

# **FUNCTIONAL DESIGN REPORT**

## **ASSABET RIVER RAIL TRAIL MAYNARD & ACTON, MA**

*Prepared for:*

**The Towns of Acton & Maynard for submittal to the  
Massachusetts Department of Transportation**

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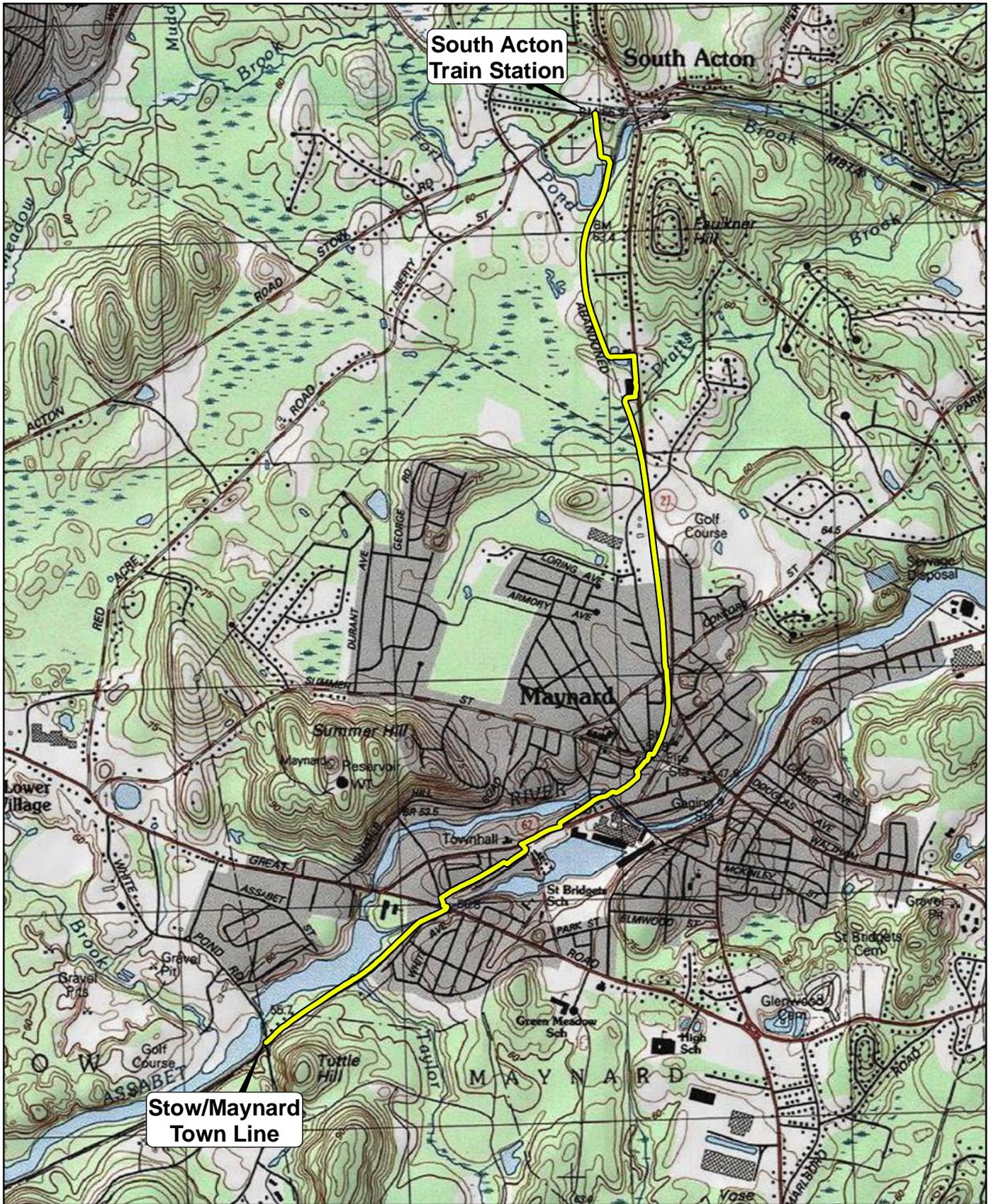
## **1.0 INTRODUCTION/ BACKGROUND**

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The municipalities of Maynard, Stow, Hudson, Marlborough, and Acton have been working together to develop the Assabet River Rail Trail (ARRT), a 12- mile long rail trail on a former rail line. The ARRT will connect downtowns in Marlborough, Hudson, and Maynard with the South Acton Commuter Rail Station and will connect in-town parks in Marlborough, Hudson, and Maynard with wooded areas, riverfront, and the Assabet River National Wildlife Refuge. The portion of the work in Marlborough and Hudson has been constructed and is being used extensively.

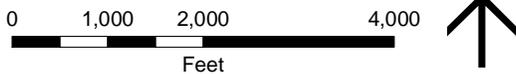
The rail trail project through Acton and Maynard will begin at the Stow Town Line, follow Track Road to Great Road, continue through a wooded section to Downtown Maynard at Clock Tower Place, continue through Maynard mostly in wooded sections to the Acton Line. In Acton the trail will continue through wooded sections, cross Mill Pond, and a Town owned farm property to Maple Street at the commuter Rail Station in South Acton.

A functional design report (FDR) has been prepared for this project to determine appropriate operations at crossings and to maintain safety. The report includes an assessment of existing roadway and traffic conditions, review of collected traffic volume and accident data, traffic signal warrant analysis, traffic accident analysis, and roadway crossing evaluation. The report also presents a traffic management plan for construction. The project area is shown in Figure 1.



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Portion of Maynard Quadrangle.  
 Data provided by Esri.



**Figure 1**  
**Locus Map**  
 Assabet River Rail Trail  
 Stow/Maynard Townline to South Acton

## **2.0 EXISTING CONDITIONS**

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### **2.1 Rail Trail Route Description**

The proposed rail trail will run in a north-south alignment in an abandoned rail right of way between the Stow Town Line, through Maynard, and end at Maple Street at the South Acton Commuter Rail Station. From the Stow town line the rail trail will run in the former rail right of way, cross Great Road, and proceed into downtown Maynard running along the front of the Clock Tower Place parking area. It will then cross Main Street and continue along the east side of Railroad Street (adjacent to parking) and then along the edge of the municipal parking area behind the Post Office. Continuing east, the existing narrow pedestrian bridge over the Assabet River at Tobin Park will be replaced with a new wider bridge to accommodate the trail. After passing alongside the downtown municipal parking lot and crossing Summer Street, the trail rejoins the abandoned rail line. It will cross Acton Street (south), Concord Street and Acton Street (north) and travel through a residential and business area to Acton.

In Acton, the trail will run along the sides and front of the parking areas associated with a commercial /industrial building(Wedgewood). This structure was built across the former RR ROW. The Town is acquiring an easement on this property to allow for the trail. The trail then continues through a residential area on the former RR ROW, over a proposed bridge replacement at Mill Pond then through the Caouette property (recently acquired by the Town of Acton for conservation and recreational purposes) to the trailhead and rail trail crossing of Maple Street. The trail will cross Maple Street just east of Stow Street to connect to the redeveloped Commuter Train Station. It is noted that a new pedestrian bridge over the MBTA commuter rail is being built (by others) as part of the upgrade of the MBTA Fitchburg Commuter Line and South Acton Commuter Rail Station forming the northern ARRT terminus.

### **2.2 Geometric Conditions at Rail Trail Roadway Crossings**

Each rail trail crossing is described below traveling from north to south through the project study area.

#### Great Road (Route 117) at Mill Street and Winter Street (Maynard)

The rail trail crossing at Great Road (Route 117) will be near its intersection with Mill Street (west) and Winter Street (east). Both Mill Street and Winter Street intersect with Great Road to form two unsignalized T-type intersections. The Mill Street approach has stop control, but the Winter Street approach has none. Because a large landscaped delta island separates Mill Street and Pine Street, most left turns into Mill Street and right turns out of Mill Street are made at the Pine Street/Great

Road intersection. Great Road consists of one 13-foot eastbound lane and one 13-foot westbound with 2-foot shoulders. There is bituminous concrete sidewalk north side of Great Road and the posted speed limit is 35 MPH. There are no crosswalks. Land use is mostly residential with access to the Maynard recycling center on the south side of Great Road.

#### Sudbury Street at Main Street (Route 62) (Maynard)

The rail trail will cross Sudbury Street at its intersection with Main Street (Route 62), west of High Street. Sudbury Street forms a T-type intersection with Main Street and Sudbury Street is Stop controlled. Main Street has one lane in each direction and Sudbury Street has a single approach lane, but it can accommodate two lanes at the intersection. The Sudbury Street approach is Stop controlled and has a short median. Main Street has a sidewalk on both sides north of Sudbury Street and on the west side south of Sudbury Street. Sudbury Street has a sidewalk on both sides. There are crosswalks across the north Main Street and Sudbury Street legs of the intersection. Land use is commercial and the posted speed limit on Main Street is 25 MPH.

#### Main Street (Route 62) at Clock Tower Place Driveway (Maynard)

The Clock Tower Place Driveway intersects Main Street to form an unsignalized T-type intersection. Both Main Street approaches are single lane and 15-feet wide, with eastbound providing a shared through/right-turn lane, and westbound providing a shared left-turn/through lane. Just west of the driveway, Railroad Street intersects Main Street at a sharp angle to form a wide unsignalized intersection. Railroad Street is one-way towards Main Street. There are metered parking spaces along the south side of Main Street east of the Clock Tower Place Driveway. Cement concrete sidewalks are provided on both sides of Main Street and a crosswalk is located on the west side of the intersection to cross Main Street. Land use along Main Street is mostly retail with commercial within the Clock Tower Place development and a small amount of residential. The posted speed limit on Main Street is 25 MPH.

#### Florida Road (Maynard)

The rail trail will cross Florida Road midblock between Railroad Street and Florida Court. Florida Road is narrow two-lane road. Adjacent land use is residential and commercial. The posted speed limit on Florida Road is 20 MPH for the southbound direction and is not posted for the northbound direction.

#### Summer Street at Maple Street (Maynard)

The Summer Street/Maple Street intersection is a four-legged unsignalized location. Maple Street intersects Summer Street from the north, and a driveway access to a

parking area intersects from the south. Both side street approaches are under Stop sign control. Summer Street consists of two lanes (eastbound and westbound), both approximately 15-feet wide. Approximately 100 feet to the east of Maple Street is the signalized intersection of Summer Street and Nason Street. There are two metered parking spaces on the south side of Summer Street between these two intersections. Cement concrete sidewalks are provided on both sides of Summer Street and crosswalks are located across Maple Street, the parking area driveway, and across the east side of Summer Street. Land use is a mix of commercial, retail and residential. There is no posted speed limit on Summer Street near the intersection.

#### Acton Street (south) at Haynes Street (Route 27) (Maynard)

The trail will cross Acton Street (south) at its intersection with Haynes Street (Route 27). The intersection is unsignalized in a Y-type configuration with Acton Street (south) having Stop control. Acton Street (south) is one-way towards Haynes Street. There is a bituminous sidewalk on the east side of Haynes Street. There is no on-street parking on either street and there are no crosswalks. The adjacent land use is residential. The posted speed limit on Haynes Street is 25 MPH.

#### Concord Street at Haynes Street/Brown Street (Route 27) (Maynard)

The trail will cross Concord Street on the west side of the intersection with Haynes Street/Brown Street (Route 27). This is a four-way unsignalized intersection with Concord Street forming the minor approaches. Both roadways have one lane in each direction and have single lane approaches to the intersection. There are no Stop signs posted for the Concord Street approaches, although motorists must grant the right of way to the Haynes and Brown Street approaches. There is no on-street parking on either street. There is a bituminous sidewalk on the east side of Haynes Street and on the south side of Concord Street, east of Haynes Street. There are crosswalks across the south leg (Haynes Street) and east leg (Concord Street) of the intersection. The land use in the vicinity of the intersection is residential and commercial. The posted speed limit on Haynes Street and Brown Street is 25 MPH.

#### Acton Street (north) at Brown Street (Route 27)/Conant Street (Maynard)

Brown Street (Route 27) intersects Acton Street (north)/Conant Street as an unsignalized four-way intersection. The trail will cross Acton Street (north) west of Brown Street. All three roadways provide two lanes and single lane approaches to the intersection. Acton Street (north) is Stop controlled and Conant Street has no Stop sign, although motorists must stop at Brown Street. There is no on-street parking on any of the roadways in the vicinity of the intersection and there are no sidewalks or crosswalks. The Maynard Country Shops and Christmas Motors are located near the intersection. The posted speed limit on Brown Street is 30 MPH.

### Maple Street at Stow Street (Acton)

The Maple Street rail trail crossing will be located just to the east of Stow Street, which forms a three-legged unsignalized intersection with Maple Street. East of Stow Street, Maple Street is one-way westbound, and two-way west of Stow Street. Therefore, vehicles approaching the intersection from Stow Street can only make a left-turn movement and vehicles from Maple Street eastbound can only make a right-turn movement into Stow Street. Both roadways have two lanes and single lane approaches. There is no Stop control for the Stow Street approach. Land use along Maple Street is mostly residential with an ambulance garage on the north side across from Stow Street. The posted speed limit along Maple Street is 25 MPH.

## **2.3 Existing Traffic Volume Data**

Traffic volume data was collected at the most critical proposed rail trail roadway crossings to assess operational characteristics and provide a basis for justifying traffic control measures such as signs, channelization, or bike path traffic signals at the proposed rail trail road crossings.

Automatic Traffic Recorder (ATR) counts were conducted for 24 hours on November 18, 2010 at the following locations in Maynard:

- Great Road (Route 117) at Mill Street,
- Main Street (Route 62), near Clock Tower Place, west of Railroad Street, and
- Summer Street, west of Maple Street.

The summary of the existing Average Daily Traffic (ADT) information is shown in Table 1.

**Table 1: Existing (2010) Traffic Volumes**

<b>Roadway</b>	<b>ADT</b>	<b>AM Peak Hour Volume (two-way)</b>	<b>K-factor<sub>1</sub></b>	<b>Directional Distribution of AM Peak Hour Traffic</b>	<b>PM Peak Hour Volume (two-way)</b>	<b>K-factor<sub>1</sub></b>	<b>Directional Distribution of PM Peak Hour Traffic</b>
Great Road	10,245	1,008	9.8%	79% EB 21% WB	942	9.2%	27% EB 73% WB
Main Street	9,136	749	8.2%	64% EB 36% WB	812	8.9%	45% EB 55% WB
Summer Street	5,572	394	7.1%	67% EB 33% WB	518	9.3%	36% EB 64% WB

<sup>1</sup> Percent of daily traffic that occurs during the peak hour

The traffic counts show that Great Road and Main Street experience the highest volumes in the study area with an ADT between 9,136 and 10,245 and peak hour volumes between 749 and 1,008. The peak direction for all roadways is eastbound in the morning and reversing to westbound in the afternoon.

Manual turning movement counts (TMCs) were conducted from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM on Thursday, November 18, 2010 at the following study intersections:

- Great Road at Mill Street,
- Main Street at Clock Tower Place Driveway, and
- Maple Street at Summer Street.

The data collected included passenger cars, trucks, bicycles and pedestrians. The percentage of heavy vehicles (trucks) during the AM and PM peak hours at each intersection ranged between 1% and 6%. Generally, the percentage of trucks was higher during the AM peak hour.

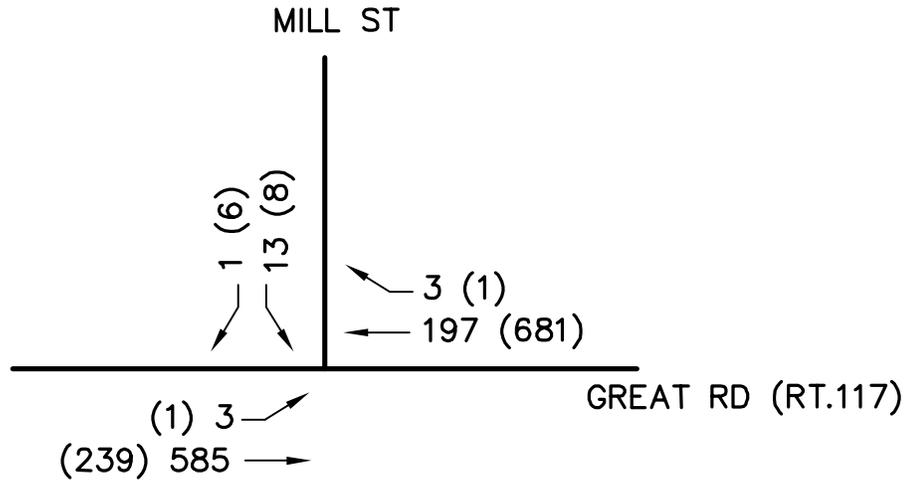
The pedestrian volume varied at each intersection. The intersection of Main Street/Clock Tower Place Driveway experienced the highest pedestrian crossings with 22 during the PM peak hour. The intersection of Maple Street/Summer Street had 11 pedestrian crossings during the PM peak hour. Both of these study intersections experienced lower pedestrian volumes during the AM peak hour. Great

Road/Mill Street had 2 pedestrians during the AM peak hour and non during the PM peak hour. Main Street/Clock Tower Place Driveway experienced between 1 and 4 bicycles during the peak hours. The other locations did not experience any bicycle activity.

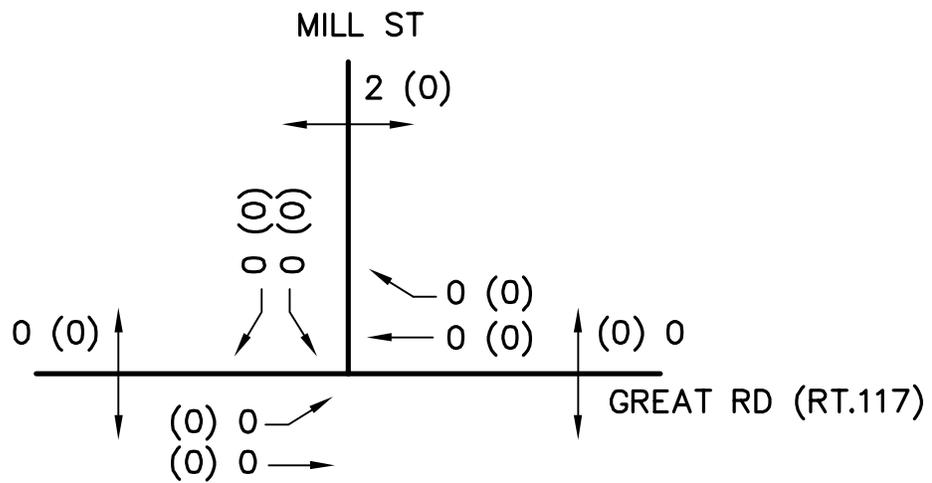
In order to determine if any of the traffic volume data needed to be adjusted to account for seasonal fluctuation within the area, the most recent MassDOT seasonal data were researched. The MassDOT seasonal data revealed that traffic volume data collected during the months of November are higher than average month conditions. Based on this, the observed volumes did not need to be adjusted. This provides a conservative (or above average) analysis condition.

Figures 2 through 4 summarize the traffic, pedestrian, and bicycle volumes at the study intersections.

FIGURE 2  
 GREAT ROAD (RT 117)/MILL STREET INTERSECTION  
 VEHICLE, PEDESTRIAN AND BICYCLE VOLUMES (2010)



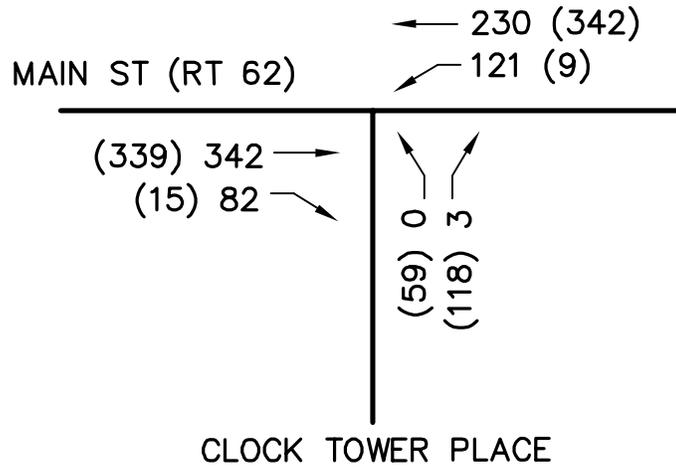
VEHICLE TURNING MOVEMENTS



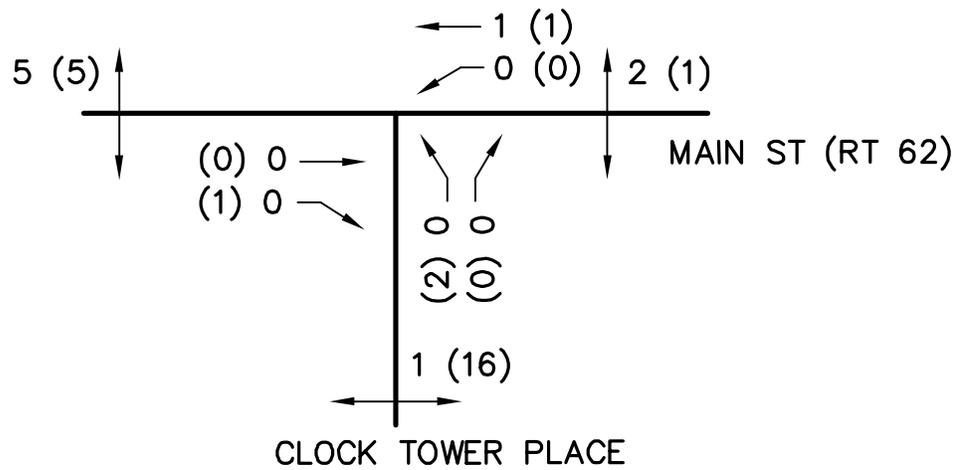
PEDESTRIAN/BICYCLE MOVEMENTS

LEGEND XXX=AM PEAK HOUR  
 (XXX)=PM PEAK HOUR  
 ← → PEDESTRIAN VOLUME  
 → BICYCLE VOLUME

FIGURE 3  
 MAIN STREET (RT 62)/CLOCK TOWER PLACE INTERSECTION  
 VEHICLE, PEDESTRIAN AND BICYCLE VOLUMES (2010)



VEHICLE TURNING MOVEMENTS

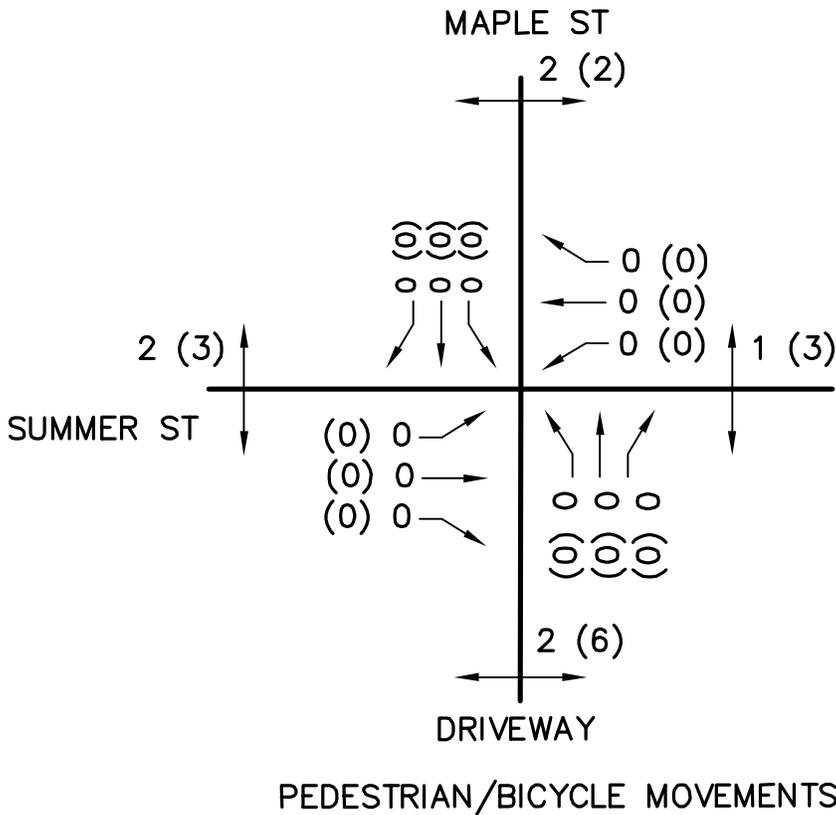
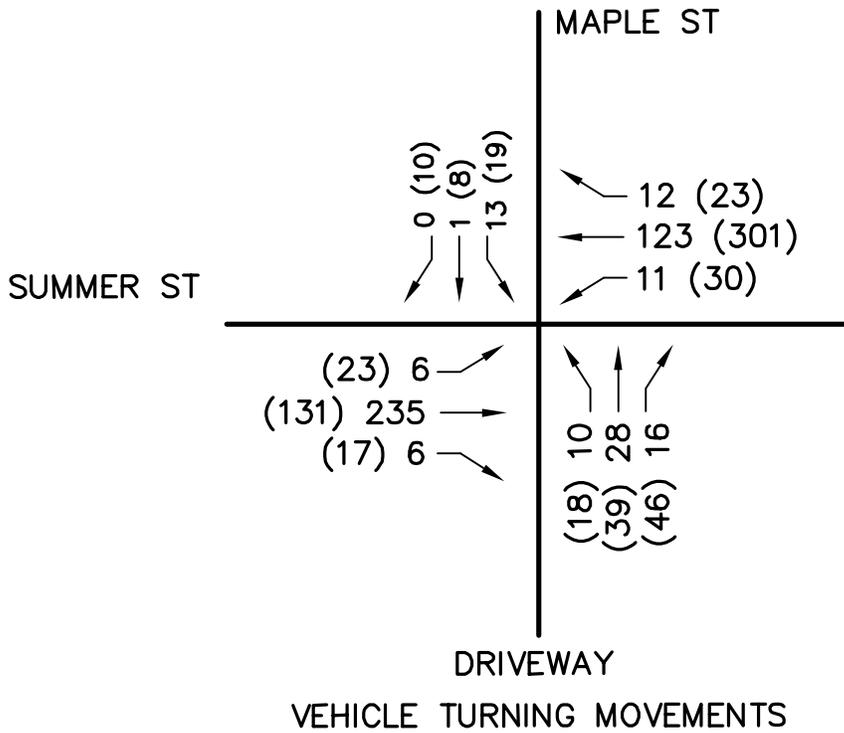


PEDESTRIAN/BICYCLE MOVEMENTS

LEGEND XXX=AM PEAK HOUR  
 (XXX)=PM PEAK HOUR  
 ← → PEDESTRIAN VOLUME  
 → BICYCLE VOLUME

FIGURE 4

SUMMER STREET/MAPLE STREET INTERSECTION  
 VEHICLE, PEDESTRIAN AND BICYCLE VOLUMES (2010)



LEGEND XXX=AM PEAK HOUR

(XXX)=PM PEAK HOUR

← → PEDESTRIAN VOLUME

→ BICYCLE VOLUME

## 2.4 Accident Data

Accident reports were obtained from MassDOT for the latest four years that data were available (from 2006 to 2009) to determine if there were any specific trends patterns at the proposed rail trail road crossing locations that would indicate safety issues.

Table 2 summarizes the accident results in the study area. A total of six accidents occurred at study intersections between 2006 and 2009. The intersection of Summer Street/Maple Street in Maynard experienced the highest number of accidents during the survey period with four. Each accident involved a vehicle traveling westbound on Summer Street. The sight distance (see discussion below) and proximity of the signal at Nason Street may be factors contributing to accidents at this location. All other locations experienced one or fewer accidents for the survey period.

Crash rates were calculated for the study intersections that experienced accidents between 2006 and 2009. Crash rates were calculated per MassDOT methodology with calculations shown in the Appendix. The crash rates for the study intersections are as follows:

- Great Road (Route 117)/Mill Street – 0.07 per million entering vehicles (MEV),
- Summer Street/Maple Street – 0.39 MEV.

Main Street (Route 62)/Clock Tower Place did not experience any accidents during the study period; therefore the crash rate is 0 MEV.

The most recent statewide and District 3 averages for unsignalized intersections published by MassDOT are 0.61 and 0.66, respectively. The calculated accident rate for study intersections analyzed is well below both the average statewide and District 3 crash rates.

**Table 2: Accident Data Summary (2006 – 2008)**

Location	Severity				Crash Type					Time of Day		Day		Road Surface				Year				Total	
	Property	Injury	Other/ Not Reported	Fatality	Head-on	Angle	Rear-end	Side-swipe	Single Veh/Other	Weekday Peak Period	Other	Weekday	Weekend/Holiday	Dry	Wet	Snow/Ice	Other	2006	2007	2008	2009		
Maple Street/Stow Street (Acton)	1								1		1			1				1				1	
Great Road (Rt. 117)/Mill Street (Maynard)		1						1								1		1				1	
Summer Street/Maple Street (Maynard)	3	1			1	2	1				4			3	1					2	1	1	4

Source: MassDOT

## **3.0 FUTURE CONDITIONS – PROPOSED PROJECT**

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### **3.1 Design Criteria**

The trail will have a design speed of 15 MPH. Design speeds are based on Chapter 11 - Shared Use Paths and Greenways of the 2006 MassDOT Project Development Guide and the 1999 AASHTO Guide for the Development of Bicycle Facilities.

The trail surface will be hot mix asphalt (HMA) pavement that is 12 feet wide with 2-foot wide grass or paved shoulders. The ARRT in Acton and Maynard will vary in width from 8 to 12 feet.

The maximum grade along the path will not exceed 4.5% and the path will have a 1.5% design typical cross slope to one side.

### **3.2 Proposed Rail Trail**

The Assabet River Rail Trail is intended to be used by a variety of users. Bicyclists, roller bladers, joggers, and walkers have traditionally used rail trails. This area will also be attractive to wheelchairs and baby carriages, as it directly serves a populated area. This portion of the ARRT will be used by people enjoying the physical recreation, but also by residents accessing the Assabet River National Wildlife Refuge and Ice House Landing. Of equal importance is the ability to use this trail to commute to work. The ARRT provides a vital connection to the MBTA and also connects some of the major employers and employment locations in the region with residential areas – Clock Tower Place in Maynard with Monster.com and EDS, the State Police Crime Lab, Intel, and others. The timing of commuter use will generally not conflict with primary times for recreational use.

The Maynard portion of the ARRT begins at the Stow line and ends at the Acton line. The southerly limit of the Maynard portion abuts the River and the northern limit is within a residential neighborhood. The central segments are through the downtown area.

The Trail starts at the Stow line, at Track Road and the west gate to the Assabet River National Wildlife Refuge (ARNWR), former Fort Devens Annex, now owned by the U.S. Fish and Wildlife Service. There is an 18-foot wide cleared gravel base, which has over the years been used as a private trucking road. There is a stream crossing of “Thanksgiving Pond,” and the structure appears to be in good condition. The existing concrete culvert at Thanksgiving Pond will need to be analyzed for emergency vehicle traffic and have railings designed.

There is a parking lot proposed to be constructed adjacent to the DPW facilities, which is located approximately in the middle from Track Road to Great Road, providing parking for approximately 5 cars.

The ARRT proceeds approximately 2,800 feet along the RR ROW where it connects to Winter Street. A former railroad bridge crossing of the stream is no longer in place, so the trail will utilize the northwesterly limit of the Winter Street ROW. The ARRT will proceed 500 feet along Winter Street to where it intersects Great Road (Route 117). The abutting section along Winter Street will need to have a railing and potentially some slope work.

The Trail then has a pedestrian crossing of Great Road (Route 117), and then connects to the RR ROW at Mill and Pine Streets. Great Road (Route 117) has moderate traffic volumes (10,000 ADT), with a crest hill located to the east of the proposed rail trail crossing. There is adequate site distance in both directions along Great Road. This trail crossing would be at grade, with appropriate signs, markings and advance warnings. Traffic and future non-vehicular volumes on Great Road (Route 117) were reviewed to determine if a pedestrian signal is warranted (see Traffic Analysis section below). The ARRT will then follow the RR ROW to Sudbury Street at Main Street (Route 62). The RR ROW widens to approximately 50 feet where it parallels High Street. Access and parking can be provided along High Street. This segment is approximately 1,500 feet in length.

The Trail then crosses Sudbury Street and proceeds along the northerly edge of the Clocktower Place parking lot. The RR ROW is privately owned and has been developed as parking for Clocktower Place, so the trail will follow Main Street as part of a wider sidewalk configuration. The ARRT then crosses Main Street (Route 62) at an modified pedestrian crosswalk at Railroad Street, to become a trail crossing. Railroad Street was reconstructed during the summer of 2000. A corridor was maintained for the ARRT to proceed along Railroad Street. The trail then will cross Florida Road, continue through the parking lot to Tobin Park.

The existing bridge at Tobin Park will be replaced with a wider structure across the Assabet River.

The trail will then proceed through the Maynard Municipal Parking Lot first on the east side then on the west side to Summer Street at Maple Street.

The trail will follow the former RR ROW through Maynard to Acton, mostly in wooded areas.

In Acton the trail crosses in front of the Wedgewood Property, and then across a wetland by way of a boardwalk structure. The location, make-up and construction

methods for the boardwalk were first presented to the Acton Conservation Commission on May 2, 2001, and have been reconsidered with the Town as the design was further developed. The proposed boardwalk over the wetlands will be approximately 200 feet long with a 14-foot wide deck. The deck would be approximately 5 feet above the wetland surface. The deck would be designed for pedestrian loads.

To minimize permanent and temporary impacts to the wetlands under the boardwalk, the use of helical screw anchors in lieu of timber piling will be considered. The use of these anchors may allow for lighter equipment for installation, therefore minimizing temporary wetland impacts from construction equipment.

The Pratts Brook culvert is a small granite block structure in Acton that will be reviewed and a railing system designed. There is a flood gauge at this point and the water levels in relation to the trail (and boardwalk) will have to be reviewed, as well.

The existing timber trestle crossing of Mill Pond in Acton is approximately 75 feet long. There are four timber bents in the water forming the substructure support system. Existing abutments are large granite block sections. It is proposed to span the entire crossing with a new pre-fabricated structure. The existing timber bents will be left in place to avoid impacts to the river in trying to remove them. The new span will support H-10 maintenance/emergency vehicle design load, or pedestrian loading only with bollards on both sides to restrict vehicles from crossing the new span. The new deck will be approximately 15 feet wide.

After Mill Pond the Trail will meander through a newly acquired farm parcel to meet Maple Street across from the newly renovated Commuter Rail Station at Maple Street.

### **3.3 Traffic Analysis**

The following analysis was conducted to assess operations and safety of the rail trail at grade roadway crossings:

- Vehicular and pedestrian signal warrant analysis,
- Sight distance measurements, and
- Trail crossing systems.

The existing year 2010 traffic volumes recorded for this study were used for analysis. These were used in lieu of future year traffic volume projections because the traffic volumes have stabilized in the last few years, and in fact may have decreased in some areas.

Future year projections of trail users were not developed because it is difficult to estimate future use for a new trail linking several towns and land uses. Instead, 1) pedestrian/bicycle thresholds were identified and used for the analysis of signal warrants at intersections, and 2) volume ranges were considered for evaluation of crossings and crossing staging areas. The sight distance and accident analysis results are applicable regardless of the expected future trail volumes.

#### Vehicle and Pedestrian Signal Warrant Analysis

An analysis was performed to determine if traffic signal control is warranted at project study crossings/intersections under criteria outlined in the *Manual on Uniform Traffic Control Devices*, 2009 Edition. The criteria involve traffic volumes on the major and minor roadways over various time periods and pedestrian volumes. For this study Warrant 3 (Peak Hour) and Warrant 4 (Pedestrian Peak Hour) were evaluated.

Signal warrant analysis was performed for the following study intersections:

- Great Road (Route 117)/Mill Street,
- Main Street (Route 62)/Clock Tower Place Driveway, and
- Summer Street/Maple Street.

The analysis results show that none of the study intersections meet the traffic volume threshold for Warrant 3 for either the AM or PM peak hours.

The minimum pedestrian volume threshold for Warrant 4 at the intersections of Main Street/Clock Tower Driveway and Summer Street/Maple Street is approximately 400 pedestrians in the peak hour. The future trail peak hour volume is not expected to approach this threshold. The minimum pedestrian volume threshold for Warrant 4 for the intersection of Great Road/Mill Street is approximately 100 pedestrians in the peak hour. It is expected that this threshold will not generally be exceeded, although it may be reached rarely during special conditions.

In addition to signal warrant analysis, other factors were considered to determine if signalization is desirable at roadway crossings including sight distance and safety concerns.

### Sight Distance Analysis

Sight distance analysis was conducted for critical trail roadway crossing locations including:

- Great Road (Rt. 117) at Mill and Winter Streets (Maynard),
- Summer Street at Maple Street (Maynard), and
- Maple Street at Stow Street (Acton).

These locations represent areas where sight distance may be restricted due to horizontal or vertical curves or obstructions. The other study trail crossing areas were reviewed and determined to be at intersections or areas where adequate sight distance was apparent.

Sight distance measurements were recorded in the field based on procedures outlined in *A Policy on Geometric Design of Highways and Streets, 2004*, American Association of State Highway Transportation Officials (AASHTO). Both stopping sight distance (SSD) and intersection sight distance (ISD) and was measured.

Table 3 summarizes the SSD at the proposed critical trail roadway crossings. The results show that SSD is satisfied for all crossings.

Table 4 summarizes ISD at critical trail crossings near intersections. ISD is satisfied for all locations except at the Winter Street approach looking east on Great Road. At this location the measured ISD is limited to 375 feet due to a vertical curve. The required ISD is 390 feet.

**Table 3: Stopping Sight Distance Summary**

Location	Posted Speed Limit Major Street	Required SSD <sup>(1)</sup>	Measured SSD	
			Eastbound	Westbound
Great Rd. (Rt. 117) crossing <sup>(2)</sup> between Mill St. & Winter St.	35 mph	250'	600'	445'
Summer St. crossing <sup>(2)</sup> at Maple St.	30 mph <sup>(3)</sup>	200'	460'	730'
Maple St. crossing <sup>(2)</sup> at Stow St.	25 mph	155'	NA	240'

Note

- 1 Stopping Sight Distance based on A Policy on Geometric Design of Highways and Streets, AASHTO, 5<sup>th</sup> Edition, 2004.
- 2 Proposed rail trail crossing location.
- 3 No posted speed limit, 30 mph used as default travel speed.

**Table 4: Intersection Sight Distance Summary**

Location	Posted Speed Limit Major Street	Required ISD <sup>(1)</sup>	Measured ISD	
			To East	To West
Great Rd. (Rt. 117) at Mill St.	35 mph	390'	560'	600'
Great Rd. (Rt. 117) at Winter St.	35 mph	390'	375'	445'
Summer St. at Maple St.	30 mph <sup>(2)</sup>	335'	950'	350'
Summer St. at Driveway	30 mph <sup>(2)</sup>	335'	425'	425'

Note

- 1 Intersection Sight Distance based on A Policy on Geometric Design of Highways and Streets, AASHTO, 5<sup>th</sup> Edition, 2004.
  - 2 No posted speed limit, 30 mph used as default travel speed.
- Does not meet requirement

## Rail Trail Roadway Crossings Control and Signage

Based on the above analysis, each rail trail roadway crossing was evaluated to develop the appropriate control and signage to ensure safe and efficient operations. Two separate crossing systems consisting of signals and signage were developed that were identified for each of project crossings. There are:

### 1 – Standard Unsignalized Crossing

- 10-foot wide painted crosswalk
- Stop signs on trail approach
- Bicycle Crossing Warning Signs
- Collapsible Bollard

### 2 – Flashing Beacons with Motion Detection

- 10-foot wide painted crosswalk
- Trail User Activated Flashing Beacon
- Bicycle Crossing Warning Signs

Both crossing types would also include 1) grading and trimming of vegetation as necessary to improve sight distance, and 2) street lighting as necessary.

Table 5 summarizes the proposed crossing type for each location. Based on the analysis results, the following location is recommended to include flashing beacon signals:

- Great Road (Rt. 117) at Mill Street (Maynard) – Flashing warning beacons are recommended based on high traffic volumes, moderate traffic speed, and restricted sight distance

The remaining crossing locations are recommended to include the standard unsignalized crossing system.

**Table 5: Trail Roadway Crossing Summary**

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<b>Crossing</b>	<b>Town</b>	<b>Crossing Type</b>
Great Rd. (Rt. 117) at Mill St.	Maynard	Flashing Beacon
Sudbury St. at Main St. (Rt. 62)	Maynard	Standard Unsignalized
Main St. (Rt. 62) at Clock Tower Place Driveway	Maynard	Standard Unsignalized
Florida Rd. at New Railroad St.	Maynard	Standard Unsignalized
Summer St. at Maple St.	Maynard	Standard Unsignalized
Acton St. (South) at Haynes St. (Rt. 27)	Maynard	Standard Unsignalized
Concord St. at Haynes St. (Rt. 27)	Maynard	Standard Unsignalized
Acton St. (North) at Brown St. (Rt. 27) and Conant St.	Maynard	Standard Unsignalized
Maple St. at Stow St.	Acton	Standard Unsignalized

## **4.0 RIGHT-OF-WAY IMPACTS**

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### **4.1 Maynard**

For the Maynard portion of the ARRT, either Maynard or private entities own the Right-of-Way (ROW).

The first section of the trail starts at the Stow Town Line and ends at Rte 117 (Great Road), 3,264-feet long. This portion of trail was recently acquired and had been used for 40 years as a haul road for a local gravel operation. This section crosses an existing culvert over Taylor Brook. The Right of Way has been cleared of all vegetation along the path of the rail trail, and the alignment is straight and the profile level. The old railroad tracks and ties have been removed from all of segment MD-I.

The crossing of Rte 117 (Great Road) is approximately 150-feet west of Winter Street and returns to the abandoned railroad Right-of-Way.

The Town of Maynard owns Winter Street and Great Road, the triangle park at Pine and Mill Street, and the rail line to just southwest of Sudbury Street. At Sudbury Street, the trail will be located within the Public ROW.

From Sudbury Street to Main Street, and then along Railroad Street, the alignment is owned by the Town and by Clock Tower Place.

The Town owns Railroad Street, Tobin Park and the Commercial/Municipal Parking Lot.

The Town owns the municipal parking Lot, Summer Street and the RR ROW to the Acton Town Line. The exception is a parcel near Route 27 that is owned by Emerald Acres. Conversations with Emerald Acres to date indicate they are receptive to granting the ARRT an easement.

Small easements are needed on a small parcel at Concord Street owned by the abutting mechanic shop. A portion of the ROW at Acton Street is owned by an abutter, the Quirk Family. Conversations have been on going with these abutters to gain easements.

### **4.2 Acton**

For the Acton portion of the ARRT, either Acton or private entities own the Right-of-Way (ROW).

Discussions are underway with Wedgewood to create an easement along the sides and the front of the property adjacent to Main Street for the ARRT.

From the Wedgewood property the RR ROW, includes the existing railroad trestle bridge over Mill Pond. After the Mill Pond bridge the rail trail will run through the Caouette property which was recently acquired by the Town of Acton for conservation and recreational purposes to the trailhead and rail trail crossing of Maple Street.

## **5.0 TRAFFIC MANAGEMENT DURING CONSTRUCTION**

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In general, this project does not involve much work in areas that have active vehicular traffic. Most of the work at the crossings will consist of repaving, curb installation, sidewalks, signs and pavement markings. No lane closures will take place during the peak hours and impacts to abutters will be minimized at all times. Traffic Management Plans have been developed to address the temporary control of traffic required for the roadway construction. The plans have been prepared in a manner to provide safe and efficient movements for all facility users (vehicles, bikes, pedestrians) through the construction areas in accordance with the latest Manual on Uniform Traffic Control Devices (MUTCD) and the MassDOT Standard Details for the Development of Temporary Traffic Control Plans. Police details and flaggers will also be utilized to help facilitate all movements and access as needed, such as temporary lane closures. All necessary traffic control devices such as signs, drums, temporary pavement markings, changeable message signs, and barriers have also been detailed on the plans.

## **6.0 ENVIRONMENTAL & HAZARDOUS MATERIALS**

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In general there is low risk associated with the proposed use of the railroad bed. The most prevalent risk associated with the proposed use would be potential contact with coal ash associated with the former railroad. Soils that must be excavated during construction will be re-used at or as near as possible to the location of original excavation. Areas along the finished trail where direct human exposure could occur to these soils will be paved or landscaped to prevent direct contact with the coal ash.

The existence of possible hazardous waste sites will be investigated and included as part of the preparation of the Environmental Notification Form (ENF).

This project has very minimal direct wetland impacts associated with the boardwalk construction. There will be work within the several wetland buffer zones and within a river front zone. An Environmental Notification Form (ENF) and a Notice of Intent (NOI) will need to be filed with the Towns of Maynard and Acton Conservation Commission.

## **7.0 DRAINAGE**

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In general, new storm drainage structures will not be required. Existing drainage patterns are being maintained and runoff from the trail is to be directed to grass swales proposed on either side of the railroad bed. There are existing cross culverts at various locations along the project which will be maintained and will require no modifications.

At proposed trailhead areas the stormwater runoff from the paved area will sheet-flow into a grass-lined swale adjacent to the trail.

## **8.0 PROPOSED PROJECT BENEFITS**

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### **8.1 Regional**

The Assabet River Rail Trail (ARRT) is a project of regional significance. The rail trail will connect the communities of Marlborough, Hudson, Stow, Maynard and Acton. The ARRT will provide a direct connection to the South Acton commuter rail station for commuters traveling into Boston, relieving the roadways of additional vehicles. The ARRT will also provide regional access for these communities to the commercial and retail centers of each of these communities. The ARRT will also connect many areas of community interest such as athletic fields, schools and the Assabet River National Wildlife Refuge (ARNWR). The completion of the ARRT will encourage further recreational uses and provide an economic benefit to the communities.

### **8.2 Safety**

The project will provide an off-road bicycle and pedestrian route through the Marlborough, Hudson, Stow, Maynard and Acton taking cyclists and pedestrian off of the local roads and reducing the interaction of these users with the motoring public. On-street bicycle accommodations do not presently exist. The paved shoulders on many of the roadways are too narrow to provide bicycle or pedestrian accommodations and sidewalks do not exist in many areas. Facility will provide for safe off-street commuting/travel route for bicyclists and users of other non-motorized modes of transportation.

### **8.3 Economic**

The project connects the commercial and retail centers of Marlborough, Hudson, Stow, Maynard and Acton. The trail will bring recreational users to retail centers and encourage use of existing businesses in these communities. In addition studies have shown that the addition of a trail such as this increases the value of residential property along the path.

### **8.4 Mobility**

The project will connect the towns of Marlborough, Hudson, Stow, Maynard and Acton to the South Acton commuter rail station providing a commuter path that can be accessed by all five towns and the region as a whole. The need for alternative transportation modes and corridors, especially in Boston urban and suburban areas has been well documented. When fully completed over its entire length, the ARRT will serve towns of Marlborough, Hudson, Stow, Maynard and Acton with a rail transit link at the ARRT's northern terminus in South Acton. By itself the Acton / Maynard segment of ARRT provides rail transit access for residents and workers in

Maynard, Acton and surrounding communities. The project will also connect the commercial and retail centers of these communities encouraging alternative modes of travel between each of these Towns. The ARRT will also connect many schools, parks and recreational facilities within each community providing much needed links to these services.

## **8.5 Environmental**

The project will provide an alternate commuter route for the communities of Marlborough, Hudson, Stow, Maynard and Acton, reducing the number of vehicles on the roadways. The reduced number of vehicles and reduced congestion will provide an environmental benefit by reducing emissions from these vehicles. The project will also connect the communities of Marlborough, Hudson, Stow, Maynard and Acton with the Assabet River National Wildlife Refuge encouraging an increased awareness of the wildlife habitat concerns in the local community.

## **APPENDICES**

**Appendix A Traffic Count Data**

**Appendix B Crash Rate Calculations**

**Appendix C Traffic Signal Warrant Analysis**

**APPENDIX A**

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**TRAFFIC COUNT DATA**

# Accurate Counts

978-664-2565

Location : Main Street West of  
 Location : Railroad Street  
 City/State: Maynard, MA  
 Counter : 13868

15080001  
 Site Code: 15080001

Start Time	18-Nov-10 Thu	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		6	85			6	75				
12:15		2	69			6	65				
12:30		4	79			10	92				
12:45		8	64	20	297	7	100	29	332	49	629
01:00		0	64			3	89				
01:15		0	58			0	49				
01:30		2	63			5	73				
01:45		1	72	3	257	4	63	12	274	15	531
02:00		1	73			2	82				
02:15		0	83			4	74				
02:30		3	73			2	78				
02:45		2	76	6	305	2	81	10	315	16	620
03:00		0	74			2	70				
03:15		0	79			0	71				
03:30		0	86			1	82				
03:45		3	78	3	317	0	87	3	310	6	627
04:00		3	75			1	83				
04:15		2	61			1	75				
04:30		4	75			1	106				
04:45		8	78	17	289	3	93	6	357	23	646
05:00		6	92			3	124				
05:15		16	103			6	119				
05:30		17	85			9	107				
05:45		28	88	67	368	10	94	28	444	95	812
06:00		30	70			17	87				
06:15		38	79			25	85				
06:30		64	67			27	81				
06:45		76	55	208	271	40	62	109	315	317	586
07:00		80	63			52	71				
07:15		103	62			71	50				
07:30		122	64			76	53				
07:45		99	61	404	250	55	35	254	209	658	459
08:00		115	36			83	28				
08:15		130	29			60	44				
08:30		114	24			62	29				
08:45		121	27	480	116	64	33	269	134	749	250
09:00		111	17			79	33				
09:15		79	23			65	32				
09:30		90	26			54	32				
09:45		61	21	341	87	61	22	259	119	600	206
10:00		56	26			67	29				
10:15		67	10			56	19				
10:30		67	15			57	12				
10:45		68	13	258	64	76	12	256	72	514	136
11:00		62	4			60	12				
11:15		56	15			69	13				
11:30		82	7			57	11				
11:45		70	4	270	30	67	3	253	39	523	69
<b>Total</b>		<b>2077</b>	<b>2651</b>			<b>1488</b>	<b>2920</b>			<b>3565</b>	<b>5571</b>
<b>Percent</b>		<b>43.9%</b>	<b>56.1%</b>			<b>33.8%</b>	<b>66.2%</b>			<b>39.0%</b>	<b>61.0%</b>
<b>Grand Total</b>		<b>2077</b>	<b>2651</b>			<b>1488</b>	<b>2920</b>			<b>3565</b>	<b>5571</b>
<b>Percent</b>		<b>43.9%</b>	<b>56.1%</b>			<b>33.8%</b>	<b>66.2%</b>			<b>39.0%</b>	<b>61.0%</b>

ADT

ADT 9,136

AADT 9,136

# Accurate Counts

978-664-2565

Location : Main Street West of  
 Location : Railroad Street  
 City/State: Maynard, MA  
 Counter : 13868

15080001  
 Site Code: 15080001

Start Time	15-Nov-10		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	*	*	*	*	20	29	*	*	*	*	*	*	20	29
01:00	*	*	*	*	*	*	3	12	*	*	*	*	*	*	3	12
02:00	*	*	*	*	*	*	6	10	*	*	*	*	*	*	6	10
03:00	*	*	*	*	*	*	3	3	*	*	*	*	*	*	3	3
04:00	*	*	*	*	*	*	17	6	*	*	*	*	*	*	17	6
05:00	*	*	*	*	*	*	67	28	*	*	*	*	*	*	67	28
06:00	*	*	*	*	*	*	208	109	*	*	*	*	*	*	208	109
07:00	*	*	*	*	*	*	404	254	*	*	*	*	*	*	404	254
08:00	*	*	*	*	*	*	<b>480</b>	<b>269</b>	*	*	*	*	*	*	<b>480</b>	<b>269</b>
09:00	*	*	*	*	*	*	341	259	*	*	*	*	*	*	341	259
10:00	*	*	*	*	*	*	258	256	*	*	*	*	*	*	258	256
11:00	*	*	*	*	*	*	270	253	*	*	*	*	*	*	270	253
12:00 PM	*	*	*	*	*	*	297	332	*	*	*	*	*	*	297	332
01:00	*	*	*	*	*	*	257	274	*	*	*	*	*	*	257	274
02:00	*	*	*	*	*	*	305	315	*	*	*	*	*	*	305	315
03:00	*	*	*	*	*	*	317	310	*	*	*	*	*	*	317	310
04:00	*	*	*	*	*	*	289	357	*	*	*	*	*	*	289	357
05:00	*	*	*	*	*	*	<b>368</b>	<b>444</b>	*	*	*	*	*	*	<b>368</b>	<b>444</b>
06:00	*	*	*	*	*	*	271	315	*	*	*	*	*	*	271	315
07:00	*	*	*	*	*	*	250	209	*	*	*	*	*	*	250	209
08:00	*	*	*	*	*	*	116	134	*	*	*	*	*	*	116	134
09:00	*	*	*	*	*	*	87	119	*	*	*	*	*	*	87	119
10:00	*	*	*	*	*	*	64	72	*	*	*	*	*	*	64	72
11:00	*	*	*	*	*	*	30	39	*	*	*	*	*	*	30	39
Lane	0	0	0	0	0	0	4728	4408	0	0	0	0	0	0	4728	4408
Day	0	0	0	0	0	0	9136	9136	0	0	0	0	0	0	9136	9136
AM Peak							08:00	08:00							08:00	08:00
Vol.							480	269							480	269
PM Peak							17:00	17:00							17:00	17:00
Vol.							368	444							368	444

Comb. Total                    0                    0                    0                    9136                    0                    0                    0                    9136

ADT                    ADT 9,136                    AADT 9,136

# Accurate Counts

978-664-2565

Location : Great Road @ Mill Street  
 Location :  
 City/State: Maynard, MA  
 Counter : 13940

15080002  
 Site Code: 15080002

Start Time	18-Nov-10 Thu	WB		Hour Totals		EB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		2	54			6	59				
12:15		9	51			3	88				
12:30		5	58			2	71				
12:45		3	57	19	220	2	75	13	293	32	513
01:00		1	59			0	70				
01:15		3	54			1	81				
01:30		2	55			0	64				
01:45		0	47	6	215	0	108	1	323	7	538
02:00		0	69			1	72				
02:15		4	76			1	65				
02:30		3	62			1	69				
02:45		2	65	9	272	0	93	3	299	12	571
03:00		3	91			2	96				
03:15		2	93			0	89				
03:30		1	97			0	91				
03:45		0	137	6	418	3	61	5	337	11	755
04:00		0	138			0	67				
04:15		2	138			4	63				
04:30		4	171			7	52				
04:45		4	180	10	627	3	47	14	229	24	856
05:00		3	186			8	65				
05:15		3	163			19	70				
05:30		5	166			26	56				
05:45		8	176	19	691	35	60	88	251	107	942
06:00		9	168			56	60				
06:15		30	131			106	60				
06:30		29	109			177	39				
06:45		43	99	111	507	170	45	509	204	620	711
07:00		40	69			197	41				
07:15		42	57			207	36				
07:30		56	53			181	25				
07:45		58	53	196	232	204	19	789	121	985	353
08:00		58	42			202	31				
08:15		69	26			178	14				
08:30		65	35			149	23				
08:45		60	36	252	139	178	16	707	84	959	223
09:00		53	43			155	17				
09:15		36	35			112	19				
09:30		55	27			112	15				
09:45		48	16	192	121	110	10	489	61	681	182
10:00		45	24			83	14				
10:15		36	26			73	6				
10:30		43	19			99	8				
10:45		49	15	173	84	85	5	340	33	513	117
11:00		57	21			95	4				
11:15		35	8			56	4				
11:30		51	4			71	3				
11:45		60	5	203	38	57	2	279	13	482	51
<b>Total</b>		1196	3564			3237	2248			4433	5812
<b>Percent</b>		25.1%	74.9%			59.0%	41.0%			43.3%	56.7%
<b>Grand Total</b>		1196	3564			3237	2248			4433	5812
<b>Percent</b>		25.1%	74.9%			59.0%	41.0%			43.3%	56.7%

ADT

ADT 10,245

AADT 10,245

# Accurate Counts

978-664-2565

Location : Great Road @ Mill Street  
 Location :  
 City/State: Maynard, MA  
 Counter : 13940

15080002  
 Site Code: 15080002

Start Time	15-Nov-10		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	*	*	*	*	*	*	19	13	*	*	*	*	*	*	19	13
01:00	*	*	*	*	*	*	6	1	*	*	*	*	*	*	6	1
02:00	*	*	*	*	*	*	9	3	*	*	*	*	*	*	9	3
03:00	*	*	*	*	*	*	6	5	*	*	*	*	*	*	6	5
04:00	*	*	*	*	*	*	10	14	*	*	*	*	*	*	10	14
05:00	*	*	*	*	*	*	19	88	*	*	*	*	*	*	19	88
06:00	*	*	*	*	*	*	111	509	*	*	*	*	*	*	111	509
07:00	*	*	*	*	*	*	196	789	*	*	*	*	*	*	196	789
08:00	*	*	*	*	*	*	252	707	*	*	*	*	*	*	252	707
09:00	*	*	*	*	*	*	192	489	*	*	*	*	*	*	192	489
10:00	*	*	*	*	*	*	173	340	*	*	*	*	*	*	173	340
11:00	*	*	*	*	*	*	203	279	*	*	*	*	*	*	203	279
12:00 PM	*	*	*	*	*	*	220	293	*	*	*	*	*	*	220	293
01:00	*	*	*	*	*	*	215	323	*	*	*	*	*	*	215	323
02:00	*	*	*	*	*	*	272	299	*	*	*	*	*	*	272	299
03:00	*	*	*	*	*	*	418	337	*	*	*	*	*	*	418	337
04:00	*	*	*	*	*	*	627	229	*	*	*	*	*	*	627	229
05:00	*	*	*	*	*	*	691	251	*	*	*	*	*	*	691	251
06:00	*	*	*	*	*	*	507	204	*	*	*	*	*	*	507	204
07:00	*	*	*	*	*	*	232	121	*	*	*	*	*	*	232	121
08:00	*	*	*	*	*	*	139	84	*	*	*	*	*	*	139	84
09:00	*	*	*	*	*	*	121	61	*	*	*	*	*	*	121	61
10:00	*	*	*	*	*	*	84	33	*	*	*	*	*	*	84	33
11:00	*	*	*	*	*	*	38	13	*	*	*	*	*	*	38	13
Lane	0	0	0	0	0	0	4760	5485	0	0	0	0	0	0	4760	5485
Day	0	0	0	0	0	0	10245		0	0	0	0	0	0	10245	
AM Peak							08:00	07:00							08:00	07:00
Vol.							252	789							252	789
PM Peak							17:00	15:00							17:00	15:00
Vol.							691	337							691	337

Comb. Total                    0                    0                    0                    10245                    0                    0                    0                    10245

ADT                    ADT 10,245                    AADT 10,245

# Accurate Counts

978-664-2565

Location : Summer Street EB West of  
 Location : Maple Street  
 City/State: Maynard, MA  
 Counter : 13735

15080003  
 Site Code: 15080003

Start Time	18-Nov-10		19-Nov-10		20-Nov-10		Daily Average	
	Thu A.M.	P.M.	Fri A.M.	P.M.	Sat A.M.	P.M.	A.M.	P.M.
12:00	3	18	*	*	*	*	3	18
12:15	2	45	*	*	*	*	2	45
12:30	3	43	*	*	*	*	3	43
12:45	2	26	*	*	*	*	2	26
01:00	0	32	*	*	*	*	0	32
01:15	2	36	*	*	*	*	2	36
01:30	1	29	*	*	*	*	1	29
01:45	1	35	*	*	*	*	1	35
02:00	1	36	*	*	*	*	1	36
02:15	0	41	*	*	*	*	0	41
02:30	0	33	*	*	*	*	0	33
02:45	1	49	*	*	*	*	1	49
03:00	1	51	*	*	*	*	1	51
03:15	0	42	*	*	*	*	0	42
03:30	0	48	*	*	*	*	0	48
03:45	2	43	*	*	*	*	2	43
04:00	0	39	*	*	*	*	0	39
04:15	1	36	*	*	*	*	1	36
04:30	3	53	*	*	*	*	3	53
04:45	2	49	*	*	*	*	2	49
05:00	3	47	*	*	*	*	3	47
05:15	11	36	*	*	*	*	11	36
05:30	11	39	*	*	*	*	11	39
05:45	19	45	*	*	*	*	19	45
06:00	16	57	*	*	*	*	16	57
06:15	27	38	*	*	*	*	27	38
06:30	50	31	*	*	*	*	50	31
06:45	50	47	*	*	*	*	50	47
07:00	62	35	*	*	*	*	62	35
07:15	57	24	*	*	*	*	57	24
07:30	80	21	*	*	*	*	80	21
07:45	50	36	*	*	*	*	50	36
08:00	69	26	*	*	*	*	69	26
08:15	66	20	*	*	*	*	66	20
08:30	53	16	*	*	*	*	53	16
08:45	41	19	*	*	*	*	41	19
09:00	52	7	*	*	*	*	52	7
09:15	44	14	*	*	*	*	44	14
09:30	32	13	*	*	*	*	32	13
09:45	57	16	*	*	*	*	57	16
10:00	32	11	*	*	*	*	32	11
10:15	42	10	*	*	*	*	42	10
10:30	36	3	*	*	*	*	36	3
10:45	26	15	*	*	*	*	26	15
11:00	36	7	*	*	*	*	36	7
11:15	40	5	*	*	*	*	40	5
11:30	41	9	*	*	*	*	41	9
11:45	42	2	*	*	*	*	42	2
<b>Total</b>	<b>1170</b>	<b>1433</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1170</b>	<b>1433</b>
<b>Combined Total</b>	<b>2603</b>		<b>0</b>		<b>0</b>		<b>2603</b>	
Peak	07:30	02:45					07:30	02:45
Vol.	265	190					265	190
P.H.F.	0.828	0.931					0.828	0.931
ADT	ADT 2,603		AADT 2,603					

# Accurate Counts

978-664-2565

Location : Summer Street EB West of  
 Location : Maple Street  
 City/State: Maynard, MA  
 Counter : 13735

15080003  
 Site Code: 15080003

Start Time	Mon 15-Nov-10	Tue 16-Nov-10	Wed 17-Nov-10	Thu 18-Nov-10	Fri 19-Nov-10	Average Day	Sat 20-Nov-10	Sun 21-Nov-10	Week Average
12:00 AM	*	*	*	10	*	10	*	*	10
01:00	*	*	*	4	*	4	*	*	4
02:00	*	*	*	2	*	2	*	*	2
03:00	*	*	*	3	*	3	*	*	3
04:00	*	*	*	6	*	6	*	*	6
05:00	*	*	*	44	*	44	*	*	44
06:00	*	*	*	143	*	143	*	*	143
07:00	*	*	*	<b>249</b>	*	<b>249</b>	*	*	<b>249</b>
08:00	*	*	*	229	*	229	*	*	229
09:00	*	*	*	185	*	185	*	*	185
10:00	*	*	*	136	*	136	*	*	136
11:00	*	*	*	159	*	159	*	*	159
12:00 PM	*	*	*	132	*	132	*	*	132
01:00	*	*	*	132	*	132	*	*	132
02:00	*	*	*	159	*	159	*	*	159
03:00	*	*	*	<b>184</b>	*	<b>184</b>	*	*	<b>184</b>
04:00	*	*	*	177	*	177	*	*	177
05:00	*	*	*	167	*	167	*	*	167
06:00	*	*	*	173	*	173	*	*	173
07:00	*	*	*	116	*	116	*	*	116
08:00	*	*	*	81	*	81	*	*	81
09:00	*	*	*	50	*	50	*	*	50
10:00	*	*	*	39	*	39	*	*	39
11:00	*	*	*	23	*	23	*	*	23
Day Total	0	0	0	2603	0	2603	0	0	2603
% Avg. WkDay	0.0%	0.0%	0.0%	100.0%	0.0%				
% Avg. Week	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	0.0%	
AM Peak				07:00		07:00			07:00
Vol.				249		249			249
PM Peak				15:00		15:00			15:00
Vol.				184		184			184
Grand Total	0	0	0	2603	0	2603	0	0	2603

ADT

ADT 2,603

AADT 2,603

# Accurate Counts

978-664-2565

Location : Summer Street WB West of  
 Location : Maple Street  
 City/State: Maynard, MA  
 Counter : 13663

Site Code: 15080003  
 150800A3

Start Time	Tue	30-Nov-10	Wed	01-Dec-10	Thu	02-Dec-10	Daily Average	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00	2	50	*	*	*	*	2	50
12:15	1	40	*	*	*	*	1	40
12:30	2	48	*	*	*	*	2	48
12:45	0	40	*	*	*	*	0	40
01:00	4	39	*	*	*	*	4	39
01:15	0	38	*	*	*	*	0	38
01:30	3	39	*	*	*	*	3	39
01:45	0	49	*	*	*	*	0	49
02:00	1	48	*	*	*	*	1	48
02:15	2	49	*	*	*	*	2	49
02:30	1	46	*	*	*	*	1	46
02:45	1	62	*	*	*	*	1	62
03:00	1	48	*	*	*	*	1	48
03:15	0	62	*	*	*	*	0	62
03:30	1	69	*	*	*	*	1	69
03:45	2	85	*	*	*	*	2	85
04:00	0	71	*	*	*	*	0	71
04:15	1	<b>83</b>	*	*	*	*	1	<b>83</b>
04:30	0	<b>77</b>	*	*	*	*	0	<b>77</b>
04:45	1	<b>87</b>	*	*	*	*	1	<b>87</b>
05:00	3	<b>86</b>	*	*	*	*	3	<b>86</b>
05:15	6	76	*	*	*	*	6	76
05:30	2	83	*	*	*	*	2	83
05:45	3	74	*	*	*	*	3	74
06:00	5	81	*	*	*	*	5	81
06:15	14	77	*	*	*	*	14	77
06:30	16	76	*	*	*	*	16	76
06:45	20	77	*	*	*	*	20	77
07:00	21	54	*	*	*	*	21	54
07:15	28	52	*	*	*	*	28	52
07:30	26	48	*	*	*	*	26	48
07:45	46	49	*	*	*	*	46	49
08:00	32	30	*	*	*	*	32	30
08:15	25	20	*	*	*	*	25	20
08:30	26	19	*	*	*	*	26	19
08:45	31	20	*	*	*	*	31	20
09:00	28	33	*	*	*	*	28	33
09:15	32	26	*	*	*	*	32	26
09:30	<b>38</b>	16	*	*	*	*	<b>38</b>	16
09:45	<b>41</b>	14	*	*	*	*	<b>41</b>	14
10:00	<b>32</b>	16	*	*	*	*	<b>32</b>	16
10:15	<b>39</b>	17	*	*	*	*	<b>39</b>	17
10:30	35	9	*	*	*	*	35	9
10:45	33	5	*	*	*	*	33	5
11:00	39	14	*	*	*	*	39	14
11:15	32	3	*	*	*	*	32	3
11:30	34	8	*	*	*	*	34	8
11:45	40	6	*	*	*	*	40	6
<b>Total</b>	<b>750</b>	<b>2219</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>750</b>	<b>2219</b>
<b>Combined Total</b>	<b>2969</b>		<b>0</b>		<b>0</b>		<b>2969</b>	
Peak	09:30	04:15					09:30	04:15
Vol.	150	333					150	333
P.H.F.	0.915	0.957					0.915	0.957
<b>ADT</b>		<b>ADT 2,969</b>	<b>AADT 2,969</b>					

# Accurate Counts

978-664-2565

Location : Summer Street WB West of  
 Location : Maple Street  
 City/State: Maynard, MA  
 Counter : 13663

Site Code: 15080003  
 150800A3

Start Time	Mon 29-Nov-10	Tue 30-Nov-10	Wed 01-Dec-10	Thu 02-Dec-10	Fri 03-Dec-10	Average Day	Sat 04-Dec-10	Sun 05-Dec-10	Week Average
12:00 AM	*	5	*	*	*	5	*	*	5
01:00	*	7	*	*	*	7	*	*	7
02:00	*	5	*	*	*	5	*	*	5
03:00	*	4	*	*	*	4	*	*	4
04:00	*	2	*	*	*	2	*	*	2
05:00	*	14	*	*	*	14	*	*	14
06:00	*	55	*	*	*	55	*	*	55
07:00	*	121	*	*	*	121	*	*	121
08:00	*	114	*	*	*	114	*	*	114
09:00	*	139	*	*	*	139	*	*	139
10:00	*	139	*	*	*	139	*	*	139
11:00	*	145	*	*	*	145	*	*	145
12:00 PM	*	178	*	*	*	178	*	*	178
01:00	*	165	*	*	*	165	*	*	165
02:00	*	205	*	*	*	205	*	*	205
03:00	*	264	*	*	*	264	*	*	264
04:00	*	318	*	*	*	318	*	*	318
05:00	*	319	*	*	*	319	*	*	319
06:00	*	311	*	*	*	311	*	*	311
07:00	*	203	*	*	*	203	*	*	203
08:00	*	89	*	*	*	89	*	*	89
09:00	*	89	*	*	*	89	*	*	89
10:00	*	47	*	*	*	47	*	*	47
11:00	*	31	*	*	*	31	*	*	31
Day Total	0	2969	0	0	0	2969	0	0	2969
% Avg. WkDay	0.0%	100.0%	0.0%	0.0%	0.0%				
% Avg. Week	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	
AM Peak		11:00				11:00			11:00
Vol.		145				145			145
PM Peak		17:00				17:00			17:00
Vol.		319				319			319
Grand Total	0	2969	0	0	0	2969	0	0	2969
ADT		ADT 2,969				AADT 2,969			

# Turning Movement Count Summary

Count Date: Thursday, November 18, 2010  
 Time Period: 7:00 - 9:00 AM  
 Comment 1: N/S Street : Clock Tower Place Driveway  
 Comment 2: E/W Street : Main Street (Route 62)  
 Comment 3: City/State : Maynard, MA  
 Comment 4: Weather : Clear, sunny, 45 degrees Fahrenheit

## Cars and Pedestrians

Start Time	Main Street (Route 62) Eastbound					Main Street (Route 62) Westbound					Driveway Northbound					Intersection Total						
	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	with peds	without peds
07:00	0	68	9	1	78	11	42	0	0	53	0	0	0	0	0					0	131	130
07:15	0	98	17	1	116	28	34	0	2	64	1	0	0	0	1					0	181	178
07:30	0	84	16	3	103	25	65	0	0	90	0	0	2	1	3					0	196	192
07:45	0	75	19	0	94	37	43	0	0	80	0	0	0	0	0					0	174	174
08:00	0	68	30	1	99	34	61	0	1	96	0	0	0	0	0					0	195	193
08:15	0	81	22	1	104	25	42	0	1	68	0	0	1	0	1					0	173	171
08:30	0	66	28	1	95	23	44	0	1	68	0	0	0	0	0					0	163	161
08:45	0	78	35	1	114	35	50	0	0	85	0	0	0	0	0					0	199	198

## Trucks

Start Time	Main Street (Route 62) Eastbound					Main Street (Route 62) Westbound					Driveway Northbound					Intersection Total						
	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	with peds	without peds
07:00	0	4	0	0	4	0	2	0	0	2	0	0	0	0	0					0	6	6
07:15	0	2	0	0	2	0	4	0	0	4	0	0	0	0	0					0	6	6
07:30	0	4	0	0	4	0	6	0	0	6	0	0	0	0	0					0	10	10
07:45	0	3	0	0	3	0	3	0	0	3	0	0	0	0	0					0	6	6
08:00	0	8	0	0	8	0	6	0	0	6	0	0	0	0	0					0	14	14
08:15	0	4	0	0	4	0	4	0	0	4	0	0	0	0	0					0	8	8
08:30	0	5	0	0	5	0	3	0	0	3	0	0	0	0	0					0	8	8
08:45	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0					0	4	4

## Cars & Trucks

Start Time	Main Street (Route 62) Eastbound					Main Street (Route 62) Westbound					Driveway Northbound					Intersection Total						
	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	with peds	without peds
07:00	0	72	9	1	82	11	44	0	0	55	0	0	0	0	0					0	137	136
07:15	0	100	17	1	118	28	38	0	2	68	1	0	0	0	1					0	187	184
07:30	0	88	16	3	107	25	71	0	0	96	0	0	2	1	3					0	206	202
07:45	0	78	19	0	97	37	46	0	0	83	0	0	0	0	0					0	180	180
08:00	0	76	30	1	107	34	67	0	1	102	0	0	0	0	0					0	209	207
08:15	0	85	22	1	108	25	46	0	1	72	0	0	1	0	1					0	181	179
08:30	0	71	28	1	100	23	47	0	1	71	0	0	0	0	0					0	171	169
08:45	0	80	35	1	116	35	52	0	0	87	0	0	0	0	0					0	203	202

Hourly Volumes without peds	
702	7:00 to 8:00
773	7:15 to 8:15
768	7:30 to 8:30
735	7:45 to 8:45
757	8:00 to 9:00

## 7:15 - 8:15 Peak Hour Summary

	Main Street (Route 62) Eastbound					Main Street (Route 62) Westbound					Driveway Northbound					0					Intersection Total	
	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	with peds	without peds
Volume	0	342	82	5	424	121	230	0	2	351	0	0	3	1	3	0	0	0	0	0	786	778
PHF	#DIV/0!	0.8550	0.6833		0.9815	0.8176	0.8099	#DIV/0!		0.8603	#DIV/0!	#DIV/0!	0.3750		0.2500	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!		0.9396
%HV	#DIV/0!	5.810%	0.000%		4.535%	0.000%	8.261%	#DIV/0!		5.382%	#DIV/0!	#DIV/0!	0.000%		0.000%	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!		0.000%

# Turning Movement Count Summary

Count Date: Thursday, November 18, 2010  
 Time Period: 7:00 - 9:00 AM  
 Comment 1: N/S Street : Maple Street / Brooks Street / Driveway  
 Comment 2: E/W Street: Summer Street  
 Comment 3: City/State : Maynard, MA  
 Comment 4: Weather : Clear, sunny, 45 degrees Fahrenheit

## Cars and Pedestrians

Start Time	Summer Street Eastbound					Summer Street Westbound					Driveway Northbound					Maple Street / Brooks Street Southbound					Intersection Total	
	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	with peds	without peds
07:00	1	62	0	0	63	1	25	1	0	27	1	0	4	1	6	5	0	0	1	6	102	100
07:15	2	52	2	0	56	2	24	4	0	30	0	2	2	0	4	2	0	0	1	3	93	92
07:30	2	67	1	0	70	1	34	3	0	38	3	14	2	0	19	3	0	0	0	3	130	130
07:45	0	56	0	1	57	0	41	3	1	45	3	4	2	1	10	5	1	0	1	7	119	115
08:00	1	63	2	0	66	3	25	3	0	31	3	3	6	0	12	3	0	0	0	3	112	112
08:15	3	49	3	1	56	7	23	3	0	33	1	6	6	1	14	1	0	0	1	2	105	102
08:30	0	48	4	1	53	3	19	3	2	27	0	8	3	1	12	1	2	1	0	4	96	92
08:45	0	36	0	1	37	1	19	4	0	24	1	3	10	0	14	4	0	0	2	6	81	78

## Trucks

Start Time	Summer Street Eastbound					Summer Street Westbound					Driveway Northbound					Maple Street / Brooks Street Southbound					intersection total
	Left	Thru	Right		approach total	Left	Thru	Right		approach total	Left	Thru	Right		approach total	Left	Thru	Right		approach total	
07:00	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		1	1
07:15	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0
07:30	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0
07:45	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0
08:00	0	0	0		0	0	0	0		0	0	0	0		0	1	0	0		1	1
08:15	0	0	0		0	0	0	0		0	0	1	0		1	0	0	0		0	1
08:30	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0
08:45	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0

## Cars & Trucks

Start Time	Summer Street Eastbound					Summer Street Westbound					Driveway Northbound					Maple Street / Brooks Street Southbound					intersection total	
	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	with peds	without peds
07:00	1	62	0	0	63	1	25	1	0	27	1	0	4	1	6	5	0	1	1	7	103	101
07:15	2	52	2	0	56	2	24	4	0	30	0	2	2	0	4	2	0	0	1	3	93	92
07:30	2	67	1	0	70	1	34	3	0	38	3	14	2	0	19	3	0	0	0	3	130	130
07:45	0	56	0	1	57	0	41	3	1	45	3	4	2	1	10	5	1	0	1	7	119	115
08:00	1	63	2	0	66	3	25	3	0	31	3	3	6	0	12	4	0	0	0	4	113	113
08:15	3	49	3	1	56	7	23	3	0	33	1	7	6	1	15	1	0	0	1	2	106	103
08:30	0	48	4	1	53	3	19	3	2	27	0	8	3	1	12	1	2	1	0	4	96	92
08:45	0	36	0	1	37	1	19	4	0	24	1	3	10	0	14	4	0	0	2	6	81	78

Hourly Volumes without peds	
438	7:00 to 8:00
450	7:15 to 8:15
461	7:30 to 8:30
423	7:45 to 8:45
386	8:00 to 9:00

## 7:30 - 8:30 Peak Hour Summary

Volume	Summer Street Eastbound					Summer Street Westbound					Driveway Northbound					Maple Street / Brooks Street Southbound					intersection total	
	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	with peds	without peds
PHF	0.5000	0.8769	0.5000		0.8821	0.3929	0.7500	1.0000		0.8111	0.8333	0.5000	0.6667		0.7105	0.6500	0.2500	#DIV/0!		0.5000		0.8865
%HV	0.000%	0.000%	0.000%		0.000%	0.000%	0.000%	0.000%		0.000%	0.000%	3.571%	0.000%		1.786%	7.692%	0.000%	#DIV/0!		6.250%		0.000%

# Turning Movement Count Summary

Count Date: Thursday, November 18, 2010  
 Time Period: 7:00 - 9:00 AM  
 Comment 1: N/S Street : Mill Street / Winter Street  
 Comment 2: E/W Street: Great Road (Route 117)  
 Comment 3: City/State : Maynard, MA  
 Comment 4: Weather : Clear, sunny, 45 degrees Fahrenheit

## Cars and Pedestrians

Start Time	Great Road (Route 117) Eastbound					Great Road (Route 117) Westbound					Winter Street Northbound					Mill Street Southbound					intersection total	
	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	Left	Thru	Right	Peds	approach total	with peds	without peds
07:00	0	153	1	0	154	1	30	0	0	31	3	0	0	0	3	5	0	0	1	6	194	193
07:15	0	155	0	0	155	0	35	0	0	35	6	0	1	0	7	2	0	0	1	3	200	199
07:30	0	136	0	0	136	0	52	0	0	52	1	1	2	0	4	3	0	0	0	3	195	195
07:45	0	126	1	0	127	0	46	1	0	47	3	0	3	0	6	5	1	0	1	7	187	186
08:00	1	129	0	0	130	1	52	2	0	55	2	1	1	0	4	3	0	0	0	3	192	192
08:15	0	114	0	0	114	0	50	1	0	51	1	1	1	0	3	1	0	0	1	2	170	169
08:30	0	96	0	0	96	2	51	0	0	53	3	0	0	0	3	1	2	1	0	4	156	156
08:45	0	119	1	0	120	1	57	0	0	58	3	0	0	0	3	4	0	0	2	6	187	185

## Trucks

Start Time	Great Road (Route 117) Eastbound				approach total	Great Road (Route 117) Westbound				approach total	Winter Street Northbound				approach total	Mill Street Southbound				approach total	intersection total	
	Left	Thru	Right			Left	Thru	Right			Left	Thru	Right			Left	Thru	Right				
07:00	0	4	0		4	0	6	1		7	0	0	0		0	0	0	0		0	0	11
07:15	0	14	0		14	0	3	0		3	0	0	0		0	0	0	0		0	0	17
07:30	0	9	0		9	0	2	0		2	0	0	0		0	0	0	0		0	0	11
07:45	0	6	0		6	0	1	0		1	0	0	0		0	0	0	0		0	0	7
08:00	0	9	0		9	0	6	0		6	3	0	0		3	0	0	0		0	0	18
08:15	0	3	0		3	0	6	1		7	0	0	0		0	0	0	0		0	0	10
08:30	0	4	0		4	0	5	0		5	0	0	0		0	0	0	0		0	0	9
08:45	0	5	0		5	0	4	0		4	0	0	0		0	0	0	0		0	0	9

## Cars & Trucks

Start Time	Great Road (Route 117) Eastbound					approach total	Great Road (Route 117) Westbound					approach total	Winter Street Northbound					approach total	Mill Street Southbound					approach total	intersection total	
	Left	Thru	Right	Peds	Left		Thru	Right	Peds	Left	Thru		Right	Peds	Left	Thru	Right		Peds	Left	Thru	Right	Peds		with peds	without peds
07:00	0	157	1	0	158	1	36	1	0	38	3	0	0	0	3	5	0	0	1	6	205	204				
07:15	0	169	0	0	169	0	38	0	0	38	6	0	1	0	7	2	0	0	1	3	217	216				
07:30	0	145	0	0	145	0	54	0	0	54	1	1	2	0	4	3	0	0	0	3	206	206				
07:45	0	132	1	0	133	0	47	1	0	48	3	0	3	0	6	5	1	0	1	7	194	193				
08:00	1	138	0	0	139	1	58	2	0	61	5	1	1	0	7	3	0	0	0	3	210	210				
08:15	0	117	0	0	117	0	56	2	0	58	1	1	1	0	3	1	0	0	1	2	180	179				
08:30	0	100	0	0	100	2	56	0	0	58	3	0	0	0	3	1	2	1	0	4	165	165				
08:45	0	124	1	0	125	1	61	0	0	62	3	0	0	0	3	4	0	0	2	6	196	194				

### Hourly Volumes without peds

819	7:00 to 8:00
825	7:15 to 8:15
788	7:30 to 8:30
747	7:45 to 8:45
748	8:00 to 9:00

## 7:15 - 8:15 Peak Hour Summary

Volume	Great Road (Route 117) Eastbound					approach total	Great Road (Route 117) Westbound					approach total	Winter Street Northbound					approach total	Mill Street Southbound					approach total	intersection total	
	Left	Thru	Right	Peds	Left		Thru	Right	Peds	Left	Thru		Right	Peds	Left	Thru	Right		Peds	Left	Thru	Right	Peds		with peds	without peds
1	584	1	0	586	1	197	3	0	201	15	2	7	0	24	13	1	0	2	14	827	825					
PHF	0.2500	0.8639	0.2500	0.8669	0.2500	0.8491	0.3750	0.8238	0.6250	0.5000	0.5833	0.8571	0.6500	0.2500	#DIV/0!	0.5000					0.9549					
%HV	0.000%	6.507%	0.000%	6.485%	0.000%	6.091%	0.000%	5.970%	20.000%	0.000%	0.000%	12.500%	0.000%	0.000%	0.000%	0.000%					0.000%	0.000%				

Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Main St From East		Clock Tower Pl From South		Main St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
16:00	1	71	1	13	72	2	160
16:15	1	64	3	12	53	2	135
16:30	2	87	7	18	74	3	191
16:45	3	85	8	22	76	3	197
Total	7	307	19	65	275	10	683
17:00	1	87	18	39	88	0	233
17:15	2	88	17	29	87	7	230
17:30	3	82	16	28	88	5	222
17:45	4	80	12	12	73	5	186
Total	10	337	63	108	336	17	871
Grand Total	17	644	82	173	611	27	1554
Apprch %	2.6	97.4	32.2	67.8	95.8	4.2	
Total %	1.1	41.4	5.3	11.1	39.3	1.7	
Cars	16	636	82	173	604	26	1537
% Cars	94.1	98.8	100	100	98.9	96.3	98.9
Trucks	1	8	0	0	7	1	17
% Trucks	5.9	1.2	0	0	1.1	3.7	1.1

Start Time	Main St From East			Clock Tower Pl From South			Main St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
16:45	<b>3</b>	85	88	8	22	30	76	3	79	197
17:00	1	87	88	<b>18</b>	<b>39</b>	<b>57</b>	<b>88</b>	0	88	<b>233</b>
17:15	2	<b>88</b>	<b>90</b>	17	29	46	87	<b>7</b>	<b>94</b>	230
17:30	3	82	85	16	28	44	88	5	93	222
Total Volume	9	342	351	59	118	177	339	15	354	882
% App. Total	2.6	97.4		33.3	66.7		95.8	4.2		
PHF	.750	.972	.975	.819	.756	.776	.963	.536	.941	.946

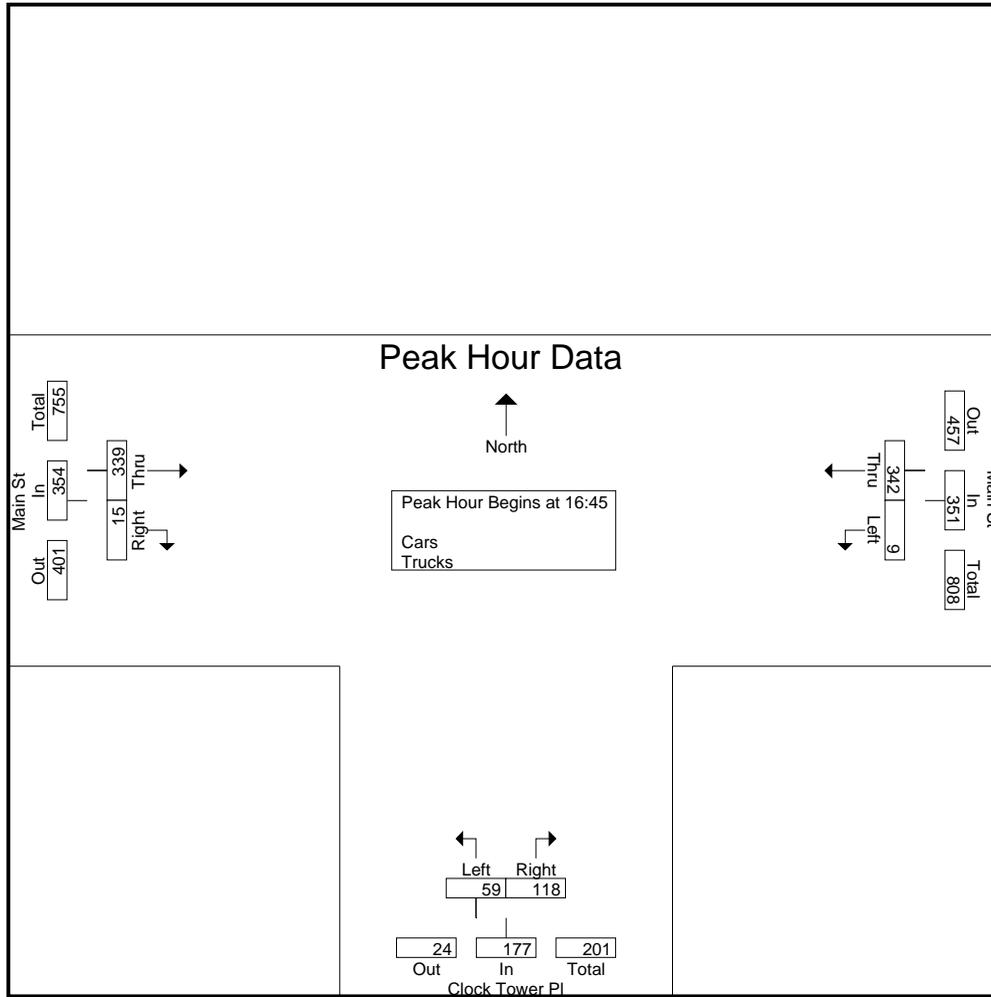
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 16:45

Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 2



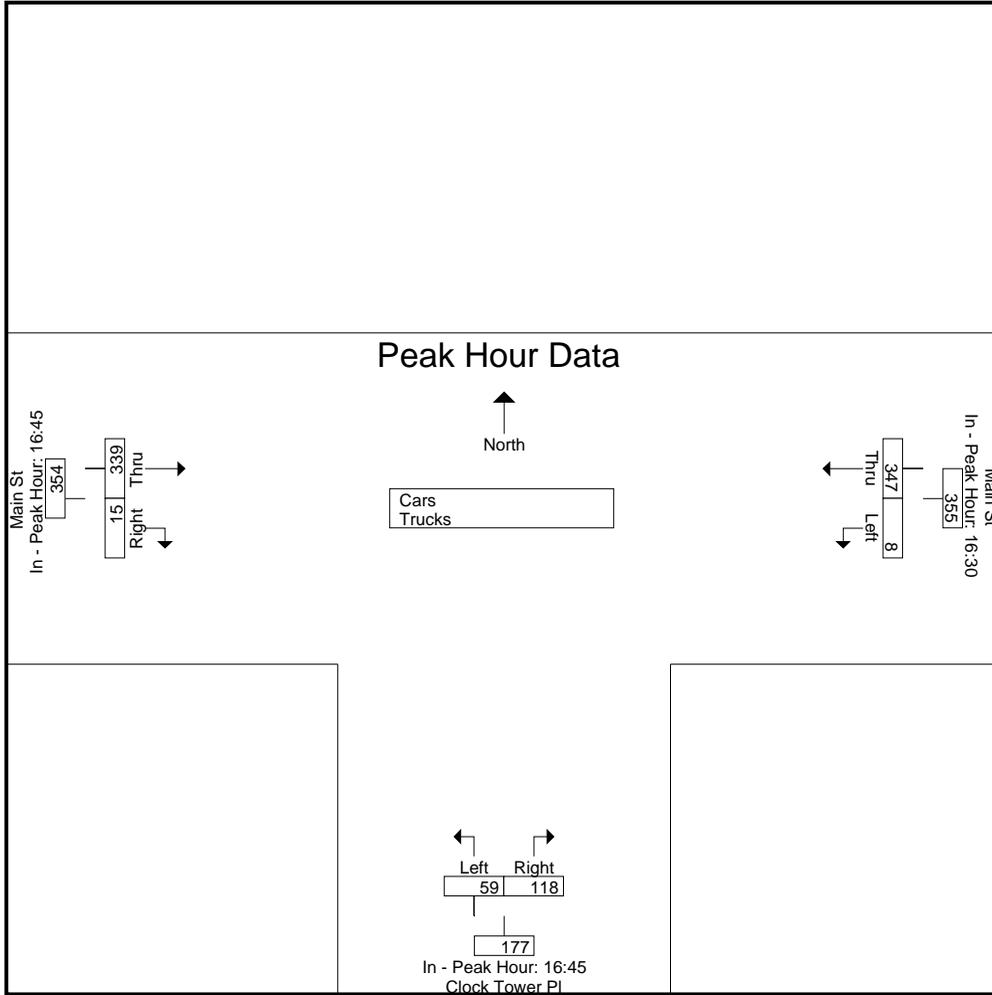
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:30			16:45			16:45		
+0 mins.	2	87	89	8	22	30	76	3	79
+15 mins.	<b>3</b>	85	88	<b>18</b>	<b>39</b>	<b>57</b>	<b>88</b>	0	88
+30 mins.	1	87	88	17	29	46	87	<b>7</b>	<b>94</b>
+45 mins.	2	<b>88</b>	<b>90</b>	16	28	44	88	5	93
Total Volume	8	347	355	59	118	177	339	15	354
% App. Total	2.3	97.7		33.3	66.7		95.8	4.2	
PHF	.667	.986	.986	.819	.756	.776	.963	.536	.941

Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 3



Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 1

Groups Printed- Cars

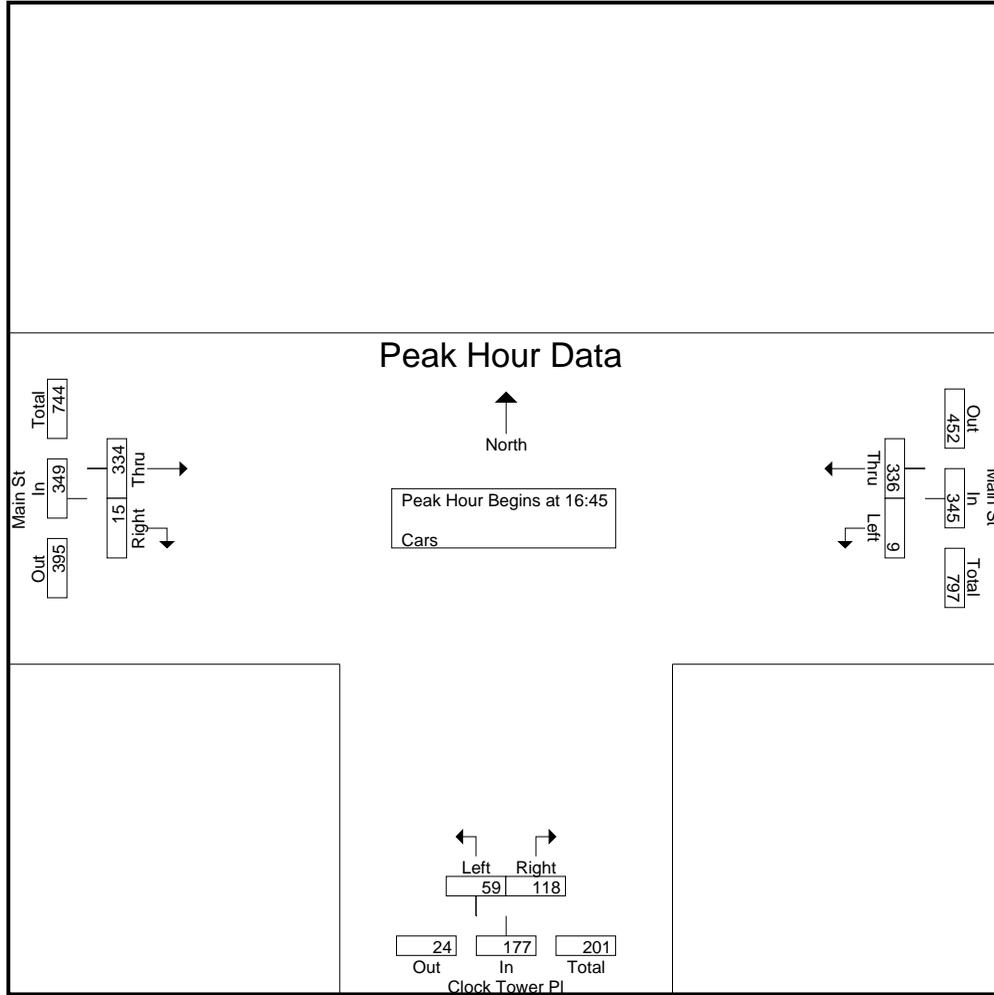
Start Time	Main St From East		Clock Tower Pl From South		Main St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
16:00	1	70	1	13	70	2	157
16:15	1	64	3	12	53	1	134
16:30	2	86	7	18	74	3	190
16:45	3	83	8	22	74	3	193
Total	7	303	19	65	271	9	674
17:00	1	85	18	39	86	0	229
17:15	2	87	17	29	86	7	228
17:30	3	81	16	28	88	5	221
17:45	3	80	12	12	73	5	185
Total	9	333	63	108	333	17	863
Grand Total	16	636	82	173	604	26	1537
Apprch %	2.5	97.5	32.2	67.8	95.9	4.1	
Total %	1	41.4	5.3	11.3	39.3	1.7	

Start Time	Main St From East			Clock Tower Pl From South			Main St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 16:45										
16:45	<b>3</b>	83	86	8	22	30	74	3	77	193
17:00	1	85	86	<b>18</b>	<b>39</b>	<b>57</b>	86	0	86	<b>229</b>
17:15	2	<b>87</b>	<b>89</b>	17	29	46	86	<b>7</b>	<b>93</b>	228
17:30	3	81	84	16	28	44	<b>88</b>	5	93	221
Total Volume	9	336	345	59	118	177	334	15	349	871
% App. Total	2.6	97.4		33.3	66.7		95.7	4.3		
PHF	.750	.966	.969	.819	.756	.776	.949	.536	.938	.951

Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 2



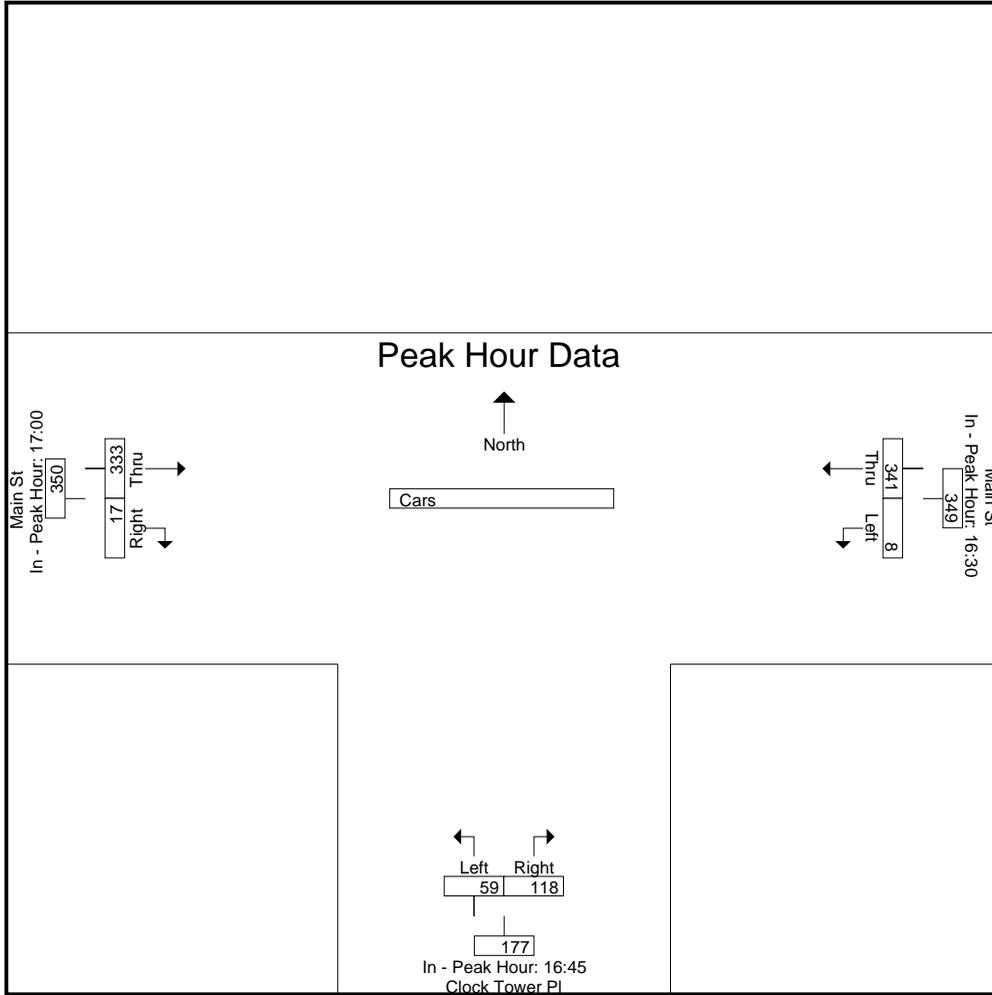
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:30			16:45			17:00		
+0 mins.	2	86	88	8	22	30	86	0	86
+15 mins.	<b>3</b>	83	86	<b>18</b>	<b>39</b>	<b>57</b>	86	<b>7</b>	<b>93</b>
+30 mins.	1	85	86	17	29	46	<b>88</b>	5	93
+45 mins.	2	<b>87</b>	<b>89</b>	16	28	44	73	5	78
Total Volume	8	341	349	59	118	177	333	17	350
% App. Total	2.3	97.7		33.3	66.7		95.1	4.9	
PHF	.667	.980	.980	.819	.756	.776	.946	.607	.941

Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 3



Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 1

Groups Printed- Trucks

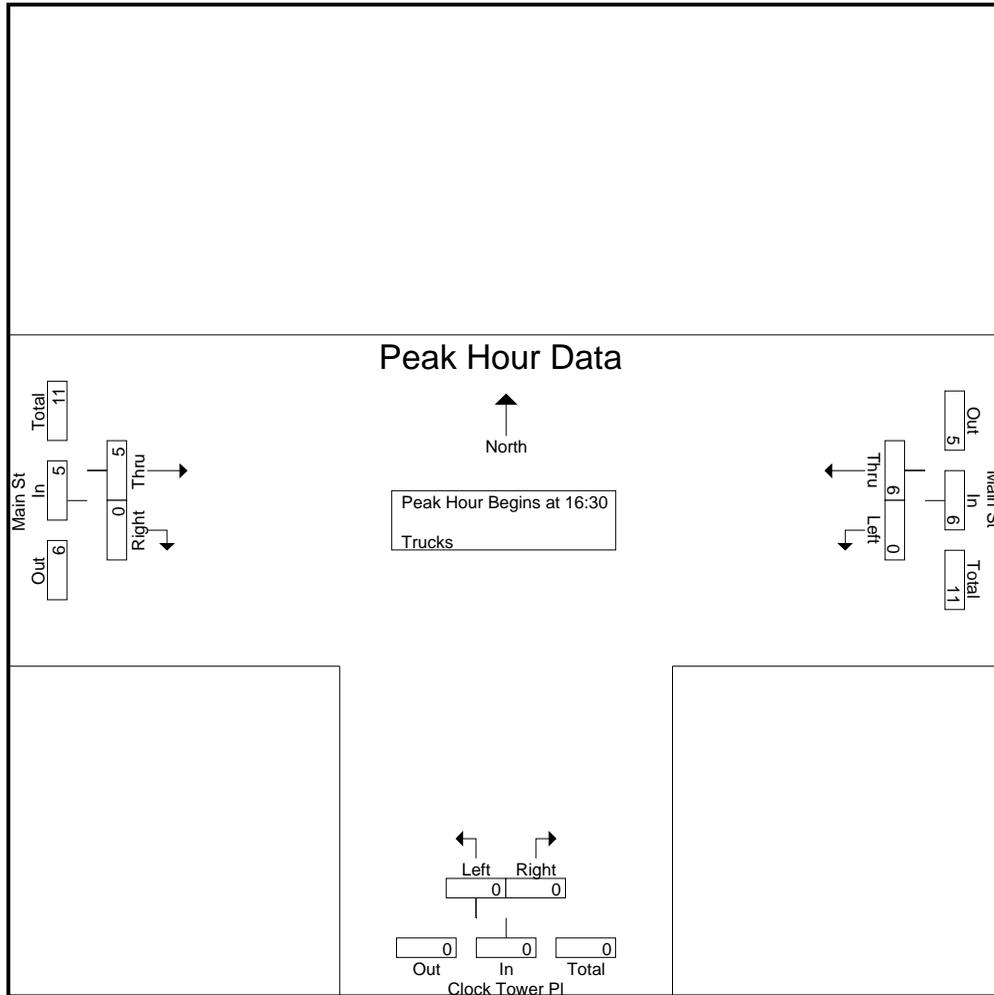
Start Time	Main St From East		Clock Tower Pl From South		Main St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
16:00	0	1	0	0	2	0	3
16:15	0	0	0	0	0	1	1
16:30	0	1	0	0	0	0	1
16:45	0	2	0	0	2	0	4
Total	0	4	0	0	4	1	9
17:00	0	2	0	0	2	0	4
17:15	0	1	0	0	1	0	2
17:30	0	1	0	0	0	0	1
17:45	1	0	0	0	0	0	1
Total	1	4	0	0	3	0	8
Grand Total	1	8	0	0	7	1	17
Apprch %	11.1	88.9	0	0	87.5	12.5	
Total %	5.9	47.1	0	0	41.2	5.9	

Start Time	Main St From East			Clock Tower Pl From South			Main St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 16:30										
16:30	0	1	1	0	0	0	0	0	0	1
16:45	0	2	2	0	0	0	2	0	2	4
17:00	0	2	2	0	0	0	2	0	2	4
17:15	0	1	1	0	0	0	1	0	1	2
Total Volume	0	6	6	0	0	0	5	0	5	11
% App. Total	0	100		0	0		100	0		
PHF	.000	.750	.750	.000	.000	.000	.625	.000	.625	.688

Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 2



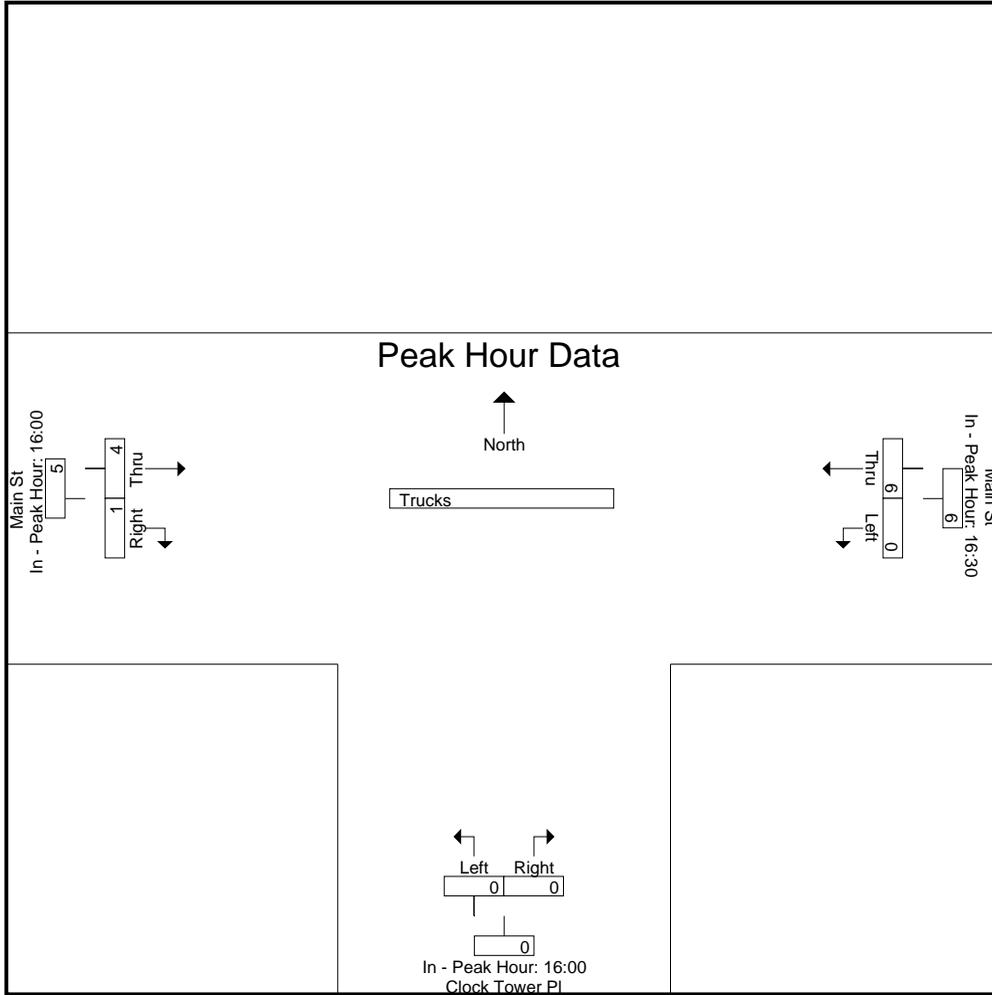
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:30			16:00			16:00		
+0 mins.	0	1	1	0	0	0	2	0	2
+15 mins.	0	2	2	0	0	0	0	1	1
+30 mins.	0	2	2	0	0	0	0	0	0
+45 mins.	0	1	1	0	0	0	2	0	2
Total Volume	0	6	6	0	0	0	4	1	5
% App. Total	0	100		0	0		80	20	
PHF	.000	.750	.750	.000	.000	.000	.500	.250	.625

Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 3



Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 1

**Groups Printed- Bikes Peds**

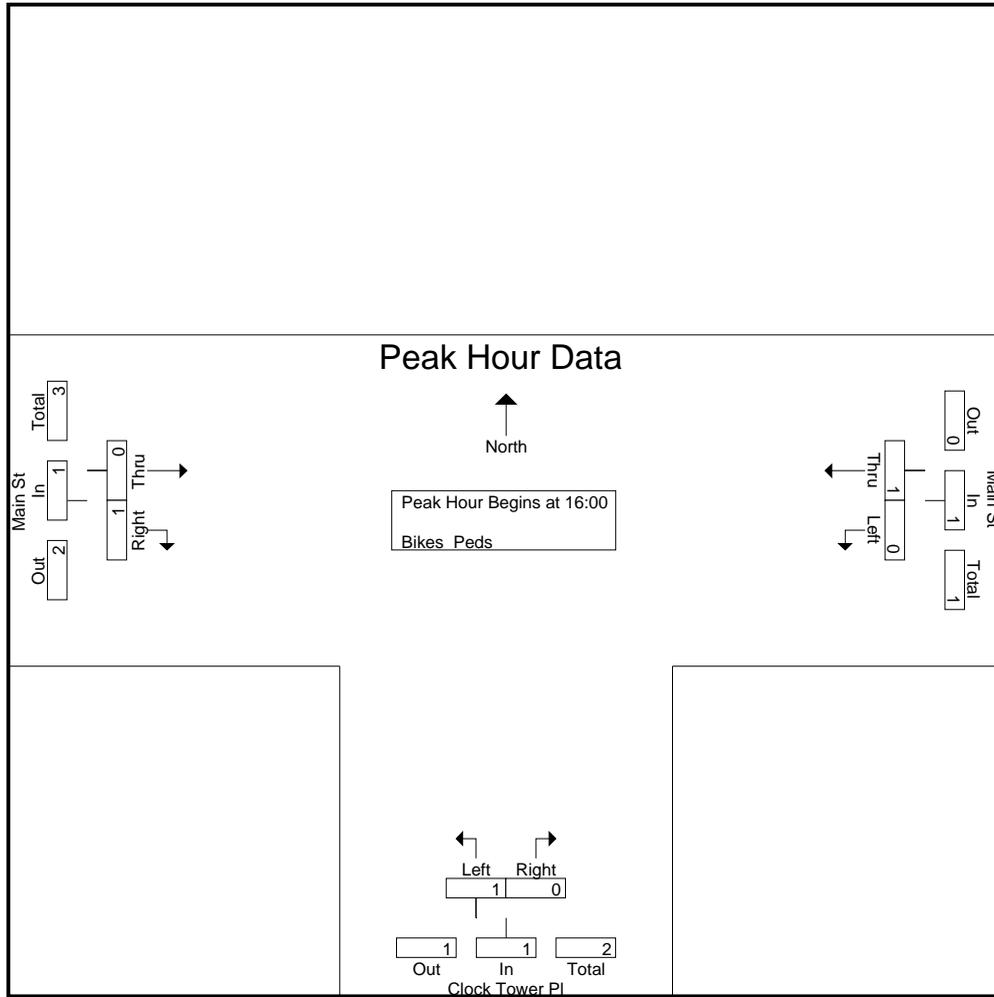
Start Time	Main St From East			Clock Tower Pl From South			Main St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
16:00	0	1	0	0	0	3	0	1	0	3	2	5
16:15	0	0	0	0	0	4	0	0	1	5	0	5
16:30	0	0	0	1	0	5	0	0	0	5	1	6
16:45	0	0	0	0	0	6	0	0	1	7	0	7
Total	0	1	0	1	0	18	0	1	2	20	3	23
17:00	0	0	0	0	0	5	0	1	0	5	1	6
17:15	0	0	0	1	0	3	0	0	1	4	1	5
17:30	0	0	1	0	0	2	0	0	3	6	0	6
17:45	0	0	0	0	0	3	0	0	3	6	0	6
Total	0	0	1	1	0	13	0	1	7	21	2	23
Grand Total	0	1	1	2	0	31	0	2	9	41	5	46
Apprch %	0	100		100	0		0	100				
Total %	0	20		40	0		0	40		89.1	10.9	

Start Time	Main St From East			Clock Tower Pl From South			Main St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 16:00										
16:00	0	1	1	0	0	0	0	1	1	2
16:15	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	1	0	1	0	0	0	1
16:45	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	1	1	0	1	0	1	1	3
% App. Total	0	100		100	0		0	100		
PHF	.000	.250	.250	.250	.000	.250	.000	.250	.250	.375

Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 2



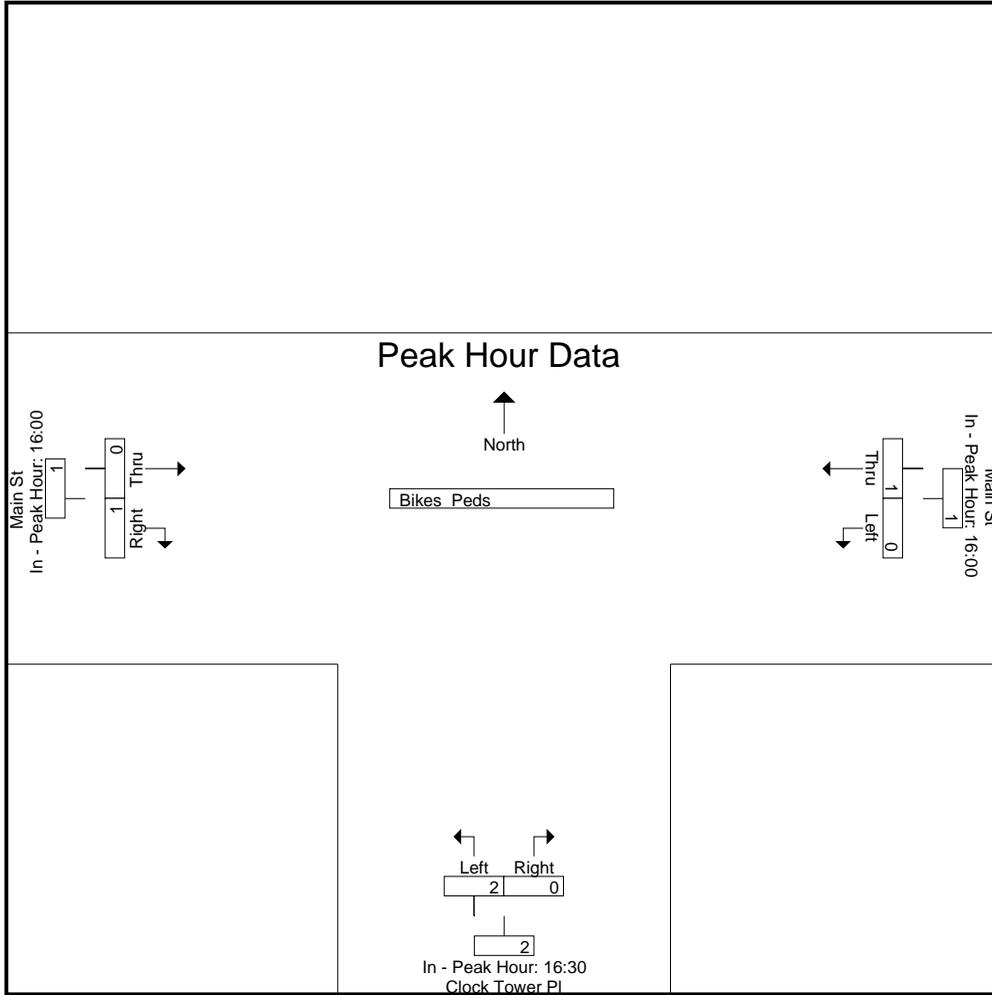
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:00			16:30			16:00		
+0 mins.	0	1	1	1	0	1	0	1	1
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	1	0	1	0	0	0
Total Volume	0	1	1	2	0	2	0	1	1
% App. Total	0	100		100	0		0	100	
PHF	.000	.250	.250	.500	.000	.500	.000	.250	.250

Accurate Counts  
978-664-2565

N/S Street : Clock Tower Place  
E/W Street: Main St (Route 62)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080001  
Site Code : 15080001  
Start Date : 11/18/2010  
Page No : 3



Accurate Counts  
978-664-2565

N/S Street : Mill Street  
E/W Street: Great Road (Route 117)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080002  
Site Code : 15080002  
Start Date : 11/18/2010  
Page No : 1

Groups Printed- Cars - Trucks

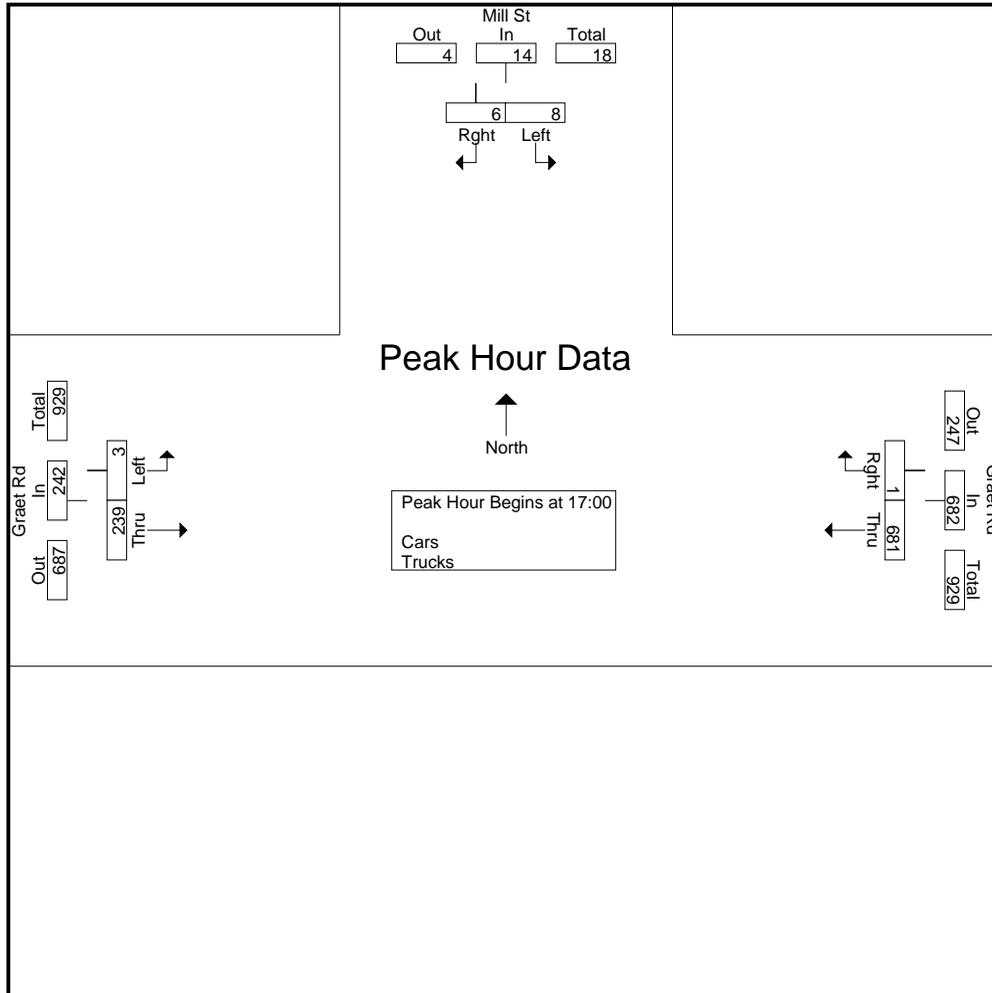
Start Time	Mill St From North		Graet Rd From East		Graet Rd From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
16:00	0	2	132	0	0	63	197
16:15	0	2	131	1	0	66	200
16:30	6	2	175	1	0	54	238
16:45	2	3	171	0	0	41	217
<b>Total</b>	<b>8</b>	<b>9</b>	<b>609</b>	<b>2</b>	<b>0</b>	<b>224</b>	<b>852</b>
17:00	3	3	178	0	2	60	246
17:15	0	1	161	0	1	68	231
17:30	3	1	163	1	0	57	225
17:45	2	1	179	0	0	54	236
<b>Total</b>	<b>8</b>	<b>6</b>	<b>681</b>	<b>1</b>	<b>3</b>	<b>239</b>	<b>938</b>
<b>Grand Total</b>	<b>16</b>	<b>15</b>	<b>1290</b>	<b>3</b>	<b>3</b>	<b>463</b>	<b>1790</b>
Apprch %	51.6	48.4	99.8	0.2	0.6	99.4	
Total %	0.9	0.8	72.1	0.2	0.2	25.9	
Cars	15	15	1279	3	3	457	1772
% Cars	93.8	100	99.1	100	100	98.7	99
Trucks	1	0	11	0	0	6	18
% Trucks	6.2	0	0.9	0	0	1.3	1

Start Time	Mill St From North			Graet Rd From East			Graet Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 17:00										
17:00	<b>3</b>	<b>3</b>	<b>6</b>	178	0	178	<b>2</b>	60	62	<b>246</b>
17:15	0	1	1	161	0	161	1	<b>68</b>	<b>69</b>	231
17:30	3	1	4	163	1	164	0	57	57	225
17:45	2	1	3	<b>179</b>	0	<b>179</b>	0	54	54	236
Total Volume	8	6	14	681	1	682	3	239	242	938
% App. Total	57.1	42.9		99.9	0.1		1.2	98.8		
PHF	.667	.500	.583	.951	.250	.953	.375	.879	.877	.953

Accurate Counts  
978-664-2565

N/S Street : Mill Street  
E/W Street: Great Road (Route 117)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080002  
Site Code : 15080002  
Start Date : 11/18/2010  
Page No : 2



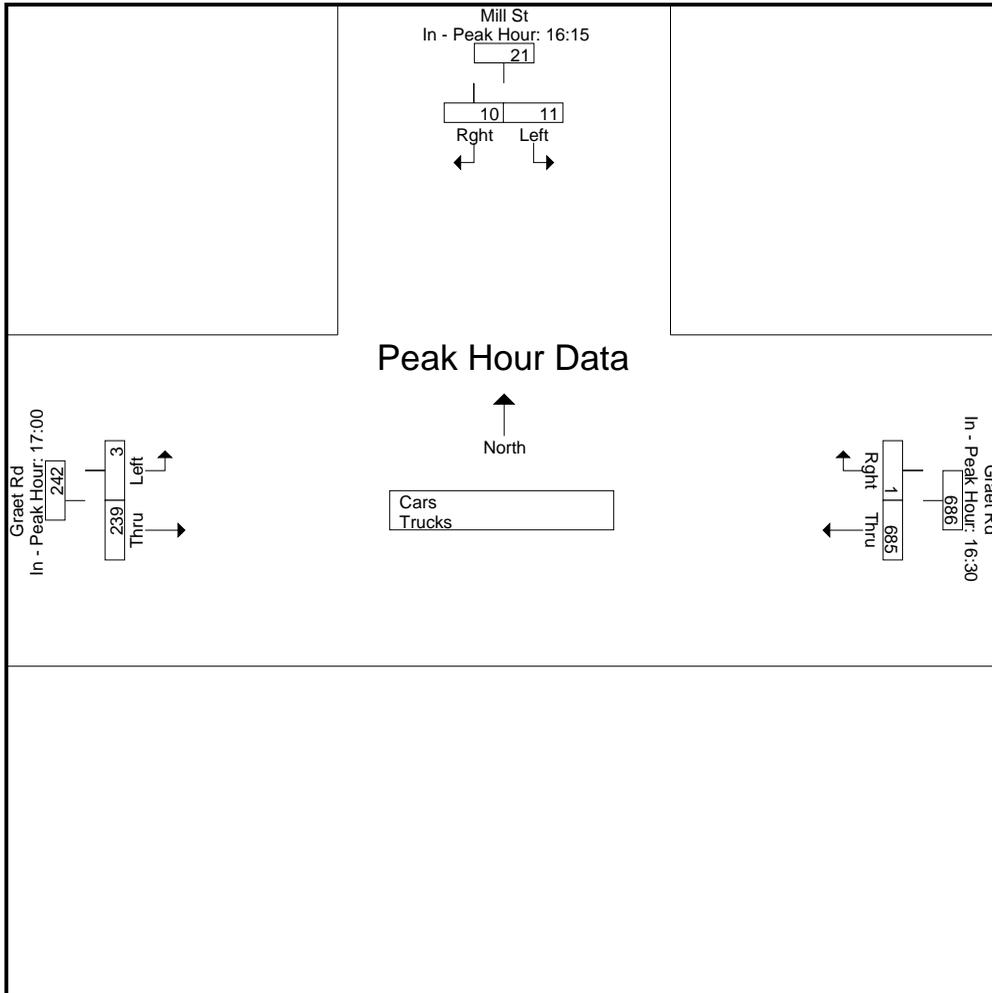
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:15			16:30			17:00		
+0 mins.	0	2	2	175	1	176	2	60	62
+15 mins.	6	2	8	171	0	171	1	68	69
+30 mins.	2	3	5	178	0	178	0	57	57
+45 mins.	3	3	6	161	0	161	0	54	54
Total Volume	11	10	21	685	1	686	3	239	242
% App. Total	52.4	47.6		99.9	0.1		1.2	98.8	
PHF	.458	.833	.656	.962	.250	.963	.375	.879	.877

Accurate Counts  
978-664-2565

N/S Street : Mill Street  
E/W Street: Great Road (Route 117)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080002  
Site Code : 15080002  
Start Date : 11/18/2010  
Page No : 3



Accurate Counts  
978-664-2565

N/S Street : Mill Street  
E/W Street: Great Road (Route 117)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080002  
Site Code : 15080002  
Start Date : 11/18/2010  
Page No : 1

Groups Printed- Cars

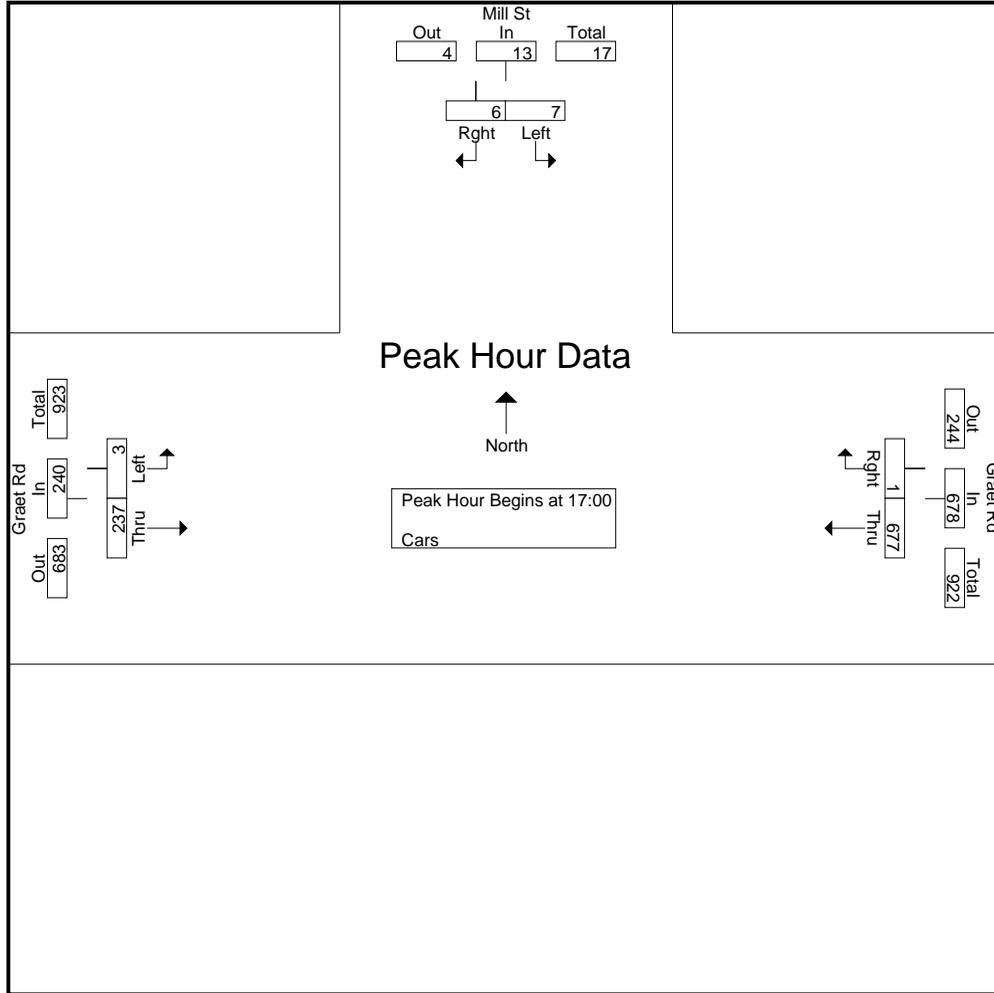
Start Time	Mill St From North		Graet Rd From East		Graet Rd From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
16:00	0	2	132	0	0	60	194
16:15	0	2	129	1	0	65	197
16:30	6	2	172	1	0	54	235
16:45	2	3	169	0	0	41	215
Total	8	9	602	2	0	220	841
17:00	2	3	177	0	2	60	244
17:15	0	1	161	0	1	68	231
17:30	3	1	162	1	0	56	223
17:45	2	1	177	0	0	53	233
Total	7	6	677	1	3	237	931
Grand Total	15	15	1279	3	3	457	1772
Apprch %	50	50	99.8	0.2	0.7	99.3	
Total %	0.8	0.8	72.2	0.2	0.2	25.8	

Start Time	Mill St From North			Graet Rd From East			Graet Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 17:00										
17:00	2	3	5	177	0	177	2	60	62	244
17:15	0	1	1	161	0	161	1	68	69	231
17:30	3	1	4	162	1	163	0	56	56	223
17:45	2	1	3	177	0	177	0	53	53	233
Total Volume	7	6	13	677	1	678	3	237	240	931
% App. Total	53.8	46.2		99.9	0.1		1.2	98.8		
PHF	.583	.500	.650	.956	.250	.958	.375	.871	.870	.954

Accurate Counts  
978-664-2565

N/S Street : Mill Street  
E/W Street: Great Road (Route 117)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080002  
Site Code : 15080002  
Start Date : 11/18/2010  
Page No : 2



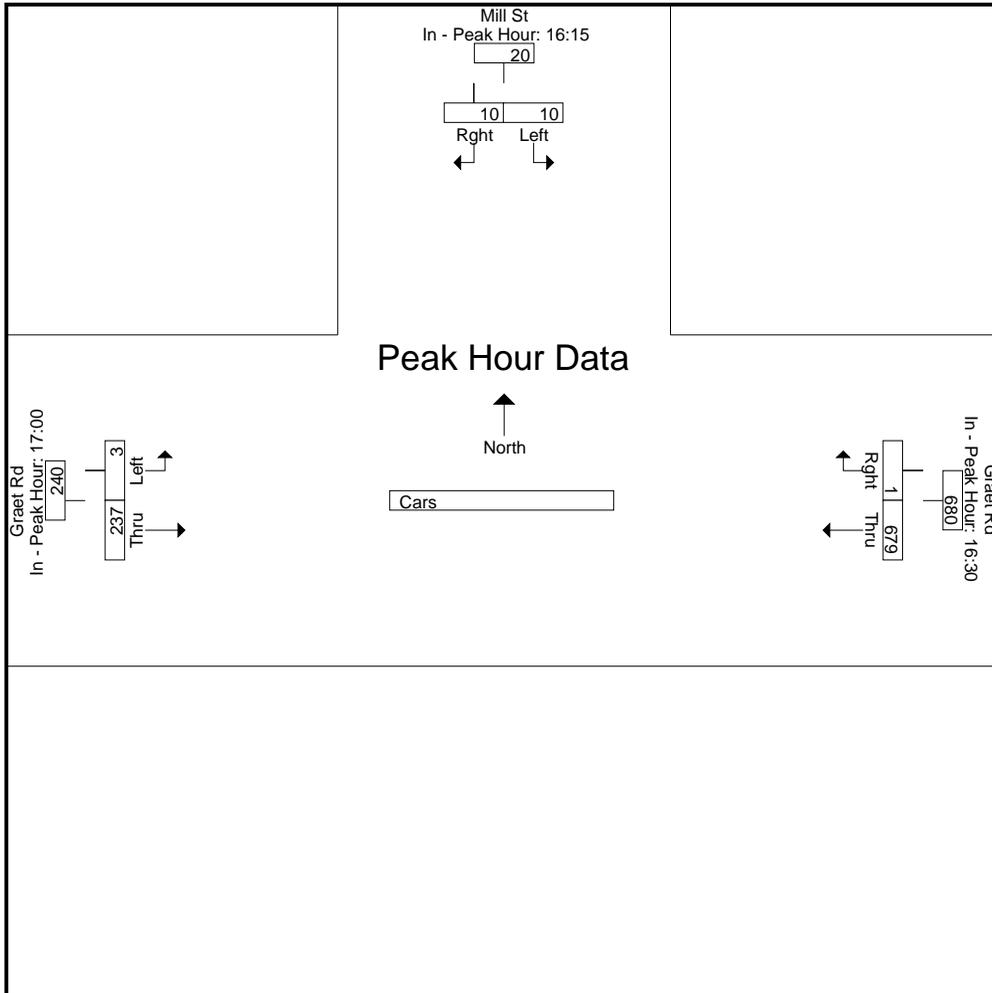
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:15			16:30			17:00		
+0 mins.	0	2	2	172	1	173	2	60	62
+15 mins.	6	2	8	169	0	169	1	68	69
+30 mins.	2	3	5	177	0	177	0	56	56
+45 mins.	2	3	5	161	0	161	0	53	53
Total Volume	10	10	20	679	1	680	3	237	240
% App. Total	50	50		99.9	0.1		1.2	98.8	
PHF	.417	.833	.625	.959	.250	.960	.375	.871	.870

Accurate Counts  
978-664-2565

N/S Street : Mill Street  
E/W Street: Great Road (Route 117)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080002  
Site Code : 15080002  
Start Date : 11/18/2010  
Page No : 3



Accurate Counts  
978-664-2565

N/S Street : Mill Street  
E/W Street: Great Road (Route 117)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080002  
Site Code : 15080002  
Start Date : 11/18/2010  
Page No : 1

Groups Printed- Trucks

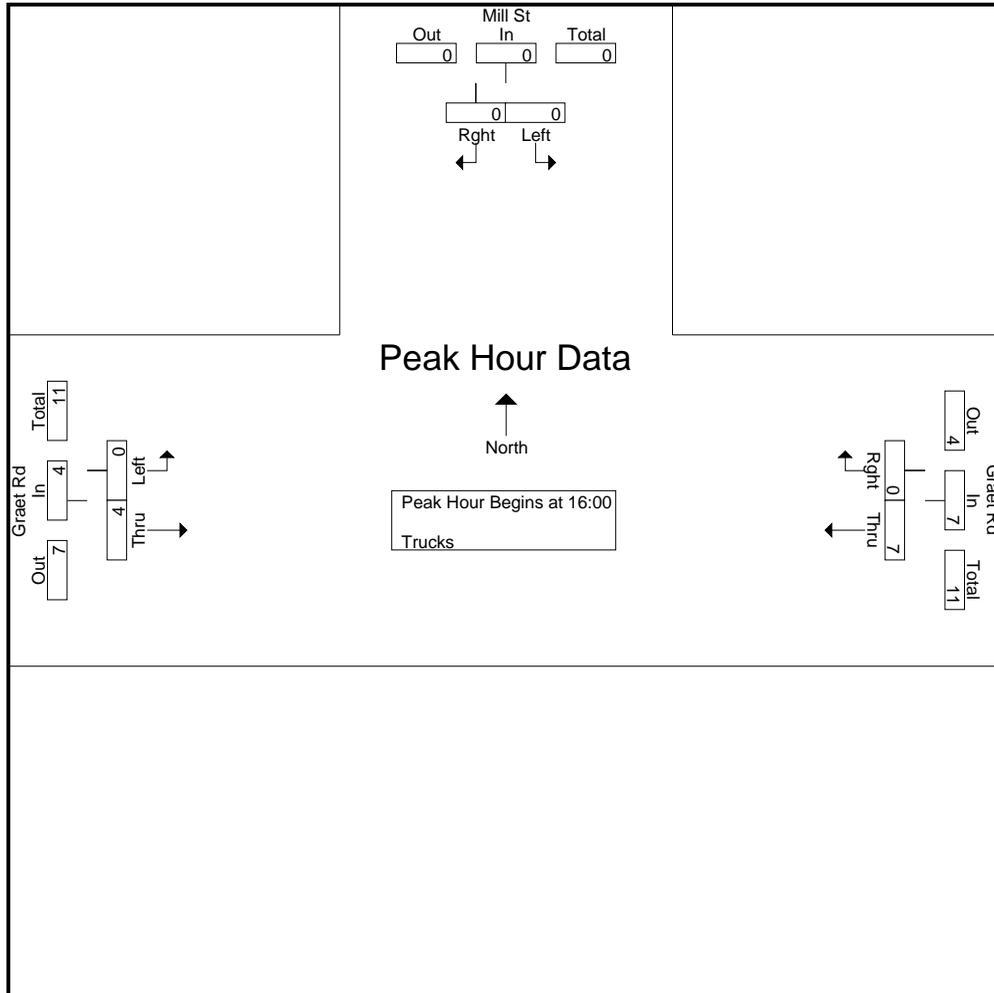
Start Time	Mill St From North		Graet Rd From East		Graet Rd From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
16:00	0	0	0	0	0	3	3
16:15	0	0	2	0	0	1	3
16:30	0	0	3	0	0	0	3
16:45	0	0	2	0	0	0	2
Total	0	0	7	0	0	4	11
17:00	1	0	1	0	0	0	2
17:15	0	0	0	0	0	0	0
17:30	0	0	1	0	0	1	2
17:45	0	0	2	0	0	1	3
Total	1	0	4	0	0	2	7
Grand Total	1	0	11	0	0	6	18
Apprch %	100	0	100	0	0	100	
Total %	5.6	0	61.1	0	0	33.3	

Start Time	Mill St From North			Graet Rd From East			Graet Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 16:00										
16:00	0	0	0	0	0	0	0	3	3	3
16:15	0	0	0	2	0	2	0	1	1	3
16:30	0	0	0	3	0	3	0	0	0	3
16:45	0	0	0	2	0	2	0	0	0	2
Total Volume	0	0	0	7	0	7	0	4	4	11
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.583	.000	.583	.000	.333	.333	.917

Accurate Counts  
978-664-2565

N/S Street : Mill Street  
E/W Street: Great Road (Route 117)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080002  
Site Code : 15080002  
Start Date : 11/18/2010  
Page No : 2



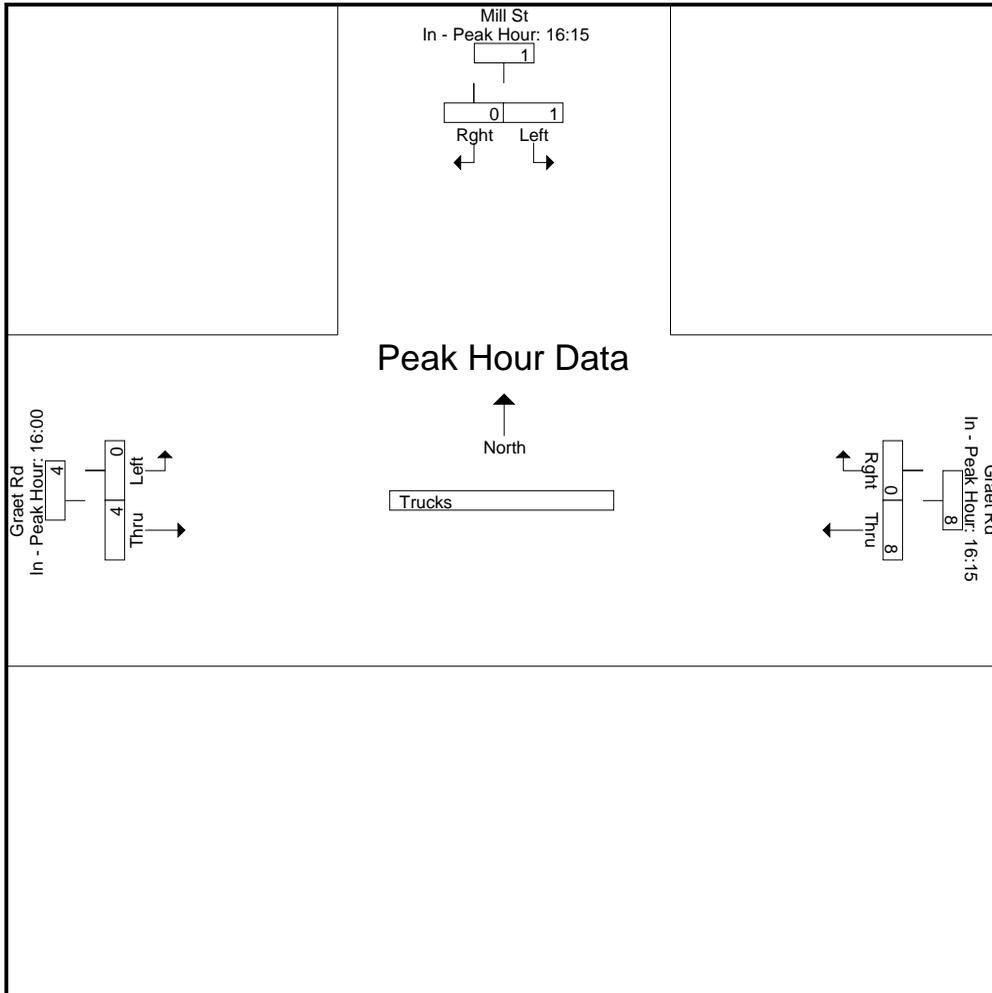
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:15			16:15			16:00		
+0 mins.	0	0	0	2	0	2	0	3	3
+15 mins.	0	0	0	3	0	3	0	1	1
+30 mins.	0	0	0	2	0	2	0	0	0
+45 mins.	1	0	1	1	0	1	0	0	0
Total Volume	1	0	1	8	0	8	0	4	4
% App. Total	100	0		100	0		0	100	
PHF	.250	.000	.250	.667	.000	.667	.000	.333	.333

Accurate Counts  
978-664-2565

N/S Street : Mill Street  
E/W Street: Great Road (Route 117)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080002  
Site Code : 15080002  
Start Date : 11/18/2010  
Page No : 3



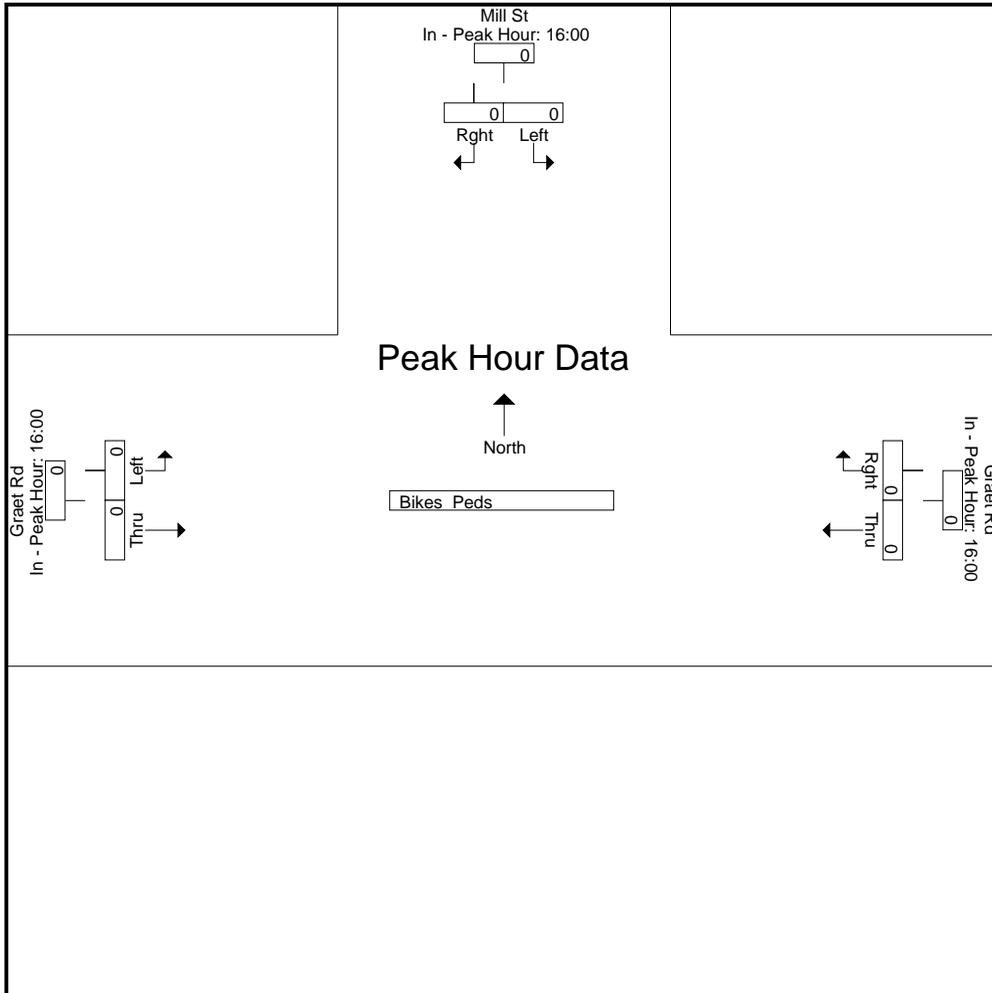




Accurate Counts  
978-664-2565

N/S Street : Mill Street  
E/W Street: Great Road (Route 117)  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080002  
Site Code : 15080002  
Start Date : 11/18/2010  
Page No : 3



Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 1

Groups Printed- Cars - Trucks

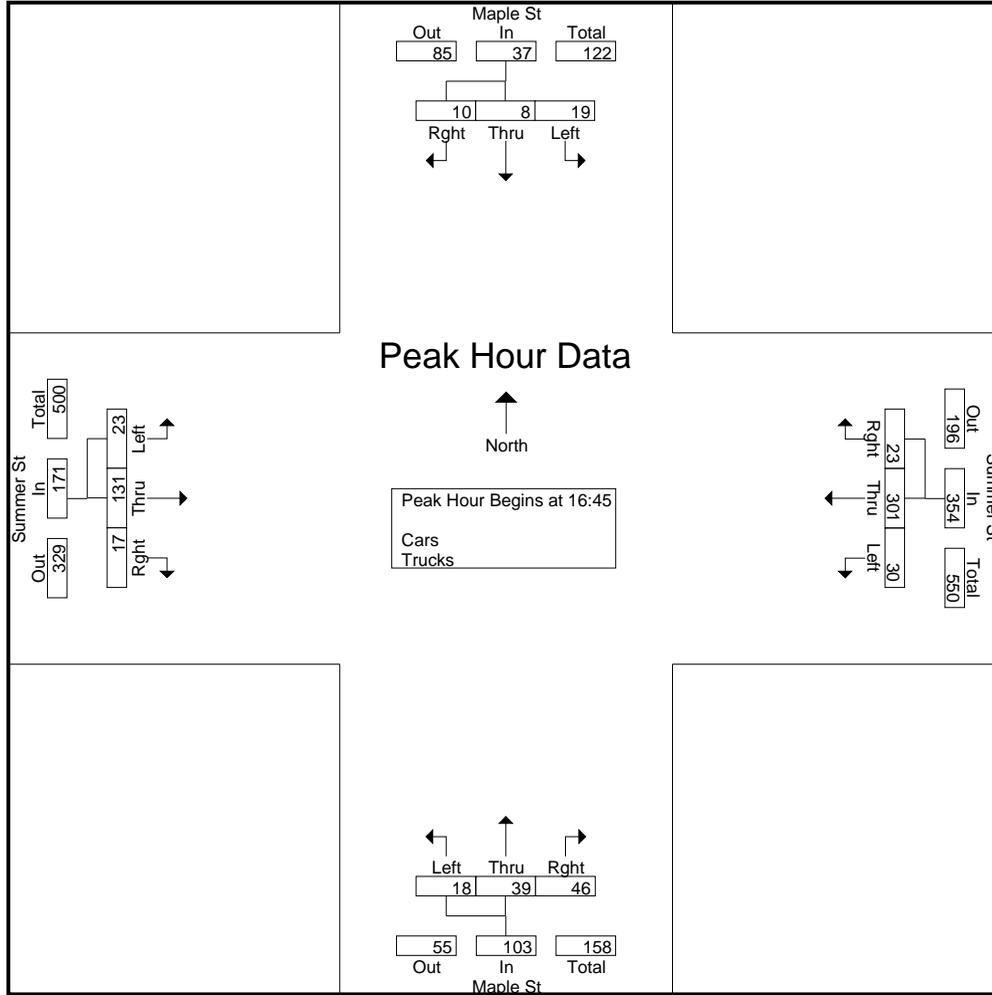
Start Time	Maple St From North			Summer St From East			Maple St From South			Summer St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	10	4	3	5	79	3	9	11	16	1	32	3	176
16:15	8	4	2	2	71	7	3	11	3	7	25	5	148
16:30	3	4	3	4	64	9	10	6	5	3	51	3	165
16:45	4	1	4	10	64	6	2	7	5	8	32	4	147
<b>Total</b>	<b>25</b>	<b>13</b>	<b>12</b>	<b>21</b>	<b>278</b>	<b>25</b>	<b>24</b>	<b>35</b>	<b>29</b>	<b>19</b>	<b>140</b>	<b>15</b>	<b>636</b>
17:00	2	3	3	5	97	5	3	16	9	6	35	4	188
17:15	4	2	2	6	78	5	5	5	16	6	30	3	162
17:30	9	2	1	9	62	7	8	11	16	3	34	6	168
17:45	10	3	0	3	62	5	10	9	7	2	30	5	146
<b>Total</b>	<b>25</b>	<b>10</b>	<b>6</b>	<b>23</b>	<b>299</b>	<b>22</b>	<b>26</b>	<b>41</b>	<b>48</b>	<b>17</b>	<b>129</b>	<b>18</b>	<b>664</b>
<b>Grand Total</b>	<b>50</b>	<b>23</b>	<b>18</b>	<b>44</b>	<b>577</b>	<b>47</b>	<b>50</b>	<b>76</b>	<b>77</b>	<b>36</b>	<b>269</b>	<b>33</b>	<b>1300</b>
Apprch %	54.9	25.3	19.8	6.6	86.4	7	24.6	37.4	37.9	10.7	79.6	9.8	
Total %	3.8	1.8	1.4	3.4	44.4	3.6	3.8	5.8	5.9	2.8	20.7	2.5	
Cars	50	23	18	44	577	47	50	76	76	36	267	33	1297
% Cars	100	100	100	100	100	100	100	100	98.7	100	99.3	100	99.8
Trucks	0	0	0	0	0	0	0	0	1	0	2	0	3
% Trucks	0	0	0	0	0	0	0	0	1.3	0	0.7	0	0.2

Start Time	Maple St From North				Summer St From East				Maple St From South				Summer St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	4	1	4	9	10	64	6	80	2	7	5	14	8	32	4	44	147
17:00	2	3	3	8	5	97	5	107	3	16	9	28	6	35	4	45	188
17:15	4	2	2	8	6	78	5	89	5	5	16	26	6	30	3	39	162
17:30	9	2	1	12	9	62	7	78	8	11	16	35	3	34	6	43	168
Total Volume	19	8	10	37	30	301	23	354	18	39	46	103	23	131	17	171	665
% App. Total	51.4	21.6	27		8.5	85	6.5		17.5	37.9	44.7		13.5	76.6	9.9		
PHF	.528	.667	.625	.771	.750	.776	.821	.827	.563	.609	.719	.736	.719	.936	.708	.950	.884

Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 2



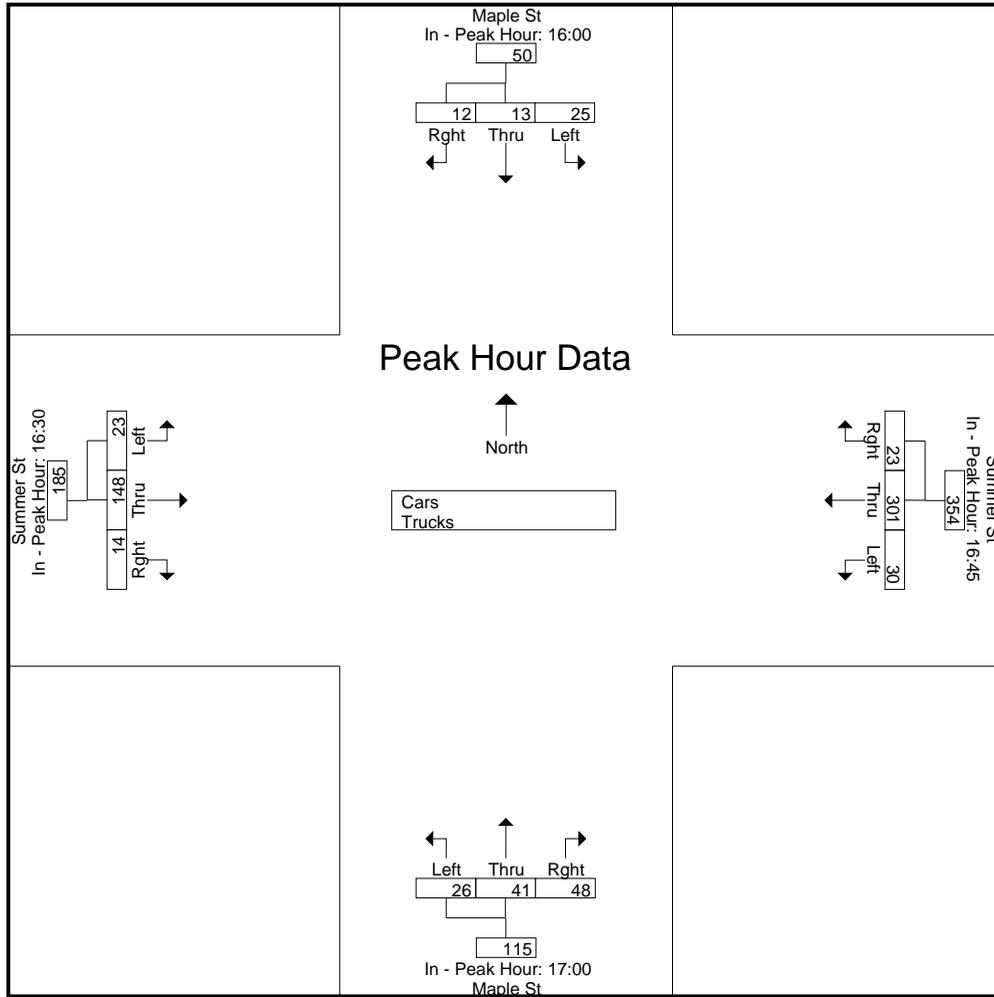
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:00				16:45				17:00				16:30			
+0 mins.	<b>10</b>	<b>4</b>	<b>3</b>	<b>17</b>	<b>10</b>	64	6	80	3	<b>16</b>	9	28	3	<b>51</b>	3	<b>57</b>
+15 mins.	8	4	2	14	5	<b>97</b>	5	<b>107</b>	5	5	<b>16</b>	26	<b>8</b>	32	<b>4</b>	44
+30 mins.	3	4	3	10	6	78	5	89	8	11	16	<b>35</b>	6	35	4	45
+45 mins.	4	1	<b>4</b>	9	9	62	<b>7</b>	78	<b>10</b>	9	7	26	6	30	3	39
Total Volume	25	13	12	50	30	301	23	354	26	41	48	115	23	148	14	185
% App. Total	50	26	24		8.5	85	6.5		22.6	35.7	41.7		12.4	80	7.6	
PHF	.625	.813	.750	.735	.750	.776	.821	.827	.650	.641	.750	.821	.719	.725	.875	.811

Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 3



Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 1

Groups Printed- Cars

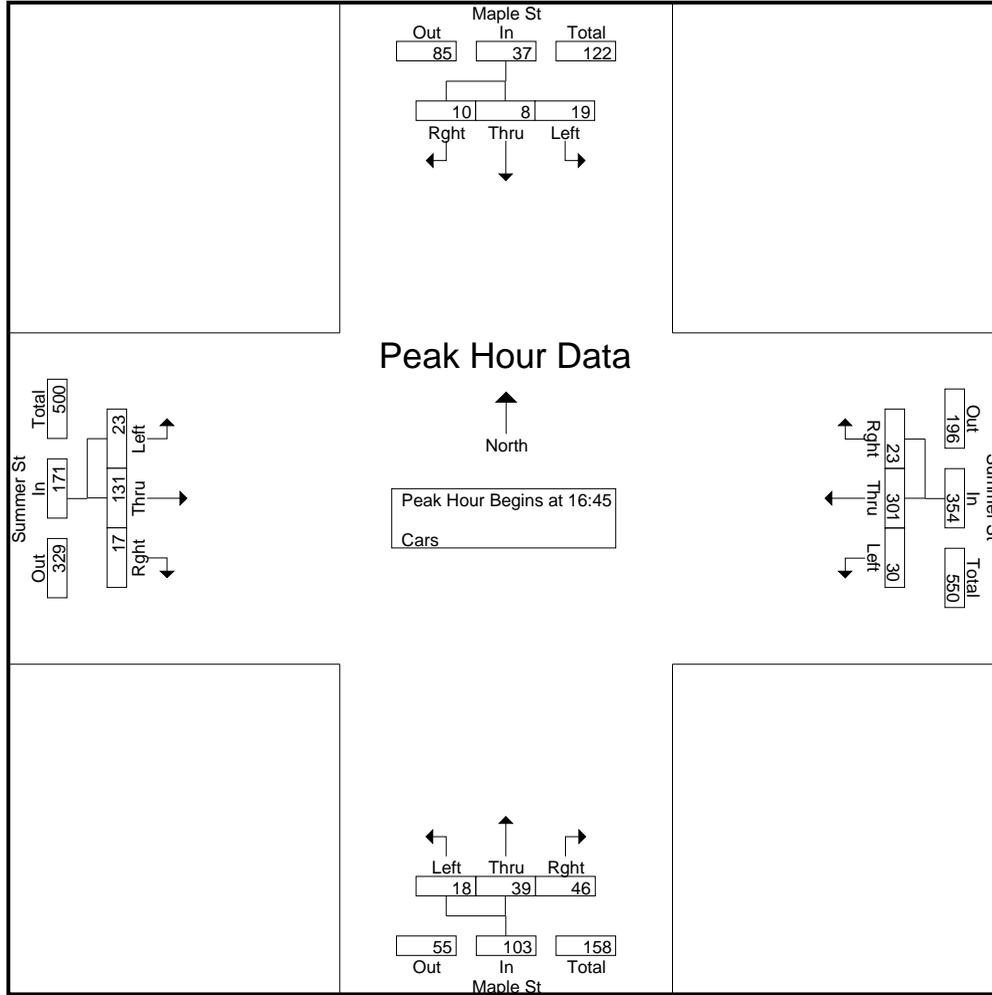
Start Time	Maple St From North			Summer St From East			Maple St From South			Summer St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	10	4	3	5	79	3	9	11	15	1	31	3	174
16:15	8	4	2	2	71	7	3	11	3	7	25	5	148
16:30	3	4	3	4	64	9	10	6	5	3	50	3	164
16:45	4	1	4	10	64	6	2	7	5	8	32	4	147
<b>Total</b>	<b>25</b>	<b>13</b>	<b>12</b>	<b>21</b>	<b>278</b>	<b>25</b>	<b>24</b>	<b>35</b>	<b>28</b>	<b>19</b>	<b>138</b>	<b>15</b>	<b>633</b>
17:00	2	3	3	5	97	5	3	16	9	6	35	4	188
17:15	4	2	2	6	78	5	5	5	16	6	30	3	162
17:30	9	2	1	9	62	7	8	11	16	3	34	6	168
17:45	10	3	0	3	62	5	10	9	7	2	30	5	146
<b>Total</b>	<b>25</b>	<b>10</b>	<b>6</b>	<b>23</b>	<b>299</b>	<b>22</b>	<b>26</b>	<b>41</b>	<b>48</b>	<b>17</b>	<b>129</b>	<b>18</b>	<b>664</b>
<b>Grand Total</b>	<b>50</b>	<b>23</b>	<b>18</b>	<b>44</b>	<b>577</b>	<b>47</b>	<b>50</b>	<b>76</b>	<b>76</b>	<b>36</b>	<b>267</b>	<b>33</b>	<b>1297</b>
Apprch %	54.9	25.3	19.8	6.6	86.4	7	24.8	37.6	37.6	10.7	79.5	9.8	
Total %	3.9	1.8	1.4	3.4	44.5	3.6	3.9	5.9	5.9	2.8	20.6	2.5	

Start Time	Maple St From North				Summer St From East				Maple St From South				Summer St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	4	1	4	9	10	64	6	80	2	7	5	14	8	32	4	44	147
17:00	2	3	3	8	5	97	5	107	3	16	9	28	6	35	4	45	188
17:15	4	2	2	8	6	78	5	89	5	5	16	26	6	30	3	39	162
17:30	9	2	1	12	9	62	7	78	8	11	16	35	3	34	6	43	168
Total Volume	19	8	10	37	30	301	23	354	18	39	46	103	23	131	17	171	665
% App. Total	51.4	21.6	27		8.5	85	6.5		17.5	37.9	44.7		13.5	76.6	9.9		
PHF	.528	.667	.625	.771	.750	.776	.821	.827	.563	.609	.719	.736	.719	.936	.708	.950	.884

Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 2



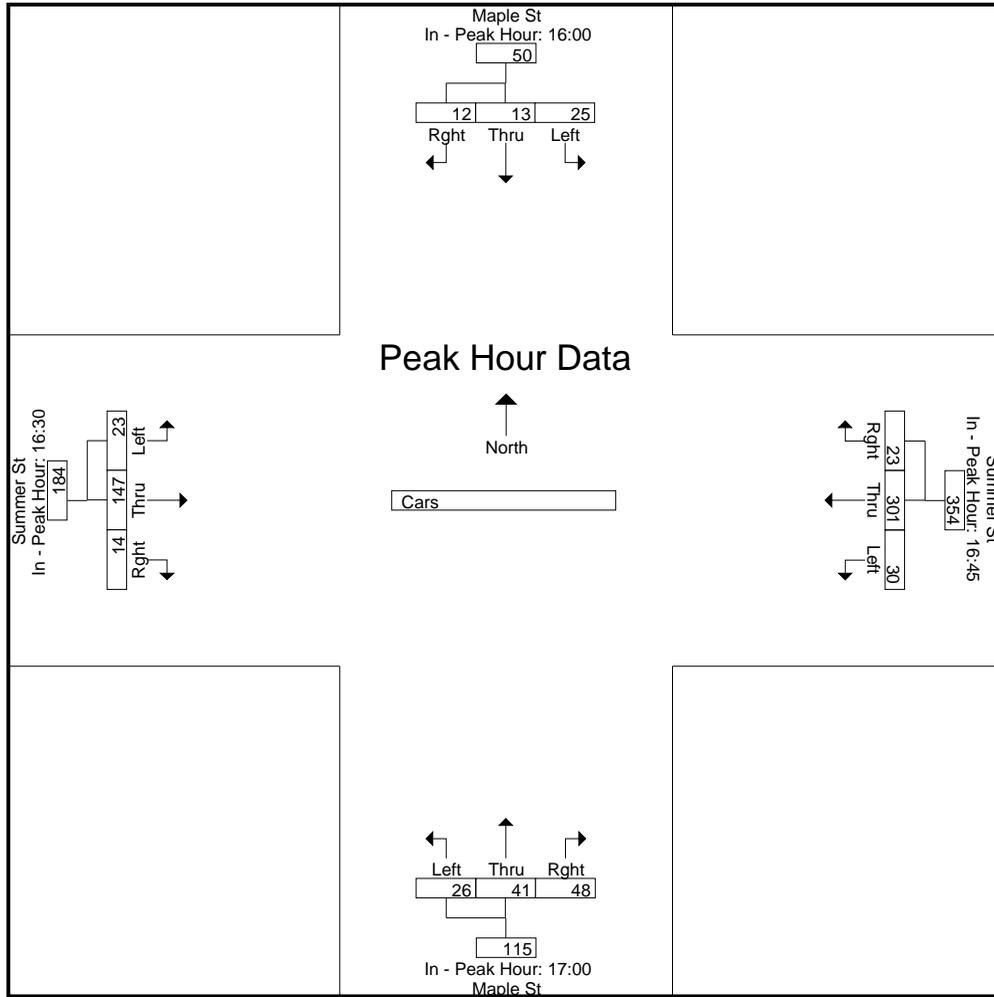
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:00				16:45				17:00				16:30			
+0 mins.	<b>10</b>	<b>4</b>	<b>3</b>	<b>17</b>	<b>10</b>	64	6	80	3	<b>16</b>	9	28	3	<b>50</b>	3	<b>56</b>
+15 mins.	8	4	2	14	5	<b>97</b>	5	<b>107</b>	5	5	<b>16</b>	26	<b>8</b>	32	<b>4</b>	44
+30 mins.	3	4	3	10	6	78	5	89	8	11	16	<b>35</b>	6	35	4	45
+45 mins.	4	1	<b>4</b>	9	9	62	<b>7</b>	78	<b>10</b>	9	7	26	6	30	3	39
Total Volume	25	13	12	50	30	301	23	354	26	41	48	115	23	147	14	184
% App. Total	50	26	24		8.5	85	6.5		22.6	35.7	41.7		12.5	79.9	7.6	
PHF	.625	.813	.750	.735	.750	.776	.821	.827	.650	.641	.750	.821	.719	.735	.875	.821

Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 3



Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 1

Groups Printed- Trucks

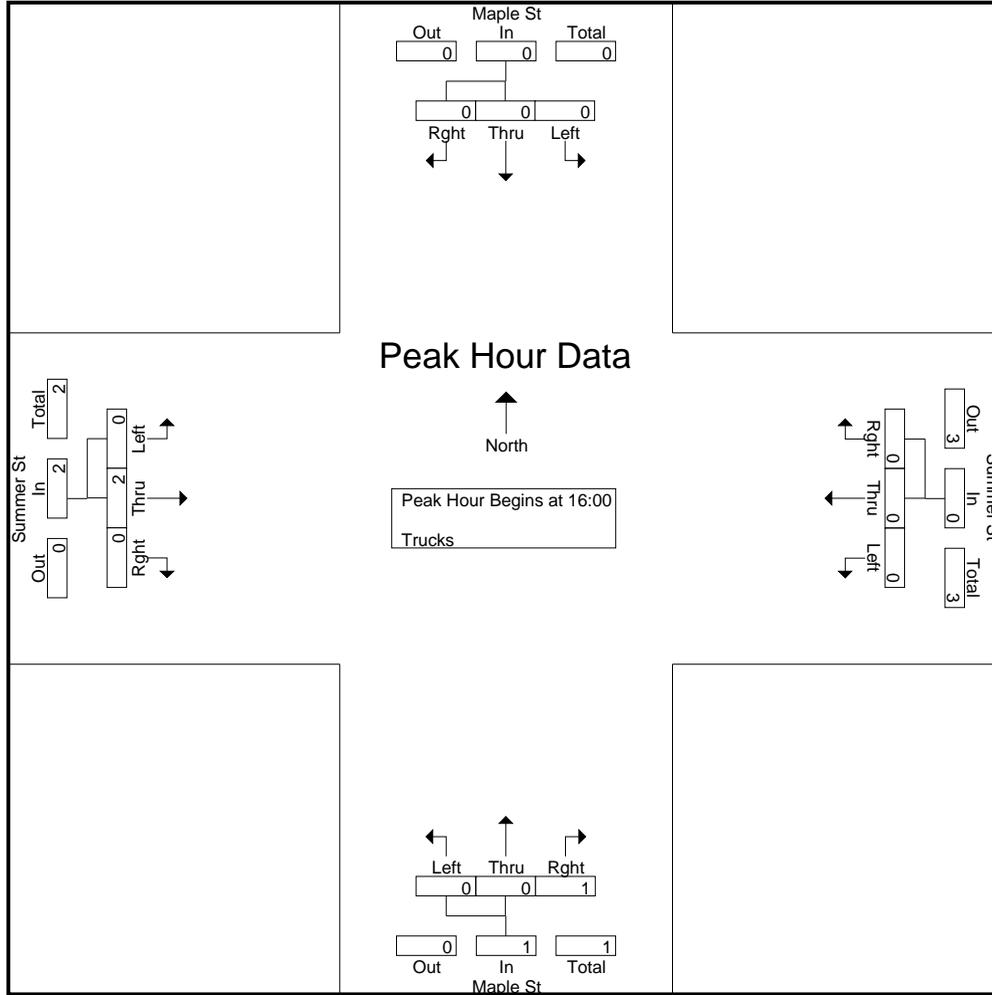
Start Time	Maple St From North			Summer St From East			Maple St From South			Summer St From West			Int. Total
	Left	Thru	Rght										
16:00	0	0	0	0	0	0	0	0	1	0	1	0	2
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	1	0	1
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	1	0	2	0	3
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	1	0	2	0	3
Apprch %	0	0	0	0	0	0	0	0	100	0	100	0	
Total %	0	0	0	0	0	0	0	0	33.3	0	66.7	0	

Start Time	Maple St From North				Summer St From East				Maple St From South				Summer St From West				Int. Total	
	Left	Thru	Rght	App. Total	Left	Thru	Rght	App. Total	Left	Thru	Rght	App. Total	Left	Thru	Rght	App. Total		
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 16:00																		
16:00	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	2
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	2	3
% App. Total	0	0	0	0	0	0	0	0	0	0	0	100		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.500	.000	.500	.375

Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 2



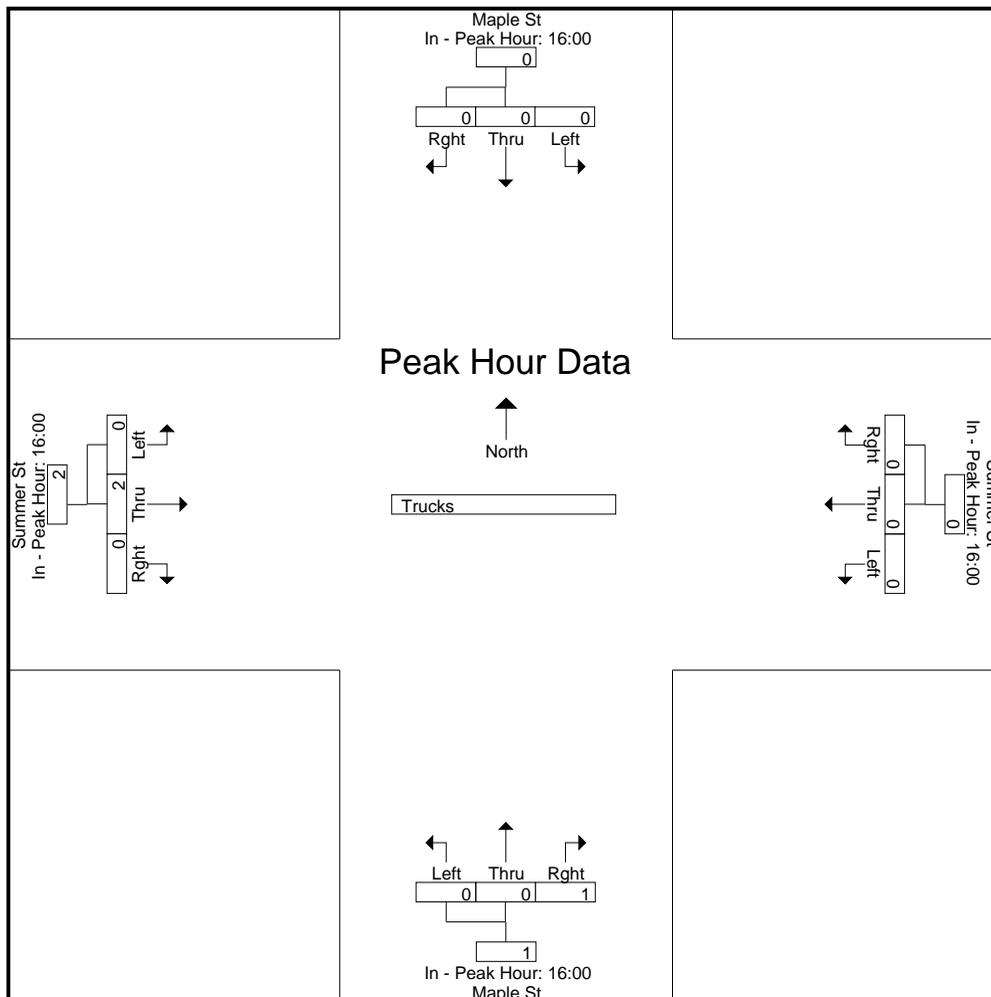
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:00				16:00				16:00				16:00			
+0 mins.	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	2
% App. Total	0	0	0	0	0	0	0	0	0	0	100	100	0	100	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.500	.000	.500

Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 3



Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 1

Groups Printed- Bikes Peds

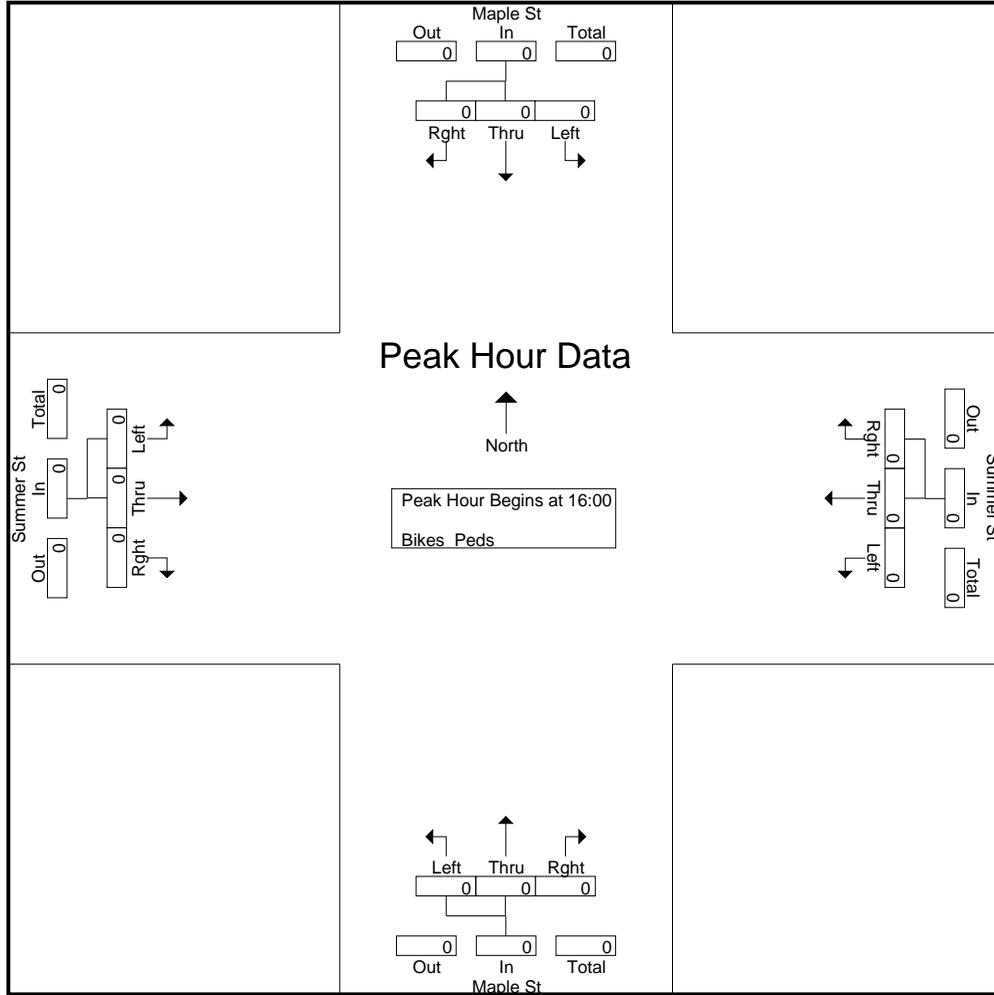
Start Time	Maple St From North				Summer St From East				Maple St From South				Summer St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Rght	Peds															
16:00	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	2	6	0	6
16:15	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	3	0	3
16:30	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	0	2
16:45	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	1	4	0	4
Total	0	0	0	5	0	0	0	3	0	0	0	3	0	0	0	4	15	0	15
17:00	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	2	7	0	7
17:15	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
17:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
17:45	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	1	4	0	4
Total	0	0	0	1	0	0	0	4	0	0	0	6	0	0	0	3	14	0	14
Grand Total	0	0	0	6	0	0	0	7	0	0	0	9	0	0	0	7	29	0	29
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

Start Time	Maple St From North				Summer St From East				Maple St From South				Summer St From West				Int. Total	
	Left	Thru	Rght	App. Total	Left	Thru	Rght	App. Total	Left	Thru	Rght	App. Total	Left	Thru	Rght	App. Total		
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 16:00																		
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0			
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 2



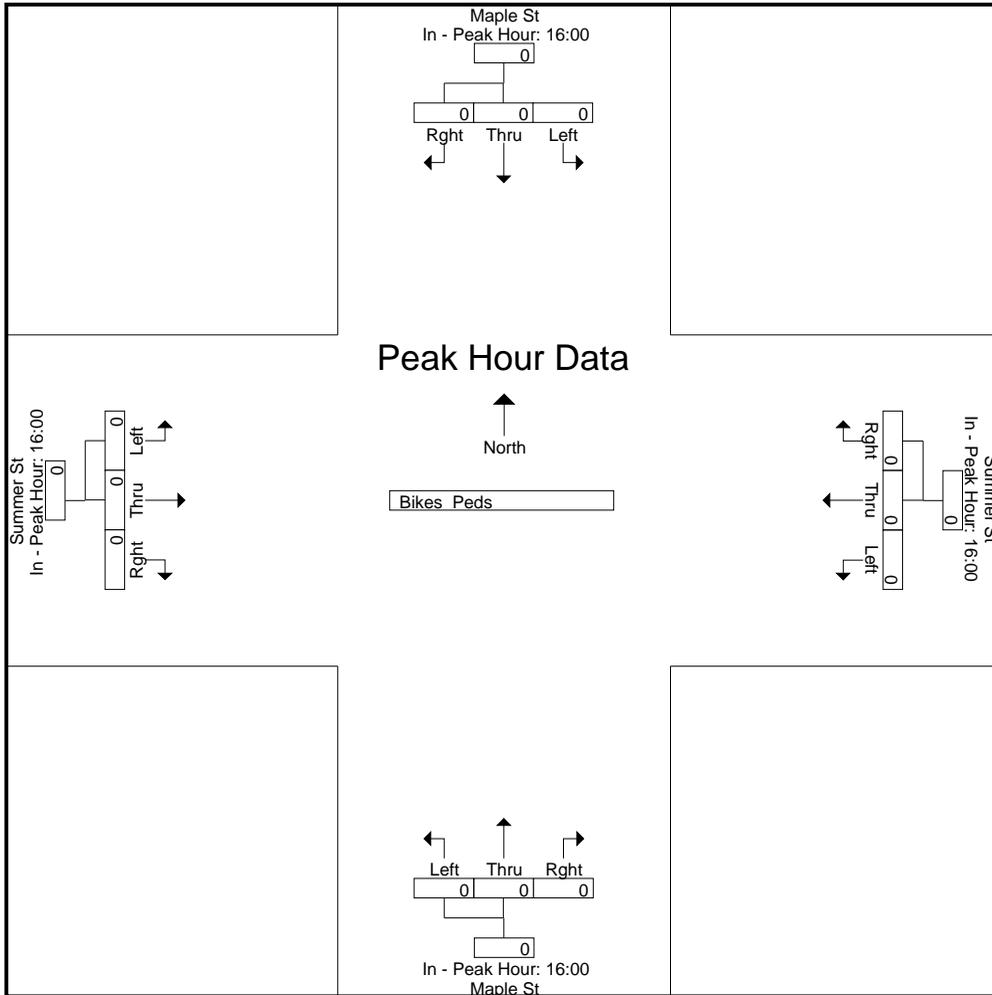
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	16:00				16:00				16:00							
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts  
978-664-2565

N/S Street : Maple Street  
E/W Street: Summer Street  
City/State : Maynard, MA  
Weather : Clear

File Name : 15080003  
Site Code : 15080003  
Start Date : 11/18/2010  
Page No : 3



## **APPENDIX B**

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### **CRASH RATE CALCULATION**





**APPENDIX C**

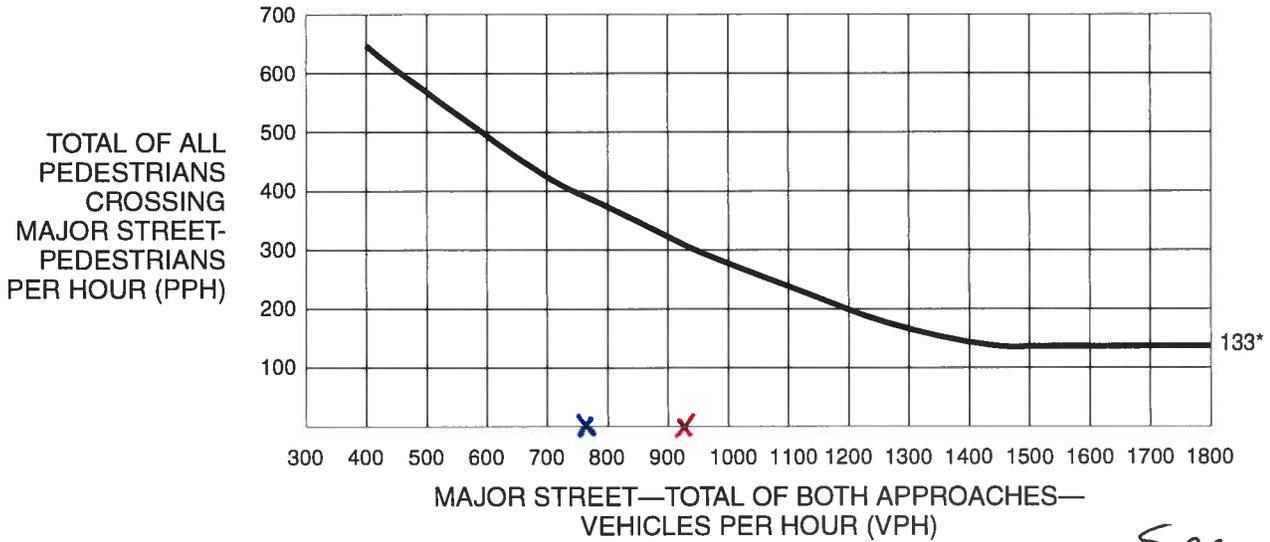
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**TRAFFIC SIGNAL WARRANT ANALYSIS**

Route 117  
@ Mill St

Blue = AM  
Red = PM

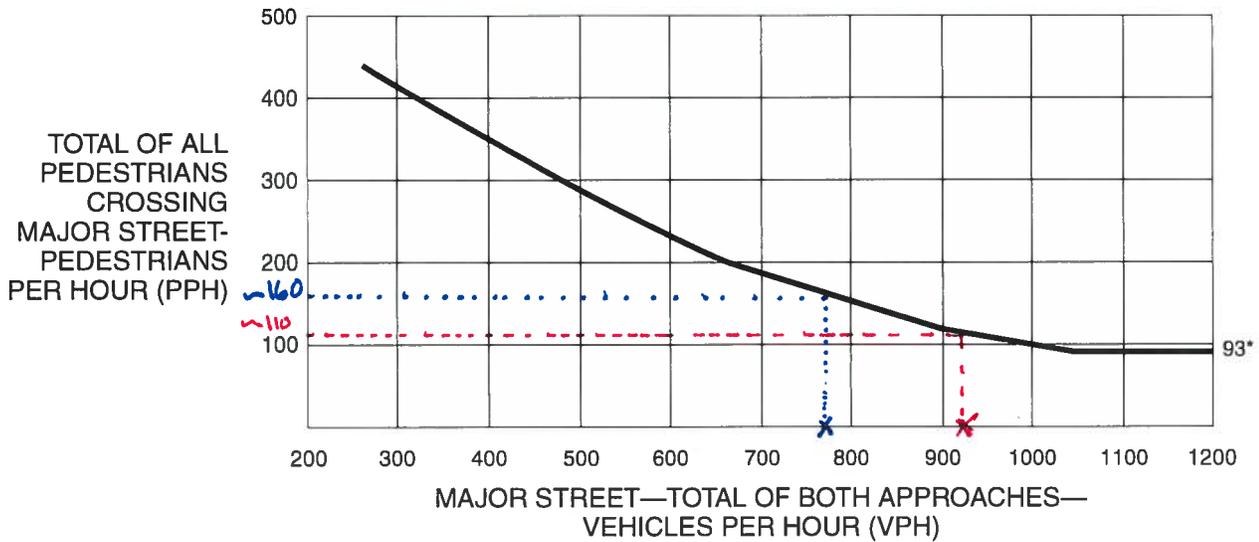
Figure 4C-7. Warrant 4, Pedestrian Peak Hour



\*Note: 133 pph applies as the lower threshold volume.

See chart below, because 85<sup>th</sup> percentile speed is above 35 mph

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)

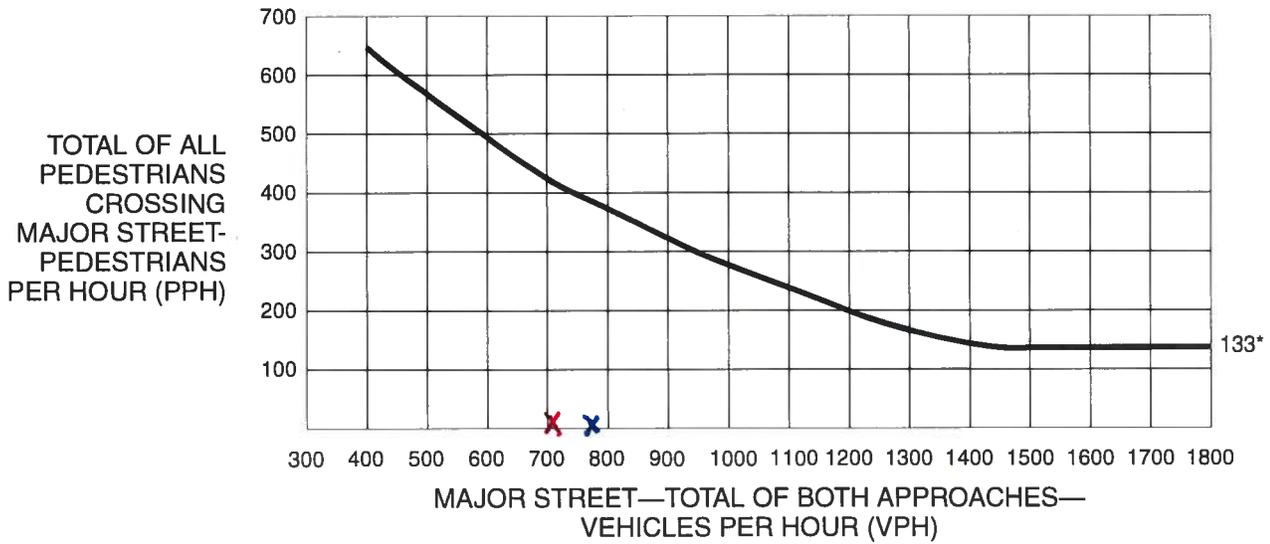


\*Note: 93 pph applies as the lower threshold volume.

Main St (Rte 62)  
@ Clock Tower Place

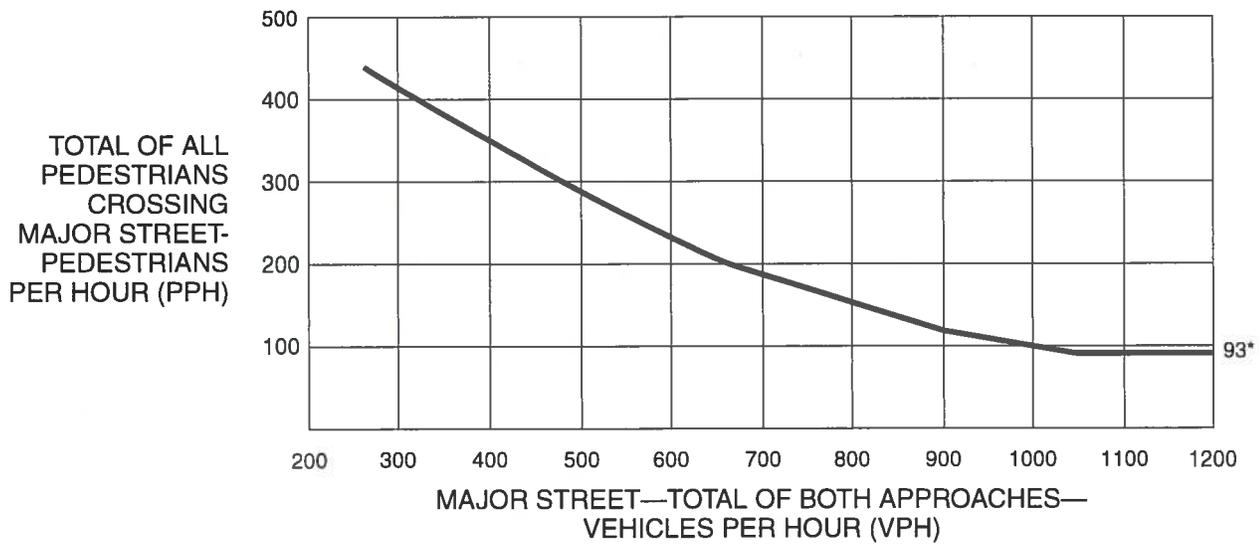
Blue = AM  
Red = PM

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



\*Note: 133 pph applies as the lower threshold volume.

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



\*Note: 93 pph applies as the lower threshold volume.

Summer St / Maple St

Blue = AM  
Red = PM

Figure 4C-7. Warrant 4, Pedestrian Peak Hour

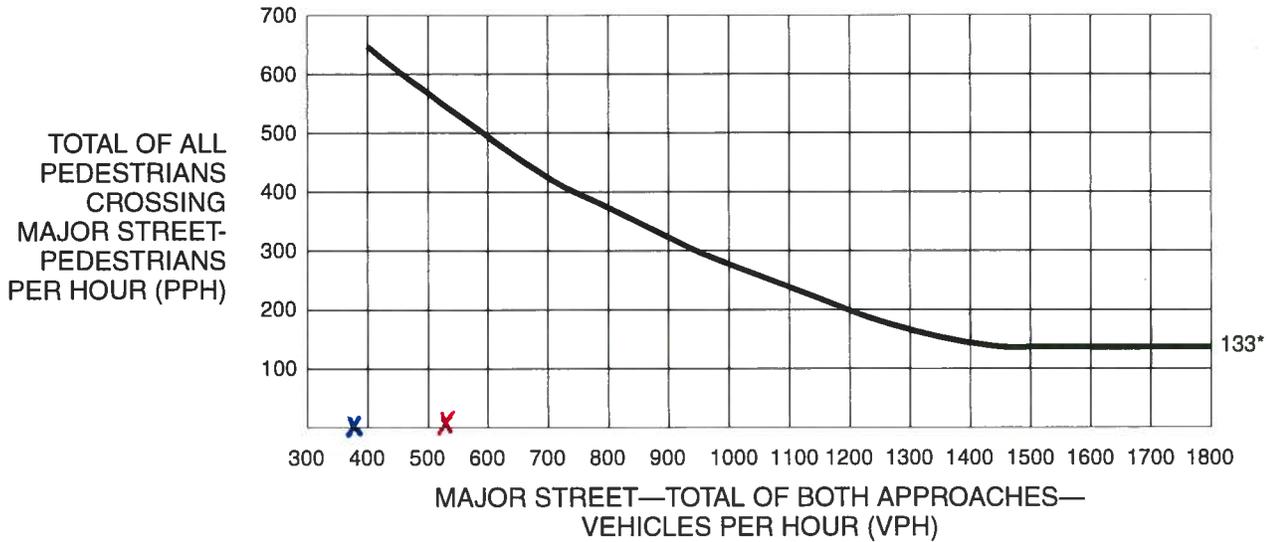
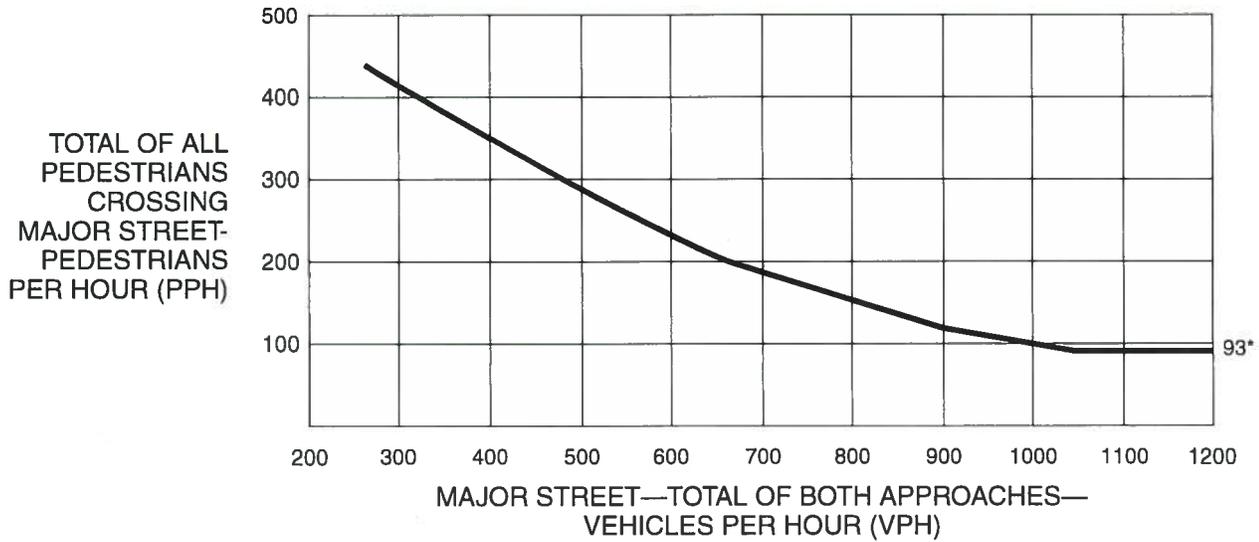


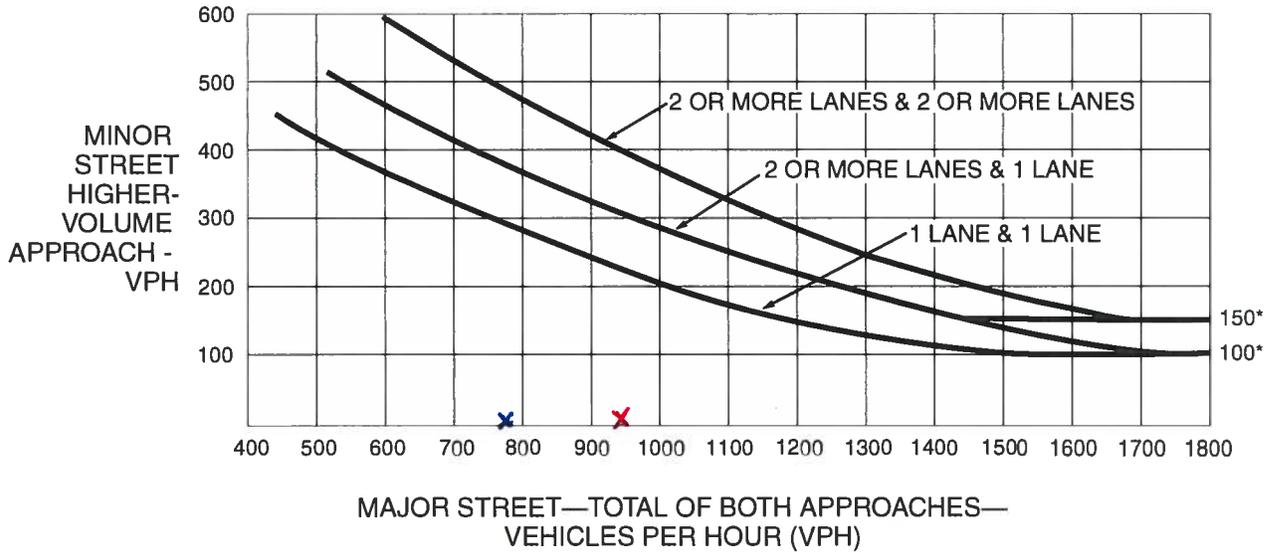
Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



Great Road (Rte 117)  
@ M:11 St

Blue = AM  
Red = PM

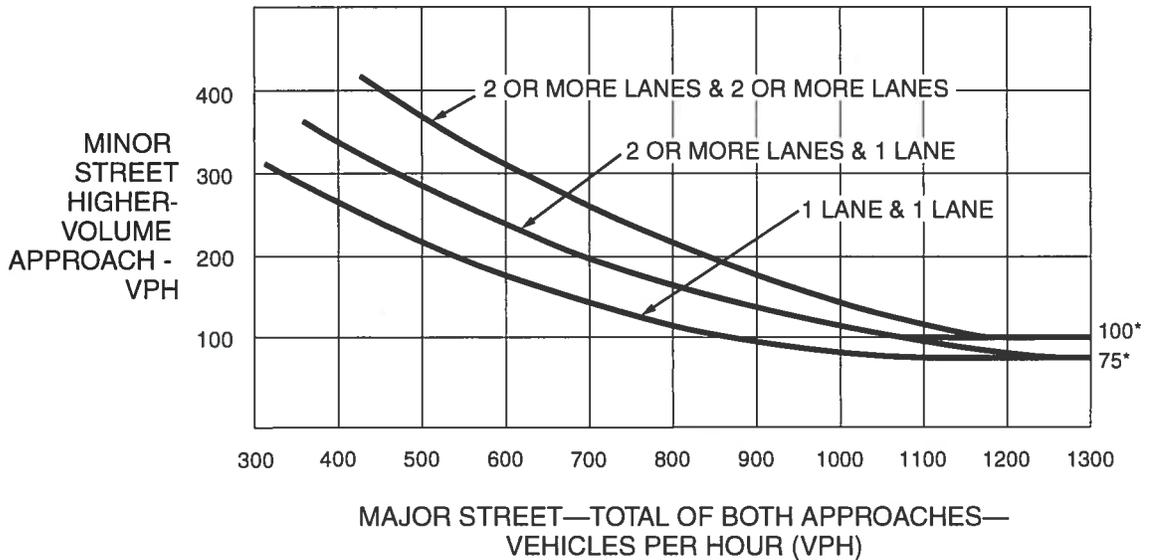
Figure 4C-3. Warrant 3, Peak Hour



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

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

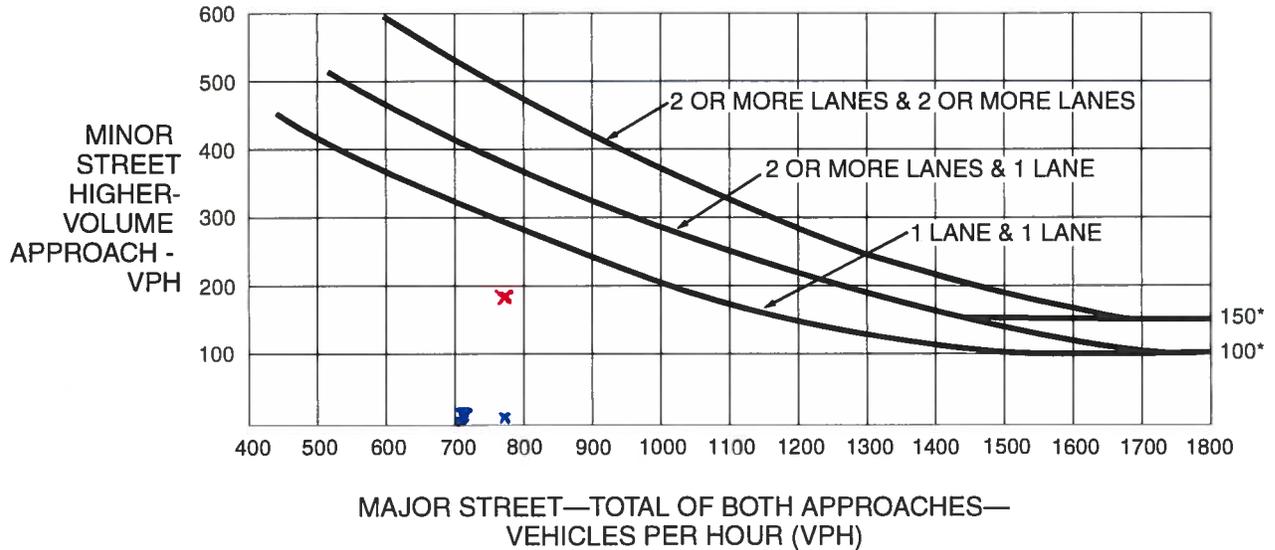


\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Main St (Rte 62)  
@Clock Tower Place driveway

Blue = AM  
Red = PM

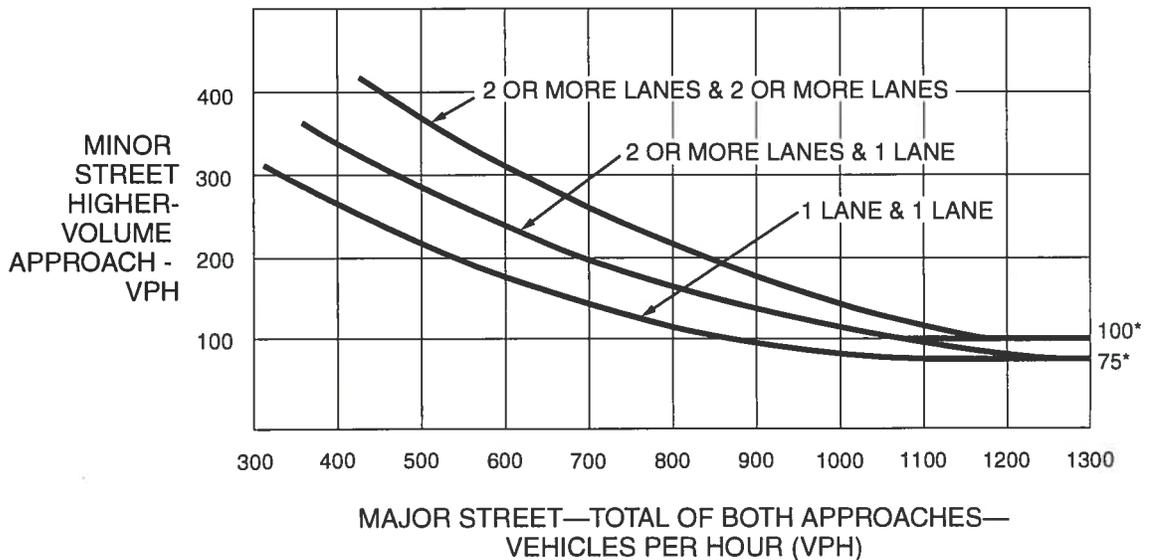
Figure 4C-3. Warrant 3, Peak Hour



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

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

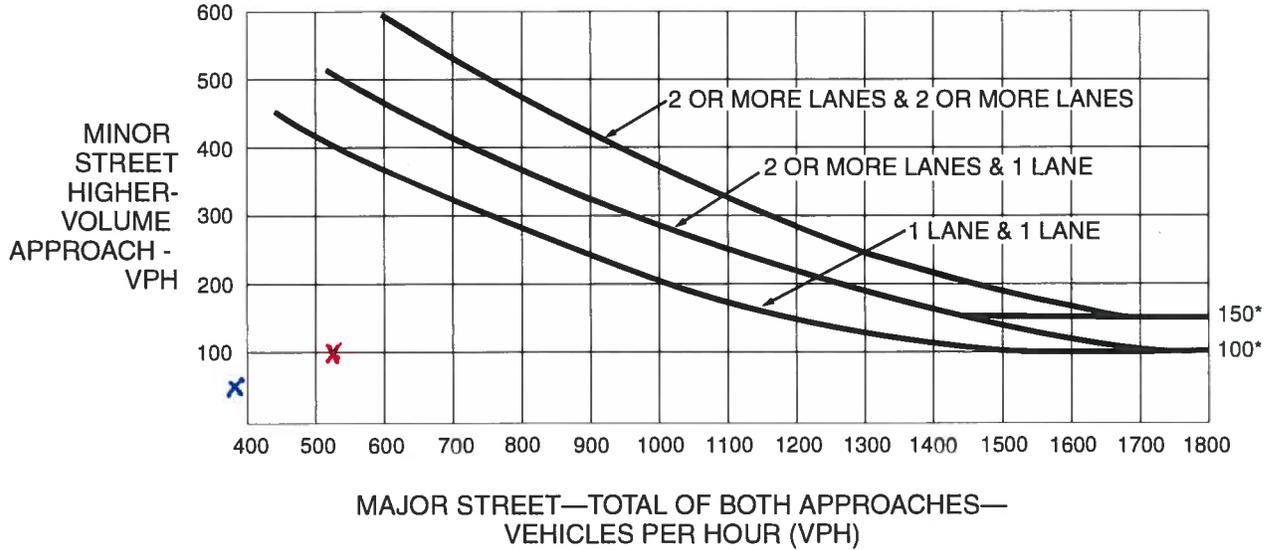
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

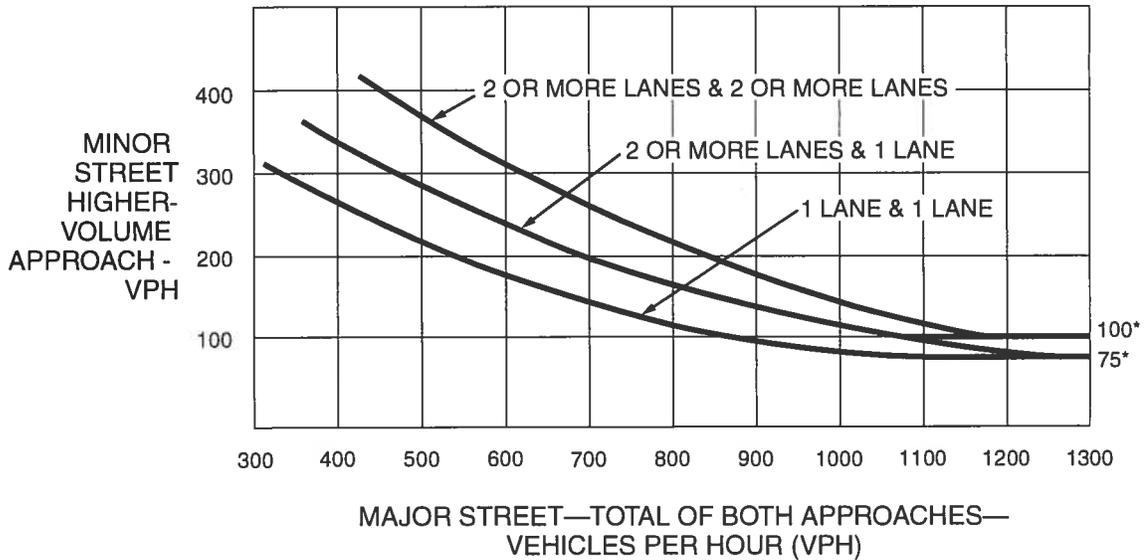
Blue = AM  
 Red = PM

**Figure 4C-3. Warrant 3, Peak Hour**



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

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.