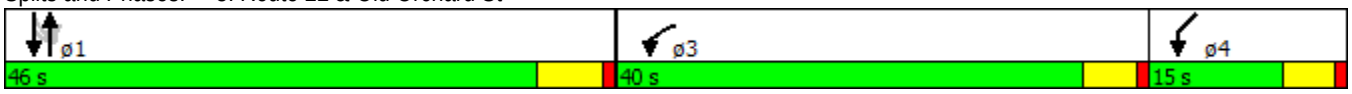
Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SWL	SWR
Lane Configurations										
Volume (vph)	77	14	426	16	117	1	31	662	18	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	10	9	9
Grade (%)	-3%		5%					-5%	-10%	
Lane Util. Factor	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00	*1.00	1.00	1.00
Frt	0.979		0.964						0.993	
Flt Protected	0.960							0.998	0.955	
Satd. Flow (prot)	1797	0	3259	0	0	0	0	3560	1703	0
Flt Permitted	0.960							0.913	0.955	
Satd. Flow (perm)	1797	0	3259	0	0	0	0	3257	1703	0
Right Turn on Red					No					No
Satd. Flow (RTOR)										
Link Speed (mph)	30		50					50	30	
Link Distance (ft)	610		1205					907	757	
Travel Time (s)	13.9		16.4					12.4	17.2	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	0%	2%	0%	0%
Adj. Flow (vph)	80	15	444	17	122	1	32	690	19	1
Shared Lane Traffic (%)										
Lane Group Flow (vph)	95	0	583	0	0	0	0	723	20	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Right	Left	Left	Left	Left	Right
Median Width(ft)	12		0					0	9	
Link Offset(ft)	0		0					0	0	
Crosswalk Width(ft)	16		16					16	16	
Two way Left Turn Lane										
Headway Factor	0.98	0.98	1.13	1.13	1.13	1.06	1.06	1.06	1.08	1.08
Turning Speed (mph)	15	9		9	9	15	15		15	9
Number of Detectors	2		0			1	1	0	1	
Detector Template						Left	Left			
Leading Detector (ft)	83		0			20	20	0	40	
Trailing Detector (ft)	-5		0			0	0	0	0	
Detector 1 Position(ft)	-5		0			0	0	0	0	
Detector 1 Size(ft)	40		6			20	20	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel										
Detector 1 Extend (s)	0.0		0.0			0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0			0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0			0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43									
Detector 2 Size(ft)	40									
Detector 2 Type	Cl+Ex									
Detector 2 Channel										
Detector 2 Extend (s)	0.0									
Turn Type	Prot		NA			Perm	Perm	NA	Prot	
Protected Phases	3		1					1	4	
Permitted Phases						1	1			
Detector Phase	3		1			1	1	1	4	

Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SWL	SWR
Switch Phase										
Minimum Initial (s)	2.0		4.0			4.0	4.0	4.0	2.0	
Minimum Split (s)	28.0		46.0			46.0	46.0	46.0	15.0	
Total Split (s)	40.0		46.0			46.0	46.0	46.0	15.0	
Total Split (%)	39.6%		45.5%			45.5%	45.5%	45.5%	14.9%	
Maximum Green (s)	35.0		40.0			40.0	40.0	40.0	10.0	
Yellow Time (s)	4.0		5.0			5.0	5.0	5.0	4.0	
All-Red Time (s)	1.0		1.0			1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	
Total Lost Time (s)	5.0		6.0					6.0	5.0	
Lead/Lag	Lead								Lag	
Lead-Lag Optimize?	Yes								Yes	
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0	3.0	
Recall Mode	None		Max			Max	Max	Max	None	
Act Effct Green (s)	9.0		44.8					44.8	6.4	
Actuated g/C Ratio	0.14		0.71					0.71	0.10	
v/c Ratio	0.37		0.25					0.31	0.12	
Control Delay	29.7		5.9					6.3	29.6	
Queue Delay	0.0		0.0					0.0	0.0	
Total Delay	29.7		5.9					6.3	29.6	
LOS	C		A					A	C	
Approach Delay	29.7		5.9					6.3	29.6	
Approach LOS	C		A					A	C	
Queue Length 50th (ft)	31		33					43	7	
Queue Length 95th (ft)	83		106					136	28	
Internal Link Dist (ft)	530		1125					827	677	
Turn Bay Length (ft)										
Base Capacity (vph)	1002		2300					2299	271	
Starvation Cap Reductn	0		0					0	0	
Spillback Cap Reductn	0		0					0	0	
Storage Cap Reductn	0		0					0	0	
Reduced v/c Ratio	0.09		0.25					0.31	0.07	

Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 63.4
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 8.0 — Intersection LOS: A
Intersection Capacity Utilization 62.0% — ICU Level of Service B
Analysis Period (min) 15
* User Entered Value

Splits and Phases: 3: Route 22 & Old Orchard St



HCM 2010 Research does not support Non-NEMA phasing.

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Volume (vph)	4	4	16	12	1119	282	0	463	7	223	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	11	10	10
Grade (%)		0%			1%			2%		-3%	
Storage Length (ft)		0	30	0		0	0		0	0	0
Storage Lanes		1	1	0		1	0		0	2	0
Taper Length (ft)		25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*1.00	*1.00
Ped Bike Factor					1.00			1.00			
Frt			0.850			0.850		0.998		0.998	
Flt Protected		0.950			0.999					0.953	
Satd. Flow (prot)	0	1745	1561	0	1711	1455	0	1796	0	3325	0
Flt Permitted		0.950			0.994					0.953	
Satd. Flow (perm)	0	1745	1561	0	1702	1455	0	1796	0	3325	0
Right Turn on Red			Yes			No			No		
Satd. Flow (RTOR)			74								
Link Speed (mph)		30			35			30		35	
Link Distance (ft)		161			816			491		600	
Travel Time (s)		3.7			15.9			11.2		11.7	
Confl. Peds. (#/hr)				1					1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	1%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	5	5	5	0	0	0	0	0
Adj. Flow (vph)	4	4	16	12	1142	288	0	472	7	228	3
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	8	16	0	1154	288	0	479	0	231	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)		11			0			0		20	
Link Offset(ft)		0			0			0		0	
Crosswalk Width(ft)		16			16			16		16	
Two way Left Turn Lane											
Headway Factor	1.04	1.04	1.04	1.10	1.13	1.13	1.06	1.06	1.06	1.07	1.07
Turning Speed (mph)	15	15	9	15		15	15		9	15	9
Number of Detectors	1	1	1	1	0	0		0		1	
Detector Template	Left	Left	Right	Left						Left	
Leading Detector (ft)	20	20	20	20	0	0		0		20	
Trailing Detector (ft)	0	0	0	0	0	0		0		0	
Detector 1 Position(ft)	0	0	0	0	0	0		0		0	
Detector 1 Size(ft)	20	20	20	20	6	20		6		20	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Turn Type	Perm	Prot	Perm	Perm	NA	pm+ov		NA		Prot	
Protected Phases		3			1	2		1		2	
Permitted Phases	3		3	1		1					

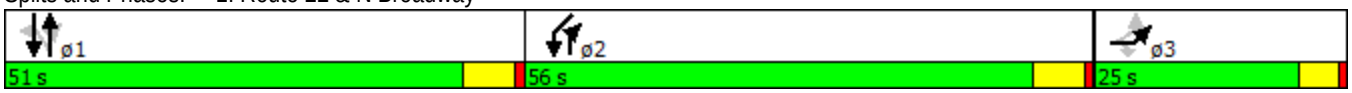
Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Detector Phase	3	3	3	1	1	2		1		2	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	
Minimum Split (s)	10.0	10.0	10.0	51.0	51.0	11.0		51.0		11.0	
Total Split (s)	25.0	25.0	25.0	51.0	51.0	56.0		51.0		56.0	
Total Split (%)	18.9%	18.9%	18.9%	38.6%	38.6%	42.4%		38.6%		42.4%	
Maximum Green (s)	20.0	20.0	20.0	45.0	45.0	50.0		45.0		50.0	
Yellow Time (s)	4.0	4.0	4.0	5.0	5.0	5.0		5.0		5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0		1.0		1.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0		0.0	
Total Lost Time (s)		5.0	5.0		6.0	6.0		6.0		6.0	
Lead/Lag				Lead	Lead	Lag		Lead		Lag	
Lead-Lag Optimize?				Yes	Yes	Yes		Yes		Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	3.0		5.0		3.0	
Recall Mode	None	None	None	Max	Max	None		Max		None	
Act Effct Green (s)		8.0	8.0		45.6	66.5		45.6		10.8	
Actuated g/C Ratio		0.11	0.11		0.62	0.91		0.62		0.15	
v/c Ratio		0.04	0.07		1.09	0.22		0.43		0.47	
Control Delay		33.9	0.6		74.2	2.1		10.5		33.0	
Queue Delay		0.0	0.0		0.0	0.0		0.0		0.0	
Total Delay		33.9	0.6		74.2	2.1		10.5		33.0	
LOS		C	A		E	A		B		C	
Approach Delay		11.7			59.8			10.5		33.0	
Approach LOS		B			E			B		C	
Queue Length 50th (ft)		3	0		~454	0		77		44	
Queue Length 95th (ft)		17	0		#1037	57		239		89	
Internal Link Dist (ft)		81			736			411		520	
Turn Bay Length (ft)			30								
Base Capacity (vph)		482	485		1059	1455		1118		2299	
Starvation Cap Reductn		0	0		0	0		0		0	
Spillback Cap Reductn		0	0		0	0		0		0	
Storage Cap Reductn		0	0		0	0		0		0	
Reduced v/c Ratio		0.02	0.03		1.09	0.20		0.43		0.10	

Intersection Summary

Area Type: Other
Cycle Length: 132
Actuated Cycle Length: 73.3
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 45.5 Intersection LOS: D
Intersection Capacity Utilization 93.3% ICU Level of Service F
Analysis Period (min) 15

* User Entered Value
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 22 & N Broadway



HCM 2010 Research does not support Non-NEMA phasing.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	15	0	13	9	2	0	266	20	1	213	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	11	11	11	10	10	10	10	10	10
Grade (%)		6%			-9%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00
Frt					0.989			0.990			0.984	
Flt Protected		0.974			0.973							
Satd. Flow (prot)	0	2034	0	0	1847	0	0	3479	0	0	3486	0
Flt Permitted											0.954	
Satd. Flow (perm)	0	2089	0	0	1898	0	0	3479	0	0	3326	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								16			26	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		221			205			600			766	
Travel Time (s)		5.0			4.7			11.7			14.9	
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%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%
Adj. Flow (vph)	19	16	0	14	9	2	0	280	21	1	224	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	35	0	0	25	0	0	301	0	0	251	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.99	0.99	0.99	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1			1		1	1	
Detector Template	Left			Left						Left		
Leading Detector (ft)	20	30		20	30			6		20	6	
Trailing Detector (ft)	0	-10		0	-10			0		0	0	
Detector 1 Position(ft)	0	-10		0	-10			0		0	0	
Detector 1 Size(ft)	20	40		20	40			6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0			10.0		10.0	10.0	
Minimum Split (s)	25.0	25.0		25.0	25.0			46.0		46.0	46.0	
Total Split (s)	30.0	30.0		30.0	30.0			46.0		46.0	46.0	
Total Split (%)	39.5%	39.5%		39.5%	39.5%			60.5%		60.5%	60.5%	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	25.0	25.0		25.0	25.0			40.0		40.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Recall Mode	None	None		None	None			Max		Max	Max	
Act Effct Green (s)		6.9			6.8			50.0			50.0	
Actuated g/C Ratio		0.12			0.12			0.87			0.87	
v/c Ratio		0.14			0.11			0.10			0.09	
Control Delay		23.3			23.0			1.9			1.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		23.3			23.0			1.9			1.9	
LOS		C			C			A			A	
Approach Delay		23.3			23.0			1.9			1.9	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		8			6			0			0	
Queue Length 95th (ft)		33			26			24			20	
Internal Link Dist (ft)		141			125			520			686	
Turn Bay Length (ft)												
Base Capacity (vph)		921			837			3036			2904	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.04			0.03			0.10			0.09	

Intersection Summary	
Area Type: Other	
Cycle Length: 76	
Actuated Cycle Length: 57.3	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.14	
Intersection Signal Delay: 4.0	Intersection LOS: A
Intersection Capacity Utilization 21.7%	ICU Level of Service A
Analysis Period (min) 15	

* User Entered Value

Splits and Phases: 2: Route 22 & Hillandale Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	15	0	13	9	2	0	266	20	1	213	25
Number	7	4	14	3	8	18	5	2	12	1	6	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	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
Adj Sat Flow, veh/h/ln	1917	1917	0	1986	1986	1986	0	1882	1900	1900	1898	1900
Adj Flow Rate, veh/h	19	16	0	14	9	2	0	280	21	1	224	26
Adj No. of Lanes	0	1	0	0	1	0	0	2	0	0	2	0
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	0	0	0	0	1	1	0	0	0
Cap, veh/h	153	42	0	155	38	8	0	2566	191	68	2367	270
Arrive On Green	0.05	0.05	0.00	0.05	0.05	0.05	0.00	0.74	0.74	0.74	0.74	0.74
Sat Flow, veh/h	908	770	0	924	684	140	0	3461	258	1	3194	365
Grp Volume(v), veh/h	35	0	0	25	0	0	0	151	150	133	0	118
Grp Sat Flow(s),veh/h/ln	1678	0	0	1748	0	0	0	1882	1837	1897	0	1663
Q Serve(g_s), s	0.4	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	0.0	0.0	1.1
Cycle Q Clear(g_c), s	1.0	0.0	0.0	0.7	0.0	0.0	0.0	1.2	1.2	1.0	0.0	1.1
Prop In Lane	0.54		0.00	0.56		0.08	0.00		0.14	0.01		0.22
Lane Grp Cap(c), veh/h	195	0	0	200	0	0	0	1395	1362	1473	0	1232
V/C Ratio(X)	0.18	0.00	0.00	0.12	0.00	0.00	0.00	0.11	0.11	0.09	0.00	0.10
Avail Cap(c_a), veh/h	858	0	0	874	0	0	0	1395	1362	1473	0	1232
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	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.6	0.0	0.0	24.4	0.0	0.0	0.0	2.0	2.0	1.9	0.0	1.9
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.4	0.0	0.0	0.0	0.7	0.7	0.6	0.0	0.5
LnGrp Delay(d),s/veh	25.0	0.0	0.0	24.7	0.0	0.0	0.0	2.1	2.1	2.1	0.0	2.1
LnGrp LOS	C			C				A	A	A		A
Approach Vol, veh/h		35			25			301			251	
Approach Delay, s/veh		25.0			24.7			2.1			2.1	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		46.0		8.0		46.0		8.0
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		40.0		25.0		40.0		25.0
Max Q Clear Time (g_c+I1), s		3.2		3.0		3.1		2.7
Green Ext Time (p_c), s		1.3		0.1		1.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	4.3
HCM 2010 LOS	A

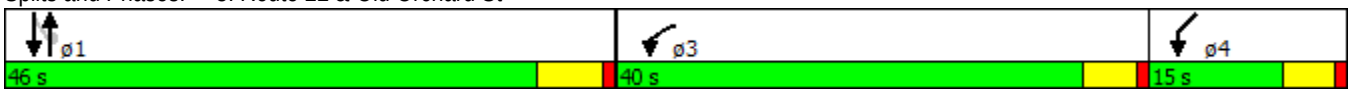
Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL	SBT	SWL	SWR
Lane Configurations									
Volume (vph)	44	8	525	2	47	9	605	7	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	9	9
Grade (%)	-3%		5%				-5%	-10%	
Lane Util. Factor	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00	1.00	1.00
Frt	0.980		0.987						
Flt Protected	0.959						0.999	0.950	
Satd. Flow (prot)	1782	0	3413	0	0	0	3592	1706	0
Flt Permitted	0.959						0.947	0.950	
Satd. Flow (perm)	1782	0	3413	0	0	0	3405	1706	0
Right Turn on Red					No				No
Satd. Flow (RTOR)									
Link Speed (mph)	30		50				50	30	
Link Distance (ft)	610		1205				907	757	
Travel Time (s)	13.9		16.4				12.4	17.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	0%	0%	0%	0%	9%	1%	0%	0%
Adj. Flow (vph)	46	8	553	2	49	9	637	7	0
Shared Lane Traffic (%)									
Lane Group Flow (vph)	54	0	604	0	0	0	646	7	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Right	Left	Left	Left	Right
Median Width(ft)	12		0				0	9	
Link Offset(ft)	0		0				0	0	
Crosswalk Width(ft)	16		16				16	16	
Two way Left Turn Lane									
Headway Factor	0.98	0.98	1.13	1.13	1.13	1.06	1.06	1.08	1.08
Turning Speed (mph)	15	9		9	9	15		15	9
Number of Detectors	2		0			1	0	1	
Detector Template						Left			
Leading Detector (ft)	83		0			20	0	40	
Trailing Detector (ft)	-5		0			0	0	0	
Detector 1 Position(ft)	-5		0			0	0	0	
Detector 1 Size(ft)	40		6			20	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel									
Detector 1 Extend (s)	0.0		0.0			0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0			0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0			0.0	0.0	0.0	
Detector 2 Position(ft)	43								
Detector 2 Size(ft)	40								
Detector 2 Type	Cl+Ex								
Detector 2 Channel									
Detector 2 Extend (s)	0.0								
Turn Type	Prot		NA			Perm	NA	Prot	
Protected Phases	3		1				1	4	
Permitted Phases						1			
Detector Phase	3		1			1	1	4	

Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL	SBT	SWL	SWR
Switch Phase									
Minimum Initial (s)	2.0		4.0			4.0	4.0	2.0	
Minimum Split (s)	28.0		46.0			46.0	46.0	15.0	
Total Split (s)	40.0		46.0			46.0	46.0	15.0	
Total Split (%)	39.6%		45.5%			45.5%	45.5%	14.9%	
Maximum Green (s)	35.0		40.0			40.0	40.0	10.0	
Yellow Time (s)	4.0		5.0			5.0	5.0	4.0	
All-Red Time (s)	1.0		1.0			1.0	1.0	1.0	
Lost Time Adjust (s)	0.0		0.0				0.0	0.0	
Total Lost Time (s)	5.0		6.0				6.0	5.0	
Lead/Lag	Lead							Lag	
Lead-Lag Optimize?	Yes							Yes	
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0	
Recall Mode	None		Max			Max	Max	None	
Act Effct Green (s)	7.4		48.8				48.8	5.8	
Actuated g/C Ratio	0.12		0.78				0.78	0.09	
v/c Ratio	0.25		0.23				0.24	0.04	
Control Delay	28.6		4.4				4.5	28.1	
Queue Delay	0.0		0.0				0.0	0.0	
Total Delay	28.6		4.4				4.5	28.1	
LOS	C		A				A	C	
Approach Delay	28.6		4.4				4.5	28.1	
Approach LOS	C		A				A	C	
Queue Length 50th (ft)	17		31				34	2	
Queue Length 95th (ft)	53		96				104	14	
Internal Link Dist (ft)	530		1125				827	677	
Turn Bay Length (ft)									
Base Capacity (vph)	1006		2673				2667	275	
Starvation Cap Reductn	0		0				0	0	
Spillback Cap Reductn	0		0				0	0	
Storage Cap Reductn	0		0				0	0	
Reduced v/c Ratio	0.05		0.23				0.24	0.03	

Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 62.3
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.25
Intersection Signal Delay: 5.6 — Intersection LOS: A
Intersection Capacity Utilization 43.1% — ICU Level of Service A
Analysis Period (min) 15
* User Entered Value

Splits and Phases: 3: Route 22 & Old Orchard St



HCM 2010 Research does not support Non-NEMA phasing.

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Volume (vph)	2	1	0	5	423	211	0	1225	2	296	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	10	10	10	10	10
Grade (%)		0%			1%			2%		-3%	
Storage Length (ft)		0	30	0		0	185		0	0	0
Storage Lanes		1	1	0		1	1		0	2	0
Taper Length (ft)		25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	*1.00	*1.00
Ped Bike Factor					1.00			1.00			
Frt						0.850				0.999	
Flt Protected		0.950			0.999					0.953	
Satd. Flow (prot)	0	1745	1837	0	1674	1387	0	3270	0	3297	0
Flt Permitted		0.950			0.986					0.953	
Satd. Flow (perm)	0	1745	1837	0	1652	1387	0	3270	0	3297	0
Right Turn on Red			Yes			No			No		
Satd. Flow (RTOR)											
Link Speed (mph)		30			35			30		35	
Link Distance (ft)		161			816			491		600	
Travel Time (s)		3.7			15.9			11.2		11.7	
Confl. Peds. (#/hr)				3					3		
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
Heavy Vehicles (%)	0%	0%	0%	20%	3%	6%	0%	2%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	5	5	5	0	0	0	0	0
Adj. Flow (vph)	2	1	0	5	436	218	0	1263	2	305	3
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	3	0	0	441	218	0	1265	0	308	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)		11			0			0		20	
Link Offset(ft)		0			0			0		0	
Crosswalk Width(ft)		16			16			16		16	
Two way Left Turn Lane											
Headway Factor	1.04	1.04	1.04	1.10	1.13	1.13	1.11	1.11	1.11	1.07	1.07
Turning Speed (mph)	15	15	9	15		15	15		9	15	9
Number of Detectors	1	1	1	1	0	0		0		1	
Detector Template	Left	Left	Right	Left						Left	
Leading Detector (ft)	20	20	20	20	0	0		0		20	
Trailing Detector (ft)	0	0	0	0	0	0		0		0	
Detector 1 Position(ft)	0	0	0	0	0	0		0		0	
Detector 1 Size(ft)	20	20	20	20	6	20		6		20	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Turn Type	Perm	Prot	Perm	Perm	NA	pm+ov		NA		Prot	
Protected Phases		3			1	2		1		2	
Permitted Phases	3		3	1		1					

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Detector Phase	3	3	3	1	1	2		1		2	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	
Minimum Split (s)	10.0	10.0	10.0	51.0	51.0	11.0		51.0		11.0	
Total Split (s)	25.0	25.0	25.0	51.0	51.0	56.0		51.0		56.0	
Total Split (%)	18.9%	18.9%	18.9%	38.6%	38.6%	42.4%		38.6%		42.4%	
Maximum Green (s)	20.0	20.0	20.0	45.0	45.0	50.0		45.0		50.0	
Yellow Time (s)	4.0	4.0	4.0	5.0	5.0	5.0		5.0		5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0		1.0		1.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0		0.0	
Total Lost Time (s)		5.0	5.0		6.0	6.0		6.0		6.0	
Lead/Lag				Lead	Lead	Lag		Lead		Lag	
Lead-Lag Optimize?				Yes	Yes	Yes		Yes		Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	3.0		5.0		3.0	
Recall Mode	None	None	None	Max	Max	None		Max		None	
Act Effct Green (s)		7.8			45.5	68.7		45.5		12.1	
Actuated g/C Ratio		0.11			0.63	0.96		0.63		0.17	
v/c Ratio		0.02			0.42	0.16		0.61		0.56	
Control Delay		32.7			9.7	1.2		11.0		32.0	
Queue Delay		0.0			0.0	0.0		0.0		0.0	
Total Delay		32.7			9.7	1.2		11.0		32.0	
LOS		C			A	A		B		C	
Approach Delay		32.7			6.9			11.0		32.0	
Approach LOS		C			A			B		C	
Queue Length 50th (ft)		1			74	0		133		60	
Queue Length 95th (ft)		10			236	41		357		114	
Internal Link Dist (ft)		81			736			411		520	
Turn Bay Length (ft)											
Base Capacity (vph)		490			1045	1387		2069		2318	
Starvation Cap Reductn		0			0	0		0		0	
Spillback Cap Reductn		0			0	0		0		0	
Storage Cap Reductn		0			0	0		0		0	
Reduced v/c Ratio		0.01			0.42	0.16		0.61		0.13	

Intersection Summary	
Area Type:	Other
Cycle Length: 132	
Actuated Cycle Length: 71.9	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 60.8%	ICU Level of Service B
Analysis Period (min) 15	

* User Entered Value

Splits and Phases: 1: Route 22 & N Broadway

HCM 2010 Research does not support Non-NEMA phasing.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	4	0	17	29	5	0	209	4	1	282	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	11	11	11	10	10	10	10	10	10
Grade (%)		6%			-9%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00
Frt					0.988			0.997			0.982	
Flt Protected		0.957			0.984							
Satd. Flow (prot)	0	1947	0	0	1824	0	0	3249	0	0	3289	0
Flt Permitted		0.708			0.876						0.955	
Satd. Flow (perm)	0	1440	0	0	1623	0	0	3249	0	0	3141	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								4			32	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		221			205			600			766	
Travel Time (s)		5.0			4.7			11.7			14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	0%	0%	4%	0%	0%	9%	0%	100%	6%	3%
Adj. Flow (vph)	35	4	0	18	32	5	0	227	4	1	307	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	39	0	0	55	0	0	231	0	0	350	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.99	0.99	0.99	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1			1		1	1	
Detector Template	Left			Left						Left		
Leading Detector (ft)	20	30		20	30			6		20	6	
Trailing Detector (ft)	0	-10		0	-10			0		0	0	
Detector 1 Position(ft)	0	-10		0	-10			0		0	0	
Detector 1 Size(ft)	20	40		20	40			6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0			10.0		10.0	10.0	
Minimum Split (s)	25.0	25.0		26.0	26.0			46.0		46.0	46.0	
Total Split (s)	30.0	30.0		30.0	30.0			46.0		46.0	46.0	
Total Split (%)	39.5%	39.5%		39.5%	39.5%			60.5%		60.5%	60.5%	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	25.0	25.0		25.0	25.0			40.0		40.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Recall Mode	None	None		None	None			Max		Max	Max	
Walk Time (s)				7.0	7.0							
Flash Dont Walk (s)				14.0	14.0							
Pedestrian Calls (#/hr)				2	2							
Act Effct Green (s)		9.4			9.5			48.8			48.8	
Actuated g/C Ratio		0.15			0.15			0.78			0.78	
v/c Ratio		0.18			0.22			0.09			0.14	
Control Delay		23.2			23.8			4.1			3.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		23.2			23.8			4.1			3.9	
LOS		C			C			A			A	
Approach Delay		23.3			23.8			4.1			3.9	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		13			18			10			15	
Queue Length 95th (ft)		34			43			37			51	
Internal Link Dist (ft)		141			125			520			686	
Turn Bay Length (ft)												
Base Capacity (vph)		581			654			2544			2466	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.07			0.08			0.09			0.14	

Intersection Summary

Area Type: Other
Cycle Length: 76
Actuated Cycle Length: 62.3
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.22
Intersection Signal Delay: 6.7 — Intersection LOS: A
Intersection Capacity Utilization 23.5% — ICU Level of Service A
Analysis Period (min) 15
* User Entered Value

Splits and Phases: 2: Route 22 & Hillandale Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	32	4	0	17	29	5	0	209	4	1	282	39
Number	7	4	14	3	8	18	5	2	12	1	6	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	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
Adj Sat Flow, veh/h/ln	1917	1866	0	1986	1940	1986	0	1746	1900	1900	1794	1900
Adj Flow Rate, veh/h	35	4	0	18	32	5	0	227	4	1	307	42
Adj No. of Lanes	0	1	0	0	1	0	0	2	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	4	4	4	0	9	9	6	6	6
Cap, veh/h	218	15	0	121	79	11	0	2496	44	67	2157	291
Arrive On Green	0.07	0.07	0.00	0.07	0.07	0.07	0.00	0.73	0.73	0.73	0.73	0.73
Sat Flow, veh/h	1346	219	0	485	1136	162	0	3420	60	1	2956	399
Grp Volume(v), veh/h	39	0	0	55	0	0	0	116	115	186	0	164
Grp Sat Flow(s),veh/h/ln	1564	0	0	1783	0	0	0	1746	1735	1793	0	1562
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	0.0	1.1	1.1	0.0	0.0	1.7
Cycle Q Clear(g_c), s	1.1	0.0	0.0	1.6	0.0	0.0	0.0	1.1	1.1	1.7	0.0	1.7
Prop In Lane	0.90		0.00	0.33		0.09	0.00		0.03	0.01		0.26
Lane Grp Cap(c), veh/h	233	0	0	211	0	0	0	1274	1266	1375	0	1140
V/C Ratio(X)	0.17	0.00	0.00	0.26	0.00	0.00	0.00	0.09	0.09	0.13	0.00	0.14
Avail Cap(c_a), veh/h	777	0	0	880	0	0	0	1274	1266	1375	0	1140
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	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.3	0.0	0.0	24.4	0.0	0.0	0.0	2.1	2.1	2.2	0.0	2.2
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.6	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.3
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	0.6	0.0	0.0	0.8	0.0	0.0	0.0	0.5	0.5	0.9	0.0	0.8
LnGrp Delay(d),s/veh	24.6	0.0	0.0	25.1	0.0	0.0	0.0	2.3	2.3	2.4	0.0	2.5
LnGrp LOS	C			C				A	A	A		A
Approach Vol, veh/h		39			55			231			350	
Approach Delay, s/veh		24.6			25.1			2.3			2.5	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		46.0		8.8		46.0		8.8
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		40.0		25.0		40.0		25.0
Max Q Clear Time (g_c+I1), s		3.1		3.1		3.7		3.6
Green Ext Time (p_c), s		1.4		0.2		1.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	5.5
HCM 2010 LOS	A

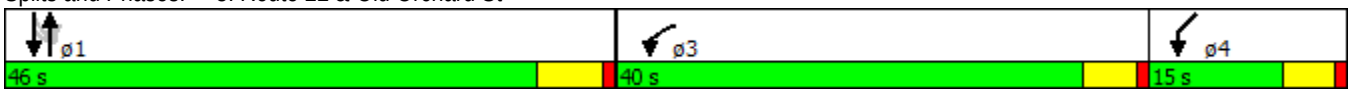
Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SWL	SWR
Lane Configurations										
Volume (vph)	83	15	461	17	127	1	34	717	19	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	10	9	9
Grade (%)	-3%		5%					-5%	-10%	
Lane Util. Factor	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00	*1.00	1.00	1.00
Frt	0.979		0.964						0.994	
Flt Protected	0.960							0.998	0.955	
Satd. Flow (prot)	1797	0	3259	0	0	0	0	3560	1704	0
Flt Permitted	0.960							0.907	0.955	
Satd. Flow (perm)	1797	0	3259	0	0	0	0	3236	1704	0
Right Turn on Red					No					No
Satd. Flow (RTOR)										
Link Speed (mph)	30		50					50	30	
Link Distance (ft)	610		1205					907	757	
Travel Time (s)	13.9		16.4					12.4	17.2	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	0%	2%	0%	0%
Adj. Flow (vph)	86	16	480	18	132	1	35	747	20	1
Shared Lane Traffic (%)										
Lane Group Flow (vph)	102	0	630	0	0	0	0	783	21	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Right	Left	Left	Left	Left	Right
Median Width(ft)	12		0					0	9	
Link Offset(ft)	0		0					0	0	
Crosswalk Width(ft)	16		16					16	16	
Two way Left Turn Lane										
Headway Factor	0.98	0.98	1.13	1.13	1.13	1.06	1.06	1.06	1.08	1.08
Turning Speed (mph)	15	9		9	9	15	15		15	9
Number of Detectors	2		0			1	1	0	1	
Detector Template						Left	Left			
Leading Detector (ft)	83		0			20	20	0	40	
Trailing Detector (ft)	-5		0			0	0	0	0	
Detector 1 Position(ft)	-5		0			0	0	0	0	
Detector 1 Size(ft)	40		6			20	20	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel										
Detector 1 Extend (s)	0.0		0.0			0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0			0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0			0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43									
Detector 2 Size(ft)	40									
Detector 2 Type	Cl+Ex									
Detector 2 Channel										
Detector 2 Extend (s)	0.0									
Turn Type	Prot		NA			Perm	Perm	NA	Prot	
Protected Phases	3		1					1	4	
Permitted Phases						1	1			
Detector Phase	3		1			1	1	1	4	

Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SWL	SWR
Switch Phase										
Minimum Initial (s)	2.0		4.0			4.0	4.0	4.0	2.0	
Minimum Split (s)	28.0		46.0			46.0	46.0	46.0	15.0	
Total Split (s)	40.0		46.0			46.0	46.0	46.0	15.0	
Total Split (%)	39.6%		45.5%			45.5%	45.5%	45.5%	14.9%	
Maximum Green (s)	35.0		40.0			40.0	40.0	40.0	10.0	
Yellow Time (s)	4.0		5.0			5.0	5.0	5.0	4.0	
All-Red Time (s)	1.0		1.0			1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	
Total Lost Time (s)	5.0		6.0					6.0	5.0	
Lead/Lag	Lead								Lag	
Lead-Lag Optimize?	Yes								Yes	
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0	3.0	
Recall Mode	None		Max			Max	Max	Max	None	
Act Effct Green (s)	9.3		44.8					44.8	6.4	
Actuated g/C Ratio	0.15		0.70					0.70	0.10	
v/c Ratio	0.39		0.27					0.34	0.12	
Control Delay	29.8		6.1					6.6	29.8	
Queue Delay	0.0		0.0					0.0	0.0	
Total Delay	29.8		6.1					6.6	29.8	
LOS	C		A					A	C	
Approach Delay	29.8		6.1					6.6	29.8	
Approach LOS	C		A					A	C	
Queue Length 50th (ft)	34		37					49	7	
Queue Length 95th (ft)	88		118					153	30	
Internal Link Dist (ft)	530		1125					827	677	
Turn Bay Length (ft)										
Base Capacity (vph)	997		2292					2276	270	
Starvation Cap Reductn	0		0					0	0	
Spillback Cap Reductn	0		0					0	0	
Storage Cap Reductn	0		0					0	0	
Reduced v/c Ratio	0.10		0.27					0.34	0.08	

Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 63.7
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.39
Intersection Signal Delay: 8.3 — Intersection LOS: A
Intersection Capacity Utilization 65.4% — ICU Level of Service C
Analysis Period (min) 15
* User Entered Value

Splits and Phases: 3: Route 22 & Old Orchard St



HCM 2010 Research does not support Non-NEMA phasing.

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Volume (vph)	4	4	17	13	1212	306	0	501	8	241	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	10	10	10	10	10
Grade (%)		0%			1%			2%		-3%	
Storage Length (ft)		0	30	0		0	185		0	0	0
Storage Lanes		1	1	0		1	1		0	2	0
Taper Length (ft)		25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	*1.00	*1.00
Ped Bike Factor					1.00			1.00			
Frt			0.850			0.850		0.998		0.998	
Flt Protected		0.950			0.999					0.953	
Satd. Flow (prot)	0	1745	1561	0	1711	1455	0	3295	0	3325	0
Flt Permitted		0.950			0.993					0.953	
Satd. Flow (perm)	0	1745	1561	0	1700	1455	0	3295	0	3325	0
Right Turn on Red			Yes			No			No		
Satd. Flow (RTOR)			74								
Link Speed (mph)		30			35			30		35	
Link Distance (ft)		161			816			491		600	
Travel Time (s)		3.7			15.9			11.2		11.7	
Confl. Peds. (#/hr)				1					1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	1%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	5	5	5	0	0	0	0	0
Adj. Flow (vph)	4	4	17	13	1237	312	0	511	8	246	3
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	8	17	0	1250	312	0	519	0	249	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)		11			0			0		20	
Link Offset(ft)		0			0			0		0	
Crosswalk Width(ft)		16			16			16		16	
Two way Left Turn Lane											
Headway Factor	1.04	1.04	1.04	1.10	1.13	1.13	1.11	1.11	1.11	1.07	1.07
Turning Speed (mph)	15	15	9	15		15	15		9	15	9
Number of Detectors	1	1	1	1	0	0		0		1	
Detector Template	Left	Left	Right	Left						Left	
Leading Detector (ft)	20	20	20	20	0	0		0		20	
Trailing Detector (ft)	0	0	0	0	0	0		0		0	
Detector 1 Position(ft)	0	0	0	0	0	0		0		0	
Detector 1 Size(ft)	20	20	20	20	6	20		6		20	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Turn Type	Perm	Prot	Perm	Perm	NA	pm+ov		NA		Prot	
Protected Phases		3			1	2		1		2	
Permitted Phases	3		3	1		1					

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Detector Phase	3	3	3	1	1	2		1		2	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	
Minimum Split (s)	10.0	10.0	10.0	51.0	51.0	11.0		51.0		11.0	
Total Split (s)	15.0	15.0	15.0	77.0	77.0	40.0		77.0		40.0	
Total Split (%)	11.4%	11.4%	11.4%	58.3%	58.3%	30.3%		58.3%		30.3%	
Maximum Green (s)	10.0	10.0	10.0	71.0	71.0	34.0		71.0		34.0	
Yellow Time (s)	4.0	4.0	4.0	5.0	5.0	5.0		5.0		5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0		1.0		1.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0		0.0	
Total Lost Time (s)		5.0	5.0		6.0	6.0		6.0		6.0	
Lead/Lag				Lead	Lead	Lag		Lead		Lag	
Lead-Lag Optimize?				Yes	Yes	Yes		Yes		Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	3.0		5.0		3.0	
Recall Mode	None	None	None	Max	Max	None		Max		None	
Act Effct Green (s)		8.1	8.1		71.6	93.6		71.6		13.3	
Actuated g/C Ratio		0.08	0.08		0.69	0.90		0.69		0.13	
v/c Ratio		0.06	0.09		1.07	0.24		0.23		0.59	
Control Delay		49.6	0.9		68.7	2.1		7.7		49.9	
Queue Delay		0.0	0.0		0.0	0.0		0.0		0.0	
Total Delay		49.6	0.9		68.7	2.1		7.7		49.9	
LOS		D	A		E	A		A		D	
Approach Delay		16.5			55.4			7.7		49.9	
Approach LOS		B			E			A		D	
Queue Length 50th (ft)		5	0		~1021	36		72		84	
Queue Length 95th (ft)		22	0		#1389	60		115		126	
Internal Link Dist (ft)		81			736			411		520	
Turn Bay Length (ft)			30								
Base Capacity (vph)		168	217		1164	1442		2257		1090	
Starvation Cap Reductn		0	0		0	0		0		0	
Spillback Cap Reductn		0	0		0	0		0		0	
Storage Cap Reductn		0	0		0	0		0		0	
Reduced v/c Ratio		0.05	0.08		1.07	0.22		0.23		0.23	

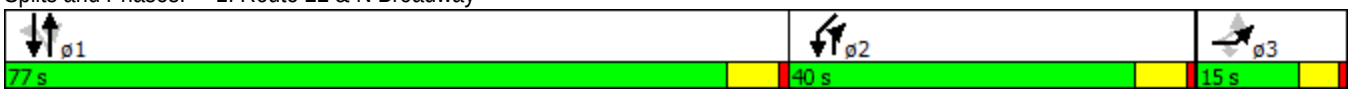
Intersection Summary	
Area Type: Other	
Cycle Length: 132	
Actuated Cycle Length: 104.5	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 43.9	Intersection LOS: D
Intersection Capacity Utilization 99.5%	ICU Level of Service F
Analysis Period (min) 15	

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 22 & N Broadway



HCM 2010 Research does not support Non-NEMA phasing.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	16	0	14	10	2	0	288	22	1	232	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	11	11	11	10	10	10	10	10	10
Grade (%)		6%			-9%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00
Frt					0.990			0.989			0.985	
Flt Protected		0.974			0.974							
Satd. Flow (prot)	0	2034	0	0	1851	0	0	3475	0	0	3490	0
Flt Permitted		0.816			0.812						0.954	
Satd. Flow (perm)	0	1704	0	0	1543	0	0	3475	0	0	3329	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								16			26	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		221			205			600			766	
Travel Time (s)		5.0			4.7			11.7			14.9	
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%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%
Adj. Flow (vph)	20	17	0	15	11	2	0	303	23	1	244	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	37	0	0	28	0	0	326	0	0	273	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.99	0.99	0.99	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1			1		1	1	
Detector Template	Left			Left						Left		
Leading Detector (ft)	20	30		20	30			6		20	6	
Trailing Detector (ft)	0	-10		0	-10			0		0	0	
Detector 1 Position(ft)	0	-10		0	-10			0		0	0	
Detector 1 Size(ft)	20	40		20	40			6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0			10.0		10.0	10.0	
Minimum Split (s)	25.0	25.0		26.0	26.0			46.0		46.0	46.0	
Total Split (s)	30.0	30.0		30.0	30.0			46.0		46.0	46.0	
Total Split (%)	39.5%	39.5%		39.5%	39.5%			60.5%		60.5%	60.5%	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	25.0	25.0		25.0	25.0			40.0		40.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Recall Mode	None	None		None	None			Max		Max	Max	
Walk Time (s)				7.0	7.0							
Flash Dont Walk (s)				14.0	14.0							
Pedestrian Calls (#/hr)				2	2							
Act Effct Green (s)		9.0			8.9			50.6			50.6	
Actuated g/C Ratio		0.15			0.15			0.85			0.85	
v/c Ratio		0.14			0.12			0.11			0.10	
Control Delay		21.5			21.3			3.3			3.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		21.5			21.3			3.3			3.2	
LOS		C			C			A			A	
Approach Delay		21.5			21.3			3.3			3.2	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		9			7			0			0	
Queue Length 95th (ft)		32			27			48			40	
Internal Link Dist (ft)		141			125			520			686	
Turn Bay Length (ft)												
Base Capacity (vph)		728			659			2949			2827	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.05			0.04			0.11			0.10	

Intersection Summary

Area Type: Other
Cycle Length: 76
Actuated Cycle Length: 59.7
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.14
Intersection Signal Delay: 5.0 — Intersection LOS: A
Intersection Capacity Utilization 22.0% — ICU Level of Service A
Analysis Period (min) 15
* User Entered Value

Splits and Phases: 2: Route 22 & Hillandale Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	16	0	14	10	2	0	288	22	1	232	27
Number	7	4	14	3	8	18	5	2	12	1	6	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	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
Adj Sat Flow, veh/h/ln	1917	1917	0	1986	1986	1986	0	1883	1900	1900	1898	1900
Adj Flow Rate, veh/h	20	17	0	15	11	2	0	303	23	1	244	28
Adj No. of Lanes	0	1	0	0	1	0	0	2	0	0	2	0
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	0	0	0	0	1	1	0	0	0
Cap, veh/h	153	46	0	152	44	7	0	2556	193	68	2364	267
Arrive On Green	0.06	0.06	0.00	0.06	0.06	0.06	0.00	0.74	0.74	0.74	0.74	0.74
Sat Flow, veh/h	882	800	0	865	767	126	0	3458	261	1	3198	362
Grp Volume(v), veh/h	37	0	0	28	0	0	0	164	162	144	0	129
Grp Sat Flow(s),veh/h/ln	1682	0	0	1757	0	0	0	1883	1836	1897	0	1663
Q Serve(g_s), s	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.4	0.0	0.0	1.2
Cycle Q Clear(g_c), s	1.1	0.0	0.0	0.7	0.0	0.0	0.0	1.3	1.4	1.2	0.0	1.2
Prop In Lane	0.54		0.00	0.54		0.07	0.00		0.14	0.01		0.22
Lane Grp Cap(c), veh/h	199	0	0	203	0	0	0	1391	1357	1469	0	1229
V/C Ratio(X)	0.19	0.00	0.00	0.14	0.00	0.00	0.00	0.12	0.12	0.10	0.00	0.10
Avail Cap(c_a), veh/h	856	0	0	875	0	0	0	1391	1357	1469	0	1229
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	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.5	0.0	0.0	24.4	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.4	0.0	0.0	0.0	0.8	0.7	0.7	0.0	0.6
LnGrp Delay(d),s/veh	25.0	0.0	0.0	24.7	0.0	0.0	0.0	2.2	2.2	2.1	0.0	2.2
LnGrp LOS	C			C				A	A	A		A
Approach Vol, veh/h		37			28			326			273	
Approach Delay, s/veh		25.0			24.7			2.2			2.1	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		46.0		8.1		46.0		8.1
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		40.0		25.0		40.0		25.0
Max Q Clear Time (g_c+I1), s		3.4		3.1		3.2		2.7
Green Ext Time (p_c), s		1.4		0.1		1.4		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	4.4
HCM 2010 LOS	A

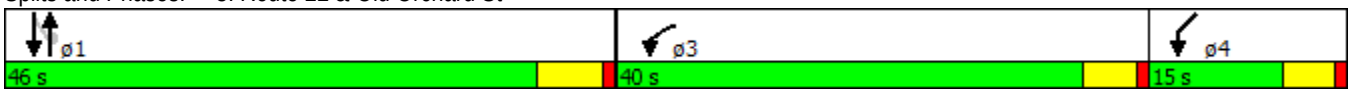
Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL	SBT	SWL	SWR
Lane Configurations									
Volume (vph)	48	9	568	2	51	10	655	8	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	9	9
Grade (%)	-3%		5%				-5%	-10%	
Lane Util. Factor	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00	1.00	1.00
Frt	0.980		0.987						
Flt Protected	0.959						0.999	0.950	
Satd. Flow (prot)	1782	0	3413	0	0	0	3591	1706	0
Flt Permitted	0.959						0.945	0.950	
Satd. Flow (perm)	1782	0	3413	0	0	0	3397	1706	0
Right Turn on Red					No				No
Satd. Flow (RTOR)									
Link Speed (mph)	30		50				50	30	
Link Distance (ft)	610		1205				907	757	
Travel Time (s)	13.9		16.4				12.4	17.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	0%	0%	0%	0%	9%	1%	0%	0%
Adj. Flow (vph)	51	9	598	2	54	11	689	8	0
Shared Lane Traffic (%)									
Lane Group Flow (vph)	60	0	654	0	0	0	700	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Right	Left	Left	Left	Right
Median Width(ft)	12		0				0	9	
Link Offset(ft)	0		0				0	0	
Crosswalk Width(ft)	16		16				16	16	
Two way Left Turn Lane									
Headway Factor	0.98	0.98	1.13	1.13	1.13	1.06	1.06	1.08	1.08
Turning Speed (mph)	15	9		9	9	15		15	9
Number of Detectors	2		0			1	0	1	
Detector Template						Left			
Leading Detector (ft)	83		0			20	0	40	
Trailing Detector (ft)	-5		0			0	0	0	
Detector 1 Position(ft)	-5		0			0	0	0	
Detector 1 Size(ft)	40		6			20	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel									
Detector 1 Extend (s)	0.0		0.0			0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0			0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0			0.0	0.0	0.0	
Detector 2 Position(ft)	43								
Detector 2 Size(ft)	40								
Detector 2 Type	Cl+Ex								
Detector 2 Channel									
Detector 2 Extend (s)	0.0								
Turn Type	Prot		NA			Perm	NA	Prot	
Protected Phases	3		1				1	4	
Permitted Phases						1			
Detector Phase	3		1			1	1	4	

Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL	SBT	SWL	SWR
Switch Phase									
Minimum Initial (s)	2.0		4.0			4.0	4.0	2.0	
Minimum Split (s)	28.0		46.0			46.0	46.0	15.0	
Total Split (s)	40.0		46.0			46.0	46.0	15.0	
Total Split (%)	39.6%		45.5%			45.5%	45.5%	14.9%	
Maximum Green (s)	35.0		40.0			40.0	40.0	10.0	
Yellow Time (s)	4.0		5.0			5.0	5.0	4.0	
All-Red Time (s)	1.0		1.0			1.0	1.0	1.0	
Lost Time Adjust (s)	0.0		0.0				0.0	0.0	
Total Lost Time (s)	5.0		6.0				6.0	5.0	
Lead/Lag	Lead							Lag	
Lead-Lag Optimize?	Yes							Yes	
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0	
Recall Mode	None		Max			Max	Max	None	
Act Effct Green (s)	7.6		48.9				48.9	5.9	
Actuated g/C Ratio	0.12		0.78				0.78	0.09	
v/c Ratio	0.28		0.25				0.26	0.05	
Control Delay	28.9		4.6				4.7	28.2	
Queue Delay	0.0		0.0				0.0	0.0	
Total Delay	28.9		4.6				4.7	28.2	
LOS	C		A				A	C	
Approach Delay	28.9		4.6				4.7	28.3	
Approach LOS	C		A				A	C	
Queue Length 50th (ft)	19		35				38	3	
Queue Length 95th (ft)	58		106				115	16	
Internal Link Dist (ft)	530		1125				827	677	
Turn Bay Length (ft)									
Base Capacity (vph)	1004		2668				2656	274	
Starvation Cap Reductn	0		0				0	0	
Spillback Cap Reductn	0		0				0	0	
Storage Cap Reductn	0		0				0	0	
Reduced v/c Ratio	0.06		0.25				0.26	0.03	

Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 62.5
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.28
Intersection Signal Delay: 5.8 — Intersection LOS: A
Intersection Capacity Utilization 45.2% — ICU Level of Service A
Analysis Period (min) 15
* User Entered Value

Splits and Phases: 3: Route 22 & Old Orchard St



HCM 2010 Research does not support Non-NEMA phasing.

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Volume (vph)	2	1	0	5	423	215	0	1225	2	312	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	10	10	10	10	10
Grade (%)		0%			1%			2%		-3%	
Storage Length (ft)		0	30	0		0	185		0	0	0
Storage Lanes		1	1	0		1	1		0	2	0
Taper Length (ft)		25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	*1.00	*1.00
Ped Bike Factor					1.00			1.00			
Frt						0.850				0.999	
Flt Protected		0.950			0.999					0.953	
Satd. Flow (prot)	0	1745	1837	0	1674	1387	0	3270	0	3297	0
Flt Permitted		0.950			0.986					0.953	
Satd. Flow (perm)	0	1745	1837	0	1652	1387	0	3270	0	3297	0
Right Turn on Red			Yes			No			No		
Satd. Flow (RTOR)											
Link Speed (mph)		30			35			30		35	
Link Distance (ft)		161			816			491		600	
Travel Time (s)		3.7			15.9			11.2		11.7	
Confl. Peds. (#/hr)				3					3		
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
Heavy Vehicles (%)	0%	0%	0%	20%	3%	6%	0%	2%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	5	5	5	0	0	0	0	0
Adj. Flow (vph)	2	1	0	5	436	222	0	1263	2	322	3
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	3	0	0	441	222	0	1265	0	325	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)		11			0			0		20	
Link Offset(ft)		0			0			0		0	
Crosswalk Width(ft)		16			16			16		16	
Two way Left Turn Lane											
Headway Factor	1.04	1.04	1.04	1.10	1.13	1.13	1.11	1.11	1.11	1.07	1.07
Turning Speed (mph)	15	15	9	15		15	15		9	15	9
Number of Detectors	1	1	1	1	0	0		0		1	
Detector Template	Left	Left	Right	Left						Left	
Leading Detector (ft)	20	20	20	20	0	0		0		20	
Trailing Detector (ft)	0	0	0	0	0	0		0		0	
Detector 1 Position(ft)	0	0	0	0	0	0		0		0	
Detector 1 Size(ft)	20	20	20	20	6	20		6		20	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Turn Type	Perm	Prot	Perm	Perm	NA	pm+ov		NA		Prot	
Protected Phases		3			1	2		1		2	
Permitted Phases	3		3	1		1					

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Detector Phase	3	3	3	1	1	2		1		2	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	
Minimum Split (s)	10.0	10.0	10.0	51.0	51.0	11.0		51.0		11.0	
Total Split (s)	25.0	25.0	25.0	51.0	51.0	56.0		51.0		56.0	
Total Split (%)	18.9%	18.9%	18.9%	38.6%	38.6%	42.4%		38.6%		42.4%	
Maximum Green (s)	20.0	20.0	20.0	45.0	45.0	50.0		45.0		50.0	
Yellow Time (s)	4.0	4.0	4.0	5.0	5.0	5.0		5.0		5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0		1.0		1.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0		0.0	
Total Lost Time (s)		5.0	5.0		6.0	6.0		6.0		6.0	
Lead/Lag				Lead	Lead	Lag		Lead		Lag	
Lead-Lag Optimize?				Yes	Yes	Yes		Yes		Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	3.0		5.0		3.0	
Recall Mode	None	None	None	Max	Max	None		Max		None	
Act Effct Green (s)		7.8			45.5	69.1		45.5		12.5	
Actuated g/C Ratio		0.11			0.63	0.96		0.63		0.17	
v/c Ratio		0.02			0.42	0.17		0.61		0.57	
Control Delay		33.0			10.0	1.1		11.3		32.1	
Queue Delay		0.0			0.0	0.0		0.0		0.0	
Total Delay		33.0			10.0	1.1		11.3		32.1	
LOS		C			A	A		B		C	
Approach Delay		33.0			7.0			11.3		32.1	
Approach LOS		C			A			B		C	
Queue Length 50th (ft)		1			76	0		136		64	
Queue Length 95th (ft)		10			240	42		364		120	
Internal Link Dist (ft)		81			736			411		520	
Turn Bay Length (ft)											
Base Capacity (vph)		487			1039	1387		2057		2304	
Starvation Cap Reductn		0			0	0		0		0	
Spillback Cap Reductn		0			0	0		0		0	
Storage Cap Reductn		0			0	0		0		0	
Reduced v/c Ratio		0.01			0.42	0.16		0.61		0.14	

Intersection Summary	
Area Type:	Other
Cycle Length: 132	
Actuated Cycle Length: 72.3	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 13.0	Intersection LOS: B
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

* User Entered Value

Splits and Phases: 1: Route 22 & N Broadway

HCM 2010 Research does not support Non-NEMA phasing.

Two Way Analysis cannot be performed on Signalized Intersection.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	4	0	17	29	5	0	213	4	1	298	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	11	11	11	10	10	10	10	10	10
Grade (%)		6%			-9%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00
Frt					0.988			0.997			0.983	
Flt Protected		0.957			0.984							
Satd. Flow (prot)	0	1947	0	0	1824	0	0	3249	0	0	3292	0
Flt Permitted		0.708			0.876						0.955	
Satd. Flow (perm)	0	1440	0	0	1623	0	0	3249	0	0	3144	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								4			30	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		221			205			600			766	
Travel Time (s)		5.0			4.7			11.7			14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	0%	0%	4%	0%	0%	9%	0%	100%	6%	3%
Adj. Flow (vph)	35	4	0	18	32	5	0	232	4	1	324	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	39	0	0	55	0	0	236	0	0	367	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.99	0.99	0.99	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1			1		1	1	
Detector Template	Left			Left						Left		
Leading Detector (ft)	20	30		20	30			6		20	6	
Trailing Detector (ft)	0	-10		0	-10			0		0	0	
Detector 1 Position(ft)	0	-10		0	-10			0		0	0	
Detector 1 Size(ft)	20	40		20	40			6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0			10.0		10.0	10.0	
Minimum Split (s)	25.0	25.0		26.0	26.0			46.0		46.0	46.0	
Total Split (s)	30.0	30.0		30.0	30.0			46.0		46.0	46.0	
Total Split (%)	39.5%	39.5%		39.5%	39.5%			60.5%		60.5%	60.5%	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	25.0	25.0		25.0	25.0			40.0		40.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Recall Mode	None	None		None	None			Max		Max	Max	
Walk Time (s)				7.0	7.0							
Flash Dont Walk (s)				14.0	14.0							
Pedestrian Calls (#/hr)				2	2							
Act Effct Green (s)		9.4			9.5			48.8			48.8	
Actuated g/C Ratio		0.15			0.15			0.78			0.78	
v/c Ratio		0.18			0.22			0.09			0.15	
Control Delay		23.2			23.8			4.1			3.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		23.2			23.8			4.1			3.9	
LOS		C			C			A			A	
Approach Delay		23.3			23.8			4.1			3.9	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		13			18			11			16	
Queue Length 95th (ft)		34			43			37			54	
Internal Link Dist (ft)		141			125			520			686	
Turn Bay Length (ft)												
Base Capacity (vph)		581			654			2544			2468	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.07			0.08			0.09			0.15	

Intersection Summary

Area Type: Other
Cycle Length: 76
Actuated Cycle Length: 62.3
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.22
Intersection Signal Delay: 6.6 — Intersection LOS: A
Intersection Capacity Utilization 23.9% — ICU Level of Service A
Analysis Period (min) 15
* User Entered Value

Splits and Phases: 2: Route 22 & Hillandale Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	32	4	0	17	29	5	0	213	4	1	298	39
Number	7	4	14	3	8	18	5	2	12	1	6	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	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
Adj Sat Flow, veh/h/ln	1917	1866	0	1986	1940	1986	0	1746	1900	1900	1794	1900
Adj Flow Rate, veh/h	35	4	0	18	32	5	0	232	4	1	324	42
Adj No. of Lanes	0	1	0	0	1	0	0	2	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	4	4	4	0	9	9	6	6	6
Cap, veh/h	218	15	0	121	79	11	0	2497	43	67	2173	278
Arrive On Green	0.07	0.07	0.00	0.07	0.07	0.07	0.00	0.73	0.73	0.73	0.73	0.73
Sat Flow, veh/h	1346	219	0	485	1136	162	0	3422	59	1	2977	381
Grp Volume(v), veh/h	39	0	0	55	0	0	0	118	118	195	0	172
Grp Sat Flow(s),veh/h/ln	1564	0	0	1783	0	0	0	1746	1735	1793	0	1565
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	0.0	1.1	1.1	0.0	0.0	1.8
Cycle Q Clear(g_c), s	1.1	0.0	0.0	1.6	0.0	0.0	0.0	1.1	1.1	1.8	0.0	1.8
Prop In Lane	0.90		0.00	0.33		0.09	0.00		0.03	0.01		0.24
Lane Grp Cap(c), veh/h	233	0	0	211	0	0	0	1274	1266	1375	0	1142
V/C Ratio(X)	0.17	0.00	0.00	0.26	0.00	0.00	0.00	0.09	0.09	0.14	0.00	0.15
Avail Cap(c_a), veh/h	777	0	0	880	0	0	0	1274	1266	1375	0	1142
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	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.3	0.0	0.0	24.4	0.0	0.0	0.0	2.1	2.1	2.2	0.0	2.2
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.6	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.3
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	0.6	0.0	0.0	0.8	0.0	0.0	0.0	0.5	0.5	0.9	0.0	0.9
LnGrp Delay(d),s/veh	24.6	0.0	0.0	25.1	0.0	0.0	0.0	2.3	2.3	2.5	0.0	2.5
LnGrp LOS	C			C				A	A	A		A
Approach Vol, veh/h		39			55			236			367	
Approach Delay, s/veh		24.6			25.1			2.3			2.5	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		46.0		8.8		46.0		8.8
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		40.0		25.0		40.0		25.0
Max Q Clear Time (g_c+I1), s		3.1		3.1		3.8		3.6
Green Ext Time (p_c), s		1.5		0.2		1.5		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	5.4
HCM 2010 LOS	A

Two Way Analysis cannot be performed on Signalized Intersection.

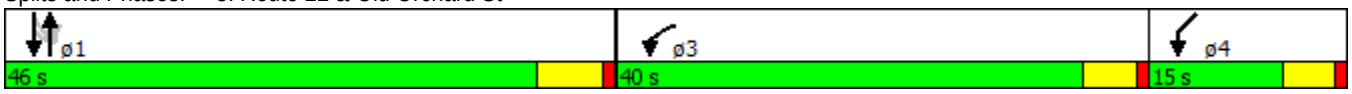
Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SWL	SWR
Lane Configurations										
Volume (vph)	136	44	461	17	140	1	41	717	19	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	10	9	9
Grade (%)	-3%		5%					-5%	-10%	
Lane Util. Factor	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00	*1.00	1.00	1.00
Frt	0.967		0.962						0.994	
Flt Protected	0.964							0.997	0.955	
Satd. Flow (prot)	1784	0	3254	0	0	0	0	3557	1704	0
Flt Permitted	0.964							0.890	0.955	
Satd. Flow (perm)	1784	0	3254	0	0	0	0	3175	1704	0
Right Turn on Red					No					No
Satd. Flow (RTOR)										
Link Speed (mph)	30		50					50	30	
Link Distance (ft)	852		1205					907	757	
Travel Time (s)	19.4		16.4					12.4	17.2	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	0%	2%	0%	0%
Adj. Flow (vph)	142	46	480	18	146	1	43	747	20	1
Shared Lane Traffic (%)										
Lane Group Flow (vph)	188	0	644	0	0	0	0	791	21	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Right	Left	Left	Left	Left	Right
Median Width(ft)	12		0					0	9	
Link Offset(ft)	0		0					0	0	
Crosswalk Width(ft)	16		16					16	16	
Two way Left Turn Lane										
Headway Factor	0.98	0.98	1.13	1.13	1.13	1.06	1.06	1.06	1.08	1.08
Turning Speed (mph)	15	9		9	9	15	15		15	9
Number of Detectors	2		0			1	1	0	1	
Detector Template						Left	Left			
Leading Detector (ft)	83		0			20	20	0	40	
Trailing Detector (ft)	-5		0			0	0	0	0	
Detector 1 Position(ft)	-5		0			0	0	0	0	
Detector 1 Size(ft)	40		6			20	20	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel										
Detector 1 Extend (s)	0.0		0.0			0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0			0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0			0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43									
Detector 2 Size(ft)	40									
Detector 2 Type	Cl+Ex									
Detector 2 Channel										
Detector 2 Extend (s)	0.0									
Turn Type	Prot		NA			Perm	Perm	NA	Prot	
Protected Phases	3		1					1	4	
Permitted Phases						1	1			
Detector Phase	3		1			1	1	1	4	

Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SWL	SWR
Switch Phase										
Minimum Initial (s)	2.0		4.0			4.0	4.0	4.0	2.0	
Minimum Split (s)	28.0		46.0			46.0	46.0	46.0	15.0	
Total Split (s)	40.0		46.0			46.0	46.0	46.0	15.0	
Total Split (%)	39.6%		45.5%			45.5%	45.5%	45.5%	14.9%	
Maximum Green (s)	35.0		40.0			40.0	40.0	40.0	10.0	
Yellow Time (s)	4.0		5.0			5.0	5.0	5.0	4.0	
All-Red Time (s)	1.0		1.0			1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	
Total Lost Time (s)	5.0		6.0					6.0	5.0	
Lead/Lag	Lead								Lag	
Lead-Lag Optimize?	Yes								Yes	
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0	3.0	
Recall Mode	None		Max			Max	Max	Max	None	
Act Effct Green (s)	12.7		40.8					40.8	6.5	
Actuated g/C Ratio	0.18		0.59					0.59	0.09	
v/c Ratio	0.57		0.33					0.42	0.13	
Control Delay	34.1		9.6					10.4	34.2	
Queue Delay	0.0		0.0					0.0	0.0	
Total Delay	34.1		9.6					10.4	34.2	
LOS	C		A					B	C	
Approach Delay	34.1		9.6					10.4	34.3	
Approach LOS	C		A					B	C	
Queue Length 50th (ft)	66		47					62	8	
Queue Length 95th (ft)	147		141					182	32	
Internal Link Dist (ft)	772		1125					827	677	
Turn Bay Length (ft)										
Base Capacity (vph)	923		1924					1877	251	
Starvation Cap Reductn	0		0					0	0	
Spillback Cap Reductn	0		0					0	0	
Storage Cap Reductn	0		0					0	0	
Reduced v/c Ratio	0.20		0.33					0.42	0.08	

Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 68.9
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 13.1 — Intersection LOS: B
Intersection Capacity Utilization 70.7% — ICU Level of Service C
Analysis Period (min) 15
* User Entered Value

Splits and Phases: 3: Route 22 & Old Orchard St



HCM 2010 Research does not support Non-NEMA phasing.

Two Way Analysis cannot be performed on Signalized Intersection.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	5	176	160	0	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12
Grade (%)		5%	-5%		-4%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.999				
Satd. Flow (prot)	0	1727	1800	0	1676	0
Flt Permitted		0.999				
Satd. Flow (perm)	0	1727	1800	0	1676	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		852	422		279	
Travel Time (s)		19.4	9.6		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%
Adj. Flow (vph)	5	191	174	0	0	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	196	174	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.13	1.13	1.06	1.06	0.97	0.97
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 23.3%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	176	160	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	5	-5	-	-4	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	5	191	174	0	0	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	174	0	-	0	376	174
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	202	-
Critical Hdwy	4.1	-	-	-	5.6	5.8
Critical Hdwy Stg 1	-	-	-	-	4.6	-
Critical Hdwy Stg 2	-	-	-	-	4.6	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1415	-	-	-	684	892
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	875	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1415	-	-	-	681	892
Mov Cap-2 Maneuver	-	-	-	-	681	-
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	872	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1415	-	-	-	892
HCM Lane V/C Ratio	0.004	-	-	-	0.024
HCM Control Delay (s)	7.6	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	15	161	98	0	0	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	15	15
Grade (%)		-1%	-1%		-4%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.996				
Satd. Flow (prot)	0	1775	1765	0	1844	0
Flt Permitted		0.996				
Satd. Flow (perm)	0	1775	1765	0	1844	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		422	318		352	
Travel Time (s)		9.6	7.2		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%
Adj. Flow (vph)	16	175	107	0	0	67
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	191	107	0	67	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		15	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	0.86	0.86
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 26.5%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	15	161	98	0	0	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-1	-1	-	-4	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	16	175	107	0	0	67

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	107	0	-	0	315	107
Stage 1	-	-	-	-	107	-
Stage 2	-	-	-	-	208	-
Critical Hdwy	4.1	-	-	-	5.6	5.8
Critical Hdwy Stg 1	-	-	-	-	4.6	-
Critical Hdwy Stg 2	-	-	-	-	4.6	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1497	-	-	-	732	964
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	871	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1497	-	-	-	723	964
Mov Cap-2 Maneuver	-	-	-	-	723	-
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	861	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1497	-	-	-	964
HCM Lane V/C Ratio	0.011	-	-	-	0.07
HCM Control Delay (s)	7.4	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Volume (vph)	4	4	17	13	1212	323	0	501	8	250	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	10	10	10	10	10
Grade (%)		0%			1%			2%		-3%	
Storage Length (ft)		0	30	0		0	185		0	0	0
Storage Lanes		1	1	0		1	1		0	2	0
Taper Length (ft)		25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	*1.00	*1.00
Ped Bike Factor					1.00			1.00			
Frt			0.850			0.850		0.998		0.998	
Flt Protected		0.950			0.999					0.953	
Satd. Flow (prot)	0	1745	1561	0	1711	1455	0	3295	0	3325	0
Flt Permitted		0.950			0.993					0.953	
Satd. Flow (perm)	0	1745	1561	0	1700	1455	0	3295	0	3325	0
Right Turn on Red			Yes			No			No		
Satd. Flow (RTOR)			74								
Link Speed (mph)		30			35			30		35	
Link Distance (ft)		161			816			491		600	
Travel Time (s)		3.7			15.9			11.2		11.7	
Confl. Peds. (#/hr)				1					1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	1%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	5	5	5	0	0	0	0	0
Adj. Flow (vph)	4	4	17	13	1237	330	0	511	8	255	3
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	8	17	0	1250	330	0	519	0	258	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)		11			0			0		20	
Link Offset(ft)		0			0			0		0	
Crosswalk Width(ft)		16			16			16		16	
Two way Left Turn Lane											
Headway Factor	1.04	1.04	1.04	1.10	1.13	1.13	1.11	1.11	1.11	1.07	1.07
Turning Speed (mph)	15	15	9	15		15	15		9	15	9
Number of Detectors	1	1	1	1	0	0		0		1	
Detector Template	Left	Left	Right	Left						Left	
Leading Detector (ft)	20	20	20	20	0	0		0		20	
Trailing Detector (ft)	0	0	0	0	0	0		0		0	
Detector 1 Position(ft)	0	0	0	0	0	0		0		0	
Detector 1 Size(ft)	20	20	20	20	6	20		6		20	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
Turn Type	Perm	Prot	Perm	Perm	NA	pm+ov		NA		Prot	
Protected Phases		3			1	2		1		2	
Permitted Phases	3		3	1		1					

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Detector Phase	3	3	3	1	1	2		1		2	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	
Minimum Split (s)	10.0	10.0	10.0	51.0	51.0	11.0		51.0		11.0	
Total Split (s)	15.0	15.0	15.0	77.0	77.0	40.0		77.0		40.0	
Total Split (%)	11.4%	11.4%	11.4%	58.3%	58.3%	30.3%		58.3%		30.3%	
Maximum Green (s)	10.0	10.0	10.0	71.0	71.0	34.0		71.0		34.0	
Yellow Time (s)	4.0	4.0	4.0	5.0	5.0	5.0		5.0		5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0		1.0		1.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0		0.0	
Total Lost Time (s)		5.0	5.0		6.0	6.0		6.0		6.0	
Lead/Lag				Lead	Lead	Lag		Lead		Lag	
Lead-Lag Optimize?				Yes	Yes	Yes		Yes		Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	3.0		5.0		3.0	
Recall Mode	None	None	None	Max	Max	None		Max		None	
Act Effct Green (s)		8.1	8.1		71.6	93.9		71.6		13.6	
Actuated g/C Ratio		0.08	0.08		0.68	0.90		0.68		0.13	
v/c Ratio		0.06	0.09		1.08	0.25		0.23		0.60	
Control Delay		49.9	0.9		70.0	2.2		7.8		50.0	
Queue Delay		0.0	0.0		0.0	0.0		0.0		0.0	
Total Delay		49.9	0.9		70.0	2.2		7.8		50.0	
LOS		D	A		E	A		A		D	
Approach Delay		16.6			55.8			7.8		50.0	
Approach LOS		B			E			A		D	
Queue Length 50th (ft)		5	0		~1026	38		73		87	
Queue Length 95th (ft)		22	0		#1396	64		116		130	
Internal Link Dist (ft)		81			736			411		520	
Turn Bay Length (ft)			30								
Base Capacity (vph)		168	217		1161	1440		2250		1087	
Starvation Cap Reductn		0	0		0	0		0		0	
Spillback Cap Reductn		0	0		0	0		0		0	
Storage Cap Reductn		0	0		0	0		0		0	
Reduced v/c Ratio		0.05	0.08		1.08	0.23		0.23		0.24	

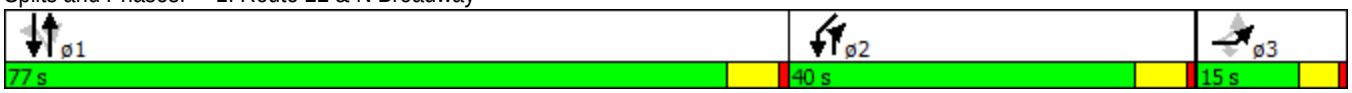
Intersection Summary	
Area Type:	Other
Cycle Length: 132	
Actuated Cycle Length: 104.8	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 44.3	Intersection LOS: D
Intersection Capacity Utilization 99.7%	ICU Level of Service F
Analysis Period (min) 15	

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 22 & N Broadway



HCM 2010 Research does not support Non-NEMA phasing.

Two Way Analysis cannot be performed on Signalized Intersection.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	16	0	14	10	2	0	305	22	1	241	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	11	11	11	10	10	10	10	10	10
Grade (%)		6%			-9%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00
Frt					0.990			0.990			0.985	
Flt Protected		0.974			0.974							
Satd. Flow (prot)	0	2034	0	0	1851	0	0	3479	0	0	3490	0
Flt Permitted		0.816			0.812						0.954	
Satd. Flow (perm)	0	1704	0	0	1543	0	0	3479	0	0	3329	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								15			25	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		221			205			600			766	
Travel Time (s)		5.0			4.7			11.7			14.9	
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%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%
Adj. Flow (vph)	20	17	0	15	11	2	0	321	23	1	254	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	37	0	0	28	0	0	344	0	0	283	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.99	0.99	0.99	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1			1		1	1	
Detector Template	Left			Left						Left		
Leading Detector (ft)	20	30		20	30			6		20	6	
Trailing Detector (ft)	0	-10		0	-10			0		0	0	
Detector 1 Position(ft)	0	-10		0	-10			0		0	0	
Detector 1 Size(ft)	20	40		20	40			6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0			10.0		10.0	10.0	
Minimum Split (s)	25.0	25.0		26.0	26.0			46.0		46.0	46.0	
Total Split (s)	30.0	30.0		30.0	30.0			46.0		46.0	46.0	
Total Split (%)	39.5%	39.5%		39.5%	39.5%			60.5%		60.5%	60.5%	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	25.0	25.0		25.0	25.0			40.0		40.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Recall Mode	None	None		None	None			Max		Max	Max	
Walk Time (s)				7.0	7.0							
Flash Dont Walk (s)				14.0	14.0							
Pedestrian Calls (#/hr)				2	2							
Act Effct Green (s)		9.0			8.9			50.6			50.6	
Actuated g/C Ratio		0.15			0.15			0.85			0.85	
v/c Ratio		0.14			0.12			0.12			0.10	
Control Delay		21.5			21.3			3.3			3.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		21.5			21.3			3.3			3.2	
LOS		C			C			A			A	
Approach Delay		21.5			21.3			3.3			3.2	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		9			7			0			0	
Queue Length 95th (ft)		32			27			51			42	
Internal Link Dist (ft)		141			125			520			686	
Turn Bay Length (ft)												
Base Capacity (vph)		728			659			2953			2827	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.05			0.04			0.12			0.10	

Intersection Summary

Area Type: Other
Cycle Length: 76
Actuated Cycle Length: 59.7
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.14
Intersection Signal Delay: 4.9 — Intersection LOS: A
Intersection Capacity Utilization 22.5% — ICU Level of Service A
Analysis Period (min) 15
* User Entered Value

Splits and Phases: 2: Route 22 & Hillandale Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	16	0	14	10	2	0	305	22	1	241	27
Number	7	4	14	3	8	18	5	2	12	1	6	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	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
Adj Sat Flow, veh/h/ln	1917	1917	0	1986	1986	1986	0	1882	1900	1900	1898	1900
Adj Flow Rate, veh/h	20	17	0	15	11	2	0	321	23	1	254	28
Adj No. of Lanes	0	1	0	0	1	0	0	2	0	0	2	0
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	0	0	0	0	1	1	0	0	0
Cap, veh/h	153	46	0	152	44	7	0	2567	183	68	2374	258
Arrive On Green	0.06	0.06	0.00	0.06	0.06	0.06	0.00	0.74	0.74	0.74	0.74	0.74
Sat Flow, veh/h	882	800	0	865	767	126	0	3474	248	1	3212	349
Grp Volume(v), veh/h	37	0	0	28	0	0	0	173	171	149	0	134
Grp Sat Flow(s),veh/h/ln	1682	0	0	1757	0	0	0	1882	1839	1897	0	1666
Q Serve(g_s), s	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	0.0	0.0	1.2
Cycle Q Clear(g_c), s	1.1	0.0	0.0	0.7	0.0	0.0	0.0	1.4	1.4	1.2	0.0	1.2
Prop In Lane	0.54		0.00	0.54		0.07	0.00		0.13	0.01		0.21
Lane Grp Cap(c), veh/h	199	0	0	203	0	0	0	1391	1359	1469	0	1231
V/C Ratio(X)	0.19	0.00	0.00	0.14	0.00	0.00	0.00	0.12	0.13	0.10	0.00	0.11
Avail Cap(c_a), veh/h	856	0	0	875	0	0	0	1391	1359	1469	0	1231
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	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.5	0.0	0.0	24.4	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.4	0.0	0.0	0.0	0.8	0.8	0.7	0.0	0.6
LnGrp Delay(d),s/veh	25.0	0.0	0.0	24.7	0.0	0.0	0.0	2.2	2.2	2.1	0.0	2.2
LnGrp LOS	C			C				A	A	A		A
Approach Vol, veh/h		37			28			344			283	
Approach Delay, s/veh		25.0			24.7			2.2			2.2	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		46.0		8.1		46.0		8.1
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		40.0		25.0		40.0		25.0
Max Q Clear Time (g_c+I1), s		3.4		3.1		3.2		2.7
Green Ext Time (p_c), s		1.5		0.1		1.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	4.3
HCM 2010 LOS	A

Two Way Analysis cannot be performed on Signalized Intersection.

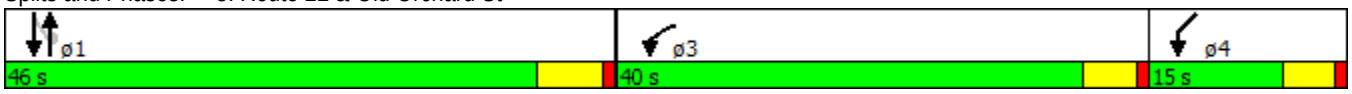
Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL	SBT	SWL	SWR
Lane Configurations									
Volume (vph)	77	25	568	2	105	39	655	8	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	9	9
Grade (%)	-3%		5%				-5%	-10%	
Lane Util. Factor	1.00	1.00	*1.00	*1.00	*1.00	*1.00	*1.00	1.00	1.00
Frt	0.967		0.976						
Flt Protected	0.964						0.997	0.950	
Satd. Flow (prot)	1771	0	3375	0	0	0	3573	1706	0
Flt Permitted	0.964						0.888	0.950	
Satd. Flow (perm)	1771	0	3375	0	0	0	3182	1706	0
Right Turn on Red					No				No
Satd. Flow (RTOR)									
Link Speed (mph)	30		50				50	30	
Link Distance (ft)	850		1205				907	757	
Travel Time (s)	19.3		16.4				12.4	17.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	0%	0%	0%	0%	9%	1%	0%	0%
Adj. Flow (vph)	81	26	598	2	111	41	689	8	0
Shared Lane Traffic (%)									
Lane Group Flow (vph)	107	0	711	0	0	0	730	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Right	Left	Left	Left	Right
Median Width(ft)	12		0				0	9	
Link Offset(ft)	0		0				0	0	
Crosswalk Width(ft)	16		16				16	16	
Two way Left Turn Lane									
Headway Factor	0.98	0.98	1.13	1.13	1.13	1.06	1.06	1.08	1.08
Turning Speed (mph)	15	9		9	9	15		15	9
Number of Detectors	2		0			1	0	1	
Detector Template						Left			
Leading Detector (ft)	83		0			20	0	40	
Trailing Detector (ft)	-5		0			0	0	0	
Detector 1 Position(ft)	-5		0			0	0	0	
Detector 1 Size(ft)	40		6			20	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel									
Detector 1 Extend (s)	0.0		0.0			0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0			0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0			0.0	0.0	0.0	
Detector 2 Position(ft)	43								
Detector 2 Size(ft)	40								
Detector 2 Type	Cl+Ex								
Detector 2 Channel									
Detector 2 Extend (s)	0.0								
Turn Type	Prot		NA			Perm	NA	Prot	
Protected Phases	3		1				1	4	
Permitted Phases						1			
Detector Phase	3		1			1	1	4	

Lane Group	WBL	WBR	NBT	NBR	NBR2	SBL	SBT	SWL	SWR
Switch Phase									
Minimum Initial (s)	2.0		4.0			4.0	4.0	2.0	
Minimum Split (s)	28.0		46.0			46.0	46.0	15.0	
Total Split (s)	40.0		46.0			46.0	46.0	15.0	
Total Split (%)	39.6%		45.5%			45.5%	45.5%	14.9%	
Maximum Green (s)	35.0		40.0			40.0	40.0	10.0	
Yellow Time (s)	4.0		5.0			5.0	5.0	4.0	
All-Red Time (s)	1.0		1.0			1.0	1.0	1.0	
Lost Time Adjust (s)	0.0		0.0				0.0	0.0	
Total Lost Time (s)	5.0		6.0				6.0	5.0	
Lead/Lag	Lead							Lag	
Lead-Lag Optimize?	Yes							Yes	
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0	
Recall Mode	None		Max			Max	Max	None	
Act Effct Green (s)	9.3		44.7				44.7	5.9	
Actuated g/C Ratio	0.15		0.71				0.71	0.09	
v/c Ratio	0.41		0.30				0.33	0.05	
Control Delay	30.2		6.1				6.3	29.5	
Queue Delay	0.0		0.0				0.0	0.0	
Total Delay	30.2		6.1				6.3	29.5	
LOS	C		A				A	C	
Approach Delay	30.2		6.1				6.3	29.5	
Approach LOS	C		A				A	C	
Queue Length 50th (ft)	36		44				46	3	
Queue Length 95th (ft)	90		129				137	16	
Internal Link Dist (ft)	770		1125				827	677	
Turn Bay Length (ft)									
Base Capacity (vph)	986		2381				2244	271	
Starvation Cap Reductn	0		0				0	0	
Spillback Cap Reductn	0		0				0	0	
Storage Cap Reductn	0		0				0	0	
Reduced v/c Ratio	0.11		0.30				0.33	0.03	

Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 63.4
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.41
Intersection Signal Delay: 8.0 — Intersection LOS: A
Intersection Capacity Utilization 65.8% — ICU Level of Service C
Analysis Period (min) 15
* User Entered Value

Splits and Phases: 3: Route 22 & Old Orchard St



HCM 2010 Research does not support Non-NEMA phasing.

Two Way Analysis cannot be performed on Signalized Intersection.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	21	123	91	0	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12
Grade (%)		5%	-5%		-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.993				
Satd. Flow (prot)	0	1702	1782	0	1685	0
Flt Permitted		0.993				
Satd. Flow (perm)	0	1702	1782	0	1685	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		850	420		291	
Travel Time (s)		19.3	9.5		6.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	0%	0%	0%
Adj. Flow (vph)	23	134	99	0	0	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	157	99	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.13	1.13	1.06	1.06	0.97	0.97
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 24.3%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	21	123	91	0	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	5	-5	-	-5	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	2	0	0	0
Mvmt Flow	23	134	99	0	0	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	99	0	-	0	278	99
Stage 1	-	-	-	-	99	-
Stage 2	-	-	-	-	179	-
Critical Hdwy	4.1	-	-	-	5.4	5.7
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1507	-	-	-	774	976
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	900	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1507	-	-	-	762	976
Mov Cap-2 Maneuver	-	-	-	-	762	-
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	886	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1507	-	-	-	976
HCM Lane V/C Ratio	0.015	-	-	-	0.012
HCM Control Delay (s)	7.4	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	62	61	57	0	0	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	15	15
Grade (%)		-1%	-1%		-4%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.975				
Satd. Flow (prot)	0	1729	1747	0	1844	0
Flt Permitted		0.975				
Satd. Flow (perm)	0	1729	1747	0	1844	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		420	337		328	
Travel Time (s)		9.5	7.7		7.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	0%	0%	0%
Adj. Flow (vph)	67	66	62	0	0	37
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	133	62	0	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		15	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	0.86	0.86
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 23.3%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	62	61	57	0	0	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-1	-1	-	-4	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	2	0	0	0
Mvmt Flow	67	66	62	0	0	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	62	0	-	0	263	62
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	201	-
Critical Hdwy	4.1	-	-	-	5.6	5.8
Critical Hdwy Stg 1	-	-	-	-	4.6	-
Critical Hdwy Stg 2	-	-	-	-	4.6	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1554	-	-	-	774	1016
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	876	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1554	-	-	-	739	1016
Mov Cap-2 Maneuver	-	-	-	-	739	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	837	-

Approach	EB	WB	SB
HCM Control Delay, s	3.7	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1554	-	-	-	1016
HCM Lane V/C Ratio	0.043	-	-	-	0.036
HCM Control Delay (s)	7.4	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

APPENDIX E

NYSDOT COUNT DATA

New York State Department of Transportation

Date: 7/22/2015

Traffic Volume Report

County Order	EMP	Ref Marker	Section Length	End Description	LATEST COUNT EST AADT	YR	PREVIOUS COUNTS EST AADT	YR	EST AADT	YR	EST AADT	YR	Station CC Station
		Route NY21		**County 117 WAYNE**	**Region 04**								
06	1.16	21 37061011	1.16	TOWN OF PALMYRA & VILLAGE OF PALMYRA	7401	14	7532	09	5492	01	5099	99	0009
06	1.64	21 37061016	0.48	START 21/31 OLAP	5547	14	5592	13	6515	07	5644	04	0494
06	2.27	21 37061022	0.63	END 21/31 OLAP	12686	14	12625	09	12129	06	12876	05	0496
06	2.46	21 37061024	0.19	BARGE CANAL	5294	14	5388	09	5692	06	5949	03	0004
06	8.38	21 37061085	5.92	WALKER RD	3285	14	3285	14	3246	11	5986	07	0005
06	14.19	21 37061142	5.81	TOWN OF MARION AND TOWN OF WILLIAMSON	3138	14	3138	14	3184	11	3519	08	0521
06	14.80	21 37061150	0.61	RT 104 END RT 21	7134	14	7345	09	6348	06	6174	03	0520
		Route NY22		**County 005 BRONX**	**Region 11**								
01	0.19		0.19	EAST 233RD ST	14456	14	14512	10	13929	08	17034	05	0018
01	0.36		0.17	BRONX/WEST CO LINE	10074	14	10295	11	9803	08	10127	04	0019
		Route NY22		**County 119 WESTCHESTER**	**Region 08**								
02	2.45		2.45	WASHINGTON ST	8362	14	8268	09	8622	02	10721	97	0175
02	4.11	22 87022009	1.66	WINTER MILL RD	4932	14	5103	11	10950	07	11781	04	0045
02	4.89	22 87022017	0.78	VILLAGE OF TUCKAHOE TOWN OF EASTCHESTER	13196	14	12652	11	12455	08	13789	05	0119
02	8.70	22 87022056	3.81	TOWN OF EASTCHESTER & VILLAGE OF SCARSDALE	11500	14	11500	14	10153	11	13442	07	0098
02	9.43	22 87022063	0.73	CITY OF WHITE PLAINS	11805	14	12207	11	13320	08	12743	02	0046
02	10.66		1.23	RT 125 MAMARONECK AVE	8468	14	8791	11	9958	08	10401	02	0177
02	10.98		0.32	S BROADWAY/POST RD	15391	14	15220	09	17740	03	14188	00	0178
02	11.13		0.15	RT 119 MAIN ST	28275	14	29408	11	29672	03	26856	00	0179
02	12.01		0.88	RT 287I CROSS WEST EXP	28012	14	28895	10	21795	97	2234	96	0180
02	12.61		0.60	WHITE PLAINS CL / NORTH CASTLE TL	22964	14	21731	03	20535	00	19491	96	0181
02	12.77		0.16	CR 150 CENTRAL W PKWY	12594	14	12362	08	13805	02	12304	99	0063
02	13.33	22 87024007	0.56	N BROADWAY	21976	14	22638	11	21068	03	21781	00	0182
02	17.15	22 87024044	3.82	START 22/120 OLAP	10880	14	10934	11	13327	01	9761	98	0183
02	17.40	22 87024048	0.25	END 22/120 OLAP	16295	14	15995	08	16339	02	16281	99	0154
02	18.62	22 87024060	1.22	RT 128	16275	14	16311	13	15307	11	16444	07	0184
02	19.24	22 87024066	0.62	RT 684I	18575	14	18072	11	20884	08	24165	04	0190
02	19.65	22 87024070	0.41	RT 433	16908	14	16595	08	16042	05	17622	02	0185
02	22.51	22 87024099	2.86	CHESTNUT RIDGE RD	6338	14	6338	14	5872	11	8220	07	0126
02	25.44	22 87024129	2.93	TOWN OF NORTH CASTLE AND TOWN OF BEDFORD	3868	14	3877	13	3496	09	3865	06	0186
02	26.45	22 87024139	1.01	END 22/172 OLAP	11938	14	11938	14	14071	11	13807	08	0148
02	26.84	22 87024142	0.39	RT 121 BEDFORD	11272	14	10976	11	10708	08	11458	05	0187
02	29.89	22 87024173	3.05	OLD RT 137	4647	14	4594	09	5048	06	4965	03	0188
02	31.71	22 87024192	1.82	RT 35	7419	14	7435	13	7069	09	7068	06	0189