

Village of Croton-on-Hudson

CROTON HARMON PARKING FACILITY VEHICULAR, PEDESTRIAN AND BICYCLE STUDY

July 2008

Prepared by:



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INTRODUCTION

The purpose of this project is to improve vehicular, pedestrian, and bicycle access to and from the Croton-Harmon Train Station in Croton-on-Hudson, Westchester County, New York. The station, which is located on Veterans Plaza south of Croton Point Avenue and immediately west of U.S. 9 (see Figure 1), serves both Metro-North and Amtrak passengers. Due to its proximity to New York City (approximately 33 miles north), the station is a commuter hub, as well a major transfer point between local and express train and Westchester County Bee-Line bus services. It serves approximately 3,400 passengers per day¹ and provides parking for over 1,900 vehicles.

Traffic data obtained for this study indicate that the train station's 3,400 passengers per day generate around 5,600 entering and exiting vehicles per weekday – approximately 25 percent of which arrive/depart during the AM/PM peak commuter hours and 50 percent of which arrive/depart during the AM/PM peak periods. This highly concentrated and directional flow of traffic, along a primarily uncontrolled facility and in such close proximity to the U.S. 9 northbound and southbound ramps, results in extreme congestion and poor pedestrian and bicycle, as well as vehicular, operations during the peak periods.

During the weekday AM period (the significantly worse of the two commuter peaks), local drivers commute to the train station by traveling south on S. Riverside Avenue and then west on Croton Point Avenue to Veterans Plaza. Due to a southbound right-turn overlap at the traffic signal at Croton Point Avenue and S. Riverside Avenue, there is a constant stream of vehicles approaching the train station along Croton Point Avenue. These vehicles operate free-flow to the train station, since there are no traffic signals or stop control for the vehicles between S. Riverside Avenue and Veterans Plaza. Because the local vehicular volumes to the train station are high and there are few gaps in traffic, there are few opportunities for pedestrians or bicyclists to cross Croton Point Avenue. Lengthy ramp queues (especially the southbound) exacerbate the situation, as there is a constant stream of traffic wishing to exit U.S. 9.

The frustration and urgency of drivers on the ramps during the weekday AM peak period result in unsafe maneuvers – pulling out in front of vehicles when gaps are inadequate and disregarding pedestrians or bicyclists for whom the drivers should yield. To address these issues in part, the Village of Croton-on-Hudson currently assigns a traffic control officer to Croton Point Avenue at Veterans Plaza and a crossing guard to the immediately adjacent intersection of Croton Point Avenue at the U.S. 9 southbound ramps. The primary goal of both personnel is to facilitate pedestrian crossings at these locations. Most pedestrian traffic to the train station approaches from the same direction as the local vehicular traffic. Pedestrians typically cross S. Riverside Avenue in the vicinity of Benedict Boulevard and then travel on the north side of Croton Point Avenue to the train station (in part because there is no sidewalk along most of the south side of Croton Point Avenue). Since many pedestrians have difficulty crossing the southbound off-ramp, the crossing guard is there to stop the southbound vehicles, prevent them from blocking the crosswalk, and assist

¹ Croton-Harmon (Metro-North station). 2008. Wikimedia Foundation, Inc. June 20, 2008. < [http:// en.wikipedia.org/wiki/Croton-Harmon_\(Amtrak_station\)](http://en.wikipedia.org/wiki/Croton-Harmon_(Amtrak_station)) >.

pedestrians across the ramp. The police officer at Croton Point Avenue and Veterans Plaza then helps the pedestrians safely cross Croton Point Avenue to get to the train station. In addition to facilitating pedestrian crossings, the crossing guard at the U.S. 9 southbound ramps monitors traffic along the ramp. When the queue extends almost to the mainline, the crossing guard stops traffic along Croton Point Avenue to give southbound vehicles the right-of-way and allow the queue to dissipate. It should be noted, however, that the Village personnel are only present for a short period during rush hour each weekday.

Similar pedestrian and bicycle safety issues occur during the weekday PM peak period. Although traffic volumes in the outbound direction are less concentrated than during the weekday AM peak period, the volumes are relatively high, and the vehicular traffic exiting the train station and accessing the U.S. 9 on-ramps conflicts with both bicyclists and pedestrians. A traffic control officer is assigned to Croton Point Avenue and Veterans Plaza during the weekday PM peak to assist with pedestrian crossings, however, a crossing guard is not assigned to control traffic at the southbound ramps.

The *Croton Harmon Parking Facility Vehicular, Bicycle and Pedestrian Study* was conducted to examine vehicular, pedestrian, and bicycle operations in the vicinity of Croton-Harmon Train Station and to develop conceptual designs to improve the current conditions. Traffic analyses were conducted to evaluate existing and future traffic operations and to ensure the feasibility of recommended improvements. Traffic models were developed for: existing conditions based on 2008 data collection and field observations and future conditions (five years beyond existing) to identify relatively short-term traffic and pedestrian needs along the corridor. The traffic models comprised the following key intersections in the core study area (see Figure 1).

1. Benedict Boulevard at S. Riverside Avenue
2. Croton Point Avenue at S. Riverside Avenue
3. Croton Point Avenue at the U.S. 9 northbound ramps
4. Croton Point Avenue at the U.S. 9 southbound ramps
5. Croton Point Avenue at Veterans Plaza

2008 EXISTING CONDITIONS

To assess the impact of proposed improvements on traffic conditions in the future design year, it was necessary to determine the existing traffic conditions from which future conditions could be projected.

Roadway Characteristics

S. Riverside Avenue is a north-south Village roadway that extends within the Village from Grand Avenue to the north to Van Cortlandt Manor to the south. In the project study area, the commercial strip between Benedict Boulevard and Croton Point Avenue, S. Riverside Avenue is two lanes (one through plus right-turn only lane) with no parking in each direction.



VILLAGE OF CROTON-ON-HUDSON

FIGURE 1

PROJECT LOCATION MAP

DRAWN BY _____

CADD FILE _____

SHEET 1 OF 1

Croton Point Avenue is an east-west Village roadway that extends within the Village from S. Riverside Avenue to the east, crossing beneath U.S. 9 and past Croton-Harmon Train Station, to Croton Point Park to the west. In the project study area, between S. Riverside Avenue and the Veterans Plaza entrance to the train station, Croton Point Avenue is two lanes in each direction. Curbside parking is prohibited during the peak commuter periods (7 to 9 AM and 5 to 8 PM) but allowed during all other time periods.

U.S. 9 is an interstate roadway that extends from the New York City metropolitan area to the U.S./Canadian border. In the project study area, there is a U.S. 9 interchange at Croton Point Avenue. Due to the significant volumes on U.S. 9 and those that are generated by Croton-Harmon Train Station, there is considerable congestion at Croton Point Avenue and both the U.S. 9 northbound and southbound ramps during the weekday peak commuter periods.

Veterans Plaza is the internal Village roadway that extends from Croton Point Avenue to the Croton-Harmon Train Station north and south parking lots. South of Croton Point Avenue, in the direction of the train station, Veterans Plaza is two lanes plus a reversible center lane. During the weekday AM peak period, the internal roadway operates as two inbound lanes and one outbound lane. During the weekday PM peak period, the roadway operates as two outbound lanes and one inbound lane.

Benedict Boulevard is a local Village roadway that extends from S. Riverside Avenue east to the Cleveland Drive/Truesdale Drive traffic circle. Benedict Boulevard provides access from residential areas to S. Riverside Avenue and U.S. 9 and Croton-Harmon Train Station via S. Riverside Avenue.

Data Collection

Manual turning movement counts by vehicle classification were collected at all study area intersections in April 2008 during the weekday AM (6:30 to 8:45) and PM (5:15 to 7:30) commuter peak periods. The counts indicate that the morning and evening peak hours are from 7 to 8 a.m. and from 5 to 6 p.m., respectively. Inventories were conducted along S. Riverside Avenue, Croton Point Avenue, and at all of the study area intersections to document lane widths, speed limits, turning restrictions, parking regulations, bus stop locations, and other parameters that would be needed as inputs into existing and future condition traffic models. In addition, a walkability/bikeability audit was conducted to document pavement, sidewalk, and pedestrian and bicycle access conditions and deficiencies in the study area. Finally, Westchester County Bee-Line bus service information was downloaded from the website to supplement bus stop inventories and field observations.

It should be noted that traffic signal timings were obtained in the field; however, both of the existing signalized intersections, S. Riverside Avenue at Benedict Boulevard and at Croton Point Avenue, are actuated signals. Although the cycle length at Benedict Boulevard appeared to be consistent throughout the peak periods, the cycle length at Croton Point Avenue was indiscernible. Traffic signal timings and plans were requested from the

Village and Westchester County; however, no intersection timing and only one intersection plan were obtained.

Detailed turning movement count summaries, transit bus schedules, and the traffic signal plan for Croton Point Avenue at S. Riverside Avenue are provided in Appendices A, B, and C, respectively.

Accident reports for the latest available three-year period (March 2005 through March 2008) were provided by the Village of Croton-on-Hudson Police Department. Along the approximate 0.29-mile segment of S. Riverside and Croton Point Avenues in the project study area, there were approximately 59 accidents in the three-year period, resulting in an accident rate for the roadway segment of 16.7, which is significantly higher than NYSDOT's average of 5.66 for an urban, four-lane, undivided, free-access facility. Individual intersection accident rates are also high – especially at the U.S. 9 ramps. As shown in Table 1, 22 and 12 accidents during the three-year period occurred at Croton Point Avenue at the northbound and southbound ramps, respectively, resulting in accident rates that are considerably higher than the NYSDOT average of 0.09.

Table 1. Accident Summary – March 2005 through March 2008

Accident Location	Accident Type			Accident Rate		
	PDO	Injury	Total	Study Area Average	NYSDOT Average	High?
Benedict Boulevard at S. Riverside Avenue	5	2	7	0.63	0.60	Yes
Croton Point Avenue at S. Riverside Avenue	7	2	9	0.59	0.35	Yes
Croton Point Avenue at U.S. 9 Northbound Ramps	21	1	22	1.31	0.09	Yes
Croton Point Avenue at U.S. 9 Southbound Ramps	9	3	12	0.78	0.09	Yes
Croton Point Avenue at Veterans Plaza	9	0	9	0.67	0.22	Yes
Entire Segment			59			Yes

Based on the police reports, most accidents in the study area are rear-end, right-angle, or overtake. These types of accidents could be significantly reduced by installing traffic signals at the currently unsignalized intersections of Croton Point Avenue with Veterans Plaza and the U.S. 9 ramps.

Traffic Volumes

The 2008 weekday AM and PM peak-hour traffic volumes are provided in Figures 2 and 3, respectively. As shown in the figures, volumes in the area are higher in than mornings than in the evenings and are highest along Croton Point Avenue between Veterans Plaza and the U.S. 9 northbound ramps.

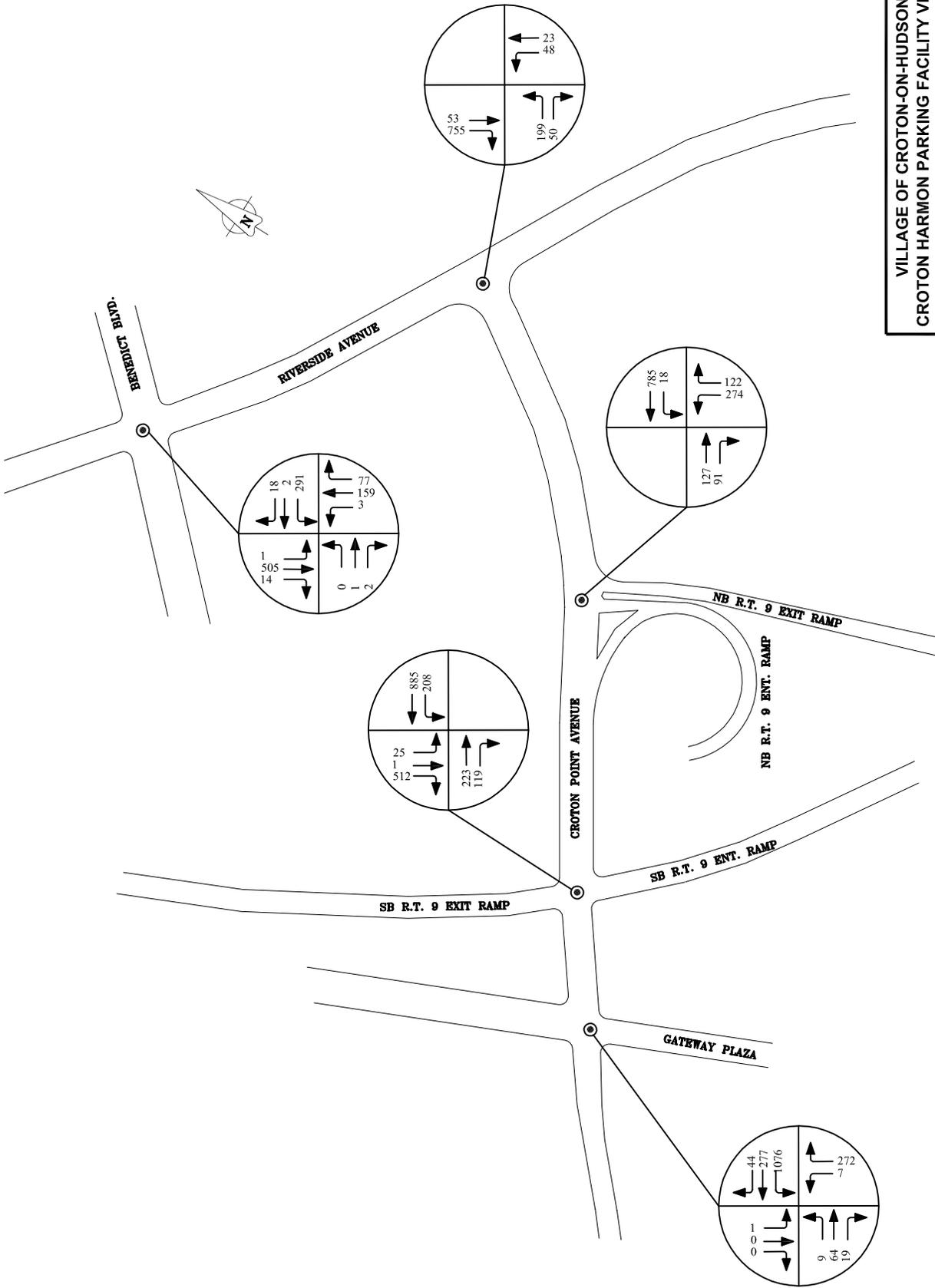
VILLAGE OF CROTON-ON-HUDSON, NY
 CROTON HARMON PARKING FACILITY VEHICULAR,
 PEDESTRIAN AND BICYCLE STUDY

2008 EXISTING CONDITION WEEKDAY
 AM PEAK-HOUR TRAFFIC VOLUMES

FIGURE NO. 2

SCALE: N.T.S.

DATE: APRIL 2008



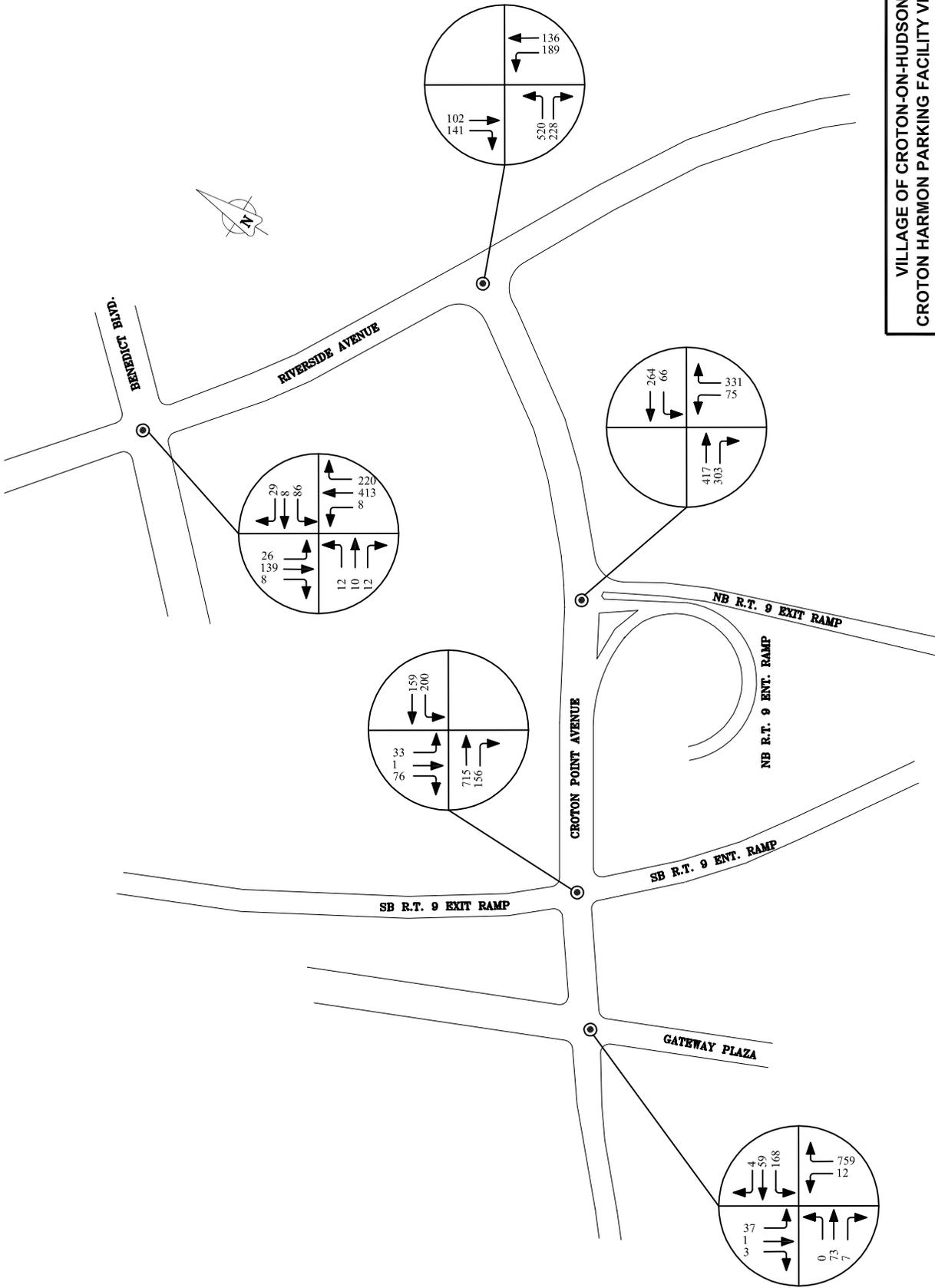
VILLAGE OF CROTON-ON-HUDSON, NY
 CROTON HARMON PARKING FACILITY VEHICULAR,
 PEDESTRIAN AND BICYCLE STUDY

2008 EXISTING CONDITION WEEKDAY
 PM PEAK-HOUR TRAFFIC VOLUMES

FIGURE NO. 3

SCALE: N.T.S.

DATE: APRIL 2008



During the weekday AM peak, the bi-directional traffic volumes along Croton Point Avenue range from approximately 1,050 vehicles per hour (vph) to the east to 1,750 vph between the U.S. 9 southbound ramps and Veterans Plaza. Traffic volumes throughout the study area are very directional, with an eastbound/westbound directional split of basically 80/20. The highest traffic volumes are between the U.S. 9 southbound ramps and Veterans Plaza (1,397 vph toward the train station, 342 vph away from the train station). Nearly 1,110 vph enter the train station during the peak hour – over 500 and nearly 275 vph of which approach via U.S. 9 from the north and south, respectively. Traffic volumes along S. Riverside Avenue between Benedict Boulevard and Croton Point Avenue are almost identical to those along Croton Point Avenue east of the U.S. 9 northbound ramps. Bi-directional traffic volumes west of Veterans Plaza decrease considerably – from nearly 1,750 to around 375 vph.

During the weekday PM peak, traffic volumes in the area are noticeably lower than and not quite as directional as during the AM period, although the directional split immediately east of Veterans Plaza is still 80/20 but in the opposite direction. Along the stretch of Croton Point Avenue between Veterans Plaza and S. Riverside Avenue, the bi-directional traffic volume is approximately 1,100 vph (roughly 800 vph eastbound away from the train station, 300 vph westbound). Approximately 750 vph exit the train station during the peak hour – of which over 300 and 150 vph utilize U.S. 9 to head to points north and south, respectively. The bi-directional traffic volumes on S. Riverside Avenue drop from the 1,100 vph along Croton Point Avenue to 900 vph, since a significant number of eastbound vehicles turn right to head toward the shopping plaza. Bi-directional traffic volumes along Croton Point Avenue west of the train station are even less than during the AM peak – around 150 vph.

Analysis Methodologies and Measures of Effectiveness

Intersection and arterial analyses of the core study area were conducted using Synchro 7 traffic signal coordination software. Typical measures of effectiveness for both signalized and unsignalized intersection analyses include volume-to-capacity ratio, delay, and level-of-service. Volume-to-capacity ratio (v/c) is an indicator of the amount of congestion that occurs at a particular location. A v/c equal to or greater than 1 indicates traffic operations at or above capacity (high levels of congestion). Delay, typically provided in seconds per vehicle (sec/veh), is an indicator of how much travel time, in addition to that which would be incurred for base conditions, is experienced on a roadway due to downstream traffic (signal or sign) control and queuing issues. Level-of-service (LOS), defined in terms of delay, is an indicator of how efficient traffic operations are at a particular location. LOS designations range from favorable A to failing F. An additional measure of effectiveness for arterial analyses is travel time, the total time, including delay, that it takes to travel between signalized intersections.

Analysis Results

The results of 2008 existing condition intersection analyses are summarized in Table 1. As indicated in the table, S. Riverside Avenue and Croton Point Avenue between Benedict Boulevard and the train station operate well during both peak hours but at the

Table 2. 2008 Existing Condition Intersection Analysis Results

Intersection and Approach	Weekday AM Peak Hour					Weekday PM Peak Hour					
	Queue (ft)	Mvmt	v/c	Delay (sec/veh)	LOS	Queue (ft)	Mvmt	v/c	Delay (sec/veh)	LOS	
1 - Benedict Boulevard at S. Riverside Avenue						Signalized					
Benedict Boulevard	EB	3	LTR	0.01	11.7	B	25	LTR	0.11	14.9	B
	WB	248	LTR	0.82	37.8	D	79	LTR	0.44	22.5	C
S. Riverside Avenue	NB	77	LT	0.27	11.9	B	180	LT	0.49	11.6	B
			R	0.13	3.0	A		R	0.27	2.0	A
	SB	304	LTR	0.77	23.1	C	70	LTR	0.27	9.1	A
Overall Intersection:					24.1	C	Overall Intersection: 10.8 B				
2 - Croton Point Avenue at S. Riverside Avenue						Signalized					
Croton Point Avenue	EB	60	L	0.22	10.6	B	261	L	0.77	21.9	C
			LR					LR			
S. Riverside Avenue	NB	50	L	0.23	26.6	C	150	L	0.49	20.1	C
			T	0.08	24.7	C		T	0.23	14.6	B
	SB	630	T	0.12	24.5	C	73	T	0.19	14.4	B
			R	0.83	18.6	B		R	0.17	2.9	A
Overall Intersection:					17.8	B	Overall Intersection: 18.1 B				
3 - Croton Point Avenue at U.S. 9 Northbound Ramps						Unsignalized					
Croton Point Avenue	EB	0	T	0.06	0.0	A	0	T	0.22	0.0	A
			TR	0.10	0.0	A		TR	0.36	0.0	A
	WB	1	LT	0.02	0.6	A	6	LT	0.08	4.2	A
			T	0.37	0.0	A		T	0.12	0.0	A
Off-Ramp	NB	274	L	0.98	79.2	F	181	L	0.50	42.5	E
			R	0.18	10.1	B		R	0.79	32.9	D
4 - Croton Point Avenue at U.S. 9 Southbound Ramps						Unsignalized					
Croton Point Avenue	EB	0	T	0.11	0.0	A	0	T	0.39	0.0	A
			TR	0.15	0.0	A		TR	0.33	0.0	A
	WB	21	LT	0.22	5.3	A	55	LT	0.43	14.4	B
			T	0.40	0.0	A		T	0.08	0.0	A
Off-Ramp	SB	494	LT	0.64	174.2	F	46	LTR	0.44	71.7	F
			R	1.14	109.9	F		R	0.10	9.3	A
5 - Croton Point Avenue at Veterans Plaza						Unsignalized					
Croton Point Avenue	EB	Err	LTR	Err	Err	F	Err	LTR	Err	Err	F
	WB	257	L	0.82	17.5	C	12	L	0.14	7.9	A
			TR	0.21	0.0	A		LTR	0.05	0.0	A
Veterans Plaza	NB	Err	LTR	3.38	Err	F	220	LTR	0.46	12.8	B
								R	0.80	22.5	C
	SB	Err	LTR	3.63	Err	F	Err	LTR	Err	Err	F

Notes: Approach = direction of approach. EB = eastbound, WB = westbound, NB = northbound, SB = southbound. Mvmt = allowed lane movement. L = left-turn, T = through, R = right-turn, LT = shared left-turn/through, etc. Err = error. Queue length, v/c, and/or delay were too excessive for Synchro to calculate.

expense of the side street movements – especially those at the unsignalized Croton Point Avenue locations. The U.S. 9 northbound and southbound off-ramps and Veterans Plaza typically fail during the peak hours. During the worse case weekday AM peak hour, drivers on the northbound and southbound off-ramps must wait 1 to 3 minutes to find a gap in traffic which to safely turn onto Croton Point Avenue toward the train station. Drivers wishing to make anything other than a northbound right turn out of Veterans Plaza have even greater problems. Without the traffic control officer who is currently posted there in the mornings, it would be virtually impossible for left-turn or through (or even right-turn vehicles on the eastbound approach) to exit the parking lots because of the constant stream of free-flowing westbound vehicles into the train station. Similar problems exist during the weekday PM peak hour, though due to vehicles headed in the opposite direction. Delays at the northbound and southbound ramps range from around 40 to 70 sec/veh, and southbound Veterans Plaza would fail completely without the on-site traffic control officer. An analysis of the traffic

data collected for this project indicates that all of the unsignalized locations currently meet NYSDOT requirements for signalization based on Warrant 3, Peak Hour criteria.

Existing condition arterial analyses were conducted along the existing signalized segment of project area roadway, S. Riverside Avenue between Benedict Boulevard and Croton Point Avenue. Based on the analyses, it takes between 30 and 35 seconds for drivers to travel between the intersections in the peak AM or PM direction. Travel times are lower – between 20 and 30 seconds in the off-peak direction.

Detailed 2008 existing condition intersection and arterial analyses results are provided in Appendix D. Detailed traffic signal warrant analyses for Croton Point Avenue at Veterans Plaza and at the U.S. 9 northbound and southbound ramps are provided in Appendix E.

2013 NO BUILD CONDITIONS

To develop traffic, pedestrian, and bicycle improvements for this study, traffic analyses were conducted for 2013 weekday AM and PM peak-hour No Build and Build conditions. The No Build conditions are future conditions in the Croton Harmon study area with planned developments, roadway improvements, signalization modifications, etc. that are not related to this study in place. These are the conditions to which Build conditions (those with No Build and recommended study-related improvements in place) will be compared.

Traffic Volumes

Future condition traffic volumes were developed by increasing existing condition traffic volumes by a linear growth rate of two percent per year as utilized in AKRF's August 2007 *Expanded EAF: Proposed DPW at 1A Croton Point Avenue*. This would result in a ten percent increase in background traffic volumes along the study area roadways between now and 2013. Since there are no planned roadway improvements or other developments in the area, and proposed improvements for this project are not expected to alter traffic volumes or travel patterns in the area, No Build and Build traffic volumes are the same. Weekday AM and PM peak-hour traffic volumes for 2013 future conditions are provided in Figures 4 and 5, respectively.

Analysis Results

Intersection and arterial analyses were conducted for 2013 No Build conditions using the same methodologies as for existing conditions. The results of weekday AM and PM peak-hour intersection analyses are provided in Tables 2 and 3, respectively. As indicated in the tables, conditions on the unsignalized approaches to the unsignalized Croton Point Avenue intersections would deteriorate noticeably between now and 2013. The northbound and southbound ramps and at least two of the three unsignalized approaches at Veterans Plaza would fail during the peak hours, incurring about double the delays as for existing conditions. At the southbound ramps during the AM peak-hour, drivers would have to wait over

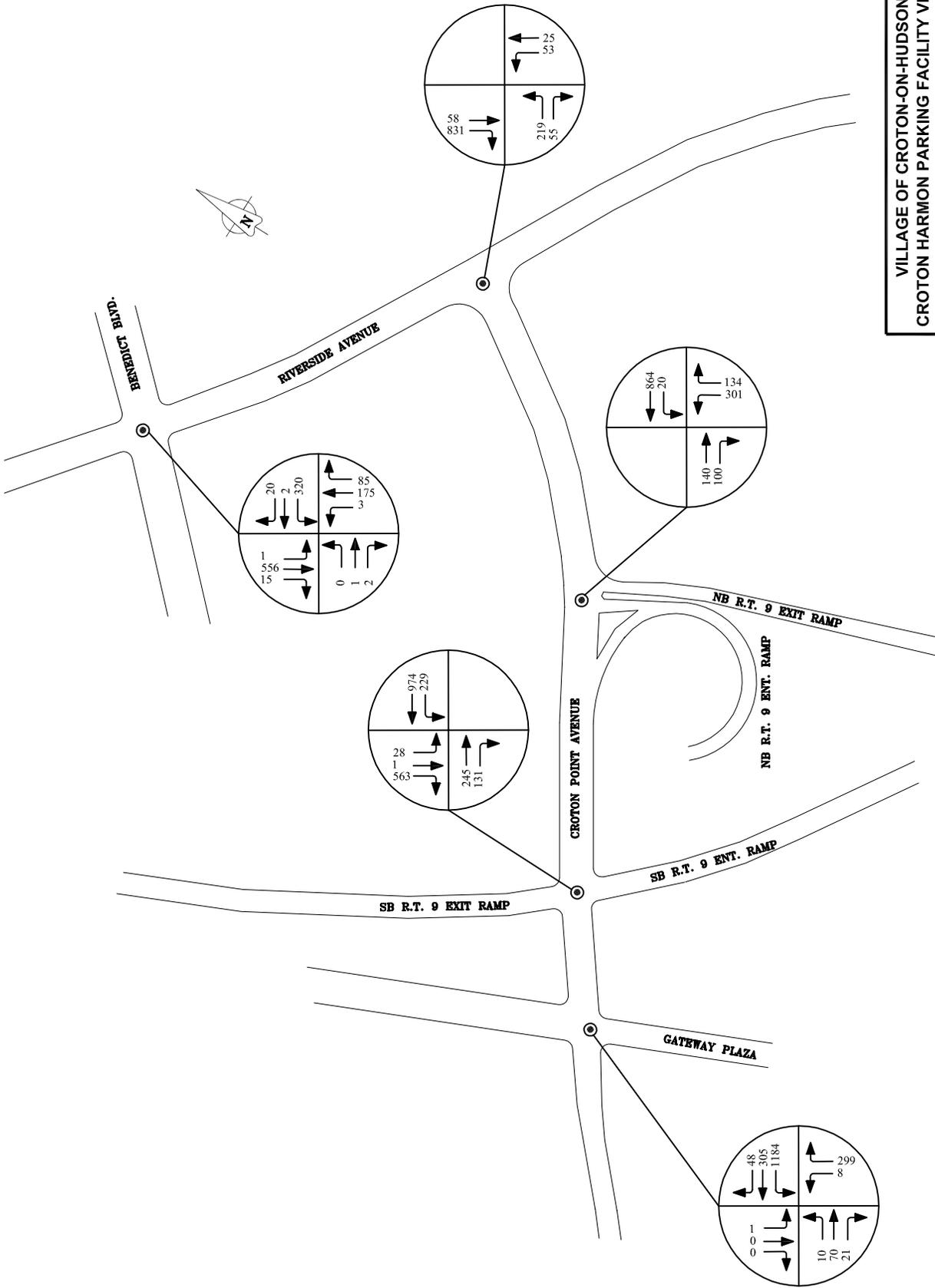
VILLAGE OF CROTON-ON-HUDSON, NY
 CROTON HARMON PARKING FACILITY VEHICULAR,
 PEDESTRIAN AND BICYCLE STUDY

2013 FUTURE NO BUILD AND BUILD CONDITION
 WEEKDAY AM PEAK-HOUR TRAFFIC VOLUMES

FIGURE NO. 4

SCALE: N.T.S.

DATE: APRIL 2008



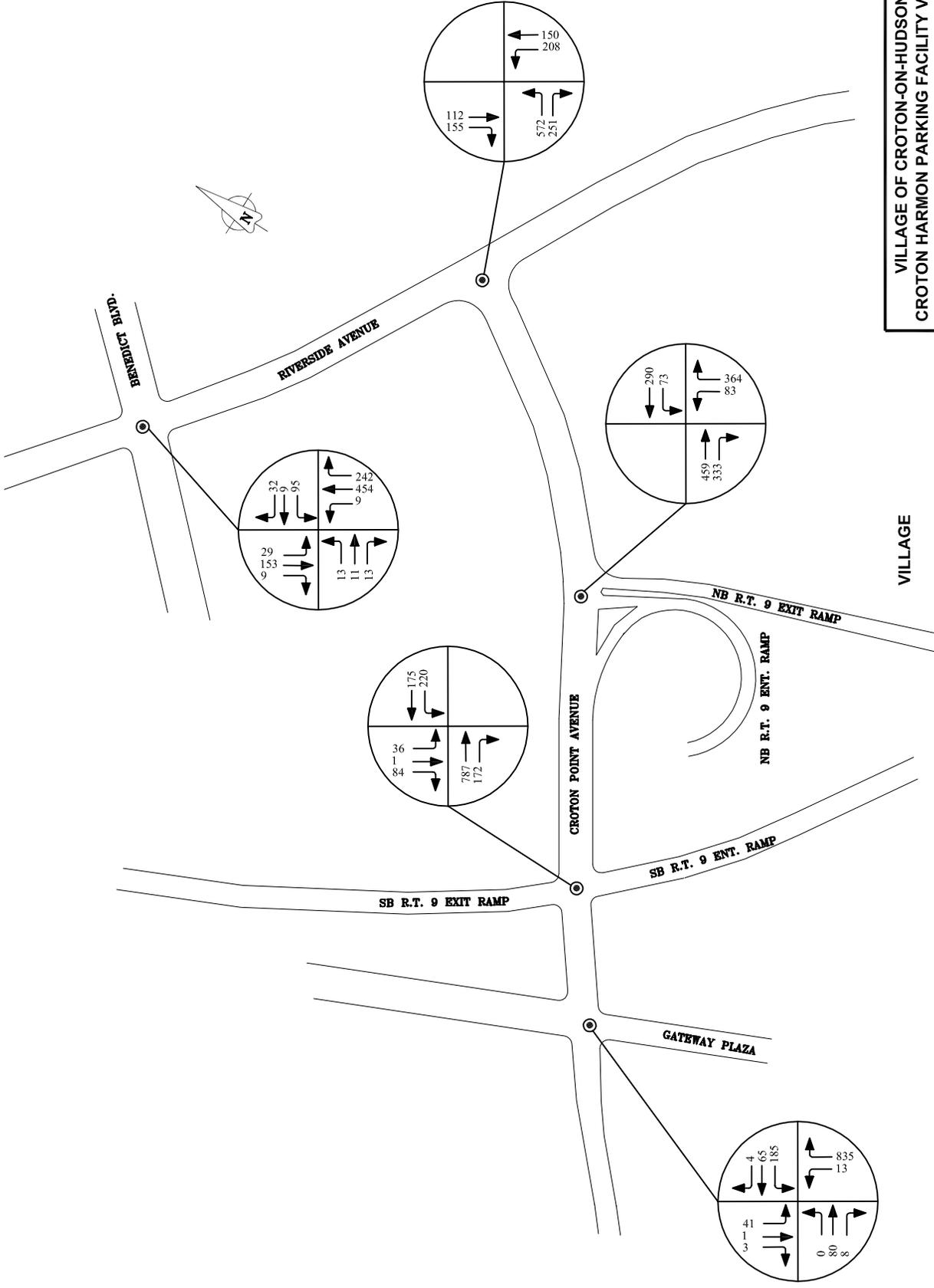


Table 3. 2013 Future No Build and Build Condition Weekday AM Intersection Analysis Results

Intersection and Approach		Weekday AM Peak Hour									
		2013 No Build Condition					2013 Build Condition				
		Queue (ft)	Mvmt	v/c	Delay (sec/veh)	LOS	Queue (ft)	Mvmt	v/c	Delay (sec/veh)	LOS
1 - Benedict Boulevard at S. Riverside Avenue		Signalized					Signalized				
Benedict Boulevard	EB	3	LTR	0.02	11.3	B	3	LTR	0.04	16.3	B
	WB	267	LTR	0.90	47.8	D	257	LTR	0.87	43.5	D
S. Riverside Avenue	NB	85	LT	0.30	12.2	B	28	LT	0.29	5.2	A
			R	0.14	2.9	A		R	0.14	0.4	A
	SB	404	LTR	0.85	28.3	C	497	LTR	0.82	30.3	C
		Overall Intersection					Overall Intersection				
		29.5					27.9				
		C					C				
2 - Croton Point Avenue at S. Riverside Avenue		Signalized					Signalized				
Croton Point Avenue	EB	65	L	0.21	10.1	B	94	L	0.63	31.8	C
			LR					LR			
S. Riverside Avenue	NB	54	L	0.29	28.9	C	21	L	0.17	5.8	A
			T	0.10	25.7	C		T	0.03	4.4	A
	SB	730	T	0.15	25.9	C	144	TR	0.53	6.9	A
			R	0.89	22.8	C		R	0.51	6.4	A
		Overall Intersection					Overall Intersection				
		20.7					11.9				
		C					B				
3 - Croton Point Avenue at U.S. 9 Northbound Ramps		Unsignalized					Signalized				
Croton Point Avenue	EB	0	T	0.07	0.0	A	5	T	0.17	1.7	A
			TR	0.11	0.0	A		TR			
	WB	1	LT	0.05	0.6	A	56	LT	0.56	7.2	A
			T	0.40	0.0	A		T			
Off-Ramp	NB	414	L	1.21	154.6	F	213	L	0.79	39.3	D
			R	0.20	10.3	B		R	0.32	6.3	A
		Overall Intersection					Overall Intersection				
		12.6					B				
4 - Croton Point Avenue at U.S. 9 Southbound Ramps		Unsignalized					Signalized				
Croton Point Avenue	EB	0	T	0.12	0.0	A	56	T	0.25	7.1	A
			TR	0.16	0.0	A		TR			
	WB	25	LT	0.25	5.8	A	482	LT	0.90	21.6	C
			T	0.44	0.0	A		T			
Off-Ramp	SB	724	LT	0.98	330.7	F	252	LTR	0.82	44.8	D
			R	1.35	194.7	F		R	0.79	42.3	D
		Overall Intersection					Overall Intersection				
		24.6					C				
5 - Croton Point Avenue at Veterans Plaza		Unsignalized					Signalized				
Croton Point Avenue	EB	Err	LTR	Err	Err	F	81	LTR	0.46	30.4	C
	WB	388	L	0.91	25.4	D	347	L	0.77	33.5	C
			TR	0.23	0.0	A		LTR	0.75	22.1	C
Veterans Plaza	NB	Err	LTR	8.56	Err	F	47	LTR	0.79	17.3	B
	SB	Err	LTR	11.30	Err	F	3	LTR	0.04	33.0	C
		Overall Intersection					Overall Intersection				
		26.1					C				

5.5 minutes to turn onto Croton Point Avenue. In addition, traffic operations on the westbound Benedict Avenue approach to S. Riverside Avenue would begin to deteriorate – operating at LOS D with over 45 sec/veh of delay during the weekday AM peak hour.

No Build condition arterial analyses along the existing signalized segment of project area roadway show a nominal 0- to 4-second increase in travel time along S. Riverside Avenue between Benedict Boulevard and Croton Point Avenue.

Detailed 2013 No Build condition intersection and arterial analyses results are provided in Appendix F.

Table 4. 2013 Future No Build and Build Condition Weekday PM Intersection Analysis Results

Intersection and Approach		Weekday AM Peak Hour									
		2013 No Build Condition					2013 Build Condition				
		Queue (ft)	Mvmt	v/c	Delay (sec/veh)	LOS	Queue (ft)	Mvmt	v/c	Delay (sec/veh)	LOS
1 - Benedict Boulevard at S. Riverside Avenue		Signalized					Signalized				
Benedict Boulevard	EB	26	LTR	0.13	14.9	B	20	LTR	0.19	12.3	B
	WB	88	LTR	0.48	23.8	C	61	LTR	0.61	22.2	C
S. Riverside Avenue	NB	204	LT	0.53	12.3	B	210	LT	0.49	7.1	A
			R	0.29	2.0	A		R	0.27	1.5	A
	SB	78	LTR	0.30	9.4	A	61	LTR	0.25	7.4	A
		Overall Intersection					Overall Intersection				
		11.4 B					8.4 A				
2 - Croton Point Avenue at S. Riverside Avenue		Signalized					Signalized				
Croton Point Avenue	EB	294	L	0.80	22.5	C	89	L	0.63	8.8	A
			LR					LR			
S. Riverside Avenue	NB	194	L	0.57	24.0	C	126	L	0.73	29.3	C
			T	0.26	15.7	B		T	0.34	14.0	B
	SB	81	T	0.22	15.3	B	46	T	0.28	10.3	B
			R	0.18	3.0	A		R	0.34	3.7	A
		Overall Intersection					Overall Intersection				
		19.2 B					11.7 B				
3 - Croton Point Avenue at U.S. 9 Northbound Ramps		Unsignalized					Signalized				
Croton Point Avenue	EB	0	T	0.25	0.0	A	38	T	0.62	4.4	A
			TR	0.39	0.0	A		TR			
	WB	8	LT	0.09	4.4	A	11	LT	0.44	3.7	A
			T	0.14	0.0	A		T			
Off-Ramp	NB	277	L	0.66	64.6	F	129	L	0.21	12.5	B
			R	0.93	55.1	F		R	0.82	24.7	C
		Overall Intersection					Overall Intersection				
		9.1 A									
4 - Croton Point Avenue at U.S. 9 Southbound Ramps		Unsignalized					Signalized				
Croton Point Avenue	EB	0	T	0.43	0.0	A	37	T	0.55	4.4	A
			TR	0.36	0.0	A		TR			
	WB	77	LT	0.53	18.1	C	38	LT	1.23dl	4.7	A
			T	0.08	0.0	A		T			
Off-Ramp	SB	75	LT	0.68	136.8	F	60	LT	0.13	20.8	C
			R	0.11	9.4	A		R	0.13	30.9	C
		Overall Intersection					Overall Intersection				
		6.2 A									
5 - Croton Point Avenue at Veterans Plaza		Unsignalized					Signalized				
Croton Point Avenue	EB	Err	LTR	Err	Err	F	53	LTR	0.60	32.9	C
	WB	14	L	0.16	8.0	A	58	L	0.45	12.2	B
			TR	0.05	0.0	A		TR	0.11	6.5	A
Veterans Plaza	NB	314	LTR	0.52	14.0	B	12	LTR	0.68	6.6	A
			R	0.90	31.8	D		R	0.68	6.1	A
	SB	Err	LTR	Err	Err	F	30	LTR	0.53	31.0	C
		Overall Intersection					Overall Intersection				
		10.3 B									

2013 BUILD CONDITIONS

Intersection and arterial traffic analyses were conducted for 2013 weekday AM and PM peak-hour Build conditions with proposed short-term improvements in place. The results of these analyses were compared to those for 2013 No Build conditions to ensure the benefit of recommended vehicle-related improvements. All short-term improvements (vehicular, pedestrian, and bicycle) are discussed below.

Recommended Improvements

Based on traffic analyses, the walkability and bikeability audit, the April 15 public meeting, and a walkthrough of the draft conceptual design that was conducted on June 12, 2008 with Village employees, trustees, and committee members, the following short-term

improvements are recommended for the project study area. These improvements are illustrated in Figure 6.

1. *Construction of a raised and pigmented shared bicycle/pedestrian path on both sides of Croton Point Avenue.* The eastbound path would begin on the west side of S. Riverside Avenue between Benedict Boulevard and Croton Point Avenue and would continue on the north side of Croton Point Avenue to the U.S. 9 southbound off-ramp. The westbound path would begin at the U.S. 9 southbound on-ramp and continue on the south side of Croton Point Avenue to S. Riverside Avenue. Due to limited right-of-way along Croton Point Avenue between the U.S. 9 southbound ramps and Veterans Plaza, the shared bicycle/pedestrian path cannot be extended to the train station. The shared paths will provide improved facilities for bicyclists and pedestrians. The eastbound path will replace narrow, cracked, and uneven sidewalk along S. Riverside Avenue and Croton Point Avenue. The westbound path will provide a facility where there is no sidewalk and only a shoulder between the U.S. 9 northbound off-ramp and S. Riverside Avenue. Although some bicyclists will still choose to travel with the stream of traffic, an alternative for the bicyclists will now be available. It should be noted that pedestrian lighting will be installed along both bicycle/pedestrian paths and that the construction of a path on the south side of Croton Point Avenue would require modifications to drainage along Croton Point Avenue between S. Riverside Avenue and the U.S. 9 northbound ramps.
2. *Sidewalk replacement.* Cracked and uneven sidewalk along Croton Point Avenue between the U.S. 9 ramps and Veterans Plaza, at all four corners of Veterans Plaza, and at the southwest corner of Croton Point Avenue at S. Riverside Avenue would be replaced.
3. *Traffic signal installation.* Traffic signals are recommended at the Croton Point Avenue intersections with the U.S. 9 northbound ramps, U.S. 9 southbound ramps, and Veterans Plaza. An actuated and coordinated traffic signal system with these and the existing S. Riverside signals would be developed. Detectors would be installed on the minor-street approaches, and signals would be timed to better accommodate traffic volumes in the study area. Traffic signals would also provide sufficient pedestrian crossing times. The traffic signals would improve overall traffic operations, improve accident conditions at the currently unsignalized locations, and eliminate the need for traffic control personnel.
4. *Pedestrian push button and countdown signal installation.* Pedestrian push buttons and countdown signals would be installed throughout the study area – at all new traffic signals and at some missing locations at existing signalized locations. The pedestrian push buttons would allow traffic signals to be pedestrian-activated. Pedestrian countdown signals would provide better guidance to pedestrians and create more of a pedestrian presence for motorists in the study area.
5. *Construction of a pedestrian refuge island.* A pedestrian refuge island would be constructed on the northeast corner of Croton Point Avenue and S. Riverside Avenue to provide a safer and more substantial location within the Croton on Hudson Veterinary



LEGEND:

EXISTING CURB	— DC —
PROPOSED CURB	—
PROPOSED SHARED BICYCLE AND PEDESTRIAN PATH	▬
PROPOSED SIDEWALK	▨
PROPOSED PEDESTRIAN RAMP	▬
PROPOSED PEDESTRIAN CROSSWALK (STREET PRINT OR HIGH VISIBILITY)	▬
PROPOSED SIGNAL	🚦

VILLAGE OF CROTON-ON-HUDSON

FIGURE 6

SHORT-TERM VEHICULAR, PEDESTRIAN AND BICYCLE IMPROVEMENT CONCEPTUAL PLAN

DRAWN BY _____ CADD FILE _____

Clinic parking lot for pedestrians to stand. This is advisable, since there is a bus stop on the corner and it is proposed that a high-visibility crosswalk be installed along the north approach to accommodate existing relatively high volumes of pedestrian traffic.

6. *Asphalt overlay.* An asphalt overlay is recommended along S. Riverside Avenue and Croton Point Avenue between Benedict Boulevard and Veterans Plaza (inclusive of the intersections). The overlay would provide an even surface for motorists, bicyclists, and crossing pedestrians. At present, the roadway is cracked with uneven pavement repairs.
7. *Pavement marking installation.* Pavement markings, including lane, lane-use, and high-visibility crosswalk markings are recommended throughout the study area to provide clear delineation of permitted vehicular and pedestrian movements. Reversible lane markings along Veterans Plaza would be updated to conform to NYSDOT standards.
8. *Sign installation.* New signs are recommended throughout the study area to clearly guide vehicular, pedestrian, and bicycle operations. Since the roadway is too narrow to provide bike lanes, SHARE THE ROAD signs are recommended along S. Riverside Avenue to alert motorists to the presence of bicyclists. BICYCLIST KEEP LEFT/ PEDESTRIANS KEEP RIGHT signs should be installed along the proposed shared bicycle/pedestrian paths to provide guidance to users. At the west end of the project study area where the roadway is too narrow to provide shared bicycle/pedestrian facilities, BICYCLIST DISMOUNT signs should be installed. At the Croton Point Avenue intersections, DO NOT BLOCK INTERSECTION signs should be installed to ensure the most effective operation of new traffic signals. Along Veterans Plaza and at Croton Point Avenue at S. Riverside Avenue and Veterans Plaza, signs should be installed to show allowed lane movements during particular time periods. In addition, variable message signs showing YIELD TO PEDESTRIANS IN CROSSWALK are recommended along the U.S. 9 southbound off-ramp to increase motorist awareness of pedestrians.
9. *Reconfiguration of U.S. 9 northbound ramps.* It is proposed to realign the intersection of the Croton Point Avenue and the U.S. 9 northbound ramps. The eastbound channelized right-turn would be eliminated so that right-turns would be made from the intersection proper. This will narrow the northbound off-ramp approach, reduce bicycle/pedestrian conflict points, reduce bicycle/pedestrian crossing distance, slow right-turning vehicles, and improve bicycle/pedestrian safety. This recommendation will require coordination with and approval by NYSDOT.
10. *Reconfiguration of U.S. 9 southbound off-ramp.* A second approximately 250-foot lane is recommended on the southbound off-ramp. This lane would allow shared left-turn/through/right-turn movements throughout the day or at least during the weekday AM peak period. This would improve overall traffic conditions in the area by making traffic operations at the congested Croton Point Avenue at U.S. 9 southbound ramps intersection more efficient. This recommendation will require coordination with and approval by NYSDOT.

11. *Relocation of existing bus stop.* It is recommended to relocate the bus stop on the north side of Croton Point Avenue beneath the U.S. 9 overpass to the U.S. 9 southbound on-ramp. This will reduce congestion caused by buses along Croton Point Avenue. It will bring the bus stop closer to the train station and allow bus/train transfers to be made without crossing Croton Point Avenue.

It is estimated that the cost of implementing these short-term improvements will be approximately \$1.5 million. Funding for these improvements has been requested through NYSDOT's Transportation Enhancements Program (TEP) – the application for which was submitted on June 27, 2008. A detailed cost estimate and notes from the April 15 public meeting from which some of the short-term, as well as long-term improvements, were derived are provided in Appendices H and I, respectively.

Analysis Results

Intersection and arterial analyses were conducted for 2013 Build conditions to assess the impacts of above short-term vehicle-related improvements. The results of weekday AM and PM peak-hour intersection analyses are provided in Tables 2 and 3, respectively. As indicated in the tables, traffic operations in the Croton Harmon study area would be better for Build conditions with the installation and coordination of traffic signals along the corridor than for No Build conditions. All lane movements would operate at generally acceptable LOS D with less than 45 sec/veh of delay or better during the weekday AM peak hour and at good LOS C with less than 35 sec/veh of delay or better during the weekday PM peak hour. With recommended signal timings and phasing, as documented in the Synchro analysis, the actuated approaches could operate at LOS D or better while the local traffic along S. Riverside Avenue and Croton Point Avenue, although no longer free-flowing, could operate at LOS C or better. It should be noted, however, that establishing the actual offsets between intersections should be done in the field. As indicated in Table 2, there are times during the weekday AM peak period when entering traffic volumes and resulting queue lengths may exceed storage capacity, as they do for existing conditions. To ensure the best traffic operations, offsets should be based on field observations, and DON'T BLOCK THE INTERSECTION regulations should be enforced.

Build condition arterial analyses along the proposed signalized segment of project area roadway indicate that it would take about 1 minute and 45 seconds to travel between Benedict Boulevard and Veterans Plaza in either direction during the weekday AM peak hour – approximately 45 seconds of which would be signal delay along Croton Point Avenue. It would take less than 1 minute and 30 seconds to travel between Benedict Boulevard and Veterans Plaza in either direction during the weekday PM peak hour – approximately 25 seconds of which would be signal delay along Croton Point Avenue. Delays to Croton Point Avenue are higher during the weekday AM peak period because more time must be allotted to the U.S. 9 northbound and southbound off-ramp traffic in the mornings than in the evenings.

Detailed 2013 Build condition intersection and arterial analyses results are provided in Appendix G.

ADDITIONAL/LONGER-TERM IMPROVEMENTS

In the process of speaking with the public and developing short-term improvements for which a TEP application has been submitted, the following additional long-term improvements have been identified.

1. The installation of SHARE THE ROAD signs north of the project study area between Benedict Boulevard and Oneida Avenue and of bicycle lanes between Oneida Avenue and U.S. 129/Maple Street to provide a continuous bicycle accommodation along S. Riverside Avenue to U.S. 129/Maple Street
2. Since S. Riverside Avenue is currently not wide enough to accommodate on- or off-street bicycle facilities, the acquisition of right-of-way along S. Riverside Avenue, in coordination with future development along the roadway between Benedict Boulevard and Croton Point Avenue, to facilitate on-street bicycle lanes and/or continuation of the raised shared bicycle/pedestrian path
3. The continuation of the River Walk bicycle/pedestrian trail from the U.S. 9 southbound on-ramp at Croton Point Avenue north of the project study area to Municipal Place
4. Consideration should be given to the construction of a bicycle/pedestrian overpass from the west end of Benedict Boulevard over U.S. 9 to a new bicycle/pedestrian path or roadway immediately north of the train station and to
5. The acquisition of property to accomplish the complete reconfiguration of the U.S. 9 southbound ramps (with a potential direct connection to the train station), which may especially be necessary should plans to construct a parking garage at the train station be implemented.

Based on discussions with the Village, it may be possible to implement the bicycle signing and striping north of the project area with available Village funds. If not, it is recommended that the Village contact NYSDOT and the New York Metropolitan Transportation Council (NYMTC) to identify the most likely funding sources for these and long-term improvements. NYSDOT Region 8 may elect to fully or partially fund improvements with State money, especially since the short-term modifications to the U.S. 9 northbound and southbound ramps at Croton Point Avenue and the potential long-term reconfiguration of the U.S. 9 southbound ramp would require NYSDOT involvement and approval. Or, NYSDOT may steer the Village toward acquiring federal funding. Based on research and a review of the Federal Highway Administration's *A Guide To Federal-Aid Programs And Projects*², it is possible that federal funding may be obtained from the NYSDOT/NYMTC Congestion Mitigation and Air Quality Improvement (CMAQ) program, straight Surface Transportation Program (STP), or affiliated STP TEP and Bicycle and Pedestrian Walkways program. Some improvements may also be federally funded by the New York State Department of Housing

² Federal Highway Administration Office of Program Administration. [A Guide to Federal-Aid Programs and Projects](http://www.fhwa.dot.gov/federalaid/projects.pdf). U.S. Department of Transportation, Federal Highway Administration. June 24, 2008. < <http://www.fhwa.dot.gov/federalaid/projects.pdf> >.

and Community Renewal (NYSDHCR) Community Development Block Grant (CDBG) program.

Detailed information regarding some of the potential federal funding sources is provided in Appendix J.

CONCLUSION

The goal of this project was to develop a conceptual plan to improve vehicular, pedestrian, and bicycle operations in the vicinity of Croton-Harmon Train Station. Based on field observations, traffic analyses, and community feedback, it was found that numerous short-term improvements could be made to improve conditions. As discussed previously and shown in Figure 6, the major short-term improvements include the following. The \$1.5 million in funding required to implement these and the additional improvements in Figure 6 will be applied for from NYSDOT's Transportation Enhancement Program.

- The construction of a raised shared bicycle/pedestrian path on either side of Croton Point Avenue
- The replacement of sidewalks
- The installation of actuated and coordinated traffic signals
- The reconfiguration of the U.S. 9 northbound and southbound off-ramps
- The repaving and re-striping of the study area roadways

Improvements outside of the project study area and/or that are more long-term could also be implemented. These improvements could include the following.

- Signing, striping, right-of-way acquisition to improve bicycle/pedestrian operations within and north of the project study area
- Construction of a River Walk bicycle/pedestrian trail extension from the U.S. 9 on-ramp to Municipal Place
- Property acquisition to effect a realignment/reconfiguration of the U.S. 9 southbound ramps

The costs and preferred funding sources for these projects are to be determined.

Appendix A

Manual Turning Movement Count Summaries

Croton Harmon Parking Facility Vehicular Pedestrian and Bicycle Study
Village of Croton-on-Hudson, Westchester County, New York

Turning Movement Count Summary

Intersection: Veterans Plaza and Croton Point Ave
 Date: Tuesday, April 8, 2008
 Time Period: Weekday AM Peak

Time	Volume	Parking Lot Southbound				Croton Point Ave Westbound				Veterans Plaza Northbound				Croton Point Ave Eastbound				Hourly Intersection Volume	
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total		
6:30 to 6:45	Car	0	0	0	0	163	85	3	251	2	0	29	31	0	12	0	12	0	12
	Truck/Bus	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	163	86	3	252	2	0	29	31	0	12	0	12	0	12
6:45 to 7:00	Car	0	0	0	0	144	89	1	234	4	0	35	39	0	6	1	7	0	7
	Truck/Bus	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	144	90	1	235	4	0	35	39	0	6	1	7	0	7
7:00 to 7:15	Car	0	0	0	0	284	61	5	350	2	0	59	61	0	11	4	15	0	15
	Truck/Bus	0	0	0	0	1	1	0	2	0	0	0	0	0	0	1	1	0	1
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	285	62	5	352	2	0	59	61	0	11	5	16	0	16
7:15 to 7:30	Car	1	0	0	1	222	60	5	287	0	0	64	64	0	16	3	19	0	19
	Truck/Bus	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
	Bicycle	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
	Total	1	0	0	1	222	61	5	288	0	0	64	64	0	16	3	19	0	1,377
7:30 to 7:45	Car	0	0	0	0	308	61	12	381	2	0	85	87	0	24	5	29	0	29
	Truck/Bus	0	0	0	0	1	1	0	2	0	0	1	1	9	1	11	11	0	11
	Bicycle	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0
	Total	0	0	0	0	309	62	12	383	2	0	86	88	9	25	6	40	0	1,593
7:45 to 8:00	Car	0	0	0	0	259	91	22	372	3	0	63	66	0	12	4	16	0	16
	Truck/Bus	0	0	0	0	1	1	0	2	0	0	0	0	0	0	1	1	0	1
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	260	92	22	374	3	0	63	66	0	12	5	17	0	1,769
8:00 to 8:15	Car	0	1	2	3	123	43	8	174	2	0	42	44	0	42	3	45	0	45
	Truck/Bus	0	0	0	0	0	1	0	1	0	0	0	0	4	1	5	5	0	5
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1
	Total	0	1	2	3	123	44	8	175	2	0	42	44	4	43	3	50	0	1,612
8:15 to 8:30	Car	0	0	1	1	128	16	16	160	2	0	37	39	0	45	1	46	0	46
	Truck/Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1
	Bicycle	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0
	Total	0	0	1	1	128	16	16	160	2	0	37	39	0	46	1	47	0	1,487
8:30 to 8:45	Car	0	0	0	0	13	7	3	23	0	0	13	13	0	9	0	9	0	9
	Truck/Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	13	7	3	23	0	0	13	13	0	9	0	9	0	1,021
		1	1	3		1,644	513	75		17	0	427		0	177	21			
		0	0	0		3	7	0		0	0	1		13	3	3			
		0	0	0		0	0	0		6	0	0		0	1	0			

Analysis Hour	Volumes	Parking Lot Southbound				Croton Point Ave Westbound				Veterans Plaza Northbound				Croton Point Ave Eastbound			
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total
7:00 to 8:00	% Truck/Bus	0.0%	#DIV/0!	#DIV/0!	0.0%	0.3%	1.4%	0.0%	0.5%	0.0%	#DIV/0!	0.4%	0.4%	100.0%	1.6%	15.8%	14.1%
	% Bicycles	0.0%	#DIV/0!	#DIV/0!	0.0%	0.0%	0.0%	0.0%	0.0%	42.9%	#DIV/0!	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%
	% HVs	0.0%	#DIV/0!	#DIV/0!	0.0%	0.3%	1.4%	0.0%	0.5%	0.0%	#DIV/0!	0.4%	0.4%	100.0%	1.6%	15.8%	14.1%
	PHF	0.25	#DIV/0!	#DIV/0!	0.25	0.87	0.75	0.50	0.91	0.58	#DIV/0!	0.79	0.79	0.25	0.64	0.79	0.58

Croton Harmon Parking Facility Vehicular Pedestrian and Bicycle Study
Village of Croton-on-Hudson, Westchester County, New York

Turning Movement Count Summary

Intersection: Veterans Plaza and Croton Point Ave
 Date: Tuesday, April 8, 2008
 Time Period: Weekday PM Peak

Time	Volume	Parking Lot Southbound				Croton Point Ave Westbound				Veterans Plaza Northbound				Croton Point Ave Eastbound				Hourly Intersection Volume
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	
		17:15 to 17:30	Car	0	1	0	1	34	15	1	50	1	1	18	20	0	19	
	Truck/Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	0	1	0	1	34	15	1	50	1	1	18	20	0	19	0	19	
17:30 to 17:45	Car	9	1	0	10	34	17	1	52	1	1	145	147	0	11	1	12	
	Truck/Bus	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	9	2	0	11	34	17	1	52	1	1	145	147	0	11	1	12	
17:45 to 18:00	Car	7	0	0	7	28	10	1	39	2	0	75	77	0	16	0	16	
	Truck/Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
	Total	7	0	0	7	28	10	1	39	2	0	75	77	0	16	0	16	
18:00 to 18:15	Car	10	0	0	10	49	22	0	71	2	0	173	175	0	32	0	32	739
	Truck/Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	10	0	0	10	49	22	0	71	2	0	173	175	0	32	0	32	
18:15 to 18:30	Car	9	0	0	9	43	11	1	55	6	0	278	284	0	19	3	22	
	Truck/Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
	Bicycle	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	
	Total	9	0	0	9	43	11	1	55	6	0	278	284	0	19	4	23	1,020
18:30 to 18:45	Car	5	0	0	5	33	11	1	45	0	0	99	99	0	15	1	16	
	Truck/Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	5	0	0	5	33	11	1	45	0	0	99	99	0	15	2	17	964
18:45 to 19:00	Car	13	1	1	15	43	15	2	60	4	0	209	213	0	7	1	8	
	Truck/Bus	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	13	1	3	17	43	15	2	60	4	0	209	213	0	7	1	8	1,123
19:00 to 19:15	Car	6	0	0	6	43	12	2	57	0	0	46	46	0	21	2	23	
	Truck/Bus	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	
	Bicycle	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	
	Total	6	0	1	7	43	12	2	57	0	0	46	46	0	21	3	24	969
19:15 to 19:30	Car	1	0	0	1	3	4	2	9	1	0	107	108	0	6	0	6	
	Truck/Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	1	0	0	1	3	4	2	9	1	0	107	108	0	6	0	6	722
		60	3	1		310	117	11		17	2	1,150		0	146	8		
		0	1	3		0	0	0		0	0	0		0	0	3		
		0	0	0		0	0	0		0	0	4		0	1	0		

Analysis Hour	Volumes	Parking Lot Southbound				Croton Point Ave Westbound				Veterans Plaza Northbound				Croton Point Ave Eastbound			
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total
		6:00 to 7:00	0.0%	0.0%	66.7%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	#DIV/0!	0.0%	0.0%	#DIV/0!	0.0%
	% Truck/Bus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	#DIV/0!	0.3%	0.3%	#DIV/0!	0.0%	0.0%	0.0%
	% Bicycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	#DIV/0!	0.3%	0.0%	#DIV/0!	0.0%	0.0%	0.0%
	% HVs	0.0%	0.0%	66.7%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	#DIV/0!	0.3%	0.0%	#DIV/0!	0.0%	28.6%	2.5%
	PHF	0.71	0.25	0.25	0.60	0.86	0.67	0.50	0.81	0.50	#DIV/0!	0.68	0.68	#DIV/0!	0.57	0.44	0.63

**Croton Harmon Parking Facility Vehicular Pedestrian and Bicycle Study
Croton-on-Hudson, Westchester County, New York**

Turning Movement Count Summary

Intersection: Southbound U.S. Route 9 Ramps & Croton Point Ave
 Date: Tuesday, April 8, 2008
 Time Period: Weekday AM Peak

Time	Volume	SB U.S. Rt 9 Exit Ramp				SB U.S. Rt 9 Ent. Ramp				Croton Point Ave								Hourly Intersection Volume
		Southbound				Northbound				Westbound				Eastbound				
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	
6:30 to 6:45	Car	4	0	96	100	0	0	0	0	0	24	155	0	179	0	26	15	41
	Truck/Bus	1	0	0	1	0	0	0	0	0	1	1	0	2	0	0	1	1
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	5	0	96	101	0	0	0	0	0	25	156	0	181	0	26	16	42
6:45 to 7:00	Car	6	0	117	123	0	0	0	0	0	42	117	0	159	0	25	16	41
	Truck/Bus	1	0	0	1	0	0	0	0	0	2	1	0	3	0	0	1	1
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	7	0	117	124	0	0	0	0	0	44	118	0	162	0	25	17	42
7:00 to 7:15	Car	3	1	104	108	0	0	0	0	0	37	246	0	283	0	37	33	70
	Truck/Bus	1	0	0	1	0	0	0	0	0	2	2	0	4	0	0	2	2
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	4	1	104	109	0	0	0	0	0	39	248	0	287	0	37	35	72
7:15 to 7:30	Car	11	0	139	150	0	0	0	0	0	43	148	0	191	0	59	22	81
	Truck/Bus	2	0	1	3	0	0	0	0	0	3	0	0	3	0	0	1	1
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	13	0	140	153	0	0	0	0	0	46	148	0	194	0	59	23	82
7:30 to 7:45	Car	2	0	125	127	0	0	0	0	0	54	256	0	310	0	80	29	109
	Truck/Bus	1	0	1	2	0	0	0	0	0	3	1	0	4	0	0	2	2
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	3	0	126	129	0	0	0	0	0	57	257	0	314	0	80	31	111
7:45 to 8:00	Car	4	0	141	145	0	0	0	0	0	62	231	0	293	0	47	28	75
	Truck/Bus	1	0	1	2	0	0	0	0	0	4	1	0	5	0	0	2	2
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	5	0	142	147	0	0	0	0	0	66	232	0	298	0	47	30	77
8:00 to 8:15	Car	4	1	90	95	0	0	0	0	0	55	84	0	139	0	53	31	84
	Truck/Bus	1	0	0	1	0	0	0	0	0	3	1	0	4	0	0	2	2
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
	Total	5	1	90	96	0	0	0	0	0	58	85	0	143	0	53	33	86
8:15 to 8:30	Car	5	1	67	73	0	0	0	0	0	57	93	0	150	0	59	23	82
	Truck/Bus	1	0	0	1	0	0	0	0	0	3	0	0	3	0	0	1	1
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	6	1	67	74	0	0	0	0	0	60	93	0	153	0	59	24	83
8:30 to 8:45	Car	2	1	7	10	0	0	0	0	0	15	16	0	31	0	16	6	22
	Truck/Bus	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	2	1	7	10	0	0	0	0	0	16	16	0	32	0	16	6	22
		41	4	886		0	0	0			389	1,346	0		0	402	203	
		9	0	3		0	0	0			22	7	0		0	0	12	
		0	0	0		0	0	0			0	0	0		0	1	0	

Analysis Hour	Volumes	SB U.S. Rt 9 Exit Ramp				SB U.S. Rt 9 Ent. Ramp				Croton Point Ave							
		Southbound				Northbound				Westbound				Eastbound			
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total
7:00 to 8:00	% Truck/Bus	20.0%	0.0%	0.6%	1.5%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	5.8%	0.4%	#DIV/0!	1.4%	#DIV/0!	0.0%	5.9%	2.0%
	% Bicycles	0.0%	0.0%	0.0%	0.0%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0%	0.0%	#DIV/0!	0.0%	#DIV/0!	0.0%	0.0%	0.0%
	% HVs	20.0%	0.0%	0.6%	1.5%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	5.8%	0.4%	#DIV/0!	1.4%	#DIV/0!	0.0%	5.9%	2.0%
	PHF	0.48	0.25	0.90	0.88	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.79	0.86	#DIV/0!	0.87	#DIV/0!	0.70	0.85	0.77

**Croton Harmon Parking Facility Vehicular Pedestrian and Bicycle Study
Croton-on-Hudson, Westchester County, New York**

Turning Movement Count Summary

Intersection: Southbound U.S. Route 9 Ramps & Croton Point Ave
 Date: Tuesday, April 8, 2008
 Time Period: Weekday PM Peak

Time	Volume	SB U.S. Rt 9 Exit Ramp				SB U.S. Rt 9 Ent. Ramp				Croton Point Ave								Hourly Intersection Volume
		Southbound				Northbound				Westbound				Eastbound				
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	
17:15 to 17:30	Car Truck/Bus Bicycle Total	11 0 0 11	1 0 0 1	17 1 0 18	29 1 0 30	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	52 1 0 53	33 0 0 33	0 0 0 0	85 1 0 86	0 0 0 0	21 0 0 21	16 0 0 16	37 0 0 37	
17:30 to 17:45	Car Truck/Bus Bicycle Total	14 1 0 15	0 0 0 0	19 1 0 20	33 2 0 35	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	63 1 0 64	33 0 0 33	0 0 0 0	96 1 0 97	0 0 0 0	133 0 0 133	32 0 0 32	165 0 0 165	
17:45 to 18:00	Car Truck/Bus Bicycle Total	8 0 0 8	0 0 0 0	10 0 0 10	18 0 0 18	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	56 1 0 57	29 0 0 29	0 0 0 0	85 1 0 86	0 0 0 0	78 0 0 78	20 0 1 21	98 0 1 99	
18:00 to 18:15	Car Truck/Bus Bicycle Total	12 0 0 12	0 0 0 0	15 1 0 16	27 1 0 28	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	52 1 0 53	56 0 0 56	0 0 0 0	108 1 0 109	0 0 0 0	172 0 0 172	43 1 0 44	215 1 0 216	1,005
18:15 to 18:30	Car Truck/Bus Bicycle Total	12 0 0 12	0 0 0 0	20 1 0 21	32 1 0 33	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	53 1 0 54	35 0 0 35	0 0 0 0	88 1 0 89	0 0 0 0	250 0 0 250	56 1 0 57	306 1 0 307	1,281
18:30 to 18:45	Car Truck/Bus Bicycle Total	4 0 0 4	0 1 0 1	19 1 0 20	23 2 0 25	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	49 1 0 50	26 0 0 26	0 0 0 0	75 1 0 76	0 0 0 0	98 0 0 98	21 0 0 21	119 0 0 119	1,204
18:45 to 19:00	Car Truck/Bus Bicycle Total	5 0 0 5	0 0 0 0	18 1 0 19	23 1 0 24	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	42 1 0 43	42 0 0 42	0 0 0 0	84 1 0 85	0 0 0 0	195 0 0 195	34 0 0 34	229 0 0 229	1,340
19:00 to 19:15	Car Truck/Bus Bicycle Total	6 0 0 6	0 0 0 0	16 1 0 17	22 1 0 23	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	45 1 0 46	41 0 0 41	0 0 0 0	86 1 0 87	0 0 0 0	60 0 0 60	13 0 0 13	73 0 0 73	1,170
19:15 to 19:30	Car Truck/Bus Bicycle Total	1 0 0 1	0 0 0 0	1 0 0 1	2 0 0 2	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	13 0 0 13	8 0 0 8	0 0 0 0	21 0 0 21	0 0 0 0	100 0 0 100	14 0 0 14	114 0 0 114	878
		73 1 0 73	1 1 0 1	135 7 0 142	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	425 8 0 433	303 0 0 303	0 0 0 0	0 0 0 0	0 0 0 0	1,107 0 4 1,111	249 2 1 252		

Analysis Hour	Volumes	SB U.S. Rt 9 Exit Ramp				SB U.S. Rt 9 Ent. Ramp				Croton Point Ave								
		Southbound				Northbound				Westbound				Eastbound				
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	
6:00 to 7:00	% Truck/Bus % Bicycles % HVs PHF	33 0.0% 0.0% 0.69	1 100.0% 0.0% 0.25	76 5.3% 0.0% 0.90	110 4.5% 0.0% 0.83	0 #DIV/0! #DIV/0! #DIV/0!	0 #DIV/0! #DIV/0! #DIV/0!	0 #DIV/0! #DIV/0! #DIV/0!	0 #DIV/0! #DIV/0! #DIV/0!	200 2.0% 0.0% 0.93	159 0.0% 0.0% 0.71	0 #DIV/0! #DIV/0! #DIV/0!	359 0.8% 0.0% 0.82	0 #DIV/0! #DIV/0! #DIV/0!	715 0.0% 0.3% 0.72	156 1.3% 0.0% 0.68	871 0.0% 0.2% 0.71	

**Croton Harmon Parking Facility Vehicular Pedestrian and Bicycle Study
Croton-on-Hudson, Westchester County, New York**

Turning Movement Count Summary

Intersection: Northbound U.S. Route 9 Ramps & Croton Point Ave
Date: Tuesday, April 8, 2008
Time Period: Weekday AM Peak

Time	Volume	NB U.S. Route 9 Ramps								Croton Point Ave								Hourly Intersection Volume
		Southbound				Northbound				Westbound				Eastbound				
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	
6:30 to 6:45	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	60 1 0 61	0 1 0 0	20 1 0 21	80 2 0 82	7 1 0 8	85 2 0 87	0 0 0 0	92 3 0 95	0 2 0 4	11 0 0 11	13 2 0 15		
6:45 to 7:00	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	49 1 0 50	0 1 0 0	32 2 0 34	81 3 0 84	6 0 0 6	95 4 0 99	0 0 0 0	101 4 0 105	0 11 0 14	9 3 0 9	20 3 0 23		
7:00 to 7:15	Car Truck/Bus Bicycle Total	0 0 0 0	0 2 0 0	0 0 0 0	0 2 0 0	81 2 0 83	0 1 0 0	15 1 0 16	96 3 0 99	3 0 0 3	198 5 0 203	0 5 0 0	201 5 0 206	0 3 0 24	9 0 0 9	30 3 0 33		
7:15 to 7:30	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	37 1 0 38	0 2 0 0	26 3 0 28	63 3 0 66	7 0 0 7	149 5 1 154	0 5 1 0	156 5 1 161	0 5 0 42	26 1 0 27	63 6 0 69	1,038	
7:30 to 7:45	Car Truck/Bus Bicycle Total	0 0 0 0	0 2 0 0	0 0 0 0	0 2 0 0	71 2 0 73	0 2 0 0	33 2 0 35	104 4 0 108	5 0 0 5	225 8 2 233	0 8 2 0	230 8 2 238	0 30 0 35	31 1 0 32	61 6 0 67	1,259	
7:45 to 8:00	Car Truck/Bus Bicycle Total	0 0 0 0	0 2 0 0	0 0 0 0	0 2 0 0	78 2 0 80	0 3 0 0	40 5 0 43	118 5 0 123	3 0 0 3	189 6 0 195	0 6 0 0	192 6 0 198	0 4 0 26	22 1 0 23	44 5 0 49	1,417	
8:00 to 8:15	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	29 1 0 30	0 2 0 0	24 3 0 26	53 3 0 56	7 1 0 8	106 3 2 109	0 2 0 0	113 4 2 117	0 28 0 32	24 1 0 25	52 5 0 57	1,309	
8:15 to 8:30	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	30 1 0 31	0 2 0 0	21 3 0 23	51 3 0 54	7 1 0 8	105 3 2 108	0 4 2 0	112 4 2 116	0 36 0 40	24 1 0 25	60 5 0 65	1,248	
8:30 to 8:45	Car Truck/Bus Bicycle Total	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	4 0 0 4	0 1 0 0	12 1 0 13	16 1 0 17	0 0 0 0	6 0 0 6	0 0 0 0	6 0 0 6	0 0 0 0	2 0 0 2	2 0 0 2	860	
		0	0	0	0	439	0	223	396	45	1,158	0	803	0	187	158		
		0	0	0	0	11	0	16	3	36	0	3	0	30	5			
		0	0	0	0	0	0	0	0	7	0	0	0	0	0			

Analysis Hour	Volumes	NB U.S. Route 9 Ramps								Croton Point Ave							
		Southbound				Northbound				Westbound				Eastbound			
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total
7:00 to 8:00	% Truck/Bus % Bicycles % HVs PHF	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	2.6% 0.0% 2.6% 0.83	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	6.6% 0.0% 6.6% 0.71	3.8% 0.0% 3.8% 0.80	0.0% 0.0% 0.0% 0.64	3.1% 0.4% 3.1% 0.84	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	3.0% 0.4% 3.0% 0.84	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	13.4% 0.0% 13.4% 0.76	3.3% 0.0% 3.3% 0.71	9.2% 0.0% 9.2% 0.79

**Croton Harmon Parking Facility Vehicular Pedestrian and Bicycle Study
Croton-on-Hudson, Westchester County, New York**

Turning Movement Count Summary

Intersection: Northbound U.S. Route 9 Ramps & Croton Point Ave
Date: Tuesday, April 8, 2008
Time Period: Weekday PM Peak

Time	Volume	NB U.S. Route 9 Ramps								Croton Point Ave								Hourly Intersection Volume	
		Southbound				Northbound				Westbound				Eastbound					
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total		
17:15 to 17:30	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	23 1 0 0	0 1 0 0	111 1 0 0	134 2 0 0	22 0 0 0	56 2 0 0	0 0 0 0	78 2 0 0	0 0 0 0	3 0 0 0	10 0 0 0	13 0 0 0		
17:30 to 17:45	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	16 1 0 0	0 1 0 0	94 1 0 0	110 2 0 0	23 1 0 0	72 1 0 0	0 0 0 0	95 2 0 0	0 0 0 0	72 2 0 0	52 0 0 0	124 2 0 0		
17:45 to 18:00	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	18 1 0 0	0 1 0 0	100 1 0 0	118 2 0 0	15 0 0 0	60 1 0 0	0 0 0 0	75 1 0 0	0 0 0 0	50 2 0 0	36 0 0 0	86 2 0 0		
18:00 to 18:15	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	22 1 0 0	0 1 0 0	102 1 0 0	124 2 0 0	20 0 0 0	77 2 0 0	0 0 0 0	97 2 0 0	0 0 0 0	114 2 0 0	65 0 0 0	179 2 0 0	1,254	
18:15 to 18:30	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	21 1 0 0	0 1 0 0	91 1 0 0	112 2 0 0	15 0 0 0	61 0 0 0	0 0 0 0	76 0 0 0	0 0 0 0	128 1 2 0	117 2 0 0	245 3 0 0		
18:30 to 18:45	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	13 1 0 0	0 1 0 0	65 1 0 0	78 2 0 0	16 0 0 0	71 1 0 0	0 0 0 0	87 1 0 0	0 0 0 0	65 0 0 0	45 0 0 0	110 0 0 0	1,463	
18:45 to 19:00	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	15 1 0 0	0 1 0 0	69 1 0 0	84 2 0 0	15 0 0 0	52 0 0 0	0 0 0 0	67 0 0 0	0 0 0 0	107 0 0 0	74 0 0 0	181 0 0 0	1,406	
19:00 to 19:15	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	20 1 0 0	0 1 0 0	47 1 0 0	67 2 0 0	14 0 0 0	60 1 0 0	0 0 0 0	74 1 0 0	0 0 0 0	58 0 0 0	24 0 0 0	82 0 0 0	1,456	
19:15 to 19:30	Car Truck/Bus Bicycle Total	0 0 0 0	0 1 0 0	0 0 0 0	0 1 0 0	2 1 0 0	0 1 0 0	7 1 0 0	9 2 0 0	0 0 0 0	4 0 0 0	0 0 0 0	4 0 0 0	0 0 0 0	0 0 0 0	10 0 0 0	10 0 0 0	1,275	
		0	0	0	0	150	0	686	846	140	513	0	653	0	597	433			
		0	0	0	0	8	0	7	15	1	8	0	9	0	7	2			
		0	0	0	0	0	0	0	0	0	0	0	0	0	2	0			

Analysis Hour	Volumes	NB U.S. Route 9 Ramps								Croton Point Ave							
		Southbound				Northbound				Westbound				Eastbound			
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total
6:00 to 7:00	% Truck/Bus % Bicycles % HVs PHF	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	5.3% 0.0% 5.3% 0.82	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	1.2% 0.0% 1.2% 0.80	1.2% 0.0% 2.0% 0.81	0.0% 0.0% 0.0% 0.83	1.1% 0.0% 1.1% 0.84	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	0.6% 0.0% 0.9% 0.83	#DIV/0! #DIV/0! #DIV/0! #DIV/0!	0.7% 0.5% 1.2% 0.81	0.7% 0.0% 0.7% 0.64	0.0% 0.0% 0.7% 0.73

Croton Harmon Parking Facility Vehicular Pedestrian and Bicycle Study
Croton-on-Hudson, Westchester County, New York

Turning Movement Count Summary

Intersection: S. Riverside Ave & Croton Point Ave
 Date: Tuesday, April 8, 2008
 Time Period: Weekday AM Peak

Time	Volume	S. Riverside Ave										Croton Point Ave								Hourly Intersection Volume
		Southbound				Northbound				Westbound				Eastbound						
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total			
6:30 to 6:45	Car Truck/Bus Bicycle Total	0 0 0 0	4 0 0 4	82 2 0 84	86 2 0 88	10 1 0 11	3 0 0 3	0 0 0 0	13 1 0 14	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	16 2 0 18	0 0 0 0	6 1 0 7	22 3 0 25			
6:45 to 7:00	Car Truck/Bus Bicycle Total	0 0 0 0	6 0 0 6	96 3 0 99	102 3 0 105	5 1 0 6	6 1 0 7	0 0 0 0	11 2 0 13	0 0 0 0	0 0 0 0	0 0 0 0	0 4 0 4	31 0 0 31	0 0 0 0	12 1 0 13	43 5 0 48			
7:00 to 7:15	Car Truck/Bus Bicycle Total	0 0 0 0	14 0 0 14	197 5 0 202	211 5 0 216	4 0 0 4	3 0 0 3	0 0 0 0	7 0 0 7	0 0 0 0	0 0 0 0	0 0 0 0	28 3 0 31	0 0 0 0	8 1 0 9	36 4 0 40				
7:15 to 7:30	Car Truck/Bus Bicycle Total	0 0 0 0	9 0 0 9	149 4 1 153	158 4 1 162	7 1 0 8	5 1 0 6	0 0 0 0	12 2 0 14	0 0 0 0	0 0 0 0	0 0 0 0	0 5 0 5	48 0 0 48	0 0 0 0	15 2 0 17	63 7 0 70			
7:30 to 7:45	Car Truck/Bus Bicycle Total	0 0 0 0	12 0 0 12	211 6 2 217	223 6 2 229	19 2 0 21	5 1 0 6	0 0 0 0	24 3 0 27	0 0 0 0	0 0 0 0	0 0 0 0	48 5 0 53	3 1 0 4	12 1 0 13	63 7 0 70				
7:45 to 8:00	Car Truck/Bus Bicycle Total	0 0 0 0	18 0 0 18	178 5 0 183	196 5 0 201	14 1 0 15	7 1 0 8	0 0 0 0	21 2 0 23	0 0 0 0	0 0 0 0	0 0 0 0	52 6 0 58	0 0 0 0	10 1 0 11	62 7 0 69				
8:00 to 8:15	Car Truck/Bus Bicycle Total	0 0 0 0	18 0 0 18	103 3 2 106	121 3 2 124	10 1 0 11	4 1 0 5	0 0 0 0	14 2 0 16	0 0 0 0	0 0 0 0	0 0 0 0	41 5 0 46	0 0 0 0	11 1 0 12	52 6 0 58				
8:15 to 8:30	Car Truck/Bus Bicycle Total	1 0 0 1	11 0 0 11	104 3 2 107	116 3 2 119	8 1 0 9	5 1 0 6	0 0 0 0	13 2 0 15	0 0 0 0	0 0 0 0	0 0 0 0	46 5 0 51	0 0 0 0	11 1 0 12	57 6 0 63				
8:30 to 8:45	Car Truck/Bus Bicycle Total	0 0 0 0	0 0 0 0	6 0 0 6	6 0 0 6	0 0 0 0	2 0 0 2	0 0 0 0	2 0 0 2	0 0 0 0	0 0 0 0	0 0 0 0	4 0 0 4	0 0 0 0	1 0 0 1	5 0 0 5				
		1	92	1,126		77	40	0		0	0	0		314	3	86				
		0	0	31		8	6	0		0	0	0		35	1	9				
		0	0	7		0	0	0		0	0	0		0	0	0				

Analysis Hour	Volumes	S. Riverside Ave								Croton Point Ave							
		Southbound				Northbound				Westbound				Eastbound			
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total
7:00 to 8:00	% Truck/Bus % Bicycles % HVs PHF	#DIV/0!	0.0%	2.6%	2.5%	8.3%	13.0%	#DIV/0!	9.9%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	9.7%	25.0%	10.0%	10.0%
		#DIV/0!	0.0%	0.4%	0.4%	0.0%	0.0%	#DIV/0!	0.0%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0%	0.0%	0.0%	0.0%
		#DIV/0!	0.0%	2.6%	2.5%	8.3%	13.0%	#DIV/0!	9.9%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	9.7%	25.0%	10.0%	10.0%
		#DIV/0!	0.74	0.87	0.88	0.57	0.72	#DIV/0!	0.66	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.84	0.25	0.74	0.89

Croton Harmon Parking Facility Vehicular Pedestrian and Bicycle Study
Croton-on-Hudson, Westchester County, New York

Turning Movement Count Summary

Intersection: S. Riverside Ave & Croton Point Ave
 Date: Tuesday, April 8, 2008
 Time Period: Weekday PM Peak

Time	Volume	S. Riverside Ave										Croton Point Ave										Hourly Intersection Volume
		Southbound					Northbound					Westbound					Eastbound					
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total					
17:15 to 17:30	Car Truck/Bus Bicycle Total	0 0 0 0	18 0 0 18	37 1 0 38	55 1 0 56	41 1 0 42	34 1 0 35	0 0 0 0	75 2 0 77	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	68 1 0 69	0 0 0 0	46 0 0 46	114 1 0 115					
17:30 to 17:45	Car Truck/Bus Bicycle Total	0 0 0 0	14 0 0 14	48 1 0 49	62 1 0 63	47 1 0 48	24 0 0 24	0 0 0 0	71 1 0 72	0 0 0 0	0 0 0 0	0 0 0 0	115 2 0 117	0 0 0 0	51 1 0 52	166 3 0 169						
17:45 to 18:00	Car Truck/Bus Bicycle Total	0 0 0 0	19 0 0 19	41 1 0 42	60 1 0 61	34 0 0 34	29 0 0 29	0 0 0 0	63 0 0 63	0 0 0 0	0 0 0 0	0 0 0 0	98 2 0 100	0 0 0 0	52 1 0 53	150 3 0 153						
18:00 to 18:15	Car Truck/Bus Bicycle Total	0 0 0 0	25 0 0 25	52 1 0 53	77 1 0 78	45 1 0 46	33 0 0 33	0 0 0 0	78 2 0 80	0 0 0 0	0 0 0 0	0 0 0 0	145 2 0 147	0 0 0 0	71 1 0 72	216 3 0 219						
18:15 to 18:30	Car Truck/Bus Bicycle Total	0 0 0 0	33 0 0 33	29 0 0 29	62 0 0 62	47 0 0 47	32 0 0 32	0 0 0 0	79 0 0 79	0 0 0 0	0 0 0 0	0 0 0 0	150 2 0 152	0 0 0 0	69 0 0 69	219 2 0 221						
18:30 to 18:45	Car Truck/Bus Bicycle Total	0 0 0 0	20 0 0 20	29 1 0 30	49 1 0 50	58 1 0 59	36 0 0 36	0 0 0 0	94 0 0 94	0 0 0 0	0 0 0 0	0 0 0 0	83 1 0 84	0 0 0 0	47 0 0 47	130 1 0 131						
18:45 to 19:00	Car Truck/Bus Bicycle Total	0 0 0 0	24 0 0 24	29 0 0 29	53 0 0 53	38 0 0 38	34 0 0 34	0 0 0 0	72 0 0 72	0 0 0 0	0 0 0 0	0 0 0 0	136 1 0 137	0 0 0 0	40 0 0 40	176 1 0 177						
19:00 to 19:15	Car Truck/Bus Bicycle Total	0 0 0 0	22 0 0 22	38 1 0 39	60 1 0 61	36 0 0 36	26 0 0 26	0 0 0 0	62 0 0 62	0 0 0 0	0 0 0 0	0 0 0 0	68 0 0 68	0 0 0 0	37 0 0 37	105 0 0 105						
19:15 to 19:30	Car Truck/Bus Bicycle Total	0 0 0 0	1 0 0 1	1 0 0 1	2 0 0 2	3 0 0 3	3 0 0 3	0 0 0 0	6 0 0 6	0 0 0 0	0 0 0 0	0 0 0 0	1 0 0 1	0 0 0 0	3 0 0 3	4 0 0 4						
		0	176	304	684	349	251	0	600	0	0	0	864	0	416	1,291						
		0	0	6	3	2	0	0	0	0	0	0	11	0	3	1,206						
		0	0	0	0	0	0	0	0	0	0	0	2	0	0	1,320						

Analysis Hour	Volumes	S. Riverside Ave										Croton Point Ave									
		Southbound					Northbound					Westbound					Eastbound				
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total				
6:00 to 7:00	% Truck/Bus % Bicycles PHF	#DIV/0!	0.0%	1.4%	0.8%	0.5%	0.7%	#DIV/0!	0.0%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.2%	#DIV/0!	0.4%	0.3%				
		#DIV/0!	0.0%	0.0%	0.0%	0.0%	0.0%	#DIV/0!	0.0%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.4%	#DIV/0!	0.0%	0.0%				
		#DIV/0!	0.0%	1.4%	0.8%	0.5%	0.7%	#DIV/0!	0.6%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.5%	#DIV/0!	0.4%	0.9%				
		#DIV/0!	0.77	0.67	0.78	0.81	0.94	#DIV/0!	0.86	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.86	#DIV/0!	0.79	0.85				

Croton Harmon Parking Facility Vehicular Pedestrian and Bicycle Study
Croton-on-Hudson, Westchester County, New York

Turning Movement Count Summary

Intersection: Benedict Blvd & S. Riverside Ave
 Date: Tuesday, April 8, 2008
 Time Period: Weekday AM Peak

Time	Volume	S. Riverside Ave								Benedict Blvd								Hourly Intersection Volume
		Southbound				Northbound				Westbound				Eastbound				
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	
6:30 to 6:45	Car	1	56	2	59	2	14	5	21	29	0	2	31	0	0	2	2	773
	Truck/Bus	0	1	0	1	1	2	0	3	0	0	0	0	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	1	57	2	60	3	16	5	24	29	0	2	31	0	0	2	2	
6:45 to 7:00	Car	1	82	1	84	0	24	15	39	36	0	2	38	0	0	2	2	967
	Truck/Bus	0	2	0	2	0	4	0	4	1	0	0	1	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	1	84	1	86	0	28	15	43	37	0	2	39	0	0	2	2	
7:00 to 7:15	Car	0	142	3	145	0	21	8	29	72	0	3	75	0	0	1	1	1,073
	Truck/Bus	0	3	0	3	0	4	0	4	1	0	0	1	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	0	145	3	148	0	25	8	33	73	0	3	76	0	0	1	1	
7:15 to 7:30	Car	0	99	1	100	0	38	21	59	55	1	2	58	0	0	0	0	967
	Truck/Bus	0	2	0	2	0	7	1	8	1	0	0	1	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	
	Total	0	101	1	102	0	45	22	67	56	1	2	59	0	0	0	0	
7:30 to 7:45	Car	0	143	5	148	1	39	17	57	87	0	5	92	0	0	0	0	967
	Truck/Bus	0	3	1	4	0	7	1	8	1	0	1	2	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	
	Total	0	146	6	152	1	46	18	65	88	0	6	94	0	0	0	0	
7:45 to 8:00	Car	1	111	3	115	2	36	28	66	73	1	6	80	0	1	1	2	1,073
	Truck/Bus	0	2	1	3	0	7	1	8	1	0	1	2	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	1	113	4	118	2	43	29	74	74	1	7	82	0	1	1	2	
8:00 to 8:15	Car	1	68	7	76	1	26	16	43	57	0	3	60	0	1	2	3	1,007
	Truck/Bus	0	1	1	2	0	5	1	6	1	0	0	1	0	1	0	1	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	1	69	8	78	1	31	17	49	58	0	3	61	0	2	2	4	
8:15 to 8:30	Car	2	51	3	56	2	38	8	48	56	1	4	61	0	1	4	5	963
	Truck/Bus	0	1	1	2	0	7	0	7	1	0	1	2	0	2	1	3	
	Bicycle	0	1	0	1	0	0	0	0	2	0	0	2	0	0	0	0	
	Total	2	52	4	58	2	45	8	55	57	1	5	63	0	3	5	8	
8:30 to 8:45	Car	0	1	0	1	0	2	3	5	5	0	0	5	0	0	1	1	664
	Truck/Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	0	1	0	1	0	2	3	5	5	0	0	5	0	0	1	1	
		6	753	25	8	238	121	470	3	27	0	3	13	0	3	13		
		0	15	4	1	43	4	7	0	3	0	3	1	0	3	1		
		0	1	0	0	0	0	4	0	0	0	0	0	0	0	0		

Analysis Hour	Volumes	S. Riverside Ave								Benedict Blvd							
		Southbound				Northbound				Westbound				Eastbound			
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total
7:00 to 8:00	% Truck/Bus	0.0%	2.0%	14.3%	2.3%	0.0%	15.7%	3.9%	11.7%	1.4%	0.0%	11.1%	1.9%	#DIV/0!	0.0%	0.0%	0.0%
	% Bicycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.6%	#DIV/0!	0.0%	0.0%	0.0%
	% HVs	0.0%	2.0%	14.3%	2.3%	0.0%	15.7%	3.9%	11.7%	1.4%	0.0%	11.1%	1.9%	#DIV/0!	0.0%	0.0%	0.0%
	PHF	0.25	0.86	0.58	0.86	0.38	0.86	0.66	0.81	0.83	0.50	0.64	0.83	#DIV/0!	0.25	0.50	0.38

**Croton Harmon Parking Facility Vehicular Pedestrian and Bicycle Study
Croton-on-Hudson, Westchester County, New York**

Turning Movement Count Summary

Intersection: Benedict Blvd & S. Riverside Ave
Date: Tuesday, April 8, 2008
Time Period: Weekday PM Peak

Time	Volume	S. Riverside Ave								Benedict Blvd								Hourly Intersection Volume
		Southbound				Northbound				Westbound				Eastbound				
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	
17:15 to 17:30	Car Truck/Bus Bicycle Total	15 0 0 15	38 1 0 39	4 0 0 4	57 1 0 58	7 1 0 8	71 1 0 72	43 0 0 43	121 2 0 123	23 0 0 23	0 0 0 0	9 0 0 9	32 0 0 32	6 0 0 6	3 0 0 3	2 0 0 2	11 0 0 11	
17:30 to 17:45	Car Truck/Bus Bicycle Total	4 0 0 4	32 0 0 32	1 0 0 1	37 0 0 37	7 1 0 8	72 1 0 73	56 1 0 57	135 3 0 138	21 0 0 21	1 0 0 1	6 0 0 6	28 0 0 28	2 0 0 2	2 0 0 2	3 0 0 3	7 0 0 7	
17:45 to 18:00	Car Truck/Bus Bicycle Total	8 0 0 8	30 0 0 30	1 0 0 1	39 0 0 39	1 0 0 1	86 1 0 87	43 0 0 43	130 1 0 131	25 1 0 26	0 0 0 0	5 0 0 5	30 1 0 31	2 0 0 2	2 0 0 2	2 0 0 2	6 0 0 6	
18:00 to 18:15	Car Truck/Bus Bicycle Total	9 0 0 9	40 1 0 41	1 0 0 1	50 0 0 50	4 0 0 4	110 1 0 111	62 1 0 63	176 2 0 178	32 1 0 33	3 0 0 3	6 0 0 6	41 1 0 42	4 0 0 4	2 1 0 3	1 0 0 1	7 1 0 8	
18:15 to 18:30	Car Truck/Bus Bicycle Total	5 0 0 5	37 1 0 38	2 0 0 2	44 1 0 45	3 0 0 3	101 1 0 102	74 1 0 75	178 2 0 180	15 0 0 15	2 0 0 2	8 0 0 8	25 0 0 25	2 0 0 2	2 0 0 2	4 0 0 4	8 0 0 8	
18:30 to 18:45	Car Truck/Bus Bicycle Total	4 0 0 4	29 0 0 29	3 0 0 3	36 0 0 36	0 0 0 0	88 1 0 89	34 0 0 34	122 1 0 123	20 0 0 20	1 0 0 1	8 0 0 8	29 0 0 29	3 0 0 3	3 0 0 3	6 0 0 6	12 0 0 12	
18:45 to 19:00	Car Truck/Bus Bicycle Total	8 0 0 8	31 0 0 31	2 0 0 2	41 0 0 41	1 0 0 1	110 1 0 111	48 0 0 48	159 1 0 160	18 0 0 18	2 0 0 2	7 0 0 7	27 0 0 27	3 0 0 3	2 0 0 2	1 0 0 1	6 0 0 6	
19:00 to 19:15	Car Truck/Bus Bicycle Total	7 0 0 7	37 0 0 37	4 0 0 4	48 0 0 48	3 0 0 3	67 1 0 68	38 0 0 38	108 1 0 109	23 0 0 23	1 0 0 1	4 0 0 4	28 0 0 28	4 0 0 4	2 0 0 2	2 0 0 2	8 0 0 8	
19:15 to 19:30	Car Truck/Bus Bicycle Total	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	2 0 0 2	2 0 0 2	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	
		60	274	18	26	705	400	177	10	53	26	18	21					
		0	3	0	2	8	3	2	0	0	0	1	0					
		0	0	0	0	0	1	0	0	0	0	0	0					

Analysis Hour	Volumes	S. Riverside Ave								Benedict Blvd							
		Southbound				Northbound				Westbound				Eastbound			
		Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total
6:00 to 7:00	% Truck/Bus % Bicycles % HVs PHF	26 0.0% 0.0% 0.0%	139 1.4% 0.0% 1.4%	8 0.0% 0.0% 0.0%	173 1.2% 0.0% 1.2%	8 0.0% 0.0% 0.0%	413 1.0% 1.0% 1.0%	220 0.9% 0.5% 1.4%	641 0.5% 0.0% 0.9%	86 1.2% 0.0% 1.2%	8 0.0% 0.0% 0.0%	29 0.0% 0.0% 0.8%	123 0.0% 0.0% 0.8%	12 0.0% 0.0% 0.0%	10 10.0% 0.0% 10.0%	12 0.0% 0.0% 0.0%	34 0.0% 0.0% 2.9%
		0.72	0.85	0.67	0.85	0.50	0.93	0.73	0.89	0.65	0.67	0.91	0.73	0.75	0.83	0.50	0.71

Appendix B

Transit Bus Schedules

10 Croton Commuter
MONDAY THRU FRIDAY
Effective November 1, 2004



the bee-line system
 Andrew J. Spanio, Westchester County Executive
 County Board of Legislators
 Lawrence C. Salley, Commissioner

CORTLANDT TOWN CENTER AND YORKTOWN TO CROTON					
Cortlandt Town Center	Shrub Oak Shopping Center	Downing Park (Rte. 132 at Rte. 202/35)	Underhill Plaza Yorktown Commons	Croton RR Sta. (Hudson Line)	Train To New York Leaves Croton
5:33	5:38	5:45	5:53	6:13	6:18/6:24
6:06	6:05	6:12	6:20	6:40	6:47/6:57
6:34	6:39	6:46	6:54	7:14	7:19/7:23
6:51	6:58	7:05	7:17	7:37	7:44

CROTON TO YORKTOWN AND CORTLANDT TOWN CENTER					
Train From New York Arrives Croton	Croton RR Sta. (Hudson Line)	Underhill Plaza Yorktown Commons	Downing Park (Rte. 132 at Rte. 202/35)	Shrub Oak Shopping Center	Cortlandt Town Center
5:43	5:50	6:10	6:18	6:25	6:30
6:08	6:17	6:37	6:45	6:52	6:57
6:47	6:52	7:12	7:20	7:27	7:32
7:11	7:16	7:36	7:44	7:51	7:56
7:20	7:30	7:50	7:58	8:05	8:10

Light Type: AM Times **Bold Type: PM Times**

The *bee-line* System cannot accept responsibility for late trains or changes in Metro-North schedules.

11 Croton Express
 MONDAY THRU FRIDAY
 Effective April 28, 2003



the bee-line system
 Andrew J. Spino, Westchester County Executive
 County Board of Legislators
 Lawrence C. Salley, Commissioner

CROTON TO ELMSFORD AND WHITE PLAINS					
<i>Train From Poughkeepsie Leaves Croton</i>	Croton RR Sta. (Hudson Line)	Spring St & Waller Av Ossining	E. Main St & S. Central Av Elmsford Square	TransCenter N. Lexington Av & Water St White Plains	S. Broadway & Main St White Plains
6:33/6:57	7:01	7:12	7:38	7:50	
7:23/7:56	8:01	8:12	8:38	8:50	8:55

WHITE PLAINS AND ELMSFORD TO CROTON					
S. Broadway & Martine Av White Plains	TransCenter N. Lexington Av & Water St White Plains	E. Main St & N. Central Av Elmsford Square	Spring St & Waller Av Ossining	Croton RR Sta. (Hudson Line)	<i>Train To Poughkeepsie Leaves Croton</i>
4:32	4:37	4:46	5:08	5:21	5:27
5:10	5:15	5:26	5:52	6:05	6:13

Light Type: AM Times **Bold Type: PM Times**

The *bee-line* System cannot accept responsibility for late trains or changes in Metro-North schedules.

EFFECTIVE 2/18/08

14 Peekskill Ossining White Plains

Only selected bus stops (time points) are listed here. For additional stops call: (914) 813-7777

Time Points

Peekskill to Ossining and White Plains

Corlandt Town Center	Rte 6/Dayton La Beach Shopping Center Peekskill	Main St & Nelson Av Peekskill	King Ferry Rd & Westchester Av Verplank	FDR Veteran's Hospital Montrose	S. Riverside Av & Croton Point Av Croton	Spring St & Main St Ossining	Pleasantville Rd & North State Rd Briarcliff Manor	Westchester Medical Center	N. Central Av & Pousling St Elmsford Square	TransCenter N. Lexington Av & Water St White Plains	Main St & S. Broadway White Plains	Bloomingsdale's White Plains
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LIGHT TYPE AND SHADE - AM TIMES
DARK TYPE AND SHADE - PM TIMES

HOLIDAY SCHEDULE

Use The Weekday Schedule For:

- Lincoln's Birthday
- Columbus Day
- Election Day
- Veteran's Day

Use The Saturday Schedule For:

- M. L. King Jr Day
- Presidents' Day

Use The Sunday Schedule For:

- New Year's Day
- Memorial Day
- Independence Day
- Labor Day

No Service On:

- Thanksgiving
- Christmas

NOTES:

- ① This trip begins at Grasslands Road and Clearbrook Road 5 minutes before Elmsford Square.
- ② This trip begins at Grasslands Road and Clearbrook Road 5 minutes before Elmsford Square, and does not make pickups on Route 119.
- ③ This trip displays a Route 40 destination sign.
- ④ This trip begins at Route 9 and Welcher Avenue in Peekskill at 9:46 a.m.

①										5:55	6:06	6:10			
②	5:45	5:55	6:00	6:13	6:22	6:38	6:52	7:03	7:18	7:33	7:46	7:50			
	6:10	6:20	6:25	6:38	6:47	7:03	7:17	7:28	7:43	7:58	8:11	8:15	8:20		
	6:45	6:55	7:00	7:13	7:23	7:42	7:57	8:08	8:23	8:36	8:51	8:55	9:00		
	7:20	7:30	7:35	7:51	8:01	8:20	8:35	8:47	9:01	9:12	9:25	9:30	9:35		
	8:35	8:45	8:50	9:05	9:13	9:31	9:45	9:55	10:09	10:19	10:30	10:35	10:40		
	9:35	9:45	9:50	10:05	10:13	10:31	10:45	10:55	11:09	11:19	11:30	11:35	11:40		
	10:45	10:55	11:00	11:15	11:23	11:41	11:55	12:05	12:19	12:29	12:40	12:45	12:50		
	11:35	11:45	11:50	12:05	12:13	12:31	12:45	12:55	1:09	1:19	1:30	1:35	1:40		
	12:35	12:45	12:50	1:05	1:13	1:31	1:45	1:55	2:10	2:20	2:35	2:40	2:45		
	1:30	1:40	1:45	2:00	2:08	2:26	2:40	2:52	3:08	3:19	3:35	3:40	3:45		
	2:30	2:40	2:45	3:00	3:08	3:26	3:40	3:53	4:11	4:23	4:40	4:45	4:50		
	3:35	3:45	3:50	4:05	4:13	4:31	4:45	4:58	5:16	5:28	5:45	5:50	5:55		
	4:35	4:45	4:50	5:05	5:13	5:31	5:45	5:55	6:11	6:21	6:36	6:40	6:45		
	5:35	5:45	5:50	6:03	6:11	6:27	6:40	6:50	7:02	7:12	7:23	7:27	7:32		
	6:40	6:50	6:55	7:08	7:16	7:32	7:45	7:55	8:07	8:17	8:28	8:32	8:37		
	7:40	7:50	7:55	8:08	8:16	8:32	8:45	8:55	9:06	9:16	9:25	9:29	9:34		
	8:20	8:30	8:35	8:48	8:56	9:12	9:25	9:35	9:46	9:56	10:05				

Saturday

①										5:57	6:08	6:12			
	5:45	5:55	6:00	6:13	6:21	6:37	6:51	7:02	7:16	7:26	7:40	7:45			
	6:45	6:55	7:00	7:13	7:21	7:37	7:50	8:00	8:14	8:24	8:35	8:40	8:45		
	8:20	8:30	8:35	8:48	8:56	9:12	9:25	9:35	9:49	9:59	10:10	10:15	10:20		
	9:20	9:30	9:35	9:48	9:56	10:12	10:25	10:35	10:49	11:00	11:13	11:18	11:23		
	10:25	10:35	10:40	10:53	11:01	11:17	11:30	11:40	11:54	12:05	12:18	12:23	12:28		
	11:30	11:40	11:45	11:58	12:06	12:22	12:35	12:45	12:59	1:10	1:23	1:28	1:33		
	12:25	12:35	12:40	12:53	1:01	1:17	1:30	1:40	1:54	2:04	2:15	2:20	2:25		
	1:25	1:35	1:40	1:53	2:01	2:17	2:30	2:40	2:54	3:04	3:15	3:20	3:25		
	2:25	2:35	2:40	2:53	3:01	3:17	3:30	3:40	3:54	4:04	4:15	4:20	4:25		
	3:25	3:35	3:40	3:53	4:01	4:17	4:30	4:40	4:54	5:04	5:15	5:20	5:25		
	4:25	4:35	4:40	4:53	5:01	5:17	5:30	5:40	5:54	6:04	6:15	6:20	6:25		
	5:25	5:35	5:40	5:53	6:01	6:17	6:30	6:40	6:54	7:04	7:15	7:20	7:25		
	6:25	6:35	6:40	6:53	7:01	7:17	7:30	7:40	7:54	8:04	8:15	8:20	8:25		
	7:20	7:30	7:35	7:48	7:56	8:12	8:25	8:35	8:49	8:59	9:10	9:15	9:20		
③									9:15	9:30	9:40				

Sunday

	10:20	10:30	10:35	10:45	10:52	11:05	11:25	11:40	11:50	12:00	12:11	12:15	12:20		
	12:20	12:30	12:35	12:45	12:52	1:05	1:25	1:40	1:50	2:00	2:11	2:15	2:20		
	2:20	2:30	2:35	2:45	2:52	3:05	3:25	3:40	3:50	4:00	4:11	4:15	4:20		
	4:30	4:40	4:45	4:55	5:02	5:15	5:35	5:50	6:00	6:10	6:21	6:25	6:30		
	6:30	6:40	6:45	6:55	7:02	7:15	7:30	7:45	7:55	8:05	8:16	8:20			

Westchester gov.com

Department of Transportation
100 E. 1st Street
Mt. Vernon, N.Y. 10550

Monday - Friday

White Plains to Ossining and Peekskill

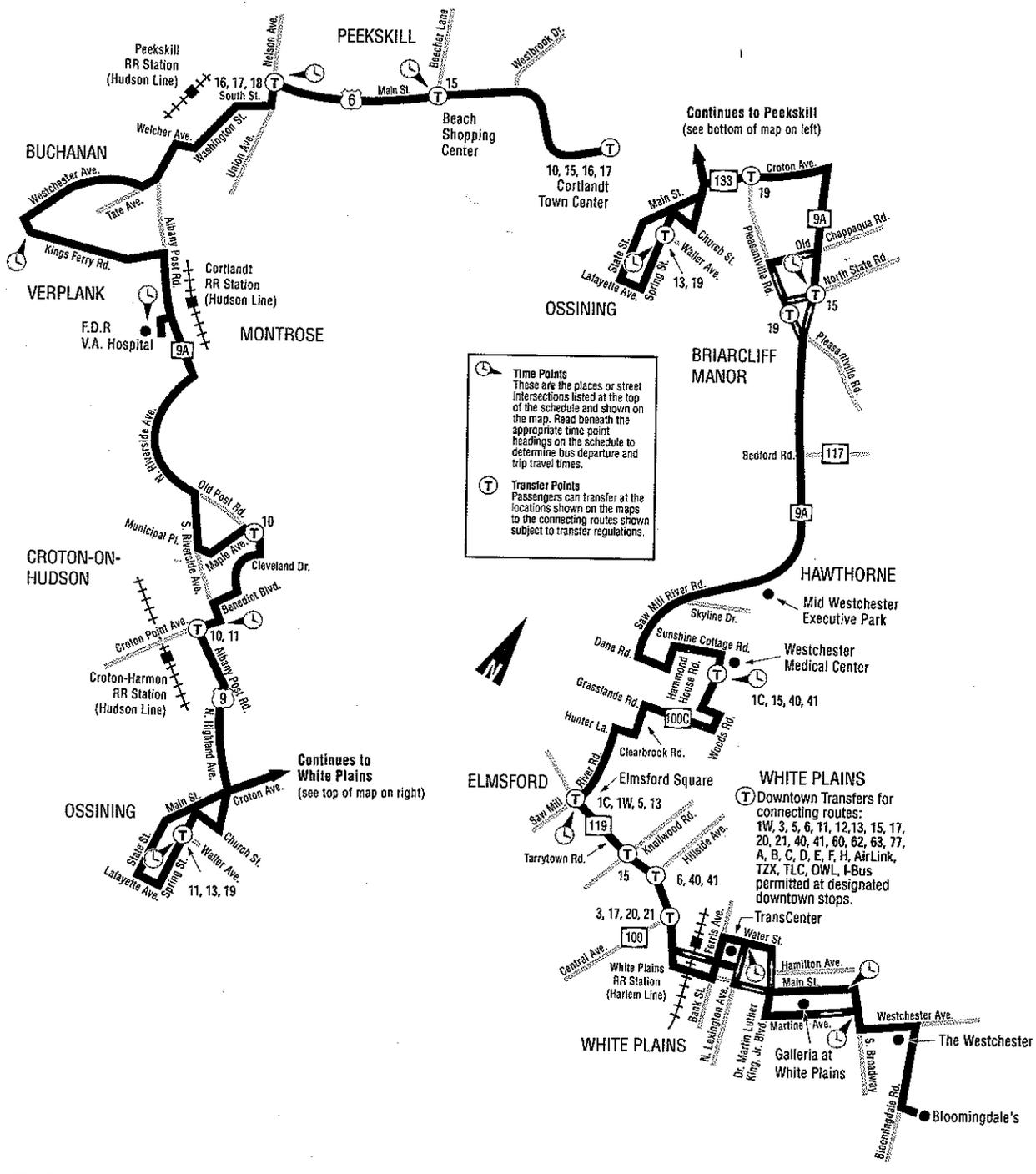
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	6:15 7:15 8:15	6:20 7:20 8:20	6:02 6:32 8:36	6:44 7:44 8:48	6:57 7:57 9:01	6:25 7:15 8:15 9:18	7:23 8:23 9:26	6:42 7:40 8:40 9:43	7:50 8:50 9:53	6:55 8:05 9:05 10:08	7:00 8:10 9:10 10:13	7:08 8:18 9:18 10:21	
9:10	9:15	9:20	9:36	9:47	9:59	10:15	10:23	10:40	10:50	11:05	11:10	11:18	
10:05	10:10	10:15	10:29	10:40	10:53	11:10	11:18	11:35	11:45	12:00	12:05	12:13	
11:05	11:10	11:15	11:29	11:40	11:53	12:10	12:18	12:35	12:45	1:00	1:05	1:13	
12:05	12:10	12:15	12:29	12:40	12:53	1:10	1:19	1:36	1:46	2:03	2:08	2:16	
1:00	1:05	1:11	1:27	1:39	1:53	2:10	2:19	2:36	2:46	3:03	3:08	3:16	
2:00	2:05	2:11	2:27	2:39	2:53	3:10	3:19	3:36	3:46	4:03	4:08	4:16	
3:00	3:05	3:12	3:30	3:44	3:58	4:15	4:24	4:41	4:51	5:08	5:13	5:21	
3:30	3:35	3:42	4:00	4:14	4:28	4:45	4:53	5:09	5:18	5:32	5:37	5:45	
4:05	4:15	4:22	4:40	4:54	5:08	5:25	5:33	5:49	5:58	6:12	6:17	6:25	
4:40	4:50	4:57	5:15	5:29	5:43	6:00	6:07	6:24	6:34	6:48	6:53	7:01	
5:10	5:20	5:26	5:42	5:54	6:08	6:25	6:32	6:48	6:56	7:10	7:15	7:23	
6:05	6:10	6:15	6:29	6:40	6:53	7:10	7:17	7:33	7:41	7:52	7:57	8:05	
7:05	7:10	7:15	7:27	7:38	7:48	8:03	8:09	8:25	8:33	8:44	8:49	8:57	
8:35	8:40	8:45	8:57	9:08	9:18	9:33	9:39	9:55	10:03	10:14	10:19	10:27	
10:05	10:10	10:15	10:27	10:38	10:48	11:03	11:09	11:25	11:33	11:44	11:49	11:57	
	6:15 7:10 8:15 9:20	6:20 7:15 8:20 9:25	6:32 7:27 8:32 9:37	6:43 7:38 8:43 9:48	6:54 7:49 8:54 9:59	7:10 8:05 9:10 10:15	7:16 8:13 9:18 10:23	7:31 8:30 9:35 10:40	7:39 8:38 9:43 10:48	7:50 8:50 9:55 11:00	7:55 8:55 10:00 11:05	8:03 9:03 10:08 11:13	
10:10	10:15	10:20	10:32	10:43	10:54	11:10	11:18	11:35	11:43	11:55	12:00	12:08	
11:10	11:15	11:20	11:32	11:43	11:54	12:10	12:18	12:35	12:43	12:55	1:00	1:08	
12:10	12:15	12:20	12:32	12:43	12:54	1:10	1:18	1:35	1:43	1:55	2:00	2:08	
1:10	1:15	1:20	1:32	1:43	1:54	2:10	2:18	2:35	2:43	2:55	3:00	3:08	
2:10	2:15	2:20	2:32	2:43	2:54	3:10	3:18	3:35	3:43	3:55	4:00	4:08	
3:10	3:15	3:20	3:32	3:43	3:54	4:10	4:18	4:35	4:43	4:55	5:00	5:08	
4:05	4:10	4:15	4:27	4:38	4:49	5:05	5:11	5:26	5:34	5:45	5:50	5:58	
5:10	5:15	5:20	5:32	5:43	5:54	6:10	6:16	6:31	6:39	6:50	6:55	7:03	
6:10	6:15	6:20	6:32	6:42	6:51	7:05	7:11	7:26	7:34	7:45	7:50	7:58	
7:10	7:15	7:20	7:32	7:42	7:51	8:05							
7:55	8:00	8:05	8:17	8:27	8:36	8:50							
9:40	9:45	9:50	10:02	10:12	10:21	10:35							
10:05	10:10	10:14	10:25	10:36	10:45	11:05	11:13	11:27	11:35	9:55 11:50	10:00 11:55	10:08 12:03	
12:05	12:10	12:14	12:25	12:36	12:45	1:05	1:13	1:27	1:35	1:50	1:55	2:03	
2:05	2:10	2:14	2:25	2:36	2:45	3:05	3:12	3:22	3:30	3:45	3:50	3:58	
4:20	4:25	4:29	4:40	4:51	5:00	5:20	5:27	5:37	5:45	6:00	6:05	6:13	
6:40	6:45	6:49	7:00	7:11	7:20	7:40	7:47	7:57	8:05	8:20	8:25	8:33	

Time Points

Please be courteous to your fellow passengers and refrain from using cell phones on the bus. Thank you.



FORGET SOMETHING?
Please remember to take all your personal items with you. The Bee-Line is not responsible for your personal items or packages. **UNATTENDED ITEMS ARE SUBJECT TO IMMEDIATE DISPOSAL!**
To inquire about lost items, call (914) 967-5959.



Cash Fares (Coins Only)

One Ride
Paper Transfer to Bee-Line & N
Senior/Disabled Reduced Fare
Senior/Disabled Paper Transfer

Pay-Per-Ride MetroCard F

(Includes One Transfer to Bee-Line)
One Ride with Transfer
Senior/Disabled Reduced Fare C

Unlimited Ride MetroCard F

(Good on Bee-Line Buses, NYC Bu
30-Days
14-Days
7-Days
1-Day Fun Pass
30-Day Senior/Disabled Reduc
14-Day Senior/Disabled Reduc
7-Day Senior/Disabled Reduced

Transfers:

(1) Paper transfers will be accep
same route initially boarded. Pa
the time of boarding.
(2) Pay-Per-Ride MetroCards wil
routes, except the same route ini
and Subways with no additional t
two hours of the initial boarding.

Pay-Per-Ride MetroCards requ
purchase and may be obtained a
York City Subway Stations and M
Purchases of \$7 or more earn a
Senior/Disabled Reduced Fare
65 years of age, certified disable
holders with proper photo identifi
are only available to holders of p
MetroCards. For more informatio
log on to the MTA website at www

Fares, schedule and equ
24 Hour Automate
(914
TTY for the hearin
Customer service
7 a.m.
Effective March 2

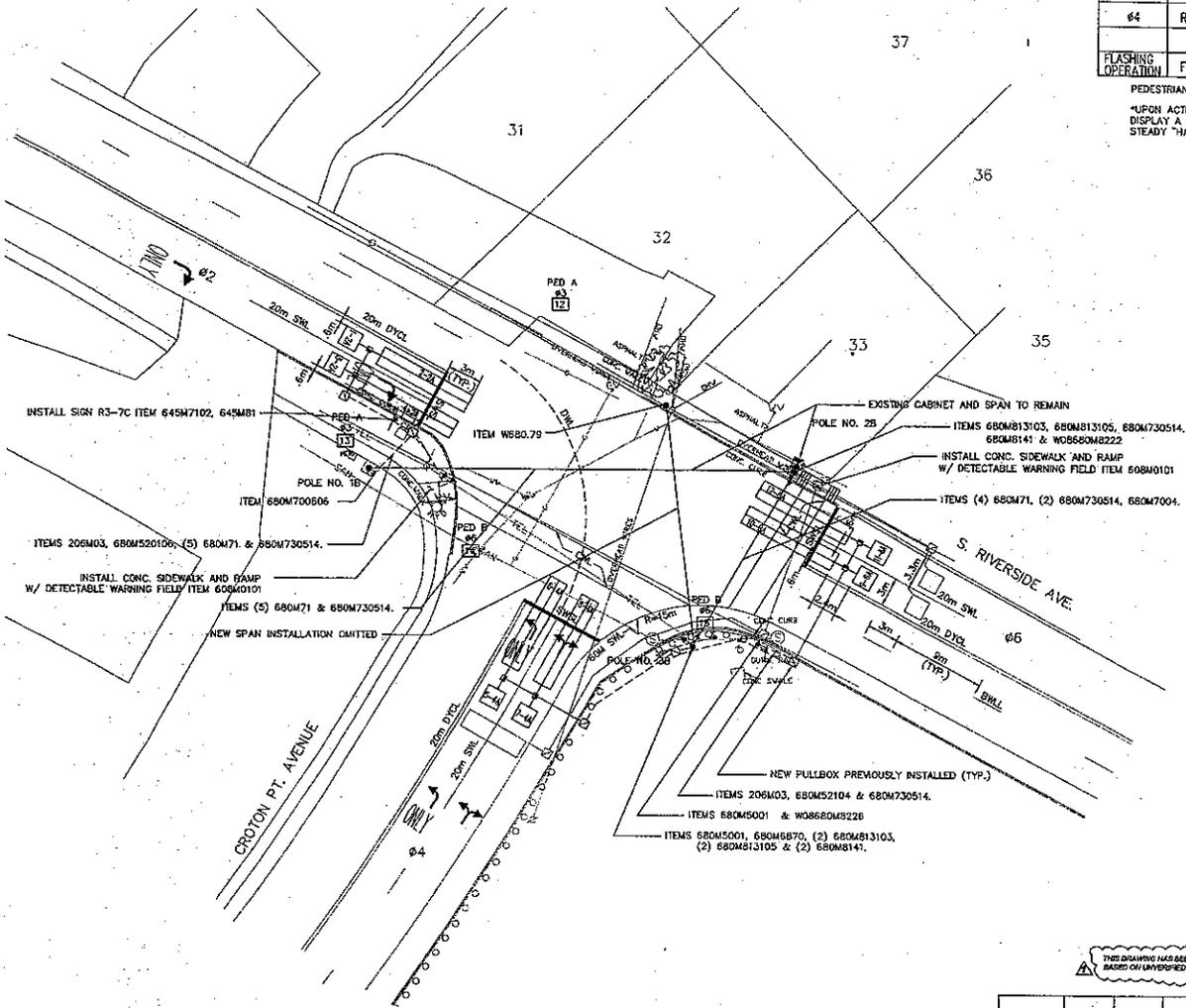


Appendix C

Existing Traffic Signal Information

TABLE OF OPERATION											
PHASE	HEAD	1	2	3	4	5	6	7	8	PED A	PED B
Ø2+Ø6	G	G	G	G	FR	FR	R	R	R	DW	W/DW*
Ø4	R	R	R	R	FR	FR	G	G	G	W/DW*	DW
FLASHING OPERATION	FY	FY	FY	FY	FR	FR	FR	FR	FR	DARK	DARK

PEDESTRIAN SIGNALS SHALL BE DEMAND-ACTUATED ONLY.
 *UPON ACTIVATION OF A PEDESTRIAN PUSH BUTTON THE INDICATION SHALL DISPLAY A STEADY "MAN" FOLLOWED BY A FLASHING "HAND" AND THEN A STEADY "HAND".



SIGN TEXT LEGEND			
NO.	SIGN TEXT	N.Y.S.M.U.T.C.D. NO.	ITEM
	NO TURN ON RED	R3 - 7C	680M201 645M7102 645M81
PED A, B		R10 - 3B (FEDERAL) MUTCD	W08680M222

LOOP LABEL IDENTIFICATION
 5-4/7A

NUMBER - NUMBER & LETTER
 1st NUMBER - DETECTOR INPUT #
 2nd NUMBER - PHASE #'S
 LETTER - WIRE LETTER A/B

NOTE:

1. NEW SIGNAL INSTALLATION COMPONENTS (CONTROLLER, CABINET CONTENTS, POLES, LED LENSES, ETC.) TO BE REMOVED UNDER ITEM W860M79 SHALL BE RETURNED TO THE COUNTY. ALL OTHER ITEMS SHALL BECOME PROPERTY OF THE CONTRACTOR.
2. ALL UNDERGROUND WORK TO BE MARKED AND VERIFIED IN ROW BY WCO/PW SURVEYING GROUP PRIOR TO START OF EXCAVATION.
3. ALL FOUNDATION AND UNDERGROUND WORK TO BE REMOVED TO BE PERFORMED WITH GREAT CARE DUE TO PROXIMITY OF UTILITIES DISCOVERED DURING INSTALLATION.
4. FOR PAVEMENT MARKING DETAILS, SEE DWG. D-1.
5. PHASES 2 AND 6 TO BE SET ON RECALL GREEN.

OF TURNS
4
-6-3

THIS DRAWING HAS BEEN MODIFIED TO REFLECT THE AS-BUILT CONDITION BASED ON UNPROCESSED INFORMATION PROVIDED BY OTHERS.



REVISION NUMBER	DATE	MADE BY	APPROVED BY	REVISION

RECORD DRAWING CERTIFICATION

AS BUILT-CHANGES AS NOTED
 AS BUILT-NO CHANGES

CONTRACTOR NAME: Richard D. Carando SIGNATURE: <i>[Signature]</i> TITLE: P.E. DATE: 4/27/09	PROJECT COORDINATOR NAME: <i>[Signature]</i> SIGNATURE: <i>[Signature]</i> TITLE: <i>[Title]</i> DATE: <i>[Date]</i>
---	--

WESTCHESTER COUNTY, NEW YORK
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF ENGINEERING

WESTCHESTER COUNTY
 TRAFFIC SIGNAL IMPROVEMENTS - PHASE II
 CROTON, NEW YORK
 ROW REDESIGN 2

SCALE: 1:250
 DATE: 12/5/06
 DPW DRAWING NO.: 32-00-C-182-0
 SHEET NO. 13A OF 28
 DRAWING NUMBER: TS-10
 REV. NO.: 2

Appendix D

2008 Existing Condition Synchro Analysis Reports

Weekday AM

Arterial Level of Service: EB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
S RIVERSIDE AVE	IV	27	33.2	10.6	43.8	0.20	16.5	C
BENEDICT BLVD	IV	30	17.9	11.9	29.8	0.10	12.0	D
Total	IV		51.1	22.5	73.6	0.30	14.7	C

Arterial Level of Service: SB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BENEDICT BLVD	IV	30	16.0	23.1	39.1	0.07	6.5	F
CROTON POINT AVE #1	IV	30	17.9	18.6	36.5	0.10	9.8	D
Total	IV		33.9	41.7	75.6	0.17	8.1	E

Lanes, Volumes, Timings
5: BENEDICT BLVD & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↗		↕	
Volume (vph)	0	1	2	291	2	18	3	159	77	1	505	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	10	10	12	12	12
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
Ped/Bike Factor		0.99			0.99			1.00	0.97		1.00	
Frnt		0.916			0.992				0.850		0.996	
Flt Protected					0.955			0.999				
Satd. Flow (prot)	0	1748	0	0	1739	0	0	1531	1444	0	1616	0
Flt Permitted					0.734			0.990				
Satd. Flow (perm)	0	1748	0	0	1329	0	0	1517	1396	0	1616	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			5				95		3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		272			348			524			372	
Travel Time (s)		6.2			7.9			11.9			8.5	
Conf. Peds. (#/hr)	8		5	5		8	12		6	6		12
Peak Hour Factor	0.38	0.38	0.38	0.83	0.83	0.83	0.81	0.81	0.81	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	1%	0%	11%	0%	16%	4%	0%	2%	14%
Bus Blockages (#/hr)	0	1	0	2	2	2	0	0	1	1	0	0
Parking (#/hr)	0	0	0	5	5	5				5	5	5
Adj. Flow (vph)	0	3	5	351	2	22	4	196	95	1	587	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	375	0	0	200	95	0	604	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	40.0	40.0	40.0	40.0	40.0	0.0
Total Split (%)	42.9%	42.9%	0.0%	42.9%	42.9%	0.0%	57.1%	57.1%	57.1%	57.1%	57.1%	0.0%
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0	34.0	34.0	34.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	3	3		4	4		3	3	3	6	6	
Act Effct Green (s)		24.0			24.0			34.0	34.0		34.0	
Actuated g/C Ratio		0.34			0.34			0.49	0.49		0.49	
v/c Ratio		0.01			0.82			0.27	0.13		0.77	
Control Delay		11.7			37.8			11.9	3.0		23.1	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		11.7			37.8			11.9	3.0		23.1	
LOS		B			D			B	A		C	
Approach Delay		11.7			37.8			9.1			23.1	
Approach LOS		B			D			A			C	

Lanes, Volumes, Timings
5: BENEDICT BLVD & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		1			143			48	0		200	
Queue Length 95th (ft)		3			#248			77	17		304	
Internal Link Dist (ft)		192			268			444			292	
Turn Bay Length (ft)												
Base Capacity (vph)		603			459			737	727		786	
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			0.82			0.27	0.13		0.77	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Pretimed
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 24.1
 Intersection LOS: C
 Intersection Capacity Utilization 69.2%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 5: BENEDICT BLVD & S RIVERSIDE AVE

 40 s	 30 s
 40 s	 30 s

Lanes, Volumes, Timings
4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø9
Lane Configurations							
Volume (vph)	199	50	48	23	53	755	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	12	9	10	9	10	
Grade (%)	0%			0%	-4%		
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.97		1.00			0.98	
Frt	0.970					0.850	
Flt Protected	0.962		0.950				
Satd. Flow (prot)	3002	0	1504	1563	1744	1493	
Flt Permitted	0.962		0.718				
Satd. Flow (perm)	2930	0	1132	1563	1744	1468	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)	56						
Link Speed (mph)	30			30	30		
Link Distance (ft)	449			979	524		
Travel Time (s)	10.2			22.3	11.9		
Confl. Peds. (#/hr)	33	5	4			4	
Peak Hour Factor	0.89	0.89	0.66	0.66	0.88	0.88	
Heavy Vehicles (%)	10%	10%	8%	13%	0%	3%	
Bus Blockages (#/hr)	1	0	0	1	0	0	
Adj. Flow (vph)	224	56	73	35	60	858	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	280	0	73	35	60	858	
Turn Type			Perm			pm+ov	
Protected Phases	4			2	6	4	9
Permitted Phases			2			6	
Detector Phase	4		2	2	6	4	
Switch Phase							
Minimum Initial (s)	1.0		1.0	1.0	1.0	1.0	1.0
Minimum Split (s)	7.0		7.0	7.0	7.0	7.0	7.0
Total Split (s)	39.0	0.0	14.0	14.0	14.0	39.0	7.0
Total Split (%)	65.0%	0.0%	23.3%	23.3%	23.3%	65.0%	12%
Maximum Green (s)	33.0		8.0	8.0	8.0	33.0	1.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.5		2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0	
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	Max	None	None
Walk Time (s)			5.0	5.0	5.0		5.0
Flash Dont Walk (s)			11.0	11.0	11.0		9.0
Pedestrian Calls (#/hr)			3	3	3		38
Act Effect Green (s)	26.1		17.1	17.1	17.1	43.2	
Actuated g/C Ratio	0.42		0.27	0.27	0.27	0.69	
v/c Ratio	0.22		0.23	0.08	0.12	0.83	
Control Delay	10.6		26.6	24.7	24.5	18.6	

Lanes, Volumes, Timings
 4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø9
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	10.6		26.6	24.7	24.5	18.6	
LOS	B		C	C	C	B	
Approach Delay	10.6			26.0	19.0		
Approach LOS	B			C	B		
Queue Length 50th (ft)	19		19	9	15	1	
Queue Length 95th (ft)	60		50	28	57	#630	
Internal Link Dist (ft)	369			899	444		
Turn Bay Length (ft)							
Base Capacity (vph)	1492		312	430	480	1075	
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	0.19		0.23	0.08	0.13	0.80	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 62.2
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 17.8
 Intersection Capacity Utilization: 60.5%
 Analysis Period (min): 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 4: CROTON POINT AVE & S RIVERSIDE AVE

↑ ø2 14 s	↖ ø4 39 s	↗ ø9 7 s
↓ ø6 14 s		

HCM Unsignalized Intersection Capacity Analysis

3: CROTON POINT AVE & NB RT 9 RAMP

6/25/2008



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (veh/h)	127	91	18	785	274	122
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.84	0.84	0.80	0.80
Hourly flow rate (vph)	161	115	21	935	342	152
Pedestrians						3
Lane Width (ft)						11.0
Walking Speed (ft/s)						4.0
Percent Blockage						0
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						449
pX, platoon unblocked						
vC, conflicting volume			164		731	141
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			164		731	141
tC, single (s)			4.1		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			98		2	82
cM capacity (veh/h)			1424		348	864

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	107	169	333	623	342	152
Volume Left	0	0	21	0	342	0
Volume Right	0	115	0	0	0	152
cSH	1700	1700	1424	1700	348	864
Volume to Capacity	0.06	0.10	0.02	0.37	0.98	0.18
Queue Length 95th (ft)	0	0	1	0	274	16
Control Delay (s)	0.0	0.0	0.6	0.0	79.2	10.1
Lane LOS			A		F	B
Approach Delay (s)	0.0		0.2		57.9	
Approach LOS					F	

Intersection Summary						
Average Delay			16.7			
Intersection Capacity Utilization			54.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: CROTON POINT AVE & SB RT 9 RAMP

6/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑						↑	↑
Volume (veh/h)	0	223	119	208	885	0	0	0	0	25	1	512
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.87	0.87	0.87	0.92	0.92	0.92	0.88	0.88	0.88
Hourly flow rate (vph)	0	290	155	239	1017	0	0	0	0	28	1	582
Pedestrians								3				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					880							
pX, platoon unblocked												
vC, conflicting volume	1017			447			1939	1865	225	1640	1943	509
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1017			447			1939	1865	225	1640	1943	509
tC, single (s)	4.1			4.2			7.5	6.5	6.9	7.9	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.7	4.0	3.3
p0 queue free %	100			78			0	100	100	38	98	0
cM capacity (veh/h)	690			1082			0	56	778	46	51	512

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	193	251	578	678	30	582
Volume Left	0	0	239	0	28	0
Volume Right	0	155	0	0	0	582
cSH	1700	1700	1082	1700	46	512
Volume to Capacity	0.11	0.15	0.22	0.40	0.64	1.14
Queue Length 95th (ft)	0	0	21	0	62	494
Control Delay (s)	0.0	0.0	5.3	0.0	174.2	109.9
Lane LOS			A		F	F
Approach Delay (s)	0.0		2.5		113.0	
Approach LOS					F	

Intersection Summary		
Average Delay		31.2
Intersection Capacity Utilization	68.9%	ICU Level of Service C
Analysis Period (min)		15

HCM Unsignalized Intersection Capacity Analysis

1: CROTON POINT AVE & GATEWAY PLAZA

6/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Volume (veh/h)	9	64	19	1076	277	44	7	0	272	1	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			7%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.91	0.91	0.91	0.79	0.79	0.79	0.25	0.25	0.25
Hourly flow rate (vph)	16	110	33	1182	304	48	9	0	344	4	0	0
Pedestrians		63						3			28	
Lane Width (ft)		12.0						11.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		5						0			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1061							
pX, platoon unblocked												
vC, conflicting volume	381			146			2893	2906	130	3223	2899	420
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	381			146			2893	2906	130	3223	2899	420
IC, single (s)	5.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	3.1			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			18			0	100	63	0	100	100
cM capacity (veh/h)	776			1445			3	3	923	1	3	590

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	159	1182	353	353	4
Volume Left	16	1182	0	9	4
Volume Right	33	0	48	344	0
cSH	776	1445	1700	105	1
Volume to Capacity	0.02	0.82	0.21	3.38	3.63
Queue Length 95th (ft)	2	257	0	Err	Err
Control Delay (s)	1.1	17.5	0.0	Err	Err
Lane LOS	A	C		F	F
Approach Delay (s)	1.1	13.5		Err	Err
Approach LOS				F	F

Intersection Summary	
Average Delay	1751.5
Intersection Capacity Utilization	90.0%
ICU Level of Service	E
Analysis Period (min)	15

Weekday PM

Arterial Level of Service: EB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
S RIVERSIDE AVE	IV	27	33.2	21.9	55.1	0.20	13.1	C
BENEDICT BLVD	IV	30	17.9	11.6	29.5	0.10	12.1	D
Total	IV		51.1	33.5	84.6	0.30	12.8	D

Arterial Level of Service: SB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BENEDICT BLVD	IV	30	16.0	9.1	25.1	0.07	10.1	D
CROTON POINT AVE #1	IV	30	17.9	2.9	20.8	0.10	17.2	C
Total	IV		33.9	12.0	45.9	0.17	13.3	C

Lanes, Volumes, Timings
5: BENEDICT BLVD & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	
Volume (vph)	12	10	12	86	8	29	8	413	220	26	139	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	10	10	12	12	12
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
Ped/Bike Factor		0.99			0.99			1.00	0.97		1.00	
Frt		0.952			0.968				0.850		0.994	
Flt Protected		0.983			0.966			0.999			0.992	
Satd. Flow (prot)	0	1700	0	0	1726	0	0	1754	1480	0	1484	0
Flt Permitted		0.877			0.762			0.995			0.902	
Satd. Flow (perm)	0	1509	0	0	1362	0	0	1747	1441	0	1349	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			22				247		5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		272			348			524			372	
Travel Time (s)		6.2			7.9			11.9			8.5	
Confl. Peds. (#/hr)	9					9	8		3	3		8
Peak Hour Factor	0.71	0.71	0.71	0.73	0.73	0.73	0.89	0.89	0.89	0.85	0.85	0.85
Heavy Vehicles (%)	0%	10%	0%	1%	0%	0%	0%	1%	1%	0%	1%	0%
Bus Blockages (#/hr)	0	2	0	1	1	1	0	0	2	2	0	0
Parking (#/hr)	5	5	5	5	5	5				20	20	20
Adj. Flow (vph)	17	14	17	118	11	40	9	464	247	31	164	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	48	0	0	169	0	0	473	247	0	204	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	45.0	45.0	45.0	45.0	45.0	0.0
Total Split (%)	35.7%	35.7%	0.0%	35.7%	35.7%	0.0%	64.3%	64.3%	64.3%	64.3%	64.3%	0.0%
Maximum Green (s)	19.0	19.0		19.0	19.0		39.0	39.0	39.0	39.0	39.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	3	3		4	4		3	3	3	6	6	
Act Effct Green (s)		19.0			19.0			39.0	39.0		39.0	
Actuated g/C Ratio		0.27			0.27			0.56	0.56		0.56	
v/c Ratio		0.11			0.44			0.49	0.27		0.27	
Control Delay		14.9			22.5			11.6	2.0		9.1	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		14.9			22.5			11.6	2.0		9.1	
LOS		B			C			B	A		A	
Approach Delay		14.9			22.5			8.3			9.1	
Approach LOS		B			C			A			A	

Lanes, Volumes, Timings
 5: BENEDICT BLVD & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		10			52			113	0		41	
Queue Length 95th (ft)		25			79			180	26		70	
Internal Link Dist (ft)		192			268			444			292	
Turn Bay Length (ft)												
Base Capacity (vph)		422			386			973	912		754	
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		0.11			0.44			0.49	0.27		0.27	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 40
 Control Type: Pretimed
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 10.8
 Intersection Capacity Utilization: 53.4%
 Analysis Period (min): 15

Intersection LOS: B
 ICU Level of Service: A

Splits and Phases: 5: BENEDICT BLVD & S RIVERSIDE AVE

↑ φ2	→ φ4
45 s	25 s
↓ φ6	← φ8
45 s	25 s

Lanes, Volumes, Timings
4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Volume (vph)	520	228	189	136	102	141	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	12	9	10	9	10	
Grade (%)	0%			0%	-4%		
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.99		0.99			0.98	
Frt	0.954					0.850	
Flt Protected	0.966		0.950				
Satd. Flow (prot)	3204	0	1608	1742	1744	1522	
Flt Permitted	0.966		0.673				
Satd. Flow (perm)	3194	0	1130	1742	1744	1489	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)	127						
Link Speed (mph)	30			30	30		
Link Distance (ft)	449			979	524		
Travel Time (s)	10.2			22.3	11.9		
Confl. Peds. (#/hr)	3	1	9			9	
Peak Hour Factor	0.85	0.85	0.86	0.86	0.78	0.78	
Heavy Vehicles (%)	2%	0%	1%	1%	0%	1%	
Bus Blockages (#/hr)	2	0	0	2	0	0	
Adj. Flow (vph)	612	268	220	158	131	181	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	880	0	220	158	131	181	
Turn Type			Perm			pm+ov	
Protected Phases	4			2	6	4	9
Permitted Phases			2			6	
Detector Phase	4		2	2	6	4	
Switch Phase							
Minimum Initial (s)	1.0		1.0	1.0	1.0	1.0	1.0
Minimum Split (s)	7.0		7.0	7.0	7.0	7.0	7.0
Total Split (s)	25.0	0.0	28.0	28.0	28.0	25.0	7.0
Total Split (%)	41.7%	0.0%	46.7%	46.7%	46.7%	41.7%	12%
Maximum Green (s)	19.0		22.0	22.0	22.0	19.0	1.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.5		2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0	
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	Max	None	None
Walk Time (s)			5.0	5.0	5.0		5.0
Flash Dont Walk (s)			11.0	11.0	11.0		9.0
Pedestrian Calls (#/hr)			0	0	7		4
Act Effct Green (s)	18.6		22.4	22.4	22.4	41.0	
Actuated g/C Ratio	0.33		0.40	0.40	0.40	0.73	
v/c Ratio	0.77		0.49	0.23	0.19	0.17	
Control Delay	21.9		20.1	14.6	14.4	2.9	

Lanes, Volumes, Timings
4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø9
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	21.9		20.1	14.6	14.4	2.9	
LOS	C		C	B	B	A	
Approach Delay	21.9			17.8	7.8		
Approach LOS	C			B	A		
90th %ile Green (s)	19.0		22.0	22.0	22.0	19.0	14.0
90th %ile Term Code	Max		MaxR	MaxR	MaxR	Max	Ped
70th %ile Green (s)	19.0		22.0	22.0	22.0	19.0	0.0
70th %ile Term Code	Max		MaxR	MaxR	MaxR	Max	Skip
50th %ile Green (s)	19.0		22.0	22.0	22.0	19.0	0.0
50th %ile Term Code	Max		MaxR	MaxR	MaxR	Max	Skip
30th %ile Green (s)	19.0		22.0	22.0	22.0	19.0	0.0
30th %ile Term Code	Max		MaxR	MaxR	MaxR	Max	Skip
10th %ile Green (s)	15.6		22.0	22.0	22.0	15.6	0.0
10th %ile Term Code	Gap		MaxR	MaxR	MaxR	Gap	Skip
Queue Length 50th (ft)	100		47	30	25	0	
Queue Length 95th (ft)	#261		150	96	73	44	
Internal Link Dist (ft)	369			899	444		
Turn Bay Length (ft)							
Base Capacity (vph)	1170		450	693	694	1100	
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	0.75		0.49	0.23	0.19	0.16	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 56.3
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 18.1
 Intersection Capacity Utilization 49.2%
 Analysis Period (min) 15
 90th %ile Actuated Cycle: 73
 70th %ile Actuated Cycle: 53
 50th %ile Actuated Cycle: 53
 30th %ile Actuated Cycle: 53
 10th %ile Actuated Cycle: 49.6
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
 4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008

Splits and Phases: 4: CROTON POINT AVE & S RIVERSIDE AVE

↑ ø2	↔ ø4	↔ ø9
23 s	25 s	7 s
↓ ø6		
28 s		

HCM Unsignalized Intersection Capacity Analysis

3: CROTON POINT AVE & NB RT 9 RAMP

6/25/2008



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	↗
Volume (veh/h)	417	303	66	264	75	331
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.83	0.83	0.81	0.81
Hourly flow rate (vph)	571	415	80	318	93	409
Pedestrians					4	
Lane Width (ft)					11.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				449		
pX, platoon unblocked						
vC, conflicting volume			575		1101	497
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			575		1101	497
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		50	21
cM capacity (veh/h)			1005		185	520

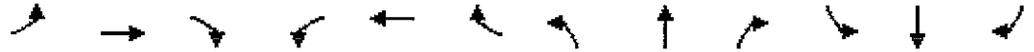
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	381	605	186	212	93	409
Volume Left	0	0	80	0	93	0
Volume Right	0	415	0	0	0	409
cSH	1700	1700	1005	1700	185	520
Volume to Capacity	0.22	0.36	0.08	0.12	0.50	0.79
Queue Length 95th (ft)	0	0	6	0	62	181
Control Delay (s)	0.0	0.0	4.2	0.0	42.5	32.9
Lane LOS			A		E	D
Approach Delay (s)	0.0		2.0		34.7	
Approach LOS					D	

Intersection Summary	
Average Delay	9.6
Intersection Capacity Utilization	48.6%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

2: CROTON POINT AVE & SB RT 9 RAMP

6/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑						↑	↑
Volume (veh/h)	0	715	156	200	159	0	0	0	0	33	1	76
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.71	0.71	0.71	0.82	0.82	0.82	0.92	0.92	0.92	0.83	0.83	0.83
Hourly flow rate (vph)	0	1007	220	244	194	0	0	0	0	40	1	92
Pedestrians								4				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					880							
pX, platoon unblocked												
vC, conflicting volume	194			1231			1798	1803	617	1185	1912	97
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	194			1231			1798	1803	617	1185	1912	97
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			57			100	100	100	59	97	90
cM capacity (veh/h)	1391			562			29	45	433	97	38	931

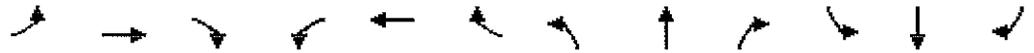
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	671	555	309	129	41	92
Volume Left	0	0	244	0	40	0
Volume Right	0	220	0	0	0	92
cSH	1700	1700	562	1700	93	931
Volume to Capacity	0.39	0.33	0.43	0.08	0.44	0.10
Queue Length 95th (ft)	0	0	55	0	46	8
Control Delay (s)	0.0	0.0	14.4	0.0	71.7	9.3
Lane LOS			B		F	A
Approach Delay (s)	0.0		10.1		28.6	
Approach LOS					D	

Intersection Summary	
Average Delay	4.6
Intersection Capacity Utilization	49.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

1: CROTON POINT AVE & GATEWAY PLAZA

6/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (veh/h)	0	73	7	168	59	4	12	0	759	37	1	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			7%			0%	
Peak Hour Factor	0.63	0.63	0.63	0.81	0.81	0.81	0.68	0.68	0.68	0.60	0.60	0.60
Hourly flow rate (vph)	0	116	11	207	73	5	18	0	1116	62	2	5
Pedestrians		60						4			20	
Lane Width (ft)		12.0						11.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		5						0			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1061							
pX, platoon unblocked												
vC, conflicting volume	98			131			679	638	125	1748	641	155
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	98			131			679	638	125	1748	641	155
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.9
p0 queue free %	100			86			94	100	0	0	99	99
cM capacity (veh/h)	1483			1462			302	333	927	0	333	696

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	127	207	78	390	744	68
Volume Left	0	207	0	18	0	62
Volume Right	11	0	5	372	744	5
cSH	1483	1462	1700	848	927	0
Volume to Capacity	0.00	0.14	0.05	0.46	0.80	Err
Queue Length 95th (ft)	0	12	0	61	220	Err
Control Delay (s)	0.0	7.9	0.0	12.8	22.5	Err
Lane LOS		A		B	C	F
Approach Delay (s)	0.0	5.7		19.2		Err
Approach LOS				C		F

Intersection Summary		
Average Delay		Err
Intersection Capacity Utilization	58.7%	ICU Level of Service B
Analysis Period (min)	15	

Appendix E

Traffic Signal Warrant Analyses

TRAFFIC SIGNAL WARRANT ANALYSES

Croton Point Avenue at U.S. 9 Northbound Ramps Croton Point Avenue at U.S. 9 Southbound Ramps Croton Point Avenue at Veterans Plaza

Introduction

All Croton Point Avenue intersections were evaluated based on April 2008 traffic volumes and the Warrant 3, Peak Hour criteria documented in the NYSDOT-approved Federal Highway Administration's 2003 Edition of the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD).

Warrant 3, Peak Hour Analysis

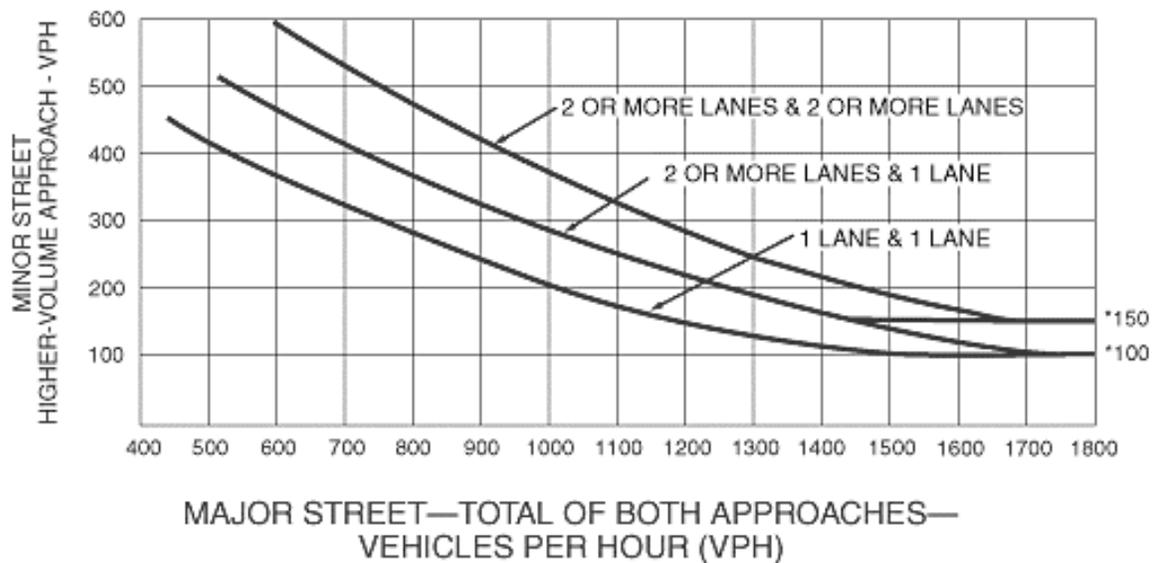
As discussed in Section 4C.04 of the MUTCD,

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

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

The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

- A. *If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:*
 1. *The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach, and*
 2. *The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and*
 3. *The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.*
- B. *The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in [the following figure] for the existing combination of approach lanes.*



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

The intersection of Croton Point Avenue and the U.S. northbound ramps has three approaches. The U.S. 9 northbound off-ramp is the only stop-controlled approach and, therefore, the minor street to be considered in the peak hour analysis. Eastbound and westbound Croton Point Avenue are free-flowing and constitute the major-street approaches.

The intersection of Croton Point Avenue and the U.S. 9 southbound ramps also has three approaches. The southbound off-ramp is the only stop-controlled approach and, therefore, the minor street to be considered in the peak hour analysis. Eastbound and westbound Croton Point Avenue are free-flowing and constitute the major-street approaches.

The intersection of Croton Point Avenue and Veterans Plaza has four approaches. Westbound Croton Point Avenue is free-flowing and constitutes the only major-street approach. Eastbound Croton Point Avenue and northbound and southbound Veterans Plaza are stop-controlled approaches. Since northbound Veterans Plaza accommodates considerably more traffic than the other minor-street approaches during both peak hours, Veterans Plaza is the minor street to be considered in the peak hour volume analysis.

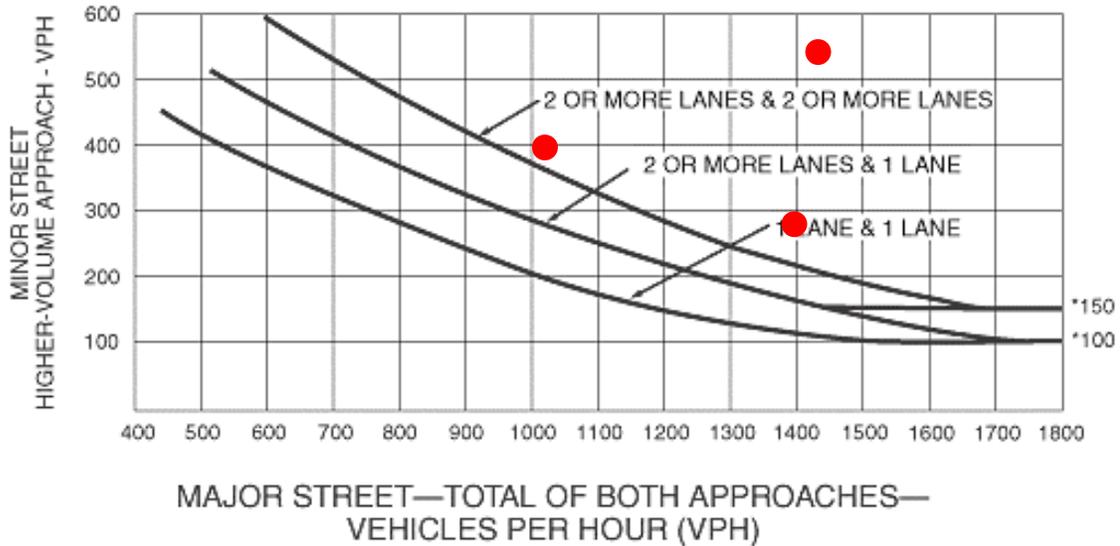
Since some lane movement delays were excessive and could not be calculated using Synchro, explicit data was not available to evaluate Warrant 3 based on Category A. Therefore, all warrant evaluations were based on Category B. The total major-street and higher minor-street volumes at the three unsignalized Croton Point Avenue intersections, as derived from the manual turning movement counts that were conducted in April 2008 (see Appendix A of this report), are provided in Table 1 below. As illustrated in

Table 1. Hourly Major- and Minor-Street Vehicular Volumes for Croton Point Avenue Unsignalized Intersections

Croton Point Avenue at:	2 or More Lanes and 2 Lanes (7 to 8 a.m.)	
	Major-Street Volume (vph) Total of Both Approaches	Minor-Street Volume (vph) Higher-Volume Approach
U.S. 9 Northbound Ramps	1,021	396
U.S. 9 Southbound Ramps	1,435	538
Veterans Plaza	1,397	279

Figure 1, the volumes all lie well above the Warrant 3 curve for approaches with a combination of two lanes and two lanes.

Figure 1. Warrant 3, Peak Hour Plot of Major- and Minor-Street Vehicular Volumes for Croton Point Avenue Unsignalized Intersections



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

Conclusion

The Croton Point Avenue intersections at the U.S. 9 northbound ramps, U.S. 9 southbound ramps, and Veterans Plaza all satisfy the Warrant 3, Peak Hour criteria for signalization, as detailed in Section 4C.04 of the MUTCD.

Appendix F

2013 Future No Build Condition Synchro Analysis Reports

Weekday AM

Arterial Level of Service: EB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
S RIVERSIDE AVE	IV	27	33.2	10.1	43.3	0.20	16.7	C
BENEDICT BLVD	IV	30	17.9	12.2	30.1	0.10	11.9	D
Total	IV		51.1	22.3	73.4	0.30	14.7	C

Arterial Level of Service: SB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BENEDICT BLVD	IV	30	16.0	28.3	44.3	0.07	5.7	F
CROTON POINT AVE #1	IV	30	17.9	22.8	40.7	0.10	8.8	E
Total	IV		33.9	51.1	85.0	0.17	7.2	E

Lanes, Volumes, Timings
5: BENEDICT BLVD & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↗		↕	
Volume (vph)	0	1	2	291	2	18	3	159	77	1	505	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	10	10	12	12	12
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
Ped Bike Factor		0.99			0.99			1.00	0.97		1.00	
Frt		0.910			0.992				0.850		0.996	
Flt Protected					0.955			0.999				
Satd. Flow (prot)	0	1735	0	0	1740	0	0	1531	1444	0	1616	0
Flt Permitted					0.734			0.990				
Satd. Flow (perm)	0	1735	0	0	1329	0	0	1517	1396	0	1616	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			5				105		3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		272			348			524			372	
Travel Time (s)		6.2			7.9			11.9			8.5	
Confl. Peds. (#/hr)	8		5	5		8	12		6	6		12
Peak Hour Factor	0.38	0.38	0.38	0.83	0.83	0.83	0.81	0.81	0.81	0.86	0.86	0.86
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	0%	0%	0%	1%	0%	11%	0%	16%	4%	0%	2%	14%
Bus Blockages (#/hr)	0	1	0	2	2	2	0	0	1	1	0	0
Parking (#/hr)	0	0	0	5	5	5				5	5	5
Adj. Flow (vph)	0	3	6	386	3	24	4	216	105	1	646	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	413	0	0	220	105	0	665	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2				6
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	40.0	40.0	40.0	40.0	40.0	0.0
Total Split (%)	42.9%	42.9%	0.0%	42.9%	42.9%	0.0%	57.1%	57.1%	57.1%	57.1%	57.1%	0.0%
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0	34.0	34.0	34.0	34.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	3	3		4	4		3	3	3	6	6	6
Act Effct Green (s)		24.0			24.0			34.0	34.0		34.0	
Actuated g/C Ratio		0.34			0.34			0.49	0.49		0.49	
v/c Ratio		0.02			0.90			0.30	0.14		0.85	
Control Delay		11.3			47.8			12.2	2.9		28.3	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		11.3			47.8			12.2	2.9		28.3	
LOS		B			D			B	A		C	
Approach Delay		11.3			47.8			9.2			28.3	

Lanes, Volumes, Timings
 5: BENEDICT BLVD & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			D			A			C	
Queue Length 50th (ft)		1			164			54	0		235	
Queue Length 95th (ft)		3			#287			85	17		#404	
Internal Link Dist (ft)		192			268			444			292	
Turn Bay Length (ft)												
Base Capacity (vph)		599			459			737	732		786	
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		0.02			0.90			0.30	0.14		0.85	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 75
 Control Type: Pretimed
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 29.5
 Intersection LOS: C
 Intersection Capacity Utilization 71.9%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 5: BENEDICT BLVD & S RIVERSIDE AVE

↑ 2	→ 4
40 s	30 s
↓ 6	← 8
40 s	30 s

Lanes, Volumes, Timings
4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø9
Lane Configurations	↖↗		↖	↑	↑	↗	
Volume (vph)	199	50	48	23	53	755	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	12	9	10	9	10	
Grade (%)	0%			0%	-4%		
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.97		1.00			0.98	
Frt	0.970					0.850	
Flt Protected	0.962		0.950				
Satd. Flow (prot)	3002	0	1504	1563	1744	1493	
Flt Permitted	0.962		0.714				
Satd. Flow (perm)	2932	0	1126	1563	1744	1468	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)	62						
Link Speed (mph)	30			30	30		
Link Distance (ft)	449			979	524		
Travel Time (s)	10.2			22.3	11.9		
Confl. Peds. (#/hr)	33	5	4			4	
Peak Hour Factor	0.89	0.89	0.66	0.66	0.88	0.88	
Growth Factor	110%	110%	110%	110%	110%	110%	
Heavy Vehicles (%)	10%	10%	8%	13%	0%	3%	
Bus Blockages (#/hr)	1	0	0	1	0	0	
Adj. Flow (vph)	246	62	80	38	66	944	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	308	0	80	38	66	944	
Turn Type			Perm			pm+ov	
Protected Phases	4			2	6	4	9
Permitted Phases			2			6	
Detector Phase	4		2	2	6	4	
Switch Phase							
Minimum Initial (s)	1.0		1.0	1.0	1.0	1.0	1.0
Minimum Split (s)	7.0		7.0	7.0	7.0	7.0	7.0
Total Split (s)	40.0	0.0	13.0	13.0	13.0	40.0	7.0
Total Split (%)	66.7%	0.0%	21.7%	21.7%	21.7%	66.7%	12%
Maximum Green (s)	34.0		7.0	7.0	7.0	34.0	1.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.5		2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0	
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	Max	None	None
Walk Time (s)			5.0	5.0	5.0		5.0
Flash Dont Walk (s)			11.0	11.0	11.0		9.0
Pedestrian Calls (#/hr)			3	3	3		38
Act Effct Green (s)	31.8		16.6	16.6	16.6	48.4	
Actuated g/C Ratio	0.47		0.25	0.25	0.25	0.72	
v/c Ratio	0.21		0.29	0.10	0.15	0.89	

Lanes, Volumes, Timings
 4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø9
Control Delay	10.1		28.9	25.7	25.9	22.8	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	10.1		28.9	25.7	25.9	22.8	
LOS	B		C	C	C	C	
Approach Delay	10.1			27.9	23.0		
Approach LOS	B			C	C		
90th %ile Green (s)	34.0		16.0	16.0	16.0	34.0	14.0
90th %ile Term Code	Max		Ped	Ped	Ped	Max	Ped
70th %ile Green (s)	34.0		16.0	16.0	16.0	34.0	14.0
70th %ile Term Code	Max		Ped	Ped	Ped	Max	Ped
50th %ile Green (s)	34.0		16.0	16.0	16.0	34.0	0.0
50th %ile Term Code	Max		Ped	Ped	Ped	Max	Skip
30th %ile Green (s)	32.4		16.0	16.0	16.0	32.4	0.0
30th %ile Term Code	Gap		Ped	Ped	Ped	Gap	Skip
10th %ile Green (s)	22.7		16.0	16.0	16.0	22.7	0.0
10th %ile Term Code	Gap		Ped	Ped	Ped	Gap	Skip
Queue Length 50th (ft)	21		24	11	19	1	
Queue Length 95th (ft)	65		54	30	61	#730	
Internal Link Dist (ft)	369			899	444		
Turn Bay Length (ft)							
Base Capacity (vph)	1517		277	384	428	1081	
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	0.20		0.29	0.10	0.15	0.87	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 67.4
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 20.7
 Intersection LOS: C
 Intersection Capacity Utilization 65.2%
 ICU Level of Service C
 Analysis Period (min) 15
 90th %ile Actuated Cycle: 82
 70th %ile Actuated Cycle: 82
 50th %ile Actuated Cycle: 62
 30th %ile Actuated Cycle: 60.4
 10th %ile Actuated Cycle: 50.7
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
 4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008

Splits and Phases: 4: CROTON POINT AVE & S RIVERSIDE AVE

↑ 02	↔ 04	↔ 09
13 s	40 s	7 s
↓ 06		
13 s		

HCM Unsignalized Intersection Capacity Analysis

3: CROTON POINT AVE & NB RT 9 RAMP

6/25/2008



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (veh/h)	127	91	18	785	274	122
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.84	0.84	0.80	0.80
Hourly flow rate (vph)	177	127	24	1028	377	168
Pedestrians						3
Lane Width (ft)						11.0
Walking Speed (ft/s)						4.0
Percent Blockage						0
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	449					
pX, platoon unblocked						
vC, conflicting volume			180			804 155
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			180			804 155
tC, single (s)			4.1			6.9 7.0
tC, 2 stage (s)						
tF (s)			2.2			3.5 3.4
p0 queue free %			98			0 80
cM capacity (veh/h)			1405			312 846

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	118	186	366	685	377	168
Volume Left	0	0	24	0	377	0
Volume Right	0	127	0	0	0	168
cSH	1700	1700	1405	1700	312	846
Volume to Capacity	0.07	0.11	0.02	0.40	1.21	0.20
Queue Length 95th (ft)	0	0	1	0	414	18
Control Delay (s)	0.0	0.0	0.6	0.0	154.6	10.3
Lane LOS	A			F B		
Approach Delay (s)	0.0		0.2		110.2	
Approach LOS	F					

Intersection Summary						
Average Delay	31.7					
Intersection Capacity Utilization	58.9%		ICU Level of Service		B	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

2: CROTON POINT AVE & SB RT 9 RAMP

6/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑						↑	↑
Volume (veh/h)	0	223	119	208	885	0	0	0	0	25	1	512
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.87	0.87	0.87	0.92	0.92	0.92	0.88	0.88	0.88
Hourly flow rate (vph)	0	319	170	263	1119	0	0	0	0	31	1	640
Pedestrians								3				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					880							
pX, platoon unblocked												
vC, conflicting volume	1119			492			2133	2052	247	1804	2137	559
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1119			492			2133	2052	247	1804	2137	559
tC, single (s)	4.1			4.2			7.5	6.5	6.9	7.9	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.7	4.0	3.3
p0 queue free %	100			75			0	100	100	5	97	0
cM capacity (veh/h)	632			1040			0	41	753	33	37	475

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	212	276	636	746	32	640
Volume Left	0	0	263	0	31	0
Volume Right	0	170	0	0	0	640
cSH	1700	1700	1040	1700	33	475
Volume to Capacity	0.12	0.16	0.25	0.44	0.98	1.35
Queue Length 95th (ft)	0	0	25	0	87	724
Control Delay (s)	0.0	0.0	5.8	0.0	330.7	194.7
Lane LOS			A		F	F
Approach Delay (s)	0.0		2.7		201.2	
Approach LOS					F	

Intersection Summary		
Average Delay		54.7
Intersection Capacity Utilization	75.1%	ICU Level of Service D
Analysis Period (min)		15

HCM Unsignalized Intersection Capacity Analysis

1: CROTON POINT AVE & GATEWAY PLAZA

6/25/2008

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (veh/h)	9	64	19	1076	277	44	7	0	272	1	0	0	
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			7%			0%		
Peak Hour Factor	0.58	0.58	0.58	0.91	0.91	0.91	0.79	0.79	0.79	0.25	0.25	0.25	
Hourly flow rate (vph)	17	121	36	1301	335	53	10	0	379	4	0	0	
Pedestrians		63						3			28		
Lane Width (ft)		12.0						11.0			12.0		
Walking Speed (ft/s)		4.0						4.0			4.0		
Percent Blockage		5						0			2		
Right turn flare (veh)													
Median type		None			None								
Median storage (veh)													
Upstream signal (ft)					1061								
pX, platoon unblocked													
vC, conflicting volume	416			160			3176	3194	142	3543	3185	452	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	416			160			3176	3194	142	3543	3185	452	
IC, single (s)	5.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2	
IC, 2 stage (s)													
tF (s)	3.1			2.2			3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	98			9			0	100	58	0	100	100	
cM capacity (veh/h)	749			1428			1	1	908	0	1	566	
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1								
Volume Total	174	1301	388	388	4								
Volume Left	17	1301	0	10	4								
Volume Right	36	0	53	379	0								
cSH	749	1428	1700	45	0								
Volume to Capacity	0.02	0.91	0.23	8.56	11.30								
Queue Length 95th (ft)	2	388	0	Err	Err								
Control Delay (s)	1.2	25.4	0.0	Err	Err								
Lane LOS	A	D		F	F								
Approach Delay (s)	1.2	19.5		Err	Err								
Approach LOS				F	F								
Intersection Summary													
Average Delay				1756.0									
Intersection Capacity Utilization				97.6%		ICU Level of Service			F				
Analysis Period (min)				15									

Weekday PM

Arterial Level of Service

6/25/2008

Arterial Level of Service: EB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
S RIVERSIDE AVE	IV	27	33.2	22.5	55.7	0.20	13.0	D
BENEDICT BLVD	IV	30	17.9	12.3	30.2	0.10	11.8	D
Total	IV		51.1	34.8	85.9	0.30	12.6	D

Arterial Level of Service: SB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BENEDICT BLVD	IV	30	16.0	9.4	25.4	0.07	10.0	D
CROTON POINT AVE #1	IV	30	17.9	3.0	20.9	0.10	17.1	C
Total	IV		33.9	12.4	46.3	0.17	13.2	C

Lanes, Volumes, Timings
5: BENEDICT BLVD & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SET	SBR
Lane Configurations		↔			↔			↔	↔		↔	
Volume (vph)	12	10	12	86	8	29	8	413	220	26	139	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	10	10	12	12	12
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
Ped. Bike Factor		1.00			0.99			1.00	0.97		1.00	
Fr't		0.952			0.968				0.850		0.994	
Flt Protected		0.982			0.966			0.999			0.992	
Satd. Flow (prot)	0	1699	0	0	1726	0	0	1754	1480	0	1484	0
Flt Permitted		0.867			0.759			0.994			0.892	
Satd. Flow (perm)	0	1493	0	0	1356	0	0	1745	1441	0	1334	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			22				272		5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		272			348			524			372	
Travel Time (s)		6.2			7.9			11.9			8.5	
Confl. Peds. (#/hr)	9					9	8		3	3		8
Peak Hour Factor	0.71	0.71	0.71	0.73	0.73	0.73	0.89	0.89	0.89	0.85	0.85	0.85
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	0%	10%	0%	1%	0%	0%	0%	1%	1%	0%	1%	0%
Bus Blockages (#/hr)	0	2	0	1	1	1	0	0	2	2	0	0
Parking (#/hr)	5	5	5	5	5	5				20	20	20
Adj. Flow (vph)	19	15	19	130	12	44	10	510	272	34	180	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	53	0	0	186	0	0	520	272	0	224	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2				6
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	45.0	45.0	45.0	45.0	45.0	0.0
Total Split (%)	35.7%	35.7%	0.0%	35.7%	35.7%	0.0%	64.3%	64.3%	64.3%	64.3%	64.3%	0.0%
Maximum Green (s)	19.0	19.0		19.0	19.0		39.0	39.0	39.0	39.0	39.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	3	3		4	4		3	3	3	6	6	
Act Effct Green (s)		19.0			19.0			39.0	39.0		39.0	
Actuated g/C Ratio		0.27			0.27			0.56	0.56		0.56	
v/c Ratio		0.13			0.48			0.53	0.29		0.30	
Control Delay		14.9			23.8			12.3	2.0		9.4	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		14.9			23.8			12.3	2.0		9.4	
LOS		B			C			B	A		A	
Approach Delay		14.9			23.8			8.8			9.4	

Lanes, Volumes, Timings
 5: BENEDICT BLVD & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			A			A	
Queue Length 50th (ft)		11			58			129	0		46	
Queue Length 95th (ft)		26			88			204	28		78	
Internal Link Dist (ft)		192			268			444			292	
Turn Bay Length (ft)												
Base Capacity (vph)		419			384			972	923		745	
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		0.13			0.48			0.53	0.29		0.30	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 11.4
 Intersection Capacity Utilization 57.5%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 5: BENEDICT BLVD & S RIVERSIDE AVE

↑ ø2 45 s	→ ø4 25 s
↓ ø6 45 s	← ø8 25 s

Lanes, Volumes, Timings
 4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations	↖↗		↖	↑	↑	↗	
Volume (vph)	520	228	189	136	102	141	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	12	9	10	9	10	
Grade (%)	0%			0%	-4%		
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.99		0.99			0.98	
Frt	0.954					0.850	
Flt Protected	0.966		0.950				
Satd. Flow (prot)	3205	0	1608	1742	1744	1522	
Flt Permitted	0.966		0.665				
Satd. Flow (perm)	3195	0	1117	1742	1744	1489	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)	130						
Link Speed (mph)	30			30	30		
Link Distance (ft)	449			979	524		
Travel Time (s)	10.2			22.3	11.9		
Confl. Peds. (#/hr)	3	1	9			9	
Peak Hour Factor	0.85	0.85	0.86	0.86	0.78	0.78	
Growth Factor	110%	110%	110%	110%	110%	110%	
Heavy Vehicles (%)	2%	0%	1%	1%	0%	1%	
Bus Blockages (#/hr)	2	0	0	2	0	0	
Adj. Flow (vph)	673	295	242	174	144	199	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	968	0	242	174	144	199	
Turn Type			Perm		pm+ov		
Protected Phases	4			2	6	4	9
Permitted Phases			2			6	
Detector Phase	4		2	2	6	4	
Switch Phase							
Minimum Initial (s)	1.0		1.0	1.0	1.0	1.0	1.0
Minimum Split (s)	7.0		7.0	7.0	7.0	7.0	7.0
Total Split (s)	26.0	0.0	27.0	27.0	27.0	26.0	7.0
Total Split (%)	43.3%	0.0%	45.0%	45.0%	45.0%	43.3%	12%
Maximum Green (s)	20.0		21.0	21.0	21.0	20.0	1.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.5		2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0	
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	Max	None	None
Walk Time (s)			5.0	5.0	5.0		5.0
Flash Dont Walk (s)			11.0	11.0	11.0		9.0
Pedestrian Calls (#/hr)			0	0	7		4
Act Effct Green (s)	19.9		21.4	21.4	21.4	41.3	
Actuated g/C Ratio	0.35		0.38	0.38	0.38	0.73	
v/c Ratio	0.80		0.57	0.26	0.22	0.18	

Lanes, Volumes, Timings
4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø9
Control Delay	22.5		24.0	15.7	15.3	3.0	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	22.5		24.0	15.7	15.3	3.0	
LOS	C		C	B	B	A	
Approach Delay	22.5			20.5	8.2		
Approach LOS	C			C	A		
90th %ile Green (s)	20.0		21.0	21.0	21.0	20.0	14.0
90th %ile Term Code	Max		MaxR	MaxR	MaxR	Max	Ped
70th %ile Green (s)	20.0		21.0	21.0	21.0	20.0	0.0
70th %ile Term Code	Max		MaxR	MaxR	MaxR	Max	Skip
50th %ile Green (s)	20.0		21.0	21.0	21.0	20.0	0.0
50th %ile Term Code	Max		MaxR	MaxR	MaxR	Max	Skip
30th %ile Green (s)	20.0		21.0	21.0	21.0	20.0	0.0
30th %ile Term Code	Max		MaxR	MaxR	MaxR	Max	Skip
10th %ile Green (s)	17.8		21.0	21.0	21.0	17.8	0.0
10th %ile Term Code	Gap		MaxR	MaxR	MaxR	Gap	Skip
Queue Length 50th (ft)	112		56	35	28	0	
Queue Length 95th (ft)	#294		#194	107	81	48	
Internal Link Dist (ft)	369			899	444		
Turn Bay Length (ft)							
Base Capacity (vph)	1226		422	658	659	1100	
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	0.79		0.57	0.26	0.22	0.18	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 56.6
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 19.2
 Intersection LOS: B
 Intersection Capacity Utilization 52.4%
 ICU Level of Service A
 Analysis Period (min) 15
 90th %ile Actuated Cycle: 73
 70th %ile Actuated Cycle: 53
 50th %ile Actuated Cycle: 53
 30th %ile Actuated Cycle: 53
 10th %ile Actuated Cycle: 50.8
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
 4: CROTON POINT AVE & S RIVERSIDE AVE

6/25/2008

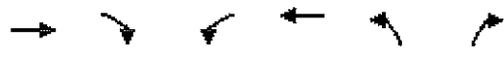
Splits and Phases: 4: CROTON POINT AVE & S RIVERSIDE AVE

↑ 02	↙ 04	↘ 09
27 s	26 s	7 s
↓ 06		
27 s		

HCM Unsignalized Intersection Capacity Analysis

3: CROTON POINT AVE & NB RT 9 RAMP

6/25/2008



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↗	↖
Volume (veh/h)	417	303	66	264	75	331
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.83	0.83	0.81	0.81
Hourly flow rate (vph)	628	457	87	350	102	450
Pedestrians						4
Lane Width (ft)						11.0
Walking Speed (ft/s)						4.0
Percent Blockage						0
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	449					
pX, platoon unblocked						
vC, conflicting volume			632		1211	546
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			632		1211	546
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		34	7
cM capacity (veh/h)			957		155	482

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	419	666	204	233	102	450
Volume Left	0	0	87	0	102	0
Volume Right	0	457	0	0	0	450
cSH	1700	1700	957	1700	155	482
Volume to Capacity	0.25	0.39	0.09	0.14	0.66	0.93
Queue Length 95th (ft)	0	0	8	0	93	277
Control Delay (s)	0.0	0.0	4.4	0.0	64.6	55.1
Lane LOS			A			F
Approach Delay (s)	0.0		2.1	56.8		
Approach LOS				F		

Intersection Summary						
Average Delay			15.6			
Intersection Capacity Utilization			52.8%	ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

2: CROTON POINT AVE & SB RT 9 RAMP

6/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑						↑	↑
Volume (veh/h)	0	715	156	200	159	0	0	0	0	33	1	76
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.71	0.71	0.71	0.82	0.82	0.82	0.92	0.92	0.92	0.83	0.83	0.83
Hourly flow rate (vph)	0	1108	242	268	213	0	0	0	0	44	1	101
Pedestrians								4				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					880							
pX, platoon unblocked												
vC, conflicting volume	213			1353			1977	1982	679	1304	2103	107
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	213			1353			1977	1982	679	1304	2103	107
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			47			100	100	100	37	94	89
cM capacity (veh/h)	1369			504			18	28	394	70	24	917

Direction Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	738	611	339	142	45	101
Volume Left	0	0	268	0	44	0
Volume Right	0	242	0	0	0	101
cSH	1700	1700	504	1700	66	917
Volume to Capacity	0.43	0.36	0.53	0.08	0.68	0.11
Queue Length 95th (ft)	0	0	77	0	75	9
Control Delay (s)	0.0	0.0	18.1	0.0	136.8	9.4
Lane LOS			C		F	A
Approach Delay (s)	0.0		12.8		48.8	
Approach LOS					E	

Intersection Summary		
Average Delay		6.7
Intersection Capacity Utilization	52.8%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis

1: CROTON POINT AVE & GATEWAY PLAZA

6/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↙	↘			↕	↗		↕	
Volume (veh/h)	0	73	7	168	59	4	12	0	759	37	1	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			7%			0%	
Peak Hour Factor	0.63	0.63	0.63	0.81	0.81	0.81	0.68	0.68	0.68	0.60	0.60	0.60
Hourly flow rate (vph)	0	127	12	228	80	5	19	0	1228	68	2	6
Pedestrians		60						4			20	
Lane Width (ft)		12.0						11.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		5						0			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1061							
pX, platoon unblocked												
vC, conflicting volume	106			144			740	699	138	1921	703	163
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	106			144			740	699	138	1921	703	163
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.9
p0 queue free %	100			84			93	100	0	0	99	99
cM capacity (veh/h)	1473			1447			271	302	913	0	301	689

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	140	228	86	429	819	75
Volume Left	0	228	0	19	0	68
Volume Right	12	0	5	409	819	6
cSH	1473	1447	1700	824	913	0
Volume to Capacity	0.00	0.16	0.05	0.52	0.90	Err
Queue Length 95th (ft)	0	14	0	76	314	Err
Control Delay (s)	0.0	8.0	0.0	14.0	31.8	Err
Lane LOS		A		B	D	F
Approach Delay (s)	0.0	5.8		25.7		Err
Approach LOS				D		F

Intersection Summary		
Average Delay		Err
Intersection Capacity Utilization	62.2%	ICU Level of Service B
Analysis Period (min)	15	

Appendix G

2013 Future Build Condition Synchro Analysis Reports

Weekday AM

Arterial Level of Service: NB #1

Gross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
GROTON POINT AVE #1	IV	25	31.5	0.0	31.5	0.17	20.0	B
SB RT 9 RAMP	IV	25	9.1	6.5	15.6	0.03	7.9	E
NB RT 9 RAMP	IV	25	18.0	1.7	19.7	0.08	14.9	C
S RIVERSIDE AVE	IV	25	18.7	31.8	50.5	0.09	6.1	F
BENEDICT BLVD	IV	30	17.9	5.2	23.1	0.10	15.5	C
Total	IV		95.2	45.2	140.4	0.48	12.2	D

Arterial Level of Service: WB #1

Gross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BENEDICT BLVD	IV	30	16.0	30.3	46.3	0.07	5.5	F
CROTON POINT AVE #1	IV	30	17.9	6.4	24.3	0.10	14.7	C
NB RT 9 RAMP	IV	25	18.7	7.2	25.9	0.09	11.8	D
SB RT 9 RAMP	IV	25	18.0	19.8	37.8	0.08	7.8	E
GATEWAY PLAZA	IV	25	9.1	11.3	20.4	0.03	6.0	F
Total	IV		79.7	75.0	154.7	0.37	8.6	E

Lanes, Volumes, Timings
 5: BENEDICT BLVD & S RIVERSIDE AVE #1

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↕		↕	
Volume (vph)	0	1	2	291	2	18	3	159	77	1	505	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	10	10	12	12	12
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
Ped Bike Factor		0.99			0.99			1.00	0.96		1.00	
Frt		0.910			0.992				0.850		0.996	
Flt Protected					0.955			0.999				
Satd. Flow (prot)	0	1734	0	0	1739	0	0	1531	1444	0	1616	0
Flt Permitted					0.734			0.990				
Satd. Flow (perm)	0	1734	0	0	1327	0	0	1517	1393	0	1616	0
Right-Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			5				105		2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		272			348			524			372	
Travel Time (s)		6.2			7.9			11.9			8.5	
Confl. Peds. (#/hr)	8		5	5		8	12		6	6		12
Peak Hour Factor	0.38	0.38	0.38	0.83	0.83	0.83	0.81	0.81	0.81	0.86	0.86	0.86
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	0%	0%	0%	1%	0%	11%	0%	16%	4%	0%	2%	14%
Bus Blockages (#/hr)	0	1	0	2	2	2	0	0	1	1	0	0
Parking (#/hr)	0	0	0	5	5	5				5	5	5
Adj. Flow (vph)	0	3	6	386	3	24	4	216	105	1	646	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	413	0	0	220	105	0	665	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		7			4			5				2
Permitted Phases	7			4			5		5	2		
Detector Phase	7	7		4	4		5			2		
Switch Phase												
Minimum Initial (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Minimum Split (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Total Split (s)	40.0	40.0	0.0	40.0	40.0	0.0	43.0	43.0	43.0	43.0	43.0	0.0
Total Split (%)	48.2%	48.2%	0.0%	48.2%	48.2%	0.0%	51.8%	51.8%	51.8%	51.8%	51.8%	0.0%
Maximum Green (s)	34.0	34.0		34.0	34.0		37.0	37.0	37.0	37.0	37.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	3	3		3	3		3	3	3	3	3	
Act Effct Green (s)		11.3			29.6			41.4	41.4		41.4	
Actuated g/C Ratio		0.14			0.36			0.50	0.50		0.50	
v/c Ratio		0.04			0.87			0.29	0.14		0.82	

Lanes, Volumes, Timings
5: BENEDICT BLVD & S RIVERSIDE AVE #1

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		16.3			43.5			5.2	0.4		30.3	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		16.3			43.5			5.2	0.4		30.3	
LOS		B			D			A	A		C	
Approach Delay		16.3			43.5			3.6			30.3	
Approach LOS		B			D			A			C	
90th %ile Green (s)	34.0	34.0		34.0	34.0		37.0	37.0	37.0	37.0	37.0	
90th %ile Term Code	Hold	Hold		Max	Max		Coord	Coord	Coord	Coord	Coord	
70th %ile Green (s)	0.0	0.0		34.0	34.0		37.0	37.0	37.0	37.0	37.0	
70th %ile Term Code	Skip	Skip		Max	Max		Coord	Coord	Coord	Coord	Coord	
50th %ile Green (s)	0.0	0.0		31.4	31.4		39.6	39.6	39.6	39.6	39.6	
50th %ile Term Code	Skip	Skip		Gap	Gap		Coord	Coord	Coord	Coord	Coord	
30th %ile Green (s)	0.0	0.0		27.4	27.4		43.6	43.6	43.6	43.6	43.6	
30th %ile Term Code	Skip	Skip		Gap	Gap		Coord	Coord	Coord	Coord	Coord	
10th %ile Green (s)	0.0	0.0		21.0	21.0		50.0	50.0	50.0	50.0	50.0	
10th %ile Term Code	Skip	Skip		Gap	Gap		Coord	Coord	Coord	Coord	Coord	
Queue Length 50th (ft)		2			187			20	0		293	
Queue Length 95th (ft)		3			257			28	0		#497	
Internal Link Dist (ft)		192			268			444			292	
Turn Bay Length (ft)												
Base Capacity (vph)		714			547			757	748		808	
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			0.76			0.29	0.14		0.82	

Intersection Summary

Area Type: Other
 Cycle Length: 83
 Actuated Cycle Length: 83
 Offset: 68 (82%), Referenced to phase 2:SBTL and 5:NBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 27.9
 Intersection LOS: C
 Intersection Capacity Utilization 66.8%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

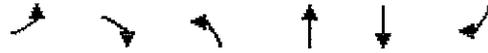
Splits and Phases: 5: BENEDICT BLVD & S RIVERSIDE AVE #1

↓ s2 43 s	← s4 40 s
↑ s5 43 s	→ s7 40 s

Lanes, Volumes, Timings

4: CROTON POINT AVE #1 & S RIVERSIDE AVE #1

6/25/2008

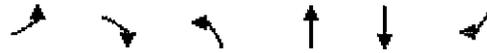


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑		↑	↑	↑	↑
Volume (vph)	199	50	48	23	53	755
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	9	10	9	10
Grade (%)	0%			0%	-4%	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	0.93		1.00		0.98	0.98
Frt	0.970				0.869	0.850
Flt Protected	0.962		0.950			
Satd. Flow (prot)	2997	0	1504	1563	1381	1418
Flt Permitted	0.962		0.428			
Satd. Flow (perm)	2792	0	676	1563	1381	1392
Right Turn on Red		Yes				No
Satd. Flow (RTOR)	34					
Link Speed (mph)	25			30	30	
Link Distance (ft)	449			979	524	
Travel Time (s)	12.2			22.3	11.9	
Confl. Peds. (#/hr)	33	5	4			4
Peak Hour Factor	0.89	0.89	0.66	0.66	0.88	0.88
Growth Factor	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	10%	10%	8%	13%	0%	3%
Bus Blockages (#/hr)	1	0	0	1	0	0
Adj. Flow (vph)	246	62	80	38	66	944
Shared Lane Traffic (%)						47%
Lane Group Flow (vph)	308	0	80	38	510	500
Turn Type			Perm			Perm
Protected Phases	4			2	5	
Permitted Phases			2			5
Detector Phase	4		2	2		
Switch Phase						
Minimum Initial (s)	1.0		1.0	1.0	1.0	1.0
Minimum Split (s)	7.0		7.0	7.0	7.0	7.0
Total Split (s)	21.0	0.0	62.0	62.0	62.0	62.0
Total Split (%)	25.3%	0.0%	74.7%	74.7%	74.7%	74.7%
Maximum Green (s)	15.0		56.0	56.0	56.0	56.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	2.5		2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	C-Max	C-Max
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	15		3	3	3	3
Act Effct Green (s)	12.7		58.3	58.3	58.3	58.3
Actuated g/C Ratio	0.15		0.70	0.70	0.70	0.70
v/c Ratio	0.63		0.17	0.03	0.53	0.51

Lanes, Volumes, Timings

4: CROTON POINT AVE #1 & S RIVERSIDE AVE #1

6/25/2008



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	31.8		5.8	4.4	6.6	6.4
Queue Delay	0.0		0.0	0.0	0.3	0.0
Total Delay	31.8		5.8	4.4	6.9	6.4
LOS	C		A	A	A	A
Approach Delay	31.8			5.3	6.6	
Approach LOS	C			A	A	
90th %ile Green (s)	15.0		56.0	56.0	56.0	56.0
90th %ile Term Code	Ped		Coord	Coord	Coord	Coord
70th %ile Green (s)	14.8		56.2	56.2	56.2	56.2
70th %ile Term Code	Gap		Coord	Coord	Coord	Coord
50th %ile Green (s)	13.1		57.9	57.9	57.9	57.9
50th %ile Term Code	Gap		Coord	Coord	Coord	Coord
30th %ile Green (s)	11.5		59.5	59.5	59.5	59.5
30th %ile Term Code	Gap		Coord	Coord	Coord	Coord
10th %ile Green (s)	9.2		61.8	61.8	61.8	61.8
10th %ile Term Code	Gap		Coord	Coord	Coord	Coord
Queue Length 50th (ft)	70		12	5	62	58
Queue Length 95th (ft)	94		21	11	m144	m134
Internal Link Dist (ft)	369			899	444	
Turn Bay Length (ft)						
Base Capacity (vph)	569		475	1097	970	977
Starvation Cap Reductn	0		0	0	123	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.54		0.17	0.03	0.60	0.51

Intersection Summary

Area Type: Other
 Cycle Length: 83
 Actuated Cycle Length: 83
 Offset: 80 (96%), Referenced to phase 5:SBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 11.9
 Intersection Capacity Utilization 48.0%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: CROTON POINT AVE #1 & S RIVERSIDE AVE #1

↑ a2 62 s	↘ a4 21 s
↓ a5 62 s	

Lanes, Volumes, Timings
 3: CROTON POINT AVE #1 & NB RT 9 RAMP

6/25/2008



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	127	91	18	785	274	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	11
Storage Length (ft)		0	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)		50	25		25	25
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99			1.00		
Frt	0.937					0.850
Flt Protected				0.999	0.950	
Satd. Flow (prot)	3071	0	0	3504	1687	1453
Flt Permitted				0.942	0.950	
Satd. Flow (perm)	3071	0	0	3303	1687	1453
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	127					151
Link Speed (mph)	25			25	25	
Link Distance (ft)	431			449	654	
Travel Time (s)	11.8			12.2	17.8	
Confl. Peds. (#/hr)		3	3			
Peak Hour Factor	0.79	0.79	0.84	0.84	0.80	0.80
Growth Factor	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	13%	3%	0%	3%	3%	7%
Bus Blockages (#/hr)	0	0	0	0	1	1
Adj. Flow (vph)	177	127	24	1028	377	168
Shared Lane Traffic (%)						
Lane Group Flow (vph)	304	0	0	1052	377	168
Turn Type			Perm			Perm
Protected Phases	7			4	2	
Permitted Phases			4			2
Detector Phase					2	2
Switch Phase						
Minimum Initial (s)	1.0		1.0	1.0	1.0	1.0
Minimum Split (s)	7.0		7.0	7.0	7.0	7.0
Total Split (s)	47.0	0.0	47.0	47.0	36.0	36.0
Total Split (%)	56.6%	0.0%	56.6%	56.6%	43.4%	43.4%
Maximum Green (s)	41.0		41.0	41.0	30.0	30.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	2.5		2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	None
Walk Time (s)	5.0		5.0	5.0		
Flash Dont Walk (s)	9.0		9.0	9.0		
Pedestrian Calls (#/hr)	2		2	2		
Act Effct Green (s)	47.5			47.5	23.5	23.5

Lanes, Volumes, Timings
 3: CROTON POINT AVE #1 & NB RT 9 RAMP

6/25/2008



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Actuated g/C Ratio	0.57			0.57	0.28	0.28
v/c Ratio	0.17			0.56	0.79	0.32
Control Delay	1.7			7.2	39.3	6.3
Queue Delay	0.0			0.1	0.0	0.0
Total Delay	1.7			7.2	39.3	6.3
LOS	A			A	D	A
Approach Delay	1.7			7.2	29.1	
Approach LOS	A			A	C	
90th %ile Green (s)	41.0		41.0	41.0	30.0	30.0
90th %ile Term Code	Coord		Coord	Coord	Max	Max
70th %ile Green (s)	44.0		44.0	44.0	27.0	27.0
70th %ile Term Code	Coord		Coord	Coord	Gap	Gap
50th %ile Green (s)	47.1		47.1	47.1	23.9	23.9
50th %ile Term Code	Coord		Coord	Coord	Gap	Gap
30th %ile Green (s)	50.3		50.3	50.3	20.7	20.7
30th %ile Term Code	Coord		Coord	Coord	Gap	Gap
10th %ile Green (s)	55.1		55.1	55.1	15.9	15.9
10th %ile Term Code	Coord		Coord	Coord	Gap	Gap
Queue Length 50th (ft)	4			62	179	6
Queue Length 95th (ft)	6			56	213	33
Internal Link Dist (ft)	351			369	574	
Turn Bay Length (ft)						100
Base Capacity (vph)	1812			1890	610	622
Starvation Cap Reductn	0			92	0	0
Spillback Cap Reductn	0			29	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.17			0.59	0.62	0.27

Intersection Summary

Area Type: Other
 Cycle Length: 83
 Actuated Cycle Length: 83
 Offset: 8 (10%), Referenced to phase 4:WBTL, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 12.6
 Intersection Capacity Utilization: 63.8%
 Analysis Period (min): 15
 Intersection LOS: B
 ICU Level of Service: B

Splits and Phases: 3: CROTON POINT AVE #1 & NB RT 9 RAMP

02	04
36 s	47 s
	07
	47 s

Lanes, Volumes, Timings
2: CROTON POINT AVE #1 & SB RT 9 RAMP

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑						↔	↔
Volume (vph)	0	223	119	208	885	0	0	0	0	25	1	512
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	0		0	225		0
Storage Lanes	0		0	0		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor		0.99			1.00							
Frt		0.948									0.864	0.850
Flt Protected					0.991						0.995	
Satd. Flow (prot)	0	3319	0	0	3537	0	0	0	0	0	1498	1519
Flt Permitted					0.742						0.995	
Satd. Flow (perm)	0	3319	0	0	2646	0	0	0	0	0	1498	1519
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		170										
Link Speed (mph)		25			25			25				30
Link Distance (ft)		181			431			646			1249	
Travel Time (s)		4.9			11.8			17.6			28.4	
Conf. Peds. (#/hr)			3	3								
Peak Hour Factor	0.77	0.77	0.77	0.87	0.87	0.87	0.92	0.92	0.92	0.88	0.88	0.88
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	0%	0%	6%	6%	0%	0%	2%	2%	2%	20%	0%	1%
Bus Blockages (#/hr)	0	0	2	2	0	0	0	0	0	0	2	0
Adj. Flow (vph)	0	319	170	263	1119	0	0	0	0	31	1	640
Shared Lane Traffic (%)												48%
Lane Group Flow (vph)	0	489	0	0	1382	0	0	0	0	0	339	333
Turn Type				Perm						Perm		Perm
Protected Phases		7			4						6	
Permitted Phases				4						6		6
Detector Phase										6	6	6
Switch Phase												
Minimum Initial (s)		1.0		1.0	1.0					1.0	1.0	1.0
Minimum Split (s)		7.0		7.0	7.0					7.0	7.0	7.0
Total Split (s)	0.0	50.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0	33.0	33.0	33.0
Total Split (%)	0.0%	60.2%	0.0%	60.2%	60.2%	0.0%	0.0%	0.0%	0.0%	39.8%	39.8%	39.8%
Maximum Green (s)		44.0		44.0	44.0					27.0	27.0	27.0
Yellow Time (s)		3.5		3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		2.5		2.5	2.5					2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		None		C-Max	C-Max					None	None	None
Walk Time (s)		5.0		5.0	5.0					5.0	5.0	5.0
Flash Dont Walk (s)		9.0		9.0	9.0					9.0	9.0	9.0
Pedestrian Calls (#/hr)		2		2	2					2	2	2
Act Effct Green (s)		48.0			48.0						23.0	23.0

Lanes, Volumes, Timings
 2: CROTON POINT AVE #1 & SB RT 9 RAMP

6/25/2008

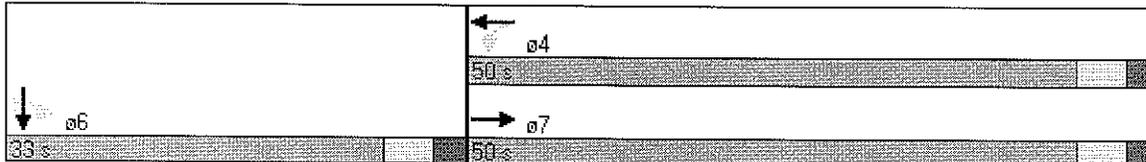


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.58			0.58						0.28	0.28
v/c Ratio		0.25			0.90						0.82	0.79
Control Delay		6.5			19.8						44.0	41.6
Queue Delay		0.6			1.8						0.9	0.7
Total Delay		7.1			21.6						44.8	42.3
LOS		A			C						D	D
Approach Delay		7.1			21.6						43.6	
Approach LOS		A			C						D	
90th %ile Green (s)		44.0		44.0	44.0					27.0	27.0	27.0
90th %ile Term Code		Coord		Coord	Coord					Max	Max	Max
70th %ile Green (s)		44.0		44.0	44.0					27.0	27.0	27.0
70th %ile Term Code		Coord		Coord	Coord					Max	Max	Max
50th %ile Green (s)		46.3		46.3	46.3					24.7	24.7	24.7
50th %ile Term Code		Coord		Coord	Coord					Gap	Gap	Gap
30th %ile Green (s)		50.4		50.4	50.4					20.6	20.6	20.6
30th %ile Term Code		Coord		Coord	Coord					Gap	Gap	Gap
10th %ile Green (s)		55.4		55.4	55.4					15.6	15.6	15.6
10th %ile Term Code		Coord		Coord	Coord					Gap	Gap	Gap
Queue Length 50th (ft)		25			161						167	163
Queue Length 95th (ft)		56			#482						252	246
Internal Link Dist (ft)		101			351			566			1169	
Turn Bay Length (ft)												
Base Capacity (vph)		1992			1531						487	494
Starvation Cap Reductn		1091			0						0	0
Spillback Cap Reductn		0			60						32	32
Storage Cap Reductn		0			0						0	0
Reduced v/c Ratio		0.54			0.94						0.75	0.72

Intersection Summary

Area Type: Other
 Cycle Length: 83
 Actuated Cycle Length: 83
 Offset: 0 (0%), Referenced to phase 4:WBTL, Start of Green, Master Intersection
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 24.6
 Intersection LOS: C
 Intersection Capacity Utilization 72.9%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 2: CROTON POINT AVE #1 & SB RT 9 RAMP



Lanes, Volumes, Timings
1: CROTON POINT AVE & GATEWAY PLAZA

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↙	↕			↕			↕	
Volume (vph)	9	64	19	1076	277	44	7	0	272	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		0%			0%			7%			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
Ped Bike Factor		0.99		1.00	0.99			0.99				
Frt		0.972			0.991			0.868				
Flt Protected		0.995		0.950	0.973			0.999			0.950	
Satd. Flow (prot)	0	1600	0	1805	1813	0	0	1537	0	0	1805	0
Flt Permitted		0.882		0.497	0.600			0.990			0.488	
Satd. Flow (perm)	0	1414	0	942	1117	0	0	1515	0	0	927	0
Right Turn on Red			No			Yes			Yes			No
Satd. Flow (RTOR)					10			379				
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		656			181			923			213	
Travel Time (s)		17.9			4.9			25.2			5.8	
Confl. Peds. (#/hr)	28		3	3		28	63					63
Peak Hour Factor	0.58	0.58	0.58	0.91	0.91	0.91	0.79	0.79	0.79	0.25	0.25	0.25
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	100%	2%	16%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	17	121	36	1301	335	53	10	0	379	4	0	0
Shared Lane Traffic (%)				36%								
Lane Group Flow (vph)	0	174	0	833	856	0	0	389	0	0	4	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			9			9	
Permitted Phases	4			8			9			9		
Detector Phase	4	4		8	8		9	9		9	9	
Switch Phase												
Minimum Initial (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Minimum Split (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Total Split (s)	28.0	28.0	0.0	37.0	65.0	0.0	18.0	18.0	0.0	18.0	18.0	0.0
Total Split (%)	33.7%	33.7%	0.0%	44.6%	78.3%	0.0%	21.7%	21.7%	0.0%	21.7%	21.7%	0.0%
Maximum Green (s)	22.0	22.0		31.0	59.0		12.0	12.0		12.0	12.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max		None	None		None	None	
Walk Time (s)	5.0	5.0			5.0							
Flash Dont Walk (s)	9.0	9.0			9.0							
Pedestrian Calls (#/hr)	3	3			10							
Act Effct Green (s)		22.0		62.8	62.8			8.2			8.2	
Actuated g/C Ratio		0.27		0.76	0.76			0.10			0.10	
v/c Ratio		0.46		0.77	0.75			0.79			0.04	
Control Delay		30.4		11.3	8.8			17.3			33.0	

Lanes, Volumes, Timings
1: CROTON POINT AVE & GATEWAY PLAZA

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0		22.2	13.3			0.0			0.0	
Total Delay		30.4		33.5	22.1			17.3			33.0	
LOS		C		C	C			B			C	
Approach Delay		30.4			27.7			17.3			33.0	
Approach LOS		C			C			B			C	
90th %ile Green (s)	22.0	22.0		31.0	59.0		12.0	12.0		12.0	12.0	
90th %ile Term Code	Hold	Hold		Coord	Coord		Max	Max		Max	Max	
70th %ile Green (s)	22.0	22.0		31.8	59.8		11.2	11.2		11.2	11.2	
70th %ile Term Code	Hold	Hold		Coord	Coord		Gap	Gap		Gap	Gap	
50th %ile Green (s)	22.0	22.0		36.6	64.6		6.4	6.4		6.4	6.4	
50th %ile Term Code	Hold	Hold		Coord	Coord		Gap	Gap		Gap	Gap	
30th %ile Green (s)	22.0	22.0		37.3	65.3		5.7	5.7		5.7	5.7	
30th %ile Term Code	Hold	Hold		Coord	Coord		Gap	Gap		Gap	Gap	
10th %ile Green (s)	22.0	22.0		37.4	65.4		5.6	5.6		5.6	5.6	
10th %ile Term Code	Hold	Hold		Coord	Coord		Gap	Gap		Gap	Gap	
Queue Length 50th (ft)		76		98	85			5			2	
Queue Length 95th (ft)		81		m347	m135			47			3	
Internal Link Dist (ft)		576			101			843			133	
Turn Bay Length (ft)												
Base Capacity (vph)		375		1075	1140			543			134	
Starvation Cap Reductn		0		262	276			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.46		1.02	0.99			0.72			0.03	

Intersection Summary

Area Type: Other
 Cycle Length: 83
 Actuated Cycle Length: 83
 Offset: 58 (70%), Referenced to phase 3:WBL and 8:WBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 26.1
 Intersection LOS: C
 Intersection Capacity Utilization 77.7%
 ICU Level of Service D
 Analysis Period (min) 15
 * User Entered Value
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: CROTON POINT AVE & GATEWAY PLAZA

03	04	09
37 s	28 s	16 s
08		
65 s		

Weekday PM

Arterial Level of Service: NB #1

Gross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
CROTON POINT AVE #1	IV	25	31.5	5.7	37.2	0.17	16.9	C
SB RT 9 RAMP	IV	25	9.1	4.2	13.3	0.03	9.3	D
NB RT 9 RAMP	IV	25	18.0	4.4	22.4	0.08	13.1	C
S RIVERSIDE AVE	IV	25	18.7	8.8	27.5	0.09	11.1	D
BENEDICT BLVD	IV	30	17.9	7.1	25.0	0.10	14.3	C
Total	IV		95.2	30.2	125.4	0.48	13.6	C

Arterial Level of Service: WB #1

Gross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BENEDICT BLVD	IV	30	16.0	7.4	23.4	0.07	10.8	D
CROTON POINT AVE #1	IV	30	17.9	3.7	21.6	0.10	16.5	C
NB RT 9 RAMP	IV	25	18.7	3.7	22.4	0.09	13.7	C
SB RT 9 RAMP	IV	25	18.0	4.7	22.7	0.08	12.9	D
GATEWAY PLAZA	IV	25	9.1	11.6	20.7	0.03	6.0	F
Total	IV		79.7	31.1	110.8	0.37	12.0	D

Lanes, Volumes, Timings
5: BENEDICT BLVD & S RIVERSIDE AVE #1

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	
Volume (vph)	12	10	12	86	8	29	8	413	220	26	139	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	10	10	12	12	12
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
Ped/Bike Factor		1.00			0.99			1.00	0.98		1.00	
Frt		0.952			0.968				0.850		0.994	
Flt Protected		0.982			0.966			0.999			0.992	
Satd. Flow (prot)	0	1748	0	0	1729	0	0	1754	1480	0	1624	0
Flt Permitted		0.851			0.759			0.994			0.893	
Satd. Flow (perm)	0	1509	0	0	1359	0	0	1745	1444	0	1461	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			32				272		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		272			348			524			372	
Travel Time (s)		6.2			7.9			11.9			8.5	
Confl. Peds. (#/hr)	9					9	8		3	3		8
Peak Hour Factor	0.71	0.71	0.71	0.73	0.73	0.73	0.89	0.89	0.89	0.85	0.85	0.85
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	0%	10%	0%	1%	0%	0%	0%	1%	1%	0%	1%	0%
Bus Blockages (#/hr)	0	2	0	1	1	1	0	0	2	2	0	0
Parking (#/hr)	0	0	0	5	5	5				5	5	5
Adj. Flow (vph)	19	15	19	130	12	44	10	510	272	34	180	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	53	0	0	186	0	0	520	272	0	224	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		7			4			5				2
Permitted Phases	7			4			5		5	2		
Detector Phase	7	7		4	4		5			2		
Switch Phase												
Minimum Initial (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Minimum Split (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Total Split (s)	18.0	18.0	0.0	18.0	18.0	0.0	29.0	29.0	29.0	29.0	29.0	0.0
Total Split (%)	38.3%	38.3%	0.0%	38.3%	38.3%	0.0%	61.7%	61.7%	61.7%	61.7%	61.7%	0.0%
Maximum Green (s)	12.0	12.0		12.0	12.0		23.0	23.0	23.0	23.0	23.0	23.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	5	5		5	5		2	2	2	2	2	2
Act Effct Green (s)		8.3			9.7			28.8	28.8			28.8
Actuated g/C Ratio		0.18			0.21			0.61	0.61			0.61
v/c Ratio		0.19			0.61			0.49	0.27			0.25

Lanes, Volumes, Timings
5: BENEDICT BLVD & S RIVERSIDE AVE #1

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		12.3			22.2			7.1	1.5		7.4	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		12.3			22.2			7.1	1.5		7.4	
LOS		B			C			A	A		A	
Approach Delay		12.3			22.2			5.2			7.4	
Approach LOS		B			C			A			A	
90th %ile Green (s)	12.0	12.0		12.0	12.0		23.0	23.0	23.0	23.0	23.0	23.0
90th %ile Term Code	Ped	Ped		Ped	Ped		Coord	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	12.0	12.0		12.0	12.0		23.0	23.0	23.0	23.0	23.0	23.0
70th %ile Term Code	Hold	Hold		Max	Max		Coord	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	0.0	0.0		10.6	10.6		24.4	24.4	24.4	24.4	24.4	24.4
50th %ile Term Code	Skip	Skip		Gap	Gap		Coord	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	0.0	0.0		8.5	8.5		26.5	26.5	26.5	26.5	26.5	26.5
30th %ile Term Code	Skip	Skip		Gap	Gap		Coord	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	0.0	0.0		0.0	0.0		41.0	41.0	41.0	41.0	41.0	41.0
10th %ile Term Code	Skip	Skip		Skip	Skip		Coord	Coord	Coord	Coord	Coord	Coord
Queue Length 50th (ft)		8			37			33	0		29	
Queue Length 95th (ft)		20			61			210	m1		61	
Internal Link Dist (ft)		192			268			444			292	
Turn Bay Length (ft)												
Base Capacity (vph)		399			371			1069	990		898	
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		0.13			0.50			0.49	0.27		0.25	

Intersection Summary

Area Type: Other
 Cycle Length: 47
 Actuated Cycle Length: 47
 Offset: 37 (79%), Referenced to phase 2:SBTL and 5:NBTL, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 8.4
 Intersection LOS: A
 Intersection Capacity Utilization 57.5%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

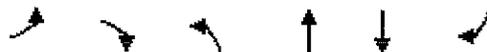
Splits and Phases: 5: BENEDICT BLVD & S RIVERSIDE AVE #1

↓ a2 29 s	← a4 18 s
↑ a5 29 s	→ a7 18 s

Lanes, Volumes, Timings

4: CROTON POINT AVE #1 & S RIVERSIDE AVE #1

6/25/2008



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	520	228	189	136	102	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	9	10	9	10
Grade (%)	0%			0%	-4%	
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99		0.99			0.98
Frt	0.954					0.850
Flt Protected	0.966		0.950			
Satd. Flow (prot)	3205	0	1602	1749	1744	1516
Flt Permitted	0.966		0.665			
Satd. Flow (perm)	3195	0	1114	1749	1744	1486
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	186					199
Link Speed (mph)	25			30	30	
Link Distance (ft)	449			979	524	
Travel Time (s)	12.2			22.3	11.9	
Confl. Peds. (#/hr)	3	1	9			9
Peak Hour Factor	0.85	0.85	0.86	0.86	0.78	0.78
Growth Factor	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	2%	0%	1%	1%	0%	1%
Bus Blockages (#/hr)	2	0	1	1	0	1
Adj. Flow (vph)	673	295	242	174	144	199
Shared Lane Traffic (%)						
Lane Group Flow (vph)	968	0	242	174	144	199
Turn Type			Perm			Perm
Protected Phases	4			2	5	
Permitted Phases			2			5
Detector Phase	4		2	2		
Switch Phase						
Minimum Initial (s)	1.0		1.0	1.0	1.0	1.0
Minimum Split (s)	7.0		7.0	7.0	7.0	7.0
Total Split (s)	25.0	0.0	22.0	22.0	22.0	22.0
Total Split (%)	53.2%	0.0%	46.8%	46.8%	46.8%	46.8%
Maximum Green (s)	19.0		16.0	16.0	16.0	16.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	2.5		2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Max		None	None	None	None
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	2		7	7	7	7
Act Effct Green (s)	21.0		14.0	14.0	14.0	14.0
Actuated g/C Ratio	0.45		0.30	0.30	0.30	0.30
v/c Ratio	0.63		0.73	0.34	0.28	0.34

Lanes, Volumes, Timings

4: CROTON POINT AVE #1 & S RIVERSIDE AVE #1

6/25/2008

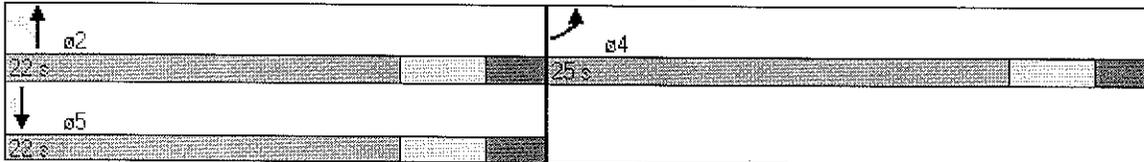


Lane-Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	8.8		29.3	14.0	10.3	3.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	8.8		29.3	14.0	10.3	3.7
LOS	A		C	B	B	A
Approach Delay	8.8			22.9	6.5	
Approach LOS	A			C	A	
90th %ile Green (s)	19.0		16.0	16.0	16.0	16.0
90th %ile Term Code	Coord		Max	Max	Ped	Ped
70th %ile Green (s)	19.0		16.0	16.0	16.0	16.0
70th %ile Term Code	Coord		Max	Max	Hold	Hold
50th %ile Green (s)	19.0		16.0	16.0	16.0	16.0
50th %ile Term Code	Coord		Max	Max	Hold	Hold
30th %ile Green (s)	22.0		13.0	13.0	13.0	13.0
30th %ile Term Code	Coord		Gap	Gap	Hold	Hold
10th %ile Green (s)	26.2		8.8	8.8	8.8	8.8
10th %ile Term Code	Coord		Gap	Gap	Hold	Hold
Queue Length 50th (ft)	67		54	34	26	0
Queue Length 95th (ft)	89		#126	66	46	17
Internal Link Dist (ft)	369			899	444	
Turn Bay Length (ft)						
Base Capacity (vph)	1537		379	595	518	581
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	0.63		0.64	0.29	0.28	0.34

Intersection Summary

Area Type: Other
 Cycle Length: 47
 Actuated Cycle Length: 47
 Offset: 19 (40%), Referenced to phase 4:EBL, Start of Green
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 11.7
 Intersection Capacity Utilization 52.4%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 4: CROTON POINT AVE #1 & S RIVERSIDE AVE #1



Lanes, Volumes, Timings
 3: CROTON POINT AVE #1 & NB RT 9 RAMP

6/25/2008

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↓			↑↓	↖	↗
Volume (vph)	417	303	66	264	75	331
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	11
Storage Length (ft)		0	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)		50	25		25	25
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99			1.00		
Frt	0.937					0.850
Flt Protected				0.990	0.950	
Satd. Flow (prot)	3312	0	0	3546	1642	1527
Flt Permitted				0.620	0.950	
Satd. Flow (perm)	3312	0	0	2220	1642	1527
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	457					137
Link Speed (mph)	25			25	25	
Link Distance (ft)	431			449	654	
Travel Time (s)	11.8			12.2	17.8	
Confl. Peds. (#/hr)		4	4			
Peak Hour Factor	0.73	0.73	0.83	0.83	0.81	0.81
Growth Factor	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	1%	1%	0%	1%	5%	1%
Bus Blockages (#/hr)	0	0	0	0	3	3
Adj. Flow (vph)	628	457	87	350	102	450
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1085	0	0	437	102	450
Turn Type			Perm			Perm
Protected Phases	7			4	2	
Permitted Phases			4			2
Detector Phase					2	2
Switch Phase						
Minimum Initial (s)	1.0		1.0	1.0	1.0	1.0
Minimum Split (s)	7.0		7.0	7.0	7.0	7.0
Total Split (s)	25.0	0.0	25.0	25.0	22.0	22.0
Total Split (%)	53.2%	0.0%	53.2%	53.2%	46.8%	46.8%
Maximum Green (s)	19.0		19.0	19.0	16.0	16.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	2.5		2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	None
Walk Time (s)	5.0		5.0	5.0		
Flash Dont Walk (s)	9.0		9.0	9.0		
Pedestrian Calls (#/hr)	3		3	3		
Act Effct Green (s)	21.1			21.1	13.9	13.9

Lanes, Volumes, Timings
 3: CROTON POINT AVE #1 & NB RT 9 RAMP

6/25/2008

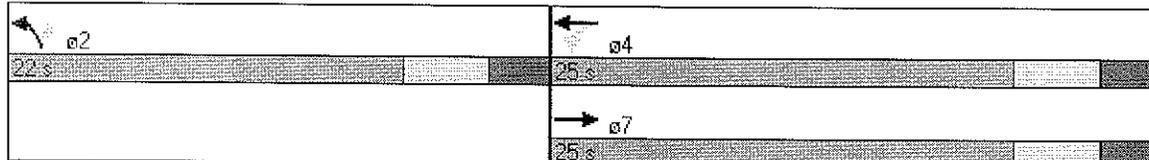


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Actuated g/C Ratio	0.45			0.45	0.30	0.30
v/c Ratio	0.62			0.44	0.21	0.82
Control Delay	4.4			3.7	12.5	24.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	4.4			3.7	12.5	24.7
LOS	A			A	B	C
Approach Delay	4.4			3.7	22.4	
Approach LOS	A			A	C	
90th %ile Green (s)	19.0		19.0	19.0	16.0	16.0
90th %ile Term Code	Coord		Coord	Coord	Max	Max
70th %ile Green (s)	19.0		19.0	19.0	16.0	16.0
70th %ile Term Code	Coord		Coord	Coord	Max	Max
50th %ile Green (s)	19.0		19.0	19.0	16.0	16.0
50th %ile Term Code	Coord		Coord	Coord	Max	Max
30th %ile Green (s)	21.9		21.9	21.9	13.1	13.1
30th %ile Term Code	Coord		Coord	Coord	Gap	Gap
10th %ile Green (s)	26.5		26.5	26.5	8.5	8.5
10th %ile Term Code	Coord		Coord	Coord	Gap	Gap
Queue Length 50th (ft)	14			11	19	69
Queue Length 95th (ft)	38			11	40	#129
Internal Link Dist (ft)	351			369	574	
Turn Bay Length (ft)						100
Base Capacity (vph)	1737			995	559	610
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	0.62			0.44	0.18	0.74

Intersection Summary

Area Type: Other
 Cycle Length: 47
 Actuated Cycle Length: 47
 Offset: 9 (19%), Referenced to phase 4:WBTL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 9.1
 Intersection LOS: A
 Intersection Capacity Utilization 56.1%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: CROTON POINT AVE #1 & NB RT 9 RAMP



Lanes, Volumes, Timings
 2: CROTON POINT AVE #1 & SB RT 9 RAMP

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑						↑	↑
Volume (vph)	0	715	156	200	159	0	0	0	0	33	1	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	0		0	225		0
Storage Lanes	0		0	0		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00							
Frt		0.973										0.850
Flt Protected					0.973						0.953	
Satd. Flow (prot)	0	3490	0	0	3474	0	0	0	0	0	1802	1538
Flt Permitted					0.570						0.953	
Satd. Flow (perm)	0	3490	0	0	2034	0	0	0	0	0	1802	1538
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		103										
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		181			431			646			1249	
Travel Time (s)		4.9			11.8			17.6			28.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	0.71	0.71	0.71	0.82	0.82	0.82	0.92	0.92	0.92	0.83	0.83	0.83
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	0%	0%	1%	2%	0%	0%	2%	2%	2%	0%	3%	5%
Bus Blockages (#/hr)	0	0	1	1	0	0	0	0	0	0	1	0
Adj. Flow (vph)	0	1108	242	268	213	0	0	0	0	44	1	101
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1350	0	0	481	0	0	0	0	0	45	101
Turn Type				Perm						Perm		Perm
Protected Phases		7			4						6	
Permitted Phases				4						6		6
Detector Phase										6	6	6
Switch Phase												
Minimum Initial (s)		1.0		1.0	1.0					1.0	1.0	1.0
Minimum Split (s)		7.0		7.0	7.0					7.0	7.0	7.0
Total Split (s)	0.0	35.0	0.0	35.0	35.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0
Total Split (%)	0.0%	74.5%	0.0%	74.5%	74.5%	0.0%	0.0%	0.0%	0.0%	25.5%	25.5%	25.5%
Maximum Green (s)		29.0		29.0	29.0					6.0	6.0	6.0
Yellow Time (s)		3.5		3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		2.5		2.5	2.5					2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		None		C-Max	C-Max					None	None	None
Walk Time (s)		5.0		5.0	5.0					5.0	5.0	5.0
Flash Dont Walk (s)		9.0		9.0	9.0					9.0	9.0	9.0
Pedestrian Calls (#/hr)		2		2	2					2	2	2
Act Effct Green (s)		32.6			32.6						5.9	5.9

Lanes, Volumes, Timings
 2: CROTON POINT AVE #1 & SB RT 9 RAMP

6/25/2008

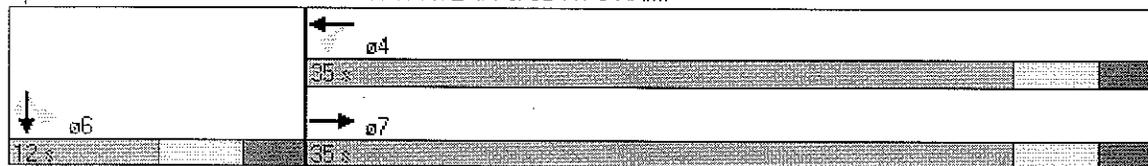


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.69			0.69						0.13	0.13
v/c Ratio		0.55			1.23dl						0.20	0.52
Control Delay		4.2			4.7						20.8	30.9
Queue Delay		0.2			0.0						0.0	0.0
Total Delay		4.4			4.7						20.8	30.9
LOS		A			A						C	C
Approach Delay		4.4			4.7						27.8	
Approach LOS		A			A						C	
90th %ile Green (s)		29.0		29.0	29.0					6.0	6.0	6.0
90th %ile Term Code		Coord		Coord	Coord					Ped	Ped	Ped
70th %ile Green (s)		29.0		29.0	29.0					6.0	6.0	6.0
70th %ile Term Code		Coord		Coord	Coord					Max	Max	Max
50th %ile Green (s)		29.0		29.0	29.0					6.0	6.0	6.0
50th %ile Term Code		Coord		Coord	Coord					Max	Max	Max
30th %ile Green (s)		29.0		29.0	29.0					6.0	6.0	6.0
30th %ile Term Code		Coord		Coord	Coord					Max	Max	Max
10th %ile Green (s)		41.0		41.0	41.0					0.0	0.0	0.0
10th %ile Term Code		Coord		Coord	Coord					Skip	Skip	Skip
Queue Length 50th (ft)		95			12						11	26
Queue Length 95th (ft)		37			38						31	#60
Internal Link Dist (ft)		101			351			566			1169	
Turn Bay Length (ft)												
Base Capacity (vph)		2452			1411						230	196
Starvation Cap Reductn		399			0						0	0
Spillback Cap Reductn		0			7						0	0
Storage Cap Reductn		0			0						0	0
Reduced v/c Ratio		0.66			0.34						0.20	0.52

Intersection Summary

Area Type: Other
 Cycle Length: 47
 Actuated Cycle Length: 47
 Offset: 0 (0%), Referenced to phase 4:WBTL, Start of Green, Master Intersection
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 6.2
 Intersection Capacity Utilization: 57.8%
 Analysis Period (min): 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: CROTON POINT AVE #1 & SB RT 9 RAMP



Lanes, Volumes, Timings
1: CROTON POINT AVE & GATEWAY PLAZA

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗			↕	↖		↕	
Volume (vph)	0	73	7	168	59	4	12	0	759	37	1	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		0%			0%			7%			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
Ped Bike Factor		1.00		1.00	1.00			1.00			0.99	
Frt		0.988			0.991			0.855	0.850		0.989	
Flt Protected				0.950				0.998			0.957	
Satd. Flow (prot)	0	1829	0	1805	1877	0	0	1512	1507	0	1694	0
Flt Permitted				0.370				0.990			0.237	
Satd. Flow (perm)	0	1829	0	701	1877	0	0	1497	1507	0	419	0
Right Turn on Red			No			Yes			Yes			No
Satd. Flow (RTOR)					5			602	626			
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		656			181			923			213	
Travel Time (s)		17.9			4.9			25.2			5.8	
Confl. Peds. (#/hr)	20		4	4		20	60					60
Peak Hour Factor	0.63	0.63	0.63	0.81	0.81	0.81	0.68	0.68	0.68	0.60	0.60	0.60
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Heavy Vehicles (%)	0%	0%	29%	0%	0%	0%	0%	0%	0%	0%	0%	67%
Adj. Flow (vph)	0	127	12	228	80	5	19	0	1228	68	2	6
Shared Lane Traffic (%)									49%			
Lane Group Flow (vph)	0	139	0	228	85	0	0	621	626	0	76	0
Turn Type	Perm			pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			9				9
Permitted Phases	4			8			9		9	9		
Detector Phase	4	4							9	9		9
Switch Phase												
Minimum Initial (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Minimum Split (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Total Split (s)	12.0	12.0	0.0	13.0	25.0	0.0	22.0	22.0	22.0	22.0	22.0	0.0
Total Split (%)	25.5%	25.5%	0.0%	27.7%	53.2%	0.0%	46.8%	46.8%	46.8%	46.8%	46.8%	0.0%
Maximum Green (s)	6.0	6.0		7.0	19.0		16.0	16.0	16.0	16.0	16.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		C-Max	C-Max		Max	Max	Max	Max	Max	
Walk Time (s)	5.0	5.0			5.0							
Flash Dont Walk (s)	9.0	9.0			9.0							
Pedestrian Calls (#/hr)	4	4			8							
Act Effct Green (s)		6.0		19.0	19.0			16.0	16.0		16.0	
Actuated g/C Ratio		0.13		0.40	0.40			0.34	0.34		0.34	
v/c Ratio		0.60		0.45	0.11			0.68	0.68		0.53	
Control Delay		32.9		11.6	6.5			6.2	5.7		31.0	

Lanes, Volumes, Timings
1: CROTON POINT AVE & GATEWAY PLAZA

6/25/2008



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0		0.7	0.0			0.4	0.4		0.0	
Total Delay		32.9		12.2	6.5			6.6	6.1		31.0	
LOS		C		B	A			A	A		C	
Approach Delay		32.9			10.7			6.4			31.0	
Approach LOS		C			B			A			C	
90th %ile Green (s)	6.0	6.0		7.0	19.0		16.0	16.0	16.0	16.0	16.0	16.0
90th %ile Term Code	Ped	Ped		Coord	Coord		MaxR	MaxR	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	6.0	6.0		7.0	19.0		16.0	16.0	16.0	16.0	16.0	16.0
70th %ile Term Code	Max	Max		Coord	Coord		MaxR	MaxR	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	6.0	6.0		7.0	19.0		16.0	16.0	16.0	16.0	16.0	16.0
50th %ile Term Code	Max	Max		Coord	Coord		MaxR	MaxR	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	6.0	6.0		7.0	19.0		16.0	16.0	16.0	16.0	16.0	16.0
30th %ile Term Code	Max	Max		Coord	Coord		MaxR	MaxR	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	0.0	0.0		19.0	19.0		16.0	16.0	16.0	16.0	16.0	16.0
10th %ile Term Code	Skip	Skip		Coord	Coord		MaxR	MaxR	MaxR	MaxR	MaxR	MaxR
Queue Length 50th (ft)		37		20	6			3	0		16	
Queue Length 95th (ft)		53		58	m23			12	8		30	
Internal Link Dist (ft)		576			101			843			133	
Turn Bay Length (ft)												
Base Capacity (vph)		233		504	762			907	926		143	
Starvation Cap Reductn		0		88	0			0	0		0	
Spillback Cap Reductn		0		0	0			55	57		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.60		0.55	0.11			0.73	0.72		0.53	

Intersection Summary

Area Type: Other
 Cycle Length: 47
 Actuated Cycle Length: 47
 Offset: 26 (55%), Referenced to phase 3:WBL and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 10.3
 Intersection LOS: B
 Intersection Capacity Utilization 68.4%
 ICU Level of Service C
 Analysis Period (min) 15
 * User Entered Value

m: Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: CROTON POINT AVE & GATEWAY PLAZA

03	04	09
13 s	12 s	22 s
08		
25 s		

Appendix H

Short-Term Improvements Cost Estimate

CONSTRUCTION COST ESTIMATE

ITEM NO	ITEM	UNIT	QUANTITY	UNIT PRICE	UNIT PRICE	AMOUNT
4.02 AG	Asphaltic Concrete Wearing Course, 3" Thick	S.Y.	9024	\$ 9.50	\$ 12.35	\$ 111,447.77
4.02 CB	Asphaltic Concrete Mixture	TONS	259	\$ 67.00	\$ 100.00	\$ 25,916.40
4.04 AC	Concrete Base for Pavement, 6" Thick, Class B-32	C.Y.	284	\$ 105.00	\$ 150.00	\$ 42,666.67
4.08 BA	Concrete Curb (21" Deep)	L.F.	3602	\$ 19.00	\$ 24.70	\$ 88,969.40
4.08 BAM	Concrete Curb, Mountable (21" Deep)	L.F.	734	\$ 19.00	\$ 24.70	\$ 18,129.80
4.13 AA	4" Concrete Sidewalk (Unpigmented)	S.F.	7642	\$ 4.30	\$ 7.00	\$ 53,494.00
4.13 AB	4" Concrete Sidewalk (Pigmented)	S.F.	12089	\$ 5.25	\$ 8.00	\$ 96,712.00
4.13 BA	7" Concrete Sidewalk (Unpigmented)	S.F.	5497	\$ 5.25	\$ 9.00	\$ 49,473.00
4.13 BB	7" Concrete Sidewalk (Pigmented)	S.F.	1270	\$ 6.50	\$ 10.00	\$ 12,700.00
4.13 D	Detectable Warning Surface	S.F.	600	\$ 10.00	\$ 13.00	\$ 7,800.00
6.02 AAN	Unclassified Excavation	C.Y.	284	\$ 31.00	\$ 40.30	\$ 11,463.11
6.03 AA	Stripping Pavement Surface (Asphaltic Concrete)	S.Y.	540	\$ 4.70	\$ 6.11	\$ 3,299.40
6.22 F	Additional Hardware	LBS	1000	\$ 1.00	\$ 1.30	\$ 1,300.00
6.36 DR	Structural Repair and Adjustment of Utility Structures	C.Y.	0	\$ 900.00	\$ 1,170.00	\$ 234.00
6.43	Photographs	SETS	180	\$ 12.00	\$ 15.60	\$ 2,808.00
6.44	Thermoplastic Reflectorized Pavement Markings (4" Wide)	L.F.	12858	\$ 0.60	\$ 0.78	\$ 10,029.24
6.44 B	Thermoplastic Reflectorized Pavement Figures	EA	4	\$ 30.00	\$ 39.00	\$ 156.00
6.50	Cleaning of Drainage Structures	EACH	13	\$ 165.00	\$ 214.50	\$ 2,788.50
6.52 A	Uniformed Full-Time Flagmen	P/HR	1560	\$ 25.00	\$ 32.50	\$ 50,700.00
6.67 MM	Subbase Course, Select Granular Material, Type MM	C.Y.	284	\$ 10.00	\$ 13.00	\$ 3,697.78
6.70	Maintenance and Protection of Traffic (MPT)	L.S.	1	\$ 28,000.00	\$ 28,000.00	\$ 28,000.00
6.83 AB	Furnishing New Traffic Sign Posts	L.F.	280	\$ 4.00	\$ 5.20	\$ 1,456.00
6.83 AR	Furnishing New Reflectorized Traffic Signs	S.F.	134	\$ 13.00	\$ 16.90	\$ 2,256.15
6.83 BA	Installing Traffic Signs	S.F.	134	\$ 9.25	\$ 12.03	\$ 1,605.34
6.83 BB	Installing Traffic Sign Posts	L.F.	280	\$ 8.00	\$ 10.40	\$ 2,912.00
6.91	Reflective Cracking Membrane (18" Wide)	L.F.	5045	\$ 2.10	\$ 2.73	\$ 13,772.85
TRAF	Furnish and Install Traffic Signals for 3 Intersections, including all countdown pedestrian signal displays	EACH	3	\$ 50,000.00	\$ 50,000.00	\$ 150,000.00
MOBL	Mobilization	L.S.	1	\$ 38,000.00	\$ 38,000.00	\$ 38,000.00
TRLR	Engineer - Trailer	MTH	9	\$ 4,000.00	\$ 4,000.00	\$ 36,000.00
TRVL	Engineer - Travel Expense	MTH	11	\$ 2,000.00	\$ 2,000.00	\$ 22,000.00
LGHT	Furnish and Install Street Lighting	EACH	10	\$ 11,000.00	\$ 11,000.00	\$ 110,000.00
	Subtotal					\$ 999,787.41
	Survey and Mapping @ 5%					\$ 49,989.37
	Design Costs @ 15%					\$ 149,968.11
	Construction Inspection @ 10%					\$ 99,978.74
	Subtotal					\$ 1,249,734.26
	20% Contingency Fee & Inflation					\$ 249,946.85
	TOTAL					\$ 1,499,681.11

Item 4.02 AG		Asphaltic Concrete Wearing Course, 3" Thick		S.Y.		
Street	From	To	Length (ft)	Area (SF)	Area (SY)	
Croton Point Ave	Veterans Plaza	SB Rt. 9 Ent. Ramp	\$ 168.00	\$ 7,896.00	877	
Croton Point Ave		SB Rt. 9 Entrance Rmp		\$ 3,731.00	415	
Croton Point Ave	Rt. 9 Ent. Ramp	Riverside Ave	\$ 803.00	\$ 35,332.00	3926	
Riverside Ave		Croton Point Avenue		\$ 5,465.00	607	
Riverside Ave	Croton Point Ave	Benedict Blvd	\$ 413.00	\$ 16,107.00	1790	
Riverside Ave		Benedict Blvd		\$ 5,006.00	556	
SB Rt. 9 Ramp		Widening	\$ 250.00	\$ 7,680.00	853	
Total Area (SY)					9,024	

Bike Lanes
2838
13359
10301

26498

Item: 4.02 CB Asphaltic Concrete Mixture					
- In roadway area around every new or modified City manhole					
- Assumed 15' linear feet per catch basin connection.					
DETAIL #	DESCRIPTION	Factor	Length (ft)	Quantity	Total (ft ³)
1	Adjacent to New Curbs in Roadway	0.50	4,336.00		2168
2	Adjacent to New Curbs in Sidewalk	0.25	4,336.00		1084
3	Catch Basin Connection	1.33	110.00		146
4	Around New Type 1 - Catch Basins	22.83		2	46
5	Around New or Modified Manhole	5.78		2	12
6	New Tree Pit Cut-out	4.17		0	0
7	Corner Quadrant Sidewalk Adjacent to New Curbs	16.67			0
8	Pavement Ramp through Intersection*	1.25	0.00		0
Subtotal (ft ³)					3456
Subtotal - 150lbs/ft ³ (lbs)					518328
Subtotal (tons)					259
Additional Temporary Pavement for Water Distribution Lines					0
Total					259

Street	From	To	Sewer/Wate	
Croton Avenue			22	
Subtotal			22	
Add 20%			1.2	
Total Number of Manholes			26	26

Item 4.04 AC		Concrete Base for Pavement, 6" Thick, Class B-32		C.Y.	
Street	From	To	Area (SF)	Volume (CY)	
SB Rt. 9 Ramp		Widening	7680	284	
Total Volume (CY)				284	

3 signals

Item 4.08 BA		Concrete Curb (21" Deep)		L.F.	
Street	From	To	Length (ft)		
Croton Point Ave	Veterans Plaza	SB Rt. 9 Ent. Ramp	484		
Croton Point Ave	SB Rt. 9 Ent. Ramp	Riverside Ave	1835		
Riverside Ave	Croton Point Ave	Benedict Blvd	1203		
Benedict Blvd		Riverside Ave	80		
Total Length (FT)			3602		

11 signs
Arrows: 15 single
8 double
4 bicycle
30 ped ram
Striping 14 Stop Bai

Item 4.08 BAM		Concrete Curb, Mountable (21" Deep)		L.F.	
Street	From	To	Length (ft)		
Croton Point Ave	Veterans Plaza	SB Rt. 9 Ent. Ramp	144		
Croton Point Ave	SB Rt. 9 Ent. Ramp	Riverside Ave	168		
Riverside Ave	Croton Point Ave	Benedict Blvd	422		
Benedict Blvd		Riverside Ave			
Total Length (FT)			734		

Item 4.13 AA	4" Concrete Sidewalk, Unpigmented		S.F.
<i>Street</i>	<i>From</i>	<i>To</i>	<i>Area (SF)</i>
Croton Point Ave	Veterans Plaza	SB Rt. 9 Ent. Ramp	1128
Riverside Ave	Croton Point Ave	Benedict Blvd	6514
Total Area (SF)			7642

Item 4.13 AB	4" Concrete Sidewalk, Pigmented		S.F.
<i>Street</i>	<i>From</i>	<i>To</i>	<i>Area (SF)</i>
Croton Point Ave	SB Rt. 9 Ent. Ramp	Riverside Ave	12089
Total Area (SF)			12089

Item 4.13 BA	7" Concrete Sidewalk, Unpigmented		S.F.
<i>Street</i>	<i>From</i>	<i>To</i>	<i>Area (SF)</i>
Croton Point Ave	Veterans Plaza	SB Rt. 9 Ent. Ramp	1710
Riverside Ave	Croton Point Ave	Benedict Blvd	3787
Total Area (SF)			5497

Item 4.13 BB	7" Concrete Sidewalk, Pigmented		S.F.
<i>Street</i>	<i>From</i>	<i>To</i>	<i>Area (SF)</i>
Croton Point Ave	SB Rt. 9 Ent. Ramp	Riverside Ave	1270
Total Area (SF)			1270

Item 4.13 D	Detectable Warning Surface		S.F.		
<i>Street</i>	<i>From</i>	<i>To</i>	<i># of Ped Ramps</i>	<i>Area (S.F.)</i>	<i>Area (S.F.)</i>
Croton Point Ave	Veterans Plaza	Riverside Ave	16	20	320
Riverside Avenue	Croton Point Avenue	Benedict Blvd	14	20	280
Total Area (S.F.)					600

Item 6.02 AAN	Unclassified Excavation		C.Y.	
<i>Street</i>	<i>From</i>	<i>To</i>	<i>Area (SF)</i>	<i>Volume (CY)</i>
SB Rt. 9 Ramp		Widening	7680	284
Total Volume (CY)				284

Item: 6.03 AA Stripping Pavement Surface (Asphalt Concrete)				
<i>Street</i>	<i>Road Width</i>	<i># of Adjust. Areas</i>	<i>Area (SY)</i>	
Croton Point Avenue @ Veterans Plaza	42	1	93	
Riverside Avenue @ Croton Point Avenue	48	1	107	
Riverside Avenue @ Benedict Avenue	45	1	100	
Benedict Boulevard @ Riverside Avenue	54	2	240	
	Total	SY	540	

Item 6.22 F	Additional Hardware	lbs
(For repairing damaged catch basins and water and sewer manhole covers and frames)		
	<u>Nominal Amount (lbs)</u>	<u>1000</u>
	Total	1000

Item: 6.36 DR Structural Repair and Adjustment of Utility Structures	
- Assume a Percentage of Structures will have to be adjusted	
- Assume 5.5' length by 6" thick brick by 4 walls by 1' high = 11 cf = .5 CY	
- (All CB's are being replaced - therefore they are not included)	
Total number of drainage structures	2 (From Item 4.02AG)
Assume a 20% of the total drainage structures	0
0.5 CY per Manhole	0.5
TOTAL (CY)	0

Item 6.43	Photographs	Sets
150 sets per million dollars of construction w/ min of 100 sets (per DDC Directives FD 12)		
<u>Approx. Cost of Construction</u>	<u>\$</u>	<u>1,200,000</u>
<u>Divided by 1 million and times 150</u>		<u>180</u>
Total		180 SETS

Item 6.44	Thermoplastic ReflectORIZED Pavement Markings (4" Wide)	L.F.			
Factor F is number of 4" stripes					
<u>Type</u>	<u>Length</u>	<u>Number of Stripes</u>	<u>F</u>	<u>Subtotal</u>	
Double Yellow	1353	2	1	2706	
Dashed Yellow	220	2	0.25	110	
Solid White	550	1	1	550	
Dashed White	2808	1	0.25	702	
Stop Bars	266	1	6	1596	
			Subtotal	L.F.	5664
<u>Crosswalks</u>	<u>Corner to Corner</u>	<u>Width</u>	<u># of Stripes</u>	F	<u>Subtotal</u>
Croton Point Avenue @ Veteran's Plaza					
N	46	10	17	3	510
W	48	10	17	3	510
S	36	10	13	3	390
Croton Point Avenue @ SB Rt. 9 Ramps					
N	38	12	14	3	504
W	53	NHV	2	3	318
S	38	10	14	3	420
Croton Point Avenue @ NB Rt. 9 Ramps					
SW	48	10	17	3	510
SE	34	10	13	3	390
Croton Point Avenue @ Riverside Avenue					
N	48	NHV	2	3	288
W	62	12	22	3	792
S	50	12	18	3	648
Riverside Avenue @ Benedict Boulevard					
N	45	NHV	2	3	270
W	58	NHV	2	3	348
S	44	12	16	3	576
E	55	12	20	3	720
			Subtotal	L.F.	7194
TOTAL				L.F.	12858

Item 6.44 AB	Thermoplastic ReflectORIZED Pavement Arrows		L.F.
<u>Type</u>	<u>Number</u>	<u>F</u>	<u>Subtotal</u>
Thru Arrows	16	50	800
Combo Arrows	9	90	810
TOTAL			L.F. 1610

Item 6.44 B	Thermoplastic ReflectORIZED Pavement Arrows		EA
<u>Type</u>	<u>Number</u>		<u>Subtotal</u>
Bicycle Rider	4		4
TOTAL			EA 4

Item: 6.50 Cleaning of Drainage Structures			
Storm Sewer Drainage Structures to remain in project area			
<u>Street</u>	<u>From</u>	<u>To</u>	<u># of</u>
Croton Point Ave	Veterans Plaza	Riverside Ave	7
Riverside Ave	Croton Point Ave	Benedict Blvd	6
Total Number of Structures			13

Item: 6.52 Uniformed Flagman	
- Estimates Number of Flagman	
Number of Flagpersons Assumed	1
Project duration is 9 months.	1560
Total Hours	1560

Item 6.67 MM	Subbase Course, Select Granular Material, Type MM		C.Y.
<u>Street</u>	<u>From</u>	<u>To</u>	<u>Volume (CY)</u>
SB Rt. 9 Ramp	Widening		284
Total Volume (CY)			284

Item 6.70	Maintenance and Protection of Traffic (MPT)		L.S.
<i>Assumed Total</i>			
TOTAL			L.S. 42500

Item: 6.83 AB Furnishing New Traffic Sign Posts	
See Item 6.82 A	
<u>Type</u>	<u>No.</u>
New ReflectORIZED Signs	20
Total	20
Total of Entire Project Area	280 LF

6.83 AR Furnishing New ReflectORIZED Traffic Signs			
<u>Type</u>	<u>No.</u>	<u>Area</u>	<u>Total</u>
ReflectORIZED (3 sf)	8	3	24
ReflectORIZED (6.25 sf)	6	6.25	37.5
ReflectORIZED (12 sf)	6	12	72
Total	20		133.5
Total of Entire Project Area			134 SF

6.83 BA Installing Traffic Signs (See Items 6.83 AR)	
Total of Entire Project Area	134 SF

6.83 BB Installing Traffic Sign Posts (See Items 6.83 AB)	
Total of Entire Project Area	280 LF

Item 6.91	Reflective Cracking Membrane	L.F.			
<i>Street</i>	<i>From</i>	<i>To</i>	<i>Length (ft)</i>	<i>Width</i>	<i>Length of Membrane</i>
Croton Point Ave	Veterans Plaza	SB Rt. 9 Ent. Ramp	168	47	504
Croton Point Ave		SB Rt. 9 Entrance Rmp	59	52	177
Croton Point Ave	Rt. 9 Ent. Ramp	Riverside Ave	803	44	2409
Riverside Ave		Croton Point Avenue	95	63	380
Riverside Ave	Croton Point Ave	Benedict Blvd	413	39	1239
Riverside Ave		Benedict Blvd	84	69	336
Total Length (L.F.)					5,045

Item T-3.32	Furnish and Install Pedestrian Signal (Modular Pole)	EA
<i>Type</i>	<i>Number</i>	<i>Subtotal</i>
Pedestrian Signal	10	10
TOTAL		EA 10

Item: 52.11D12 12" Ductile Iron Pipe Basin Connection			
Connections measured from edge to edge.			
<i>Street</i>	<i>From</i>	<i>To</i>	<i>Length (lf)</i>
Croton Point Ave	Riverside Avenue	Veterans Plaza	110
Catch Basin Connection (LF)			110

Appendix I

April 15, 2008 Public Meeting Notes

**Croton Harmon Parking Facility Vehicular, Pedestrian and Bicycle Study
Village of Croton-on-Hudson, Westchester County, NY**

PUBLIC MEETING

**7:30 p.m., Tuesday, April 15, 2008
Stanley H. Kellerhouse Municipal Building
1 Van Wyck Street, Croton-on-Hudson, NY 10520**

Notes/Comments/Recommendations/Questions from Public (after presentation of project purpose, status, and existing conditions observations was made)

Vehicular

- Difficult to make left turns from southbound S. Riverside Avenue to eastbound Benedict Boulevard
- Congestion at S. Riverside Avenue and Benedict Boulevard causes cut-through traffic from Oneida Avenue to Hastings Avenue where many children live
- Southbound ramp is a problem in the mornings
- Very little red time for southbound right turn from S. Riverside Avenue to Croton Point Avenue
- Westchester County Bee-Line bus stops on Croton Point Avenue beneath U.S. 9 overpass
- Drivers are aggressive exiting train station in the evenings
- Motorists have difficulty making left turns from Croton Point Avenue to U.S. 9 southbound on-ramp in the evenings
- Steady stream of traffic from train station in the evenings blocks Croton Point Avenue traffic wishing to turn onto U.S. 9 on-ramps
- Speeding along Croton Point Avenue to over the bridge and west of the train station
- Traffic control officer puts pylons at Croton Point Avenue and Veterans Plaza in the evenings to better guide the two lanes of exiting traffic to the appropriate eastbound travel lanes
- Prohibit left turns from Croton Point Avenue to U.S. 9 northbound and southbound on-ramps
- Relocate bus stop under the overpass to U.S. 9 southbound on-ramp
- Put lane delineation from train station to S. Riverside Avenue
- Need to enforce on-street parking regulations
- Need to enforce traffic operations at U.S. 9 southbound off-ramp
- Roundabout at Croton Point Avenue and Veterans Plaza?
- Possible to construct new street north of Veterans Plaza through existing north train station parking lot?

Pedestrian

- Physical disconnect between Croton Point Park activities and S. Riverside Avenue restaurants
- Difficult to cross high volumes on U.S. 9 southbound off-ramp in the mornings
- Need access to/from Shop Rite shopping plaza
- Pedestrian currently utilize cow path to climb up from Shop Rite shopping plaza and walk along shoulder and non-existent sidewalk on south side of Croton Point Avenue
- Install sidewalk on S. Riverside Avenue between Croton Point Avenue and Van Cortlandt Manor
- Need lighting under U.S. 9 overpass
- Install neckdowns at U.S. 9 southbound ramps
- Install YIELD TO PEDESTRIAN variable message signs along U.S. 9 southbound ramps to slow vehicles
- Pedestrian bridge over U.S. 9 from western end of Benedict Boulevard to some location closer to train station?

Bicycle

- Signs along Croton Point Avenue mounted too low for bicyclists to travel comfortably
- Difficult for bicycles to travel along Croton Point Avenue because of conflicting vehicular volumes at the U.S. 9 southbound on-ramp and northbound on- and off-ramps
- Existing bicycle/pedestrian trail on west side of U.S. 9 southbound on-ramp
- Steep grade in vicinity of U.S. 9 between Benedict Boulevard and Croton Point Avenue may make construction of a bicycle/pedestrian facility connecting Benedict Boulevard to Croton Point Avenue infeasible
- No separation for bicyclists on south side of Croton Point Avenue
- Make Croton Point Avenue and U.S. 9 northbound ramps a right-angle intersection (eliminate channelized eastbound right turn) to slow turning vehicles down and eliminate vehicular/bicycle conflicts
- Need curb cuts at U.S. 9 southbound on-ramp and to existing bicycle/pedestrian trail
- Extend existing bicycle/pedestrian trail from U.S. 9 southbound on-ramp northward to Municipal Place
- Replace dangerous grating at northwest corner of Croton Point Avenue and S. Riverside Avenue

Train Station

- Two lanes existing Veterans Plaza in the evenings
- If motorists forced to inside lane and want to access U.S. 9 ramps, it is difficult to change lanes to do so
- Improve drop-off area
- Need greeter at drop-off area
- Separate bicycles/pedestrians/shuttle buses from passenger car drop-off
- Westchester County Bee-Line stops at drop-off area, too
- Install signs and lollipops for reversible lanes along Veterans Plaza
- Would like bike check incentives program

- Want to install rented bike boxes?
- Possible to construct a direct U.S. 9 off-ramp to the train station?

Miscellaneous

- Benedict Boulevard is being modified using Commercial Development Block Grant (CDBG) federal funds
- Shop Rite shopping plaza has been asked to do a study of S. Riverside Avenue with any future development
- Van Cortlandt Manor has gotten funding to improve their gateway
- To what extent will NYSDOT need to be involved with improvements?

Appendix J

Potential Federal Funding Programs Information

***Congestion Mitigation And Air Quality Improvement Program (CMAQ)
Updated April 20, 2007***

STATUS: ACTIVE

PROGRAM CODES:

- 320 -- CMAQ
- 32A -- CMAQ
- 3AZ -- CMAQ-FTA
- 0AD -- CMAQ, Advance Construction
- Q400 - TEA-21
- H400 - STEA
- L400 - SAFETEA-LU

FEDERAL SHARE: 80 percent (90 percent if used on the Interstate System, 100 percent if used for certain safety projects: carpool/vanpool projects, priority control systems for emergency vehicles and transit vehicles, and traffic control signalization).

PERIOD AVAILABLE: FY + 3 Years

FUND: Highway Trust Fund

FUND DISTRIBUTION METHOD: Apportionment

AUTHORITY: Contract

SUBJECT TO OBLIGATION LIMITATION: Yes

STATUTORY REFERENCE: 23 U.S.C. 149

CFR REFERENCE: None

ELIGIBILITY: Eligible projects/programs include:

- transportation activities in an approved State Implementation Plan,
- transportation control measures to assist areas designated as nonattainment under the Clean Air Act Amendments (CAAA) of 1990,
- pedestrian/bicycles off-road or on-road facilities including modification of existing public walkways to comply with the Americans with Disabilities Act,
- ISTEAs management and monitoring systems,
- traffic management/monitoring/congestion relief strategies,
- transit (new system/service expansion or operations),
- alternative fuel projects (including vehicle refueling infrastructure, clean fuel fleet programs and conversions),
- public/private partnerships and initiatives,
- inspection and maintenance (I/M) programs,
- intermodal freight ,
- telecommunications,
- travel demand management,
- project development activities for new services and programs with air quality benefits,
- public education and outreach activities,
- rideshare programs,
- establishing/contracting with transportation management associations (TMAs),
- fare/fee subsidy programs (operating subsidies have a 3-year limit),
- diesel retrofits,
- truck-stop electrification
- experimental pilot projects/innovative financing, and
- other transportation projects with air quality benefits.

Ineligible projects include:

- Construction of projects which add new capacity for single-occupancy vehicles.

BACKGROUND: The CMAQ program was established by the Intermodal Surface Transportation Act of 1991 (1991 ISTEA, Public Law 102-240) and has been continued by the Transportation Equity Act for the 21st Century (TEA-21, Public Law 105-178) under 23 U.S.C. 149. On an annual basis, the new SAFETEA-LU CMAQ program is 24 percent larger than TEA-21's program with funding authorized at \$8.6 billion over five years, FYs 2005-2009.

Under 23 U.S.C. 104(b)(2)(B), each State is apportioned funding based on county populations residing within ozone and carbon monoxide (CO) nonattainment and maintenance areas and the severity of the areas' air quality problems. Extra weighting is given to nonattainment or maintenance areas with both ozone and CO problems.

SAFETEA-LU highlights some of the existing eligible project types, most notably diesel retrofits. Also, the new bill makes projects in former 1-hr ozone nonattainment and maintenance areas eligible for CMAQ support.

A metropolitan planning organization or State can enter into a public/private partnership agreement with any public, private, or nonprofit entity to cooperatively implement any project funded under the CMAQ program. If a State has no ozone or carbon monoxide nonattainment or maintenance areas, the funds may be used for Surface Transportation Program eligible or CMAQ eligible purposes. The TEA-21 allows States the option to transfer up to 50 percent of its increase in CMAQ funds compared to what it would have received if the CMAQ program were funded at \$1.35 billion nationwide. The funds may be transferred to other Federal-aid programs, but can only be utilized for projects located within nonattainment and maintenance areas.

ADDITIONAL INFORMATION: Contact the Office of Natural and Human Environment (HEPN).

Recreational Trails Program (RTP)
Updated April 20, 2007

STATUS: ACTIVE

PROGRAM CODES:

- 3840 -FY 1993, 1996, and 1997
- 38B0 - St Adm Costs, up to 7%
- 38C0 - St Env Protect & Safety Ed Costs, up to 5%
- H940 - STEA 03
- HR10 - 7% Admin - STEA 03
- HR20 - 5% Education - STEA 03
- Q940 - Sec. 1112, TEA-21
- QR10 - 7% Admin - TEA-21
- QR20 - 5% Education - TEA-21
- L940 - SAFETEA-LU

Headquarters Use Only:

- 38A0 - National Recreational Trails Headquarters Admin
- 38E0 - National Recreational Trails Headquarters to States
- J940 - Recreational Trails Program Headquarters Administration - STEA 03
- R940 - Recreational Trails Program Headquarters Administration - TEA-21

FEDERAL SHARE: 80 percent with sliding scale (see 23 USC 120). Federal agency project sponsors may provide additional Federal funds up to a total Federal share of 95 percent. Other Federal programs may provide matching funds toward the non-Federal share if the project also is eligible under the other Federal program. RTP funds may be used to match other Federal programs if the project also is eligible under the other Federal program. States may allow a programmatic match for funds from non-Federal sources. "Soft-match" (donations of funds, material, services, or new right-of-way) may be permitted from any project sponsor, whether a public agency or private organization.

PERIOD AVAILABLE: FY + 3 years

FUND: Highway Trust Fund

FUND DISTRIBUTION METHOD: Apportionment. FHWA may use up to \$840,000 annually for program administration and trail related research, technical assistance, and training. The remainder of the funds are distributed to the States. Half of the funds are distributed equally among all States, and half are distributed in proportion to the estimated amount of off-road recreational fuel use in each State: fuel used for off-road recreation by snowmobiles, all-terrain vehicles, off-road motorcycles, and off-road light trucks.

TYPE OF AUTHORITY: Contract

SUBJECT TO OBLIGATION LIMITATION: Yes

STATUTORY REFERENCE: 23 U.S.C. 104(h) and 206. Sections 1101(a)(7), 1103(f), and 1112 of the Transportation Equity Act for the 21st Century (TEA-21, Public Law 105-178). Sections 1101(a)(8) and 1109 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, Public Law 109-59).

CFR REFERENCE: None

ELIGIBILITY: The Recreational Trails Program (RTP) provides funds to the States to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, cross-country skiing, snowmobiling, off-road motorcycling, all-terrain vehicle riding, four-wheel driving, or using other off-road motorized vehicles.

Each State administers its own program, usually through a State resource or park agency. Each State develops its own procedures to solicit and select projects for funding. Funds may be used to:

- Maintain and restore existing trails.
- Develop and rehabilitate trailside and trailhead facilities and trail linkages.
- Purchase and lease of trail construction and maintenance equipment.

- Construct new trails (with restrictions for new trails on Federal lands).
- Acquire easements or property for trails.
- Assess trail conditions for accessibility and maintenance.
- Develop and disseminate publications and operation of educational programs to promote safety and environmental protection related to trails (including supporting non-law enforcement trail safety and trail use monitoring patrol programs, and providing trail-related training) (limited to 5 percent of a State's funds).
- State administrative costs related to this program (limited to 7 percent of a State's funds).

States may make grants to private organizations, or to municipal, county, State, Federal, or other government agencies. Some States do not provide funds to private organizations. Projects may be on public or private land, but projects on private land must provide written assurances of public access.

States are encouraged to enter into contracts and cooperative agreements with qualified youth conservation or service corps to perform construction and maintenance of recreational trails.

BACKGROUND: The Intermodal Surface Transportation Efficiency Act of 1991 (1991 ISTEA, Public Law 102-240) included the National Recreational Trails Fund Act (Section 1302), which established the National Recreational Trails Funding Program. The program was authorized at \$30 million per year but without contract authority.

The National Highway System Designation Act of 1995 (Public Law 104-59) established funding for the RTP in 23 U.S.C. 104(h) and authorized \$15 million annually for FY 1996 and 1997 from FHWA administrative funds and made some program amendments (Section 337).

The Transportation Equity Act for the 21st Century (TEA-21, Public Law 105-85) replaced the National Recreational Trails Fund Act with the Recreational Trails Program. Section 1101(a)(7) authorized \$30 million for FY 1998, \$40 million for FY 1999 and \$50 million for each of FYs 2000-2003. Section 1103(f) amended 23 U.S.C. 104(h) to establish the RTP apportionments. Section 1112 of TEA-21 amended 23 U.S.C. 206 creating the Recreational Trails Program (RTP).

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, Public Law 109-59) continued the RTP with amendments. Section 1101(a)(8) authorized \$60 million for FY 2005, \$70 million for FY 2006, \$75 million for FY 2007, \$80 million for FY 2008, and \$85 million for FY 2009. Section 1109 amended 23 U.S.C. 104(h) and 206.

ADDITIONAL INFORMATION: See <http://www.fhwa.dot.gov/environment/rectrails/>. Contact the Office of Natural and Human Environment (HEPN).

Surface Transportation Program (STP)
Updated April 20, 2007

STATUS: ACTIVE

PROGRAM CODES:

ISTEA

- 3AA -- STP-Other Than 200,000 Population
- 3AC -- STP-Areas Under 200,000 Population, 100 percent Federal Participation
- 3AD -- STP-1/4 percent Skill Training
- 3AE -- STP-TMFW Rail-Highway Crossings/Protective Devices
- 3AF -- STP-TMFW Rail-Highway Crossings/Hazard Elimination
- 3AG -- STP-TMFW-1/16 percent NHI Skill Training
- 3AH -- STP-TMFW Hazard Elimination Program
- 3AJ -- STP-TMFW 1/4 percent Skill Training
- 3AK -- STP-FTA Urbanized Areas >200,000 Population
- 3AL -- STP-FTA Optional Safety
- 3AM -- STP-FTA Transportation Enhancement
- 3AN -- STP-FTA State Flexible
- 3AP -- STP-FTA Mandatory Amount for Non-Urban Areas
- 3AR -- STP-FTA Rail-Highway Crossings, Protective Devices
- 3AT -- STP-FTA Rail-Highway Crossings, Elimination of Hazards
- 3AW -- STP-FTA Hazard Elimination Program
- 3AY -- STP-FTA Other Than 200,000 Population
- 33A -- STP-Optional Safety
- 33B -- STP-Transportation Enhancement
- 33C -- STP-Urbanized Areas With Populations >200,000
- 33D -- STP-State Flexible
- 33E -- STP-Mandatory Amount for Non-Urban Areas
- 33F -- STP-1/16 percent Skill Training (23 U.S.C. 321(b), NHI)
- 33M -- STP-Rail-Highway Crossings, Protective Devices
- 33N -- STP-Rail-Highway Crossings, Elimination of Hazards
- 33P -- STP-Hazard Elimination Program
- 33Q -- STP-Optional Safety, 100 percent
- 33R -- STP-Transportation Enhancement, 100 percent for Safety
- 33S -- STP-Urbanized Areas With Populations >200,000, 100 percent for Safety
- 33T -- STP-State Flexible, 100 percent for Safety
- 33W -- STP-Mandatory Amount for Non-Urban Areas, 100 percent for Safety
- 33X -- STP-Rail-Highway Crossings, Protective Devices, 100 percent for Safety
- 33Y -- STP-Rail-Highway Crossings, Elimination of Hazards, 100 percent for Safety
- 33Z -- STP-Hazard Elimination Program, 100 percent for Safety

TEA-21

- Q200 - STP < 200K
- Q210 - STP SFTY
- Q220 - STP-ENH
- Q230 - STP-URB
- Q240 - STP-FLEX
- Q250 - STP < 5K
- Q260 - STP RH PR
- Q270 - STP-RH HZ
- Q280 - STP-HAZ EL
- Q290 - STP-NHI

- Q300 - STP 1/2
- Q310 - STP PILOT
- Q320 - STP < 200K-G
- Q330 - STP-SAFETY-G
- Q340 - STP ENHAN-G
- Q350 - STP URBAN-G
- Q360 - STP ANY AREA-G
- Q370 - STP NON-URB-G
- Q380 - STP R/H P/D-G
- Q390 - STP HAZ EL-G
- Q430 - STP HAZ ELIM-G
- QB10 - STP < 200,000-FTA
- QB20 - STP ASFETY-FTA
- QB30 - STP ENHAN-FTA
- QB40 - STP > 200K-FTA
- QB50 - STP ANY-FTA
- QB60 - STP NON-URB-FTA
- QB70 - STP PROT DV-FTA
- QB80 - STP ELM HAZ-FTA
- QB90 - STP HAZ ELM-FTA
- QT30 - STP-TAX EVA

SURF. TRANS. EXT. ACTS OF 2003, 2004 & 2005

- H200 - STP<200K
- H210 - STP SFTY
- H220 - STP-ENH
- H230 - STP URB
- H240 - STP-FLEX
- H250 - STP <5K
- H260 - STP RH PR
- H270 - STP-RH HZ
- H280 - STP-HAZ EL
- H290 - STP-NHI
- H300 - STP 1/2
- HT30 - STP-TAX EVA

SAFETEA-LU

- L200 - STP<200K
- L220 - STP ENH
- L230 - STP>200K
- L240 - STP FLEXIBLE
- L250 - STP <5,000
- L290 - STP NHI
- L300 - STP 1/2 SK TR
- LT30 - STP TAX EVASION

FEDERAL SHARE: 80 percent, including sliding scale under 23 U.S.C. 120. When STP funds are used for Interstate projects (including projects to add high occupancy vehicle or auxiliary lanes, but not any other lanes), the Federal share may be 90 percent, including sliding scale.

PERIOD AVAILABLE: FY + 3 Years

FUND: Highway Trust Fund

FUND DISTRIBUTION METHOD: Apportionment

AUTHORITY: Contract

SUBJECT TO OBLIGATION LIMITATION: Yes

STATUTORY REFERENCE: 23 U.S.C. 133, 23 U.S.C. 104(b)(3); SAFETEA-LU Sections 1101(a)(4), 1103(f), 1113, 1603, 1960, 6006

CFR REFERENCE: None

ELIGIBILITY: Funds apportioned to a State for the STP may be obligated for:

- Construction, reconstruction, rehabilitation, resurfacing, restoration, and operational improvements for highways (including Interstate highways) and bridges (including bridges on public roads of all functional classifications), including any such construction or reconstruction necessary to accommodate other transportation modes, and including the seismic retrofit and painting of and application of calcium magnesium acetate, sodium acetate/formate, or other environmentally acceptable, minimally corrosive anti-icing and de-icing compositions on bridges and approaches thereto and other elevated structures, mitigation of damage to wildlife, habitat, and ecosystems caused by a transportation project funded under Title 23, United States Code;
- Capital costs for transit projects eligible for assistance under chapter 53 of Title 49, United States Code, including vehicles and facilities, whether publicly or privately owned that are used to provide intercity passenger service by bus;
- Carpool projects, fringe and corridor parking facilities and programs, bicycle transportation and pedestrian walkways in accordance with 23 U.S.C. 217, and the modification of public sidewalks to comply with the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.);
- Highway and transit safety infrastructure improvements and programs, hazard eliminations, projects to mitigate hazards caused by wildlife, and railway-highway grade crossings;
- Highway and transit research and development and technology transfer programs;
- Capital and operating costs for traffic monitoring, management, and control facilities and programs, including advanced truck stop electrification systems;
- Surface transportation planning programs;
- Transportation enhancement activities;
- Transportation control measures listed in Section 108(f)(1)(A) (other than clause xvi) of the Clean Air Act (42 U.S.C. 7408(f)(1)(A));
- Development and establishment of management systems under 23 U.S.C. 303;
- In accordance with all applicable Federal law (including regulations), participation in natural habitat and wetland mitigation efforts related to projects funded under this title, which may include participation in natural habitat and wetland mitigation banks, contributions to statewide and regional efforts to conserve, restore, enhance, and create natural habitats and wetland, and development of statewide and regional natural habitat and wetland conservation and mitigation plans, including any such banks, efforts, and plans authorized under the Water Resources Development Act of 1990 (Public Law 101-640) (including crediting provisions). Contributions to the mitigation efforts described in the preceding sentence may take place concurrent with or in advance of project construction; except that contributions in advance of project construction may occur only if the efforts are consistent with all applicable requirements of Federal law (including regulations) and State transportation planning processes. With respect to participation in a natural habitat or wetland mitigation effort related to a project funded under this title that has an impact that occurs within the service area of a mitigation bank, preference shall be given, to the maximum extent practicable, to the use of the mitigation bank if the bank contains sufficient available credits to offset the impact and the bank is approved in accordance with the Federal Guidance for the Establishment, Use and Operation of Mitigation Banks (60 Fed. Reg. 58605 (November 28, 1995)) or other applicable Federal law (including regulations);
- Projects relating to intersections that--
 - A. have disproportionately high accident rates,
 - B. have high levels of congestion, as evidenced by--
 - i. interrupted traffic flow at the intersection; and
 - ii. a level of service rating that is not better than "F" during peak travel hours, calculated in accordance with the Highway Capacity Manual issued by the Transportation Research Board, and
 - C. are located on a Federal-aid highway;
- Infrastructure-based intelligent transportation systems capital improvements;
- Environmental restoration and pollution abatement in accordance with 23 U.S.C. 328; and
- Control of noxious weeds and aquatic noxious weeds and establishment of native species in accordance with 23 U.S.C. 329.

BACKGROUND: The STP was established by Section 1007 of the Intermodal Surface Transportation Efficiency Act of 1991 (1991 ISTEA, Public Law 102-240), which added Section 133 to Title 23, United States Code. The 1991 ISTEA authorized \$23.9 billion to be appropriated out of the Highway Trust Fund for the 6-years FYs 1992-1997. These funds were apportioned to the States based on a State's percentage share of apportionments for FYs 1987-1991.

The Transportation Equity Act for the 21st Century (TEA-21, Public Law 105-178), enacted on June 9, 1998, authorized \$33.3 billion from the Highway Trust Fund for FYs 1998 through 2003 for the STP. The authorized amounts were subject to deductions of \$500,000 each year for Operation Lifesaver, and \$5,250,000 each year for elimination of hazards at railway-highway crossings in high-speed rail corridors.

The TEA-21 also established a formula for apportionment of STP funds to the States as follows:

- 25 percent in the ratio that total lane miles of Federal-aid highways in a State bears to total lane miles of Federal-aid highways in all States;
- 40 percent in the ratio that total vehicle miles of travel on lanes on Federal-aid highways in a State bears to the total vehicle miles of travel on lanes on such highways in all States; and
- 35 percent in the ratio the estimated tax payments attributable to highway users in each State paid into the Highway Trust Fund (other than the Mass Transit Account) in the latest fiscal year bears to the total of such payments in all the States.
- Each State was to receive a minimum of 1/2 percent of the funds apportioned.
- In addition, a portion of a State's Minimum Guarantee program funds was added to its STP apportionment.

Each State's apportioned STP funds were suballocated in the following manner:

- Ten percent of each State's apportionment was set-a-side for safety construction activities (i.e., hazard elimination and rail-highway crossings);
- Ten percent was set-a-side for transportation enhancement activities;
- Fifty percent (62.5 percent of the remaining 80 percent) of the funds were divided between urbanized areas over 200,000 in population and the remaining areas of the State. (The portion that goes to urbanized areas over 200,000 population must be distributed on the basis of population unless the State and relevant MPOs request the use of other factors and the FHWA approves. This provision is not applicable to Alaska and Hawaii.);
- The remaining 30 percent (37.5 percent of the remaining 80 percent) could be used in any area of the State. (This provision is not applicable to Alaska and Hawaii.),
- Areas of less than 5,000 population were guaranteed an amount that was not less than 110 percent of a State's FY 1991 pre-ISTEA secondary road program apportionment. For FYs 1998-2003, up to 15 percent of the funds for areas less than 5,000 population could be used on roads functionally classified as rural minor collectors;
- For the period FYs 1992-1997, a State with STP funds suballocated to urbanized areas over 200,000 population had to make obligation authority available over this 6-year period to each of these areas at the same percent that obligation authority was made available to the State over this period. The TEA-21 changed this provision to require that such obligation authority be made available over each of two 3-year periods, FYs 1998-2000 and FYs 2001-2003; and
- If a State or local government had failed to comply substantially with any provision of 23 U.S.C. 133 and the State failed to take corrective action within 60 days from the date of receipt of notification of noncompliance, future STP apportionments were to be withheld until appropriate corrective action had been taken.

The Surface Transportation Extension Acts of 2003, 2004 (Parts I through V), and 2005 (Parts I through VI) authorized continued funding for the STP program at FY 2003 levels until the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, Public Law 109-59) was enacted on August 10, 2005.

Section 1101(a)(4) of SAFETEA-LU authorized \$32.5 billion for the STP for FYs 2005 through 2009.

For FY 2005, \$560,000 of this STP authorization is set aside for the Operation Lifesaver Program. For FYs 2006 through 2009, Operation Lifesaver is funded with its own authorization.

For FY 2005, \$5.25 million of this STP authorization is set aside for Rail-Highway Crossing Hazard Elimination in High Speed Rail Corridors. For FYs 2006 through 2009, this program is funded with its own authorization.

In addition, under 23 U.S.C. 140(b) and 23 U.S.C. 140(c), up to \$10 million each is set aside for administration of OJT Supportive Services and DBE Training, respectively.

The remaining STP authorization under SAFETEA-LU continues to be apportioned to the States in accordance with the above formula established in TEA-21. Each State must still receive a minimum of 1/2 percent of the total STP funds apportioned. In addition, each State's STP apportionment is augmented by a portion of the Equity Bonus Program (previously Minimum Guarantee Program under TEA-21) under 23 U.S.C. 105.

The set-asides and sub-allocations of a State's STP apportionment under SAFETEA-LU continue as under TEA-21 with the following modifications:

- For FY 2005, the 10 percent set-aside of a State's STP apportionment under 23 U.S.C. 133(d)(1) for safety programs continues. However, for FYs 2006 through 2009, safety programs are funded under the new Highway Safety Improvement Program established in 23 U.S.C. 148 by section 1401 of SAFETEA-LU, and 23 U.S.C. 133(d)(1) is repealed effective October 1, 2005 by section 1113(b) of SAFETEA-LU.
- For FY 2005, the 10 percent set-aside of a State's STP apportionment under 23 U.S.C. 133(d)(2) for transportation enhancements continues. However, under the provisions of 23 U.S.C. 133(d)(2), as amended by section 1113(c) of SAFETEA-LU, for FYs 2006 through 2009, this set-aside is modified to be the greater of 10 percent of a State's STP apportionment or the amount set aside for transportation enhancements for the State in FY 2005.
- The 62.5 percent of a State's remaining STP apportionment (after the transportation enhancements set-aside) is divided among sub-State areas on the basis of population under the provisions of 23 U.S.C. 133(d), as amended by section 1113(b) of SAFETEA-LU.

The following modifications to STP eligible activities are included in SAFETEA-LU:

- Under section 1113(a)(1) of SAFETEA-LU, advanced truck stop electrification systems is added to 23 U.S.C. 133(b)(6).
- Under section 1113(a)(2) of SAFETEA-LU, 23 U.S.C. 133(b)(12) is added, which provides eligibility for projects at intersections that have high accident rates, high levels of congestion, and are on a Federal-aid highway.
- Under section 6006 of SAFETEA-LU, environmental restoration and pollution abatement, as described in 23 U.S.C. 328, is added under 23 U.S.C. 133(b)(14).
- Under section 6006 of SAFETEA-LU, control of noxious weeds and aquatic noxious weeds and establishment of native species, as described in 23 U.S.C. 329, is added under 23 U.S.C. 133(b)(15).
- The provision in section 1108(f) of TEA-21, which allowed obligation of up to 15 percent of a State's STP sub-allocation for areas with less than 5,000 population on rural minor collectors, was not continued under SAFETEA-LU.

ADDITIONAL INFORMATION: Contact the Office of Planning (HEPP) or the Office of Program Administration (HIPA).

***STP Set Aside For Transportation Enhancements
Updated April 20, 2007***

STATUS: ACTIVE

PROGRAM CODES:

- 33B0 - STP-Transportation Enhancement (ISTEA)
- 33R0 - STP-Transportation Enhancement, 100 percent for Safety (ISTEA)
- 3AM0 - STP-FTA Transportation Enhancement (ISTEA)
- H220 - STP-Transportation Enhancement - STEA 03
- Q220 - STP-Transportation Enhancement - TEA21
- Q340 - STP-Transportation Enhancement, 100 percent for Safety (TEA-21)
- QB30 - STP-FTA Transportation Enhancement (TEA-21)
- L220 -- STP-Transportation Enhancement - SAFETEA-LU

FEDERAL SHARE: Same as STP: 80 percent with sliding scale. Title 23, section 133(e)(5)(C) has additional provisions for innovative financing: Provided that the aggregate non-Federal share is the same as the non-Federal share required under Section 120(b): 80 percent with sliding scale: (1) funds from other Federal agencies or other contributions to be credited toward the non-Federal share, (2) the non-Federal share may be calculated on a multiple project or program basis, or (3) the Federal share of an individual project may be up to 100 percent.

PERIOD AVAILABLE: FY + 3 Years

FUND: Highway Trust Fund

FUND DISTRIBUTION METHOD: TE funds are 10 percent of STP Apportionments, plus 10 percent of Equity Bonus programmatically distributed to the STP. The amount set aside after FY 2005 must be at least the amount set aside in FY 2005 (SAFETEA-LU Section 1113(c)).

AUTHORITY: Contract

SUBJECT TO OBLIGATION LIMITATION: Yes

STATUTORY REFERENCE: 23 U.S.C. 101(a)(35) and 133(d)(2). Sections 1108(b) and (g), and 1201 of the Transportation Equity Act for the 21st Century (TEA-21, Public Law 105-178). Sections 1113 and 1122 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, Public Law 109-59).

CFR REFERENCE: None, except for property acquisition: 23 CFR 710.511.

ELIGIBILITY: Transportation enhancement activity.--The term "transportation enhancement activity" means, with respect to any project or the area to be served by the project, any of the following activities as the activities relate to surface transportation:

- A. Provision of facilities for pedestrians and bicycles.
- B. Provision of safety and educational activities for pedestrians and bicyclists.
- C. Acquisition of scenic easements and scenic or historic sites (including historic battlefields).
- D. Scenic or historic highway programs (including the provision of tourist and welcome center facilities).
- E. Landscaping and other scenic beautification.
- F. Historic preservation.
- G. Rehabilitation and operation of historic transportation buildings, structures, or facilities (including historic railroad facilities and canals).
- H. Preservation of abandoned railway corridors (including the conversion and use of the corridors for pedestrian or bicycle trails).
- I. Inventory, control, and removal of outdoor advertising.
- J. Archaeological planning and research.
- K. Environmental mitigation--
 - i. to address water pollution due to highway runoff; or,
 - ii. reduce vehicle-caused wildlife mortality while maintaining habitat connectivity.
- L. Establishment of transportation museums.

Each State administers its own program and develops its own procedures to solicit and select projects for funding.

States are encouraged to enter into contracts and cooperative agreements with qualified youth conservation or service corps to perform appropriate transportation enhancement activities (TEA-21 Section 1108(g)).

BACKGROUND: The Intermodal Surface Transportation Efficiency Act of 1991 (1991 ISTEA, Public Law 102-240) established the STP, including transportation enhancements (Section 1107). Under 23 U.S.C. 133(d)(2), 10 percent of the STP funds apportioned to a State each fiscal year may only be used for transportation enhancement activities.

The National Highway System Designation Act of 1995 (Public Law 104-59) established an advanced payment option for TE projects in 23 U.S.C. 133(e)(3) and streamlining procedures in §133(e)(5) (Section 316).

The Transportation Equity Act for the 21st Century (TEA-21, Public Law 105-85) amended TE as follows: Section 1108 (b) amended §133(e)(5) to provide additional cost sharing flexibilities. Section 1108(g) required the Secretary to encourage States to use qualified youth conservation or service corps. Section 1201 of TEA-21 amended the eligible categories.

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, Public Law 109-59) amended TE as follows: Section 1113(c) guaranteed a minimum funding level for TE to be no less than the amount available in FY 2005. Section 1122 of SAFETEA-LU clarified the eligible categories.

ADDITIONAL INFORMATION: See <http://www.fhwa.dot.gov/environment/te/>. Contact the Office of Natural and Human Environment (HEPN).

Bicycle Transportation And Pedestrian Walkways ***Updated April 20, 2007***

STATUS: ACTIVE

PROGRAM CODES: None. Bicycle and pedestrian projects are broadly eligible throughout the Federal-Aid and Federal Lands programs. National Highway System (NHS), Surface Transportation Program (STP), Congestion Mitigation and Air Quality Improvement Program (CMAQ), Highway Safety Improvement Program (HSIP), Scenic Byways, Recreation Trails and Federal Lands Highways funds may be used for bicycle transportation and pedestrian walkways.

FEDERAL SHARE: In accordance with 23 U.S.C. 120(b)

PERIOD AVAILABLE: N/A

FUND: Highway Trust Fund

FUND DISTRIBUTION METHOD: N/A

TYPE OF AUTHORITY: Contract

SUBJECT TO OBLIGATION LIMITATION: Yes

STATUTORY REFERENCE: 23 U.S.C. 217

CFR REFERENCE: 23 CFR 652 (to be updated)

ELIGIBILITY: STP and CMAQ funds may be used for the construction of pedestrian walkways and bicycle transportation facilities and for carrying out non-construction projects related to safe bicycle use. NHS funds may be used for the construction of pedestrian walkways and bicycle transportation facilities on land adjacent to any highway on the NHS. Federal Lands Highways funds authorized for forest highways, forest development roads and trails, public lands development roads and trails, park roads, parkways, Indian reservation roads, and public lands highways may be used for the construction of pedestrian walkways and bicycle transportation facilities.

BACKGROUND: This program was established by Section 124(a) of the Federal-aid Highway Act of 1973 (Public Law 93-87), which provided for the use of Primary, Secondary and Urban system funds on independent projects constructing separate or preferential bicycle lanes and facilities and pedestrian walkways in conjunction with those systems. Forest Highway, Forest Development Roads and Trails, Park Roads and Trails, Parkways, Indian Reservation Roads, and Public Lands Highways funds could also be used. The program was codified in 23 U.S.C. 217.

Section 141 of the Federal-aid Highway Act of 1978 (Public Law 95-599) revised the program to stress energy conservation in addition to the multiple use of highway rights-of-way and to expand the types of projects that could be constructed.

Section 126 of the Surface Transportation Assistance Act of 1982 (1982 STAA, Public Law 97-424) continued the program and further expanded the types of projects that could be constructed. It specified that projects must be principally for transportation rather than recreational purposes. States could obligate up to \$4.5 million per year (raised from \$2.5 million) for these projects. The Federal share was established as 100 percent for independent walkway and bikeway projects and for non-construction bicycle projects. Funds for Federal Lands Highways could be used for independent bikeway and walkway projects, but not for non-construction bicycle projects.

Section 127 of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (1987 STURAA, Public Law 100-17) permitted the use of Interstate Substitute funds for all eligible bicycle transportation and pedestrian walkway projects.

Section 1033 of the Intermodal Surface Transportation Efficiency Act of 1991 (1991 ISTEA, Public Law 102-240) amended 23 U.S.C. 217 to reflect the impacts of the STP, CMAQ, and NHS on bicycle transportation and pedestrian walkways. In addition to the ISTEA provisions in the Eligibility section above, other important revisions were as follows:

- Each State must use some of its STP and CMAQ moneys to fund a State DOT "bicycle and pedestrian coordinator" position for promoting and facilitating (a) the increased use of non-motorized modes of transportation, including developing facilities for the use of pedestrians and bicyclists, and (b) public education, promotional, and safety programs for using such facilities.
- When Federal-aid funds are being used to replace or rehabilitate bridge decks, except on fully access controlled highways, safe bicycle accommodations must be considered and provided where feasible.
- Construction of a pedestrian walkway and a bicycle transportation facility are deemed to be highway projects. Hence, the Federal share is 80 percent.

- Pedestrian walkways and bicycle transportation facilities to be constructed under the provisions of 23 U.S.C. 217 must be included in long range plans developed by Metropolitan Planning Organizations and States.
- No motorized vehicles should be allowed on any trails or pedestrian walkways, except as necessary for maintenance purposes and possibly for snowmobiles and motorized wheelchairs.
- Bicycle projects must be principally for transportation rather than recreational purposes.

The Transportation Equity Act for the 21st Century (TEA-21, Public Law 105-178) amended Section 217 to allow use of NHS funds for pedestrian walkways, as well as previously eligible bicycle facilities, on any route of the NHS. It removed the restrictions of bridges "where access was fully controlled" to accommodate bicycles. It also provided:

- Bicycle safety issues must be addressed on rail-highway crossing hazard elimination projects
- Bicycle improvements are eligible for the hazard elimination program
- For due consideration of bicyclists and pedestrians in the development of comprehensive transportation plans under 23 U.S.C. 134 and 135
- No regulatory action may be taken by the Secretary that results in the severance of a major bicycle route or has an adverse impact on the safety of non-motorized traffic unless a reasonable alternate route exists or is provided
- When permitted by State or local regulations, electric bicycles may be used on Federally funded trails and pedestrian walkways
- Design guidance for accommodating bicycle and pedestrian travel will be issued by FHWA by December 9, 1999.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, Public Law 109-59) amended Section 217 to allow the use of Federal lands funds for pedestrian walkways and bicycle transportation facilities for projects that are not in conjunction with trails, roads, highways, and parkways.

ADDITIONAL INFORMATION: Contact the Office of Natural and Human Environment (HEPN).
