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# A plan for improved motor vehicle access on Railroad Avenue in Provincetown

February 2011





# A plan for improved motor vehicle access on Railroad Avenue in Provincetown

## INTRODUCTION AND PROBLEM IDENTIFICATION

Town of Provincetown officials have requested Cape Cod Commission technical assistance relative to a resident's complaints with truck turning traffic from Johnson Street Extension onto Railroad Avenue. The majority of trucks making this movement originate from the parking lot at the Far Lands Provisions where they are making deliveries to the business. Most trucks exit the parking lot using Johnson Street Extension in a northerly direction. Their typical path includes turning right onto Railroad Avenue, and then turning left onto Conwell Street destined for Route 6.

The resident complaint arises from these trucks encroaching onto private property on the corner of Railroad Avenue and Johnson Street Extension. A hedge planted within the northern portion of Railroad Avenue's right-of-way limits the turning radii of the trucks, forcing a more acute turning angle that often results in the breach of private property.

## STUDY AREA

Cape Cod Commission staff looked at the following intersections to determine the best possible solution to the truck turning problem at Johnson Street Extension and Railroad Avenue.

### **Railroad Avenue and Johnson Street Extension**

Railroad Avenue is a narrow road that accommodates traffic in both directions. Johnson Street Extension is a narrow road that



accommodates traffic in both directions. Johnson Street Extension traverses through the Far Land Provisions parking lot. Railroad Avenue is the major street and Johnson Street Extension is the minor street. Neither street has a stop sign nor any traffic control devices (stop lines, yield sign, etc.)

### **Railroad Avenue and Conwell Street**

Railroad Avenue is a narrow road that accommodates traffic in both directions. Conwell Street is a narrow road that accommodates traffic in both directions. Conwell Street is the main road and connects Route 6 to Bradford Street (Route 6A). Railroad Avenue is the minor street and has a stop sign but no stop line.

### **Johnson Street Extension and Bradford Street (Route 6A)**

Johnson Street Extension is a narrow road that accommodates traffic in both directions. Bradford Street is a narrow road that accommodates traffic in both directions. Bradford Street is the main road and Johnson Street Extension is the minor street. Johnson Street Extension does not have a stop sign or a stop line.

### **Center Street and Bradford Street**

Bradford Street is a narrow road that accommodates traffic in both directions. Center Street is a continuation of Railroad Avenue that terminates at Bradford Street. Center Street is a narrow road that accommodates traffic in both directions. Bradford Street is the main road and Center Street is the minor street. Center Street does not have a stop sign or a stop line.

## **TRAFFIC COUNT DATA**

At the request of Provincetown Officials, Cape Cod Commission staff conducted turning movement traffic counts at the following intersections:

- Railroad Avenue and Johnson Street Extension
- Railroad Avenue and Conwell Street
- Johnson Street Extension and Bradford Street

An automatic traffic recorder was also installed on Railroad Avenue west of Conwell Street to collect daily traffic volumes.



### **Railroad Avenue and Johnson Street Extension**

The intersection of Railroad Avenue and Johnson Street Extension experienced sixteen (16) vehicles during the afternoon peak hour (4 to 5 pm) during the summer season (July). Compared to other area intersections, this intersection experiences very low traffic volumes and Cape Cod Commission staff is not aware of any congestion issues at this intersection.

### **Railroad Avenue and Conwell Street**

During the Railroad Avenue/Johnson Street Extension traffic count, Cape Cod Commission transportation staff was able to record the number of left turning vehicles from Railroad Avenue to Conwell Street. Cape Cod Commission transportation staff recorded six (6) left turning vehicles at this intersection during the afternoon peak hour (4 to 5PM) during the summer season (July). Six left turning vehicles are very low traffic volumes and Cape Cod Commission staff is not aware of any congestion issues at this intersection.

### **Johnson Street Extension and Bradford Street**

The Johnson Street Extension/Bradford Street intersection experienced heavy volumes on Bradford Street, however only nine (9) right turns and eighteen (18) left turns exited Johnson Street Extension during the afternoon peak hour (4 to 5 PM) during the summer season (July). Vehicles exiting Johnson Street Extension (the Far Land Provisions parking lot) may experience delays due to the heavy volume of traffic on Bradford Street.

### **Railroad Avenue**

An automatic traffic recorder registered 150 daily vehicle trips in Railroad Avenue during an average weekday in July (July 14, 2010). Off-season traffic volumes are estimated to be far lower. Industry standards typically define any road with an average daily traffic below 400 as low volume.



## ALTERNATIVES CONSIDERED

Cape Cod Commission staff looked at a number of potential alternatives to alleviate the encroachment of vehicles turning right from Johnson Street Extension to Railroad Avenue. These alternatives are listed below.

### **Railroad Avenue One-Way Westbound to Johnson Street Extension**

Prohibiting eastbound traffic on Railroad Avenue between Johnston Street Extension and Conwell Street would eliminate right hand turns from Johnson Street Extension onto Railroad Avenue. The restriction of right hand turns would remove the occurrence of encroachment onto private property by vehicles taking the turn too closely.

### **Restrict Right-turns from Johnson Street Extension onto Railroad Avenue**

Restricting right-turns onto Railroad Avenue from Johnson Street Extension by use of signage would remove the occurrence of encroachment onto private property by vehicles taking the turn too closely.

This restriction would re-route vehicles westbound on Railroad Avenue, left onto Center Street, exit left onto Bradford Street, and then left onto Conwell Street.

### **Cutting Back Hedges on Northern Side of Railroad Avenue**

The parcel directly north of Johnson Street Extension across Railroad Avenue has a substantial vegetated hedge encroaching within the public right-of-way. The protruding hedge further narrows the already narrow Railroad Avenue, encouraging vehicles turning right from Johnson Street Extension to make sharper turns and possibly encroach on private property on the intersection's southeast quadrant. The following graphic shows the encroachment of the hedges on the northern part of the Railroad Avenue right-of-way.



## SIGHT DISTANCE REQUIREMENTS

In conformance with guidelines outlined in the Massachusetts Project and Design Guide Manual, the Cape Cod Commission staff calculated and evaluated the sight distance for three intersections located within the study area (Railroad Ave at Conwell St, Johnson St Extension at Bradford St, and Center St at Bradford St). Each intersection was evaluated for two different categories of sight distances. First, the *Stopping Sight Distance* (SSD) is calculated to measure the distance available for a vehicle approaching an intersection from either direction to recognize and act in response to a potential conflict. The potential conflict in these situations is a turning vehicle exiting a minor road.

The second category of sight distance evaluated, *Intersection Sight Distance* (ISD), otherwise known as *Decision Sight Distance* (DSD), is the sight distance available to vehicles positioned on the minor road that is used to determine a safe moment to execute a turning movement. The distances calculated refer to the length of major road that can be seen in either direction from the perspective of a driver exiting a minor road. For a major road with higher travel



speeds, a longer DSD is preferred to provide turning vehicles ample time to consider a safe moment to make their turning movement.

The American Association of State Highway and Transportation Officials (AASHTO) have created recommended standards for SSD and DSD. The calculation is based on a road’s design speed, and it can be further analyzed to include a road’s vertical grade.

### Stopping Sight Distance (SSD)

The following table details the recommended and existing stopping sight distances relevant to the three analyzed intersections within the study area.

Design Speed (mph)	Calculated SSD (ft)*	Bradford St @ Center St Existing SSD (ft)		Bradford St @ Johnson St Ext Existing SSD (ft)		Conwell St @ Railroad Ave Existing SSD (ft)	
		Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound
25	151.9	165	290	300	400		
30	196.7					155**	850

\* A Policy on Geometric Design of Highways and Streets 2004, AASHTO

\*\* Distance from Bradford St/Conwell St intersection and Conwell St's intersection with Railroad Ave

The SSD for each intersection is acceptable, with the possible exception of Conwell Street’s northbound movement towards Railroad Avenue. The SSD is limited to 155 feet, as this is the entire length of the roadway between Railroad Avenue and Bradford Street. It is likely that the recommended 196.7 foot SSD at this location is overly conservative, as it is unlikely a vehicle turning onto Conwell Street from Bradford Street has enough roadway to achieve the desired speed limit of 30 mph before reaching Railroad Avenue.

The following graphic shows several views of the aforementioned Stopping Sight Distances. Notice the length of Conwell Street between Bradford Street and Railroad Avenue is straight and uncluttered, further evidence that 155 feet of SSD is likely to be suitable for northbound traffic.



SSD: Bradford St EB to Johnston St Ext



SSD: Bradford St EB to Center St



SSD: Conwell St NB to Railroad Ave



View from Railroad Ave along Conwell St SB

### **Decision Sight Distance (DSD)**

Due to the existence of signage, vegetation, and road curvature, the DSD for the minor roads of two of the three studied intersections fail to meet recommended thresholds. Poor DSD encourages drivers to encroach into the major road in an effort to see further down the corridor. The following table displays how the DSD of each



intersection’s turning movements relate to the recommended minimums.

Design Speed (mph)	Calculated DSD (ft)*	Center St @ Bradford St Existing DSD (ft)		Johnson St Ext @ Bradford St Existing DSD (ft)		Railroad Ave @ Conwell St Existing DSD (ft)	
		Looking Left	Looking Right	Looking Left	Looking Right	Looking Left	Looking Right
25	170	40	25	445	350		
30	220					35	18

\* A Policy on Geometric Design of Highways and Streets 2004, AASHTO

Southbound vehicles on Johnson Street Extension have a satisfactory DSD in either direction. The DSD for Center Street at Bradford Street is lacking in both directions, as are both directions for Railroad Avenue at Conwell Street. The following graphic depicts the left and right sight distances from Center Street and Railroad Avenue, looking down their respective major roads.



DSD: Center St looking left onto Bradford St



DSD: Center St looking right onto Bradford St



DSD: Railroad Ave looking left onto Conwell St



DSD: Railroad Ave looking right onto Conwell St

**AASHTO's Geometric Design Manual has recommendations for locations that fail to meet minimum requirements in regards to sight distances: "If it is not practical to provide decision sight distance...special attention should be given to the use of suitable traffic control devices for providing advance warning of the conditions that are likely to be encountered."**



## ANALYSIS OF ALTERNATIVES

Cape Cod Commission staff looked at a number of potential alternatives to alleviate the encroachment of vehicles turning right from Johnson Street Extension to Railroad Avenue. These alternatives are listed below.

### **Railroad Avenue One-Way Westbound to Johnson Street Extension**

Although prohibiting eastbound traffic on Railroad Avenue between Johnston Street Extension and Conwell Street would eliminate right hand turns from Johnson Street Extension onto Railroad Avenue, and hence remove the occurrence of encroachment onto private property by vehicles taking the turn too closely, traffic counts conducted by the Cape Cod Commission indicate such low volumes that a drastic change in vehicle operations like this would create more problems than it would solve. Under these conditions, overall traffic operations would likely become more complicated. Railroad Avenue's eastbound traffic, destined for Route 6, would be forced to take a right onto Johnson Street Extension southbound, and then make two additional left-turns to make their way to Conwell Street northbound. Northbound traffic on Johnson Street Extension would be forced to take a left onto Railroad Avenue westbound, left onto Center Street, left onto Bradford Street, then left onto Conwell Street.

The Cape Cod Commission performed an automatic traffic recorder count on Railroad Avenue west of Conwell Street during a 48 period of consecutive weekdays in July. A daily average of 150 vehicles drove on this portion of Railroad Avenue. During the peak hour, eight vehicles drove eastbound on Railroad Avenue, and two vehicles drove westbound. Peak hour traffic at this location is very low volume and does not merit one-way travel restrictions.

### **Restrict Right-turns from Johnson Street Extension onto Railroad Avenue**

Restricting right-turns onto Railroad Avenue from Johnson Street Extension by use of signage would remove the occurrence of encroachment onto private property by vehicles taking the turn too closely. Based on Cape Cod Commission traffic counts, this alternative is inappropriate for the conditions. During a peak hour in July, only four vehicles executed this right-turn. Restricting the



right-turn would send those few vehicles on a excessive route that requires several left-turns on more heavily traveled roads.

### **Cutting Back Hedges on Northern Side of Railroad Avenue**

While the hedges may be influencing drivers to take the turn too closely, there is a benefit to a road that is visually narrow. The existing conditions of Railroad Avenue (narrow roadway, lack of striping, encroaching hedge) act as a calming measure, and cars drive slower by default. The Cape Cod Commission is not recommending any alternative that will lead to greater speeds in the study area.

## RECOMMENDATIONS

Cape Cod Commission transportation staff does not offer any roadway configuration changes to address the encroachment of right turning vehicles from Johnson Street Extension to Railroad Avenue. The alternatives analyzed would result in more adverse conditions than presently exist. Cape Cod Commission staff recommends working with the Far Land Provisions business owner to schedule truck deliveries to non-peak hour and then having the delivery truck exit Johnson Street Extension to Bradford Street.

The town may want to further investigate restricting trucks and other heavy vehicles from Railroad Avenue. This measure would only prove useful if there is sufficient room for a truck to turn around in the Far Land Provisions parking lot. Trucks would be required to leave the lot via Johnson Street Extension at Bradford Street.

The 2006 Massachusetts Highway Department Manual on Uniform Traffic Control Devices (MUTCD) outlines a series of rules and stipulations necessary to establish a truck exclusion. This excerpt from the MUTCD is included in this report's appendix.

To address deficiencies in the aforementioned intersections in regards to Decision Sight Distance, the town may consider appropriate signage to alert motorists to potential hazards.



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The following graphic can serve as a guideline to the types of new signage that would be appropriate for the study area, as well as their potential placement.



MUTCD: W2-1 W2-2



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## APPENDIX

## **LIMITING TRUCK TRAFFIC**

According to the Mass Highway, **Manual on Uniform Traffic Control Devices (MUTCD)**, October 2006 edition, the following information pertains to limiting local truck traffic:

### Section 11A-9 Heavy Commercial Vehicle Exclusion (pages 11 & 12)

A truck exclusion from a municipal way may be authorized provided a suitable alternate route is available. The alternate route shall have an effective width and pavement structure which can safely accommodate the additional truck traffic. In addition, the alternate route must meet one of the following conditions:

- a) lie wholly within the community making the application,
- b) lie partially in an adjacent community but only on State Highway, or
- c) lie partially in an adjacent community but have the adjacent community's written approval.

An engineering study, as outlined in the Data requested below, must be made. In addition, one or more of the following warrants may be sufficient justification for truck exclusion:

#### Warrants

- A. A volume of heavy commercial vehicles, which usually is in the range of five to eight percent, reduces the utilization of the facility and is cause for a substantial reduction in capacity or safety.
- B. The condition of pavement structure of the route to be excluded indicates that further repeated heavy wheel loads will result in severe deterioration of the roadway.
- C. Notwithstanding the foregoing, in certain instances where land use is primarily residential in nature and a municipality has requested exclusion only during hours of darkness, a specific night exclusion may be granted.

#### Data

Before the Department can consider an exclusion proposal, the following data must be submitted by the municipality:

- a. A 24-hour consecutive count of all vehicles using the subject street. The count shall be broken into one-half intervals showing both commercial vehicles with a carrying capacity over two and one-half tons and other vehicles.
- b. Map of the area, with excluded street marked in red and the alternate route in green.
- c. Physical characteristics of excluded and alternate streets in question (ie. length, width, type and condition of surface of sidewalk.)
- d. Types of buildings or property abutting street (Residential, business, school, playground etc.).
- e. Zoning of Street (Residential, Industrial etc.)
- f. Proximity of probable alternate route to the proposed excluded route and the additional distance to be traveled using the alternate route.
- g. Types of traffic control existing on street.
- h. Hours during which exclusion is to be in effect.
- i. A written statement from the municipality as to the need for the exclusion.

# Cape Cod Commission

Location: Railroad Ave W of Conwell St  
 Town: Provincetown  
 Counted By: DA BM  
 Counter: AP-2

3225 Main St., PO Box 226  
 Barnstable, MA, 02630  
 508-362-3828

Site Code: 21244  
 Date Start: 14-Jul-10

Time	12-Jul-10		Tue		Wed		Thu		Fri		Sat		Sun		Weekday Ave	
	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	*	*	*	*	*	*	0	0	0	0	*	*	*	*	0	0
01:00	*	*	*	*	*	*	0	1	0	2	*	*	*	*	0	2
02:00	*	*	*	*	*	*	0	2	0	0	*	*	*	*	0	1
03:00	*	*	*	*	*	*	0	0	0	0	*	*	*	*	0	0
04:00	*	*	*	*	*	*	0	0	0	0	*	*	*	*	0	0
05:00	*	*	*	*	*	*	0	0	0	0	*	*	*	*	0	0
06:00	*	*	*	*	*	*	1	2	0	0	*	*	*	*	0	1
07:00	*	*	*	*	*	*	2	7	2	6	*	*	*	*	2	6
08:00	*	*	*	*	*	*	4	3	4	4	*	*	*	*	4	4
09:00	*	*	*	*	*	*	2	6	3	8	*	*	*	*	2	7
10:00	*	*	*	*	*	*	2	8	2	10	*	*	*	*	2	9
11:00	*	*	*	*	5	12	0	6	*	*	*	*	*	*	2	9
12:00 PM	*	*	*	*	4	(12)	2	9	*	*	*	*	*	*	3	10
01:00	*	*	*	*	(6)	12	2	4	*	*	*	*	*	*	4	8
02:00	*	*	*	*	6	6	2	10	*	*	*	*	*	*	4	8
03:00	*	*	*	*	4	8	4	4	*	*	*	*	*	*	4	6
04:00	*	*	*	*	2	9	1	7	*	*	*	*	*	*	(2)	(8)
05:00	*	*	*	*	2	4	4	7	*	*	*	*	*	*	3	6
06:00	*	*	*	*	0	4	1	4	*	*	*	*	*	*	0	4
07:00	*	*	*	*	1	6	0	6	*	*	*	*	*	*	0	6
08:00	*	*	*	*	0	5	2	4	*	*	*	*	*	*	1	4
09:00	*	*	*	*	2	7	2	12	*	*	*	*	*	*	2	10
10:00	*	*	*	*	0	2	0	4	*	*	*	*	*	*	0	3
11:00	*	*	*	*	0	0	0	4	*	*	*	*	*	*	0	2
<b>Total</b>	0	0	0	0	32	87	31	110	11	30	0	0	0	0	(35)	(114)
<b>Day</b>	0	0	0	0	119		141		41		0	0	0	0	149	
<b>AM Peak</b>					11:00	11:00	08:00	10:00	08:00	10:00					08:00	10:00
<b>Vol.</b>					5	12	4	8	4	10					4	9
<b>PM Peak</b>					13:00	12:00	15:00	21:00							13:00	12:00
<b>Vol.</b>					6	12	4	12							4	10

Comb. Total	0	0	119	141	41	0	0	149
ADT	ADT 141	AADT 141						

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Site Code: 21244  
 Date Start: 14-Jul-10

Start Time	12-Jul-10 Mon	13-Jul-10 Tue	14-Jul-10 Wed	15-Jul-10 Thu	16-Jul-10 Fri	17-Jul-10 Sat	18-Jul-10 Sun	Week Average	Weekday Average
12:00 AM	*	*	*	0	0	*	*	0	0
01:00	*	*	*	1	2	*	*	2	2
02:00	*	*	*	2	0	*	*	1	1
03:00	*	*	*	0	0	*	*	0	0
04:00	*	*	*	0	0	*	*	0	0
05:00	*	*	*	0	0	*	*	0	0
06:00	*	*	*	3	0	*	*	2	2
07:00	*	*	*	9	8	*	*	8	8
08:00	*	*	*	7	8	*	*	8	8
09:00	*	*	*	8	11	*	*	10	10
10:00	*	*	*	10	12	*	*	11	11
11:00	*	*	17	6	*	*	*	12	12
12:00 PM	*	*	16	11	*	*	*	14	14
01:00	*	*	(18)	6	*	*	*	12	12
02:00	*	*	12	12	*	*	*	12	12
03:00	*	*	12	8	*	*	*	10	10
04:00	*	*	11	8	*	*	*	10	(10)
05:00	*	*	6	11	*	*	*	8	8
06:00	*	*	4	5	*	*	*	4	4
07:00	*	*	7	6	*	*	*	6	6
08:00	*	*	5	6	*	*	*	6	6
09:00	*	*	9	14	*	*	*	12	12
10:00	*	*	2	4	*	*	*	3	3
11:00	*	*	0	4	*	*	*	2	2
<b>Total</b>	<b>0</b>	<b>0</b>	<b>119</b>	<b>141</b>	<b>41</b>	<b>0</b>	<b>0</b>		
<b>Percentage</b>	<b>0.0%</b>	<b>0.0%</b>	<b>77.8%</b>	<b>92.2%</b>	<b>26.8%</b>	<b>0.0%</b>	<b>0.0%</b>		
<b>AM Peak</b>			<b>11:00</b>	<b>10:00</b>	<b>10:00</b>				
<b>Vol.</b>			<b>17</b>	<b>10</b>	<b>12</b>				
<b>PM Peak</b>			<b>13:00</b>	<b>21:00</b>					
<b>Vol.</b>			<b>18</b>	<b>14</b>					
<b>Total</b>								<b>153</b>	<b>(153)</b>

# CAPE COD COMMISSION

3225 Main Street • P.O. Box 226  
 Barnstable, MA 02630  
 Tel: 508.362.3828 • Fax: 508.362.3136  
 E-Mail: trans@capecodcommission.org

Counter #:5

Printed By: Derek Andersen  
 Location: Railroad ave/Johnson st ext  
 Date: 05/14/10

File Name : 3822\_07142010

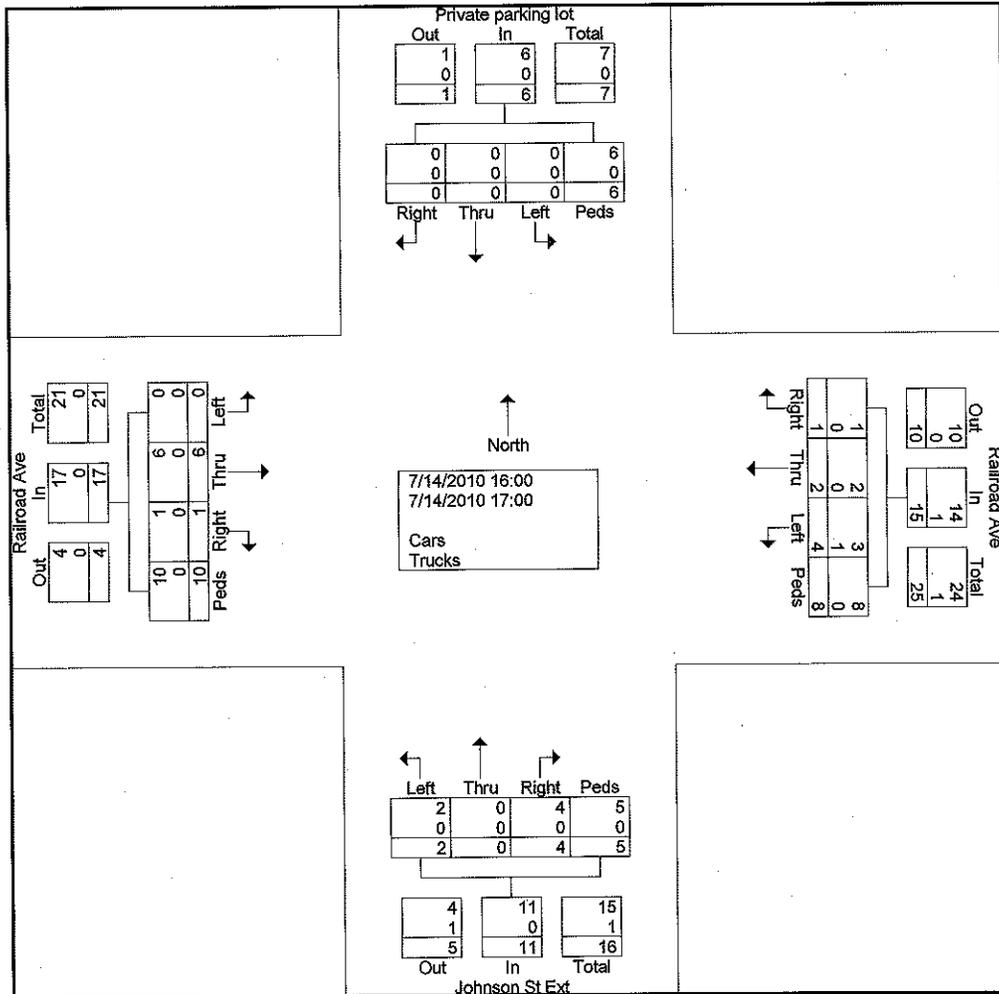
Site Code : 00003822

Start Date : 7/14/2010

Page No : 1

### Groups Printed- Cars - Trucks

Start Time	Private parking lot From North				Railroad Ave From East				Johnson St Ext From South				Railroad Ave From West				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
16:00	0	0	0	2	0	0	1	2	1	0	0	2	0	1	0	3	12
16:15	0	0	0	2	0	1	0	2	0	0	2	1	0	1	0	1	10
16:30	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	2	5
16:45	0	0	0	1	3	0	0	4	0	0	0	1	0	2	1	4	16
→ Total	0	0	0	5	4	1	1	8	1	0	3	4	0	5	1	10	43
17:00	0	0	0	1	0	1	0	0	1	0	1	1	0	1	0	0	6
Grand Total	0	0	0	6	4	2	1	8	2	0	4	5	0	6	1	10	49
Approch %	0	0	0	100	26.7	13.3	6.7	53.3	18.2	0	36.4	45.5	0	35.3	5.9	58.8	
Total %	0	0	0	12.2	8.2	4.1	2	16.3	4.1	0	8.2	10.2	0	12.2	2	20.4	
Cars	0	0	0	6	3	2	1	8	2	0	4	5	0	6	1	10	48
% Cars	0	0	0	100	75	100	100	100	100	0	100	100	0	100	100	100	98
Trucks	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
% Trucks	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	2



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Counter #:5

Designed By: Derek Andersen

Location: Railroad ave/Johnson st ext

Date:05/14/10

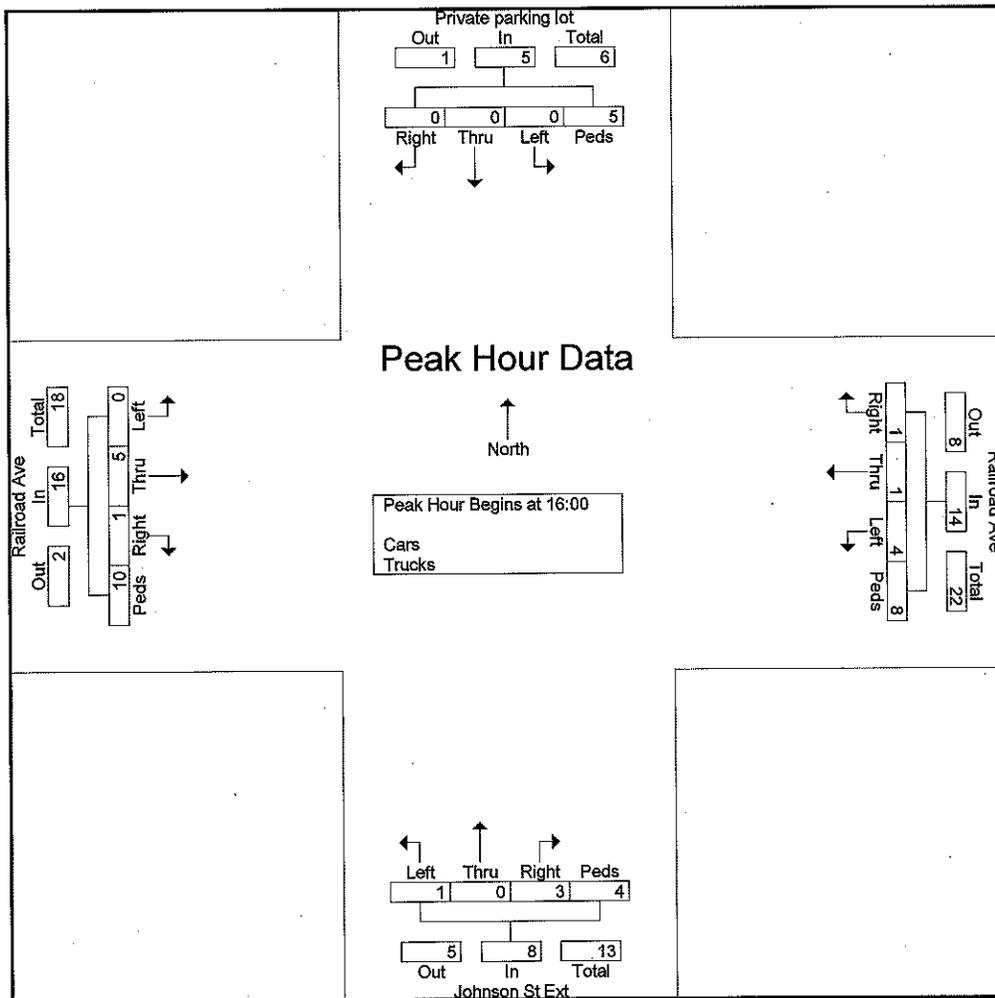
File Name : 3822\_07142010

Site Code : 00003822

Start Date : 7/14/2010

Page No : 2

Start Time	Private parking lot From North					Railroad Ave From East					Johnson St Ext From South					Railroad Ave From West					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 16:00 to 17:00 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at (16:00)																					
16:00	0	0	0	2	2	0	0	1	2	3	1	0	0	2	3	0	1	0	3	4	12
16:15	0	0	0	2	2	0	1	0	2	3	0	0	2	1	3	0	1	0	1	2	10
16:30	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	1	0	2	3	5
16:45	0	0	0	1	1	3	0	0	4	7	0	0	0	1	1	0	2	1	4	7	16
Total Volume	0	0	0	5	5	4	1	1	8	14	1	0	3	4	8	0	5	1	10	16	43
% App. Total	0	0	0	100		28.6	7.1	7.1	57.1		12.5	0	37.5	50		0	31.2	6.2	62.5		
PHF	.000	.000	.000	.625	.625	.333	.250	.250	.500	.500	.250	.000	.375	.500	.667	.000	.625	.250	.625	.571	.672



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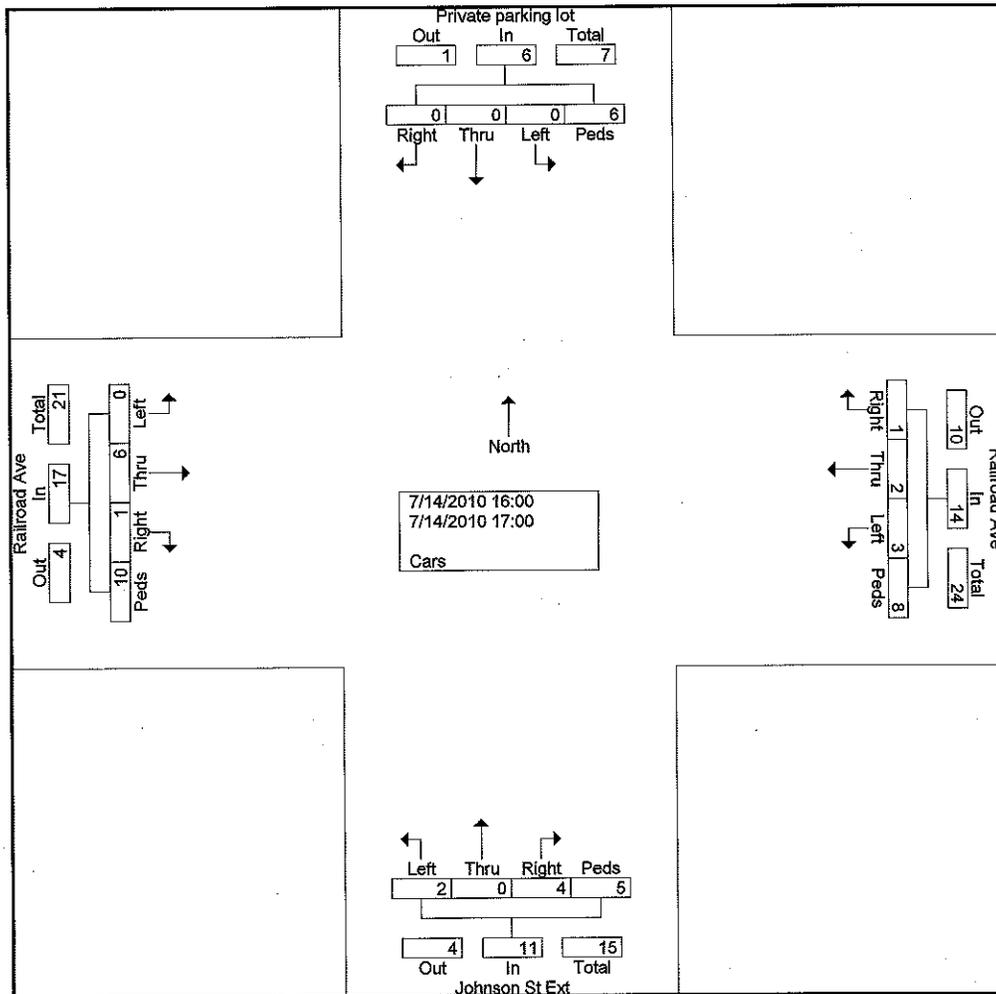
Site Code : 00003822

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### Groups Printed- Cars

Start Time	Private parking lot From North				Railroad Ave From East				Johnson St Ext From South				Railroad Ave From West				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
16:00	0	0	0	2	0	0	1	2	1	0	0	2	0	1	0	3	12
16:15	0	0	0	2	0	1	0	2	0	0	2	1	0	1	0	1	10
16:30	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	2	5
16:45	0	0	0	1	2	0	0	4	0	0	0	1	0	2	1	4	15
Total	0	0	0	5	3	1	1	8	1	0	3	4	0	5	1	10	42
17:00	0	0	0	1	0	1	0	0	1	0	1	1	0	1	0	0	6
Grand Total	0	0	0	6	3	2	1	8	2	0	4	5	0	6	1	10	48
Apprch %	0	0	0	100	21.4	14.3	7.1	57.1	18.2	0	36.4	45.5	0	35.3	5.9	58.8	
Total %	0	0	0	12.5	6.2	4.2	2.1	16.7	4.2	0	8.3	10.4	0	12.5	2.1	20.8	



# CAPE COD COMMISSION

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 Barnstable, MA 02630  
 Tel: 508.362.3828 • Fax: 508.362.3136  
 E-Mail: trans@capecodcommission.org

Counter #:5

Printed By: Derek Andersen

Location: Railroad ave/Johnson st ext

Date:05/14/10

File Name : 3822\_07142010

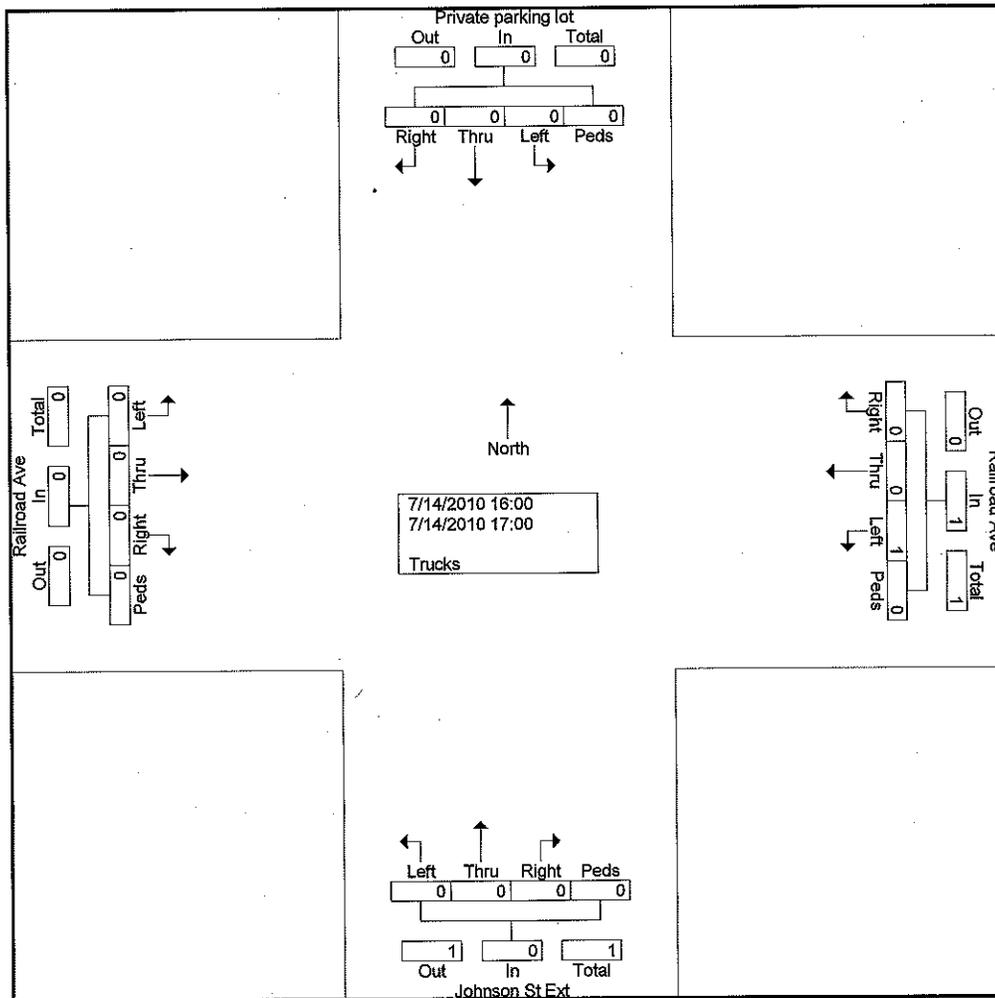
Site Code : 00003822

Start Date : 7/14/2010

Page No : 1

### Groups Printed- Trucks

Start Time	Private parking lot From North				Railroad Ave From East				Johnson St Ext From South				Railroad Ave From West				Int. Total	
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds		
*** BREAK ***																		
16:45	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***																		
Grand Total	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0



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Counter #:5

Counted By: Derek Andersen

Location: Railroad ave/Johnson st ext

Date:05/14/10

File Name : 3822\_07142010

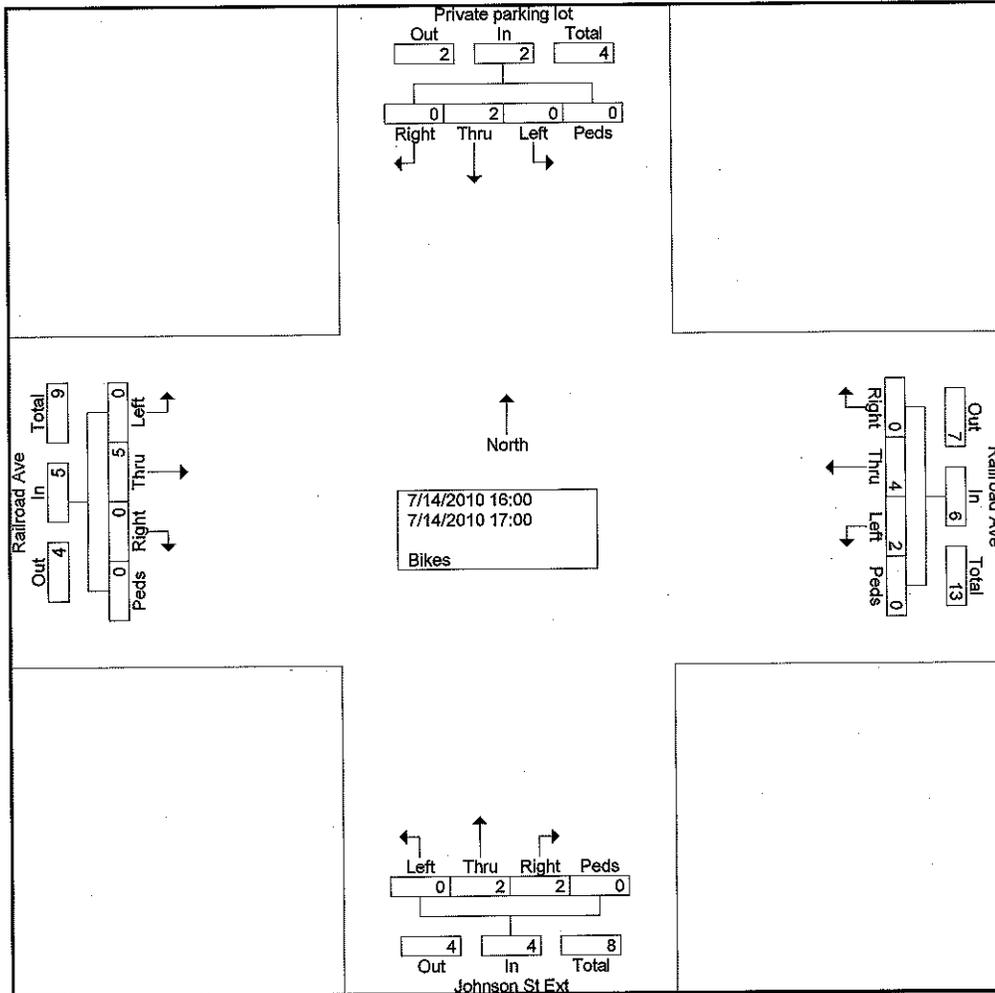
Site Code : 00003822

Start Date : 7/14/2010

Page No : 1

### Groups Printed- Bikes

Start Time	Private parking lot From North				Railroad Ave From East				Johnson St Ext From South				Railroad Ave From West				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
*** BREAK ***																	
16:15	0	0	0	0	0	2	0	0	0	0	2	0	0	1	0	0	5
16:30	0	0	0	0	0	1	0	0	0	2	0	0	0	1	0	0	4
16:45	0	2	0	0	2	1	0	0	0	0	0	0	0	1	0	0	6
Total	0	2	0	0	2	4	0	0	0	2	2	0	0	3	0	0	15
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Grand Total	0	2	0	0	2	4	0	0	0	2	2	0	0	5	0	0	17
Apprch %	0	100	0	0	33.3	66.7	0	0	0	50	50	0	0	100	0	0	
Total %	0	11.8	0	0	11.8	23.5	0	0	0	11.8	11.8	0	0	29.4	0	0	



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Counter #: 4

Printed By: Brian Meuse

Location: Bradford St (6A) @ Johnson St.

Date: 7/14/2010

File Name : Not Named 1

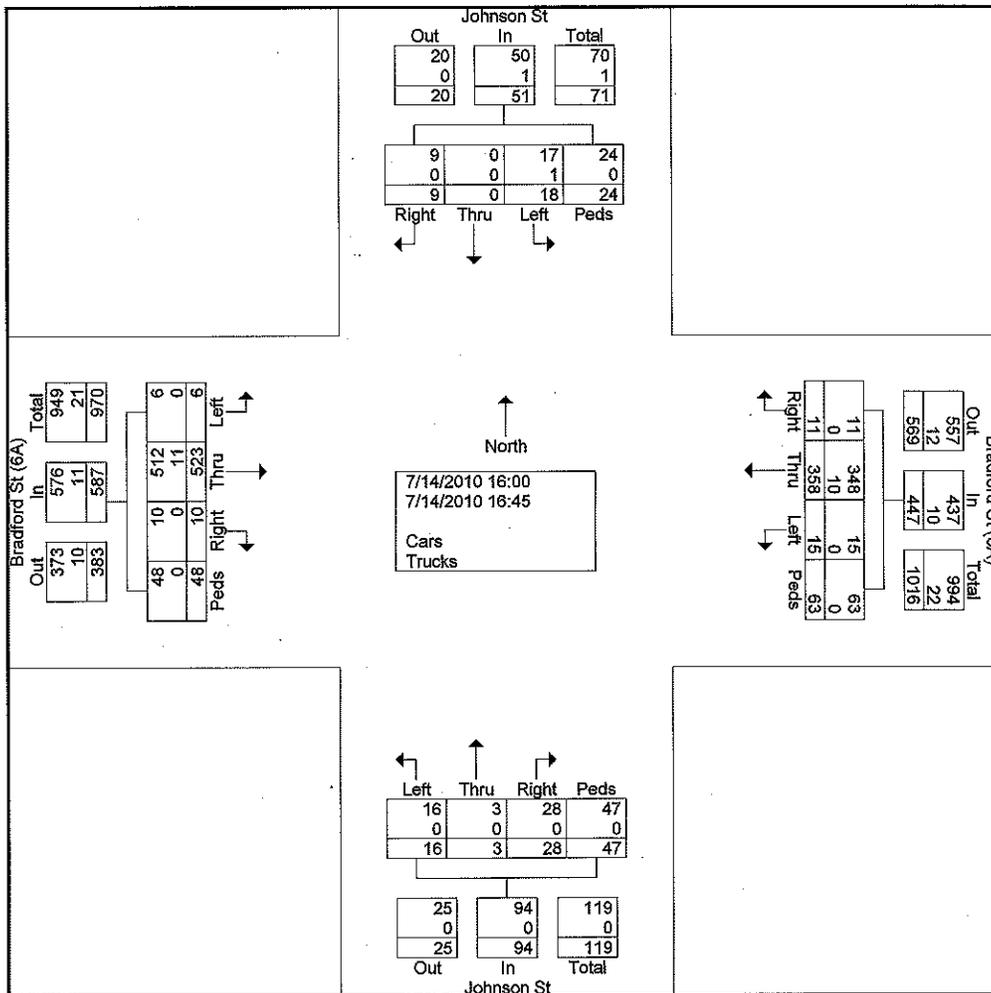
Site Code : 3821

Start Date : 7/14/2010

Page No : 1

### Groups Printed- Cars - Trucks

Start Time	Johnson St From North				Bradford St (6A) From East				Johnson St From South				Bradford St (6A) From West				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
16:00	4	0	1	4	3	89	4	22	3	0	11	20	2	129	2	16	310
16:15	6	0	2	10	4	108	4	12	5	0	6	7	2	143	3	12	324
16:30	6	0	3	4	1	81	2	16	3	3	4	5	1	136	2	15	282
16:45	2	0	3	6	7	80	1	13	5	0	7	15	1	115	3	5	263
<b>Total</b>	<b>18</b>	<b>0</b>	<b>9</b>	<b>24</b>	<b>15</b>	<b>358</b>	<b>11</b>	<b>63</b>	<b>16</b>	<b>3</b>	<b>28</b>	<b>47</b>	<b>6</b>	<b>523</b>	<b>10</b>	<b>48</b>	<b>1179</b>
<b>Grand Total</b>	<b>18</b>	<b>0</b>	<b>9</b>	<b>24</b>	<b>15</b>	<b>358</b>	<b>11</b>	<b>63</b>	<b>16</b>	<b>3</b>	<b>28</b>	<b>47</b>	<b>6</b>	<b>523</b>	<b>10</b>	<b>48</b>	<b>1179</b>
Approch %	35.3	0	17.6	47.1	3.4	80.1	2.5	14.1	17	3.2	29.8	50	1	89.1	1.7	8.2	
Total %	1.5	0	0.8	2	1.3	30.4	0.9	5.3	1.4	0.3	2.4	4	0.5	44.4	0.8	4.1	
Cars	17	0	9	24	15	348	11	63	16	3	28	47	6	512	10	48	1157
% Cars	94.4	0	100	100	100	97.2	100	100	100	100	100	100	100	97.9	100	100	98.1
Trucks	1	0	0	0	0	10	0	0	0	0	0	0	0	11	0	0	22
% Trucks	5.6	0	0	0	0	2.8	0	0	0	0	0	0	0	2.1	0	0	1.9



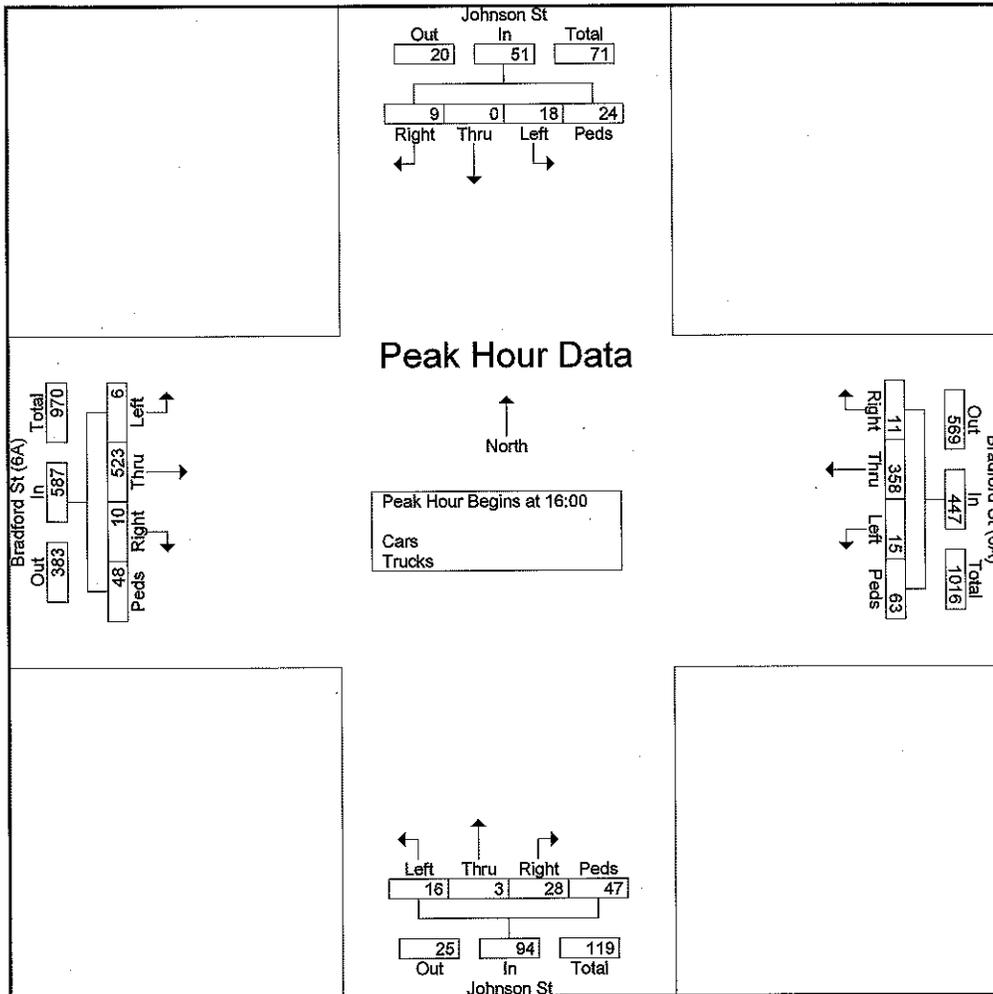
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 Barnstable, MA 02630  
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 E-Mail: trans@capecodcommission.org

Counter #: 4  
 Counted By: Brian Meuse  
 Location: Bradford St (6A) @ Johnson St.  
 Date: 7/14/2010

File Name : Not Named 1  
 Site Code : 3821  
 Start Date : 7/14/2010  
 Page No : 2

Start Time	Johnson St From North					Bradford St (6A) From East					Johnson St From South					Bradford St (6A) From West					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	4	0	1	4	9	3	89	4	22	118	3	0	11	20	34	2	129	2	16	149	310
16:15	6	0	2	10	18	4	108	4	12	128	5	0	6	7	18	2	143	3	12	160	324
16:30	6	0	3	4	13	1	81	2	16	100	3	3	4	5	15	1	136	2	15	154	282
16:45	2	0	3	6	11	7	80	1	13	101	5	0	7	15	27	1	115	3	5	124	263
Total Volume	18	0	9	24	51	15	358	11	63	447	16	3	28	47	94	6	523	10	48	587	1179
% App. Total	35.3	0	17.6	47.1		3.4	80.1	2.5	14.1		17	3.2	29.8	50		1	89.1	1.7	8.2		
PHF	.750	.000	.750	.600	.708	.536	.829	.688	.716	.873	.800	.250	.636	.588	.691	.750	.914	.833	.750	.917	.910



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Counter #: 4

Printed By: Brian Meuse

Location: Bradford St (6A) @ Johnson St.

Date: 7/14/2010

File Name : Not Named 1

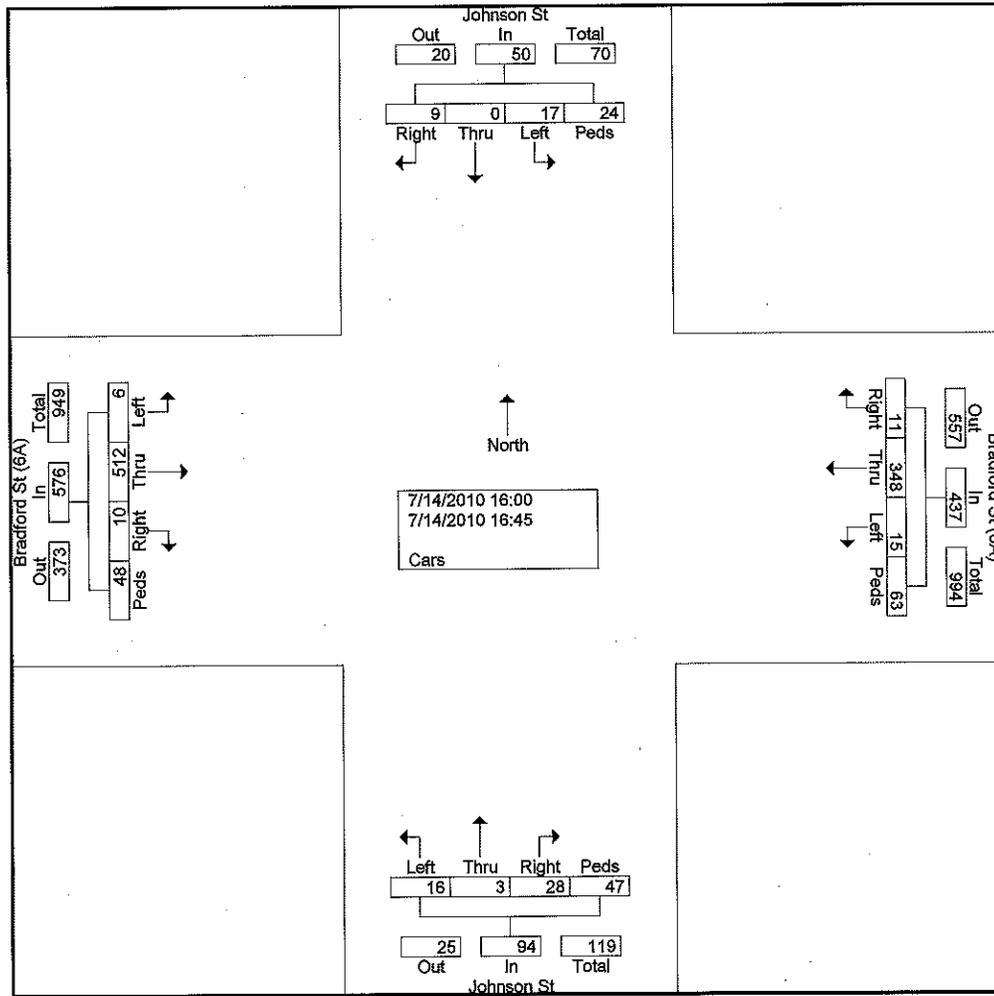
Site Code : 3821

Start Date : 7/14/2010

Page No : 1

### Groups Printed- Cars

Start Time	Johnson St From North				Bradford St (6A) From East				Johnson St From South				Bradford St (6A) From West				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
16:00	4	0	1	4	3	87	4	22	3	0	11	20	2	127	2	16	306
16:15	6	0	2	10	4	105	4	12	5	0	6	7	2	140	3	12	318
16:30	6	0	3	4	1	79	2	16	3	3	4	5	1	133	2	15	277
16:45	1	0	3	6	7	77	1	13	5	0	7	15	1	112	3	5	256
<b>Total</b>	<b>17</b>	<b>0</b>	<b>9</b>	<b>24</b>	<b>15</b>	<b>348</b>	<b>11</b>	<b>63</b>	<b>16</b>	<b>3</b>	<b>28</b>	<b>47</b>	<b>6</b>	<b>512</b>	<b>10</b>	<b>48</b>	<b>1157</b>
<b>Grand Total</b>	<b>17</b>	<b>0</b>	<b>9</b>	<b>24</b>	<b>15</b>	<b>348</b>	<b>11</b>	<b>63</b>	<b>16</b>	<b>3</b>	<b>28</b>	<b>47</b>	<b>6</b>	<b>512</b>	<b>10</b>	<b>48</b>	<b>1157</b>
<b>Apprch %</b>	<b>34</b>	<b>0</b>	<b>18</b>	<b>48</b>	<b>3.4</b>	<b>79.6</b>	<b>2.5</b>	<b>14.4</b>	<b>17</b>	<b>3.2</b>	<b>29.8</b>	<b>50</b>	<b>1</b>	<b>88.9</b>	<b>1.7</b>	<b>8.3</b>	
<b>Total %</b>	<b>1.5</b>	<b>0</b>	<b>0.8</b>	<b>2.1</b>	<b>1.3</b>	<b>30.1</b>	<b>1</b>	<b>5.4</b>	<b>1.4</b>	<b>0.3</b>	<b>2.4</b>	<b>4.1</b>	<b>0.5</b>	<b>44.3</b>	<b>0.9</b>	<b>4.1</b>	



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Counter #: 4

Printed By: Brian Meuse

Location: Bradford St (6A) @ Johnson St.

Date: 7/14/2010

File Name : Not Named 1

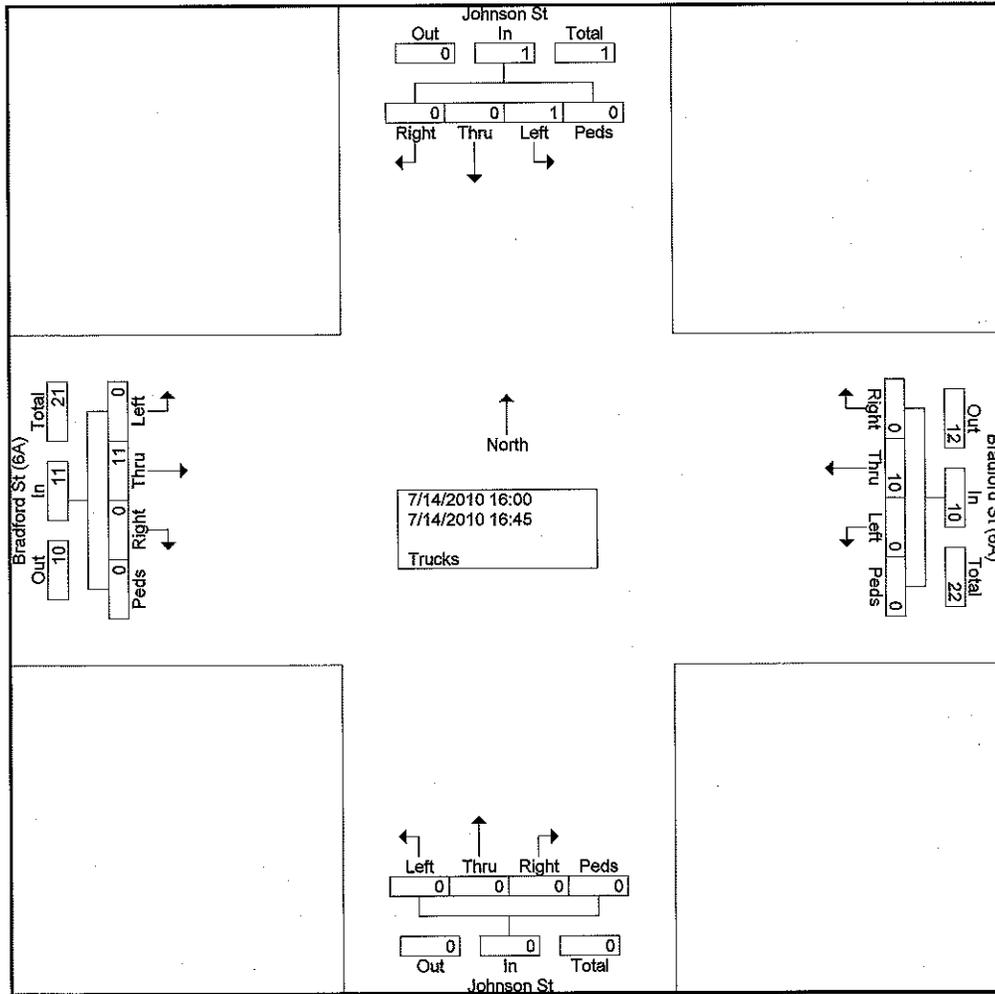
Site Code : 3821

Start Date : 7/14/2010

Page No : 1

### Groups Printed-Trucks

Start Time	Johnson St From North				Bradford St (6A) From East				Johnson St From South				Bradford St (6A) From West				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
16:00	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	4
16:15	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	6
16:30	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	5
16:45	1	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	7
<b>Total</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>22</b>
<b>Grand Total</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>22</b>
Approch %	100	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0	
Total %	4.5	0	0	0	0	45.5	0	0	0	0	0	0	0	50	0	0	



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Counter #: 4

Counted By: Brian Meuse

Location: Bradford St (6A) @ Johnson St.

Date: 7/14/2010

File Name : Not Named 1

Site Code : 3821

Start Date : 7/14/2010

Page No : 1

### Groups Printed- Bikes

Start Time	Johnson St From North				Bradford St (6A) From East				Johnson St From South				Bradford St (6A) From West				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
16:00	0	0	0	0	2	14	0	0	0	0	1	0	0	24	0	0	41
16:15	0	1	0	0	2	8	0	0	0	3	2	0	1	11	2	0	30
16:30	0	0	1	0	0	3	2	0	0	0	2	0	0	9	0	0	17
16:45	0	2	3	0	1	14	1	0	0	1	1	0	0	7	0	0	30
<b>Total</b>	0	3	4	0	5	39	3	0	0	4	6	0	1	51	2	0	118
<b>Grand Total</b>	0	3	4	0	5	39	3	0	0	4	6	0	1	51	2	0	118
<b>Approch %</b>	0	42.9	57.1	0	10.6	83	6.4	0	0	40	60	0	1.9	94.4	3.7	0	
<b>Total %</b>	0	2.5	3.4	0	4.2	33.1	2.5	0	0	3.4	5.1	0	0.8	43.2	1.7	0	

