# Tab 12

## TRAFFIC STUDY

## EAST POINTE ROGER WILLIAMS AVENUE EAST PROVIDENCE, RHODE ISLAND

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#### INTRODUCTION

Northeast Engineers and Consultants (NE&C) have been asked to prepare a traffic study for the East Point residential development in East Providence, Rhode Island. The site has approximately 28.2 acres occupied by the vacant Ocean State Steel plant and is shown on Figure 1. The proposal consists of residential and water related uses. The residential portion will contain 495 units comprising 464 multifamily units and 31 single-family houses. The other uses include 50,000 square feet of office space, 33,000 square feet of retail uses, a 75-slip marina and several restaurants with a total of 140 seats.

#### **METHODOLOGY**

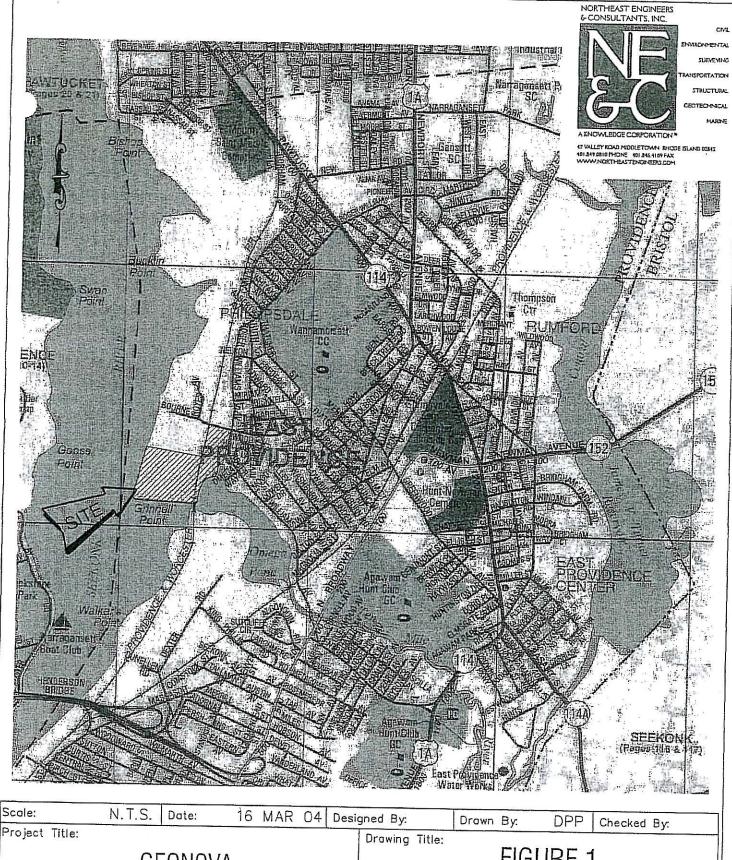
As part of this study a field reconnaissance was made of the site environs noting roadway characteristics and land use. The Rhode Island Department of Transportation (RIDOT) was contacted for available traffic volume data. In addition automatic traffic counts (ATC) were made on Roger Williams Avenue and Bourne Avenue. Manual turning movement counts were made at several nearby intersections during the morning and afternoon on a weekday and on a Saturday afternoon. Information on accidents was obtained for the study intersections from both the East Providence Police Department and RIDOT.

Site traffic volumes were estimated for the proposed uses. The site traffic volumes were distributed to the roadway network and capacity analyses were made of the study intersections for the before and after development conditions. The impact of the site traffic was determined and recommendations were made.

#### ROADWAYS

Interstate I-195 provides regional access to the area. It is an east/west limited access highway starting in Providence at I-95 and continuing into Massachusetts. There are a number of interchanges in the area. Interchange 4 provides access to Taunton Avenue (Route 44), Warren Avenue (Route 6) and Veterans Memorial Parkway. Interchange 5 provides access to Broadway to and from the west and interchange 6 provides access to Route 6 to and from the east. Interchanges 7 and 8 provide access to Route 6 and the East Shore Expressway. Interchange 5 is the only exit available westbound on I-195 in East Providence.

Route 44 is and east/west arterial entering Gloucester from Connecticut and running through Rhode Island leaving East Providence and continuing into Massachusetts. It is a four-lane road with a speed limit of 30 miles per hour (mph) in the vicinity of Pawtucket Avenue (Route 114). Route 6 is also an east/west arterial entering Foster from Connecticut and exiting into Massachusetts from East Providence. Both Route 44 and Route 6 are part of I-95 and I-195 in Providence before separating in East Providence. Route 6 then runs parallel to I-195.



Project Title:

GEONOVA
EAST PROVIDENCE, R.I.

Drawing Title:

FIGURE 1

SITE LOCATION

Drawing Number:

Project Number:

Project Number:

O3103.0

Route 114 is a north/south road connecting Route 122 in Woonsocket with Route 138 in Newport. In East Providence it is called Pawtucket Avenue and is also numbered as Route 1A. It is a four-lane road with a speed limit of 35 mph. North of the Newport Avenue (Route 1A) intersection it is a two-lane road with a speed limit of 30 mph. In the vicinity of Roger Williams Avenue parking is allowed on the east side of the road and there are sidewalks on both sides of the road. Between I-195 and Roger Williams Avenue there are traffic signals at the intersections on Waterman Avenue, Route 44, Centre Street, Route 114A, Route 152, Wilson Avenue, Route 1A and Roger Williams Avenue.

Bourne Avenue and Roger Williams Avenue will provide the immediate access to the site. Bourne Avenue is a local east/west road running between Wilson Avenue and ending west of Roger Williams Avenue. West of Roger Williams Avenue it is approximately 30 feet wide with parking on the north side of the road. Bourne Avenue has Stop signs at its intersection with Roger Williams Avenue. There is an at-grade crossing of the Providence and Worcester Railroad on Bourne Avenue west of Roger Williams Avenue.

Roger Williams Avenue is a north/south road connecting Pawtucket Avenue (Route 114) and North Broadway. East of North Broadway it continues as Centre Street. The intersection of Roger Williams Avenue, Centre Street and North Broadway is signalized. In the site vicinity Roger Williams Avenue is around 30 feet wide with no parking and sidewalks on both sides of the road. Vehicles were observed parking halfway into the street south of Bourne Avenue in front of a church. The speed limit is posted at 25 mph. The RIDOT had a proposal in 1993 to reconstruct Roger Williams Avenue from Pawtucket Avenue to North Broadway. The project is divided into three segments. The segment from North Broadway to Bourne Avenue encompasses the site location. This project is currently on hold.

Centre Street begins at North Broadway opposite Roger Williams Avenue and ends at Pawtucket Avenue. It is a two-lane road with parking on the north side of the road. The speed limit is posted at 25 mph. Broadway is a north/south local road connecting Greenwood Avenue with Veterans Memorial Parkway south of I-195. In the site vicinity it is called North Broadway. South of Roger Williams Avenue it is initially a three-lane road before dropping a lane and having parking on both sides of the road. The speed limit is posted at 30 mph. It provides access to the Henderson Bridge into and out of Providence. It also provides a bypass of the one-way circulation system in downtown East Providence to reach interchange 5 of I-95.

Another RIDOT project in the area is Waterfront Drive. Waterfront Drive is a two lane limited access highway running from I-195 to Pawtucket Avenue along the Providence and Worcester railroad tracks which are designed to be relocated to the eastern side of the right of way. The design of the northern portion of the road has been completed. Other portions of Waterfront have not been designed and the project is on hold with no immediate plans for it to become active in the near future.

#### SITE ENVIRONS

Besides the vacant Ocean State Steel plant there are a number of land uses in the area. Phillipsdale Landing, a commercial/industrial development with a number of tenants, is located adjacent to the site at the end of Bourne Avenue west of Roger Williams Avenue. New England Construction is also located on Bourne Avenue. Bourne Avenue is residential east of Roger Williams Avenue. Land use on Roger Williams Avenue is mostly residential. Ross Common Condominiums are being built on the west side of Roger Williams Avenue north of Bourne Avenue. E&M Motors is located on the southeast corner of Roger Williams Avenue and Bourne Avenue. The Grace Chapel Assembly of God is located on Roger Williams Avenue south of Bourne Avenue. The Wannamoisett Country Club and the Agawam Hunt Club are located between Roger Williams Avenue and Pawtucket Avenue. Land use on North Broadway is commercial south of its intersection with Roger Williams Avenue while land use on Centre Street is residential.

Land use on Route 44 is commercial. The Wapanoag Mall and Shoppers Town Mall are located at the intersection of Route 44 and Pawtucket Avenue. Land use on Pawtucket Avenue is commercial in the southern section. It becomes residential north of Route 44 with sporadic commercial uses at major intersections. The East Providence High School is located on the east side of Pawtucket Avenue south of Route 44. Police were observed directing exiting traffic at the high school in the afternoon. A playground is located on Pawtucket Avenue opposite the Centre Street intersection.

## EXISTING TRAFFIC VOLUMES

Automatic traffic counts (ATC) in the area were obtained from RIDOT. A summary of the counts is shown on Table 1. The counts by hour are located in Appendix A. The annual average daily traffic (AADT) on Pawtucket Avenue was 11,300 vehicles in 2000 at the city line. It increased to 18,000 vehicles in the area between Route 1A and Route 152. There were 12,200 vehicles per day in 2000 on Pawtucket Avenue between Route 114A and Centre Street. RIDOT also had two traffic counts made in 2000 on Roger Williams Avenue between Pawtucket Avenue and Bourne Avenue. The northern end of Roger Williams Avenue had 4,200 vehicles while the southern end had 9,300 vehicles.

In addition to the RIDOT counts NE&C made an ATC on Roger Williams Avenue south of Bourne Avenue and on Bourne Avenue west of Roger Williams Avenue from Thursday April 10, 2003 to Monday April 14, 2003. A summary of the count is included in Table 1 and the hourly volumes are in Appendix A. The all day traffic on Roger Williams Avenue on Friday April 11, 2003 was adjusted to an AADT of 6,300 vehicles. During the morning peak hour from 7:00 to 8:00 AM there were 206 vehicles northbound and 221 vehicles southbound for a total of 427 vehicles. During the afternoon peak hour from 5:00 to 6:00 PM there were 298 vehicles northbound and 254 vehicles southbound for a total of 552 vehicles.

The AADT on Bourne Avenue was calculated to be 1,300 vehicles. During the morning peak hour from 7:00 to 8:00 AM there were 27 vehicles eastbound and 61 vehicles westbound for a total of 88 vehicles. During the afternoon peak hour from 4:00 to 5:00 PM there were 79 vehicles eastbound and 24 vehicles westbound for a total of 103 vehicles. This corresponds to vehicles entering Bourne Avenue in the morning to go to work and leaving in the afternoon.

Table 1 TRAFFIC VOLUMES

Location	Date	AADT	AM Peak	PM Peak
Pawtucket Avenue (Route 114)			1 van 1 Car	THIFEAK
At East Providence/Pawtucket city line	May 2002	11,300	1,024	1,354
Between Newman and Newport Ave	August 2000	18,000	1,251	1,816
Between Pleasant St and Centre St	August 2000	12,200	721	1,234
Roger Williams Avenue				
Between Pawtucket Ave and Bourne Ave	July 2000	4,200	289	427
Between Bourne Ave and N Broadway	July 2000	9,300	637	896
			90,	030
South of Bourne Ave	April 2003	6,300	427	552
Northbound		3,300	206	298
Southbound		3,000	221	254
Bourne Avenue				
West of Roger Williams Ave	April 2003	1,300	88	103
Eastbound		660	27	79
Westbound ADT- Average Appual Daily Troffic		640	61	24

AADT- Average Annual Daily Traffic

In addition to the traffic volumes, the speed of vehicles on Roger Williams Avenue was also measured and the results can be found in Appendix A. The 85<sup>th</sup> percentile speed was 33 mph northbound and 31 mph southbound. This means that eighty-five percent of the vehicles were traveling at or below that speed. The average speed was calculated as 32 mph northbound and 30 mph southbound. Since the posted speed limit is 25 mph vehicles are traveling at an acceptable speed.

NE&C made manual turning movement counts at several intersections in the area. The intersection of Roger Williams Avenue and Bourne Avenue was counted on Thursday April 10, 2003, Friday April 11, 2003 and Saturday April 12, 2003. The intersection of Roger Williams Avenue, Centre Street and North Broadway was counted on Tuesday April 22 and Saturday May 10, 2003. The intersection of Pawtucket Avenue and Roger Williams Avenue was counted on Wednesday April 23, 2003 and Saturday May 3, 2003.

The intersection of Pawtucket Avenue and Centre Street was counted on Thursday April 24, 2003 and Saturday April 26, 2003. The counts were made in the morning from 7:00 to 9:00 AM, in the afternoon from 4:00 to 6:00 PM and on Saturday from 12 noon to 2:00 PM. The counts by fifteen-minute intervals are included in Appendix A. Figures 2 to 4 show the existing traffic volumes for the morning, afternoon and Saturday peak hour. Traffic volumes on Pawtucket Avenue, Roger Williams Avenue, Centre Street and North Broadway are less on Saturday than during the morning and afternoon peak hour.

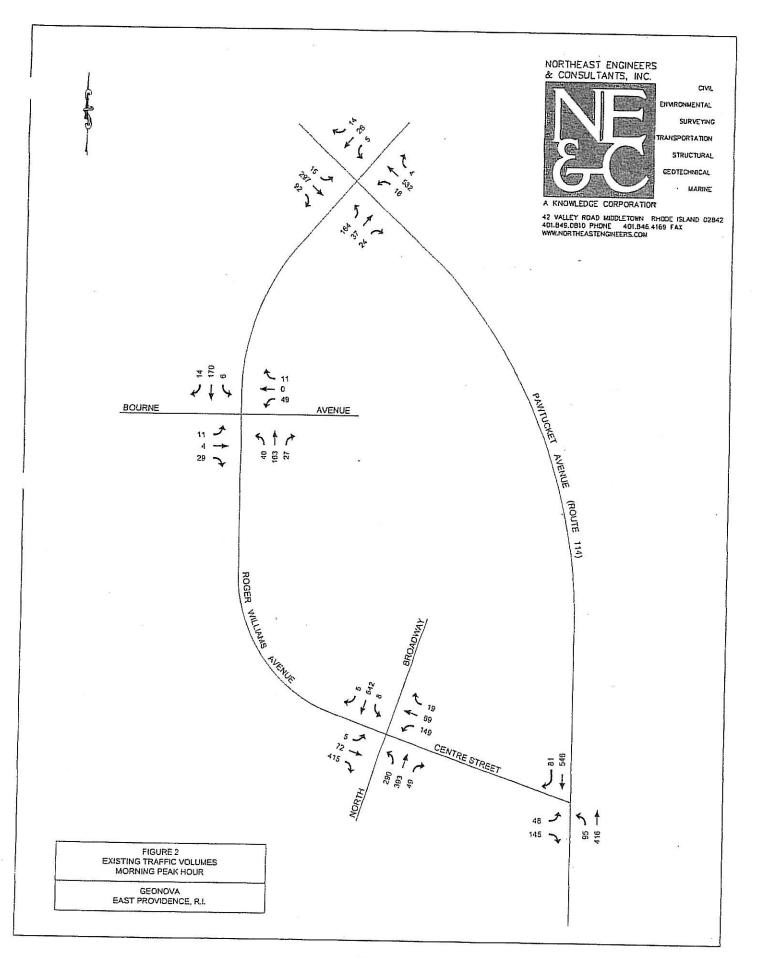
#### ACCIDENTS

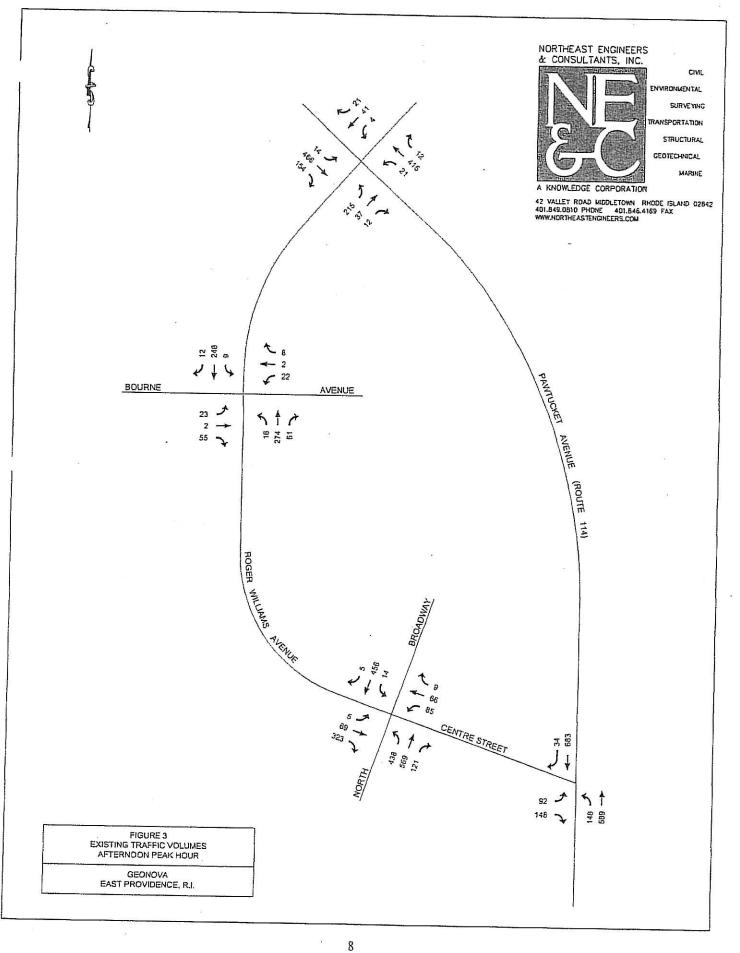
The East Providence Police Department and RIDOT were contacted for accidents at the study intersections. Computer printouts of accidents and accident reports for the years 2000 through 2003 were reviewed. A summary of the accidents by location and year is included in Appendix A along with the accident rate calculations. Table 2 summarizes the accident data by intersection for the four-year period.

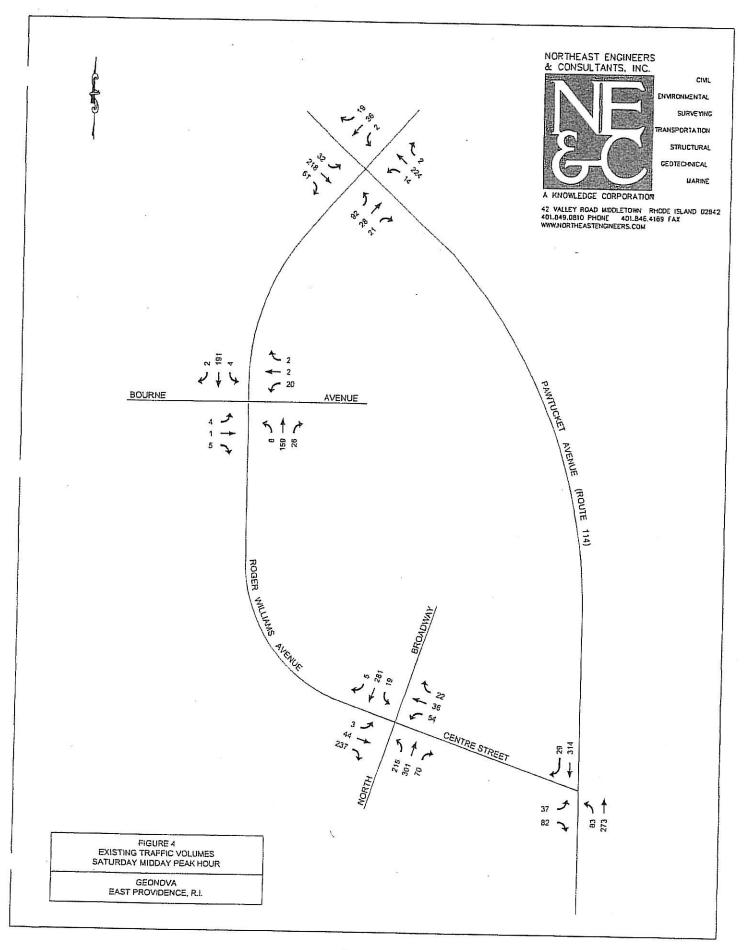
Table 2
ACCIDENT ANALYSIS

	Numb Accid					Тур	e of Acc	cidents	8.		¥H.	
Location	Property Damage	Injury	Turn	Rear End	Angle	Side-		Parked	Back -ing		Total	Rate
Pawtucket Ave & Roger Williams Ave	9	5	2	7	1	1	. 0	0	0	3	14	0.62
Pawtucket Ave & Centre St	13	3	1	8	0	4	0	1	1	1	16	0.75
Roger Williams Ave, Centre St & Broadway	31	3	11	13	2	3	1	0	0	4	34	1.07
Roger Williams Ave & Bourne Ave	9	4	0	1	3	1	4	2	1	1	13	1.17

There were a total of 14 accidents at the intersection of Pawtucket Avenue and Roger Williams Avenue. Seven of the accidents were rear end crashes. Three of the accidents were self-reporting and the type of accident is unknown. This intersection has a rate of 0.62 accidents per million entering vehicles. The intersection of Pawtucket Avenue and Centre Street had 16 accidents with eight rear end crashes and four sideswipe accidents. Most of the accidents occurred on Pawtucket Avenue. This intersection has a rate of 0.75 accidents per million entering vehicles.







There were 34 accidents at the intersection of Roger Williams Avenue, Centre Street and North Broadway over the four-year time period. Most of the accidents involved turns or rear end crashes. There were also three accidents where the type of crash was unknown. The rate for this intersection is 1.07 accidents per million entering vehicles.

There were 13 accidents in the vicinity of Roger Williams Avenue and Bourne Street. Most of the accidents occurred on Roger Williams Avenue in the vicinity of Bourne Street rather than at the intersection. There were four fixed object accidents, two accidents involving parked cars and one backing accident on Roger Williams Avenue. While these accidents didn't really occur at the intersection a rate of 1.17 accidents per million entering vehicles was calculated. According to RIDOT an intersection is considered a high hazard location if there are ten or more accidents in a year. Since none of the intersections reviewed had 40 or more accidents in the four-year period they are not considered a safety problem.

### PROPOSED DEVELOPMENT

The site consists of approximately 28.2 acres occupied by the vacant Ocean State Steel plant. The proposal consists of residential, commercial and water related uses. The residential portion will contain 495 units comprising 31 single-family houses and 464 multifamily units. The other uses include 50,000 square feet of office space, 33,000 square feet of retail uses, a 75-slip marina and several restaurants totaling 140 seats. A total of 1,266 parking spaces will be provided for the project.

The Providence and Worcester Railroad bisects the property. The tracks are used by the railroad twice a day. There is an existing driveway to the site on Roger Williams Avenue approximately 450 south of Bourne Avenue. An at-grade crossing over the railroad provides access to the rest of the site. This driveway on Roger Williams Avenue will provide the main access for the new development also. The existing railroad crossing will be used to connect both sections of the property. One driveway accessing the front portion of the site will be provided on Bourne Avenue. In addition there is a 20-foot right of way through Pillipsdale Landing west of the railroad tracks that can be used for emergency access to Bourne Avenue.

The sight distance for the existing site driveway on Roger Williams Avenue was investigated in the field. The driveway is on the outside of a curve with the road curving to the east in both the north and south directions. In addition Roger Williams Avenue is on a slight downgrade to the north in the vicinity of the driveway and then has a slight upgrade past Bourne Avenue. To the north a sight distance is available past the intersection with Bourne Avenue, which is 450 feet away. To the south a sight distance of around 500 feet is available.

A Policy of Geometric Design of Streets and Highways<sup>1</sup> was reviewed to determine the desirable sight distances for vehicles exiting the site driveway. The 85<sup>th</sup> percentile speed of 33 mph northbound and 31 mph southbound was used to calculate the required sight distance. The desirable sight distance from the driveway would be 300 feet to the north (left) for right turns and 370 feet to the south (right) for left turns. The available sight distance is greater than required so the driveway will provide safe ingress and egress to the site. The sight distance calculations are located in Appendix A.

## ANTICIPATED SITE TRAFFIC VOLUMES

The traffic volumes estimated to be generated by the proposed new development were determined using rates published in the Institute of Transportation Engineers (ITE) *Trip Generation* manual.<sup>2</sup> Land Use Code (LUC) 210 Single Family Houses was used for houses and LUC 230 Residential Condominium/Townhouse was used for the multifamily units. LUC 420 Marina was used for the marina slips. The restaurant traffic was determined using LUC 832 High Turnover Sit-Down Restaurant. LUC 820 Shopping Center was used for the retail use. LUC 710 General Office Building was used for the office use.

Table 3 shows the traffic volumes associated with each land use and the total expected volumes for the time periods evaluated. All day on a weekday the proposed uses are estimated to generate 5,890 vehicle trips with 415 vehicle trips entering and exiting during the morning peak hour and 545 vehicle trips during the afternoon peak hour. On a Saturday all day vehicle trips would be 5,830 with 580 vehicles entering and exiting during the midday peak hour. The trip generation calculations are located in Appendix B.

### SITE TRAFFIC DISTRIBUTION

Visitors will be coming to the site for the marina, restaurant, office and retail facilities and residents of the site will be leaving for work, shopping, etc. The existing traffic flows in the area and the traffic counts made by NE&C were used to determine the distribution of the site traffic. In addition *Journey to Work*<sup>3</sup> data for residents of East Providence was evaluated. This information is also included in Appendix B.

Figure 5 illustrates the distribution of the site traffic. Based on the site and parking layout it is estimated that 15% of the traffic would use the driveways on Bourne Avenue and 85% of the traffic would use the main driveway on Roger Williams Avenue. It is estimated that 80% of the site traffic will arrive and depart on Roger Williams Avenue to and from the south and 20% will be to and from the north.

<sup>2</sup> Trip Generation. Seventh Edition, Institute of Transportation Engineers, 2003.

<sup>&</sup>lt;sup>1</sup> <u>A Policy of Geometric Design of Streets and Highways</u>, Fourth Edition, American Association of State Highway and Transportation Officials, 2001.

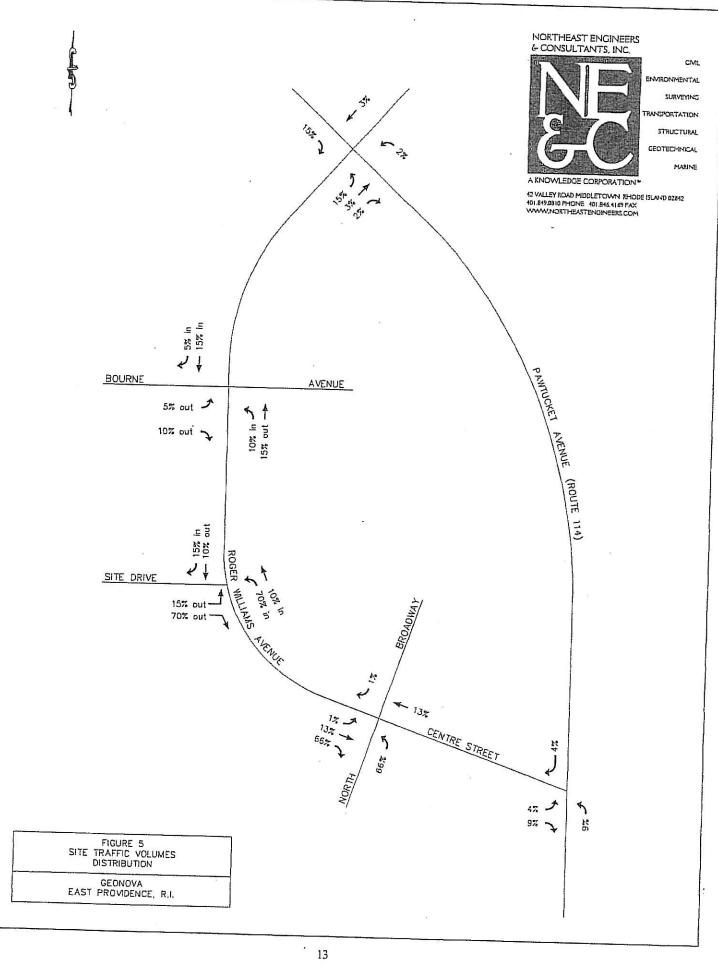
<sup>&</sup>lt;sup>3</sup> 2000 Census Data for Transportation Planning, Technical Paper Number 153, Statewide Planning Program, Rhode Island Department of Transportation, 2003.

East Providence, Rhode Island Anticipated Site Traffic East Pointe Table 3

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			ZZO	20	125	165	20	580

Note: Trips calculated based on trip rates published in Institute of Transportation Engineers Trip Generation:
(1) Land Use 210- 31 single family houses
(2) Land Use 230- 444 residential townhouse/condominium
(3) Land Use 420- 75 slip marina
(6) Land Use 710- 50

(4) Land Use 932- 140 seat high turnover sit-down restaurant(5) Land Use 820 - 33,000 square foot shopping center(6) Land Use 710- 50,000 square foot office building



Of the 20% at the intersection with Pawtucket Avenue it was assumed that 15% would turn on Pawtucket Avenue to the north, 3% would continue on Roger Williams Avenue and 2% would turn on Pawtucket Avenue to the south. Of the 80% of the site traffic at the intersection of Roger Williams Avenue, North Broadway and Centre Street it was assumed that 66% would turn on North Broadway to the south, 1% would turn on North Broadway to the north and 13% would continue straight onto Centre Street. At Centre Street and Pawtucket Avenue it was assumed that 9% would turn to the south and 4% would turn to the north.

### **FUTURE TRAFFIC CONDITIONS**

The existing manual turning movement traffic volumes for the peak hours increased by five percent to adjust for the difference in traffic between April and July and then were increased by another seven percent (1% per year for seven years) to account for traffic growth to 2010. The adjustment factors are included in Appendix A. In addition traffic from the expansion of New England Construction and the Ross Common Condominiums were included. Figures 6 to 8 show these background traffic volumes for the study intersections for the weekday morning and afternoon and Saturday peak hours. The site traffic volumes were distributed to the roadway using the proposed distribution as shown on Figures 9 to 11. The site traffic volumes were then added to the background traffic volumes to form the combined future traffic volumes. Figures 12 to 14 show the future combined traffic volumes for the weekday morning and afternoon peak hour and the Saturday midday peak hour.

### CAPACITY ANALYSES

Capacity analyses were performed for the morning, afternoon and Saturday peak hours for the signalized intersections of Roger Williams Avenue and Pawtucket Avenue, Roger Williams Avenue, Centre Street and North Broadway and Centre Street and Pawtucket Avenue for the existing, background and combined traffic volumes. These analyses were done to determine the quality of traffic operations of the intersection. The quality of operations is measured and expressed as a Level of Service (LOS). LOS is defined as a measure of delay and inconvenience that motorists experience. The levels are expressed with letter designations of A through F. LOS A represents little or no vehicle delay while LOS F reflects an intersection or movement that is over capacity and where long delays can be expected. A description of Level of Service for signalized intersections and the analysis sheets are included in Appendix C. Queuing analyses for the combined traffic volumes is also included in the Appendix. Table 4 shows the results of the capacity analyses for the existing, background and combined conditions for the three intersections.

All three intersections operate at an acceptable LOS with the existing and background traffic volumes. With the addition of the site traffic the intersection of Pawtucket Avenue and Centre Street and the intersection of Roger Williams Avenue and Pawtucket Avenue continue to operate at a good LOS for all time periods.

The intersection of Roger Williams Avenue, North Broadway and Centre Street operates at LOS D for the morning peak hour, LOS F for the afternoon peak hour and LOS B for the Saturday peak hour. The signal cycle was increased to 90 seconds for the morning peak hour and 100 seconds for the afternoon peak hour for the combined traffic volumes. This intersection has the largest percentage of site traffic going through it and therefore is impacted more than the other two intersections. To improve the LOS some improvements are proposed at this intersection. Improvements are constrained by crossings over the Ten Mile River to the north and west of the intersection. On Centre Street it is recommended that the intersection be restriped to provide a left turn lane and a through/right lane. In addition the phasing should be changed to provide a westbound advance for that approach. With these changes the LOS improves from D to C in the morning peak hour and from F to D in the afternoon peak hour. Queuing analyses for this intersection for the morning and afternoon peak hour with the combined traffic volumes and intersection improvements is also included in the Appendix.

Table 4
SIGNALIZED CAPACITY ANALYSES

Intersection	AM Peak Hour	PM Peak Hour	Saturday Peak Hour
Pawtucket Ave and Centre St			
Existing Traffic Volumes	B (2.8)	B (13.6)	B (12.0)
Background Traffic Volumes	B (13.3)	B (14.7)	B (12.3)
Future Traffic Volumes	B (14.0)	B (16.1)	B (13.1)
Pawtucket Ave and Roger Willia	ams Ave		
Existing Traffic Volumes	B (11.4)	B (12.8)	A (9.7)
Background Traffic Volumes	B (12.8)	B (15.2)	A (10.0)
Future Traffic Volumes	B (14.6)	B (19.8)	B (10.9)
North Broadway, Roger William	is Ave and Centre S		2 (10.5)
Existing Traffic Volumes	B (15.4)	B (15.5)	A (9.7)
Background Traffic Volumes	B (19.8)	C (20.7)	A (10.0)
Future Traffic Volumes no Improvements	D (40.2)	F (98.4)	B (12.0)
Future Traffic Volumes with Improvements	C (26.3)	D (35.9)	B (14.4)

An analysis was also made of the unsignalized intersection of Bourne Avenue and Roger Williams Avenue since secondary access to the site will be located on Bourne Avenue. A description of Level of Service for unsignalized intersections and the analysis sheets are also included in Appendix C. Capacity analyses for unsignalized intersections evaluate the ability of vehicles on the minor road to exit onto the major road and for left turning vehicles on the major road to enter the minor road. The chief impact on LOS is left turns exiting the minor road, which must contend with traffic in both directions on the major road. Table 5 summarizes the results of the analyses.

Table 5
UNSIGNALIZED CAPACITY ANALYSES

	AM Pe	ak Hour	PM Pe	eak Hour	Saturday	Peak Hour
Intersection	EB	WB	EB	WB	EB	WB
Roger Williams Ave and Bourn	e Ave			-	<u> </u>	
Existing Traffic Volumes	В	В	В	C	В	В
	(10.7)	(13.2)	(12.5)	(15.5)	(10.7)	(11.7)
Background Traffic Volumes	В	C	В	C	В	В
	(11.7)	(15.1)	(14.3)	(18.5)	(10.8)-	(12.1)
Future Traffic Volumes	В	С	С	C	В	В
	(13.4)	(18.2)	(19.4)	(24.5)	(12.1)	(14.8)
	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT
Roger Williams Avenue and Sit	e Drive					
Future Traffic Volumes no		MODEL CO.				
Improvements	C (19.9)	B (12.1)	E (47.3)	B (13.8)	D (26.4)	B (11.3)
Future Traffic Volumes with						
Improvements	C (19.9)	B (12.1)	E (47.3)	B (13.8)	C (26.4)	B (11.3)

Finally an analysis of the unsignalized intersection of the site driveway and Roger Williams Avenue was made. Left turns exiting the site driveway operate at LOS C for the morning, LOS E for the afternoon peak hour and LOS D for the Saturday peak hour as shown on Table 5. Right turns exiting the site driveway operate at LOS B for all time periods. Left turning vehicles entering the site driveway operate at LOS A. Left turns exiting in the afternoon peak hour operate poorly due to conflicts with the large number of left turning vehicles entering the site and the larger volumes of traffic on Roger Williams Avenue. There are only 35 exiting vehicles turning left but there are 210 vehicles turning left into the site.

An analysis was also made with a northbound left turn lane on Roger Williams Avenue and this made no change to the LOS. With the large number of vehicles turning left into the site Roger Williams Avenue should be widened at the site driveway if possible to provide either a left turn lane or bypass area to allow through traffic to proceed around vehicles waiting to turn left into the site.

### SIGNAL WARRANT ANALYSES

Due to the poor LOS of vehicles exiting the site during the afternoon peak hour a signal warrant analysis was made to see if a signal is needed at the intersection of the site driveway and Roger Williams Avenue.

Warrant 1-Eight-Hour Vehicular Volume, Warrant 2 Four-Hour Vehicular Volume and Warrant 3-Peak Hour were reviewed and the results are included in Appendix C. Future traffic volumes on Roger Williams Avenue and left turning traffic exiting the site were used for the warrant analysis. Neither the traffic on Roger Williams Avenue nor turning left from the site meets the three warrants. Therefore a traffic signal is not recommended at this location.

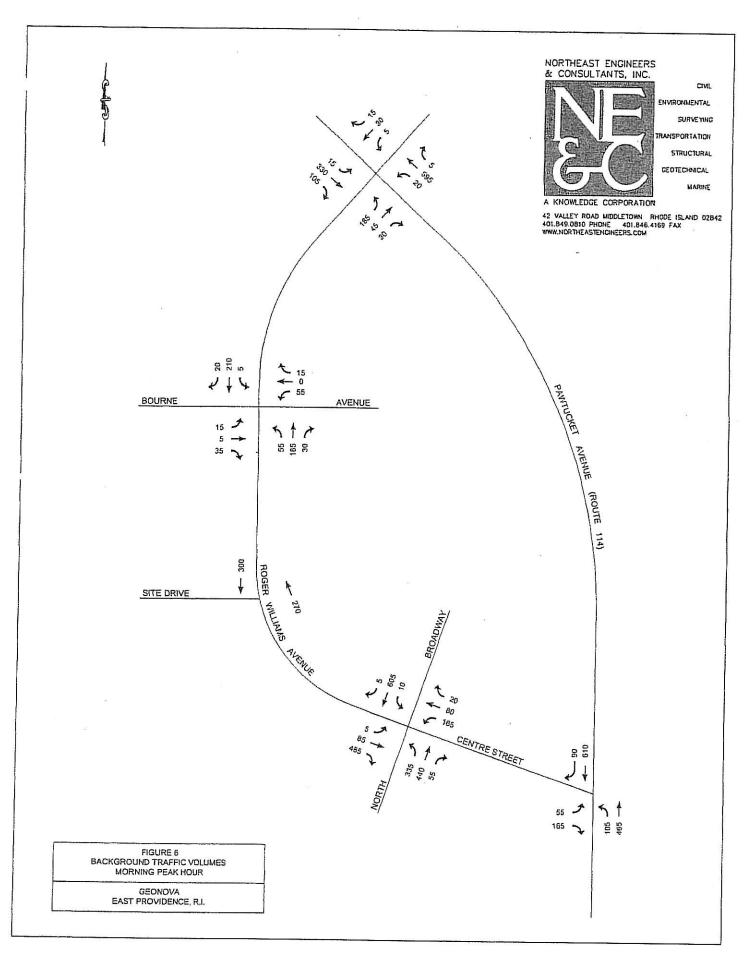
## RECOMMENDATIONS AND CONCLUSIONS

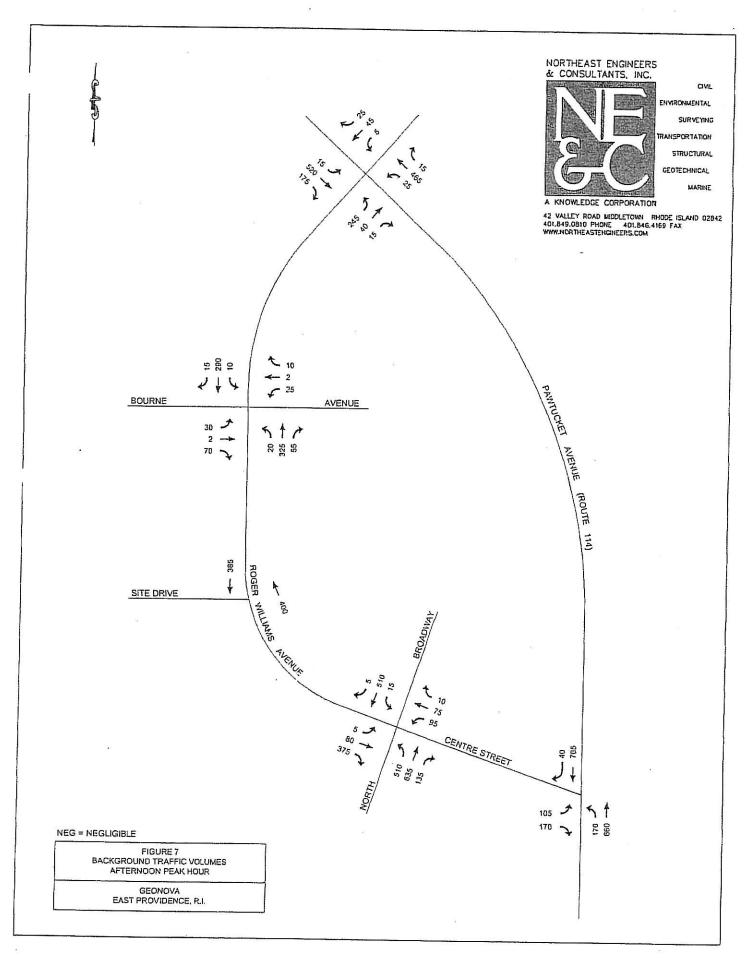
The addition of the site traffic causes a reduction in LOS at the intersection of Roger Williams Avenue, North Broadway and Centre Street. To improve the LOS the Centre Street approach should be widened to provide a left turn lane and a through/right lane. In addition the signal phasing should be changed to provide an advance for that approach and the cycle should be increased to 90 seconds for the morning peak hour and 100 seconds for the afternoon peak hour. With these improvements the intersection will operate at LOS D or better. Additional improvements to the intersection are inhibited by crossings over the Three Mile River in the immediate vicinity. The intersections of Pawtucket Avenue with Roger Williams Avenue and with Centre Street operate at a good LOS with the future traffic volumes. The unsignalized intersection of Roger Williams Avenue and Bourne Avenue also operates at an acceptable LOS.

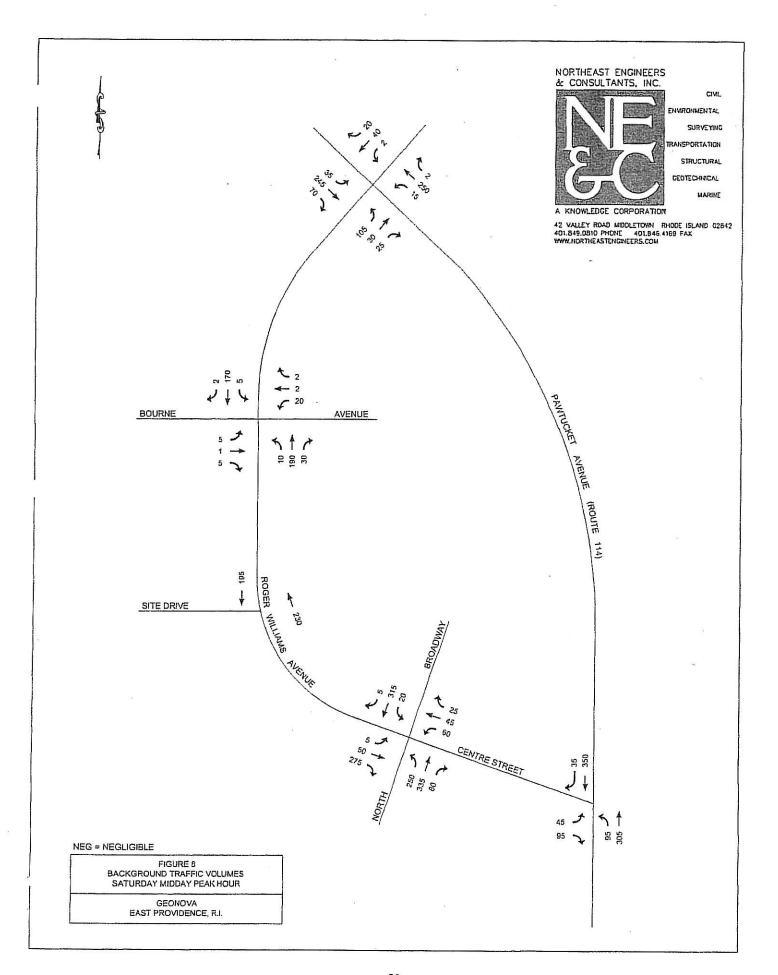
It should be noted that the property was formerly a working steel plant. At its peak it also generated sizeable amounts of traffic. At one time the front parcel was a large parking lot and the back parcel contained numerous buildings. Therefore the traffic generated by this previous use in its prime might have had similar traffic volumes on a weekday when compared to the new proposal.

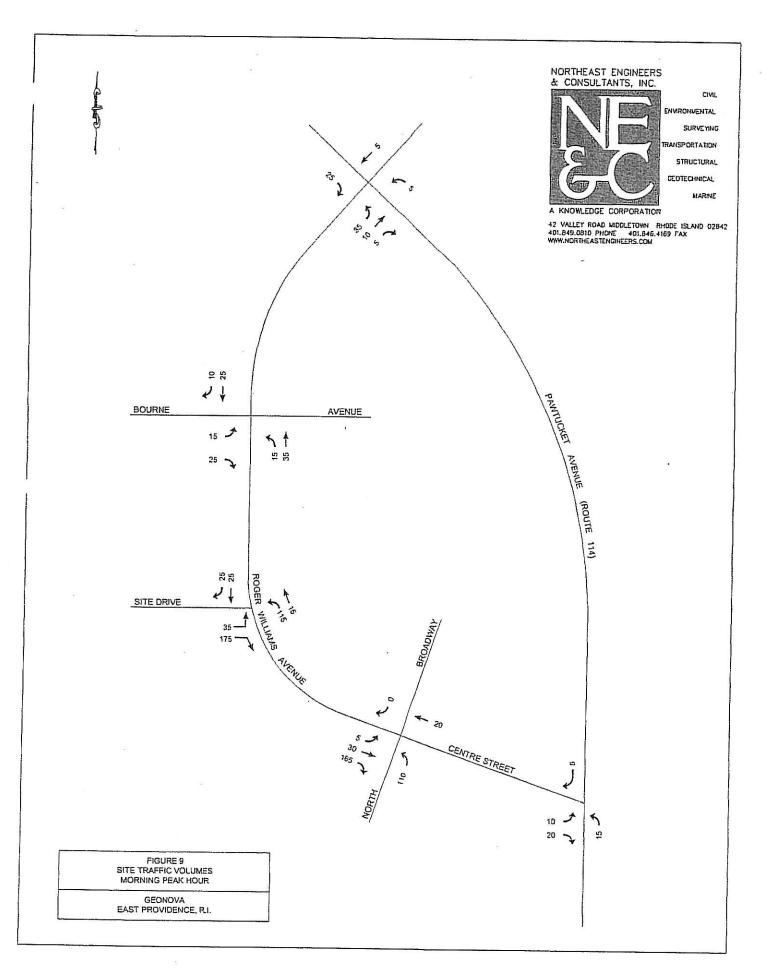
A traffic signal warrant analysis was made to determine if a signal should be installed at the intersection of Roger Williams Avenue and the site drive. Using the future traffic volumes on both roads it was determined that a signal is not warranted at the intersection. However due to the large number of vehicles turning left into the site a widening of Roger Williams Avenue is recommended to accommodate either a left turn lane or a bypass lane.

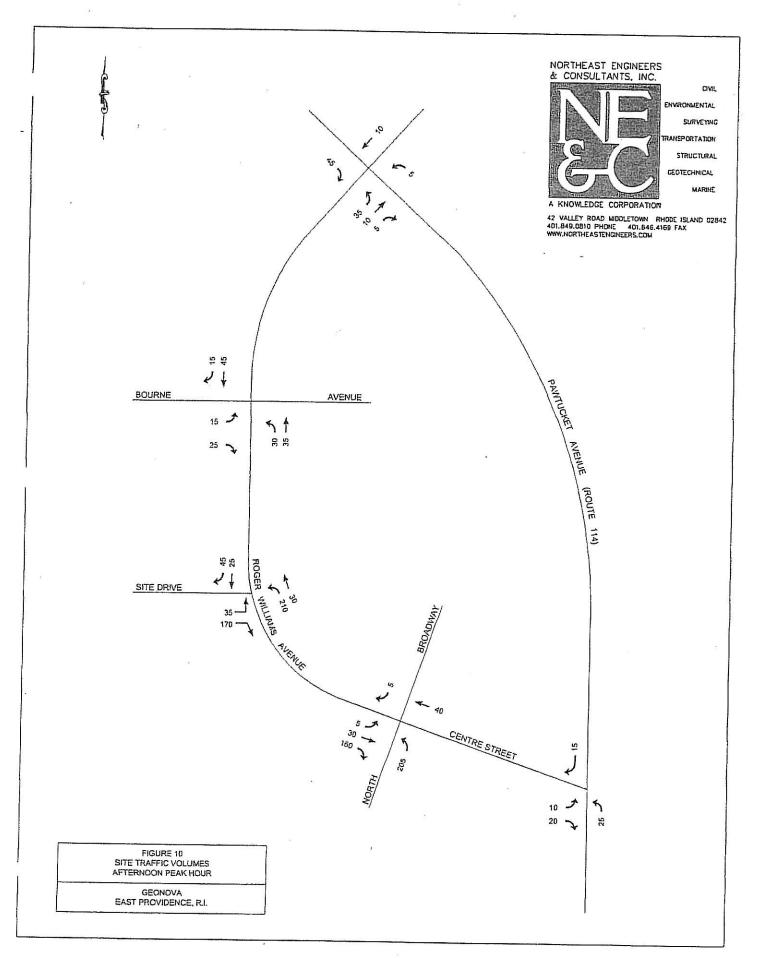
The site traffic has an impact on some intersections in the vicinity. To improve the traffic operation some improvements including road widening and signal upgrading are proposed. With these improvements the roadway network in the area can accommodate the site traffic.

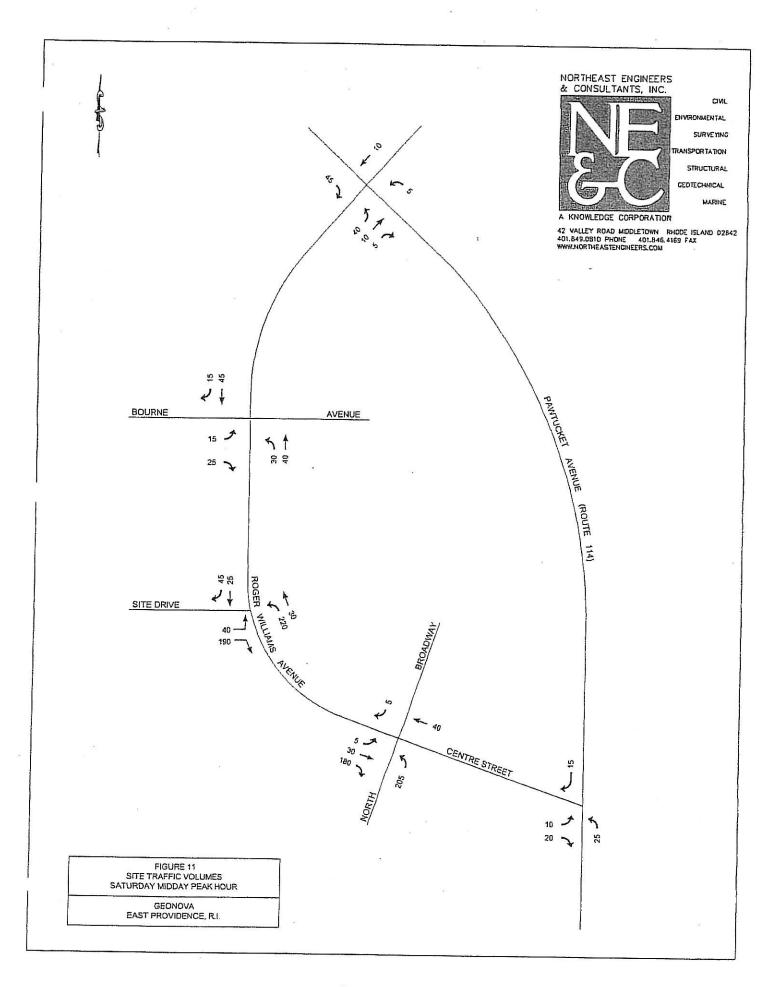


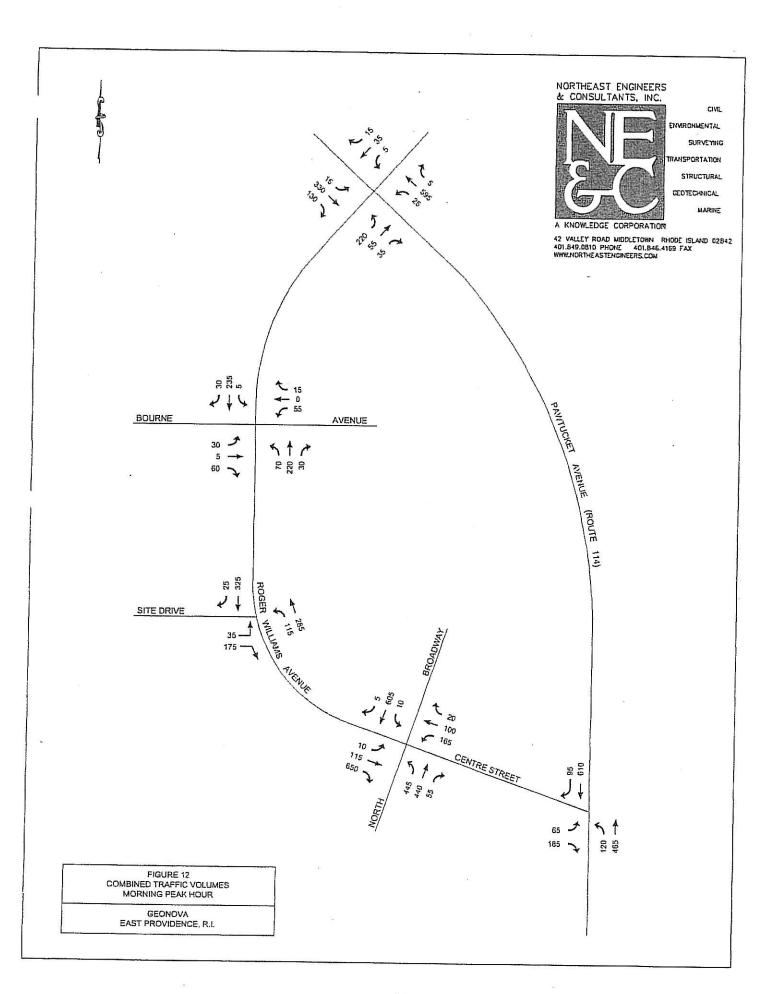


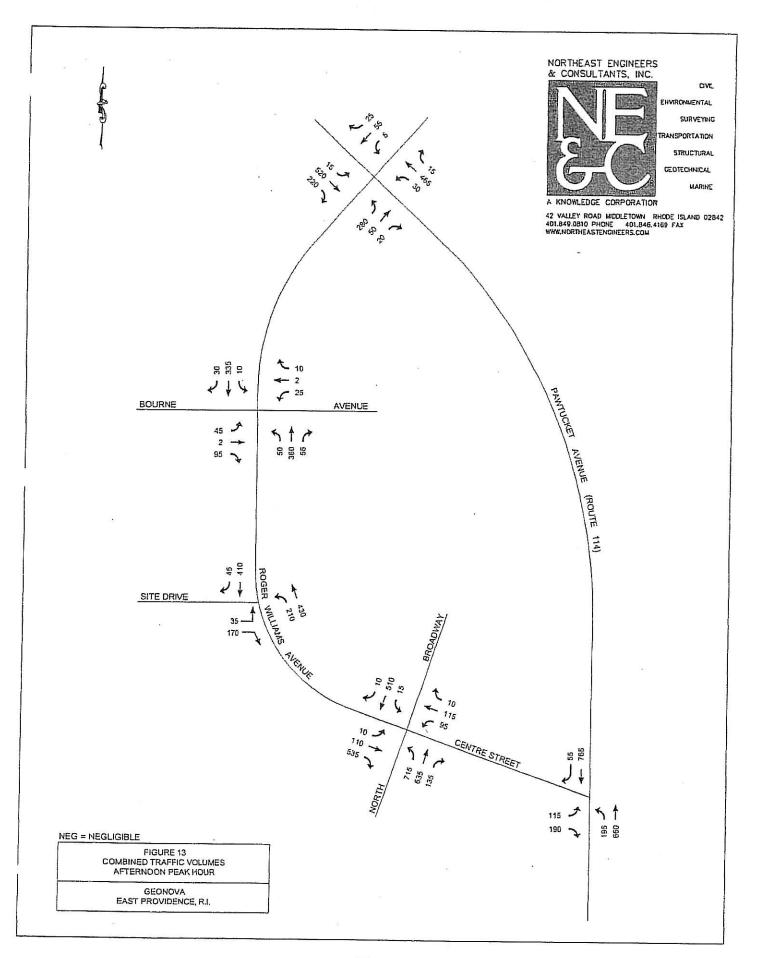


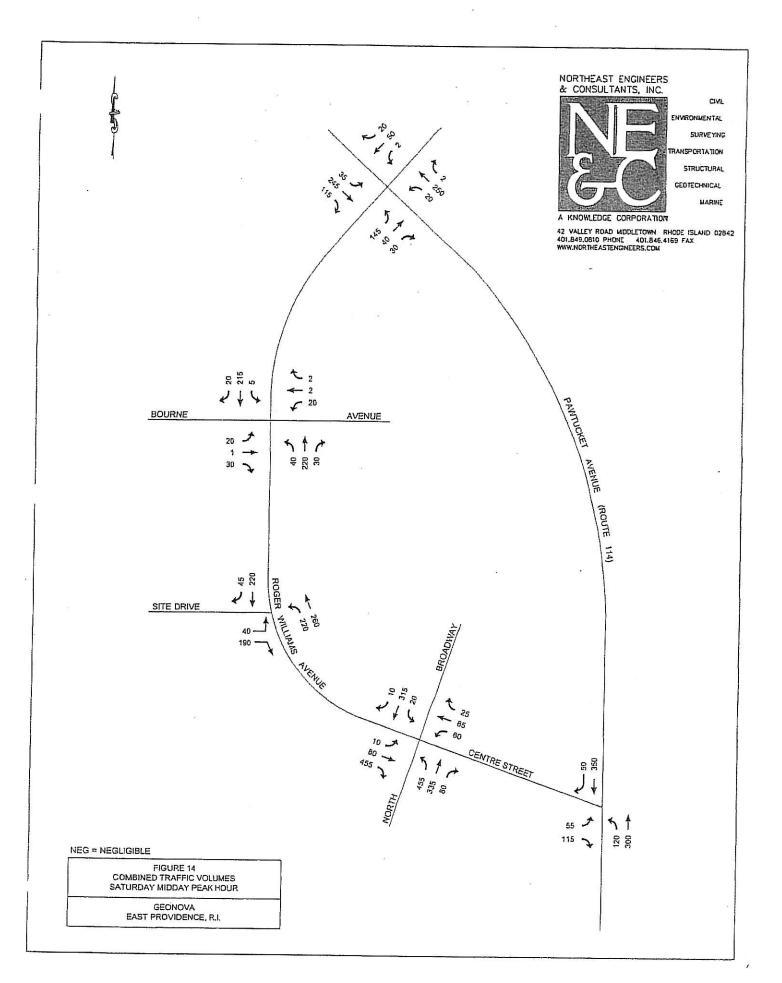












# APPENDIX A

## TRAFFIC VOLUMES AND ACCIDENTS

Hourly Automatic Traffic Count Pawtucket Ave (Route 114) at East Providence/Pawtucket Town Line August 2000

Time	Tuesday	Wednesday	Thursday
mid-1:00 AM		89	78
1:00-2:00 AM		51	50
2:00-3:00 AM		31	38
3:00-4:00 AM		28	32
4:00-5:00 AM		57	48
5:00-6:00 AM		207	213
6:00-7:00 AM		702	714
7:00-8:00 AM		1,024	970
8:00-9:00 AM		1,024	1,020
9:00-10:00 AM		643	633
10:00-11:00 AM		733	575
11:00-noon		684	740
noon-1:00 PM	779	709	817
1:00-2:00 PM	751	723	758
2:00-3:00 PM	915	875	826
3:00-4:00 PM	1,172	1,171	1,133
4:00-5:00 PM	1,370	1,344	1,349
5:00-6:00 PM	1,338	1,338	1,354
6:00-7:00 PM	747	837	771
7:00-8:00 PM	581	555	542
8:00-9:00 PM	442	451	113
9:00-10:00 PM	317	377	11
10:00-11:00 PM	233	253	3
11:00-mid	167	156	3
Total	8,812	14,062	12,791

AADT-11,300

Hourly Automatic Traffic Count Pawtucket Ave (Route 114) between Newport Ave & Newman St August 2000

Time	Monday	Tuesday	Wednesday	Thursday
mid-1:00 AM		131	135	122
1:00-2:00 AM		72	85	85
2:00-3:00 AM		56	49	39
3:00-4:00 AM		53	36	48
4:00-5:00 AM		93	99	87
5:00-6:00 AM	10	274	278	286
6:00-7:00 AM		813	780	788
7:00-8:00 AM		1,251	1,216	1,272
8:00-9:00 AM		1,194	1,189	
9:00-10:00 AM		1,044	964	
10:00-11:00 AM		1,144	1,058	
11:00-noon		1,168	1,098	
noon-1:00 PM	1,315	1,266	1,281	
1:00-2:00 PM	1,266	1,169	1,185	
2:00-3:00 PM	1,359	1,167	1,302	
3:00-4:00 PM	1,456	1,511	1,456	
4:00-5:00 PM	1,659	1,724	1,696	
5:00-6:00 PM	1,802	1,767	1,816	
6:00-7:00 PM	1,256	1,299	1,219	
7:00-8:00 PM	989	969	900	
8:00-9:00 PM	767	757	662	
9:00-10:00 PM	661	611	494	
10:00-11:00 PM	390	470	346	
11:00-mid	312	273	305	
Total	13,232	20,276	19,649	2,727

AADT-18,000

Hourly Automatic Traffic Count Pawtucket Ave (Route 114) between Pleasant St & Centre St August 2000

Time	Monday	Tuesday	Wednesday	Thursday
mid-1:00 AM		90	89	85
1:00-2:00 AM		51	67	55
2:00-3:00 AM		26	28	24
3:00-4:00 AM		30	21	27
4:00-5:00 AM		44	54	39
5:00-6:00 AM		146	145	143
6:00-7:00 AM		440	426	442
7:00-8:00 AM		717	721	730
8:00-9:00 AM		811	800	***************************************
9:00-10:00 AM		706	663	
10:00-11:00 AM		671	708	
11:00-noon		792	748	
noon-1:00 PM	923	866	891	
1:00-2:00 PM	847	840	864	
2:00-3:00 PM	909	811	934	
3:00-4:00 PM	1,011	1,047	932	
4:00-5:00 PM	1,174	1,159	1,144	
5:00-6:00 PM	1,277	1,226	1,234	
6:00-7:00 PM	905	916	960	
7:00-8:00 PM	73,1	715	716	
8:00-9:00 PM	588	585	463	
9:00-10:00 PM	449	409	348	
10:00-11:00 PM	249	317	259	
11:00-mid	182	180	179	
Total	9,245	13,595	13,394	1,545

AADT-12,200

Hourly Automatic Traffic Count Roger Williams Ave between Pawtucket Ave and Bourne Ave July 2000

Time	Monday	Tuesday	Wednesday	Thursday
mid-1:00 AM		24	30	34
1:00-2:00 AM		17	17	24
2:00-3:00 AM		12	11	17
3:00-4:00 AM		8	10	11
4:00-5:00 AM		19	29	25
5:00-6:00 AM		75	84	77
6:00-7:00 AM		253	234	245
7:00-8:00 AM		278	289	281
8:00-9:00 AM		266	232	245
9:00-10:00 AM		197	178	
10:00-11:00 AM	191	203	213	
11:00-noon	190	230	195	
noon-1:00 PM	281	265	275	
1:00-2:00 PM	238	247	265	
2:00-3:00 PM	237	250	263	
3:00-4:00 PM	367	371	364	
4:00-5:00 PM	406	407	427	
5:00-6:00 PM	386	427	420	
6:00-7:00 PM	285	281	290	
7:00-8:00 PM	212	233	243	
8:00-9:00 PM	164	176	201	
9:00-10:00 PM	141	164	153	
10:00-11:00 PM	86	100	109	1
11:00-mid	66	74	66	
l'otal	3,250	4,577	4,598	959

AADT-4,200

Hourly Automatic Traffic Count Roger Williams Ave between Bourne Ave and North Broadway July 2000

Time	Monday	Tuesday	Wednesday	Thursday	Friday
mid-1:00 AM		71	74	73	73
1:00-2:00 AM		36	28	40	49
2:00-3:00 AM		25		25	31
3:00-4:00 AM		25		25	32
4:00-5:00 AM		43		44	41
5:00-6:00 AM		171		181	183
6:00-7:00 AM		515		516	485
7:00-8:00 AM		637		595	641
8:00-9:00 AM		583		567	498
9:00-10:00 AM		447		449	452
10:00-11:00 AM	448	457	385	466	530
11:00-noon	517	559	513	516	
noon-1:00 PM	522	569	555	544	7
1:00-2:00 PM	524	518	565	515	
2:00-3:00 PM	631	586	661	618	
3:00-4:00 PM	776	818	752	756	
4:00-5:00 PM	876	896	944	904	
5:00-6:00 PM	799	850	877	872	•
6:00-7:00 PM	573	567	620	626	
7:00-8:00 PM	499	509	525	502	
8:00-9:00 PM	377	376	423	482	<del></del>
9:00-10:00 PM	296	348	348	339	
10:00-11:00 PM	183	225	230	249	
11:00-mid	147	155	150	147	
Total	7,168	9,986	7,650	10,051	3,015

AADT-9,300

Hourly Automatic Traffic Counts Bourne Avenue east of Roger Williams Avenue East Providence, Rhode Island April 2003

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don April 44	ind Mosthaind T	Mesiponila	٥	0	<b>-</b>	2	30	280	74	5.0	57	5	45																288
Mon	Factbound	Lastoonia	2	0	•	-	2	9 8	18	20	90	14	+							2									143
2003	Total		7	11	13	ည	10	6.	3	10	7	11	- 6	12	t t	2		3	7	20	13	18	44	-	2	٥	4	2	253
Sunday April 13 2	Westhound	,	-	6	9	2		6	2	9	4	α	10	L ur.	α	y u	7	=	θ	13	5	1	4	ŭ	0	7	2	0	126
Simo	Eastbound	╌		7	/	3	6	0	-	4	3	3	10	7	8	9	Ş	7	c c	7	8	11	7	. 4:	,	# (	2	2	127
003	Total	,	-	0	c	7	80	14	13	14	16	25	25	31	30	21	100	92	S.	11	22	7	12	25	0 0	7 0	3	4	355
Saturday April 12.2003	Westbound	-	-				7	11	10	6	10	13	11	15	12	. 10	45	2 4		8	13	3	ლ	2	-	-	7	2	175
Satur	Eastbound		и	,	4		-	9	3	5	9	12	14	16	18	11	4.2	76	+7	6	12	4	6	9	-		- -	2	180
	Total	3	c	9	0	4	37	22	83	88	68	77	96	128	121	87	120	113	2 6	8	60	35	30	36	33	3	4	8	1,380
Friday April 11, 2003	Westbound	-	c	000	7 0	2	29	19	70	61	47	36	. 20	52	68	39	51	32	200	99	47		16	20	12	-	- ;	5	677
Friday A	Eastbound	2	0	P		- 0	a	3	19	27	42	41	46	76	53	48	69	81	G L	200	640	17	14	16	21	65	,	0	/03
2003	Total																	77	103	27.	± 12	3 4	40	12	25	F	u	2 00	402
Thursday April 10, 2003	Westbound																	26	24	28	200	71	2	9	1	5		777	144
Thurs	Eastbound																	51	79	46	28	38	23	: Q	14	9	2	250	ממט
j	Lime	nud-1:00 AM	1:00-2:00 AM	2:00-3:00 AM	3:00-4:00 AM	4.00.5.00 AM	MIN 00 7 00 7	3:00-6:00 AM	7.00 9.00 AM	8.00 0.00 AM	0.00-9:00 AIM	9:00-10:00 AM	10:00-11:00 AM	11:00-10011	noon-1:00 PM	1:00-2:00 PM	2:00-3:00 PM	3:00-4:00 PM	4:00-5:00 PM	5:00-6:00 PM	6:00-7:00 PM	7.00-8.00 PM	TAL 00.000.0	8:00-9:00 PM	9:00-10:00 PM	10:00-11:00 PM	11:00-mid	Total	10101

AADT- 1,300 Source: Northeast Enigneers and Consultants

Hourly Automatic Traffic Counts Roger Williams Avenue south of Bourne Avenue East Providence, Rhode Island April 2003

	2003	Total	34	20	10	2 6	77	3/	Brr S	3/1	362	370																		4 250	1,355
	Monday April 14, 2003	Southbound	12	13	2	43	2 4	2 5	443	134	193	202																		878	070
	Mon	Northbound	19	16	12	-	10	175	766	107	169	168																		730	200
200	2003	lotal	79	61	49	30	250	200	25.0	3	76	162	229	255	333	200	301	326	340	348	310	200	200	2/8	259	210	183	100	277	4 540	- 21212
	Sullday April 13, 2	Souvidound	29	18	18	F	13	200	£.	3 8	2	76	124	134	132	140	71.	141	144	150	151	137	101	77	108	97	102	80	200	2.040	, , , , , , , , , , , , , , , , , , ,
benio	Northhouse	punoamia sontinoania	20	43	31	19	100	14	20	7.4	444	92	105	121	201	210	2.10	185	196	196	168	170	2 2 2	8	151	113	93	62	59	2,500	
1 200	July L	ınıaı	75	56	45	18	35	53	115	420	77	71.7	235	27.1	332	358		305	379	37.1	350	326	320	250	293	730	209	160	145	5,131	
Saturday April 12 2003	Southbound	חחחחחחחח	27	18	17	4	1	23	09	FE	36	103	105	134	161	169		104	171	163	175	150	180	200	200	131	78	72	63	2,354	
Satur	Northhound	_	48	38	28	14	24	30	55	67	100	00.5	130	137	171	189	400	080	208	208	175	167	160	180	102	AC.	131	88	82	2,777	
	Total		35	27	15	20	48	96	346	427	100	12.4	5A4	294	384	374	304	160	494	909	518	552	410	330	244	4.4.7	503	183	137	6,864	
pril 11, 2003				,	2	8	13	35	123	221	240	750	130	136	196	176	103	200	7777	353	260	254	190	130	101	500	16	79	53	3,270	
Friday April 11	Northbound   Southbour	24	17	7	19	12	35	61	223	206	184	136	200	158	188	198	198	220	717	253	258	298.	220	200	143	143	711	104	84	3,594	
2003	Total																				602	586	424	308	226	20B	2007	14/	84	2,585	
Thursday April 10, 2003	Northbound Southbound																				287	276	191	141	96	75	2 2	0	32	1,159	
Thur	Northbound																				315	310	233	167	130	133	90	3 2	25	1,426	
	Time	mid-1:00 AM	1.00.2.00 AM	7.00 2.00 A&A	2.00 4 90 4 M	5:00-4:00 AIM	4:00-5:00 AM	5:00-6:00 AM	6:00-7:00 AM	7:00-8:00 AM	8:00-9:00 AM	9:00-10:00 AM	10-00 FI-00 ANA	11.00	17:00-10011	1:00 PM	1:00-2:00 PM	2:00-3:00 PM	3.00 4.00 DA	2.00 r 00 r M	4:00-5:00 PM	5:00-6:00 PM	6:00-7:00 PM	7:00-8:00 PM	8:00-9:00 PM	9:00-10:00 PM	10-00, 11-00 PM	11.00-11-00-11	11:00-mid	l otal	

AADT- 6,300 Source: Northeast Enigneers and Consultants

A-6

Speed Data Roger Williams Avenue south of Bourne Avenue East Providence, Rhode Island April 2003

Northbound Southbound	-	Thursday A	hursday April 10, 2003	Friday Ap	v April 11, 2003	Safurday A	nril 12 2003	Sunday An	ril 13 2002	Manuel	0000
4         32         20         10         2           10         44         48         25         21           75         109         339         172         248           471         1012         1471         999         952           482         1813         157         176         698           79         443         157         176         95           14         37         15         16         95           1         4         5         7         1           2         22         19         6         3           1138         3516         3207         2336         2033           30         32         33         31         32	Northbo	punc	_	E	Southbound	Northbound	Southbound	Northbound	Southhound	Northhound	Southbound
10         44         48         25         21         7           75         109         339         172         248         8           471         1012         1471         999         952         852           482         1813         1133         925         698         8           79         443         157         16         95         13           14         37         15         16         13         1           2         22         19         6         3         3         1           1138         3516         3207         2336         2033         3         3           30         32         33         31         32         3         3         3         3	17	,	4	32	Γ		10		2	Plipography	ninoquinoo
75         109         339         172         248           471         1012         1471         999         952           482         1813         1133         925         698           79         443         157         176         95           14         37         15         16         95           1         4         5         7         1           2         22         19         6         3           1138         3516         3207         2336         2033           30         32         30         30         29           32         33         31         32         32	2	5	10	44	48		25		24		0 1
471         1012         1471         999         540           482         1813         1133         925         698           79         443         157         176         95           14         37         15         16         13           1         4         5         7         1         1           2         22         19         6         3         3           1138         3516         3207         2336         2033         3           30         32         30         30         29         3           32         33         31         37         37         31         37	2	4	7.5	109	339		17.2		2/8		,
482         1813         1133         925         698           79         443         157         176         95           14         37         15         16         13           2         22         19         6         3           1138         3516         3207         2336         2033           30         32         30         29         31           32         33         31         32         34	Æ	47	471	1012	1471	,	666		042		305
79         443         157         176         95           14         37         15         16         13           2         22         19         6         3           1138         3516         3207         2336         2033           30         32         30         29           32         33         31         32         34	7	34	482	1813	1133		925		SOB		595
14         37         15         16         13           1         4         5         7         1           2         22         19         6         3           1138         3516         3207         2336         2033           30         32         30         29           32         33         31         32	2	01	79	443	157		176		30		707
1         4         5         7         1           2         22         19         6         3           1138         3516         3207         2336         2033           30         32         30         29           32         33         31         32         34		21	14	37	15		16		120		So
2         22         19         6         3           1138         3516         3207         2336         2033           30         32         30         29           32         33         31         32		3	-	4	5		2		2 -		α ,
1138         3516         3207         2336         2033           30         32         30         29           32         33         31         32		1	2	22	19		. 9		- 6		-   c
30 32 30 29 32 33 31 32 35	13	183	1138	3516	3207		2336		2033		74.4
32 33 31	63	12	30	32	30		30		29		30
		33	32	33	31		32		3 6		000

Note: No data for speeds northbound is available after Friday April 11, 2003

Manual Turning Movement Count
East Pointe
Roger Willliams Avenue and Bourne Avenue
East Providence, Rhode Island

#### Friday April 11, 2003

*		Re	oger Willi	ams Aver	nic .				Bourne	Avenue			T
		Northbound			Southbound		***	Eastbound			Westbound		1
TIME	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	TOTAL
7:00-7:15 AM	б	24	2	0	24	3	4	0	8	4	0	0	
7:15-7:30 AM	12	41	5	3	43	6	2	0	5	12	1	· ·	75
7:30-7:45 AM	8	40	1	1	41	4	1	0	6	9	1 1	1	131
7:45-8:00 AM	13	52	3	2	43	6					0	5	116
8:00-8:15 AM	8	41	9	1	40	3	4	1	4	10	0	4	139
8:15-8:30 AM	11	30	14	2	46		- 4	1	10	16	0	0	133
8:30-8:45 AM	4	39	3		36	1	5	2	9	14	0	2	136
8:45-9:00 AM	11	29	5	2	30	9		0	5	10	0	2	111
TOTAL	73					3	11	0	8	14	1	1	105
	1 /3	296	42	12	303	35	20	4	55	89	2	15	946
PEAK HOUR 7:30-8:30 AM	40	163	27	6	170	14	11		20				Supplement.
PHF	0.77	0.78	0.48	0.75	0.92	0.58	0.55	0.50	29 0.73	0.77	0.00	0.55	524 0,94

#### Thursday April 10, 2003

		Re	oger Willi	ams Aven	ne				Bourne	Avenue			T
		Northbound			Southbound			Eastbound			Westbound		†
TIME	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	TOTAL
4:00-4:15 PM	3	35	11	0	32	1	3	0	6	4	1 1 1	0	
4:15-4:30 PM	4	69	12	1	56	3	4	1	7	7	0		96
4:30-4:45 PM	7	68	12	3	66	2	7	2	19	10		2	166
4:45-5:00 PM	4	68	12	3	54	2	9	0	14		0	2	198
5:00-5:15 PM	2	70	10	2	67	3	5	0		6			174
5:15-5:30 PM	3	68	17	- <u>-</u>	61	5	2		17	3	1	2	182
5:30-5:45 PM	2	59	13	<del></del>	59	2		0	5	3	0	. 3	168
5:45-6:00 PM	1	61	7	0	53		5	3	10	15	0	2	170
TOTAL	26	498	94	11	448	4		0	5	10	2	1	149
PEAK HOUR		420		- 11	440	22	39	6	83	58	5	13	1303
4:30-5:30 PM	16	274	51	9	248	12	23	. 2	55	22	2	8	722
PHF	0.57	0.98	1.06	0.75	0.94	0.60	0.64	0.25	0.72	0.55	0.50	1.00	0.91

#### Saturday April 12, 2003

		Ro	oger Willi	ams Aver	nue				Bourne	Avenue		3.700.00	T
		Northbound			Southbound			Eastbound			Westbound		1
TIME	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	TOTAL
12:00-12:15 PM	0	22	2	2	25	0	3	0	4	1	0	0	59
12:15-12:30 PM	1	43	4	i	33	4	0	0	4	9	0	<u> </u>	
12:30-12:45 PM	2	40	10	1	18	2	2	0	- 1	7	0		100
12:45-1:00 PM	i	45	7	1	42	1	0	0	2	6		0	83
1:00-1:15 PM	3	29	5	1	31	0	3	1		2	2 0	<del></del>	108
1:15-1:30 PM	2	38	6	1	37	1	0	0				0	76
1:30-1:45 PM	2	47	8	<u> </u>	31	0	1	0		8	0	0	94
1:45-2:00 PM	3	45	5	0	33	1	<del></del>	0	3	<del>4</del>	0	1	96
TOTAL	14	309	47	8	250	9	10	<del>-                                    </del>		8	0	0	99
PEAK HOUR					250		10	1	17	45	2	3	715
12:45-1:45 PM	8	159	26	4	141	2	4	,	5	20	2	2	374
PHF	0.67	0.88	0.81	1.00	0.84	0.50	0.33	0.25	0.63	0.63	0.25	0.50	0.87

Manual Turning Movement Count
East Pointe
Pawtucket Avenue (Route 114) and Centre Street
East Providence, Rhode Island

Thursday April 24, 2003

	Pav	vtucket Aver	ue (Route	114)	Centr	e Street	
	North	bound	Southbo	ound	Eastl	ound	1
TIME	Left	Through	Through	Right	Left	Right	TOTAL
7:00-7:15 AM	13	50	82	7	4	41	197
7:15-7:30 AM	20	73	130	18	2	49	292
7:30-7:45 AM	24	126	129	33	12	50	374
7:45-8:00 AM	24	104	145	15	15	35	338
8:00-8:15 AM	. 21	92	139	13	15	37	317
8:15-8:30 AM	26	94	133	20	6	23	302
8:30-8:45 AM	29	96	89	18	6	21	259
8:45-9:00 AM	11	74	74	12	6	31	208
TOTAL	168	709	921	136	66	287	2287
PEAK HOUR							2207
7:30-8:30 AM	95	416	546	81	48	145	1331
PHF	0.99	0.83	0.94	0.61	0.80	0.73	0.89

Thursday April 24, 2003

	Pav	vtucket Aver	ue (Route	114)	Centre	Street	
	North	bound	Southbo	und	Eastb	ound	1
TIME	Left	Through	Through	Right	Left	Right	TOTAL
4:00-4:15 PM	33	117	144	11	13	31	349
4:15-4:30 PM	29	121	132	7	16	36	341
4:30-4:45 PM	35	142	121	4	15	27	344
4:45-5:00 PM	39	129	151	10	22	35	386
5:00-5:15 PM	33	156	172	5	14	34	414
5:15-5:30 PM	41	150	186	11	31	43	462
5:30-5:45 PM	35	154	174	8	25	36	432
5:45-6:00 PM	32	121	153	8	21	32	367
TOTAL	277	1090	1233	64	157	274	3095
PEAK HOUR							2022
4:45-5:45 PM	148	589	683	34	92	148	1694
PHF	0.90	0.94	0.92	0.77	0.74	0.86	0.92

Saturday April 26, 2003

	Pav	vtucket Aver	nue (Route	114)	Centr	e Street	
18	North	bound	Southbo	und	Eastb	ound	1
TIME	Left	Through	Through	Right	Left	Right	TOTAL
12:00-12:15 PM	27	82	84	7	10	30	240
12:15-12:30 PM	24	62	90	8	8	14	206
12:30-12:45 PM	10	68	67	5	7	19	176
12:45-1:00 PM	22	61	73	9	12	19	196
1:00-1:15 PM	18	68	74	4	9	17	190
1:15-1:30 PM	19	66	65	6	8	22	186
1:30-1:45 PM	20	70	71	5	7	10	183
1:45-2:00 PM	13	62	81	5	13	16	190
TOTAL	153	539	605	49	74	147	1567
PEAK HOUR						1-1/	1507
12:00-1:00 PM	83	273	314	29	37	82	818
PHF	0.77	0.83	0.87	0.91	0.77	0.68	0.85

Manual Turning Movement Count East Pointe Pawtucket Avenue (Route 114) and Roger Williams Avenue East Providence, Rhode Island

Wednesday April 23, 2003

		Pawti	icket Ave	nue (Rout	e 114)			R	oger Willi	ams Aven	ue		T
		Northbound			Southbound		***************************************	Eastbound			Westbound		†
TIME	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	TOTAL
7:00-7:15 AM	0	54	1	2	28	17	21	4	2	1	5	1	136
7:15-7:30 AM	2	82	1	0	59	12	26	5	<del></del> -	2	9	3	202
7:30-7:45 AM	3	132	0	3	78	21	33	8	6	1	9		295
7:45-8:00 AM	1	149	0	5	77	24	52	16	5			6	
8:00-8:15 AM	5	128	3	3	75	17	41	9	9	0	5	4	341
8:15-8:30 AM	7	123	1	4	67	30	38	4	4	3	7	3	299
8:30-8:45 AM	0	94	0	5	61	11	36	11	6		1 4		291
8:45-9:00 AM	1	63	2	5	60	19	23	3	5		4	2	231
TOTAL	19	825	8	27	505	151	270	60	38	- 10	4	3	189
PEAK HOUR	1				505	131	210	00	28	10	48	23	1984
7:30-8:30 AM	16	532	4	15	297	92	164	37	24	5	26	14	1226
PHF	0.57	0.89	0.33	0.75	0.95	0.96	0.79	0.58	0.67	0.42	0.72	0.58	0.90

Wednesday April 23, 2003

3.		Pawn	icket Aver	nue (Rout	e 114)			Ri	oger Willi	ams Aven	me		Т
		Northbound			Southbound			Eastbound			Westbound		1
TIME	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	TOTAL
4:00-4:15 PM	3	87	0	4	90	31	33	5	2	0	3	2	260
4:15-4:30 PM	9	88	0	4	104	32	· 40	14	3	1	8	3	
4:30-4:45 PM	3	102	2	2	125	53	59	8	2	1	11		306
4:45-5:00 PM	7	97	4	5	134	28	50	11	3	0	9	6	374
5:00-5:15 PM	5	121	3	3	115	34	46	13	5	1	13		354
5:15-5:30 PM	6	95	3	4	92	39	60	5	2	2	8	5	364
5:30-5:45 PM	12	85	1	1	81	28	46	12	3	0	10	4	320
5:45-6:00 PM	14	67	4	6	72	21	32	6	3	0		3	282
TOTAL	59	742	17	29	813	266	366	74			8	3	238
PEAK HOUR		- · · · -		<del></del> _	012	200	200	/4	23	5	70	34	2498
4:30-5:30 PM	21	415	12	14	466	154	215	37	12	4	41	21	1417
PHF	0.75	0.86	0.75	0.70	0.87	0.73	0.90	0.71	0.60	1.00	0.79	0.88	0.94

Saturday May 3, 2003

		Pawtu	icket Ave	nue (Rout	<b>≏</b> 114)			R	oger Willi	ams Aven	ne		
		Northbound			Southbound			Eastbound			Westbound		1
TIME	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	TOTAL
12:00-12:15 PM	4	46	1	1	48	14	35	8	3	1	5	2	169
12:15-12:30 PM	4	47	0	6	59	17	26	7	4	1	7 1	5	183
12:30-12:45 PM	3	59	0	8	50	13	25	10	5	0	10	2	185
12:45-1:00 PM	4	61	1	10	58	18	27	7	5	0	11	6	208
1:00-1:15 PM	3	57	1	В	51	13	14	4	7	1	8	6	173
1:15-1:30 PM	1	48	0	3	54	12	26	3	3	0	4	5	159
1:30-1:45 PM	2	44	1	2	49	15	25	4	2	1	8	3	
1:45-2:00 PM	2	45	0	1	57	16	27	13	3	0	5		156
TOTAL	23	407	4	0	426	118	205	56	32			4	173
PEAK HOUR					120	110	203	30	32	4	58	34	1406
12:15-1:15 PM	14	224.	2	32	218	61	92	28	21	2	36	19	749
PHF	0.88	0.92	0.50	0.80	0.92	0.85	0.85	0.70	0.75	0.50	0.82	0.79	0.90

Manual Turning Movement Count

East Pointe

Roger Willliams Avenue, North Broadway and Centre Street

East Providence, Rhode Island

Tuesday April 22, 2003

18			North B	roadway			Roger V	Williams Ave	nue		Centre Stree	t	1
		Northbound			Southbound			Eastbound			Westbound		1
TIME	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left .	Through	Right	TOTAL
7:00-7:15 AM	34	48	12	2	84	0	0	14	56	16	7	7	275
7:15-7:30 AM	45	95	7	2	117	2	1	17	81	30	10	2	409
7:30-7:45 AM	76	92	9	3	126	0	1	24	110	40	10	5	496
7:45-8:00 AM	70	106	10	3	134	3	2	13	99	48	19	5	512
8:00-8:15 AM	68	98	14	1	123	1	0	15	100	26	17	4	467
8:15-8:30 AM	76	97	16	ı	159	1	2	20	106	35	.23	5	541
8:30-8:45 AM	52	84	13	2	114	1	0	14	95	37	10	<del></del>	423
8:45-9:00 AM	82	92	13	5	77	1	0	13	73 -	31	10	3	400
TOTAL	503	712	94	19	934	9	6	130	720	263	106	27	
PEAK HOUR	1							150	720	203	100	21	3523
7:30-8:30 AM	290	393	49	8	542	5	5	72	415	149	69	19	2016
PHF	0.95	0.93	0.77	0.67	0.85	0.42	0.63	0.75	0.94	0.93	0.75	0.95	2016 0.93

Tuesday April 22, 2003

			North B	roadway			Roger V	Williams Ave	nue		Centre Stree	t	T
		Northbound			Southbound			Eastbound			Westbound		1
TIME	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	TOTAL
4:00-4:15 PM	66	101	13	5	85	0	1	17	87	24	26	2	427
4:15-4:30 PM	94	119	24	1	124	0	0	17	77	17	22	4	499
4:30-4:45 PM	74	119	27	3	80	1	2	18	100	17	18	7	466
4:45-5:00 PM	94	129	33	5	95	1	2	18	86	24	11	4	502
5:00-5:15 PM	99	125	30	3	140	1	2	20	76	17	18	2	533
5:15-5:30 PM	137	155	38	5	121		1	18	89	29	23	2	620
5:30-5:45 PM	108	160	20	1	100	1	0	13	72	15	14		505
5:45-6:00 PM	106	101	25	3	105	0	1	14	82	21	21	- 1	<del></del>
TOTAL	778	1009	210	26	850	6	9	135	669			2	481
PEAK HOUR					550			133	009	164	153	24	4033
4:45-5:45 PM	438	569	121	14	456	5	5	69	323	85	66	9	2160
PHF	0.80	0.89	0.80	0.70	0.81	0.63	0.63	0.86	0.91	0.89	0.72	0.56	0.87

Saturday May 10, 2003

			North B	roadway			Roger V	Williams Ave	nue		Centre Stree	1	T
		Northbound		J. A.	Southbound			Eastbound			Westbound		1
TIME	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	TOTAL
12:00-12:15 PM	50	52	10	3	53	0	1	7	51	8	10	1	246
12:15-12:30 PM	40	68	25	2	54	3	1	13	54	9	15	- 5	289
12:30-12:45 PM	49	83	14	4	72	1	î	7	58	15	7	7	318
12:45-1:00 PM	53	69	21	2	71	0	1	17	66	17	14	5	336
1:00-1:15 PM	56	69	15	7	93	3	1	8	47	11	8	3	321
1:15-1:30 PM	57	80	20	6	45	1	0	12	66	11	7		
1:30-1:45 PM	44	50	10	2	51	1	1	7	45	17	10	2	312
1:45-2:00 PM	66	80	10	2	61	1	<del>-</del> -	13	47	13			240
TOTAL	415	551	125	28	500	10	7	84	434		4	2	300
PEAK HOUR					300	-10		84	454	101	75	32	2362
12:30-1:30 PM	215	301	70	19	281	5	3	44	237	54	36	22	1287
PHF	0.94	0.91	0.83	0.68	0.76	0.42	0.75	0.65	0.90	0.79	0.64	0.79	0.96

Accident Analysis East Providence

	Nimber		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,									
	Io Iaomina	Indition of Accidents			0.00	<b>C</b>	Type of Accidents	ents				
	Property	Injury	Turn	Rear End	Rear End Unknown	Angle		Fixed	Parked	Head on	Backing	
Location	Damage					)	Sideswine	Ohiect	now in v	Tream OII	Dacking	10,04
Pawtucket Ave (Route 114)	te 114)						adv	Colore				LOIGI
At Roger Williams Ave	ve											
2000	3	F-	1	2			-					
2001		-		1	65	-	-					4
2002	0	0									٠	5
2003	2	3	-	4								0
Total	6	5	2	1	3		F	C	C			
At Centre St											D	14
2000	2	2		3								
2001	2	+		2			- 6					4
2002	4	0		2	-		7				<b>,-</b> -	9
2003	2	0	-	-								4
Total		3	-	- α			-					2
Roger Williams Ave & Bourne Avenue	2 Bourne Aven			ļ	1		#	1			-	16
2000	6	3										
2001	7	7						2	2		-	5
2002	-					7	1	2		-		5
2003	2			-								-
Total	6	4	0	-	0	6		+				2
At Centre St & North Broadway	Broadway			<del></del>		,		#	7	1		13
2000	1 1	2	2		-							
2001	8	-			6	-						6
2002	6	c	0	1 14	7 +		-					6
2003	7	C	1 0	0 0						-	21100	6
Total	3.1	c	7	707	,		2					7
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CALCULATED BY _	JZR	DATE	9/28/09
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Accident Retc	
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AAOT Restricted Ave 11,300	· ‡
Roga Williams Re 1,200	
75,500	
Total Number of Accidents 14 over queers	
Alla = 25 accident	
14/4 = 3.5 accidents per year	
Patra Allera Para	
Bete = Accidents + Bosis	
Exposure	
Rold = 3.5 × 1 million = 0.62 mEV	
15,500 x 365 million entering rehodes	
Pawtocket Ave & Cepter St	
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Assure 2 1010 5,000/ = \$,500	
14,700	
Total Number of Accidents 16 over 4years	
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JOB 03/03	1,0 East	Pointe	887
SHEET NO.	ے	OF	Z
CALCULATED BY	JZR	DATE_	9/28/09
CHECKED BY		DATE	

	SCALE
Accident Pate	
Roger Williams Ave, Centre 50 +	Brandway
AAD7 - Regen Williams Ave	7,300/27 4,650
Browdway NB PMI	Ocak 1892 20,000/2 10,000
Broodug SB pm. Centre St pm	
Accidents 34 over 4	21,800
<u> </u>	
Rete = 8.5 × 1 million 21,800 × 365	1.07 MEV
81,800 x 865	
Roce Williams AK & Bourne A	
BADT Reprovillions -	6,340
10 to And	// 3 00
	7,600
Total Number of Accidents	13 . ver 4 years 225/year
	19 19 20 3 3 3 200
17 of c = 3,25 x 1 m;11,	on = 1.17 mer
7,609 × 366	
A = 1	5

************	Me	etric			US Cu	stomary	
Design	Stopping sight	Intersection distance passenge	e for er cars	Design	Stopping sight	Intersection distance passenge	e for
speed (km/h)	distance (m)	Calculated (m)	Design (m)	speed (mph)	distance	Calculated	Design
20	20	41.7	45	15	(ft)	(ft)	<u>(ft)</u>
30	35	62.6	65	20	80	165.4	170
40	50	83.4	85	25	115	220.5	225
50	65	104.3	105	23 20	155	275.6	280
60	85	125.1	130	35	Samuel Control of the Land		335
70	105	146.0	150	40	250	385.9	390
53	130	166.8	170	45	305 305	441.0	445
90	160	187.7	190	<del>5</del> 0	425	496.1 -	500
100	185	208.5	210	55		551.3	555
110	220	229.4	230	60	495 570	606.4	610
120	250	250.2	255	65	570 645	661.5	665
130	285	271.1	275	70	730	716.6	720
	vide in second of \$100.			75	820	771.8	775
			ı	80	910	826.9	B30
ntos Ind				UU	310	882.0	B85

Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3 percent or less. For other conditions, the time gap must be adjusted and required sight distance recalculated.

Exhibit 9-55. Design Intersection Sight Distance—Case B1—Left Turn From Stop

Sight distance design for left turns at divided-highway intersections should consider multiple design vehicles and median width. If the design vehicle used to determine sight distance for a divided-highway intersection is larger than a passenger car, then sight distance for left turns will need to be checked for that selected design vehicle and for smaller design vehicles as well. If the divided-highway median is wide enough to store the design vehicle with a clearance to the through lanes of approximately 1 m [3 ft] at both ends of the vehicle, no separate analysis for the departure sight triangle for left turns is needed on the minor-road approach for the near roadway to the left. In most cases, the departure sight triangle for right turns (Case B2) will provide sufficient sight distance for a passenger car to cross the near roadway to reach the median. Possible exceptions are addressed in the discussion of Case B3.

If the design vehicle can be stored in the median with adequate clearance to the through lanes, a departure sight triangle to the right for left turns should be provided for that design vehicle turning left from the median roadway. Where the median is not wide enough to store the design vehicle, a departure sight triangle should be provided for that design vehicle to turn left from the minor-road approach.

The median width should be considered in determining the number of lanes to be crossed. The median width should be converted to equivalent lanes. For example, a 7.2-m [24-ft] median should be considered as two additional lanes to be crossed in applying the multilane highway adjustment for time gaps in Exhibit 9-54. Furthermore, a departure sight triangle for left turns from the median roadway should be provided for the largest design vehicle that can be stored on

Design vehicle	Time gap (s) at design speed of major road ( $t_q$ )
Passenger car Single-unit truck	6.5
Combination truck	8.5
Note: Time	10.5

Note:

Time gaps are for a stopped vehicle to turn right onto or cross a two-lane highway with no median and grades 3 percent or less. The table values require adjustment as follows:

For multilane highways:

For crossing a major road with more than two lanes, add 0.5 seconds for passenger cars and 0.7 seconds for trucks for each additional lane to be crossed and for narrow medians that cannot store the design vehicle.

For minor road approach grades: If the approach grade is an upgrade that exceeds 3 percent, add 0.1 seconds for each percent grade.

Exhibit 9-57. Time Gap for Case B2—Right Turn from Stop and Case B3—Crossing Maneuver

	N	letric			US C	ustomary	
Design speed (km/h) 20	Stopping sight distance (m)	distan passeng Calculated (m)		. Design speed (mph)	Stopping sight distance (ft)	Intersect distand passeng Calculated	ce for er cars Design
30 40 50 60 70 80 90 100 110 120 130	20 35 50 65 85 105 130 160 185 220 250 285	36.1 54.2 72.3 90.4 108.4 126.5 144.6 162.6 180.7 198.8 216.8 234.9	40 55 75 95 110 130 145 165 185 200 220 235	15 20 25 30 35 40 45 50 55 60 65 70 75 80	80 115 155 200 776	(ft) 143.3 191.1 238.9 286.7 334.4 382.2 430.0 477.8 525.5 573.3 621.1 668.9 716.6 764.4	(ft) 145 195 240 290 335 385 430 480 530 575 625 670 720

Note: Intersection sight distance shown is for a stopped passenger car to turn right onto or cross a two-lane highway with no median and grades 3 percent or less. For other conditions, the time gap must be adjusted and required sight distance recalculated.

Exhibit 9-58. Design Intersection Sight Distance—Case B2—Right Turn from Stop and Case B3—Crossing Maneuver

Table 16.8
Forecast Year 2020 Vehicle Miles Traveled by Municipality

Municipality	Vehicle M	lles Traveled	% Growth
(City/Town)	1990	2020	per Year
Barrington	181,843	236,473	0.88
Bristo)	187,801	244,208	0.88
Burrillville	253,781	333,795	0.92
Central Falls	95,732	116,000	0.64
Charlestown	152,220	222,630	1.2B
Coventry	344,690	484,358	1.14
Cranston	1,459,060	2,008,320	1.07
Cumberland	521,711	854,685	1.66
East Greenwich	454,246	634,616	1.12
East Providence	906,041		### NO.193
Excici	292,762	419,835	1,21
Foster	120,477	170,241	1.16
Glocester	196,922	260,820	0.94
Hopkinton	263,344	374,671	1.18
Jameslown	82,420	117,146	1.18
Johnston	786,291	1,168,820	1.33
Lincoln	620,708	967,829	1.49
Line Compton	39,897	58,111	1.26
Middletown	259,456	398,511	1.44
Narragansen	172,926	268,247	1.47
New Shoreham	5,483	9,456	1.83
Newport	206,625	318,870	1.46
North Kingstown	685,839	1,071,540	1.50
North Providence	340,380	454,231	0,97
Yorth Smithfield	445,187	596,651	0.98
Pawnicket	1,064,020	1,298,320	0.67
Portsmouth	389,658	566,083	1.25
Providence	2,993,210	3,701,660	0.71
Richmond	204.836	319.103	1.49
Scimate	236,507	339,389	1.21
Smithfield	381,489	602,416	1.53
South Kingstown	464,389	675,003	1.25
Γίνεποη	277,258	381,838	1.07
Varren	187,797	244,928	0.89
Warwick	2,030,960	2,730,910	0.99
Vest Greenwich	311,319	472,897	1.40
Vest Warwick	331,166	469,023	1.17
Vesterly	342,018	503,570	1,30
Voonsocker	355,B12	489,640	1.07
tatewide	18 645 281	25 780 485	1.09

JOB 03/03.0 Fast	Point	<u> </u>
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Traffic Counts

		Percen	t of M	onthly .	Average	Daily	Traffic	(%MAD	T) $B_{\nu}$	Day of	Week an	d Month	
		Sun		Mon	Tue		Wed	Thu		ri	Sat	Year	Group
Ja	n	74.	7	99.0	106.	9	99.1	106.9	1-	13.7	95.5	3	URBAN
Fe	b	78.	5	90.0	99.	D	110.1	113.5		08.9	100.1		OKDAN
Ma	er .	77.	4	101.7	105.7	7	106.5	97.2		4.2	102.1		
Ap	Γ	78.	9	101.7	101.8	3	104.7	106.1		1.7	92.5		
Ma	20	82.0	)	91.3	102.1	[	103.9	104.5		2.3	99.7		
Jur		77.2		102.7	106.1		101.9	105.3		2.7	99.3		
Jul		83.2		101.6	104.2		104.7	105.7		0.0	96.6		
Aug	-	81.8		98.9	103.8	•	105.2	99.4	10	9.9	96.1		
Sep		78.3		95.6	102.6		05.9	105.9	11:	2.8	99.2		
Oct		72.7		97.0	104.6	. 1	03.9	104.7	11	4.2	97.4		
Nov		76.4		103.7	102.8	1	05.5	105.D	11.	4.3	98.6		
Dec	3	65.8		108.8	115.6	1	8.80	98.2	114	1.3	85.6		
			j	MADT.	Percent	of AA	DT					-	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
90.6	87.9	94.5	102.8	106.3	106.0	106.1	106.0	105.8	106.7	95.9	87.0		
								.00.0	100.7	55.5	0.10		
10			2	S 8728									
	98		I	Daily, M	tonthly.	Divisor	•						
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
.944	.945	.975	1.072	1.100	1.107		9 1.089	1.109	1.114	1.001	.921		

### APPENDIX B

#### TRIP GENERATION AND DISTRIBUTION

Land Use code 210- Single Family Houses

	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated	Min Anticipated	1	Used
IN OUT	9.57 9.57	4.31	21.85 21.85	50%	31	148	511e Traffic 67 67	339 339	150
AM Peak Hour									300
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated	Min Anticipated	Max Anticipated	Used
OUT	0.75 0.75	0.33 0.33	2.27 2.27	25% 75%	31 31	6 17	33	51te Tarric 18 53	5 20
PM Peak Hour					<b>1•</b> 3				25
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated	Min Anticipated	Max Anticipated	Used
IN OUT	1.01 1.01	0.42 0.42	2.98	63%	31	20 12	Site Traffic 8 5	Site Traffic 58	20
All Day Saturday									30
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated	Min Anticipated	Max Anticipated	Used
IN OUT	10.1 10.1	5.32 5.32	15.25 15.25	50%	31	157	82 82	Site Traffic 236 236	160
Saturday									320
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated	Min Anticipated	Max Anticipated	Used
IN OUT	0.94	0.5 0.5	1.75 1.75	54% 46%	31	16 13	Site Faffic 8 7	Site Traffic 29 25	15

03103 Geonova Trips by Land Use

Land Use code 230- Residential Condominlum/Townhouse

All Day Weekday					×ì				
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated Site Traffic	Min Anticipated Site Traffic	Max Anticipated Site Traffic	Used
OUT	5.86 5.86	1.83 1.83	11.79 11.79	50% 50%	464 464	1360 1360	425 425	2735 2735	1360
AM Peak Hour									2720
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated Site Traffic	Min Anticipated Site Traffic	Max Anticipated	Used Value
IN OUT	0.44	0.15 0.15	1.61 1.61	17% 83%	464 464	35 169	12 58	127 620	35
PM Peak Hour									205
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated Site Traffic	Min Anticipated Site Traffic	Max Anticipated	Used
IN OUT	0.52 0.52	0.18 0.18	1.24 1.24	67% 33%	464	162 80	56 28	385	160
All Day Saturday									240
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated Site Traffic	Min Anticipated	Max Anticipated	Used
IN OUT	5.67 5.67	1.17 1.17	11.4	50%	464	1315	271	2645 2645	1315
Saturday									2630
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated Site Traffic	Min Anticipated	Max Anticipated	Used
IN OUT	0.47 0.47	0.14 0.14	0.93 0.93	54% 46%	464 464	118 100	35	233 198	120 100
									220

03103 Geonova Trips by Land Use

Land Use code 420- Marina

All Day Weekday									
	Mean Generator	Min Generator	Max Generator	. %	Number of Units	Mean Anticipated Site Traffic	Min Anticipated		Used Value
OUT	2.96 2.96	1.91 1.91	10.04 10.04	50% 50%	75 75	11 11	72 72 72	377 377	110
AM Peak Hour		en.							220
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated Site Traffic	Min Anticipated	1020	Used
OUT	0.08	0.07 0.07	0.09 0.09	33% 67%	75 75	2 4	2 2 4	2 5 5	3
PM Peak Hour									5
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated	Min Anticipated	Max Anticipated	Used
IN OUT	0.19 0.19	0.17 0.17	0.21	60% 40%	75 75	9	Site Framic 8 5	Site Fraffic 9 6	10 10
All Day Saturday									12
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated	Min Anticipated	Max Anticipated	Used
IN OUT	3.22 3.22	2.47 2.47	12.78 12.78	50%	75 75	121 121	93	Site Traffic 479 479	120
Saturday									240
	Mean Generator	Min Generator	Max Generator	%	Number of Units	Mean Anticipated		Max Anticipated	Used
IN OUT	0.27 0.27	0.21 0.21	0.48 0.48	44% 56%	75 75	9	7 9	51te Traffic 16 20	10
									20

03103 Geonova Trips by Land Use

Land Use Code 932- High Turnover Sit Down Restaurant

All Day Weekday								**************************************	
	Mean - Generator	Min Generator	Max Generator	%	Number of Seats	Mean Anticipated	Min Anticipated	Max Anticipated	Used
IN OUT	4.83 4.83	4.37 4.37	5.49	50%	140	338 338 338	Site Traffic 306 306	Site Traffic 384	340
AM Peak Hour									089
	Mean Generator	Min Generator	Max Generator	%	Number of Seats	Mean Anticipated	Min Anticipated		Used
OUT	0.47	0.30 0.30	0.76 0.76	52% 48%	140 140	34	22 20	55 51	33
PM Peak Hour									65
	Mean Generator	Min Generator	Max Generator	%	Number of Seats	Mean Anticipated	Min Anticipated	Max Anticipated	Used
IN OUT	0.42	0.14 0.14	1.73 1.73	58% 42%	140	34 25	11 11 8	140 102	35
All Day Saturday	90								09
	Mean Generator	Min Generator	Max Generator	%	Number of Seats	Mean Anticipated	Min Anticipated	Max Anticipated	Used
IN OUT	6.21 6.21	5.6 5.6	7.09 7.09	50% 50%	140 140	435 435	392 392 392	Site Traffic 496 496	435
Saturday									870
	Mean Generator	Min Generator	Max Generator	%	Number of Seats	Mean Anticipated	Min Anticipated	-Max Anticipated	Used
IN OUT	0.88 0.88	0.45 0.45	1.88 1.88	58% 42%	140	71	37 37 26	153 141	70
							10	-	20

03103 Geonova Trips by Land Use

Land Use Code 820-Shopping Center

All Day Weekday									
	Mean Generator	Min Generator	Max Generator	%	Square Feet 1,000	Mean Anticipated Site Traffic	Min Anticipated Site Traffic	Max Anticipated Site Traffic	Used Value
IN OUT	42.94 42.94	12.50 12.50	270.89 270.89	50% 50%	33 33	709 709	206 206	4470 4470	710
AM Peak Hour									1420
	Mean Generator	Min Generator	Max Generator	%	Square Feet 1,000	Mean Anticipated Site Traffic	Min Anticipated	Max Anticipated	Used
IN OUT	1.03 1.03	0.10 0.10	9.05 9.05	61% 39%	33 33	21	2 1	182 116	20
PM Peak Hour									35
	Mean Generator	Min Generator	Max Generator	%	Square Feet 1,000	Mean Anticipated Site Traffic	Min Anticipated Site Traffic	Max Anticipated	Used
IN OUT	3.75 3.75	0.68 0.68	29.27 29.27	48% 52%	33 33	59	11	464	60
All Day Saturday							*)		125
	Mean Generator	Min Generator	Max Generator	%	Square Feet 1,000	Mean Anticipated Site Traffic	Min Anticipated Site Traffic	Max Anticipated Site Traffic	Used Value
OUT	49.97 49.97	16.7 16.7	227.5 227.5	50% 50%	33 33	825 825	276 276	3754 3754	825 825
Saturday					*				1650
	Mean Generator	Min Generator	Max Generator	%	Square Feet 1,000	Mean Anticipated Site Traffic	Min Anticipated Site Traffic	Max Anticipated	Used Value
IN OUT	4.97 4.97	1.46 1.46	19.32 19.32	52% 48%	33 33	85 79	25	332	85 80
									165

03103 Geonova Trips by Land Use

Land Use Code 710-General Office

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	Mean Generator	Min Generator	Max Generator	%	Square Feet 1,000	Mean Anticipated	Min Anticipated	1	Used
N OUT	11.01 11.01	3.58 3.58	28.8 28.8	50%	50	275 275 275	Site Traffic 90	Site Traffic 720	275
AM Peak Hour								03.	550
	Mean Generator	Min Generator	Max Generator	%	Square Feet 1,000	Mean Anticipated	Min Anticipated		Used
IN OUT	1.55 1.55	0.60	5.98 . 5.98	88% 12%	50 50	910 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Site Traffic 26 4	Site Traffic 263 36	70
PM Peak Hour		*							88
	Mean Generator	Min Generator	Max Generafor	%	Square Feet . 1,000	Mean Anticipated	Min Anticipated		Used
IN OUT	1.49 1.49	0.49 0.49	6.39	17%	50	Site Traffic 13 62	Site Traffic 4	Site Traffic 54	15
All Day Saturday				et .			77	203	75
	Mean Generafor	Min Generator	Max Generator	%	Square Feet 1,000	Mean Anticipated	Min Anticipated	Max Anticipated	Used
IN OUT	2.37 2.37	0.59 0.59	14.67 14.67	50%	50	51   raffic 59 59	Site Traffic 15	Site Traffic 367	60 60
Saturday							2	200	120
	Mean Generator	Min Generator	Max Generator	%	Square Feet 1,000	Mean Anticipated	Min Anticipated	Max Anticipated	Used
IN OUT	0.41	0.16 0.16	1.57 1.57	54% 46%	50 50	Site Traffic 11 9	Site Traffic 4 4	Site Traffic 42 36	10
		*						A CONTRACTOR OF THE PERSON NAMED IN	

# COMMUTING PATTERNS RHODE ISLAND WORKERS BY PLACE OF RESIDENCE AND PLACE OF WORK 2000

ommuting from:		RKERS	Commuting to:
lace of Residence	Number	Percent	Place of Work
ast Providence	6,257	27.89%	East Providence
	5.163	23.01%	Providence
1	1,510	(2673%)	Pawtocket 6.7
1	1,205	5.37%	Warwick austral
1	982	4.38%	Cranston
1	408	/stipliBZ%的是	関Uncoll的語彙 / / 7 a
1	348	1.55%	Barrington
1	274	1.22%	Woonsocket
-	266	1.19%	Warren
1	264	1.18%	Smithfield
.	248	1.11%	Johnston
	235		ACumberlands 化 .535
-	200	0.89%	~
-	169 144	0.75%	North Providence
-	139	0.64%	Newport
<del> -</del>	128	0.62%	North Kingstown
1	98		MCentral Falls We / 57
F-	90	0.44%	North Smithfield
F	77	0.34%	East Greenwich West Warwick
F	59	0.26%	Portsmouth
-	50	0.22%	South Kingstown
<u> </u>	49	0.22%	Coventry
F	48	0.21%	West Greenwich
r	43	0.19%	Burriliville
	37	0.16%	Richmond
Γ	35	0.16%	Tiverton
	29	0.13%	Middletown
	28	0.12%	Charlestown
	26	0.12%	Westerly
	21	0.09%	Scituate
	19	0.08%	Foster
	14	0.06%	Little Compton
<u>L</u>	12	0.05%	Glocester
	10	0.04%	Exeter
<u></u>	7	0.03%	Hopkinton
<u> </u>	0	0.00%	Jamestown
-	0	0.00%	Narragansett
-	10 000	0.00%	New Shoreham
-	18,692	83.32%	Total Rhode Island
_			
-	63	0.28%	New London County, CT
-	27	0.12%	New Haven County, CT
-	13	0.06%	Windham County, CT
<del> </del>	7	0.05%	Tolland County, CT
-	122	0.03%	Middlesex County, CT
_	122	0.54%	Total Connecticut
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. –	2,424	MUBINE E	Bristol County MAE 化 5.4
_	531 254		Norfolk-County-MA
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<u> </u>	150 85		Middlesex:Gdanty;MA
-	60	0.38%	Plymouth County, MA
<u> </u>	19	0.08%	Worcester County, MA
<del> </del>	.s B	0.04%	Nantucket County, MA
_	8	0.04%	Hampden County, MA Essex County, MA
<del> </del>	6	0.03%	Barnstable County, MA
<del>[</del>	5	0.03%	Franklin County, MA
-	3,550	15.82%	Total Massachusetts
<del></del>	-,500	10.02/0	. Ctal Massachusells
<del> </del>	70	0.345/	All Other States
<u> </u>	0		All Other States
<del> </del>	70		Abroad
<del> </del>	10	1/9 1/6	Total Other States & Abroad
	00.40		
	22,434	100.00%	TOTAL WORKERS

18,305% USC 20%

Source: U.S. Census Bureau

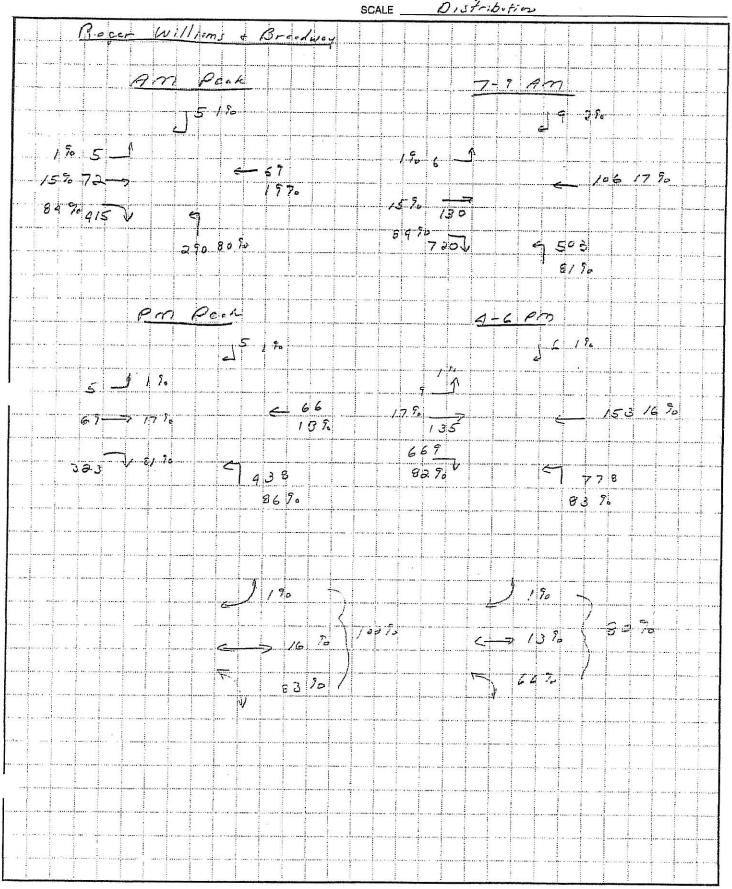
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# APPENDIX C CAPACITY ANALYSES

#### LEVEL OF SERVICE FOR SIGNALIZED INTERSECTIONS

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption and lost travel time. The delay experienced by a motorist is made up of a number of factors including amount and distribution of traffic movements, traffic composition, geometric characteristics and details of intersection signalization. LOS is evaluated for signalized intersections on the basis of control delay per vehicle. Control delay is the portion of the total delay that is attributed to the traffic signal operation. Control delay includes initial deceleration delay, queue move-up time, stopped delay and final acceleration delay. The average control delay per vehicle is estimated for each lane group and aggregated for each approach and the intersection as a whole. The LOS is directly related to the control delay as shown on the table below.

LEVE	L OF SERVICE CRITERIA
LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (SEC)
A	≤10.0
В	> 10.0 to 20.0
С	> 20.0 to 35.0
D	> 35.0 to 55.0
Е	> 55.0 to 80.0
F	> 80.00

Source: Highway Capacity Manual, Transportation Research Board, 2000.

Pawtucket Avenue and Centre Street

#### HCS2000- DETAILED REPORT General Information 2014 April 1982 April 1982 Analyst JZR Intersection Pawtucket Ave & Centre St Agency or Co. NE&C Area Type All other areas Date Performed 3/25/04 Jurisdiction East Providence, RI AM Peak Hour Time Period Analysis Year 2003 Project ID Existing Traffic Volumes Volume and Uning Input CANCELL TOUR CONTRACTOR OF EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Number of lanes, N. 0 0 0 0 0 0 1 2 0 0 2 0 Lane group LR L T T Volume, V (vph) 48 145 95 416 546 % Heavy vehicles, %HV 1 1 0 3 3 Peak-hour factor, PHF 0.89 0.89 0.89 0.89 0.89 Pretimed (P) or actuated (A) A A Α Α A Start-up lost time, I, 2.0 2.0 2.0 2.0 Extension of effective green, e 2.0 2.0 2.0 2.0 Arrival type, AT 3 3 3 3 Unit extension, UE 3.0 3.0 3.0 3.0 Filtering/metering, I 1.000 1.000 1.000 1.000 Initial unmet demand, Qh 0.0 0.0 0.0 0.0 Ped / Bike / RTOR volumes 0 0 0 0 Lane width 12.0 12.0 12.0 12.0 Parking / Grade / Parking N 0 N N N N 0 N N 0 Ν Parking maneuvers, N<sub>m</sub> Buses stopping, N<sub>B</sub> 0 0 0 0 Min. time for pedestrians, Gp 3.2 3.2 3.2 Phasing **EB** Only 02 04 NB Only Thru Only 08 G = 15.0G = G = G = G = 10.0G = 23.0G = G = Timing Y = 4Y = Y = Y = Y = 4Y = 4Y = Y = Duration of Analysis, T = 1.00 Cycle Length, C = 60.0 Lane-Group Capacity, Control Delay, and LOS Determination. EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Adjusted flow rate, v 217 107 467 613 Lane group capacity, c 418 301 2161 1344 v/c ratio, X 0.52 0.36 0.22 0.46 Total green ratio, g/C 0.25 0.17 0.62 0.38 Uniform delay, d1 19.4 22.1 5.1 13.8 Progression factor, PF 1.000 1.000 1.000 1,000 Delay calibration, k 0.12 0.11 0.11 0.11 Incremental delay, d2 1.2 0.7 0.1 0.2 Initial queue delay, d<sub>3</sub> Control delay 20.6 22.9 5.1 14.1 Lane group LOS C C A B Approach delay 20.6 8.4 14.1 Approach LOS C A В Intersection delay 12.8 $X_{r} = 0.46$ Intersection LOS В

#### HCS2000- DETAILED REPORT Analyst JZR Intersection Pawtucket Ave & Centre St Agency or Co. NE&C Агеа Туре All other areas Date Performed 3/30/04 Jurisdiction East Providence, RI Time Period PM Peak Hour Analysis Year 2003 Project ID Existing Traffic Volumes Volume and Timing Input EB WB SB LT TH RT LT TH RT LT TH RT LT TH RT Number of lanes, N. 0 0 0 0 0 0 1 2 0 0 2 0 Lane group LR L T T Volume, V (vph) 92 148 148 589 683 % Heavy vehicles, %HV 1 1 0 3 3 Peak-hour factor, PHF 0.92 0.92 0.92 0.92 0.92 Pretimed (P) or actuated (A) A A Α A A Start-up lost time, I 2.0 2.0 2.0 2.0 Extension of effective green, e 2.0 2.0 2.0 2.0 Arrival type, AT 3 3 3 ż Unit extension, UE 3.0 3.0 3.0 3.0 Filtering/metering, 1 1.000 1.000 1.000 1.000 Initial unmet demand, Qh 0.0 0.0 0.0 0.0 Ped / Bike / RTOR volumes 0 0 0 0 Lane width 12.0 12.0 12.0 12.0 Parking / Grade / Parking N 0 Ν N N. N 0 N Ν 0 N Parking maneuvers, N<sub>m</sub> Buses stopping, Na 0 0 0 0 Min. time for pedestrians, Gp 3.2 3.2 3.2 Phasing **EB** Only 04 **NB** Only Thru Only 80 G = 15.0G = G = G = G = 10.0G = 23.0G = G = Timing Y = 4Y = Y = Y = Y = 4 Y = 4Y = Y = Duration of Analysis, T = 1.00 Cycle Length, C = 60.0 Lane Group Capacity, Control Delay, and LOS Determination EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Adjusted flow rate, v 261 161 640 742 Lane group capacity, c 423 301 2161 1344 v/c ratio, X 0.62 0.53 0.30 0.55 Total green ratio, g/C 0.25 0.17 0.62 0.38 Uniform delay, d<sub>1</sub> 20.0 22.9 5.4 14.5 Progression factor, PF 1.000 1.000 1.000 1.000 Delay calibration, k 0.20 0.14 0.11 0.15 Incremental delay, d2 2.7 1.9 0.1 0.5 Initial queue delay, d<sub>3</sub> Control delay 22.7 24.8 5.5 15.0 Lane group LOS C C Α В Approach delay 22.7 9.3 15.0 Approach LOS C A В Intersection delay 13.6 $X_c = 0.57$ Intersection LOS В

#### HCS2000- DETAILED REPORT General Information Site Information Analyst JZR Intersection Pawtucket Ave & Centre St Agency or Co. NE&C Area Type All other areas Date Performed 3/30/04 East Providence, RI Jurisdiction Time Period Saturday Peak Hour Analysis Year 2003 Project ID Existing Traffic Volumes Volume and Timing Input **編、編** EB WB SB LT TH TH RT LT RT LT TH RT LT TH RT Number of lanes, N. 0 0 0 0 0 0 2 1 0 0 2 0 Lane group LR L T T Volume, V (vph) 37 82 273 83 314 % Heavy vehicles, %HV 1 1 0 3 3 Peak-hour factor, PHF 0.85 0.85 0.85 0.85 0.85 Pretimed (P) or actuated (A) A A Α A A Start-up lost time, I, 2.0 2.0 2.0 2.0 Extension of effective green, e 2.0 2.0 2.0 2.0 Arrival type, AT 3 3 3 3 Unit extension, UE 3.0 3.0 3.0 3.0 Filtering/metering, I 1.000 1.000 1.000 1.000 Initial unmet demand, Q<sub>b</sub> 0.0 0.0 0.0 0.0 Ped / Bike / RTOR volumes 0 0 D 0 Lane width 12.0 12.0 12.0 12.0 Parking / Grade / Parking N 0 N N Ν N 0 N N 0 N Parking maneuvers, Nm Buses stopping, N<sub>B</sub> 0 0 0 0 Min. time for pedestrians, Gp 3.2 3.2 3.2 Phasing **EB** Only 02 03 04 **NB** Only Thru Only 08 G = 15.0G = G = G = G = 10.0G = 23.0G = G = Timing Y = 4 Y = Y = Y = Y = 4Y = 4Y= Y = Duration of Analysis, T = 1.00Cycle Length, C = 60.0 Lane Group Capacity, Control Delay, and tios Determination EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Adjusted flow rate, v 140 98 321 369 Lane group capacity, c 420 301 2161 1344 v/c ratio, X 0.33 0.33 0.15 0.27 Total green ratio, g/C 0.25 0.17 0.62 0.38 Uniform delay, d<sub>1</sub> 18.4 22.0 4.9 12.8 Progression factor, PF 1.000 1.000 1.000 1.000 Delay calibration, k 0.11 0.11 0.11 0.11 Incremental delay, d2 0.5 0.6 0.0 0.1 Initial queue delay, da Control delay 18.9 22.7 4.9 12.9 Lane group LOS В C A В Approach delay 18.9 9.0 12.9 Approach LOS В B Intersection delay 12.0 $X_{c} = 0.30$ Intersection LOS В

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Lane group			+		LR	-	0	-	-	U	0	1	2	0	0	2	0
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Arrival type, A			+		3			-	-			2.0	2.0			2.0	+
Unit extension			+		3.0	$\dashv$			$\dashv$			3	3			3	4_
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Lane width			+		12.0	-+-		-	+	-		40.0	100	+	0		╄
Parking / Grad	ie / Parking		+	N	0		N	N	+			12.0	12.0	<del> </del>	<del></del>	12.0	-
Parking mane	201-201 No. 11-28-201-101-1		+	//	10	-	· ·	14			N	N	0	N	N	0	N
Buses stoppin			+	6	0	+				-		0	0	┼	-		┼
	edestrians, Gp		十		3.2				3.	.2	-	-	1 0	<u> </u>		3.2	
Phasing	EB Only		02			03 04		1			1 7	пи Опіу	<del></del>	07 08			
	G = 15.0	G=			G=		G=				10.0		23.0	G=		G =	
Timing	Y = 4	Y =	*			Y = 4		Y = 4		<del>-</del>							
Duration of An	alysis, T = 1.00			Y = Y =				=	4			Y =	1,420				
							102					Сус	le Length	1, C =	60.0		
Laire Group C	apacity, Contr	oi Dela	ıy, a			termin	ation			8							
		H	Т	E Th		RT	LT		WB TH	DT	٠.		NB			SB	
Adjusted flow r	ate, v	+-	-	247	10	NI		+	111	RT			TH	RT	LT	TH	RT
ane group ca		$\neg$		418			-				30		22			685	
/c ratio, X		$\dashv$		0.59				-								1346	
otal green rat	io, g/C	-	-	0.28				$\dashv$			0.3		24			0.51	
Jniform delay,		$\dashv$		19.8	-			+	$\dashv$		22.		.2			0.38	
rogression fac	•	$\top$		1.00				$\dashv$	$\dashv$		1.00		000			14.2	
Delay calibration, k			0.18				_			0.1		11			1.000		
ncremental delay, d <sub>2</sub>		$\dashv$	2.2				+	$\dashv$		0.1		.1			0.12		
nitial queue delay, d <sub>3</sub>			_==	-			+	-		0.0	-+"	-			0.3		
nitial queue de	Control delay		$\neg$	22.0	,						23.	1 5	.2			14.5	
									-+		C		1				-
	S			C					- 1		1 .						
Control delay			22	C 2.0					l	-	+-		`			B 14.5	
Control delay ane group LO	/	-						_ <u></u> _			+	8.5 A	`			14.5 B	

General In	formation				CS2000			-	-			-				
Analyst Agency or ( Date Perior Time Perior	JZR Co. NE&C med 6/7/05	Area Type All other are Jurisdiction East Provid Analysis Year 2010							r areas ovidence							
Volume an	d Timing Input		-												***	
	,	•		EB			W	/B		T		NB		1	SB	
		····	LT	TH	RT.	LT	T	Н	RT	1	T	TH	RT	LT	TH	R
Number of lanes, N <sub>t</sub> Lane group			0	0	0	0	0		0		1	2	0	0	2	0
			<u> </u>	LR		1				1	-	T			T	
Volume, V (			105		170	1				17	70	660			765	
	hicles, %HV		1		1					1	)	3			3	
Peak-hour f			0.92		0.92					0.	92	0.92			0.92	
	) or actuated (A)		Α		A					1		Α -			A	Τ
Start-up lost				2.0						2.	0	2.0			2.0	
	f effective green,	e		2.0				$\dashv$		2.	0	2.0			2.0	
Arrival type,	SEC. W. R.			3		-		$\perp$		3		3			3	
Unit extensi				3.0						3	.0	3.0			3.0	
Filtering/me				1.000						1.0	00	1.000			1.000	
	demand, Q <sub>b</sub>			0.0						0.	0	0.0			0.0	
	RTOR volumes		0		0	0		$\dashv$						0		
Lane width				12.0						12	0	12.0			12.0	
	ade / Parking		N	0	N	N			Ν	٨		0	·N	- N	0	٨
Parking mar																
Buses stopp				0	<u> </u>	<u> </u>	3.2	丄				0			0	
	pedestrians, G <sub>p</sub>	_	3.2					_		<u> </u>					3.2	
Phasing	EB Only	0:	2	03		04	NB NB		B Only	_	Thru	Only		07	08	
Timing	G = 15.0	G =		G=		) = 		10.0		G = 2	23.0	G =		G=		
	Y = 4	Y =		Y =	'=	Y = 4				Y = 4		Y =	′= Y=			
Duration of A	Analysis, $T = 1.00$	)				And the control of th					Cycle	Length,	C = 6	0.0		
Lane Group	Capacity, Conti	rol Delay	, and L	OS Deter	minatio	ח										
			E	В		ν	<b>V</b> B				N	В		•	SB	
		LT	TI		T L'	Т	гн	RT	L7	Γ	Th	1	RT	LT	TH	R
Adjusted flov	on the state of th		29						188	5	717				832	
ane group o	capacity, c		42						301	1	216	6			1346	
v/c ratio, X			0.7						0.6	1	0.33	3			0.62	
Total green r			0.2						0.17	7	0.62	?		,	0.38	
Jniform dela			20.						23.2		5.5				15.0	
Progression			1.00						1.00	10	1.00				1.000	
Delay calibration, k		0.2						0.20		0.11				0.20		
Incremental delay, d <sub>2</sub>		5.5						3.8		0.1				0.9		
Initial queue delay, d <sub>3</sub> Control delay		-						4		ļ						
			26.	<u> </u>		_ _	_		27.0	)	5.6				15.8	
ane group L			C		_		L_		С		A				В	
Approach del Approach LO			26.0							7	0.0				15.8	
nlersection d			С							-	В				В	
WHERECHOD A	IHIAV		14.7			$X_c = 0.6$	Intersection LOS					В				

#### HCS2000- DETAILED REPORT General Information Site Information Analyst Intersection Pawtucket Ave & Centre St Agency or Co. NE&C Area Type All other areas Date Performed 6/7/05 Jurisdiction East Providence, RI Time Period Saturday Peak Hour Analysis Year 2010 Project ID Background Traffic Volumes Volume and Timing Input EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Number of lanes, N. 0 0 0 0 0 0 2 1 0 0 2 0 Lane group LR L T T Volume, V (vph) 45 95 95 305 350 % Heavy vehicles, %HV 1 1 0 3 3 Peak-hour factor, PHF 0.85 0.85 0.85 0.85 0.85 Pretimed (P) or actuated (A) A A A A A Start-up lost time, I, 2.0 2.0 2.0 2.0 Extension of effective green, e 2.0 2.0 2.0 2.0 Arrival type, AT 3 3 3 3 Unit extension, UE 3.0 3.0 3.0 3.0 Filtering/metering, I 1.000 1.000 1.000 1.000 Initial unmet demand, Qh 0.0 0.0 0.0 0.0 Ped / Bike / RTOR volumes 0 0 0 0 Lane width 12.0 12.0 12.0 12.0 Parking / Grade / Parking N 0 N N N N 0 N N Ň Parking maneuvers, N<sub>m</sub> Buses stopping, N<sub>B</sub> 0 0 0 0 Min. time for pedestrians, Gp 3.2 3.2 3.2 Phasing EB Only 03 04 NB Only Thru Only 07 08 G = 15.0G = G = G = G = 10.0G = 23.0G = G = Timing Y = 4Y = Y = Y = Y = 4Y = 4 Y = Y = Duration of Analysis, T = 1.00 Cycle Length, C = 60.0 Lane Group Capacity, Control Delay, and LOS Determination EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Adjusted flow rate, v 165 112 359 412 Lane group capacity, c 421 301 2166 1346 v/c ratio, X 0.39 0.37 0.17 0.31 Total green ratio, g/C 0.25 0.17 0.62 0.38 Uniform delay, d<sub>1</sub> 18.7 22.2 4.9 12.9 Progression factor, PF 1.000 1.000 1.000 1.000 Delay calibration, k 0.11 0.11 0.11 0.11 incremental delay, d2 0.6 0.8 0.0 0.1 Initial queue delay, d<sub>3</sub> Control delay 19.3 23.0 4.9 13.1 Lane group LOS B C A В Approach delay 19.3 9.2 13.1 Approach LOS В A В Intersection delay 12.3 $X_c = 0.35$ Intersection LOS В

#### HCS2000" DETAILED REPORT General Information Site Information Analyst J7R Intersection Pawtucket Ave & Centre St Agency or Co. NE&C Агеа Туре All other areas Date Performed 6/7/05/04 Jurisdiction East Providence, RI Time Period AM Peak Hour Analysis Year 2010 Project ID Combined Traffic Volumes Volume and Timing Input EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Number of lanes, N. 0 0 0 0 n 0 2 1 0 2 0 Lane group LR L T T Volume, V (vph) 65 185 120 465 610 % Heavy vehicles, %HV 1 1 0 3 3 Peak-hour factor, PHF 0.89 0.89 0.89 0.89 0.89 Pretimed (P) or actuated (A) A Α A A A Start-up lost time, I, 2.0 2.0 2.0 2.0 Extension of effective green, e 2.0 2.0 2.0 2.0 Arrival type, AT 3 3 3 3 Unit extension, UE 3.0 3.0 3.0 3.0 Filtering/metering, I 1.000 1.000 1.000 1.000 Initial unmet demand, Qh 0.0 0.0 0.0 0.0 Ped / Bike / RTOR volumes 0 0 0 Lane width 12.0 12.0 12.0 12.0 Parking / Grade / Parking N 0 N N N N 0 Ν N 0 Ν Parking maneuvers, N<sub>m</sub> Buses stopping, NB 0 0 0 0 Min. time for pedestrians, Gp 3.2 3.2 3.2 Phasing **EB Only** 02 03 **NB** Only Thru Only 07 08 G = 15.0 G = G = G = G = 10.0G = 23.0G = G= Timing Y = 4Y = Y= Y = Y = 4Y = 4Y= Y = Duration of Analysis, T = 1.00 Cycle Length, C = 60.0 Lane Group Capacity, Control Delay, and LOS Determination EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Adjusted flow rate, v 281 135 522 685 Lane group capacity, c 418 301 2166 1346 v/c ratio, X 0.67 0.45 0.24 0.51 Total green ratio, g/C 0.25 0.17 0.62 0.38 Uniform delay, d1 20.3 22.5 5.2 14.2 Progression factor, PF 1.000 1.000 1.000 1.000 Delay calibration, k 0.24 0.11 0.11 0.12 Incremental delay, d<sub>2</sub> 4.3 1.1 0.1 0.3 initial queue delay, d<sub>3</sub> Control delay 24.6 23.6 5.2 14.5 Lane group LOS C C A В Approach delay 24.6 9.0 14.5 Approach LOS C A В Intersection delay 14.0 $X_{r} = 0.55$ Intersection LOS В.

General Info	rmation					н	5200	U- L				PORT						
Analyst Agency or Co Date Perform Time Period	JZR o. NE&C ned 6/7/05 PM Pea	ık Houi							In A Ju A	iterse rea T urisdi nalys	ype ction is Ye	n ı	All ott East I 2010	ucket Ave ner areas Provident nined Tra	ce, RI			
Volume and	Timing Input																	
	*1		F		_	EB		1		W				NB			SB	
Number of lar	nes N	-	+	LT O	_	TH	RT	+	LT	T		RT	LT	TH	RT	LT	TH	R
Lane group	103, 14,		+	U	-	0	0	+	0	0		0	1	2	0	0	2	0
Volume, V (vp	ah)		$\dashv$	440	1.	R	100	+		-	$\dashv$		L_	T			T	
% Heavy vehi			+	110	+		190	+					195	660	ļ		765	
Peak-hour fac			+	1	+		1	+		_	4		0	3			3	
	or actuated (A)		+	0.92	+		0.92	+		_	_		0.92	0.92			0.92	
Start-up lost ti			+	Α	4.		A	4		_	_		A	. A			A	
	ime, I, effective green,	<u> </u>	+		-	.0		+	2000		-		2.0	2.0	-		2.0	
Arrival type, A			+	_	-	3		+		<u> </u>	-		2.0	2.0	-		2.0	4_
Unit extension			+	-	-		_	+		<del>                                     </del>	-		3	3		-	3	_
Filtering/meter			+		-	.0		+		_	4		3.0	3,0			3.0	
Initial unmet d			+	19.1	-	000		+		<u> </u>	4		1.000	1.000			1.000	
	TOR volumes		+	0	+0	.0		+		_	-		0.0	0.0		<u> </u>	0.0	
Lane width	TOR VOIDINES		+	υ	+.		0	-	0		-					0		<del> </del>
Parking / Grac	ie / Parking		+	N		2.0		╀		_	4		12.0	12.0	<u> </u>	-	12.0	
Parking mane			+	N	+-	7	N	+	N		$\dashv$	N	N	0	N	N	0	N
Buses stoppin			+		+	)		+		_	$\dashv$			<u> </u>				ـــــ
	edestrians, G <sub>p</sub>		十			.2		+	- 1	3.2			0	D	<u> </u>	+	1 0	Щ
Phasing	EB Only	T	02		T	03			D4	<u> </u>		B Only	I TI	an Oak		1	3.2	
	G = 15.0	G=		_	G =			G =	U-1	$\dashv$		10.0		only	<del> _</del>	07		80
Timing	Y = 4	Y =			Y =					-			_	23.0	G =		G =	
Turntion of An	alysis, T = 1.00				Υ =			Y =		_1	Y =	4	Y =		Y =		Y =	
			_		<u> </u>								Сус	le Length	, C =	60.0		
Lane Group C	apacity, Contr	ol Del	ay, a			eterr	ninatio	on										
		<u> </u>	<del>-</del>	_	В		+	-	WE		_			NB			SB	
Adjusted flow r	ale v	<del>-  - '</del>	Τ	32:		RT		LT_	TH	-	RT	LT		TH	RT	LT	TH	RT
ane group ca		+		422	-		+		├	+		212		17.			832	
/c ratio, X	pacity, c			-					<u> </u>	+		301		166			1346	
otal green rat	io a/C			0.7					-	+		0.70		33			0.62	
Iniform delay,				20.5	_		-			+		0.1		62			0.38	
rogression fac		+		1.00	-		+		<u> </u>	$\dashv$		23.0		.5			15.0	
elay callbratio				0.32			+		<u> </u>	+		1.00		000			1.000	
cremental de		-		9.3			+		<u> </u>	+		0.27		11			0.20	
		+		5.3	$\dashv$		+			+		7.6	- 0	.1			0.9	
ritial queue de	,, J	$\dashv$		30,2	, -				<b>-</b>	+		31.2	, +-	.6			45.5	
nitial queue de Control delay		1			-		-			+		C C					15.8	
	S			(:				- 63				1 6	1 /	١	- 1	-	B	
ontrol delay		-	3	C 10.2			$\dashv$						44 E				Ц	
ontrol delay ane group LO	/		-	0.2 C									11.5 B				15.8 B	

#### HCS2000" DETAILED REPORT General Information Site Information Analyst JZR Intersection Pawtucket Ave & Centre St Agency or Co. NE&C Area Type All other areas Date Performed 6/7/05 Jurisdiction East Providence, RI Time Period Saturday Peak Hour Analysis Year 2010 Project ID Combined Traffic Volumes Volume and Timing Input EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Number of lanes, N. 0 0 0 0 0 2 1 0 2 0 Lane group LR L T T Volume, V (vph) 55 115 120 300 350 % Heavy vehicles, %HV 1 1 0 3 3 Peak-hour factor, PHF 0.85 0.85 0.85 0.85 0.85 Pretimed (P) or actuated (A) A A Α A A Start-up lost time, I, 2.0 2.0 2.0 2.0 Extension of effective green, e 2.0 2.0 2.0 2.0 Arrival type, AT 3 3 3 3 Unit extension, UE 3.0 3.0 3.0 3.0 Filtering/metering, I 1.000 1.000 1.000 1.000 Initial unmet demand, Qh 0.0 0.0 0.0 0.0 Ped / Bike / RTOR volumes 0 0 0 Lane width 12.0 12.0 12.0 12.0 Parking / Grade / Parking 0 N N N N 0 N N 0 N Parking maneuvers, Nm Buses stopping, N<sub>B</sub> 0 0 0 0 Min. time for pedestrians, Gp 3.2 3.2 3.2 Phasing EB Only 02 NB Only Thru Only 07 08 G = 15.0G = G = G = G = 10.0G = 23.0G= G = Timing Y = 4Y = Y= Y= Y = 4 Y = 4 Y= Y = Duration of Analysis, T = 1.00 Cycle Length, C = 60.0 Lane Group Capacity, Control Delay, and LOS Determination WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Adjusted flow rate, v 200 141 353 412 Lane group capacity, c 421 301 2166 1346 v/c ratio, X 0.48 0.47 0.16 0.31 Total green ratio, g/C 0.25 0.17 0.62 0.38 Uniform delay, d<sub>1</sub> 19.1 22.6 4.9 12.9 Progression factor, PF 1.000 1.000 1.000 1.000 Delay calibration, k 0.11 0.11 0.11 0.11 Incremental delay, d2 0.9 1.2 0.0 0.1 Initial queue delay, da Control delay 20.0 23.8 4.9 13.1 Lane group LOS В C A В Approach delay 20.0 10.3 13.1 Approach LOS B B В Intersection delay 13.1 $X_c = 0.39$ Intersection LOS В

Pawtucket Avenue and Roger Williams Avenue

### HCS2000" DETAILED REPORT General Information Analyst JZR Intersection Pawtucket Ave & Roger Williams Agency or Co. NE&C Area Type All other areas Date Performed 3/30/04 Jurisdiction East Providence, RI Time Period AM Peak Hour Analysis Year 2003 Project ID Existing Traffic Volumes

80				EB			WE			NB	************	Ţ	SB	
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of la	nes, N,	Approximation (Artist	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		302		LTR			LTR			LTR			LTR	
Volume, V (v	ph)		164	37	24	5	26	14	16	532	4	15	297	92
% Heavy veh	icles, %HV		0	2	0	2	0	0	0	3	0	0	3	0
Peak-hour fa	ctor, PHF		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P)	or actuated (A)		Α	A	A	A	A	A	A	A	I A	A	A	A
Start-up lost t				2.0			2.0			2.0			2.0	
Extension of	effective green, e	3		2.0			2.0			2.0			2.0	
Arrival type, A	AT .			3			3		1	3	ļ.		3	T
Unit extension	n, UE			3.0			3.0			3.0			3.0	
Filtering/mete	ering, I			1.000		1	1.000	)		1.000			1.000	<u> </u>
Initial unmet o	demand, Q <sub>b</sub>			0.0			0.0			0.0			0.0	
Ped / Bike / R	RTOR volumes		0		0	0		0	0		0	0		0
Lane width				12.0			12.0			12.0			12.0	
Parking / Gra	de / Parking		Ν	0	N	N	0	N	N	0	N	N	0	N
Parking mane	euvers, N <sub>m</sub>													
Buses stoppir	ng, N <sub>B</sub>			0			0			0	1 1941		0	
Min. time for p	oedestrians, G <sub>p</sub>			3.2			3.2			3.2			3.2	
Phasing	EW Perm	C	2	03	3	04		NS Pern	n	06	T	07	1 0	08
Timing	G = 19.0	G=		G=		G=		G = 33.0	G=	•	G=		G =	
1 mind	Y = 4	Y =		Y =		Y=		Y = 4	Y =	<u> </u>	Y =		Y =	2000
Duration of Ar	, AT lon, UE stering, I t demand, Q <sub>b</sub> 'RTOR volumes rade / Parking neuvers, N <sub>m</sub> ping, N <sub>B</sub> r pedestrians, G <sub>p</sub> EW Perm G = 19,0 G					Mm			Cvi	cie Lengti	n. C = 6	0.0		11 10 1

Lane Group Capacity, Com	rol Belay, a	ndLOS i	Determir	ation							THE STATE OF THE S	
		. EB			WB			NB			SB	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		250			51			613			449	
Lane group capacity, c		445			556			999			966	
v/c ratio, X		0.56			0.09			0.61			0.46	
Total green ratio, g/C		0.32			0.32			0.55			0.55	
Uniform delay, d <sub>1</sub>		17.0			14.4			9.2			8.2	
Progression factor, PF		1.000			1.000			1.000			1.000	
Delay calibration, k		0.16			0.11			0.20			0.11	
Incremental delay, d <sub>2</sub>		1.6			0.1			1.1			0.4	
Initial queue delay, d <sub>3</sub>												
Control delay		18.7			14.5			10.3			8.5	
Lane group LOS		В			В	-		В			A	
Approach delay	7	8.7			14.5			10.3	'		8.5	
Approach LOS		В			В		1	В			A	
Intersection delay	1	1.4		X <sub>c</sub>	= 0.59		Intersec	tion LOS		***	- B	

#### HCS2000- DETAILED REPORT General Information Analyst JZR Intersection Pawtucket Ave & Roger Williams Agency or Co. NE&C Area Type All other areas Date Performed 3/30/04 East Providence, RI Jurisdiction Time Period PM Peak Hour Analysis Year 2003 Project ID Existing Traffic Volumes Volume, and Timing Input EB WB SB LT TH RT LT TH RT LT TH RT LT TH RT Number of lanes, N. 0 1 0 0 1 0 0 1 0 0 1 0 Lane group LTR LTR LTR LTR Volume, V (vph) 215 37 12 4 41 21 21 415 12 14 466 154 % Heavy vehicles, %HV 0 2 0 2 0 0 3 0 0 3 0 Peak-hour factor, PHF 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 Pretimed (P) or actuated (A) A A Α A A A A A A A Start-up lost time, I, 2.0 2.0 2.0 2.0 Extension of effective green, e 2.0 2.0 2.0 2.0 Arrival type, AT 3 3 3 3 Unit extension, UE 3.0 3.0 3.D 3.0 Filtering/metering, I 1.000 1.000 1.000 1.000 Initial unmet demand, Q. 0.0 0.0 0.0 0.0 Ped / Bike / RTOR volumes 0 0 0 0 0 0 0 0 Lane width 12.0 12.0 12.0 12.0 Parking / Grade / Parking N 0 N N 0 N N 0 N N 0 N Parking maneuvers, N<sub>m</sub> Buses stopping, N<sub>B</sub> 0 0 0 0 Min. time for pedestrians, Gn 3.2 3.2 3.2 3.2 Phasing EW Perm 03 04 NS Perm 06 08 G = 19.0G = G = G = G = 33.0G = G = G = Timing Y = 4 Y = Y = Y = Y = 4Y = Y = Y = Duration of Analysis, T = 1.00 Cycle Length, C = 60.0 Lane Group Capacity, Control Delay, and LOS Determination EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Adjusted flow rate, v 281 70 476 675 Lane group capacity, c 428 566 976 978 v/c ratio, X 0.66 0.12 0.49 0.69 Total green ratio, g/C 0.32 0.32 0.55 0.55 Uniform delay, d<sub>1</sub> 17.7 14.6 8.3 9.8 Progression factor, PF 1.000 1.000 1.000 1.000 Delay calibration, k 0.23 0.11 0.11 0.26 Incremental delay, d<sub>2</sub> 3.7 0.1 0.4 2.1 Initial queue delay, da Control delay 21.4 14.7 8.7 11.9 Lane group LOS C В Α В Approach delay 21.4 14.7 8.7 11.9 Approach LOS C В A B Intersection delay 12.8 $X_c = 0.68$ Intersection LOS B

#### HCS2000" DETAILED REPORT General Information Site Information 1997 Analyst JZR Intersection Pawtucket Ave & Roger Williams Agency or Co. NE&C Area Type All other areas Date Performed 3/30/04 Jurisdiction East Providence, RI Time Period Saturday Peak Hour Analysis Year 2003 Project ID Existing Traffic Volumes Volume and Timing Input NB SB LT TH RT LT TH RT LT TH RT LT TH RT Number of lanes, N. 0 1 0 0 1 0 1 0 0 1 0 Lane group LTR LTR LTR LTR Volume, V (vph) 92 28 21 2 36 19 14 224 2 32 218 61 % Heavy vehicles, %HV 0 2 0 2 0 0 0 3 0 0 3 0 Peak-hour factor, PHF 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 Pretimed (P) or actuated (A) A A A A A A A A Α A Α A Start-up lost time, I, 2.0 2.0 2.0 2.0 Extension of effective green, e 2.0 2.0 2.0 2.0 Arrival type, AT 3 3 3 3 Unit extension, UE 3.0 3.0 3.0 3.0 Filtering/metering, 1 1.000 1.000 1.000 1.000 Initial unmet demand, Qb 0.0 0.0 0.0 0.0 Ped / Bike / RTOR volumes 0 0 0 0 0 0 0 Lane width 12.0 12.0 12.0 12.0 Parking / Grade / Parking N 0 Ν N N 0 N N 0 Ν Parking maneuvers, N<sub>m</sub> Buses stopping, NB 0 0 0 0 Min. time for pedestrians, Gp 3.2 3.2 3.2 3.2 Phasing EW Perm 02 04 NS Perm 06 G = 19.0G = G = G = G = 33.0G = G = G = Timing Y = 4 Y = Y = Y = Y = Y = Y = 4Y = Duration of Analysis, T = 1.00 Cycle Length, C = 60.0 Lane Group Capacity, Control Delay, and LOS Determination WB NB SB LT TH RT LT TH RT TH RT LT TH RT Adjusted flow rate, v 156 63 267 346 Lane group capacity, c 462 571 991 950 v/c ratio, X 0.34 0.11 0.27 0.36 Total green ratio, g/C 0.32 0.32 0.55 0.55 Uniform delay, d<sub>1</sub> 15.7 14.5 7.1 7.6 Progression factor, PF 1.000 1.000 1.000 1.000 Delay calibration, k 0.11 0.11 0.11 0.11 incremental delay, do 0.4 0.1 0.1 0.2 Initial queue delay, d3 Control delay 16.1 14.6 7.3 7.8 Lane group LOS В B A Α Approach delay 16.1 14.6 7.3 7.8 Approach LOS B В A A Intersection delay $X_c = 0.35$ 9.7 Intersection LOS A

į .					Н	CS20	1-000	DETA	All F	) RF	EPOR	T					***************************************	
General Info	rmation										mation				*************			
Analyst Agency or Co Date Perform Time Period	ed 6/7/0	15	Hour						Interso Area Jurisd Analys Projec	Гуре ictio sis Y	п	1 2	All oth East F 2010	icket Avi ner areas Providen iround T	ce, RI	er Willian Iumes	ns	
Volume and	Timing Inpl	ıt											- 6000					
					EB	<b>,</b>	$\perp$		W					NB			SB	
Number of lar	N			LT	TH	RT	-	LT	Ti	1_	RT	4	LT	TH	RT	LT	TH	RT
Lane group	ies, IV,			0	1	0	- -	0	1	_	0	4	0	1	0	0	1	0
·Volume, V (vp	ıb)			405	LTR	<del>  -</del>			LTI	_		+		LTR	<u> </u>		LTR	
% Heavy vehi				185	45	30		5	30		15		20	595	5	_ 15	330	105
Peak-hour fac				0	2	0	-	2	0	_	0	+	D	3	0	0	3	0
Pretimed (P)		'A)		0.90	0.90	0.90		.90	0.9	9	0.90		.90	0.90	0.90	0.90	0.90	0.90
Start-up lost ti		Α)		Α	A	A	- -	Α	A	$\dashv$	<u> </u>	+	A	A	Α	Α	A	A
Extension of e		2n A			2.0	-			2.0	-		+		2.0			2.0	
Arrival type, A	-	J., C		<del></del>	3	-	+	.,	2.0			+	·	2.0	-	-	2.0	
Unit extension					3.0	-	+		3.0	$\dashv$	-	+		3			3	
Filtering/meter					1.000	-	- -		1.00	_		+		3.0		-	3.0	<u> </u>
Initial unmet de					0.0				-	_		╀		1.000	-		1.000	
Ped / Bike / R		25		0	0.0	0	+	0	0.0	-	0	╀	0	0.0	-	-	0.0	-
Lane width	, or totallic				12.0	-		U	12.0	+		+		12.0	0	0	100	0
Parking / Grad	le / Parking			N	0	N	$\dashv$	N	0	+	N	+	.,		<del>                                     </del>		12.0	
Parking mane			- 14		-	+	-	1 "	$\dashv$	- 14	+	.V	D	N	N	0	N	
Buses stoppin		_			0		$\dashv$		0	$\dashv$		╁		0			0	
Min. time for p		G <sub>p</sub>			3.2		$\dashv$	*********	3.2			1		3.2			3.2	L
Phasing	EW Perr	-	0	)2	03	3	T	04		I	IS Per	<u> </u>	T	06	1	07		08
	G = 19.0	$\neg$	G =		G=		G=			<del></del>	= 33.0		G=		G=	<del></del>	G=	<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>
Timing	Y = 4	$\neg$	Y =		Y =		Y =			_	4		Y =		Y=		Y =	
Duration of An			•		<u> </u>		11						_			CO 0	Υ =	
			10.1		000 /								Cyc	le Lengt	1, 0 = 1	50,0		
Lane Group C	араспу, С	ontro	Delay			rmina	tion		1415								-	
			Lī		B I I F	T	LT	_	WB TH	R	-	LT		NB TH T	RT	LT	SB TH	RT
Adjusted flow r	ate, v		1	28				_	6		<del>'</del>			89	<u> </u>		501	RI
Lane group ca	pacity, c		1	44				-	57		十		-	95			965	
v/c ratio, X			1	0.6	5	$\neg$		0.	10		_		-	.69	-		0.52	
Total green rat	io, g/C			0.3	2			0.3	32		_		-	55			0.55	
Uniform delay,	d <sub>1</sub>		1	17.	6			-	1.5	-	_		_	0.8			8.5	
Progression fa	ctor, PF			1.00	00			1.0	000				1.	000			1.000	
Delay calibration	on, k			0.2	3			0.1	11					26			0.12	
incremental de				3.4				0.	1				2	.1			0.5	
Initial queue de	lay, d <sub>3</sub>									_								
Control delay				21.	0			14	.5	24.0-215			1	1.9			9.0	
Lane group LO				С				B	3					В			Α	
Approach delay				21.0				14.5	5	- 10000			11.5	)		2013 (2000) 4400	9.0	
Approach LOS				С				В					В				Α	
Intersection del	ay			12.8			X,	= 0.6	58		In	terse	ction	LOS			В	

			***********		4052/	ח-ממנ	ETAI	ILED	REPO	)DT						
General Info	rmation				70320	ט טטי			format							
Analyst Agency or Co Date Perform Time Period	JZR o. NE&C	к Ноиг					In Ar Ju Ar	iterse rea T urisdi	ction ype ction is Year		All of East i 2010	ucket Ave her areas Provident ground Ti	ce, RI		ทร	
Volume and	Timing Input														-	
		S. Himing		EB				Wi	3			NB		T	SB	***************************************
Nicoshau af la			LT	TH	RT		Τ.	TH	F	₹T	LT	TH	RT	LT	TH	RT
Number of lar	ies, N,		0	1	0	- 1 "	7	1		,	0	1	0	0	1	0
Lane group				LTR	4_			LTR				LTR			LTR	
Volume, V (vp			245	40	15	5	5	45	2	5	25	465	15	- 15	520	175
% Heavy vehi			0	2	0	2	2	0	0		0	3	0	0	3	0
Peak-hour fac			0.94	0.94	0.94	0.5	94	0.94	0.9	94	0.94	0.94	0.94	0.94	0.94	0.94
	or actuated (A)		Α	Α	A	1	1	Α	Α		A	A	A	A	Α.	A
Start-up lost ti				2.0	-			2.0		$\Box$		2.0			2.0	
	effective green,	е		2.0			_	2.0		_		2.0			2.0	
Arrival type, A				3	_		_	3		$\perp$		3			3	
Unit extension				3.0				3.0				3.0			3.0	
Filtering/mete				1.000	_			1.000	2			1.000			1.000	
Initial unmet d				0.0				0.0				0.0		20	0.0	
Ped / Bike / R	TOR volumes		0		0	0			0		0		0	0		0
Lane width				12.0				12.0				12.0			12.0	
Parking / Grac			N	0	N	N		0	N		N	0	N	N	0	N
Parking maner																
Buses stoppin				0				0				0	100-1100-		0	
	edestrians, G <sub>p</sub>			3.2				3.2				3.2			3.2	
Phasing	EW Perm		)2	0	3		04		NS F	erm		06		07		08
Timing	G = 19.0	G =		G =		G =			G = 33	3.0	G =		G =		G =	
	Y = 4	Y =		Y =		Y =			Y = 4		Y =		Y=		Y =	
Duration of An	alysis, $T = 1.00$		Por Secure Continues								Сус	le Length	1, C = 6	50.0		
Lane Group C	apacity, Contr	ol Dela	y, and L	OS Det	ermina	tion										
		T		В	— T		W	В		Т	-	NB			SB	
		L7			RT	LT	TH	1	RT	Lī		TH	RT	LT	TH	RT
Adjusted flow r			32	0			80				5	38			755	
Lane group cap	pacity, c		42	5			562	2			9	65			976	
v/c ratio, X			0.7	5			0.14	1			0	.56	10		0.77	
Total green rat			0.3	2			0.32	2			0.	.55			0.55	
Uniform delay,			18.	4			14.7	7			Ε	.8			10.6	
Progression fai			1.00	00			1.000	0			1.1	000			1.000	
Delay calibratio			0.3	1		-	0.11				0.	15			0.32	
ncremental de			7.8				0.1				0	.7			4.0	
nitial queue de	day, d <sub>3</sub>															
Control delay			26.	2			14.8				9	.5			14.6	
ane group LO			С				В					4			В	
Approach delay			26.2				14.8				9.5				14.6	
	pach LOS C section delay 15.2								200	100000000000000000000000000000000000000		120-2				
Approach LOS			ن				В				Α			-	В	

General Info	rmation					HC	S200	0- DI				EPOI matic							
Analyst Agency or Co Date Perform Time Period	JZR . NE& ed 6/7/0 Satur	5 rday F	Peak H	lour			Sa a constant		1	Inters Area Jurisd Analy Projec	ectio Type iction sis Y	on e n 'ear		All otl East l 2010	ucket Ave ner areas Providend ground Ti	ce, RI		ns	
Volume and	Timing Inpu	rt				D.		<u>.</u>											
				LT	T	В	RT	+	<del>-</del>	W	-		_	<del></del>	NB	1 52		SB	
Number of lar	nes. N			0	1		0	10		T    1	-	RT 0	+	LT O	TH 1	RT	LT 0	TH 1	RT
Lane group					LTI			ᡰ᠆ᢆ	-	LTI	5	-	+		LTR	U	- 0	_	0
Volume, V (vp	nh)			105	30		25	1 2	)	40	-	20	+	15	250	-	25	LTR	<del> </del>
% Heavy vehi			-	0	2	-	0	1 2		0	-1	0	+	0	3	0	- 35	245	70
Peak-hour fac				0.90	0.9	-	0.90	-		-	_		+				0	3	0
Pretimed (P)		'Δ'				-		0,9		0.9	-	0.90	4	0.90	0.90	0.90	0.90	0.90	0.90
Start-up lost ti		, ^)	-	Α	2.0	+	Α	A	_	A 20	-	A	+	Α	A 2.0	A	A	A	A
Extension of e		en. e			2.0	-		+		2.0	-		+		2.0			2.0	<del> </del>
Arrival type, A					3	-	1.1.	+-		3			- -		2.0	-	+	2.0	<u> </u>
Unit extension					3.0	-		+-		3.0	,—{		+				+	3	<del> </del>
Filtering/meter					1.00	-		┼		-			+		3.0			3.0	ļ
Initial unmet di					0.0	_		+-	_	1.00	_		+		1.000		-	1.000	<u> </u>
Ped / Bike / R			0	0.0	<del>'  </del>	0	0		0.0	-		+		0.0			0.0	<u> </u>	
Lane width	TON VOIDING		-	10	<del>_</del> +	U	+ 0		10	_	0	_	0		0	0		0	
	width ng / Grade / Parking				12.			+	-	12.0	-		+	-	12.0		-	12.0	
	g / Grade / Parking				0	$\dashv$	N	N		0	-	N	+	N ·	0	N	N	0	N
Buses stoppin	g maneuvers, N <sub>m</sub>				0	-		┼		<u> </u>	-		-						
Min. time for p		G			3.2			┢		3,2			+		3.2	<u> </u>	-	3.2	<u> </u>
Phasing	EW Pem			2	7	03	—т	<u> </u>	04	3.2	_	10.0		<del></del>					-
i nasing		-		2					04			NS Pe		+	06		07		08
Timing	G = 19.0	_	G =		G =	_		G =			_	= 33.0	0	G =		G =		G=	
	Y = 4		Υ =		Y =			Υ =			Υ=	= 4		Y =		Y =		Υ=	
Duration of An	alysis, T = 1	.00		<u> </u>										Cyc	le Lengti	1, C = 1	60.0		
Lane Group C	apacity, Co	ntro	l Delay	, and	LOS E	)eten	ninati	оп										889-88	
					EB				٧	VΒ	in the co				NB		1	SB	
A 11		01.15 -00 TV	LT		TH	RT		LT	T	H	R	Т	LT		TH	RT	LT	TH	RT
Adjusted flow r					78				6					2	97			389	
Lane group ca	pacity, c		1		55				57	2				9	90			948	
v/c ratio, X					39				0.1			_		0	.30			0.41	
Total green rat		<b>_</b>		.32				0.3						.55			0.55		
Uniform delay,		+	-	5.0		-		14.			_			7.3			7.8		
	ression factor, PF y calibration, k				000		_		1.0			_		_	000			1.000	
	y calibration, k emental delay, d <sub>2</sub>				11		+		0.1	-		_			.11			0.11	
		-	10	,6				0.	1		_		10	).2			0.3		
	il queue delay, d <sub>3</sub> trol delay						-					-		+					
	group LOS						-		14.			-		-	.4			8.1	
									В			_			A			Α	
Approach celay	7.13							14.6			_		7,4				8.1		
							В			4		A				A			
ntersection del	on delay 10.0							X <sub>c</sub> =	0.4	10		!	nters	ection	LOS			A	

					H	CS200	00- DE	TAILE								
General Info								Site I	nform	ation						
Analyst Agency or Co Date Perform Time Period	. N	ZR IE&C /7/05 M Peak	: Hour	2	ь			Area Jurisc	liction sis Yea		All Ea. 20°	wtucket Avo other areas ot Providen 0 mbined Tra	s ce, RI		า <b>ร</b>	
Volume and	Timing I	nput			-					_					-	
					EB		T	V	/B	***********	Т	NB		T	SB	
			5	LT	TH	RT	Lī	T	H	RT	LT	TH	RT	LT	TH	RT
Number of lar	es, N,		1101	0	1	0	0	1		0	0	1	0	0	1	0
Lane group					LTR			LT	R			LTR			LTR	1
Volume, V (vp	h)			220	55	35	5	35	5	15	25	595	5	- 15	330	130
% Heavy vehi	cles, %H	V		0	2	0	2	0		0	0	3	0	0	3	0
Peak-hour fac	tor, PHF			0.90	0.90	0.90	0.90	0.9	0 0	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P)	or actuate	ed (A)		Α	A	Α	A	A		Α	A	A	A	A	A	A
Start-up lost ti					2.0	1	1	2.0			m	2.0	1	ti	2.0	<del>  ^</del>
Extension of e	ffective o	green, e			2.0			2.0	,			2.0		<b>†</b>	2.0	1
Arrival type, A	T				3			3				3	T	1	3	T
Unit extension	, UE		-		3.0		-	3.1	0			3.0			3.0	<del>                                     </del>
Filtering/meter	ing, I				1.000			1.00	00			1.000	<del> </del>		1.000	<del> </del>
Initial unmet de	emand, (	⊋ <sub>b</sub>			0.0	1	1	0.0	,			0.0	<del> </del>	<del> </del>	0.0	<del> </del>
Ped / Bike / R	TOR volu	ımes		0		0	0	$\neg$		0	0		0	0	1 0.0	0
Lane width	idth				12.0		1	12.	0			12.0	<b>-</b>	+	12.0	۳
Parking / Grac	g / Grade / Parking				0	N	N	0	_	N	N	0	N	N	0	N
Parking maner	ıvers, N	11			<del>                                     </del>		1	+-				+	<del>  ''</del>	<del>                                     </del>	1	<del>  ^</del>
Buses stoppin					0		1	0	_			10	<del>                                     </del>		0	<del> </del>
Min. time for p	edestriar	ıs, G <sub>p</sub>			3.2			3.2	?			3.2	<u></u>		3.2	L
Phasing	EW F	erm	(	)2	0:	3		)4	NS	Pem	T	06	7.	07		08
	G = 19	0.0	G =		G=		G =		+	33.0		; =	G=		G=	
Timing	Y = 4		Y =		Y =		Y=		Y = .			=	Y =			-
Duration of An		= 1.00			<del> </del>	-			<u> </u>	<del></del>					Y =	
					1							ycle Lengt	n, C = (	30,0		
Lane Group C	apacity,	Contro	ol Dela		-	rminat	ion									
			1		EB 'H F	₹T	LT	WB	_ DT		_	NB			SB	
Adjusted flow r	ate. v	******	L-1	34		<del>`</del>	<u> </u>	TH 62	RT.		.T	TH 695	RT	LT	TH	RT
Lane group ca				44		$\dashv$	-+	559	_	+					528	
v/c ratio. X			_	0.7				0.11	-	┿		987			962	
	io a/C		+-	0.3		$\dashv$			-	-		0.70			0.55	
Jniform delay,	reen ratio, g/C				.6	$\dashv$		0.32 14.5		+		0.55		-	0.55	+
	m delay, d <sub>1</sub> ession factor, PF				00	-		1.000	<u> </u>	+		9.9			8.7	
	y calibration, k				33	-		0.11		$\dashv$		0.27			1.000	
	mental delay, d <sub>2</sub>				0	$\dashv$		0.11		+	-	2.3		-	0.15	
	queue delay, d <sub>3</sub>				-		$\dashv$	J. 1		+-	-	2.3		-+	0.7	
Control delay	rol delay				6	$\dashv$	$\dashv$	14.6		+		12.2			9.4	
ane group LO				- 0		$\dashv$	$\dashv$	В		+	_	B				
Approach delay		W-S	1	27.6				4.6	L	+		2.2			9.4	
Approach LOS			+	C		$\dashv$		<del>т.о</del> В		+-		z. z B				
ntersection del	av		-	14.6		_	X <sub>c</sub> =			150					<u>A</u>	
S2000TM				77.0		L		Florida, A	Sattlew Son 1			on LOS			В	

#### HCS2000- DETAILED REPORT General Information Site Information Analyst JZR Intersection Pawtucket Ave & Roger Williams Agency or Co. NE&C Area Type All other areas Date Performed 6/7/05 Jurisdiction East Providence, RI Time Period PM Peak Hour Analysis Year 2010 Project ID Combined Traffic Volumes Volume and Timing Input EB WB NB SB TH RT LT TH RT LT TH RT LT RT TH Number of lanes, N. 0 1 0 0 1 0 0 1 0 0 0 1 Lane group LTR LTR LTR LTR Volume, V (vph) 280 50 20 5 55 25 30 465 15 15 520 220 % Heavy vehicles, %HV 2 0 0 2 0 0 0 3 0 0 3 0 Peak-hour factor, PHF 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 Pretimed (P) or actuated (A) A A A Α A A A A A A A A Start-up lost time, I, 2.0 2.0 2.0 2.0 Extension of effective green, e 2.0 2.0 2.0 2.0 Arrival type, AT 3 3 3 3 Unit extension, UE 3.0 3.0 3.0 3.0 Filtering/metering, I 1.000 1.000 1.000 1.000 Initial unmet demand, Qb 0.0 0.0 0.0 0.0 Ped / Bike / RTOR volumes 0 0 0 0 Đ 0 0 0 Lane width 12.0 12.0 12.0 12.0 Parking / Grade / Parking N 0 N N 0 N N 0 N N 0 N Parking maneuvers, N<sub>m</sub> Buses stopping, NB 0 0 0 0 Min. time for pedestrians, Gp 3.2 3.2 3.2 3.2 Phasing **EW Perm** 02 03 NS Perm 06 G = 19.0G= G = G = G = 33.0G = G = G = Timing Y = Y = Y = 4Y = Y= Duration of Analysis, T = 1.00 Cycle Length, C = 60.0 Lane Group Capacity, Control Delay, and LOS Determination WB NB SB TH RT TH LT RT LT TH RT LT TH RT Adjusted flow rate, v 372 91 543 803 Lane group capacity, c 426 565 951 972 v/c ratio, X 0.87 0.16 0.57 0.83 Total green ratio, g/C 0.32 0.32 0.55 0.55 Uniform delay, d<sub>1</sub> 19.4 14.8 8.9 11.1 Progression factor, PF 1.000 1.000 1.000 1.000 Delay calibration, k 0.11 0.40 0.17 0.36 Incremental delay, d2 21.4 0.1 0.8 6.3 Initial queue delay, d<sub>3</sub> Control delay 40.7 14.9 9.7 17.4 Lane group LOS D В A B Approach delay 40.7 14.9 9.7 17.4 Approach LOS D B В Intersection delay 19.8 $X_{c} = 0.84$ Intersection LOS В

					H	ICS2	200-	DETA	AILE	RE	POR	 [						
General Info	mation							-		_	nation	_					3 3/2 10	
Analyst Agency or Co Date Perform Time Period	ed 6/7/	8.C 105	Peak H	lour	,				Interson Area Jurisd Analys Project	Type iction sis Y	1	A E 2	All oth East F 1010	icket Ave ier areas Provident ined Tra	se, RI	er Willian mes	ns	
Volume and	Timing Inp	out																
					EB	-			W	В				NB			SB	
N				LT	TH	R		LT	TH	1	RT	-	<u>-T</u>	TH	RT	LT	TH	RT
Number of lar	ies, N,			0	1	0	_	0	1		0	1	0	1	0	0	1 1	0
Lane group					LTR	4	_		LTI	_		_		LTR			LTR	
Volume, V (vp				145	40	30	$\dashv$	2	50		20	4-	20	250	2 .	35	245	115
% Heavy vehi				0	2	0	_	2	0	_	0	+	0	3	0	0	3	0
Peak-hour fac	College College School			0.90	0.90	0.9	2 (	0.90	0.9	0	0.90	0.	90	0.90	0.90	0.90	0.90	0.90
Pretimed (P)		(A)		Α	A	A	4	Α	A	_	A	1	4	A	Α	A	A	A
Start-up lost ti Extension of e		.oo .c			2.0	+	-		2.0	_		╀-		2.0	ļ	<u> </u>	2.0	
Arrival type, A		э <b>с</b> іі, Е		<b>-</b>	2.0		-		2.0	-		$\vdash$		2.0	<b> </b>	<del> </del>	2.0	
Unit extension					3.0	-	-		3	$\dashv$		╀		3		<u> </u>	3	
Filtering/meter					1.000	┿┈	-+-		3.0			╄		3.0		—	3.0	-
Initial unmet d					0.0	┼	+		1.00			┼		1.000	<u> </u>	ļ	1.000	
	/ Bike / RTOR volumes				0.0	0	+	0	0.0		0	<del>                                     </del>	2	0.0		+-	0.0	<u> </u>
Lane width	width				12.0	+	-	<i>U</i>	12.0	$\dashv$	U	-		40.0	0	0	100	0
					0	N	$\dashv$	N	0	<del>'</del> +	N.	<del>                                     </del>	,	12.0	A/		12.0	
					1	1 /	+	70	10	+	//	1	<u> </u>	0	N	N	0	N
Buses stoppin				0	+-	$\dashv$		10	+		╁	-	0		-	0	-	
Min. time for p		, G <sub>n</sub>			3.2	4	$\dashv$		3.2			├-	·	3.2			3.2	
Phasing	EW Per			)2		13	一	04		T	S Perr	<u> </u>		06		07		DB
	G = 19.0		G=		G=		G =			-	33.0	-	G=		G =		G =	
Timing	Y = 4		Y =		Y =		Y =			Y =			Y =		Y =		Y =	
Duration of An		1.00			<del>     </del>					1 -			<u> </u>			20.0	Υ =	
							192						Cyc	le Lengti	1, 0 = 1	50.0		
Lane Group C	apacity, C	ontr	oi Dela	y, and		ermin	ation											
			L.	-	EB TH	RT	LT	-	WB TH	R	┿	LT		NB TH	RT	LT	SB	l pr
Adjusted flow r	ale, v				38		<u> </u>	_	30		-		_	02	KI	L.I.	TH 439	RT
Lane group ca			_	-	41	$\dashv$			76		$\dashv$			77			942	
v/c ratio, X			$\neg$		54				14					.31			0.47	
Total green rat	io, g/C				32				32		$\dashv$		_	.55			0.55	
Uniform delay,	d,			5.9 -				4.7		$\dashv$		_	7.3			8.2		
Progression fa	ctor, PF		1.	000				000					000			1.000		
Delay calibration	on, k		0.	14		27 10	0.	11				-	11			0.11		
incremental de	lay, d <sub>2</sub>			1	.3	$\neg \uparrow$			.1	-	$\neg \vdash$		_	.2			0.4	
Initial queue de	elay, d <sub>3</sub>																	
Control delay				11	3.2			14	1.B				7	.5			8.5	
Lane group LO								E	3				1	A			Α	
Approach dela								14.8	3				7.5				8.5	
Approach LOS	ch LOS B.							В	3				Α				Α	
ntersection de	ay			10.9			X	<sub>c</sub> = 0.	49		Int	erse	ction	LOS			В	

North Broadway and Roger Williams Avenue/Centre Street

## HCS2000- DETAILED REPORT

General Information

alyst ancy or Co. JZR

Date Performed

NE&C 5/13/03

Time Period

AM Peak Hour

Intersection North Broadway & Roger William

Area Type

All other areas

2003

Jurisdiction

East Providence, RI

Analysis Year

Project ID

Existing Traffic Volumes

						100	12.00							
Volume and Tu	ming Input	國。如											門鄉縣南	
				EB			WE			NB			SB	
Ni i - fi			LT	TH	RT		TH	RT	LT_	TH	RT	LT	TH	RT
Number of lanes	s, N,		0	1	1	0	1	0	0	2	0	0	1	0
Lane group				LT	R		LTR		DefL	T	1		LT	
Volume, V (vph)			5	72	415	149	69	19	290	393		8	542	
% Heavy vehicle	es, %HV		0	2	0	2	0	0	0	3		0	3	
Peak-hour factor	r, PHF		0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93		0.93	0.93	
Pretimed (P) or a	actuated (A)		Α	A	A	A	A	A	Α	A		A	A	
Start-up lost time				2.0	2.0		2.0		2.0	2.0			2.0	
Extension of effe	ective green, e	=		2.0	2.0		2.0		2.0	2.0			2.0	
Arrival type, AT				3	3		3		3	3			3	
Unit extension, L	JE			3.0	3.0		3.0		3.0	3.0			3.0	
Filtering/metering	g, l			1.000	1.000	)	1.000	,	1.000	1.000			1.000	
Initial unmet dem	rand, Q <sub>b</sub>			0.0	0.0		0.0		0.0	0.0		<del>                                     </del>	0.0	
Ped / Bike / RTC	R volumes		0		0	0		0	0			0		
Lane width				12.0	12.0		12.0		12.0	12.0			12.0	
Parking / Grade	/ Parking		N	0	N	N	0	l N	N	0	N	N	0	N
Parking maneuv	ers, N <sub>m</sub>						1			<del> </del>				
es stopping,				0	D		0		0	0			0	
time for ped	time for pedestrians, G <sub>p</sub>			3.2			3.2	· · · · · · · · · · · · · · · · · · ·		3.2			3.2	
Phasing	EW Perm	02		03		04		NB Only	N	S Perm		07	1 0	8
	G = 18.0	G=		G =		G=	(	S = 6.0	G =	26.0	G =		G =	-
Timing	Y = 3.5	Y =		Y =		Y =	,	/ =	Y =	3.5	Y =		Y =	
Duration of Analy	/sis, T = 1.00							Cvc	le Length,	C = 60.	0			
Lage Group Car			etine mana	rusan dinawan	ria nameni	The Cimenson	TO RECEIVE THE TAXABLE PROPERTY.							aform purposes

Lane Group Capacity, Contro		EB			WB			NB			SB	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		82	446		254		312	423			592	
Lane group capacity, c		550	740		410		420	1077		1	795	
v/c ratio, X		0.15	0.60		0.62		0.74	0.39		1	0.74	
Total green ratio, g/C		0.30	0.46		0.30		0.08	0.58		1	0.43	
Uniform delay, d₁		15.4	12.2		18.1		12.5	6.8	1		14.2	
Progression factor, PF		1.000	1.000		1.000		1.000	1.000			1.000	
Delay calibration, k		0.11	0.19		0.20		0.30	0.11			0.30	·
Incremental delay, d <sub>2</sub>		0.1	1.4		2.9		7.3	0.2			3.9	
Initial queue delay, d <sub>3</sub>												
Control delay		15.5	13.6		20.9		19.8	7.0			18.2	
Lane group LOS		В	В		С		В	A			В	
Approach delay	1	3.9			20.9			12.4	1		18.2	
Approach LOS		В			С			В			В	
ntersection delay	1	5.4					Intersec	ion LOS			В	

### HCS2000- DETAILED REPORT

General Information. 'nalyst

JZR

ency or Co.

NE&C

Site information 1971 1971 1971 1971 1971

Intersection

North Broadway & Roger William

Агеа Туре All other areas

Date Performe	- CANADA						1	risdic	S		East F	Providence	, RI			
Time Period	PM Peak H	our						3335	s Year		2003					
								oject				ig Traffic V				
Volume and	Timing Input	<b>同等</b> "那么									<b>MADE</b>		1000 四篇			<b>到</b> 到15
			17	EB	Tor	_ _	1	W			<u> </u>	NB			SB	1
Number of lan	ies. N		LT	TH 1	RT 1		LT O			7T 0	LT	TH	RT	LT	<del>  TH_</del>	RT
Lane group			-	LT	R	$\dashv$	0	1 LTF		<u> </u>	0	2	0	0	1 1	0
Volume, V (vp	.h)		5	69	323		35				DefL			<b>—</b>	LT	-
% Heavy vehic			0	2	0		2	66		9	438	569	<del> </del> -	14	456	┼
Peak-hour fac			0.87	0.87	0.87			_		Sau-	0	3		0	3	
Pretimed (P) o			A		-		.87	0.87		87	0.87	0.87		0.87	0.87	-
Start-up lost til			<del>  ^</del> _	A   2.0	2.0	+	A	A 2.0		4	A 2.0	A 20		A	A	-
	ffective green, e			2.0	2.0	-		2.0			2.0	2.0			2.0	+
Arrival type, A				3	3	- -		3	-		2.0 3	2.0	-	<del> </del>	2.0	
Unit extension				3.0	3.0	$\dashv$		-9434	,  -	-				-	3	
Filtering/meter				1.000		+		3.0			3.0	3.0	<del>                                     </del>	-	3.0	<del> </del>
Initial unmet de				0.0	0.0	+		1.00			1.000		+	-	1.000	
Ped / Bike / R7			0	10.0	0.0	-	0	0.0		, -	0.0	0.0	+	-	0.0	+
Lane width	. Ott Toldingo		-	12.0	12.0	_		10.0		<b>'</b> —		100	-	0	100	<u> </u>
Parking / Grad	le / Parking		N	0	N		$\frac{1}{N}$	12.0	1	,	12.0 N	12.0	1	+-,,-	12.0	
Parking maneu			<del>'</del> ''	+	"	+-'	<u> </u>	- 0	-+-	v	- 10	0	<u> </u>	N	0	N
ses stopping				0	0	_	-	0				0	+		10	
n. time for pe				3.2		+		3.2				3.2			3.2	
Phasing	EW Perm	02	-	03			04	7	NB C	)nlv	1	NS Perm	<del></del>	07		18
	G = 14.0	G=		G =		G=			G = 10		_	= 26.0	G =	01	G =	0
Timing	Y = 3.5	Y =		Y =		Y =		-	Y =		_					- 7 - 2
Duration of Acc	alysis, T = 1.00	11-		1 -		1 -			T =		_	= 3.5	Y =		Y =	
		SPACE AND THE STATE OF THE STAT		enteranzens	##Hot il	Entesymen	tooksora	TOTAL COL	and the state of t	are no ex		cle Length			Charles of the Santa	Manada - Na
Lane Group C	apacity, Gontrol	Delay, an	Service Control	and Alberta de Lancon	tion	Jie.								ter introduced.		4-street
			EI TU		-	- T	WB	<del>-</del>		<del>- </del> -		NB ( Tit		<u> </u>	SB	
Adjusted flow n	ate v	LT	TH 85	RT 371		<u>LT</u>	TH 184		RT		.T	TH	RT	LT	TH	RT
Lane group car			427	740			336			50		654			540	
v/c ratio, X			0.20		-		0.55			0.8		1200	ļ	<u> </u>	784	
Total green rati	io. a/C	_	0.23				0.23			0.0		0.55 0.65		<b> </b>	0.69	
Jniform delay,			18.5		+		20.2	$\dashv$		-		2003400070			0.43	
Progression fac			1.000				1.000	$\dashv$		1.0		5.7			13.7	178 33 3
Delay calibratio			0.11				0.15			0.4		1.000			1.000	
ncremental del			0.2	0.5	$\dashv$		1.9	$\dashv$	2	18		0.15 0.5			0.26	
nitial queue de			1 0.2	1 0.5			1.3	-+		10.	٤.	0.0			2.6	
Control delay			18.7	12.0	$\neg$		22.1	+		26.	4	6.2			16.3	
ane group LO	S		B	B	$\dashv$		C	$\dashv$		C		A			10.3 B	
Approach delay			13.2		$\dashv$	25	2.1			+-		5.0				
Approach LOS										+-					16.3	

Approach LOS

Intersection delay

C

В

Intersection LOS

В

15.5

В

В

## HCS2000- DETAILED REPORT

General Information ·nalyst

JZR

ancy or Co. Date Performed NE&C

Time Period

5/20/03

Saturday Peak Hour

Intersection

North Broadway & Roger William

Area Type

All other areas

Jurisdiction

East Providence, RI

Analysis Year

2003

Project ID

Existing Traffic Volumes

							Toject i			Traffic Vo	iumes		99	
Volumeland	Mining Input	蝴蝶市湯	脚型網				8373.00		可能能够		例開業院		調度 臓	
			<u> </u>	EB			WE			NB			SB	
Niverbox of lear	11		LT	TH	RT		TH	RT	LT	TH	RT	LT	TH	R
Number of lar	ies, iv,		0	1	1	0	1 1	0	0	2	0	0	1	0
Lane group				LT	R		LTR		DefL	T			LT	
Volume, V (vp			3	44	237	54	36	22	215	301	-	19	281	
% Heavy vehi	cles, %HV		0	2	0	2	0	0	0	3		0	3	
Peak-hour fac	tor, PHF		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96		0.96	0.96	
Pretimed (P)	or actuated (A)		A	Α	A	Α	A	A	A	Α		A	IA	
Start-up lost ti	me, í,			2.0	2.0		2.0		2.0	2.0			2.0	1
Extension of e	ffective green, e			2.0	2.0		2.0		2.0	2.0	ļ		2.0	†
Arrival type, A	Т			3	3		3		3	3		<del> </del>	3	
Unit extension	extension, UE			3.0	3.0		3.0	5-17-	3.0	3.0			3.0	
Filtering/meter	ring, I			1.000	1.000	)	1.000		1.000	1.000			1.000	
Initial unmet d	emand, Q <sub>b</sub>			0.0	0.0		0.0		0.0	0.0		1	0.0	1
Ped / Bike / R	TOR volumes		0		0	0		0	0			0	1	
Lane width				12.0	12.0		12.0		12.0	12.0		<del>                                     </del>	12.0	<del>                                     </del>
Parking / Grac	le / Parking		N	0	N	N	0	N	N	0	N	N	0	N
Parking mane	uvers, N <sub>m</sub>						1		1					
res stoppin	g, N <sub>B</sub>			0	0		0		0	0			10	
time for p	edestrians, G <sub>p</sub>			3.2			3.2	<del></del>		3.2	-		3.2	
Phasing	EW Perm	02	?	03		04	T	NB Only	l N	S Perm		07	1 0	8
Tieslan	G = 14.0	G=	5.4	G =		G=	G	3 = 10.0		26.0	G =		G =	
Timing	Y = 3.5	Y=	- W	Y =		Y =	Y	/=	Y =	3.5	Y =		Y =	
Duration of An	alvsis. T = 1.00					L			Curi	a Langth	C = 60	0	1.	

Phasing	EW Perm	02	03	04	NB Only	NS Perm	07	08
Timing	G = 14.0	G=	G =	G =	G = 10.0	G = 26.0	G =	G=
Thining	Y = 3.5	Y =	Y =	Y =	Y =	Y = 3.5	Y =	Y =
Duration of A	Analysis, T = 1.00					Cycle Length,	C = 60.0	

Lane Group Capacity, Contr	and and and	LUD DEI	enninano		A transfer				<b>有有其世内</b>			
	ļ	EB		<u> </u>	WB			NB			SB	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		49	247		117		224	314	1		313	
Lane group capacity, c		430	740		366		712	1200			780	
v/c ratio, X		0.11	0.33	1	0.32		0.31	0.26			0.40	
Total green ratio, g/C		0.23	0.46		0.23		0.15	0.65	1		0.43	
Uniform delay, d <sub>1</sub>		18.1	10.4		19.1		5.1	4.4			11.7	
Progression factor, PF		1.000	1.000		1.000		1.000	1.000		-	1.000	1
Delay calibration, k		0.11	0.11		0.11		0.11	0.11			0.11	
Incremental delay, d <sub>2</sub>	i)	0.1	0.3		0.5	İ	0.3	0.1		1	0.3	
Initial queue delay, d <sub>3</sub>												
Control delay		18.2	10.7		19.6		5.4	4.5			12.0	
Lane group LOS	(•	В	В		В		A	A			В	
Approach delay	1	1.9	·		19.6	-		4.9		<del>                                     </del>	12.0	
Approach LOS		11.9 B			В		1	A ·	7900	<u> </u>	В	
Intersection delay	9	.7					Intersec	ion LOS		1	· A	

General Info	rmati				F	CS20	00- D	_		_		_						
Analyst Agency or Co Date Perform Time Period	o. ned	JZR NE&C 5/31/05 AM Peal	k Hour					II A J	nters Area Jurisc	nforn ection Type liction sis Ye ct ID	1	on	All of East 2010	n Broadwa her areas Provident ground Ti	ce, RI		am ·	
Volume and	Timin	g Input		,														
					EB	1	_			VB .		_		NB			SB	
Number of lar	nes. N			LT 0	TH 1	RT 1	+	LT 0	$+\frac{1}{2}$	Н	R O		LT O	TH 2	RT	LT	TH	RT 0
Lane group		1		1941	LT	R	$\dashv$		LT			$\dashv$	DefL	T	+-	+	1   LT	-
Volume, V (v)	oh)			5	85	485		65	81	-	20		335	440	┼	10	605	+
% Heavy vehi		%HV		0	2	0	-+	2	10	-	0		0	3	+-	0	3	<del> </del>
Peak-hour fac				0.93	0.93	0.93	3 0	.93	0.5	-+	0.9		0.93	0.93	+	0.93	0.93	
Pretimed (P)	170			A	A	A		A	A		A		A	A	+	A	A A	+
Start-up lost t					2.0	2.0			2.	_		$\dashv$	2.0	2.0	+	1^	2.0	<del> </del>
Extension of e	effectiv	e green, e	В		2.0	2.0	7		2.			寸	2.0	2.0	1	1	2.0	1
Arrival type, A	T				3	3			3	$\neg$		寸	3	3		1	3	1
Unit extension	ı, UE				3.0	3.0			3.	0		寸	3.0	3.0	$\dagger$	†	3.0	+
Filtering/mete	ring, l				1.000	1.00	0		1.0	00		$\dashv$	1.000	1.000		1-	1.000	<del> </del>
Initial unmet d	eman	d, Q <sub>b</sub>			0.0	0.0	十		0.1	5		$\dashv$	0.0	0.0	<del>                                     </del>	+-	0.0	${\dagger}$
Ped / Bike / R	TOR	olumes		0		0		0		$\neg$	0	$\neg$	0		†	0	1	$\vdash$
Lane width					12.0	12.0			12.	0	*****	$\neg$	12.0	12.0		1	12.0	
Parking / Grad	ie / Pa	rking		N	0	N		N	0	$\neg$	N		N	0	N	N	0	N
Parking mane	uvers,	N <sub>m</sub>										一						
Buses stoppin					0	0			0				0	0			D	
Min. time for p	edest	rlans, G <sub>p</sub>			3.2				3	2				3,2			3.2	
Phasing	EV	V Perm		2	0	3		04		N	во	niy		NS Perm		07		08
Timing	G =	17.0	G =		G=		G =			G=	7.0	)	G:	= 26.0	G =		G≃	
<del>-</del>	Y =	3.5	Y =		Y =	-	Y =			Y =			Υ =	3.5	Y =		Y =	
Duration of An	alysis	T = 1.00								-			Су	cle Lengti	ı, C = .	60.0		
Lane Group (	Capac	ity, Contr	ol Delay	, and L	OS Dete	rmina	tion										<del></del>	
				E	В			V	VΒ					NB			SB	
		·	LT			T	LT	T	Н	RT		LT		TH	RT	LT	TH	RT
Adjusted flow			_	96				28.	5		$\perp$	360		473			662	
Lane group ca	pacity	, c		520				36			$\downarrow$	421	_	1107			794	
v/c ratio, X				0.18				0.7			_	0.86	5	0.43			0.83	
Total green rat		;	4_	0.28				0.2				0.60	_	0.60			0.43	
Jniform delay, Progression fa			-	16.3				19.			4	9.5		6.5			15.1	
		Ή	-	1.00				1.00	_		-	1.000		.000			1.000	
Delay calibration ncremental de			+	0.11				0.3			-	0.39		0.11			0.37	
nitial queue de			-	0.2	3.	-		11.	-		+	18.3	-	0.3			8.2	
Control delay	y, U	3	-	16.4	16.	1		31	_		+	27.0	<del>,  </del>	6.7			22.5	
ane group LC	s		-	10.4 B	10. B	_		31			+	27.8 C	$\dashv$	A A			23.3 C	
Approach dela			1	16.2		$\dashv$		31.5			+		15.				23.3	
Approach LOS			1	В		$\dashv$		C			+		, j. B				23.3 C	
ntersection de	lay		$\top$	19.8		-	X	= 0.9	7		-	nter	-	LOS			В	
				0.735.70		L							Journ	. 200			ט	

nation  JZR  NE&C  5/31/05  PM Pea	k Hour		528	···				nters		mation				11.00		
NE&C 5/31/05 PM Pea	k Hour						11									
5/31/05 PM Pea	k Hour						7.03		Type	0.00		Broadwa ner areas		er Willia	m	
	k Hour								fiction			rovidenc				
ming Input									sis Y		2010	TOVIDETIL	e, ru			
ming Input								Ргоје				round Tr	affic Vol	umes		
																_
		-	Ť	EB Tu	T ==	_	<del></del>	_	VB	T ==		NB			SB	
s, N,			2	TH 1	RT 1	$\dashv$	LT 0	+ 7	H	RT	LT	TH	RT	LT	TH	R
-1.11		+-	_	LT	R	+	U	-		0	0	2	0	0	1	0
<del></del>		+-			+	$\dashv$	0.5	LT			DefL	T	-	<b> </b>	LT	
				1915	_		9.000	+					-	+	510	
		+-			+	$\dashv$		-			<del> </del>			0	3	
MARCHAON ELE		-	_			4		-	_			0.90		0.90	0.90	
The state of the s		$+^{A}$	1		-	+	A	-		Α	A			A	Α	
	Δ	+			+	+		+			2.0	2.0			2.0	
Jouve green,		+			+	+		-	-			2.0			2.0	
IE .		+-			-	4					3	3			3	
		+			_	_		-	_		3.0	3.0			3.0	
		+-			_	1			_		1.000	1:000			1.000	
		+-		0.0		_		0.0	,		0.0	0.0			0.0	
or volumes		0			<u> </u>	4	0		_	0	0			0	<u> </u>	
/ Dorlei		-			-	4			$\rightarrow$		12.0	12.0			12.0	
		N		0	\ \ \	4	N	0	_	N	N	0	Ν	N	0	N
		+-				+		<u> </u>	$\dashv$							
		$\vdash$			0	+					0	0			0	
	T	US.	-			一	Ω4	3.2	_	ID 6 1	<u> </u>		7		T	
	-	U2		69.00		-			_					07	_	8
	-		-			-			_				G =		G =	
	- 2			Υ =		Y =			Y =				Y =		Y =	
			l								Cycl	e Length	C = 6	0.0		
pacity, Contr	of Dela	ıy, an			rminat	ion										
	1.	т				IΤ			D~	<del>.   .</del>			I		SB	
9, V	╁	+				<u>L I</u>		$\overline{}$	KI				RT	LT		RT
	+	$\dashv$					-									
	+-	_						-	-							
a/C	+-														0.75	
	+-	_				-		_							0.43	
	+-	_						_		_						
	+-	_													-	
	-								-							
	-		U.4	1.0	$\dashv$		23.2	-		30.	7 0	.6			4.0	
,, -3	+	<del>-</del>	20.6	120			16	, +			, -	<del>,  </del>				
	+-	_			+			-								
	+-		98/05	1 8	$\dashv$		1			$+^{D}$		9			В	
	+				_											
	+-										*************				В	
	UE  Ig, I  Inand, Q <sub>b</sub> OR volumes  / Parking  Iers, N <sub>m</sub> N <sub>B</sub> destrians, G <sub>p</sub> EW Perm  G = 12.0  ( = 3.5  ysis, T = 1.00	es, %HV  or, PHF actuated (A) e, I, ective green, e  UE og, I mand, Qb DR volumes  / Parking ers, Nm NB destrians, Gp EW Perm G= 12.0 G= (= 3.5 Y= ysis, T = 1.00  pacity, Control Dela e, v city, c  g/C or, PF k /, d2 y, d3	es, %HV	es, %HV 0 or, PHF 0.90 actuated (A) A e, I, ective green, e  UE og, I onand, Qb OR volumes 0  / Parking N ers, N <sub>m</sub> N <sub>B</sub> destrians, G <sub>p</sub> EW Perm 02 G= 12.0 G= (-3.5 Y= ysis, T=1.00  pacity, Control Delay, and Lot e, v 95 city, c 366 g/C 0.20 aor, PF 1.000 pacity, d <sub>2</sub> 0.4 y, d <sub>3</sub> 20.6 C 14.3 B	es, %HV	es, %HV	es, %HV	es, %HV	es, %HV	es, %HV	es, %HV	es, %HV	es, %HV	See, %HV	See, %HV	se, %HV

					Н	CS20	00- DE	ETAIL	ED	REP	ORT							
General Inform	nation	T.						Sit	te In	forma	ation							
Analyst Agency or Co. Date Performed Time Period		Peak	Нои	r				Are Jur An	ea T risdio	ction is Yea	ar	All o East 2010	n Broadw her areas Providen ground T	ce, F	₹		n .	
Volume and Ti	iming Input																	
			L	7	EB				W	В			NB				SB	
				LT	TH	RT	L	.T	TI-	1	RT	LT	TH		RT	LT	TH	RT
Number of lane	s, N,			0	1	1		7	1		0	0	2	T	0	0	1	0
Lane group					LT	R			LTF	?		DefL	T	Т			LT	
Volume, V (vph	)			5	50	275	6	0	45		25	250	335			20	315	
% Heavy vehicl	es, %HV		T	0	2	0	2	?	0		0	0	3	$\top$	***********	0	3	
Peak-hour facto	or, PHF		0	.96	0.96	0.96	0.9	96	0.96	3 (	0.96	0.96	0.96			0.96	0.96	
Pretimed (P) or	actuated (A)		T	A	Α	A	1		Α	$\neg \vdash$	Α	A	A	$\top$		Α	A	
Start-up lost tim	ie, I,		T		2.0	2.0			2.0			2.0	2.0	T			2.0	
Extension of eff	ective green, e	2	T		2.0	2.0			2.0			2.0	2.0				2.0	
Arrival type, AT		7875-1-1080W	T		3	3			3			3	3				3	
Unit extension,	UE		7		3.0	3.0			3.0			3.0	3.0	T			3.0	
Filtering/metering	ng, i		Т		1.000	1.000			1.00	0		1.000	1.000	$\top$			1.000	
Initial unmet der	mand, Q <sub>b</sub>		Τ		0.0	0.0			0.0			0.0	0.0	$\top$			0.0	
Ped / Bike / RT	OR volumes			0		0	0	,			0	0		T		0		
Lane width .			7		12.0	12.0	1		12.0	,		12.0	12.0	9			12.0	
Parking / Grade	/ Parking			N	0	N	٨	,	0		Ν	N	0	十	N	N	0	N
Parking maneur	vers, N <sub>m</sub>		$\top$							$\neg \vdash$				1				<del>                                     </del>
Buses stopping	, N <sub>B</sub>		T		0	0		一十	0	-		0	0	1			0	<b>i</b>
Min. time for pe	destrians, G <sub>p</sub>		I		3.2				3.2				3.2				3.2	
Phasing	EW Perm		02		٥	3		04		NE	3 Only		NS Perm	T		07	1 0	8
	G = 14.0	G=			G=		G=			G =	10.0	G	= 26.0		G =		G=	
Timing	Y = 3.5	Y =			Y =		Y =		$\neg$	Y =		Y	3.5	7	Y =		Y =	
Duration of Ana	lysis, T = 1.00			-								Cy	cle Lengi	h, C	= 6	0.0		-
Lane Group Ca	pacity, Contr	ol Del	av. a	and L	OS Dete	ermina	tion											
		7		E		T		WE	3	-	T		NB	-	7		SB	
		L	T	TH		T	LT	TH	-	RT	Ľ	τ Т	TH	R	Т	LT	TH	RT
Adjusted flow ra	ite, v			57	28	16		136			26	0	349				349	

		EB			WB			NB			SB	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v ·		57	286	_	136		260	349			349	
Lane group capacity, c		427	740		364		686	1199			780	
v/c ratio, X		0.13	0.39		0.37		0.38	0.29			0.45	
Total green ratio, g/C		0.23	0.46		0.23		0.65	0.65			0.43	
Uniform delay, d <sub>1</sub>		18.2	10.7		19.3		5.4	4.5			12.0	
Progression factor, PF		1.000	1.000		1.000		1.000	1.000			1.000	
Delay calibration, k		0.11	0.11		0.11		0.11	0.11			0.11	
incremental delay, d <sub>2</sub>		0.1	0.3		0.6		0.4	0.1			0.4	
Initial queue delay, d <sub>3</sub>												
Control delay		18.3	11.0		20.0		5.8	4.7			12.4	
Lane group LOS		В	В		В		A	A			В	
Approach delay	and the same w	12.2			20.0			5.1			12.4	
Approach LOS		В			В		<b> </b>	Α			В	
Intersection delay		10.0		X,	= 0.57		Intersec	tion LOS			Α	

				Н	CS20	יום -ממ	ETAI	I ED	DED	OPT						
General Info	rmation				03200	וכן טכ		_	forma							····
Analyst Agency or Co Date Perform Time Period		k Hour					Int Ar Ju An	terse rea T irisdic	ction ype ction is Yea		All or East 2008	n Broadw her area: Providen bined Tra	ce, Ri		am	
Volume and	Timing Input										-					
				EB				W	В			NB			SB	
		-	LT	TH	RT	L	Т_	TH		RT	LT	TH	RT	LT	TH	RT
Number of lar	nes, N,		0	1	1	(	0	1		0	0	2	0	0	1	0
Lane group				LT	R			LTR	5		DefL	T			LT	
Volume, V (vp			10	115	650	16	55	100	) ;	20	445	440		. 10	605	
% Heavy vehi	CONTRACTOR CONTRACTOR		0	2	0	2	2	0		0	0	3		0	3	
Peak-hour fac			0.93	0.93	0.93	0.9	93	0.93	0.	.93	0.93	0.93		0.93	0.93	
	or actuated (A)		A	-A	A	, <i>F</i>	1	Α		A	Α	A		A	Α	
Start-up lost ti	me, I, effective green,			2.0	2.0	-		2.0			2.0	2.0			2.0	
Arrival type, A		<del>.</del>		2.0	2.0	-	_	2.0			2.0	2.0			2.0	
Unit extension			-	3	3	-		3	- -		3	3			3	
Filtering/meter				3.0	3.0	_		3.0			3.0	3.0			3.0	
Initial unmet d				1.000	1.000	<u>'</u>		1.000	0		1.000	1.000			1.000	
Ped / Bike / R			0	0.0	0.0	-	+	0.0	$\dashv$		0.0	0.0	╂—	4_	0.0	<u> </u>
Lane width	TOTA FEIGURES		-	12.0	12.0	- 0	<del>'</del>	12.0		0	0	122	+	0	+	
Parking / Grad	te / Parking		N	0	12.0 N	- N	<del>,  </del>	0		v	12.0	12.0	+	+	12.0	-
Parking mane				-	14	+-^	-	-	- -'	<u> </u>	N	0	_ N	N ,	0	N:
Buses stoppin				0	0	+		0	+	_	0	0	<del> </del>		0	-
Min. time for p	edestrians, G <sub>o</sub>			3.2	<u> </u>	+		3.2		$\neg$		3.2		-	3.2	
Phasing	EW Perm	T	)2	03	1	ľ	04	Ŧ	NB	Only	Ti	IS Perm	1	07		08
	G = 28.0	G=		G=		G=		十	G = 1			35.0	G =		G =	
Timing	Y = 3.5	Y =		Y =		Y =		-+	Y =			3.5	Y =		Y =	
Duration of An	alysis, T = 1.00					Li										
	Capacity, Conti			00.0-4-			-				Cy	cle Lengt	1, 0 =	90.0		
Lane Group C	apacity, com	oi Dela		B Dere	rminat	ion	WE							_		
		1:3			-	LT	TH	_	RT	L	-8	NB TH	RT	LT	SB '	RT
Adjusted flow r	rate, v		135		9		307			47		473	-111		662	101
Lane group ca	pacity, c		563	870	,		357			490		1127			712	
v/c ratio, X		$\top$	0.24	0.8	0		0.86	;		0.9	8	0.42		<del>                                     </del>	0.93	
Total green rat	io, g/C		0.31	0.5	4		0.31			0.6		0.61			0.39	
Uniform delay,	d <sub>1</sub>		23.1	16,	9		29.2			19.	1	9.2			26.3	
Progression fa	ctor, PF		1.00	0 1.00	0		1.000	2		1.00	00 1	.000			1.000	
Delay calibration	on, k		0.11	0.3	5		0.39			0.4	8	0.11			0.45	
Incremental de			0.2	5.8			22.2			59.	7	0.3			24.9	
Initial queue de	elay, d <sub>3</sub>															
Control delay			23.3		5		51.4			78.8	3	9.4			51.2	- 1 - W(8 - (1)
Lane group LO			С	С	$\perp$		D			E		Α			D	
Approach delay		-	22.8				51.4				44.	3			51.2	
Approach LOS		-	С				D				.D				D	
ntersection de	ıay		40.2	Copyright	丄		1.00				section	LOS			D ·	

General Info	ormation				H	CS200	U- DE	_	-	EPO matic	_						
Analyst Agency or C Date Perform	JZR a. NE&C							Inte	rsection	on e		All oth	Broadwa er areas		jer Willia	ım	****
Time Period	PM Pea							Апа	sdictio lysis \ ect ID	ear/	•	2010	rovidenc ined Trafi		mar		
Volume and	Timing Input		-					1.1-7					1100 1701	10 10121			
					EB				WB				NB		T	SB	
			LT		TH	RT	L.	Т	TH	R	Т	LT	TH	RT	LT	TH	R
Number of la	nes, N,		0	$\perp$	1	1	0		1	0		0	2	0	0	1 7	0
Lane group				1	LT	R		1	TR			DefL	T			LT	
Volume, V (v			10		110	535	95	5 7	15	10		715	635		15	510	
% Heavy veh			0	$\perp$	2	0	2		0	0		0	3		0	3	T
Peak-hour fa			0.90	0	.90	0.90	0.9	0 0	.90	0.9	0	0.90	0.90		0.90	0.90	
Pretimed (P)	or actuated (A)		Α		Α	Α	A		A	A		Α	A		A	A	$\top$
Start-up lost				1	2.0	2.0		- 2	2,0			2.0	2.0			2.0	100
	effective green,	e		2	2.0	2.0		[ 2	2.0			2.0	2.0			2.0	
Arrival type,					3	3			3			3	3			3	
Unit extensio				3	3.0	3.0			3.0			3.0	3.0			3.0	T
Filtering/mete				1.	000	1.000		1,	000			1.000	1.000			1.000	T
Initial unmet o				0	0.0	0.0		0	0.0		$\neg$	0.0	0.0		-	0.0	1
Ped / Bike / F	RTOR volumes		0			0	0			0		0			0		T
Lane width				12	2.0	12.0		1:	2.0		$\neg$	12.0	12.0			12.0	1
Parking / Gra	1977		N		0	N	N		0	N		N	0	Ν	N	0	N
Parking mane																	$\vdash$
Buses stoppir					0	0			0			0	0			0	一
Min. time for p	oedestrians, G <sub>p</sub>			3	3.2			3	3.2				3.2			3.2	
Phasing	EW Perm		02		03		(	)4		NB O	nly	NS	S Perm		07	0	08
Timing	G = 20.0	G =		G	=		G =		G:	= 32.	0	G =	28.0	G=		G =	
·g	Y = 3.5	Y =		Υ:	=		Y =		Υ =	: 3	2000	Y =	3.5	Y=		Y=	
Duration of A	nalysis, T = 1.00	)										Cycli	e Length,	C = 9	0.0		
Lane Group	Capacity, Cont	rol Dela	y, and	LOS	Deter	minati	on	-		- Inch							
	**************************************			EB		T		WB				76 <u>————————————————————————————————————</u>	NB			SB	
		Ľ	T	Ή	RT	•	LT	TH	R	T	LT	-	TH	RT	LT	TH	R1
Adjusted flow			13	3	594			245		$\neg$	794	7	06			584	
ane group ca	apacity, c		40	)4	996	V/55827		233			742	12	291			560	
//c ratio, X			0.3	33	0.60	)		1.05			1.07	0.	55			1.04	
Total green ra	tio, g/C		0.2	22	0.62	?		0.22			0.70	0.	70			0.31	
Jniform delay			29.	4	10.5			35.0			22.9	6	.6			31.0	
Progression fa	actor, PF		1.0	00	1.000	0		1.000		1	1.000	1.0	000			1.000	
Delay calibrati	on, k		0.1	1	0.19			0.50			0.50	0.	15			0.50	
ncremental de		-	0.:	5	1.0		1	75.9	T	7	156.1	0.	.5			125.3	
nitial queue d	elay, d <sub>3</sub>																
Control delay			29.	9	11.4		2	210.9			178.9	7.	.1			156.3	
			С		В			F.			F	1	4			F	
ane group LC			14.8				21	0.9		$\neg$		98.0				156.3	
ane group LC approach dela	ıy		14.0			and the second											
			B			7		F		$\dashv$		F	- M			F	

			-	F	ICS20	00- D											
General Info							5	Site I.	nform	ation							
Analyst	JZR						4		ection		N	orth I	Broadwa <sub>.</sub>	y & Rog	jer Willia	רחו	
Agency or Co Date Perform									Гуре				er areas				
Time Period	ned 5/31/05 Saturday	. Dools L	lave				4.0		iction				rovidenc	e, RI			
Time Fellog	Saluruay	reak r	TOUL				10000		sis Ye	ar		110					
Volume and	Timing Input		*					rojec	T ID		<u> </u>	וסחוכ	ned Trafi	ic voiui	nes		
volume and	Tilling Input		Т	EB		<del>-</del>		V	/B		T		NB		т—	SB	
			LT	TH	RT	-	LT	T		RT	$\dagger$	T	TH	RT	LT	TH	RT
Number of lar	nes, N,		0	1	1		0	1		0	(	,	2	0	0	1	0
Lane group				LT	R			LT	R		De	fL	T	$\vdash$	1-	LT	1
Volume, V (vp	oh)		10	80	455		60	85	5	25	45	55	335		20	315	+-
% Heavy vehi	icles, %HV		0	2	0	$\neg$	2	0	一十	0	0	,	3		0	3	-
Peak-hour fac	tor, PHF		0.96	0.96	0.96	0.	.96	0.9	6	0.96	0.9		0.96	_	0.96	0.96	<del> </del>
Pretimed (P)	or actuated (A)		Α	Ā	A	_	A	A		A	A		A		A	A	-
Start-up lost ti			128851	2.0	2.0	_		2.0			2.	_	2.0	<del>                                     </del>	+~	2.0	-
	effective green, e	3		2.0	2.0	$\neg$		2.0			2.		2.0		$\vdash$	2.0	$\vdash$
Arrival type, A				3	3	_		3			3		3		1	3	-
Unit extension	ı, UE	************	<u> </u>	3.0	3.0	7		3.			3.	-	3.0	<b>-</b>	┪	3.0	<del>                                     </del>
Filtering/mete	ring, l			1.000	1.000			1.00	-		1.0		1.000				-
Initial unmet d				0.0	0.0	-		0.0			0.0		0.0		┼	1.000	-
	TOR volumes		0	0.0	0.0	+	0	0.0	+	0	0.0		0.0		<del>  _</del>	0.0	
Lane width				12.0	12.0			12.	<del>.  </del>	·	12.		12.0		0	100	
Parking / Grad	de / Parking		N	0	N N	_	N	0	-	N	12. N			- N	<del> </del>	12.0	<u> </u>
Parking mane	75			-	1	+	•	-	$\dashv$	14	-		0	N	N N	0	N
Buses stoppin				0	0	+		0	$\dashv$		0		0		├	0	
	edestrians, G <sub>n</sub>			3.2				3.2			<del>                                     </del>		3.2		-	3.2	
Phasing	EW Perm	0	12	0;	3	T	04		NE	3 Only	<del>'</del>	N.S	Perm	<del>                                     </del>	07		В
	G = 15.0	G=		G =		G=			G =		_		25.0	G=	U)	G=	0
Timing	Y = 3.5	Y =		Y =		Y =				70.0	_				-		
Duration of An	alysis, T = 1.00			1 -		11-			Y =		-	Y = .		Y =		Y =	
					3							Cycle	E Length,	C = 6	0.0		
Lane Group C	Capacity, Contr	ol Delay			rmina	tion											
			E		<del>-</del>		W	_			_	_	NB			SB	
Adjusted flow r	cate v	LT	93	R		LT	TH 178	-	RT	L	-	-	TH 10	RT	LT	TH	RT
Lane group ca		+	452					_		47		-	49			349	
v/c ratio, X	publity, o	-	0.21				403			66	800	+-	68			750	the sectors
Total green rat	io a/C	-					0.44			0.7		+	30			0.47	
Uniform delay,		-	17.8				10.2	-		0.6		-	63			0.42	
Progression fa		+-	1.000				1.00	-	-	7.0			0			12.7	
Delay calibration		-	0.11	_			0.11	_		1.00		-	000			1.000	
ncremental de		+-	0.17	1.5			0.1	-		0.2		0.				0.11	
nitial queue de		+	0.2	<del>    '</del>	-		0.8	-		3.8		0.	<del>'  </del>			0.5	
Control delay	71-3	+	18.0	13.	<del>,                                    </del>		19.7	,		10.	7	5.	<del>,  </del>			121	
ane group LO	ıs	_	B	13.	-		19.7 B					-				13.1	
Approach delay		+	14.0	1 1	$\dashv$		19.7			В		A				B	
Approach LOS		+	· B							+-		8.3		$\rightarrow$		13.1	
ntersection del		+			$\dashv$	V.	B			-		A				В	
IN-INCLUDIT UE	i La y	1	12.0		1	X.	= 0.62	4		Inte	rsect	ion L	.OS			В	

General Inf	formation		345	h	CS20	100- D	ETAIL									
Analyst	JZR						_	rsectio	<i>nation</i> n	_	Jorth F	Smadwa	v & Poo	er Willia	m	
Agency or C							100000000000000000000000000000000000000	а Туре	1000			er areas	y a muy	er vvinia.	111	
Date Perform							Juri	sdiction	n			rovidenc	e, RI			
Time Period	AM Peal	k Hour					Ana	lysis Y	ear		010					
							Proj	ect ID				ned Trafi ements	fic Volum	nes With		
Volume and	d Timing Input										пріот	cmonta				
			<u> </u>	EB	1 ==	_		WB				NB			SB	
Number of la	anes N		LT 0	TH 1	RT 1	+	LT 1	TH	RT	+	LT	TH	RT	LT	TH	R
Lane group			<u> </u>	LT	R		L	1 TR	0	+-	0	2 T	0	0	1	10
Volume, V (	vph)		10	115	650	_		100	20		9efL 145	440		10	LT	+
	hicles, %HV		0	2	0	_	2	0	0	+	0	3	+	- 10	605	+
Peak-hour fa			0.93	0.93	0.93			0.93	0.93	1	.93	0.93	-	0.93	0.93	+
Pretimed (P)	) or actuated (A)		A	A	A		A	A	A		A	A .		A	0.93 A	+
Start-up lost				2.0	2.0			2.0	1		2.0	2.0	+	1-	2.0	+-
Extension of	effective green,	е		2.0	2.0			2.0			2.0	2.0		<del>                                     </del>	2.0	+-
Arrival type,				3	- 3		3	3			3	3			3	+
Unit extension	on, UE			3.0	3.0	3	.0	3.0		1	3.0	3.0		1	3.0	+
Filtering/met				1.000	1.00	0 1.0	000 1	.000		1.	000	1.000			1.000	+
	demand, Q <sub>b</sub>			0.0	0.0	0	.0	0.0		10	0.0	0.0	1	1	0.0	T
Ped / Bike / I	RTOR volumes		0		0		0		0		0			0		十
Lane width				12.0	12.0	12	2.0 1	2.0		1.	2.0	12.0			12.0	
	ade / Parking		N	0	N	1	V	0	Ν		N .	0	N	N	0	N
Parking man					<u> </u>											
Buses stopp				0	0	- 4	2	0		$\perp$	0	0			0	
	pedestrians, G <sub>p</sub>			3.2		<del>-</del>		3.2		丄		3.2			3.2	
Phasing	EW Perm		)2	03	3		04	_	VB Onl	У	NS	S Perm		07		80
Timing	G = 24.0	G =		G =		G=		-	18.0		G =	38.0	G =		G=	
	Y = 3.5	Y =		Y =		Y =		Υ =	3		Y =	3.5	Y =		Y =	
	malysis, $T = 1.00$			<u> </u>		-					Cycle	e Length	, C = 9	0.0		
Lane Group	Capacity, Contr	ol Delay		***************************************	rmina	tion										
		17	I TU		<del>-  </del> -	17	WB	T =				NB			SB	
Adjusted flow	rate, v	+LT	135			LT 177	130	R		LT	_	TH 72	RT	LT	TH	R7
ane group c		+-	488		_	307	494	+		178 161	-	73			662	<del> </del>
//c ratio, X	•		0.28			0.58	0.26	+		.85		39			773	
Total green ra	atio, g/C	_	0.27			0.27	0.27	+		.66		66 66			0.86	
Jniform delay		+	26.1			28.6	26.0	+		4.6		.2			0.42 23.5	
Progression f	actor, PF		1.000		-+	.000	1.000	+		000		000			1.000	
Delay calibrat	tion, k		0.11		_	0.17	0.11	+		.38		11			0.39	
ncremental d	telay, d <sub>2</sub>		0.3	9.9		2.7	0.3	1-	_	3.5	_	.2			10.4	
nitial queue d	delay, d <sub>3</sub>							1	1		1					
Control delay			26.4	29.3	3 3	31.3	26.3		2	B. 1	7.	.4			33.9	
ane group L	os		С	C		С	С			С	1	4			С	
	av		28.8				29.2				17.8				33.9	
pproach del	- 1									_						
approach del approach LO			С				С			×.*	В		- 1		C	

0				Н	CS20	000- D	_									2	
General Information Analyst Agency or Co Date Performation Time Period	JZR NE&C ed 5/31/04 PM Peak	Hour					Ir A Ji A	nterse rea T urisdi	ection Type ction is Ye		P 2	II othe ast P 010 combin	Broadway er areas rovidence ned Traff ements	ə, RI		n	
Volume and	Timing Input																
			<u> </u>	EB	T	_		N			$\perp$		NB	·	<b></b>	SB	
Number of lan	es. N		LT 0	TH 1	RT 1	-	LT 1	TI	_	RT 0	+	LT O	TH 2	RT	LT	TH 1	RT
Lane group				LT	R	-	L	TH	-		+,	DefL.	17	1	-	LT	┼-
Volume, V (vp	h)		10	110	535		95	11	-	10		715	635	-	15	510	┼
% Heavy vehi			0	2	0		2	0	-	0	+	0	3	<b>-</b>	0	3	+
Peak-hour fac			0.90	0.90	0.9		.90	0.9		0.90	1	0.90	0.90	┼	0.90	0.90	<del> </del>
	or actuated (A)		A	A	A		A	A	$\rightarrow$	0.50 A	+	A	A		A A	A A	├
Start-up lost ti				2.0	2.0		2.0	2.0	-		$\dashv$	2.0	2.0		- A	2.0	├──
	ffective green,	}		2.0	2.0	<del></del>	2.0	2.0	_		_	2.0	2.0	<del>                                     </del>		2.0	
Arrival type, A	T			3	3		3	3	_		$\top$	3	3	<u> </u>		3	<del>                                     </del>
Unit extension	, UE			3.0	3.0	3	.0	3.	0		+	3.0	3.0		<b>†</b>	3.0	<del> </del>
Filtering/meter	ing, l			1.000	1.00	0 1.	000	1.00	00		1	000	1.000			1.000	
Initial unmet de	emand, Q <sub>b</sub>			0.0	0.0	0	.0	0.0	,	~		2.0	0.0			0.0	_
Ped / Bike / R	TOR volumes		0		0		0	$\vdash$	寸	0	+	0			0	<del>                                     </del>	
Lane width				12.0	12.0	) 1:	2.0	12.	0		1	2.0	12.0			12.0	<u> </u>
Parking / Grad	le / Parking		N	0	N		V	0	$\Box$	N	+	N	0	N	N	0	N
Parking mane	uvers, N <sub>m</sub>					$\neg \vdash$		$\vdash$	$\dashv$		$\dashv$		<del>                                     </del>			1	
Buses stoppin	g, N <sub>B</sub>			0	0		0	0				0	0			0	
Min. time for p	edestrians, G <sub>p</sub>			3.2			202	3.2	?				3.2			3.2	
Phasing	WB Only	EW	Perm	03	3		04		N	IB Or	ıly	N	S Perm		07		8
Timina	G = 4.0	G= 1	0.0	G=		G =			G =	37.0	)	G=	36.0	G=		G=	
Timing	Y = 3	Y = 3.	.5	Y =		Y =			Y =	3		Y =	3.5	Y =		Y =	
Duration of An	alysis, T = 1.00								L			Cyc	e Length	, C = 1	00.0		
Lane Group C	apacity, Contr	ol Dela	v. and L	OS Dete	rmina	ation											
arti-artical international of the property of the second		T	E		7		V	/B		Т			NB			SB	
		LT	TH	R'	r Í	LT	T	Н	R	T	LT	$\Box$	TH	RT	LT	TH	RT
Adjusted flow i			133	594	1	106	13	19			794		706			584	
Lane group ca	pacity, c		181	816	5	145	31	9			825	1	402			648	
v/c ratio, X			0.73	0.7	3	0.73	0.4	14			0.96	0	).50			0.90	
Total green rat			0.10		-	0.17	0.1				0.76	0	.76			0.36	
Uniform delay,			43.7		_	39.8	37				21.1	_	4.7			30.3	
Progression fa		-	1.000	_	_	1.000	1.0			-	1.000		000			1.000	
Delay calibration		+-	0.29		_	0.29	0.1			-	0.47		.11			0.42	
Incremental de		+-	15.6	3.4	$\dashv$	18.8	1.	U	_	+	34.8	1	0.3			19,3	
Initial queue de Control delay	siay, ug	+-	59.4	22.7	<del>,  </del>	58.7	38.	2	-	+	EE O	+	- +			40.7	
Lane group LO	ıs.	+	59.4 E		+					$\dashv$	55.9 E		5.0			49.7	
Approach deia		+		C	$\dashv$	E	17.0		L	-	E		A			D 1	
Approach LOS		+	29.4 C		+		47.0 D			+		31.9 C				49.7	
Intersection de		+			+					-			100			D	
CS2000TM	y		35.9	Convrish	1 65 2004	O Universi	= 0.9		II Pinh	_		ection	LUS			D ,	Version 4.1:

#### HCS2000- DETAILED REPORT General Information Site Information Intersection North Broadway & Roger William Analyst .IZR Area Type All other areas Agency or Co. NE&C East Providence, RI Jurisdiction **Date Performed** 5/31/05 Analysis Year 2010 Time Period Saturday Peak Hour Combined Traffic Volumes With Project ID **Improvements** Volume and Timing Input EB WB NB SB LT TH RT LT TH RT TH LT RT TH LT RT Number of lanes, N. 0 1 1 1 1 0 0 2 0 0 0 1 Lane group LT R L TR DefL T LT Volume, V (vph) 10 80 455 60 85 25 455 335 20 315 % Heavy vehicles, %HV 2 0 0 2 0 0 0 3 0 3 Peak-hour factor, PHF 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96 Pretimed (P) or actuated (A) A A A A A A A A A A Start-up lost time, I, 2.0 2.0 2.0 2.0 2.0 2.0 2.0 Extension of effective green, e 2.0 2.0 2.0 2.0 2.0 2.0 2.0 Arrival type, AT 3 3 3 3 3 3 3 Unit extension, UE 3.0 3.0 3.0 3.0 3.0 3.0 3.0 Filtering/metering, I 1.000 1.000 1.000 1.000 1.000 1.000 1.000 Initial unmet demand, Qb 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Ped / Bike / RTOR volumes 0 0 0 0 0 0 Lane width 12.0 12.0 12.0 12.0 12.0 12.0 12.0 Parking / Grade / Parking N 0 N N 0 N Ν 0 N N 0 N Parking maneuvers, N<sub>m</sub> Buses stopping, N<sub>B</sub> 0 0 0 0 0 0 0 Min. time for pedestrians, Gn 3.2 3.2 3.2 3.2 EW Perm Phasing WB Only 03 04 **NB** Only NS Perm 07 80 G = 3.0G = 10.0G= G = G = 10.0G = 24.0G = G = Timing Y = 3Y = 3.5Y = Y = Y = Y = 3.5Y = Y = Duration of Analysis, T = 1.00 Cycle Length, C = 60.0 Lane Group Capacity, Control Delay, and LOS Determination EB WB NB SB LT TH RT LT TH RT LT TH RT LT TH RT Adjusted flow rate, v 93 474 63 115 474 349 349 Lane group capacity, c 301 633 294 490 641 1138 719 v/c ratio, X 0.31 0.75 0.21 0.23 0.74 0.31 0.49 Total green ratio, g/C 0.17 0.39 0.27 0.27 0.62 0.62 0.40 Uniform delay, da 22.0 15.7 17.2 16.8 7.6 5.4 13.4 Progression factor, PF 1.000 1.000 1.000 1.000 1.000 1.000 1.000 Delay calibration, k 0.11 0.30 0.11 0.11 0.30 0.11 0.11 Incremental delay, do 0.6 5.1 0.4 0.2 4.7 0.2 0.5 Initial queue delay, d<sub>3</sub> Control delay 22.6 20.8 17.2 17.5 12.2 5.6 13.9 Lane group LOS C C B В В A В Approach delay 17.4 21.1 9.4 13.9 Approach LOS C B A В Intersection delay 14.4 $X_c = 0.66$ Intersection LOS В

# LEVEL OF SERVICE FOR UNSIGNALIZED INTERSECTIONS

Level of Service (LOS) for unsignalized intersections is based on the assumption that minor street movements do not affect major street traffic. In order for the minor street traffic or traffic turning left into the minor street to proceed vehicles must wait for a gap in the major street traffic. The distribution of available gaps in the major street traffic stream depends on the total volume of traffic, its directional distribution, the number of lanes on the major street and the degree and type of platooning in the traffic stream. The gap sizes required by the minor street drivers depend on the type of maneuver (left, through, right), the number of lanes on the major street, the speed of major street traffic, sight distance, the length of time the major street vehicles has been waiting and driver characteristics (eyesight, reaction time, age). LOS is determined based on the control delay and is defined for each minor movement but not for the intersection as a whole. The LOS criteria are based on average control delay per vehicle as shown in the table below. Control delay is the total elapsed time for a vehicle joining the queue until its departure from the stop position at the head of the queue. The control delay also includes the time required to decelerate to a stop and to accelerate to the free flow speed.

LEVEL OF	SERVICE CRITERIA
LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SEC)
A	≤ 10.0
В	> 10.0 to 15.0
C	> 15.0 to 25.0
D	> 25.0 to 35.0
Е	> 35.0 to 50.0
F	> 50.00

Source: Highway Capacity Manual, Transportation Research Board, 2000.

Roger Williams Avenue and Bourne Avenue

#### TWO-WAY STOP CONTROL SUMMARY General Information Site Information Analyst JZR Intersection Roger Williams Ave & Bourne Av Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/21/04 Analysis Year 2004 Analysis Time Period AM Peak Project Description Existing Traffic Volumes East/West Street: Bourne Avenue North/South Street: Roger Williams Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Northbound Southbound Movement 2 3 4 5 L R T R 1 Volume 40 163 27 6 170 14 Peak-Hour Factor, PHF 0.94 0.94 0.94 0.94 0.94 0.94 Hourly Flow Rate, HFR 42 173 28 6 180 14 Percent Heavy Vehicles 2 --0 Median Type Undivided RT Channelized 0 0 Lanes 0 1 0 0 1. 0 Configuration LTR LTR Upstream Signal 0 0 **Minor Street** Westbound Eastbound Movement 9 10 8 11 12 L T R L T R Volume 49 0 11 11 4 29 0.94 Peak-Hour Factor, PHF 0.94 0.94 0.94 0.94 0.94 Hourly Flow Rate, HFR 52 0 11 11 4 30 Percent Heavy Vehicles 0 0 0 2 0 2 Percent Grade (%) 0 0 Flared Approach N N Storage 0 0 RT Channelized 0 0 Lanes 0 1 0 0 1 0 Configuration LTR LTR Delay, Queue Length, and Level of Service Approach NB SB Westbound Eastbound Movement 1 4 7 12 11 Lane Configuration LTR LTR LTR LTR 42 δ v (vph) 63 45 C (m) (vph) 1379 1383 500 675 v/c 0.03 0.00 0.13 0.07 95% queue length 0.09 0.01 0.43 0.21 Control Delay 7.7 7.6 13.2 10.7 LOS A A В В Approach Delay 13.2 10.7

Approach LOS Rights Reserved

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В

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B

#### TWO-WAY STOP CONTROL SUMMARY General Information Site information: Analyst JZR Intersection Roger Williams Ave & Bourne Av Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/21/04 Analysis Year 2004 Analysis Time Period PM Peak Project Description Existing Traffic Volumes East/West Street: Bourne Ave North/South Street: Roger Williams Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments **Major Street** Northbound Southbound Movement 2 3 4 5 6 R L R T Volume 16 274 51 9 248 12 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 17 Hourly Flow Rate, HFR 301 56 9 272 13 Percent Heavy Vehicles 2 \_ \_ 0 \_ \_ Median Type Undivided RT Channelized 0 0 0 0 Lanes 1 0 1 0 Configuration LTR LTR Upstream Signal 0 0 Westbound Minor Street Eastbound Movement 7 9 10 8 12 T R L T R Volume 22 2 8 23 2 55 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 24 2 8 25 2 60 Percent Heavy Vehicles 0 0 0 2 2 0 Percent Grade (%) 0 0 Flared Approach Ν N Storage 0 0 RT Channelized D 0 Lanes 0 1 0 0 1 0 Configuration LTR LTR Delay, Queue Length, and Level of Service: Approach NB SB Westbound Eastbound Movement 1 4 7 9 8 10 11 12 Lane Configuration LTR LTR LTR LTR 17 9 v (vph) 34 87 C (m) (vph) 1277 1213 377 566 v/c 0.01 0.01 0.09 0.15 95% queue length 0.04 0.02 0.30 0.54 Control Delay 7.9 8.0 15,5 12.5 LOS A A C В Approach Delay 15.5 12.5 \_ Approach LOS C В

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#### TWO-WAY STOP CONTROL SUMMARY Site Information General Information JZR Analyst Intersection Roger Williams Ave & Bourne Av Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/21/04 Analysis Year 2004 Analysis Time Period SAT Peak Project Description Existing Traffic Volumes East/West Street: Bourne Ave North/South Street: Roger Williams Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Southbound **Major Street** Northbound Movement 3 5 6 T L R T R Volume 8 159 26 191 4 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 8 174 28 4 209 2 2 Percent Heavy Vehicles ---0 ---Median Type Undivided RT Channelized 0 0 Lanes 0 1 0 0 1 0 LTR Configuration LTR Upstream Signal 0 D Westbound Minor Street Eastbound 7 Movement 9 10 11 12 T R T R Volume 20 2 2 4 5 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 21 2 2 4 5 1 Percent Heavy Vehicles 0 0 0 2 0 2 Percent Grade (%) 0 0 Flared Approach N N 0 Storage 0 RT Channelized 0 0 0 Lanes 1 0 0 1 0 Configuration LTR LTR Delay Queue Length, and Level of Service Approach NB SB Westbound Eastbound Movement 1 4 7 8 9 10 11 12 LTR LTR Lane Configuration LTR LTR v (vph) 8 4 25 10 C (m) (vph) 1360 1382 550 646 v/c 0.01 0.00 0.05 0.02 0.02 95% queue length 0.01 0.14 0.05 Control Delay 7.7 7.6 11.9 10.7 LOS A A B Approach Delay 11.9 10.7 Approach LOS В --\_ В

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General Information			Site I	formatio	'n				
Analyst         JZR           Agency/Co.         NE&C           Date Performed         6/7/05           Analysis Time Period         AM Peak				Intersection Roger Williams Ave & Bourne Jurisdiction East Providence Analysis Year 2010					
Project Description Back		mes							
East/West Street: Bourne					t: Roger Willi	iams Ave			
Intersection Orientation: A			Study	Period (hrs	): 0.25				
Vehicle Volumes and A	djustments	Northbound							
Major Street Movement	1	<del></del>	3 4			Southbound			
MOASILISH	<del></del>	2 T	R		4 L	5 T		6 R	
Volume	55	185	30		5	210		20	
Peak-Hour Factor, PHF	0.94	0.94	0.94		0.94	0.94		0.94	
Hourly Flow Rate, HFR	58	196	31		- 5	223		21	
Percent Heavy Vehicles	2				0				
Median Type		<del></del>	Undivided			<del></del>			
RT Channelized		1 0	<del></del>						
Lanes	0	1 1	0		0	1 1		0	
Configuration	LTR				LTR	<del>                                     </del>			
Upstream Signal		0				1 0			
Minor Street						Eastbound			
Movement	7	Westbound 8	9		10	11		12	
	L	T	R		L	. T		R	
Volume	55	0	15		15	5		35	
Peak-Hour Factor, PHF	0.94	0.94	0.94		0.94	0.94		0.94	
Hourly Flow Rate, HFR	58	0	15		15	5		37	
Percent Heavy Vehicles	0	0	0		2	0		2	
Percent Grade (%)		0				0			
Flared Approach		N				N			
Storage		0				0			
RT Channelized			0					0	
anes	0	1	0		0	1		0	
Configuration		LTR				LTR		======================================	
Delay, Queue Length, and	Level of Service		***************************************		The second secon			The state of the s	
Approach	NB	SB	Westbo		nd	Eastbo		und	
Movement	1	4	7	8	9	10	11	12	
ane Configuration	LTR	LTR		LTR			LTR		
(vph)	58	5		73		57		1	
C (m) (vph)	1322	1353	-	429		595			
//c	0.04	0.00		0.17		1	0.10		
95% queue length	0.14	0.01		0.61		0.32		1	
Control Delay	7.8	7.7		15.1			11.7	1	
.os	Α	Α		С			В	1	
Approach Delay	_		15.1		11.7				
pproach LOS		-	С			В			

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		TWO-WAY STO	P CONTR	OL SUMN	IARY .	4			
General Information			Site	nformatio	n	•			
Analyst JZR Agency/Co. NE&C Date Performed 6/7/05 Analysis Time Period PM Peak				ection iction sis Year		Roger Williams Ave & Boume At East Providence 2010			
Project Description Back		mes							
East/West Street: Boume					t: Roger Wi	lliams Ave			
Intersection Orientation: /			Study	Period (hrs	): 0.25				
Vehicle Volumes and A	djustments			-					
Major Street	Northbound			3 4		Southbound			
Movement	1	2 T			4	5 T		<u>6</u> .	
Volume	20	335			10	290		R 15	
Peak-Hour Factor, PHF	0.91	0.91			0.91				
Hourly Flow Rate, HFR	21	368	60		10	318		16	
Percent Heavy Vehicles	2				0				
Median Type	+ -		Undivided			<del></del>			
RT Channelized		<del></del>				-1			
anes	<del>                                     </del>	1	0		0			0	
Configuration			0			1		0	
	LTR	0	-		LTR				
Jpstream Signal						1 0 1			
Minor Street Movement	7	Westbound			9 10		Eastbound		
VIOVEITIETII	<del>                                     </del>	-   8 T	F		10 L	11 T		12 R	
Volume	25	2	10		30	1 2		70 ·	
Peak-Hour Factor, PHF	0.91	0.91	0.9		0.91		0.91		
Hourly Flow Rate, HFR	27	2	10		32	2		0.91 76	
Percent Heavy Vehicles	. 0	0	0		2	0		2	
Percent Grade (%)		<u>'</u>				0			
Flared Approach		1 N				N			
Storage		0	<del></del>	+		0			
RT Channelized						+		0	
Lanes	0	1	0		0	1		0	
Configuration		LTR				LTR			
Delay, Queue Length, and	Level of Service								
Approach	NB				ound Eastbound				
Movement	i	4	7	В	9	10	11	12	
ane Configuration	LTR	LTR		LTR	<del>                                     </del>		LTR	+	
/ (vph)	21	10		39				<del>                                     </del>	
C (m) (vph)	1225	1142		306			110 495	1	
//c	0.02	0.01		0.13			0.22	1	
5% queue length	0.05	0.03		0.43	1		0.84	1	
Control Delay	8.0	8.2		18.5	<del>                                     </del>	+	14.3	<b></b>	
.os	A	A	<del> </del>	C	+	+	B	<b>†</b>	
Approach Delay		· · · · · · · · · · · · · · · · · · ·		18.5		1	14.3		
pproach LOS									
ights Deserved			С			В			

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#### TWO-WAY STOP CONTROL SUMMARY General Information Site Information JZR Intersection Roger Williams Ave & Bourne Av Analyst Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/7/05 Analysis Year 2010 Analysis Time Period SAT Peak Project Description Background Traffic Volumes North/South Street: Roger Williams Ave East/West Street: Bourne Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Northbound Major Street Southbound 3 4 Movement 2 5 6 R 1 T R 10 Volume 190 30 5 170 2 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 5 Hourly Flow Rate, HFR 10 208 32 186 2 Percent Heavy Vehicles 2 0 \_ ---Median Type **Undivided** RT Channelized 0 0 Lanes 0 1 0 0 1 0 Configuration LTR LTR Upstream Signal 0 0 Minor Street Westbound Eastbound 7 10 Movement В 9 11 12 L T R L T R 20 Volume 2 2 5 1 5 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 21 5 1 2 2 5 0 2 0 0 2 Percent Heavy Vehicles 0 0 0 Percent Grade (%) Flared Approach N N 0 0 Storage RT Channelized 0 0 Lanes 0 0 0 1 0 Configuration LTR LTR Delay, Queue Length, and Level of Service SB Westbound Eastbound Approach NB Movement 1 4 7 9 В 10 11 12 Lane Configuration LTR LTR LTR LTR 5 25 11 v (vph) 10 C (m) (vph) 1386 1339 534 627 v/c 0.01 0.00 0.05 0.02 95% queue length 0.02 0.01 0.15 0.05 Control Delay 7.6 7.7 10.8 12.1 В LOS Α A В Approach Delay 12.1 10.8 Approach LOS В В

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		TWO-WAY STO	JI OOMII	CC SOMM	IAKI			18			
General Information				Informatio	n						
Analyst         JZR           Agency/Co.         NE&C           Date Performed         6/7/05           Analysis Time Period         AM Peak				Intersection Roger Williams Ave & Bourne Jurisdiction East Providence Analysis Year 2010							
	bined Traffic Volum	es									
East/West Street: Bourne Avenue				North/South Street: Roger Williams Ave							
Intersection Orientation:			Study	Period (hrs	): 0.25						
Vehicle Volumes and A	Adjustments		•								
Major Street Movement	Northbound 1 2						Southbound				
WOVERHEIR	L	2 T		3	4	5 T		6			
Volume ·	70	220	-	0		235		R 30			
Peak-Hour Factor, PHF	0.94	0.94	0.94		0.94	0.94		0.94			
Hourly Flow Rate, HFR	74	234	31		5	250		31			
Percent Heavy Vehicles	2	-			0	<del>                                     </del>					
Median Type		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Undivid	ed						
RT Channelized		1 0	0			—————	0				
Lanes	0	1	0		0	7		0			
Configuration	LTR		-		LTR						
Upstream Signal		<del>                                     </del>			LIK	0		W-18			
Minor Street	Westbound			-			Eastbound				
Movement	7	8	9		10	11		12			
	L	Т	R		L	T					
Volume	55	0	15		30	5		60			
Peak-Hour Factor, PHF	0.94	0.94	0.9	4	0.94	0.94		0.94			
Hourly Flow Rate, HFR	58	0	1:	5 .	31	5		63			
Percent Heavy Vehicles	0	0	0		2	0		2			
Percent Grade (%)		0				0					
lared Approach		N				N					
Storage		0				0					
RT Channelized				)				0			
anes	0	1	0		0	1		0			
Configuration		LTR				LTR	SCOTINGEN OF THE SCOTING				
Delay, Queue Length, and	Level of Service										
Approach	NB	SB		Westbound		Eastbound					
Movement	1	4	7	8	9	10	11	12			
ane Configuration	LTR	LTR		LTR	1		LTR	1			
(vph)	74	5		73		1	99				
(m) (vph)	1282	1311		346	1	<b> </b>	527	1			
/c	0.06	0.00		0.21	<b>-</b>		0.19				
5% queue length	0.18	0.01		0.78		1	0.69				
Control Delay	8.0	7.8		18.2	1		13.4				
os	Α	Α		С	1		В				
pproach Delay				18.2			13.4				
pproach LOS		_	С			В					

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#### TWO-WAY STOP CONTROL SUMMARY General Information Site Information Analyst JZR Intersection Roger Williams Ave & Bourne Av Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/7/05 Analysis Year 2010 Analysis Time Period PM Peak Project Description Combined Traffic Volumes East/West Street: Bourne Ave North/South Street: Roger Williams Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Northbound Southbound Movement 3 4 5 T R 1 R Volume 50 360 55 10 335. 30 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 54 395 60 10 368 32 Percent Heavy Vehicles 2 0 ---Median Type Undivided RT Channelized 0 0 anes 0 1 0 0 1 0 Configuration LTR LTR Upstream Signal n 0 Minor Street Westbound Eastbound Movement 9 8 10 11 12 L Т R 1 T R Volume 25 2 10 45 2 95 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 27 2 10 49 2 104 Percent Heavy Vehicles 0 0 0 2 0 2 Percent Grade (%) 0 0 Flared Approach N N Storage 0 0 RT Channelized 0 0 Lanes 0 0 0 1 0 Configuration LTR LTR Delay, Queue Length, and Level of Service Approach NB SB Westbound Eastbound Movement 1 4 7 B 9 10 11 12 Lane Configuration LTR LTR LTR LTR v (vph) 54 10 39 155 C (m) (vph) 1159 1116 223 404 v/c 0.05 0.01 0.17 0.38 95% queue length 0.15 0.03 0.62 1.77 Control Delay 8.3 8.3 24.5 19.4 LOS A Α C C Approach Delay \_\_\_ \_ 24.5 19.4 Approach LOS C C

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#### TWO-WAY STOP CONTROL SUMMARY General Information Site Information Analyst JZR Intersection Roger Williams Ave & Bourne Av Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/7/05 Analysis Year 2010 Analysis Time Period SAT Peak Project Description Combined Traffic Volumes East/West Street: Bourne Ave North/South Street: Roger Williams Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Northbound Southbound Movement 3 4 6 I R L T R Volume 40 220 30 5 215 20 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 43 241 32 5 236 21 Percent Heavy Vehicles 2 0 Median Type Undivided RT Channelized 0 anes 0 1 0 0 1 0 Configuration LTR LTR Upstream Signal 0 0 Minor Street Westbound Eastbound Movement 7 В 9 10 11 12 T L R T 1 R Volume 20 2 2 20 1 30 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 21 2 2 21 1 32 Percent Heavy Vehicles 0 0 0 2 0 2 Percent Grade (%) 0 0 Flared Approach N N Storage 0 0 RT Channelized 0 0 \_anes 0 1 0 0 1 0 Configuration LTR LTR Delay, Queue Length, and Level of Service Approach SB Westbound Eastbound Movement 1 4 11 12 Lane Configuration LTR LTR LTR LTR v (vph) 43 5 25 54 C (m) (vph) 1308 1302 394 563 v/c 0.03 0.00 0.06 0.10 95% queue length 0.10 0.01 0.20 0.32 Control Delay 7.8 7.8 14.8 12.1 OS A A B B Approach Delay 14.8 12.1 Approach LOS В B

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Roger Williams Avenue and Site Driveway

#### TWO-WAY STOP CONTROL SUMMARY General Information Site Information Analyst JZR Intersection Roger Williams Ave & Site Dr Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/7/05 Analysis Year 2010 Analysis Time Period AM Peak Project Description Future Traffic Volumes East/West Street: Site Drive North/South Street: Roger Williams Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Northbound Southbound Movement 2 3 4 5 6 L R 1 R Volume 115 285 0 325 0 25 Peak-Hour Factor, PHF 0.94 0.94 0.94 0.94 0.94 0.94 Hourly Flow Rate, HFR 122 303 0 0 345 26 Percent Heavy Vehicles 0 0 \_ ---Median Type Undivided RT Channelized 0 0 anes 0 1 0 0 1 0 Configuration LT TR Upstream Signal 0 0 Minor Street Westbound Eastbound Movement 8 9 10 11 12 L T R L Т R Volume 0 0 n 35 0 175 Peak-Hour Factor, PHF 0.94 0.94 0.94 0.94 0.94 0.94 Hourly Flow Rate, HFR 0 0 0 37 0 186 Percent Heavy Vehicles 0 0 0 0 0 0 Percent Grade (%) 0 0 Flared Approach N N Storage 0 0 RT Channelized 0 0 Lanes 0 0 0 1 0 1 Configuration L R Delay, Queue Length, and Level of Service Approach NB SB Westbound Eastbound Movement 1 4 7 9 10 11 12 Lane Configuration LTL R v (vph) 122 37 186 C (m) (vph) 1199 278 691 vic 0.10 0.13 0.27 95% queue length 0.34 0.45 1.09 Control Delay 8.3 19.9 12.1 LOS Α C В Approach Delay --13.4 Approach LOS В

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#### TWO-WAY STOP CONTROL SUMMARY General Information Site Information Analyst JZR Intersection Roger Williams Ave & Site Dr Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/7/05 Analysis Year 2010 Analysis Time Period PM Peak Project Description Future Traffic Volumes East/West Street: Site Drive North/South Street: Roger Williams Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Northbound Major Street Southbound Movement 2 3 4 5 6 L R T R Volume 210 430 ō 0 410 45 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 230 472 0 0 450 49 Percent Heavy Vehicles 0 0 \_ \_ Median Type Undivided RT Channelized 0 0 anes 0 1 0 0 1 0 LT Configuration TR Upstream Signal 0 0 Minor Street Westbound Eastbound Movement 7 8 9 10 11 12 L T R L T R Volume 0 0 0 35 0 170 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 0 0 0 38 0 186 Percent Heavy Vehicles 0 0 0 0 0 0 Percent Grade (%) 0 0 Flared Approach N N Storage 0 0 RT Channelized 0 0 Lanes 0 0 0 0 1 Configuration L R Delay, Queue Length, and Level of Service Approach NB SB Westbound Eastbound Movement 1 4 7 8 9 10 11 12 Lane Configuration LT L R v (vph) 230 38 186 C (m) (vph) 1075 122 595 v/c 0.21 0.31 0.31 95% queue length 0.81 1.22 1.33 Control Delay 9.3 47.3 13.8 LOS A E В Approach Delay \_ 19.5 Approach LOS C

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#### TWO-WAY STOP CONTROL SUMMARY General Information Site Information Analyst JZR Intersection Roger Williams Ave & Site Dr Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/7/05 Analysis Year 2010 Analysis Time Period SAT Peak Project Description Future Traffic Volumes East/West Street: Site Drive North/South Street: Roger Williams Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Northbound Southbound Movement 3 4 5 6 L T R L R Volume 220 260 0 n 220 45 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 241 285 0 0 241 49 Percent Heavy Vehicles 0 0 Median Type Undivided RT Channelized 0 0 anes 0 1 0 0 1 0 Configuration LT TR Upstream Signal 0 0 Minor Street Westbound Eastbound Movement 7 9 10 11 12 L T R 1 R Volume 0 0 0 40 0 190 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 0 0 0 43 0 208 Percent Heavy Vehicles 0 0 0 0 0 0 Percent Grade (%) 0 0 Flared Approach N N Storage 0 0 RT Channelized 0 0 Lanes 0 0 0 1 0 1 Configuration L R Delay, Queue Length, and Level of Service Approach NB SB Westbound Eastbound Movement 1 4 7 8 9 10 11 12 Lane Configuration LT L R v (vph) 241 43 208 C (m) (vph) 1283 211 778 v/c 0.19 0.20 0.27 95% queue length 0.69 0.74 1.08 Control Delay 8.5 26.4 11.3 LOS A D В Approach Delay -13.9 Approach LOS В

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		TWO-WAY STOP	CONTR	OL SUM	WARY				
General Information			Site I	nformatio	on		<del></del>		
Analyst         JZR           Agency/Co.         NE&C           Date Performed         6/7/05           Analysis Time Period         AM Peak				Intersection Roger Williams Ave & Site Dr Jurisdiction East Providence Analysis Year 2010					
Project Description Futu	re Traffic Volumes L	.eft Tum Lane Enteri	ng					***************************************	
East/West Street: Site Dr					et: <i>Roger Wil</i>	liams Ave	3		
Intersection Orientation:			Study	Period (hrs	s): 0.25				
Vehicle Volumes and A Major Street	Adjustments								
Movement	1	Northbound 2	] з		4	Southbo	ound		
	Ĺ	<del>                                     </del>	R		<del>-</del>	- 5 T		6 R	
Volume	115	285	0		0	325		25	
Peak-Hour Factor, PHF	0.94	0.94	0.9		0.94	0.94		0.94	
Hourly Flow Rate, HFR	122	303	0		0	345		26	
Percent Heavy Vehicles	0	-	-		0 .	-		9	
Median Type				Undivid	ded				
RT Channelized			0					0	
Lanes	1	1	0		0	1		0	
Configuration	L	$\tau$						TR	
Upstream Signal		0				0			
Minor Street		Westbound Eastbour					ınd		
Movement	7	8	9		10	11		12	
Volume	L L	T	R		L	Т		R	
Peak-Hour Factor, PHF	0.94	0.94	0.94	, -	35	0		175	
Hourly Flow Rate, HFR	0	0	0.94	<del>'</del> ————————————————————————————————————	0.94 37	0.94		0.94	
Percent Heavy Vehicles	0	0	0					186	
Percent Grade (%)		0	0		0	1		0	
Flared Approach						0			
Storage		N 0				N			
RT Channelized	<del></del>	1	0			0			
anes	0	1 0	0		1	0		0	
Configuration		<del>                                     </del>				- 0			
Delay, Queue Length, and	L ovol of Carrier		******		L			R	
Selay, Quede Length, and Approach	NB NB	SB		Westbou		Г	F_4		
Novement					110 T		Eastbound	) —————	
	1	4	7	8	9	10	11	12	
ane Configuration	L					L		R	
(vph)	122					37		186	
(m) (vph)	1199		86			278		691	
/c	0.10		***************************************			0.13		0.27	
5% queue length	0.34					0.45		1.09	
ontrol Delay	8.3					19.9			
os	A			<b> </b>	-			12.1	
pproach Delay				<u></u>	1	C	40.1	В	
	-	-		NO. 100 - 10			13.4		
pproach LOS ights Reserved							В		

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#### TWO-WAY STOP CONTROL SUMMARY General Information Site Information Analyst JZR Intersection Roger Williams Ave & Site Dr Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/7/05 Analysis Year 2010 Analysis Time Period PM Peak Project Description Future Traffic Volumes Left Turn Entering East/West Street: Site Drive North/South Street: Roger Williams Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Northbound Southbound Movement 3 4 5 6 L T R L R Volume 210 430 0 410 0 45 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 230 472 0 0 450 49 Percent Heavy Vehicles 0 0 --Median Type Undivided RT Channelized 0 0 Lanes 1 1 0 0 1 0 Configuration L TR Upstream Signal 0 0 Minor Street Westbound Eastbound Movement 7 8 9 10 11 12 L T R L T R Volume 0 0 0 35 0 170 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 0 0 0 38 0 186 Percent Heavy Vehicles 0 0 0 0 0 0 Percent Grade (%) 0 0 Flared Approach Ν N Storage 0 0 RT Channelized 0 0 Lanes 0 0 0 0 1 Configuration L R Delay, Queue Length, and Level of Service Approach NB SB Westbound Eastbound Movement 1 4 7 8 9 10 12 Lane Configuration L L R v (vph) 230 38 186 1075 C (m) (vph) 122 595 0.21 0.31 0.31 95% queue length 0.81 1.22 1.33 Control Delay 9.3 47.3 13.8 LOS A Ε В Approach Delay \_ 19.5 Approach LOS C

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#### TWO-WAY STOP CONTROL SUMMARY General Information Site Information Analyst JZR Intersection Roger Williams Ave & Site Dr Agency/Co. NE&C Jurisdiction East Providence Date Performed 6/7/05 Analysis Year 2010 Analysis Time Period SAT Peak Project Description Future Traffic Volumes Left Turn Lane Entering East/West Street: Site Drive North/South Street: Roger Williams Ave Intersection Orientation: North-South Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Northbound Southbound Movement 2 3 4 5 6 T R L T R Volume 220 260 0 0 220 45 Peak-Hour Factor, PHF 0.91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 241 285 0 0 241 49 Percent Heavy Vehicles 0 0 \_ \_ Median Type Undivided RT Channelized 0 0 anes 1 1 0 0 1 0 Configuration L T TR Upstream Signal 0 0 Minor Street Westbound Eastbound Movement 7 8 9 10 11 12 L T R L T R Volume 0 0 0 40 0 190 Peak-Hour Factor, PHF 0,91 0.91 0.91 0.91 0.91 0.91 Hourly Flow Rate, HFR 0 0 0 43 0 208 Percent Heavy Vehicles 0 0 0 0 0 0 Percent Grade (%) 0 0 Flared Approach N N Storage 0 0 RT Channelized 0 0 Lanes 0 0 0 0 1 Configuration L R Delay, Queue Length, and Level of Service Approach SB Westbound Eastbound Movement 1 4 8 9 10 11 12 Lane Configuration L L R v (vph) 241 43 208 C (m) (vph) 1283 211 778 v/c 0.19 0.20 0.27 95% queue length 0.69 0.74 1.08 Control Delay 8.5 26.4 11.3 LOS A D В Approach Delay 13.9 Approach LOS В

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### APPENDIX D

QUEUING AND SIGNAL WARRANT ANALYSES

North Broadway, Roger Williams Ave/Centre St	DATE	10/5/2004
AM Combined with improvements NB Left	JOB#	3103

#### Overflow Queue:

OVERFLOW QUEUE: No			BACK OF THE QUEUE		
			Nb = N/(1-(j/v)qL)	1	
				l	
No =if known	Cap	561.00	WHERE		
n =number of lanes	n	1.00	Nb = back of the queue in vehicles		
S = cruising speed, MPH	S	35.00	N = the stop line queue in vehicles	N	5.47
g =effective green	g		qL = lane flow, in vehicles per sec		0.13
C =cycle length	C	90.00			
s = saturation flow	s	0.45	[1] [1] [1] [1] [1] [1] [1] [1] [1] [1]	J	
Q =capacity in vph	Q	561.00	approximation)		
V =flow rate in Tf(usually in vph)	V	478.00	j = avg queue space per vehicle	li	25.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00		ľ	
q = flow rate in vps; V/Tf or V/3600	q	0.13	v = normal cruising speed in feet	v	51.33
QTf =throughput, ie the max number of	Qtf	561.00			
veh dishcharged in period Tf			travel one vehicle space at		1
X =V/Qtf, degree of saturation	X	0.85			
z =X-1 (note this has a negative value	z	-0.15		Nb	5.85
for X<1; also zQ=q-Q		6 43			
Xo =deg of sat below which avg overflow	Xo	0.71			
queue is approx zero and given by	İ				
Xo =0.67+ s*g/600	١.,		MAXIMUM BACK OF QUEUE		
where s=sat flow vps, g=eff green	X-Xc	0.14	Nm = N/(1-y)		
j = average queue space per vehicle (ft)	i	E. vanishing	reached after the start of green	ļ	
No = avg overflow queue (total veh	•		, and the second		
all lanes)	No	1.35	WHERE		
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)			Nm = maximum back of queue		1
for X>Xo, otherwise No=0			N = gr +No	N	5.47
			y = flow ratio q avg vps/sat flow	У	0.30
QUEUE LENGTH			g = arrival vps, VPH/3600	9	0.13
			r =C-G =effective red time, gr in veh	F	31.00
The avg number of vehicles in the queue			, ,	V	478.00
at the start of the green period can be			No = avg overflow queue (total veh	No	1.35
calculated from:			all lanes)		
N=qr+No				Nm	7.76
,					VEHICLES
where					
q=arrival demand rate in vps or veh/cycle	a	0.13			
r =C-G =effective red time, qr in veh	c	2750777 7495555	CRITICAL QUEUE LENGTH .	1	
C = cycle time in seconds	G		Nc = 2 Nb	No	11.69
	r	31.00	OFFICE STREET,	100	VEHICLES
¥		200			, ,,,,,,,,
	N	5.47	REQUIRED STORAGE is jNc/n		292.36
*		VEHICLES			FEET

	DATE	10/5/2004
AM Combined with improvements NB Through	JOB#	3103

### Overflow Queue:

BACK OF THE QUEUE		i
	1	1
Nb = N/(1-(j/v)qL)		
		İ
	N	3.28
qL = lane flow, in vehicles per sec		0.13
(total movement flow divided by		
the number of lanes as a first		
approximation)		
= avg queue space per vehicle	j	25.00
in feet		
v = normal cruising speed in feet	v	51.33
per second (hence j/v = time to		
travel one vehicle space at		
cruising speed		
<u>-</u>	Nb	3.50
		-
MAXIMUM BACK OF QUEUE		
Nm = N/(1-y)		
Social pulse from the second s		
WHERE		L.
Vm = maximum back of queue		
oran contentino	N	3.28
/ = flow ratio g avg vps/sat flow	v	0.29
		0.13
		31.00
Product Transaction Control of the Control of the Control of Contr	v	473.00
lo = avg overflow queue (total veh	No	-0.80
	Nm	4.63
		VEHICLES
1"		
CRITICAL QUEUE LENGTH		
AND STANDARD STANDARD	No .	7.00
		VEHICLES
		VENTOLLO
EQUIRED STORAGE is jNc/n		174.97
		11-1.01
	WHERE Ib = back of the queue in vehicles I = the stop line queue in vehicles L = lane flow, in vehicles per sec (total movement flow divided by the number of lanes as a first approximation) = avg queue space per vehicle in feet = normal cruising speed in feet per second (hence j/v = time to travel one vehicle space at cruising speed  IAXIMUM BACK OF QUEUE m = N/(1-y) eached after the start of green  WHERE m = maximum back of queue = qr +No = flow ratio q avg vps/sat flow = arrival vps, VPH/3600 •C-G = effective red time, qr in veh all lanes)  RITICAL QUEUE LENGTH c = 2 Nb	WHERE Ib = back of the queue in vehicles I = the stop line queue in vehicles L = lane flow, in vehicles per sec (total movement flow divided by the number of lanes as a first approximation) = avg queue space per vehicle in feet = normal cruising speed in feet per second (hence j/v = time to travel one vehicle space at cruising speed  Nb  MAXIMUM BACK OF QUEUE m = N/(1-y) eached after the start of green  /HERE m = maximum back of queue = qr +No = flow ratio q avg vps/sat flow = arrival vps, VPH/3600 cC-G = effective red time, qr in veh D = avg overflow queue (total veh all lanes)  NRITICAL QUEUE LENGTH C = 2 Nb  No  RITICAL QUEUE LENGTH C = 2 Nb

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#### Overflow Queue:

OVERFLOW QUEUE: No			BACK OF THE QUEUE		
			Nb = N/(1-(j/v)qL)		
No =if known	Сар	773.00	WHERE		
n =number of lanes	n	1.00	Nb = back of the queue in vehicles		1
S = cruising speed, MPH	S	35.00	N = the stop line queue in vehicles	N	11.17
g =effective green	g		qL = lane flow, in vehicles per sec		0.18
C =cycle length	C	90.00			
s = saturation flow	s	0.45	[1. [사용] 이 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		1
Q =capacity in vph	Q	773.00	The state of the s		
V =flow rate in Tf(usually in vph)	V		j = avg queue space per vehicle	li	25.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00	in feet	ľ	
q = flow rate in vps; V/Tf or V/3600	q		v = normal cruising speed in feet	v	51.33
QTf =throughput, ie the max number of	Qtf	773.00		1	
veh dishcharged in period Tf			travel one vehicle space at	1	
X =V/Qtf, degree of saturation	Х	0.86			
z =X-1 (note this has a negative value	z	-0.14		Nb	12,26
for X<1; also zQ=q-Q		0			12.20
Xo =deg of sat below which avg overflow	Χo	0.70			
queue is approx zero and given by	1	0., 0	·		
Xo =0.67+ s*g/600		=	MAXIMUM BACK OF QUEUE		
where s=sat flow vps, g=eff green	X-Xc	0.16	Nm = N/(1-y)	1	l
i = average queue space per vehicle (ft)	i		reached after the start of green		
No = avg overflow queue (total veh	,	20.00	rodoned ditor the start of groot	1	
all lanes)	No	1.60	WHERE	1	
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)	110		Nm = maximum back of queue		
for X>Xo, otherwise No=0		VEINOLLO	N = gr +No	N	11.17
io x xo, one wise to-o			y = flow ratio q avg vps/sat flow	y	0.41
QUEUE LENGTH			q = arrival vps, VPH/3600		0.41
QUEUE ELIVOTTI			r =C-G =effective red time, gr in veh	q r	52.00
The avg number of vehicles in the queue			r =0-0 =enective red time, qr in ven	ľv	662.00
at the start of the green period can be			No = avg overflow queue (total veh	No	1.60
calculated from:			all lanes)	INO	1.00
N=qr+No			all failes)	Nm	18.88
14-qi +140				INIII	
  where					VEHICLES
	_	0.18		<b> </b>	
	C C				
r =C-G =effective red time, qr in veh			CRITICAL QUEUE LENGTH	No	04.50
C = cycle time in seconds	G		Nc = 2 Nb	Nc	24.53
	ı	52.00			VEHICLES
	N1	4447	DECLUDED STORAGE IS IN 1		
	N		REQUIRED STORAGE is jNc/n		613.18
		VEHICLES			FEET

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#### Overflow Queue:

			,		
OVERFLOW QUEUE: No			BACK OF THE QUEUE		
			Nb = N/(1-(j/v)qL)		
1				1	1
No =if known	Cap	488.00	WHERE	1	
n =number of lanes	n	1.00	Nb = back of the queue in vehicles	İ	
S = cruising speed, MPH	s	35.00	N = the stop line queue in vehicles	N	1.62
g =effective green	g		qL = lane flow, in vehicles per sec		0.04
C =cycle length	C	90.00			
s = saturation flow	s	0.45	[14] [[ - 이모리 - 14 - 14 - 14 - 14 - 14 - 14 - 14 - 1		
Q =capacity in vph	Q	488.00	constitution in the resolution of the constitution of the constitution of the second constitution.		
V =flow rate in Tf(usually in vph)	V		j = avg queue space per vehicle	li	25.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00	in feet	ľ	
q = flow rate in vps; V/Tf or V/3600	q	į.	v = normal cruising speed in feet	v	51.33
QTf =throughput, ie the max number of	Qtf	488.00		ľ	01.00
veh dishcharged in period Tf			travel one vehicle space at		
X =V/Qtf, degree of saturation	x	0.28			
z =X-1 (note this has a negative value	z	-0.72		Nb	1.65
for X<1; also zQ=q-Q		5.72	=	130	1.00
Xo =deg of sat below which avg overflow	Χn	0.69			
queue is approx zero and given by	1	0.00			
Xo =0.67+ s*g/600			MAXIMUM BACK OF QUEUE	<del> </del>	
where s=sat flow vps, g=eff green	X-Xc	-0.41	Nm = N/(1-y)		1
j = average queue space per vehicle (ft)	i	20000100000000	reached after the start of green		
No = avg overflow queue (total veh	ľ	20,00	readified after the start of green	1	
all lanes)	No	-0.86	WHERE		
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)	140		Nm = maximum back of queue		
for X>Xo, otherwise No=0		VEHICLES	N = gr +No	l <sub>N</sub>	4 00
IIIOI X-X0, Otherwise No-0			NA DE MARIE TARRESTONE	N	1.62
QUEUE LENGTH			y = flow ratio q avg vps/sat flow	У	0.08
QUEUE LENGTH			q = arrival vps, VPH/3600	q	0.04
The gus sumber of vehicles in the guerre			r =C-G =effective red time, qr in veh	r	66.00
The avg number of vehicles in the queue			NI	V	135.00
at the start of the green period can be		J	No = avg overflow queue (total veh	No	-0.86
calculated from:			all lanes)		
N=qr+No				Nm	1.76
					VEHICLES
where					
q=arrival demand rate in vps or veh/cycle		0.04			
r =C-G =effective red time, qr ln veh	С		CRITICAL QUEUE LENGTH		
C = cycle time in seconds	G	A STATE AND A STATE OF THE STAT	Nc = 2 Nb	Nc	3.30
	r	66.00			VEHICLES
		ing possession			Company and
	N		REQUIRED STORAGE is jNc/n		82.40
		VEHICLES			FEET

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#### Overflow Queue:

LOVEDELOW OUTLIE 11	<del></del>	<del> </del>	I DAOK OF THE OVER	<del></del>	<del></del>
OVERFLOW QUEUE: No			BACK OF THE QUEUE	1	1
			Nb = N/(1-(j/v)qL)		
N. 161			1	Ī	
No =if known	Cap		WHERE		
n =number of lanes	n		Nb = back of the queue in vehicles		
S = cruising speed, MPH	S		N = the stop line queue in vehicles	N	10.09
g =effective green	g		qL = lane flow, in vehicles per sec		0.19
C =cycle length	C	90.00			
s = saturation flow	S	0.45			
Q =capacity in vph	Q	816.00			
V =flow rate in Tf(usually in vph)	V	699.00	j = avg queue space per vehicle	lj .	25.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00			
q = flow rate in vps; V/Tf or V/3600	q	0.19	v = normal cruising speed in feet	V	51.33
QTf =throughput, ie the max number of	Qtf	816.00			
veh dishcharged in period Tf	1		travel one vehicle space at		
X =V/Qtf, degree of saturation	X	0.86		1	
z =X-1 (note this has a negative value	Z.	-0.14	A DOMESTIC CONTROL OF THE STATE	Nb	11.15
for X<1; also zQ=q-Q				1	
Xo =deg of sat below which avg overflow	Χo	0.70			
queue is approx zero and given by				l	
Xo =0.67+ s*g/600			MAXIMUM BACK OF QUEUE		
where s=sat flow vps, g=eff green	X-Xc	0.15	Nm = N/(1-y)		
j = average queue space per vehicle (ft)	li i		reached after the start of green		
No = avg overflow queue (total veh	,		9.		
all lanes)	No	1.55	WHERE		
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)			Nm = maximum back of queue		
for X>Xo, otherwise No=0			N = gr +No	N	10.09
			y = flow ratio q avg vps/sat flow	у	0.43
QUEUE LENGTH			q = arrival vps, VPH/3600	q	0.19
			r =C-G =effective red time, qr in veh	Г	44.00
The avg number of vehicles in the queue			a choose rea line, quarter	ľv	699.00
at the start of the green period can be			No = avg overflow queue (total veh	No	1 <i>.</i> 55
calculated from:			all lanes)	INO	1,00
N=qr+No			di idiles)	Nm	17.75
41.110				T VIII	VEHICLES
where					VEHICLES
q=arrival demand rate in vps or veh/cycle	ا <sub>ا</sub>	0.19			
r =C-G =effective red time, qr in veh	C		CRITICAL QUEUE LENGTH		
C = cycle time in seconds	G		No = 2 Nb	Nc	22.30
S Syste units in seconds	-	44.00	MANDERN SCHOOL CANDE	140	
**	'	44.00		ļi	VEHICLES
	N	10.00	REQUIRED STORAGE is jNc/n		557 20
	14				557.39
		VEHICLES			FEET

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### Overflow Queue:

OVERFLOW QUEUE: No		<del> </del>	N DAGK OF THE OUTLE		
OVERPLOW QUEUE. NO			BACK OF THE QUEUE		
			Nb = N/(1-(j/v)qL)		
No =if known	Сар	207.00	WHERE		
n =number of lanes	1 .	1	Nb = back of the queue in vehicles		1
S = cruising speed, MPH	n S		N = the stop line queue in vehicles	N	0.05
g =effective green		200000000000000000000000000000000000000	The state of the s	IN	2.85
C =cycle length	g C		qL = lane flow, in vehicles per sec		0.05
s = saturation flow		90.00			
The state of the s	s	0.45			
Q =capacity in vph	Q V	307.00			
V =flow rate in Tf(usually in vph)			j = avg queue space per vehicle	נן	25.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00	77 (00) NOW (00)		
q = flow rate in vps; V/Tf or V/3600	q		v = normal cruising speed in feet	V	51.33
QTf =throughput, ie the max number of	Qtf	307.00	, , ,		
veh dishcharged in period Tf			travel one vehicle space at		
X =V/Qtf, degree of saturation	X	0.58	cruising speed		
z =X-1 (note this has a negative value	z	-0.42		Nb	2.92
for X<1; also zQ=q-Q					
Xo =deg of sat below which avg overflow	Xo	0.69		1	
queue is approx zero and given by					
Xo =0.67+ s*g/600			MAXIMUM BACK OF QUEUE		
where s=sat flow vps, g=eff green	X-Xc	- CO - CO - CO - CO - CO - CO - CO - CO	Nm = N/(1-y)		
j = average queue space per vehicle (ft)	j	25.00	reached after the start of green		
No = avg overflow queue (total veh	2 25			1	
all lanes)	No	The second of th	WHERE		
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)		VEHICLES	Nm = maximum back of queue		
for X>Xo, otherwise No=0			N = qr + No	N	2.85
			y = flow ratio q avg vps/sat flow	У	0.11
QUEUE LENGTH			q = arrival vps, VPH/3600	q	0.05
			r =C-G =effective red time, qr in veh	r	66.00
The avg number of vehicles in the queue				V	177.00
at the start of the green period can be			No = avg overflow queue (total veh	No	-0.40
calculated from:			all lanes)		
N=qr+No				Nm	3.20
0.7					VEHICLES
where	(4				
q=arrival demand rate in vps or veh/cycle		0.05			
r =C-G =effective red time, qr in veh	С		CRITICAL QUEUE LENGTH		
C = cycle time in seconds	G		Nc = 2 Nb	Nc	5.84
	r	66.00			VEHICLES
			2		
	N		REQUIRED STORAGE is jNc/n		145.88
		VEHICLES			FEET

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#### Overflow Queue:

			N		
OVERFLOW QUEUE: No	T		BACK OF THE QUEUE		
		1	Nb = N/(1-(j/v)qL)	1	
No =if known	Cap	494.00	WHERE		
n =number of lanes	n '		Nb = back of the queue in vehicles		
S = cruising speed, MPH	S		N = the stop line queue in vehicles	N	1.51
g =effective green	g	24.00	qL = lane flow, in vehicles per sec	Γ	0.04
C =cycle length	Č	90.00		1	0.04
s = saturation flow	s	0.45			
Q =capacity in vph	Q	494.00	CONTRACTOR OF THE SECOND PROPERTY.		
V =flow rate in Tf(usually in vph)	v		j = avg queue space per vehicle		25.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00		ľ	25.00
q = flow rate in vps; V/Tf or V/3600	ſ	i	v = normal cruising speed in feet	l.,	F4 22
QTf =throughput, ie the max number of	q Qtf	494.00		ľ	51.33
veh dishcharged in period Tf	Cell	454.00			
X =V/Qtf, degree of saturation	х	0.26	travel one vehicle space at		
z =X-1 (note this has a negative value	z.		, ,	l	l
	2	-0.74		Nb	1.54
for X<1; also zQ=q-Q	\	0.00			
Xo =deg of sat below which avg overflow	YO.	0.69		(4)	
queue is approx zero and given by					
Xo =0.67+ s*g/600		~	MAXIMUM BACK OF QUEUE	ĺ	
where s=sat flow vps, g=eff green	X-Xc		Nm = N/(1-y)		1
j = average queue space per vehicle (ft)	1)	25.00	reached after the start of green		
No = avg overflow queue (total veh	l '	2002			
all lanes)	No		WHERE		
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)		VEHICLES	Nm = maximum back of queue		
for X>Xo, otherwise No=0			N = qr + No	N	1.51
			y = flow ratio q avg vps/sat flow	У	0.08
QUEUE LENGTH			q = arrival vps, VPH/3600	q	0.04
			r =C-G =effective red time, qr in veh	r	66.00
The avg number of vehicles in the queue				V	130.00
at the start of the green period can be			No = avg overflow queue (total veh	No	-0.87
calculated from:			all lanes)		
N=qr+No			*	Nm	1.65
					VEHICLES
where					
q=arrival demand rate in vps or veh/cycle	q	0.04			
r =C-G =effective red time, gr in veh	Ċ	90.00	CRITICAL QUEUE LENGTH		
C = cycle time in seconds	G		Nc = 2 Nb	Nc	3.08
	r	66.00			VEHICLES
	N	1.51	REQUIRED STORAGE is jNc/n		77.07
		VEHICLES			FEET

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#### Overflow Queue:

12.12 0.22
0.22
05.00
25.00
E4 00
51.33
40.50
13.58
40.40
12.12
0.49
0.22
25.00
794.00
6.61
22.70
23.78
HICLES
]
27.40
27.16
HICLES
670.40
679.12 FEET

Mosth Decades D. Milli A. IO. I. C.		
North Broadway, Roger Williams Ave/Centre St	IDATE I	10/5/2004
DM Combined with it	UAIL	10/3/2004
PM Combined with improvements NB Through	JOB#	3103
	1000 #	3103

### Overflow Queue:

03103.0 East PointeBroadwayRogerWilliamsPM

Each formula below can be considered to have a uniform and overflow component. Average overflow queue is the average number of vehicles left in the queue at the beginning of the green period. Even if the arrrival rate flow rate is, on average, less than the capacity, (ie the degree of saturation X<1) there are some oversaturated cycles because of the random fluctuations in arrival flow rates. The following approximate expressrion has been derived for predicting average overflow queues in both undersaturated (X<1) and oversaturated (X>1) conditions at isolated fixed time signals:

OVEDELOW OFFICE OF					
OVERFLOW QUEUE: No			BACK OF THE QUEUE		
			Nb = N/(1-(j/v)qL)		
No =if known					
	Cap		WHERE		
n =number of lanes	n	1.00	Nb = back of the queue in vehicles	ľ	
S = cruising speed, MPH	S	35.00	N = the stop line queue in vehicles	N	4.23
g =effective green	g	75.00	qL = lane flow, in vehicles per sec	1	0.20
C =cycle length	С	100.00	1		
s = saturation flow	s	0.45			
Q =capacity in vph	Q	1402.00	11		
V =flow rate in Tf(usually in vph)	V	706.00	j = avg queue space per vehicle	j j	25.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00		l	
q = flow rate in vps; V/Tf or V/3600	q	0.20	v = normal cruising speed in feet	V	51.33
QTf =throughput, ie the max number of	Qtf	1402.00			
veh dishcharged in period Tf			travel one vehicle space at		1
X =V/Qtf, degree of saturation	Х	0.50	J		
z =X-1 (note this has a negative value	z	-0.50	0.00	Nb	4.68
for X<1; also zQ=q-Q			=,		
Xo =deg of sat below which avg overflow	Χo	0.73			
queue is approx zero and given by			0	1	
Xo =0.67+ s*g/600		8	MAXIMUM BACK OF QUEUE		
where s=sat flow vps, g=eff green	X-X	0.0000000000000000000000000000000000000	Nm = N/(1-y)		
j = average queue space per vehicle (ft)	j	25.00	reached after the start of green		
No = avg overflow queue (total veh					
all lanes)	No		WHERE		i l
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)		VEHICLES	Nm = maximum back of queue		1 1
for X>Xo, otherwise No=0			N = qr + No	N	4.23
			y = flow ratio q avg vps/sat flow	у	0.44
QUEUE LENGTH			q = arrival vps, VPH/3600	q	0.20
			r =C-G =effective red time, gr in veh	r	25.00
The avg number of vehicles in the queue				V	706.00
at the start of the green period can be			No = avg overflow queue (total veh	No	-0.67
calculated from:			all lanes)		
N=qr+No		1	150	Nm	7.49
					VEHICLES
where					
q=arrival demand rate in vps or veh/cycle	q	0.20			
r =C-G =effective red time, qr in veh	С		CRITICAL QUEUE LENGTH		
C = cycle time in seconds	G	75.00	Nc = 2 Nb	Nc	9.35
	r	25.00			VEHICLES
	N	4.23	REQUIRED STORAGE is jNc/n		233.76
		VEHICLES	N		FEET

6/7/2005

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#### Overflow Queue:

OVEDELOW OFFICE ME	_		To all and a second	<del>-,</del>	
OVERFLOW QUEUE: No			BACK OF THE QUEUE		
			Nb = N/(1-(j/v)qL)	1	
N101	_				
No =if known	Cap		WHERE		
n =number of lanes	n		Nb = back of the queue in vehicles		
S = cruising speed, MPH	s		N = the stop line queue in vehicles	N	13.40
g =effective green	g		qL = lane flow, in vehicles per sec		0.16
C =cycle length	C	100.00	(total movement flow divided by		
s = saturation flow	s	0.45	the number of lanes as a first	1	
Q =capacity in vph	Q	648.00			
V =flow rate in Tf(usually in vph)	V ·	584.00	j = avg queue space per vehicle	li	25.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00	in feet	ľ	
q = flow rate in vps; V/Tf or V/3600	q	0.16	v = normal cruising speed in feet	v	51.33
QTf =throughput, ie the max number of	Qtf	648.00			2.100
veh dishcharged in period Tf			travel one vehicle space at	1	
X =V/Qtf, degree of saturation	X	0.90			
z =X-1 (note this has a negative value	z	-0.10	(1) 10 10 10 10 10 10 10 10 10 10 10 10 10	Nb	14.55
for X<1; also zQ=g-Q				1	700
Xo =deg of sat below which avg overflow	Χo	0.70			
queue is approx zero and given by					
Xo =0.67+ s*g/600		· ·	MAXIMUM BACK OF QUEUE	<del> </del>	
where s=sat flow vps, g=eff green	X-Xc	0.20	Nm = N/(1-y)	- 1	
j = average queue space per vehicle (ft)	i		reached after the start of green	1	
No = avg overflow queue (total veh	1	20.00	reaction and the start of green	]	
all lanes)	No	2.86	WHERE		
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)			Nm = maximum back of queue		
for X>Xo, otherwise No=0		VEITOLLO	N = qr +No	N	13.40
io x xo, outsimilas res o			y = flow ratio q avg vps/sat flow	500000	AD CONTRACTOR OF THE ACT
QUEUE LENGTH			q = arrival vps, VPH/3600	У	0.36
GOLOL LLINGINI				q	0.16
The avg number of vehicles in the queue			r =C-G =effective red time, qr in veh	r	65.00
at the start of the green period can be			No = oug ougston //- (-1-)	V	584.00
calculated from:			No = avg overflow queue (total veh	No	2.86
The Party and report of the section			all lanes)	l I	
N=qr+No				Nm	20.96
hubara		1			VEHICLES
where	20000				
q=arrival demand rate in vps or veh/cycle	q	0.16			
r =C-G =effective red time, qr in veh	C		CRITICAL QUEUE LENGTH		
C = cycle time in seconds	G		Nc = 2 Nb	Nc	29.10
	r	65.00			VEHICLES
	N	13.40	REQUIRED STORAGE is jNc/n		727.60
		VEHICLES			FEET

North Broadway, Roger Williams Ave/Centre St	DATE	10/5/2004
PM Combined with improvements EB Left/Through	JOB#	3103

### Overflow Queue:

OVERFLOW QUEUE: No			BACK OF THE QUEUE -		
			Nb = N/(1-(j/v)qL)		
				1	
No =if known	Cap	181.00	WHERE		
n =number of lanes	n		Nb = back of the queue in vehicles		
S = cruising speed, MPH	S		N = the stop line queue in vehicles	N	3.60
g =effective green	g	11.00	qL = lane flow, in vehicles per sec	1.	0.04
C =cycle length	C	100.00			0.04
s = saturation flow	s	0.45	III. Common management and an arrangement and an arrangement and arrangement and arrangement and arrangement and arrangement and arrangement arrangeme		
Q =capacity in vph	Q	181.00			
V =flow rate in Tf(usually in vph)	V		j = avg queue space per vehicle	li .	25.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00		ľ	25.00
q = flow rate in vps; V/Tf or V/3600	q	E	v = normal cruising speed in feet	V	51.33
QTf =throughput, ie the max number of	Qtf	181.00		1	51.55
veh dishcharged in period Tf		101.00	travel one vehicle space at		
X =V/Qtf, degree of saturation	X	0.73			
z =X-1 (note this has a negative value	z	-0.27	, ,	Nb	3.67
for X<1; also zQ=q-Q	-	0.27		IND	3.07
Xo =deg of sat below which avg overflow	Χo	0.68		1	
queue is approx zero and given by	1	0.00	25		
Xo =0.67+ s*g/600			MAXIMUM BACK OF QUEUE	-	
where s=sat flow vps, g=eff green	X-X	0.06	Nm = N/(1-y)		
j = average queue space per vehicle (ft)	1		reached after the start of green		
No = avg overflow queue (total veh	ľ	25.00	reactied after the start of green		
all lanes)	No	0.22	WHERE		
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)	INO		( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )		1
for X>Xo, otherwise No=0		VEHICLES	Nm = maximum back of queue	l.,	
illor X-Xo, otherwise No-o	0		N = qr +No	N	3.60
QUEUE LENGTH	-		y = flow ratio q avg vps/sat flow	У	0.08
QOLOC LENGTH			q = arrival vps, VPH/3600	q	0.04
The sugar makes of each interior			r =C-G =effective red time, qr in veh	r	89.00
The avg number of vehicles in the queue			61	V	133.00
at the start of the green period can be			No = avg overflow queue (total veh	No	0.32
calculated from:			all lanes)		
N=qr+No				Nm	3.93
					VEHICLES
where		8800 8000 A			
	q	0.04			
r =C-G =effective red time, qr in veh	С		CRITICAL QUEUE LENGTH		
C = cycle time in seconds	G		Nc = 2 Nb	No	7.34
	r	89.00			VEHICLES
	2				
	N		REQUIRED STORAGE is jNc/n		183.49
		VEHICLES			FEET

North Broadway, Roger Williams Ave/Centre St	DATE	10/5/2004
PM Combined with improvements EB Right	JOB#	3103

#### Overflow Queue:

OVERFLOW QUEUE: No	T		PACK OF THE OHELE	_	<del> </del>
OVERTICOV QUEUE. NO			BACK OF THE QUEUE		
			Nb = N/(1-(j/v)qL)		
No =if known	Сар	816.00	WHERE		
n =number of lanes	n	•	Nb = back of the queue in vehicles		
S = cruising speed, MPH	s		N = the stop line queue in vehicles	N	0.40
g =effective green	1		qL = lane flow, in vehicles per sec	l <sub>IA</sub>	8.19
C =cycle length	g	100.00			0.17
s = saturation flow	s	0.45			
Q =capacity in vph	Q	816.00			
V =flow rate in Tf(usually in vph)	V			1.	
Tf =flow period of demand V (a.aa hrs.)	Tf		j = avg queue space per vehicle	J	25.00
q = flow rate in vps; V/Tf or V/3600	1	1.00	V6000 4000000000000000000000000000000000		
	d		v = normal cruising speed in feet	V	51.33
QTf =throughput, ie the max number of	Qtf	816.00			
veh dishcharged in period Tf	V	0	travel one vehicle space at	1	
X =V/Qtf, degree of saturation	X	0.73			
z =X-1 (note this has a negative value for X<1; also zQ=q-Q	z	-0.27		Nb	8.91
Xo =deg of sat below which avg overflow	Χo	0.71			
queue is approx zero and given by	1	0.71			
Xo =0.67+ s*g/600			MAXIMUM BACK OF QUEUE	-	
where s=sat flow vps, g=eff green	X-Xc	0.00	Nm = N/(1-y)		
j = average queue space per vehicle (ft)	ו א-אנ			1	
No = avg overflow queue (total veh	)	25.00	reached after the start of green		
all lanes)	No	0.11	WHERE		
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)	INO	100 CONTRACTOR (CONTRACTOR SON)			
for X>Xo, otherwise No=0		VEHICLES	Nm = maximum back of queue N = qr +No		
iot X2X0, outerwise No-0			1	N	8.19
QUEUE LENGTH			y = flow ratio q avg vps/sat flow	У	0.37
WOLOE ELIVOITI		929	q = arrival vps, VPH/3600	q	0.17
The avg number of vehicles in the queue			r =C-G =effective red time, qr in veh	lr V	49.00
at the start of the green period can be			No a gua quadique quale (fal-1)	V	594.00
calculated from:			No = avg overflow queue (total veh	No	0.11
N=qr+No			all lanes)	Nie	10.01
14-qi -140				Nm	12.94
where					VEHICLES
q=arrival demand rate in vps or veh/cycle	0	0.17			
r = C-G =effective red time, qr in veh	C		CRITICAL QUEUE LENGTH		
C = cycle time in seconds	G		appears and a second se	Nc	17 00
.,	r	49.00	HO - Z ND	INC	17.82
					VEHICLES
	N	ន 10	REQUIRED STORAGE is jNc/n		445.47
		VEHICLES	. LECTRED OF OF OTOL 13 JNO/11		FEET

NI- III D. I. D. MOIII		
North Broadway, Roger Williams Ave/Centre St	IDATE	10/5/2004
"PM Combined with improvements WB Left	JOB#	
		3103

#### Overflow Queue:

OVERFLOW QUEUE: No	_	<del></del>	TRACK OF THE CHELLS	<del></del>	
OVERPLOW QUEDE: NO			BACK OF THE QUEUE		
			Nb = N/(1-(j/v)qL)		
No =if known	Cap	145.00	WHERE		
n =number of lanes	n	E .	Nb = back of the queue in vehicles		
S = cruising speed, MPH	S	35.00	N = the stop line queue in vehicles	N	2.68
g =effective green		18.00	qL = lane flow, in vehicles per sec	1	0.03
C =cycle length	g C	100.00			0.03
s = saturation flow	s	0.45	1		
Q =capacity in vph	Q	145.00	1		
V =flow rate in Tf(usually in vph)	V		j = avg queue space per vehicle	l <sub>i</sub>	25.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00	in feet	ľ	20.00
q = flow rate in vps; V/Tf or V/3600	q	9-39771	v = normal cruising speed in feet	v	51.33
QTf =throughput, ie the max number of	Qtf	145.00	per second (hence j/v = time to		01.00
veh dishcharged in period Tf			travel one vehicle space at		1
X =V/Qtf, degree of saturation	X	0.73			
z =X-1 (note this has a negative value	z	-0.27		Nb	2.71
for X<1; also zQ=q-Q					
Xo =deg of sat below which avg overflow	Χo	0.68			
queue is approx zero and given by					
Xo =0.67+ s*g/600		)	MAXIMUM BACK OF QUEUE		
where s=sat flow vps, g=eff green	X-Xc		Nm = N/(1-y)	1	ĺ
j = average queue space per vehicle (ft)	j	25.00	reached after the start of green		
No = avg overflow queue (total veh				1	
all lanes)	No		WHERE		
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)		VEHICLES	Nm = maximum back of queue		
for X>Xo, otherwise No=0			N = qr + No	N	2.68
01/5/15 / 5/105/1			y = flow ratio q avg vps/sat flow	У	0.07
QUEUE LENGTH			q = arrival vps, VPH/3600	q	0.03
			r =C-G =effective red time, qr in veh	Г	82.00
The avg number of vehicles in the queue				V	106.00
at the start of the green period can be calculated from:			No = avg overflow queue (total veh	No	0.26
		i	all lanes)		
N=qr+No				Nm	2.86
where					VEHICLES
		0.00			
q=arrival demand rate in vps or veh/cycle reC-G =effective red time, qr in veh		0.03			
C = cycle time in seconds	C G		CRITICAL QUEUE LENGTH		
o byole line in seconds	5		Nc = 2 Nb	Nc	5.43
ě.	<b>'</b> [	82.00			VEHICLES
9	N	2 60	REQUIRED STORAGE is jNc/n		105 75
	'	VEHICLES	NEGOINED STORAGE IS JINC/II	-	135.75 FEET

North Broadway, Roger Williams Ave/Centre St	DATE	10/5/2004
PM Combined with improvements WB Through/Right	JOB#	3103
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### Overflow Queue:

OVERFLOW QUEUE: No	7		The old of the old of		
OVERTICOW GOEDE. NO			BACK OF THE QUEUE		
			Nb = N/(1-(j/v)qL)		
No =if known	Cap	319.00	WHERE		
n =number of lanes	n	120	Nb = back of the queue in vehicles		1
S = cruising speed, MPH	S	35.00	N = the stop line queue in vehicles	N	0.50
g =effective green	g	18.00	qL = lane flow, in vehicles per sec	IN	2.50
C =cycle length	Č	100.00	(total movement flow divided by		0.04
s = saturation flow	s	0.45	II ( I I I I I I I I I I I I I I I I I		
Q =capacity in vph	Q	319.00	approximation)		
V =flow rate in Tf(usually in vph)	V	,	j = avg queue space per vehicle		55.00
Tf =flow period of demand V (a.aa hrs.)	Tf	1.00	in feet	Į.	25.00
q = flow rate in vps; V/Tf or V/3600	q		v = normal cruising speed in feet		54.00
QTf =throughput, ie the max number of	Qtf	319.00	per second (hence j/v = time to	V	51.33
veh dishcharged in period Tf		1	travel one vehicle space at	1	1 1
X =V/Qtf, degree of saturation	X	0.44	cruising speed	1	
z =X-1 (note this has a negative value	z	-0.56	))	Nb	2.55
for X<1; also zQ=q-Q				IND	2.55
Xo =deg of sat below which avg overflow	Χo	0.68			
queue is approx zero and given by					
Xo =0.67+ s*g/600			MAXIMUM BACK OF QUEUE		
where s=sat flow vps, g=eff green	X-X	-0.25	Nm = N/(1-y)	1	1
j = average queue space per vehicle (ft)	j	25.00	reached after the start of green	1	
No = avg overflow queue (total veh			Secretary many first and a secretary secretary	l	1 1
all lanes)	No	-0.66	WHERE	İ	
(Q*Tf/4)*(z+(z^2+12*(X-Xo)/Q*Tf)^.5)		VEHICLES	Nm = maximum back of queue		
for X>Xo, otherwise No=0		16	N = qr + No	N	2.50
			y = flow ratio q avg vps/sat flow	y	0.09
QUEUE LENGTH			q = arrival vps, VPH/3600	q	0.04
			r =C-G =effective red time, qr in veh	r	82.00
The avg number of vehicles in the queue			, ,	V	139.00
at the start of the green period can be			No = avg overflow queue (total veh	No	-0.66
calculated from:	١.		all lanes)		3.00
N=qr+No				Nm	2.74
	182				VEHICLES
where			¥		
q=arrival demand rate in vps or veh/cycle		0.04			
r =C-G =effective red time, qr in veh	C	100.00	CRITICAL QUEUE LENGTH		
C = cycle time in seconds	G	18.00		Nc	5.10
	r	82.00		2010/2010	VEHICLES
-	.				
	N	2.50	REQUIRED STORAGE is jNc/n	İ	127.53
03103 0 East Pointo Propriet Page 4899		VEHICLES			FEET

Table B1: Signal Warrant Study

	Existing Traffic	Total Traffic			Warrants Fo	r Left Turn Ex	iting Traffic
	Roger	Williams	S	ite	Warrant 1	Warrant 2	Warrant
Time	Total Traffic	Existing+Entering	Entering	Left Turn Exiting	Meets Warrant	Meets Warrant	Meets
mid-1:00	34	34	0	0	Wallall	vy atrant	Warran
1:00-2:00	28	28	0	0			<del></del>
2:00-3:00	16	16	0	0	<del></del>		
3:00-4:00	21	21	0	0		1.	r la company
4:00-5:00	50	50	0	0			
5:00-6:00	101	106	5	6		<del> </del>	-
6:00-7:00	364	409	45	30			
7:00-8:00	449	564	115	41			
8:00-9:00	446	576	130	50			
9:00-10:00	309	404	95	37		<del> </del>	
10:00-11:00	309	429	120	39			
11:00-noon	404	549	145	46		<del> </del>	<b>-</b>
noon-1:00	393	618	225	34		<del> </del>	<del> </del>
1:00-2:00	411	636	225	34		<del> </del>	
2:00-3:00	519	774	255	35	*	<b>-</b>	<del> </del>
3:00-4:00	637	917	280	43		<del> </del>	<del> </del>
4:00-5:00	544	839	295	45			
5:00-6:00	580	880	300	48			
6:00-7:00	431	671	240	37			<del> </del>
7:00-8:00	356	546	190	33		<del> </del>	<del> </del>
8:00-9:00	256	396	140	17	<del></del>		<del>                                     </del>
9:00-10:00	220	300	80	12			<del>                                     </del>
10:00-11:00	192	227	35	2			<del>                                     </del>
11:00-mid	144	169	25	0			
Total	7214	10,159	2,945	589	No	No	No
	2		Warrant Re	quirement	75	110	250
				- Charles and the Control of the Con	Over 750 in	Over 900 in	Over 900 in

Over 750 in Over 900 in Over 900 in Major Street Major Street Major Street

### Note:

Warrant 1: The Warrant required traffic volume must be surpassed during 8 hours Warrant 2: The Warrant required traffic volume must be surpassed during 4 hours

Warrant 3: The Warrant required traffic volume must be surpassed during 1 hour

This analysis assume that all the exiting vehicles use the main site driveway (conservative approach).

## Tab 13

### COMMITMENT FOR TITLE INSURANCE CHICAGO TITLE INSURANCE COMPANY SCHEDULE A

Commitment Number:

5029446

1. Effective Date:

November 10, 2014 at 8:00 a.m.

2. Proposed policy or policies to be issued:

(a) ALTA Owner's Policy (06-17-06) or Owner's Residential Advantage Policy (1-15-98)

PROPOSED AMOUNT:

\$TBD

PROPOSED INSURED:

TBD

(b) ALTA Loan Policy (06-17-06) or Advantage Residential Loan Policy (2-98)

PROPOSED AMOUNT:

\$TBD

PROPOSED INSURED:

TBD, its successors and or assigns as their interests may appear.

3. Title to the Fee Simple estate or interest in the land described or referred to in this commitment is at the effective date hereof vested in:

City of East Providence (as to Fee Simple)

GeoNova Development Company LLC, a Delaware limited liability company (as to Ground Lease)

4. The land referred to in this Commitment is situated in the City of East Providence, the County of Providence, State of Rhode Island and is identified in accordance with Exhibit A attached hereto known and numbered as:

\* 300 Bourne Avenue, East Providence, RI - Map 203 Block 1 Parcel 4

Countersigned by:

LU WIGHTON

### COMMITMENT FOR TITLE INSURANCE CHICAGO TITLE INSURANCE COMPANY EXHIBIT A

Commitment Number:

5029446

Those four (4) certain lots or parcels of land, with all the buildings and improvements thereon, situated in the City of East Providence, County of Providence and State of Rhode Island, bounded and described as follows:

#### PARCEL ONE

That tract or parcel of land, with all buildings and improvements thereon, situated southerly from the most westerly portion of Bourne Avenue (formerly Wilson Street) in the City of East Providence, State of Rhode Island bounding:

EASTERLY on the railroad location of the Providence and Worcester Company;

GENERALLY SOUTHERLY AND WESTERLY on the Seekonk River; and

GENERALLY NORTHERLY on land now or lately of the Okonite Company.

EXCLUDING, HOWEVER, the portion of said parcel conveyed by that certain deed from the Washburn Wire Company to The Okonite Company dated November 30, 1960 and recorded December 5, 1960 at 9:20 a.m. in Book 206 at Page 336.

TOGETHER WITH the right to pass and repass across and over the land adjoining said parcel on the north to and from Boume Avenue as set forth in that certain deed from American Electrical Works to Francis M. Smith dated April 17, 1899 and recorded January 27, 1900 at 4:25 p.m. in Book 44 at Page 129, as modified by Agreement by and between Washburn Wire Company and American Electrical Works dated June 10, 1930 and recorded June 11, 1930 at 1:15 p.m. in Book 108 at Page 450, and as reserved in that certain deed from the Washburn Wire Company to The Okonite Company dated November 30, 1960 and recorded December 5, 1960 at 9:20 a.m. in Book 206 at Page 336.

TOGETHER WITH the appurtenant rights the right to lay, maintain and utilize sewer lines and pump through forced main on adjacent property as provided in the Memorandum of Agreement recorded in Book 147 at Page 70.

PARCEL TWO

That tract or parcel of land, with all buildings and improvements thereon, bounding

EASTERLY AND NORTHEASTERLY on Roger Williams Avenue;

SOUTHEASTERLY AND EASTERLY on land now or lately of Grace Church Memorial to Grace Phillips;

SOUTHEASTERLY on land now or lately of John J. Rose, et al (known as Phillipsdale Pond);

WESTERLY on the railroad location of Providence and Worcester Railroad Company, and

NORTHERLY on Bourne Avenue.

### PARCEL THREE

The dam across Omega Pond or Ten Mile River at or near its mouth, and the gate and flume and other appurtenances connected or used or useful therewith and the right to maintain said dam and to drive and maintain priming in and along the embankments to the upland.

### PARCEL FOUR

That strip of land of irregular shape and varying width along the southwesterly shore of Omega Pond and extending from the railroad location the Providence and Worcester Company southeasterly and southerly to land now or lately of The Providence Journal Company bounding generally northeasterly and easterly on said Pond, southeasterly on said land now or lately of The Providence Journal Company, westerly and southwesterly on land now or lately of Bird & Son, Inc. and westerly on said railroad location.

EXCLUDING FROM SAID PARCELS, HOWEVER, that certain lot or parcel of land described in that deed from Ocean State Steel, Inc. to Development One Corporation dated June 9, 1995 and recorded June 27, 1995 at 3:01 p.m. in Book 1157 at Page 212.

TOGETHER WITH all rights appurtenant thereto, including (1) all right, title and interest in and to that portion of the railroad location of the Providence and Worcester Company insofar as the same adjoins and is coextensive with the parcels herein described, and (2) all rights, privileges, and easements as set forth or referred to in deeds of record.

# CHICAGO TITLE INSURANCE COMPANY SCHEDULE B - SECTION 1 Requirements

Commitment Number:

5029446

The following are the requirements to be complied with:

- Payment to or for the account of the grantors or mortgagors of the full consideration for the estate or interest to be insured.
- 2. Pay the premiums, fees and charges due to the Company for the policy.
- 3. Satisfactory evidence should be had that improvements and/or repairs or alterations thereto are completed; that contractor, subcontractors, labor and materialmen are all paid.
- 4. Proper instrument(s) creating the estate or interest to be insured must be executed and duly filed for record to-wit:
  - (a) Deed from TBD to TBD.
  - (b) Mortgage Deed from TBD to TBD.
- 5. The nature of the transaction to be insured herein must be disclosed to the Company prior to closing. Title may be subject to additional exceptions as may be appropriate after disclosure of the type of transaction.
- Compliance with Foreign Investment in Real Property Tax Act of 1980, Section 1445 and 897 of the IRS Code and related Treasury regulations.
- Compliance with Rhode Island law and the Rhode Island Fire Code concerning Smoke and Carbon Monoxide Detectors.

The following matters or documents must be resolved and/or produced to the satisfaction of the Company:

- 8. Compliance with Rhode Island General Laws § 44-30-71.3 Non Resident Withholding, and Regulations promulgated pursuant thereto. This applies only to the sale of property located in Rhode Island. If applicable, requires that a percentage of sellers' net proceeds be withheld and remitted to the Rhode Island Division of Taxation. A recitation of Rhode Island residency contained in a recorded deed discharges the § 44-30-71.3 lien. A recital as to the manner of compliance must be contained in any deed of conveyance.
- 9. Compliance with the Rhode Island Life Safety Code of the Rhode Island Fire Code, Section 8, Chapters 24 (one-and-two family dwellings), 25 (three family apartment buildings), 30 (new apartment buildings) or 31 (existing apartment buildings). These chapters apply to the sale of residential property located in Rhode Island and, if applicable, require that seller deliver to buyer a smoke and carbon monoxide detector inspection certificate dated not more than 60 days prior to the date of sale
- 10. Pay all unpaid real estate taxes, sewer installation charges, sewer use charges, water use charges, water installation charges, fire service (water), fire district taxes and all other applicable municipal charges and assessments. Municipal Lien Certificate to be ordered and recorded.
- 11. Water meter reading to be supplied to Company no later than 5 days prior to closing.
- 12. In order to Delete the Standard Exceptions from the Loan policy, the Company will require the following:
  - a) Executed Mechanic's Lien and Parties in Possession Affidavit and Indemnity;
  - b) A Survey, certified to Chicago Title Insurance Company and the Insured Lender, prepared in compliance with the Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys as adopted by American Congress on Surveying & Mapping, together with an executed Surveyor's report. This Survey must be dated within 6 months prior to the date of the proposed closing.

- Except in an exempt transaction, the Company must be furnished with seller's social security number or tax Identification number and all other information necessary to complete IRS Form 10998.
- 14. If A Usury Endorsement will be issued to the Proposed Insured Lender upon receipt by the Company of
  - (a) evidence that the loan is not secured by a mortgage against the principal residence of any member of the borrower;
  - (b) the borrower has obtained a "pro forma methods analysis" satisfactory to the Company from a Rhode Island-licensed CPA indicating that the loan is capable of being repaid, and
  - (c) additional special risk premium of \$TBD per thousand dollars of policy liability.
- 15. As GeoNova Development Company, LLC is a Limited Liability Company, the Company requires the following information and/or documents prior to closing:
  - a) A Certificate of Existence from the Rhode Island Secretary of State;
  - b) A Certificate of Good Standing from the Rhode Island Division of Taxation if the entity operates as a corporation;
  - c) Vote and/or consent of the members of GeoNova Development Company, LLC authorizing the transaction to be insured.
  - d) Copy of the Operating Agreement forming the subject Limited Liability Company certified as true and correct by the members.
- 16. Obtain and record discharges, terminations and/or releases for the following instruments:
  - a. Leasehold Mortgage and Security Agreement by GeoNova Development Company, LLC to the City of East Providence, dated September 26, 2003 and recorded with the City of East Providence Land Evidence Records on September 29, 2003 in Book 2114 at Page 53 to secure the amount of \$3,000,000.00.

b.

If the mortgage set forth above is purported to be a "Open End" mortgage. It is a requirement that the Mortgagor of said mortgage provide written authorization to close said credit line account to the Lender when the mortgage is being paid off through the Company or other Settlement/Escrow Agent or provide a satisfactory subordination of this mortgage to the proposed mortgage to be recorded at closing.

NOTE: All matters recited above as requiring recorded discharges, terminations and/or releases which are not as of the date of policy so discharged, terminated and/or released will appear as title exceptions in Schedule B-I of the Title Policy Issued hereunder.

NOTE: The Company may make other requirements or exceptions upon its review of the proposed documents creating the estate or interest to be insured or otherwise ascertaining details of the transaction.

### CHICAGO TITLE INSURANCE COMPANY SCHEDULE B - SECTION 2 Exceptions

Commitment Number:

5029446

The policy or policies to be issued will contain exceptions to the following unless the same are disposed of to the satisfaction of the Company:

- Defects, liens, encumbrances, adverse claims or other matters, if any, first appearing in the public records or attaching subsequent to the effective date hereof but prior to the date the proposed insured acquires for value of record an estate or interest or mortgage thereon covered by this Commitment.
- Rights or claims of parties other than the Proposed Insured or Proposed Mortgagor in actual possession of any or all of the property. To be deleted from the Residential Loan Title Insurance Policy upon execution of a satisfactory Owners/Sellers Affidavit.
- 3. Any encroachment, encumbrance, violation or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. To be deleted from the Residential Loan Title Insurance Policy upon execution of a satisfactory Owners/Sellers Affidavit and payment of the survey deletion fee.
- 4. Unfiled mechanics' or materialmen's liens. To be deleted from the Residential Loan Title Insurance Policy upon execution of a satisfactory Owners/Sellers Affidavit.
- Riparlan rights of others in and to the waters of any stream and/or rivers lying along and/or crossing the land, and any right, title and interest of others in an to any portion of the land consisting of filled tidal lands.
- 6. Covenants, Conditions, Restrictions, Reservations, Easements, Liens for Assessments, Options, Powers of Attorney and Limitations on title as set forth in the Declaration of Condominium, and By-Laws as recorded, as the same may be amended, and as contained in the Rhode Island Condominium Act, R.I. Gen. Laws §34-36.1-1 et seq. and the Rhode Island Condominium Ownership Act, R.I. Gen. Laws §34-36-1 et seq., as applicable. Applicable only if the proposed insured premises is a condominium unit.
- 7. Any provision in any recorded covenants, conditions and restrictions which indicate any preference, limitation or discrimination based on race, color, religion, sex, handicap, familial status or national origin are hereby deleted. Applicable only if the proposed insured premises are subject to any recorded covenants, conditions and/or restrictions.
- 8. Taxes and municipal charges and any water and/or sewer charges and/or assessments.
- 9. Any unrecorded leases and agreements.
- 10. Restrictions of record as set forth in Book 20 at Page 188.
- 11. Restrictions of record as set forth in Book 20 at Page 190.
- Easement of record as set forth in Book 44 at Page 129; as modified in Book 108 at Page 450 (affects Parcel One)
- 13. Memorandum of Agreement made by and between Washburn Wire Company and Kennecott Wire and Cable Company dated December 8, 1950 and recorded with the City of East Providence Land Evidence Records on December 14, 1950 in Book 147 at Page 70. (affects Parcel One)
- Agreement of record by and between the State of Rhode Island and Sayles Finishing Plants, Inc. dated December 26, 1949 and recorded with the City of East Providence Land Evidence Records on September 10, 1958 in Book 173 at Page 378. (affects Parcel Two)
- 15. Restrictions of record as set forth in Book 176 at Page 83.

- 16. Restrictions of record as set forth in Book 199 at Page 279. (affects Parcel Two)
- 17. Affidavit recorded February 23, 1960 in Book 199 at Page 360.
- 18. Easement of record as set forth in Book 206 at Page 336.
- 19. Easement of record as set forth in Book 256 at Page 389. (affects Parcel Two)
- 20. Easement of record as set forth in Book 268 at Page 245. (affects Parcel Two)
- 21. Easement of record as set forth in Book 285 at Page 18. (affects Parcel Two)
- 22. Easement of record as set forth in Book 285 at Page 22. (affects Parcel Two)
- Department of Environmental Management Notice of Violation dated July 11, 1979 and recorded with the City of East Providence Land Evidence Records on July 13, 1979 in Book 395 at Page 138.
- 24. Agreement of record by and between Rhode Island Forging Steel, Inc. and The Okonite Company, Inc. dated February 22, 1983 and recorded with the City of East Providence Land Evidence Records on March 29, 1983 in Book 488 at Page 175. Affects Parcels One-Four)
- Coastal Resources Management Council letter recorded with the City of East Providence Land Evidence Records on October 1, 1990 in Book 866 at Page 63.
- 26. Any and all other rights and encumbrances as contained in Deed recorded in Book 1429 at Page 160.
- 27. Memorandum of Ground Lease made by and between the City of East Providence, as lessor, and GeoNova Development Company, LLC, as lessee, dated September 26, 2003 and recorded with the City of East Providence Land Evidence Records on September 29, 2003 in Book 2114 at Page 47.
- Declaration of Covenants, Conditions and Restrictions dated September 26, 2003 and recorded with the City of East Providence Land Evidence Records on September 29, 2003 in Book 2114 at Page 38.
- 29. Coastal Resources Management Council Assent recorded November 12, 2003 in Book 2145 at Page 209.
- Coastal Resources Management Council Assent recorded May 10, 2004 in Book 2249 at Page 130.
- 31. Rhode Island Department of Environmental Management Temporary Remedial Action Permit recorded May 10, 2004 in Book 2249 at Page 135.
- 32. Environmental Land Usage Restriction dated May 11, 2006 and recorded May 12, 2006 in Book 2662 at Page 107.
- Notice of Acknowledgement and Agreement dated May 18, 2006 and recorded July 7, 2006 in Book 2691 at Page 185.
- Rhode Island Department of Environmental Management Insignificant Alteration Permit dated August 22, 2007 and recorded August 29, 2007 in Book 2877 at Page 195.
- 35. Coastal Resources Management Council Assent recorded June 10 2008 in Book 2976 at Page 218.
- 36. Easement Agreement dated April 27, 2011 and recorded May 17, 2011 in Book 3257 at Page 49; as affected by a First Amendment to Easement Agreement recorded August 2, 2011 in Book 3275 at Page 200; as further affected by a Second Amendment to Easement Agreement recorded April 16, 2013 in Book 3454 at Page 202.

NOTE:

if policy is to be issued in support of a mortgage loan, attention is directed to the fact that the Company can assume no liability under its policy, the closing instructions, or insured Closing Service for compliance with the requirements of any consumer credit protection or truth in lending law in connection with said mortgage loan.