

# MASSACHUSETTS AVENUE

## TRAFFIC EVALUATION



Prepared For:

TOWN OF LEXINGTON, MA

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Prepared By:

Weston & Sampson Engineers, Inc.  
100 Foxborough Boulevard, Suite 250  
Foxborough, MA 02035

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MASS. AVE /  
MARRETT RD.  
INTERSECTION

MASS. AVE /  
MAPLE ST.  
INTERSECTION



MASS. AVE /  
PLEASANT ST.  
INTERSECTION

FIGURE 1  
LOCUS MAP  
SCALE: NOT TO SCALE

## 1.0 INTRODUCTION

Weston & Sampson Engineers Inc. (WSE) has been retained by the Town of Lexington to perform a Traffic Study of the Massachusetts Avenue (Mass Ave) corridor from Marrett Road to Pleasant Street. The purpose of this study is to address traffic, safety and operational deficiencies within this stretch of Massachusetts Avenue.

### 1.1 Project Description

The Project Study Area includes the Mass Ave corridor from Marrett Road to Pleasant Street and all links and intersections in between. The corridor includes three (3) unsignalized intersections as follows: Mass Ave/Marrett Road, Mass Ave/Maple Street and Mass Ave at Pleasant Street and Follen Road. In addition, there are two signalized locations within the corridor including a signal at the Lexington Fire Station on the corner of Mass Ave and Locust Street and a pedestrian signal for crossing of school children from the local school and athletic fields to the rear.

We have driven the project area and made particular note of the operational and physical constraints of Mass Ave and each intersection along the route from Pleasant Street (Rte 4/225) to Marrett Road (Rte 2A). In addition, we have also investigated the area on a subsequent weekday afternoon at about 4 PM to see how the corridor operates during peak conditions and noted the following observations.

During this time period Mass Ave was experiencing heavy traffic volumes, making it easy to see possible reasons for delays at the study area intersections. The Mass Ave corridor, within the study area, consists of one lane in each direction with exclusive left turn lanes southbound onto Maple Street and northbound onto Marrett Road. In general there is a generous travel lane width and a white painted fog lines in areas near the intersections. Some locations have unregulated parking in front of residences along the route.

Marrett Road at Mass Ave is a non-signalized “T” intersection. An exclusive left turn lane and a through lane from northbound Mass Ave allows traffic to proceed on Mass Ave without being deterred by the Marrett Road turning traffic. However, the southbound Mass Ave traffic flow makes it difficult to enter from Marrett Road during peak traffic times of the day and northbound Marrett Road left turning traffic waits for long periods of time to find a break in the Mass Ave traffic stream.

Mass Ave at Maple Street (Rte 2A) operates as a non-signalized “T” intersection with a round, planted, channelization island in the center. The island contains a mature tree; some low growing plantings and several utility poles that obscures the sight distance from Maple Street to the south and makes it difficult to see left turning traffic from Maple Street while driving northbound on Mass Ave. There is a left turn lane from southbound Mass Ave onto Maple Street and a generous one-lane approach to Maple Street from northbound Mass Ave. The Maple Street approach to Mass Ave splits into a left and right turn lane separated with a painted island. This approach is a sea of pavement that might be made smaller and more efficient in the future. The driveway access to a gas station on the northeast corner of the intersection adds to the

confusion of the Maple Street traffic. There doesn't appear to be any formal pedestrian safety features such as crosswalks and the like at this intersection.

The intersection of Pleasant St/Mass Ave consists of a round island median at the intersection. It looks like a roundabout, but due to the configuration does not operate as such. Pleasant Street enters the intersection and is stop sign controlled at Mass Ave while Follen Road enters into the intersection and is stop sign controlled at this location. The round island is offset from Mass Ave providing no traffic calming relief to the intersection. Mass Ave has little to no obstructed flow making it difficult to enter onto Mass Ave from Pleasant St. The roundabout is planted with trees and shrubs that obscure the sight distance to all portions of the intersection, posing a safety hazard for motorists and pedestrians. Pedestrian crosswalks are located on the outside of the roundabout and appear to create long walking distances.

In general, the pavement condition throughout the corridor is good with spotty locations of localized cracking and trench patching. Sidewalks are in fair shape and consist of areas of hot mix asphalt and areas of cement concrete. Curb reveal is moderate and inconsistent within the corridor and tree lawn areas are in fairly good condition.

The intent of the project is to facilitate traffic flow and improve vehicular and pedestrian safety at the intersections, roadway links and respective approaches. Specific improvements to be studied as they relate to the operation of the corridor may include the following:

- Roadway widening or narrowing
- Geometric improvements to accommodate new lane configurations
- Installation of traffic signal systems if appropriate.
- Installation of new pavement markings and traffic signs.

**1.2 Data Collection And Field Investigation**

In order to evaluate the layout of Mass Ave and the intersections within the corridor a base plan was compiled to be utilized as a talking board for public hearings and to allow the roadway configuration, lane arrangements and widths, traffic data and the like to be compiled. This work was not performed by an instrument survey, but rather measurements of the physical attributes of the roadway and geometry of the intersections within the corridor. The linework and details gathered from the field measurements were transferred onto Mass GIS bases to show the limits of our work and how it blends into the existing conditions. Measurements taken include general alignment angles, roadway curb-to-curb widths, lane widths, offset line distances, lengths of stacking and turning lanes, limits of islands and sidewalk widths. This base plan will allow us to make sketch plans of proposed geometric and lane alterations and show how they line up and blend with existing conditions within the corridor.

Automatic Traffic Recorder (ATR) counts were performed by WSE at all major roadway links within the study area (see App B). These counts are taken with air hoses stretched across the

particular roadway section to count the number of vehicles passing that point at any given 15-minute period of the counting cycle. These ATR machines counted directional traffic flow for 24 hours of a mid week in March (Tues, 3/31/09) and also classified the type of vehicles that make up the total traffic counts. The ATR machines classify the vehicles based on the number of axles and are categorized as Bikes, Car & Trailers, 2 Axle (Long), Buses and a number of combinations of other axle configurations. The locations for the 24-hours counts are as follows:

- Mass Ave North of Marrett Road
- Mass Ave South of Marrett Road
- Mass Ave South of Pleasant Street
- Marrett Road West of Mass Ave
- Maple Street East of Mass Ave
- Pleasant Street South of Fern Street

Turning movement counts were also performed by WSE during a typical weekday (Tues, 3/31/09) between 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM. These counts will be utilized to perform the capacity and queue analysis on each of the three (3) intersections and to act as a base condition for the expanding of the counts to a period twenty years in the future for design of traffic equipment. The counts were analyzed in terms of the corridor and balanced between intersections to account for any discrepancies between the count locations due to side streets or the like.

Accident history was obtained from the Lexington Police Department dating back three years (1/1/05 to 12/31/08). A total of eighty eight (88) accidents were recorded with the Police Department during this time period at or near the corridor intersections and are included in this report (See Appendix F).

### **1.3 Analysis Designation**

The Massachusetts Highway Department (MassHighway) requires an evaluation of existing traffic flow operations and future operations with and without improvements in place. In addition to these scenarios, Mass Highway requires analysis of how the design would impact existing traffic volume levels if it were in place today. Although this is not a study for MassHighway we have prepared the study so that the Town can easily adapt the study for future use in MassHighway submittals. The scenarios examined as part of this study include:

- Existing 2009 volumes analyzed under existing non-signalized condition
- Projected 2029 volumes analyzed under existing non-signalized condition (Because the existing intersections operate at an unacceptable LOS it is assumed the LOS will be worse in the future and this analysis was not required)
- Existing 2009 traffic volumes analyzed under proposed traffic control
- Projected 2029 traffic volumes analyzed under proposed traffic control

A twenty (20) year design condition has been utilized as a measure of continued effectiveness of the proposed improvements.

#### **1.4 Area Growth/Design Year Volumes**

Once the existing peak hour volumes were obtained, projected peak hour traffic volumes for the design year 2029 were developed.

Based on the anticipated impacts of local development, a **one-percent per-year growth rate** was used to account for regional traffic growth. This rate was applied to existing traffic volumes over the entire 20-year period to accommodate for planned development, and regional increases in population and employment. The 2029 morning and evening peak hour traffic volume networks derived from these projections are shown in the Appendix.

#### **1.5 Safety Analysis**

This report includes a detailed safety analysis for the intersection in the Project corridor. Roadway safety deficiencies are defined and discussed based on this analysis with respect to existing conditions. The Appendix provides a summary of accident history data obtained from the Town of Lexington Police Department and MassHighway. Based on the 88 accidents in the three (3) sampled years, the corridor and all intersections are substantially above the MassHighway Crash Rates for typical intersections.

## **2.0 EXISTING CONDITIONS**

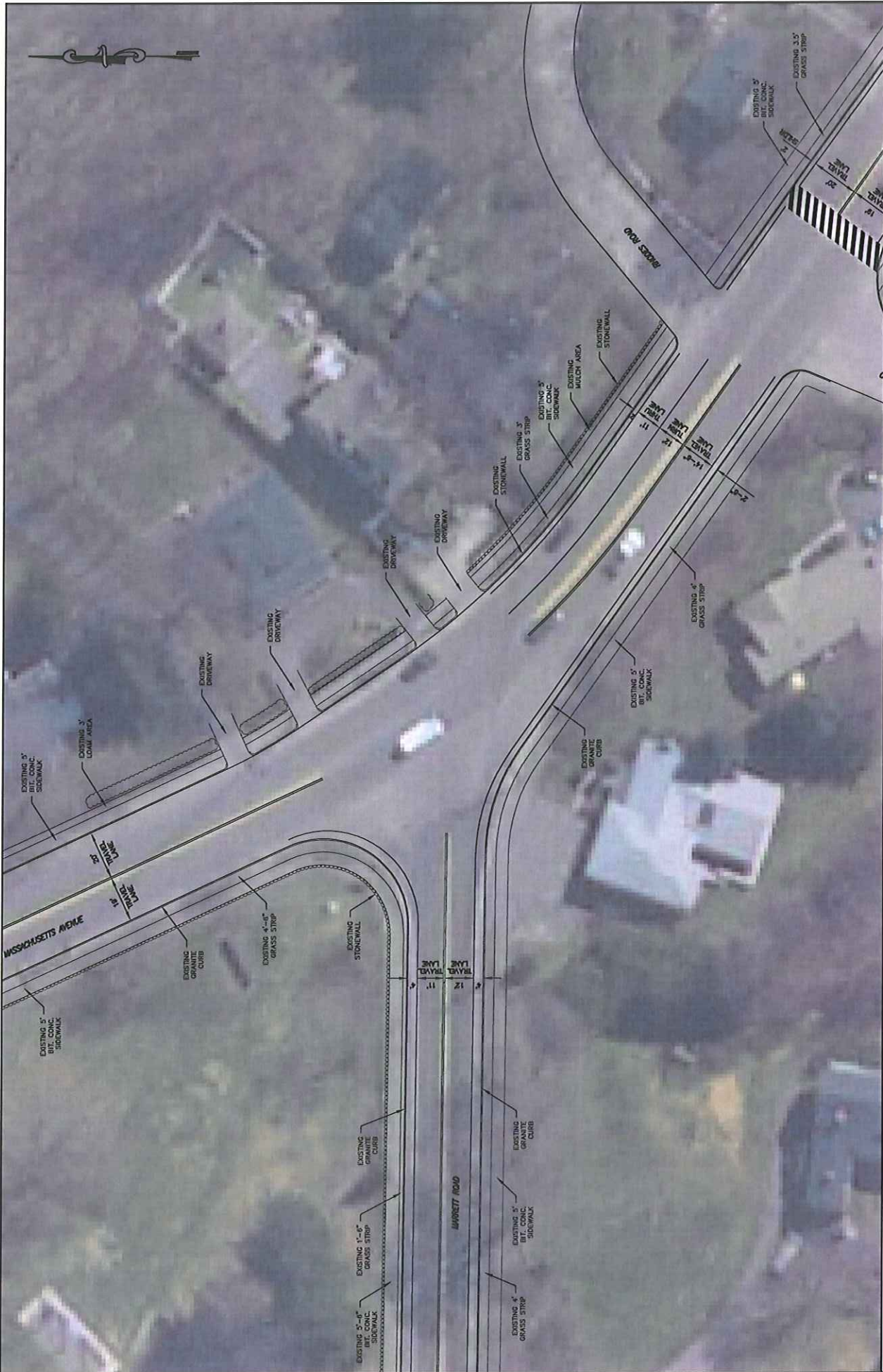
### **2.1 Geometry**

Mass Ave is a major east-west roadway bisecting the Town of Lexington. The Project corridor included in this study is located at the overlap of Route 2A and Routes 4/225. It is approximately 0.8 miles to the north of the intersection of Routes 4/225 and the Route 2 interchange.

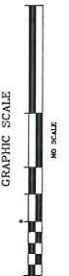
Within the Project corridor Mass Ave traverses in a general north-south direction and is predominantly a two-lane roadway. The typical cross section consists of approximately 40-feet of pavement from curb to curb. Between Marrett Road and Maple Street intersections there is a 2-foot paved shoulder on both sides of Mass Ave and a 12-foot exclusive left turn lane northbound from Mass Ave to Marrett Road and an 11-foot exclusive left turn lane southbound Mass Ave to Maple Street. The rest of the corridor has no paved shoulders and is configured into an oversized northbound and southbound lane measuring between 19 feet to 22 feet in width. There are sidewalks on both sides of Mass Ave within the Project corridor that are constructed of hot mix asphalt with tree lawns of varying dimensions on the granite curb edge of the corridor.



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**FIGURE 2**  
**MASSACHUSETTS AVE. / MARRETT RD. INTERSECTION**  
 SCALE: NOT TO SCALE



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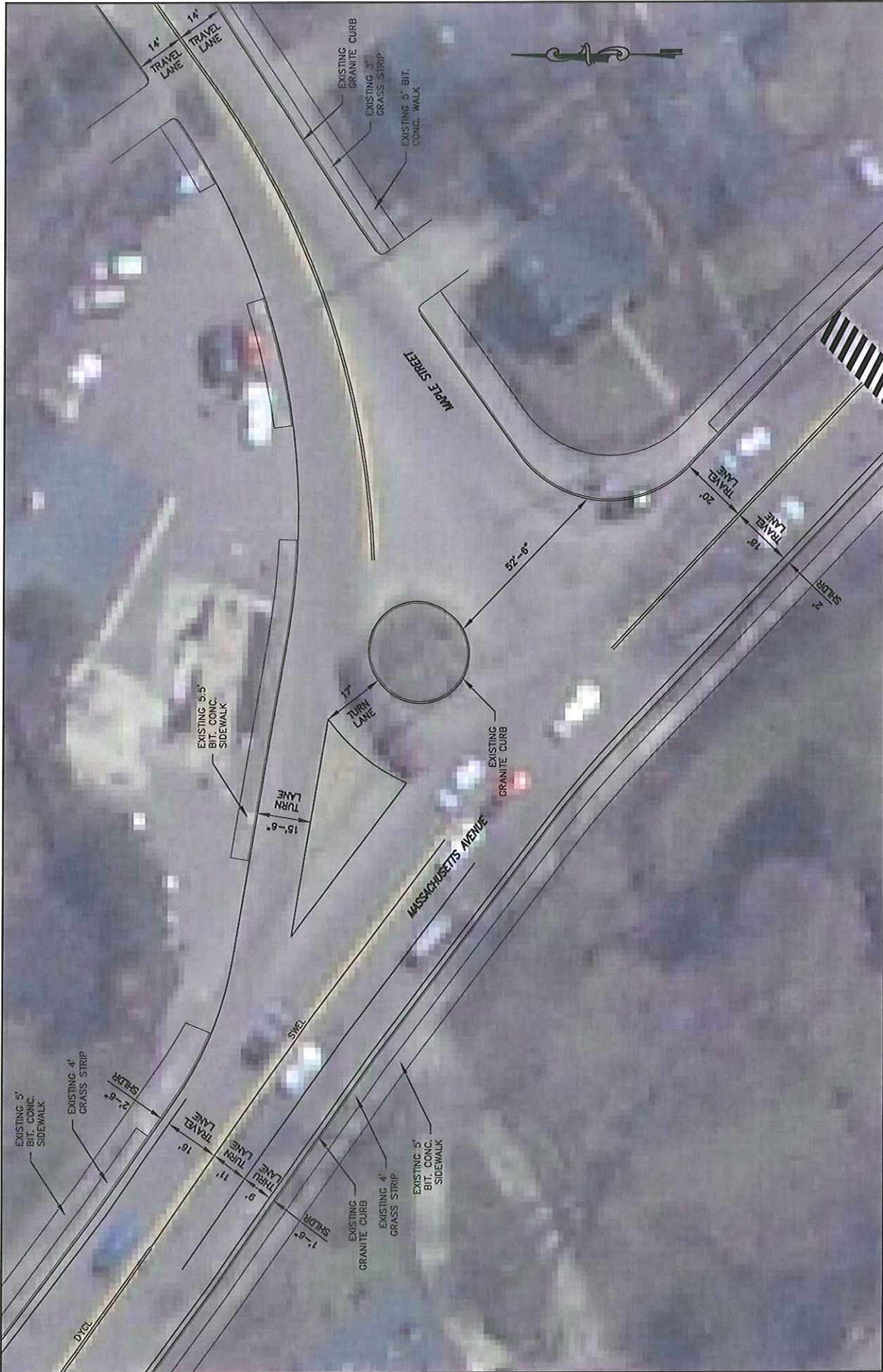
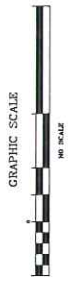
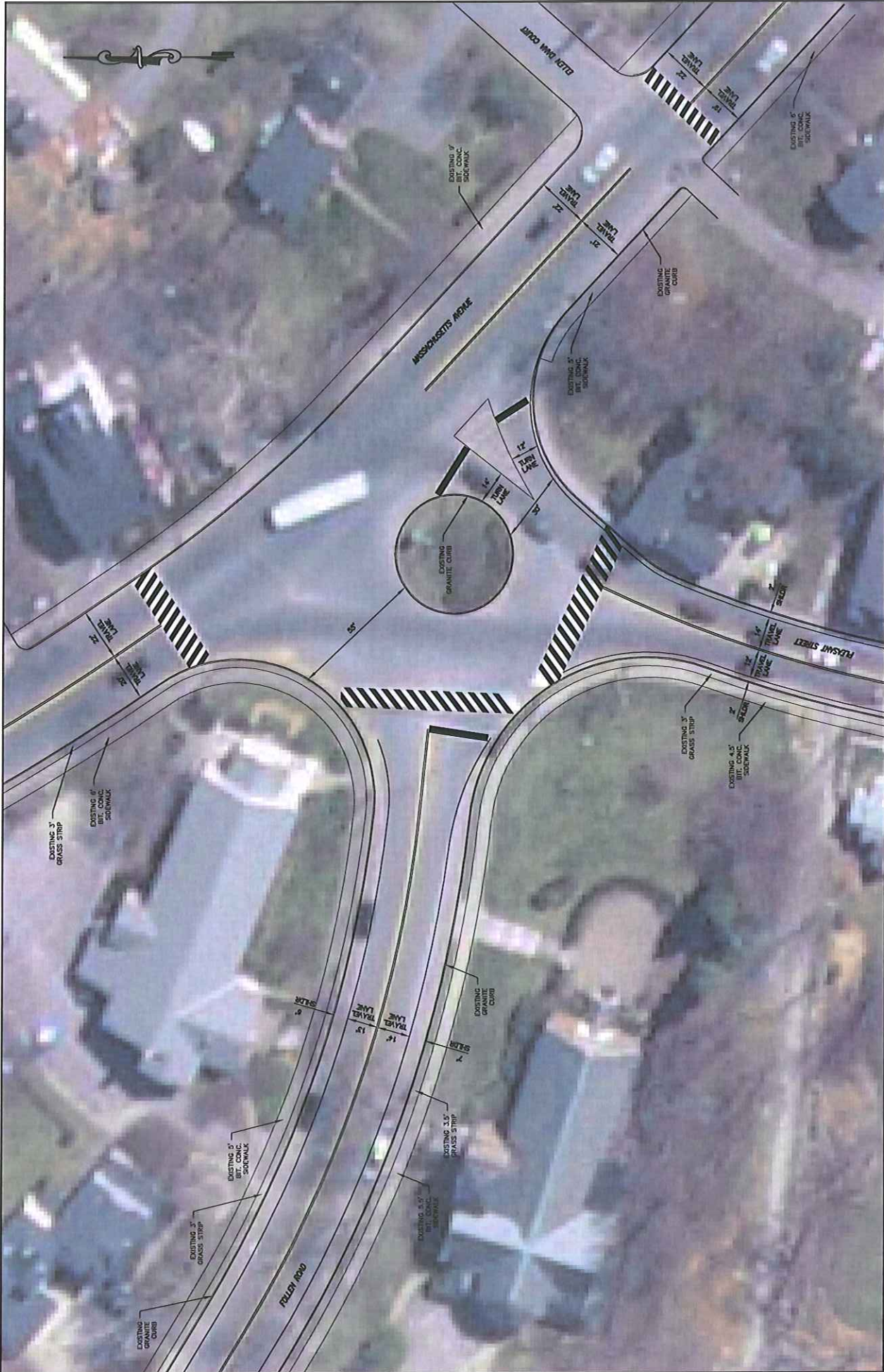


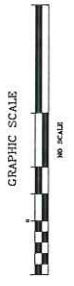
FIGURE 3  
MASSACHUSETTS AVE. / MAPLE ST. INTERSECTION  
SCALE: NOT TO SCALE



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**FIGURE 4**  
**MASSACHUSETTS AVE. / PLEASANT ST. INTERSECTION**  
 SCALE: NOT TO SCALE



Marrett Road, within the Project limits, traverses in a general east-west direction and is a two-lane roadway. It operates as a non-signalized “T” intersection with Mass Ave. The typical cross section consists of approximately 31-feet of pavement from curb to curb. There is a 4-foot paved shoulder on both sides of Marrett Road with an 11-foot westbound travel lane and a 12-foot east bound approach lane. The pavement width flares at the intersection with Mass Ave to allow for 2-3 right turning vehicles to stack apart from the left turning vehicles. There are sidewalks on both sides of Mass Ave within the Project corridor that are constructed of hot mix asphalt with tree lawns of varying dimensions on the granite curb edge of the corridor.

Maple Street, within the Project limits, traverses in a general east-west direction and is a two-lane roadway and operates as a non-signalized “T” intersection with Mass Ave. The typical cross section consists of approximately 28-feet of pavement from curb to curb. There are two 14-foot travel lanes approximately 100 feet east of the intersection with Mass Ave and there are no paved shoulders in this location. At the intersection with Mass Ave Maple Street flares to an exclusive right turn slot and a left turn lane is formed at a round vegetated island. The island contains a mature tree; some low growing plantings and several utility poles that obscures the sight distance from Maple Street to the south and makes it difficult to see left turning traffic from Maple Street while driving northbound on Mass Ave. A gas/service station is located on the northeast corner of the intersection with drive openings entering into the right turn lane. There is a sidewalk on the south side of Maple Street constructed of hot mix asphalt with a tree lawn of varying dimensions on the granite curb edge of the corridor.

Pleasant Street, within the Project limits, traverses in a general north-south direction and is a two-lane roadway. It operates as a non-signalized “T” intersection with a round vegetated island serving as a channelization device. It looks like a roundabout, but due to the configuration does not operate as such. Pleasant Street is stop sign controlled at Mass Ave while Follen Road enters into the intersection and is stop sign controlled at this location. The round island is offset from Mass Ave providing no traffic calming relief to the intersection. Mass Ave has little to no obstructed flow making it difficult to enter onto Mass Ave from Pleasant St. The round island is planted with trees and shrubs that obscure the sight distance to all portions of the intersection, posing a safety hazard for motorists and pedestrians. Pedestrian crosswalks are located on the outside of the roundabout and appear to create long walking distances.

The pavement conditions for the corridor were evaluated during a site visit. As a result, it was noted that the pavement along Mass Ave between Marrett Road and Maple Street is in fairly good condition while the pavement from Maple Street to Pleasant Street shows minor cracking in limited areas and is not in as good a condition as the latter section. In general, the pavement condition throughout the corridor is good with spotty locations of localized cracking and trench patching. Sidewalks are in fair shape and consist of areas of hot mix asphalt and areas of cement concrete. Curb reveal is moderate and inconsistent within the corridor and tree lawn areas are in fairly good condition.

All intersections within the study corridor are operating as unsignalized intersections with pedestrian signals at the Lexington Fire Station (on the corner of Locust Street) and opposite the driveway to the local school and Adams Field.

## 2.2 Peak Hour Traffic Volumes

Automatic Traffic Recorder (ATR) and Manual Turning Movement Counts were performed within the corridor limits during an average weekday in the month of March 2009. The Average Daily Traffic (ADT) volumes have been determined from ATR counts and are listed in Table 2.1.

**Table 2.1**  
**Daily Traffic Volumes**

Location	DIR	ADT	
		DIR ADT	TOT ADT
Mass Ave North of Marrett	NBD	6629	
	SBD	7203	13832
Mass Ave South of Marrett	NBD	8772	
	SBD	9646	18418
Mass Ave South of Pleasant	NBD	6412	
	SBD	6055	12467
Marrett Road West of Mass Ave	EBD	3946	
	WBD	3714	7660
Maple Street East of Mass Ave	EBD	6166	
	WBD	5924	12090
Pleasant Street South of Mass Ave	NBD	5886	
	SBD	6896	12782

The peak hours for the AM and PM periods were determined from the largest sum of four 15-minute contiguous time periods from the turning movement counts. The AM peak hour occurred between 7:45 and 8:45 AM. The PM peak hour occurred between 4:45 and 5:45 PM. These peak hour traffic volumes were used to determine existing Level of Service (LOS).

## 2.3 Level Of Service

### Definition

Level of Service (LOS) is an indicator of the operating conditions at a particular intersection or road segment during a particular hour. The LOS rating at an intersection is based upon the calculation of delay per approaching vehicle. The amount of delay is dependent upon many factors such as: traffic volumes, roadway characteristics, speed, and phasing and timing of traffic signals. There are six levels-of-service that are defined. These levels-of-service are expressed by the letters "A" through "F"; "A" being the best (free flow), "F" being the worst (no movement). In practice, any given roadway or intersection may operate at a wide range of LOS ratings depending upon time of day, day of week, or period of year. A LOS rating of "C", a condition of stable flow, is considered desirable for peak or design flow in rural areas. A LOS rating of "D" is considered acceptable in urban areas.

For non-signalized intersections, LOS is measured in terms of average vehicle delay. Delay time is an indicator of driver comfort and frustration, fuel consumption, and lost productivity due to time delays. The average delay is evaluated using a mathematical model that calculates the number of gaps in the traffic stream that will be available for each minor movement at the intersection. The minor movement consists of all side street movements plus left turns from the major street, with the basic assumption that the major street movement is not restricted by the minor street movement and the left turns from the major streets are made from left turn lanes. The definitions for the LOS ratings at non-signalized intersections are provided in Chapter 10 of the 2000 Highway Capacity Manual and are summarized in Table 2.2.

**Table 2.2**  
**Levels of Service Criteria**  
**Non-Signalized Intersections**

Levels of Service	Delay per Vehicle (Seconds)
A	< 10.0
B	10.1 To 15.0
C	15.1 To 25.0
D	25.1 To 35.0
E	35.1 To 50.0
F	> 50.0

For signalized intersections, LOS is measured in terms of average individual stopped delay. Delay time is an indicator of driver comfort and frustration, fuel consumption, and lost productivity due to time delays. Mathematically, delay time is a function of traffic progression, signal cycle length, and the ratio of volume to capacity for the lane group, approach, and intersection under study. The definitions for the LOS ratings at signalized intersections are provided in Chapter 10 of the 2000 Highway Capacity Manual and are summarized in Table 2.3.

**Table 2.3**  
**Levels of Service Criteria**  
**Signalized Intersections**

Levels of Service	Delay per Vehicle (Seconds)
A	< 10.0
B	10.1 To 20.0
C	20.1 To 35.0
D	35.1 To 55.0
E	55.1 To 80.0
F	> 80.0

Existing Level of Service

Providence Road (Route 122) experiences relatively minor delays and queuing at this intersection and operates at a LOS A during the AM and PM peak hours (See Table 2.4). However, the eastbound and westbound approaches from Millbury Street experience severe delays and excessive queuing and operate at a LOS F during the AM and PM peak hours.

**Table 2.4**  
**Existing Level of Service-2009**  
**(Non-signalized Intersection)**

Intersection	Approach	AM Peak Hour			PM Peak Hour		
		LOS	Queue (Veh)	Delay (Sec)	LOS	Queue	Delay (Sec)
<b>Mass Ave @ Marrett Rd</b>	Mass Ave (NB)	A	0	0	A	0	0
	Mass (NB) LT	C	4	16.4	B	2	10.0
	Mass Ave (SB)	A	0	0	A	0	0
	Marrett (EB)	F	24	710	F	25	219.2

Intersection	Approach	AM Peak Hour			PM Peak Hour		
		LOS	Queue (Veh)	Delay (Sec)	LOS	Queue	Delay (Sec)
<b>Mass Ave @ Maple St</b>	Mass Ave (NB)	A	0	0	A	0	0
	Mass (SB) LT	C	5	19.3	B	1	10.1
	Mass Ave (SB)	A	0	0	A	0	0
	Maple (WB) LT	F	-	-	F	-	-
	Maple (WB) RT	C	4	24.5	E	7	35.1

Intersection	Approach	AM Peak Hour			PM Peak Hour		
		LOS	Queue (Veh)	Delay (Sec)	LOS	Queue	Delay (Sec)
<b>Mass Ave @ Pleasant</b>	Mass Ave (NB)	B	2	10.0	A	1	3.5
	Mass Ave (SB)	A	0	0	A	0	0
	Pleasant (EB) LT	F	-	-	F	-	-
	Pleasant (EB) RT	C	1	16.5	C	1	15.8

Intersection	Approach	AM Peak Hour			PM Peak Hour		
		LOS	Queue (Veh)	Delay (Sec)	LOS	Queue	Delay (Sec)
Pleasant @ Follen	Pleasant (EB)	A	0	0.1	A	0	0.1
	Pleasant (WB)	A	0	0	A	0	0
	Follen (SB)	D	2	28.1	B	1	12.8

Note: Queue length is 95 percentile and is measured in car lengths of 25 feet each

### 3.0 FUTURE TRAFFIC CONDITIONS

#### 3.1 Traffic Signal Warrant Analysis

Part IV of the Manual on Uniform Traffic Control Devices (MUTCD) 2000 Millennium edition was utilized to perform the traffic signal warrant analysis. The MUTCD defines eight (8) criteria for which a signal may be warranted based upon vehicular or pedestrian volumes, roadway geometry, traffic accidents and/or vehicular delays.

#### Warrant 1, Eight-Hour Vehicular Volume

The Minimum Vehicular Volume, Condition A, is intended for application where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal. Table 3.1 and 3.2 is a recreation of Table 4C-1 found on page 4C-5 of the MUTCD (Millennium Edition).



**Table 3.1**  
**Warrant 1, Eight-Hour Vehicular Volume (Condition A)**

<i>Condition A- Minimum Vehicular Volume</i>							
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total on both approaches)			Vehicles per hour on higher-volume minor-street approach (one direction only)		
<u>Major Street</u>	<u>Minor Street</u>	<u>100%<sup>a</sup></u>	<u>80%<sup>b</sup></u>	<u>70%<sup>c</sup></u>	<u>100%<sup>a</sup></u>	<u>80%<sup>b</sup></u>	<u>70%<sup>c</sup></u>
1.....	1.....	500	400	350	150	120	105
2 or more.....	1.....	600	480	420	150	120	105
2 or more.....	2 or more...	600	480	420	200	160	140
1.....	2 or more...	500	400	350	200	160	140

<sup>a</sup>Basic minimum hourly volume.

<sup>b</sup>Used for combination of Conditions A and B after adequate trial of other remedial measures.

<sup>c</sup>May be used when the major-street speed exceeds 70 km/h (40 mph) or in an isolated community with a population of less than 10,000.

The interruption of Continuous Traffic, Condition B, is intended for application where the traffic volume on a major street is so heavy that traffic on a minor road suffers excessive delay or conflict in entering or crossing the major street.

**Table 3.2**  
**Warrant 1, Eight-Hour Vehicular Volume (Condition B)**

<i>Condition B-Interruption of Continuous Traffic</i>							
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total on both approach)			Vehicles per hour on higher-volume minor-street approach (one direction only)		
<u>Major Street</u>	<u>Minor Street</u>	<u>100%<sup>a</sup></u>	<u>80%<sup>b</sup></u>	<u>70%<sup>c</sup></u>	<u>100%<sup>a</sup></u>	<u>80%<sup>b</sup></u>	<u>70%<sup>c</sup></u>
1.....	1.....	750	600	525	75	60	53
2 or more.....	1.....	900	720	630	75	60	53
2 or more.....	2 or more...	900	720	630	100	80	70
1.....	2 or more...	750	600	525	100	80	70

<sup>a</sup>Basic minimum hourly volume.

<sup>b</sup>Used for combination of Conditions A and B after adequate trial of other remedial measures.

<sup>c</sup>May be used when the major-street speed exceeds 70 km/h (40 mph) or in an isolated community with a population of less than 10,000.

**Warrant Satisfied for all intersections. See Warrant Summary.**

### **Warrant 2, Four-Hour Vehicular Volume**

The four hour vehicular volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. Refer to Figure 4C-1 and 4C-2, page 4C-7, MUTCD (Millennium Edition).

**Warrant Satisfied for all intersections. See Warrant Summary.**

### **Warrant 3, Peak Hour**

The Peak Hour Signal Warrant is intended for use at a location where traffic conditions are such that for a minimum of an average day, the minor street traffic suffers undue delay when entering or crossing the major street. Refer to Figure 4C-3 and 4C-4, page 4C-9, MUTCD (Millennium Edition).

**Warrant Satisfied for all intersections. See Warrant Summary.**

### **Warrant 4, Pedestrian Volume**

The Pedestrian Volume Signal Warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

**Warrant does not apply.**

### **Warrant 5, School Crossing**

The School Crossing Signal Warrant is intended for application where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal.

**Warrant does not apply.**

### **Warrant 6, Coordinated Signal System**

Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signal at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles. The coordinated traffic signal system signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 300m (1,000 ft).

**Warrant does not apply.**

**Warrant 7, Crash Experience**

The Crash Experience Signal Warrant conditions apply where the severity of accidents are the principal reasons to consider installing a traffic control signal.

**Warrant Satisfied for all intersections. See Warrant Summary.**

**Warrant 8, Roadway Network**

Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

**Warrant Satisfied for all intersections. See Warrant Summary.**

**Table 3.3  
Warrant Summary Mass Ave @ Marrett Road**

Time	Mass Ave total both Approaches (Three Lane)	Marrett Road Higher Volume (One Lane)	Warrant #1			Warrant #2		Warrant #3		Warrant #7		Warrant #8	
			Condition A			Figure 4C-1	Figure 4C-2	Figure 4C-3	Figure 4C-3	Crash Experience			Roadway Network
			100 %	80 %	70 %					100	80%		
			Condition B										
100 %	80 %	70 %											
7-8 AM	1260	940	Y	Y		Y				Y	Y		
8-9 AM	1538	246	Y	Y		Y		Y		Y	Y		
9-10 AM	1085	179	N	Y		Y				Y	Y		
11-12 PM	923	222	N	Y		Y				Y	Y		
12-1 PM	952	244	N	Y		Y				Y	Y		
2-3 PM	1058	278	N	Y		Y				Y	Y		
3-4 PM	1192	366	Y	Y		Y		Y		Y	Y		
4-5 PM	1154	395	Y	Y		Y		Y		Y	Y		
5-6 PM	1172	500	Y	Y		Y		Y		Y	Y		
6-7 PM	1108	339	N	Y		Y		Y		Y	Y		
<b>Warrant Requirements Condition A</b>			600/150-100% 480/120-80%			Any 4 hour of an average day		1 Hour, any four 15 minute		5 or more in 12 mo		Warrant 1,2,3 met	
<b>Hours Warrant Met</b>			10 hrs. 100% 10 hrs. 80%			10 hrs		5 hrs		10 hrs		10 hrs	
<b>Warrant Satisfied</b>			Yes			Yes		Yes		Yes		Yes	
<b>Note: For Warrant 1, 70% not used, for warrant 2, figure 4C-1 and for warrant 3, figure 4C-3 has been implemented.</b>													
<b>Warrant #4, Pedestrian Volume:</b>			No										
<b>Warrant #5, School Crossing:</b>			No										
<b>Warrant #6, Coordinated Signal System:</b>			No										

**Table 3.4  
Warrant Summary Mass Ave @ Maple Street**

Time	Mass Ave total both Approaches (Three Lane)	Maple St Higher Volume (One Lane)	Warrant #1			Warrant #2		Warrant #3		Warrant #7		Warrant #8	
			Condition A			Figure 4C-1	Figure 4C-2	Figure 4C-3	Figure 4C-3	Crash Experience			Roadway Network
			100 %	80 %	70 %					100	80%		
			Condition B										
100 %	80 %	70 %											
7-8 AM	1132	684	Y	Y		Y		Y		Y	Y		
8-9 AM	1326	643	Y	Y		Y		Y		Y			
9-10 AM	974	449	N	Y		Y		Y		Y			
11-12 PM	968	306	N	Y		Y				Y			
12-1 PM	940	320	N	Y		Y				Y			
2-3 PM	1089	370	N	Y		Y		Y		Y	Y		
3-4 PM	1216	450	Y	Y		Y		Y		Y	Y		
4-5 PM	1257	406	Y	Y		Y		Y		Y	Y		
5-6 PM	1405	389	Y	Y		Y		Y		Y	Y		
6-7 PM	1172	330	N	Y		Y		Y		Y	Y		
<b>Warrant Requirements Condition A</b>			600/150-100% 480/120-80%			Any 4 hour of an average day		1 Hour, any four 15 minute		5 or more in 12 mo		Warrant 1,2,3 met	
<b>Hours Warrant Met</b>			10 hrs. 100% 10 hrs. 80%			10 hrs		8 hrs		10 hrs		10 hrs	
<b>Warrant Satisfied</b>			Yes			Yes		Yes		Yes		Yes	
<b>Note: For Warrant 1, 70% not used, for warrant 2, figure 4C-1 and for warrant 3, figure 4C-3 has been implemented.</b>													
<b>Warrant #4, Pedestrian Volume:</b>			No										
<b>Warrant #5, School Crossing:</b>			No										
<b>Warrant #6, Coordinated Signal System:</b>			No										

**Table 3.5  
Warrant Summary Mass Ave @ Pleasant Street**

Time	Mass Ave total both Approaches (Two Lane)	Pleasant St Higher Volume (One Lane)	Warrant #1			Warrant #2		Warrant #3		Warrant #7		Warrant #8
			Condition A			Figure 4C-1	Figure 4C-2	Figure 4C-3	Figure 4C-3	Crash Experience		
			100 %	80 %	70 %					100	80%	
			Condition B									
100 %	80 %	70 %										
7-8 AM	1132	313	Y	Y		Y		Y		Y	Y	
8-9 AM	1326	387	Y	Y		Y		Y		Y	Y	
9-10 AM	974	297	N	Y		Y				Y	Y	
11-12 PM	968	337	N	Y		Y				Y	Y	
12-1 PM	940	323	N	Y		Y				Y	Y	
2-3 PM	1089	392	N	Y		Y				Y	Y	
3-4 PM	1216	501	Y	Y		Y		Y		Y	Y	
4-5 PM	1257	512	Y	Y		Y		Y		Y	Y	
5-6 PM	1405	519	Y	Y		Y		Y		Y	Y	
6-7 PM	1172	465	N	Y		Y		Y		Y	Y	
<b>Warrant Requirements Condition A</b>			600/150-100% 480/120-80%			Any 4 hour of an average day		1 Hour, any four 15 minute		5 or more in 12 mo		Warrant 1,2,3 met
<b>Hours Warrant Met</b>			10 hrs. 100% 10 hrs. 80%			10 hrs		6 hrs		10 hrs		10 hrs
<b>Warrant Satisfied</b>			Yes			Yes		Yes		Yes		Yes
<p><b>Note:</b> For Warrant 1, 70% not used, for warrant 2, figure 4C-1 and for warrant 3, figure 4C-3 has been implemented.</p>												
<p><b>Warrant #4, Pedestrian Volume:</b> No</p>												
<p><b>Warrant #5, School Crossing:</b> No</p>												
<p><b>Warrant #6, Coordinated Signal System:</b> No</p>												

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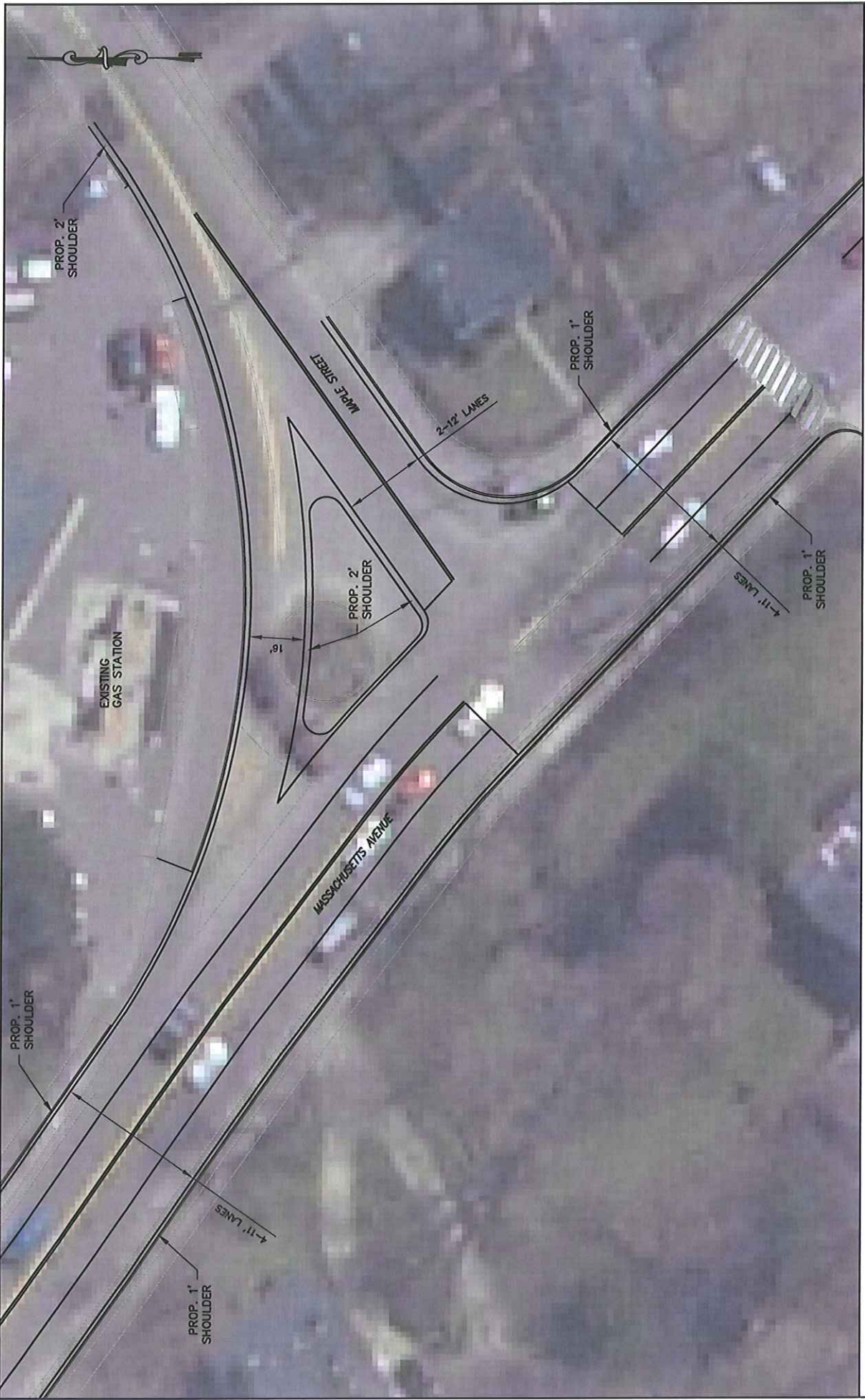


NOTE:  
SIGNAL EQUIPMENT  
LAYOUT NOT INDICATED

FIGURE 5  
MASSACHUSETTS AVE. / MARRETT RD. INTERSECTION  
SCALE: NOT TO SCALE



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NOTE:  
SIGNAL EQUIPMENT  
LAYOUT NOT INDICATED

FIGURE 6  
MASSACHUSETTS AVE. / MAPLE ST. INTERSECTION  
SCALE: NOT TO SCALE





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**FIGURE 7**  
 MASSACHUSETTS AVE. / PLEASANT ST. INTERSECTION  
 SCALE: NOT TO SCALE

**NOTE:**  
 SIGNAL EQUIPMENT  
 LAYOUT NOT INDICATED



Based on the Warrant Analysis of the three major intersection within the project area it has been determined that traffic signals are warranted in all locations. The major contributor to the need for signals is the volume of traffic on the major movement, Mass Ave, and the opposing side street left turning traffic at Marret and Maple Street.

### **3.2 Intersection Analyses**

Roadway improvement projects are normally designed to accommodate traffic projected to a future design year, usually 10-20 years. A 20-year design horizon to a Design year 2029 has been selected for this project.

To provide analysis of proposed conditions, it is necessary to determine design year (2029) volumes. This was accomplished by increasing 2009 volumes based on a rate of 1% per year to the year 2029. This increase in growth rate will be coordinated with the Town Planning Department and the Regions Planning Agency.

Traffic operations for this study were analyzed according to standard procedures and practices outlined in the "Highway Capacity Manual 2000" published by the Transportation Research Board.

Traffic flow through an intersection is measured in terms of capacity and LOS. Capacity of an intersection is defined for each approach as the maximum rate of flow that passes through the intersection under prevailing traffic, roadway and/or signalized conditions. LOS is the qualitative measure of the efficiency of traffic flow assigned as a result of the capacity analysis. LOS is described in terms of Levels A through F, where LOS A represents the best possible conditions and LOS F represents forced-flow or failing conditions. Generally, LOS C or better is considered acceptable, although in urban locations, LOS D is also considered acceptable during peak periods.

At signalized intersections, LOS is defined in terms of average delay per approach (see Table 2.3 for signalized LOS criteria). For non-signalized intersections, reserve capacity is used to determine LOS conditions (see Table 2.2 for non-signalized LOS criteria). Average delay measures the mean stopped delay experienced by vehicles entering a signalized intersection during the peak hour period. Average delay is measured for each individual approach and the intersection as a whole. The LOS tends to decrease as average delays increase.

Reserve capacity is the unused capacity of the minor approach and is typically the controlled approach. Reserve capacity is defined in vehicles per hour and indicates the number of additional vehicles using an individual approach that would bring the facility to capacity.

The following is a summary of the project intersections analyzed under Existing 2009 Non-signalized, Existing 2009 Signalized, Future 2029 Non-signalized and Proposed 2009 Signalized scenarios.

### *Existing 2009 Volumes Analyzed Under Existing (Non-Signalized) Conditions*

See Appendix for analysis results by intersection as follows:

#### **Mass Ave @ Marrett Road**

The non-signalized analysis of the existing AM peak hour volumes resulted in a LOS F for the eastbound left turn and a LOS B for the eastbound right turn and a LOS A for the northbound and southbound approaches to the intersection.

The analysis of the PM peak hour volumes resulted in a LOS F for the eastbound left turn and a LOS C for the eastbound right turn and a LOS A for the northbound and southbound approaches to the intersection.

#### **Mass Ave @ Maple Street**

The non-signalized analysis of the existing AM peak hour volumes resulted in a LOS F for the westbound left turn (the westbound right turn is a yield that operates out of the intersection), a LOS A for the northbound approach and a LOS A and LOS C for the southbound through and left turn respectively.

The analysis of the PM peak hour volumes resulted in a LOS F for the westbound left turn (the westbound right turn is a yield that operates out of the intersection), a LOS A for the northbound approach and a LOS A and LOS B for the southbound through and left turn respectively.

#### **Mass Ave @ Pleasant Street**

The non-signalized analysis of the existing AM peak hour volumes resulted in a LOS F for the eastbound approach and a LOS B and a LOS A for the northbound and southbound approaches respectively.

The analysis of the PM peak hour volumes resulted in a LOS F for the eastbound approach and a LOS A for both the northbound and southbound approaches.

#### **Pleasant Street @ Follen Road**

The non-signalized analysis of the existing AM peak hour volumes resulted in a LOS D for the southbound (out of Follen) approach and a LOS A for the eastbound and westbound approaches to the intersection.

The analysis of the PM peak hour volumes resulted in a LOS B for the southbound (out of Follen) approach and a LOS A for the eastbound and westbound approaches to the intersection.

### *Projected 2029 Volumes Analyzed Under Existing (Non-Signalized) Conditions*

The results of the Non-signalized analysis for the 2009 existing conditions indicates a LOS F for most of the side street approaches to Mass Ave. As a result of the increase in traffic volumes over the 20-year period the LOS will deteriorate to a worse degree for the existing traffic volumes projected forward for a 20-year time frame and therefore was not analyzed.

### *Existing 2009 Traffic Volumes Analyzed Under Proposed Traffic Control*

See Appendix for analysis results by intersection as follows:

#### **Mass Ave @ Marrett Road**

The signalized analysis of the existing AM peak hour volumes resulted in a LOS C for the eastbound left turn and a LOS A for the eastbound right turn, a LOS D for the northbound left turn and a LOS A for the northbound through, a LOS B for the southbound approach to the intersection. ***The resultant LOS for the intersection was a LOS B.***

The analysis of the PM peak hour volumes resulted in a LOS C for the eastbound left turn and a LOS A for the eastbound right turn, a LOS A for the northbound left turn and a LOS A for the northbound through, a LOS B for the southbound approach to the intersection. ***The resultant LOS for the intersection was a LOS A.***

#### **Mass Ave @ Maple Street**

The signalized analysis of the existing AM peak hour volumes resulted in a LOS C for the westbound left turn (the westbound right turn is a yield that operates out of the intersection), a LOS B for the northbound approach and a LOS B for the southbound approach. ***The resultant LOS for the intersection was a LOS B.***

The analysis of the PM peak hour volumes resulted in a LOS C for the westbound left turn (the westbound right turn is a yield that operates out of the intersection), a LOS B for the northbound approach and a LOS B for the southbound approach. ***The resultant LOS for the intersection was a LOS B.***

#### **Mass Ave @ Pleasant Street**

The signalized analysis of the existing AM peak hour volumes resulted in a LOS B for the eastbound approach, a LOS B for the northbound approach and a LOS B for the southbound approach. ***The resultant LOS for the intersection was a LOS B.***

The analysis of the PM peak hour volumes resulted in a LOS B for the eastbound approach, a LOS B for the northbound approach and a LOS B for the southbound approach. ***The resultant LOS for the intersection was a LOS B.***

### **Pleasant Street @ Follen Road**

The non-signalized analysis of the existing AM peak hour volumes resulted in a LOS D for the southbound (out of Follen) approach and a LOS A for the eastbound and westbound approaches to the intersection.

The analysis of the PM peak hour volumes resulted in a LOS B for the southbound (out of Follen) approach and a LOS A for the eastbound and westbound approaches to the intersection.

The capacity analyses of existing traffic volumes analyzed under traffic signal control resulted in a LOS B for all movements during both the AM and PM peak hours.

### **Projected 2029 Traffic Volumes Analyzed Under Proposed Traffic Control**

See Appendix for analysis results by intersection as follows:

#### **Mass Ave @ Marrett Road**

The signalized analysis of the existing AM peak hour volumes resulted in a LOS C for the eastbound left turn and a LOS A for the eastbound right turn, a LOS D for the northbound left turn and a LOS A for the northbound through, a LOS B for the southbound approach to the intersection. ***The resultant LOS for the intersection was a LOS B.***

The analysis of the PM peak hour volumes resulted in a LOS C for the eastbound left turn and a LOS A for the eastbound right turn, a LOS A for the northbound left turn and a LOS A for the northbound through, a LOS B for the southbound approach to the intersection. ***The resultant LOS for the intersection was a LOS A.***

#### **Mass Ave @ Maple Street**

The signalized analysis of the existing AM peak hour volumes resulted in a LOS C for the westbound left turn (the westbound right turn is a yield that operates out of the intersection), a LOS B for the northbound approach and a LOS B for the southbound approach. ***The resultant LOS for the intersection was a LOS B.***

The analysis of the PM peak hour volumes resulted in a LOS C for the westbound left turn (the westbound right turn is a yield that operates out of the intersection), a LOS B for the northbound approach and a LOS B for the southbound approach. ***The resultant LOS for the intersection was a LOS B.***

### **Mass Ave @ Pleasant Street**

The signalized analysis of the existing AM peak hour volumes resulted in a LOS B for the eastbound approach, a LOS B for the northbound approach and a LOS B for the southbound approach. *The resultant LOS for the intersection was a LOS B.*

The analysis of the PM peak hour volumes resulted in a LOS B for the eastbound approach, a LOS B for the northbound approach and a LOS B for the southbound approach. *The resultant LOS for the intersection was a LOS B.*

### **Pleasant Street @ Follen Road**

The non-signalized analysis of the existing AM peak hour volumes resulted in a LOS D for the southbound (out of Follen) approach and a LOS A for the eastbound and westbound approaches to the intersection.

The analysis of the PM peak hour volumes resulted in a LOS B for the southbound (out of Follen) approach and a LOS A for the eastbound and westbound approaches to the intersection.

The capacity analyses of existing traffic volumes analyzed under traffic signal control resulted in a LOS B for all movements during both the AM and PM peak hours.

### **3.3 Summary**

The analysis of the existing (2009) and future (2029) traffic conditions indicates that the non-signalized intersections operate at an unacceptable LOS with the side streets operating at a LOS F. This is due to the high Mass Ave volume of traffic and the conflicting left turning movements from the side streets. Without a formal way of allowing the side street traffic to make their turns across Mass Ave there is not enough gaps in the Mass Ave traffic stream to allow this to happen without causing major delays and unacceptable LOS for the sides streets.

The analysis of existing (2009) traffic volumes under signalized conditions indicates that with the addition of traffic signals to the project intersections the needed gaps for the side street traffic are supplied and the intersections operate at a reasonable LOS. Analysis of the 2029 traffic volumes under traffic signal control also indicates that with the addition of traffic signals to the project intersections a reasonable LOS is realized. The difference is that the 2029 analysis indicates several movements with poor LOS and the queue lengths are typically longer than those of the 2009 analysis year.

The results of the signalized intersection analysis under 2009 and 2029 projected volumes is as follows:

**Table 3.6  
Future Level of Service - AM 2009/2029  
(Signalized Intersection)**

Intersection	2009 AM Peak Hour			2029 AM Peak Hour		
	LOS	Queue (Veh)	Delay (Sec)	LOS		Delay (Sec)
<b>Mass Ave @ Marrett Rd</b>	<b>B</b>		<b>17.6</b>	<b>C</b>		<b>34.3</b>
Eastbound Left	C	1		E	4	
Eastbound Right	A	0		A	0	
Northbound Left	D	14		D	22	
Northbound Thru	A	4		A	5	
Southbound Thru	B	19		D	55	
Southbound Right	A	1		A	3	
<b>Mass Ave @ Maple St</b>	<b>B</b>		<b>13.8</b>	<b>C</b>		<b>29.7</b>
Westbound Left	C	7		D	12	
Westbound Right	A	4		C	10	
Northbound Thru	B	15		C	25	
Northbound Right	A	6				
Southbound Left	B	7		D	30	
Southbound Thru	A	7		A	16	
<b>Mass Ave @ Pleasant St</b>	<b>B</b>		<b>12.9</b>	<b>B</b>		<b>18.5</b>
Eastbound Left	B	10		C	19	
Eastbound Right	A	1		A	3	
Northbound Left	B	6		B	8	
Northbound Thru	B	12		B	17	
Southbound Thru	C	10		C	15	
Southbound Right	A	8		B	19	
<b>Pleasant St @ Follen *</b>	<b>D</b>		<b>28.1</b>	<b>E</b>		<b>37.5</b>

\* Pleasant @ Follen is non-signalized in the future

**Table 3.7**  
**Future Level of Service - PM 2009/2029**  
**(Signalized Intersection)**

Intersection	2009 PM Peak Hour			2029 PM Peak Hour		
	LOS		Delay (Sec)	LOS		Delay (Sec)
<b>Mass Ave @ Marrett Rd</b>	<b>A</b>		<b>7.7</b>	<b>A</b>		<b>7.8</b>
Eastbound Left	C	2		C	3	
Eastbound Right	A	0		A	0	
Northbound Left	A	2		A	3	
Northbound Thru	A	5		A	7	
Southbound Thru	B	13		B	15	
Southbound Right					1	
<b>Mass Ave @ Maple St</b>	<b>B</b>		<b>13.1</b>	<b>B</b>		<b>18.6</b>
Westbound Left	C	9		D	18	
Westbound Right	A	4		B	12	
Northbound Thru	B	12		B	12	
Northbound Right	A	4				
Southbound Left	A	3		A	5	
Southbound Thru	B	17		B	35	
<b>Mass Ave @ Pleasant St</b>	<b>B</b>		<b>14.9</b>	<b>B</b>		<b>18.0</b>
Eastbound Left	C	13		C	17	
Eastbound Right	A	2		A	3	
Northbound Left	B	3		B	3	
Northbound Thru	B	10		B	12	
Southbound Thru	C	14		C	19	
Southbound Right	A	1		A	1	
<b>Pleasant St @ Follen *</b>	<b>B</b>		<b>12.8</b>	<b>B</b>		<b>14.8</b>

\* Pleasant @ Follen is non-signalized in the future

As a result, calculations indicate the operation of the intersections will improve considerably during the AM and PM peak hour with the installation of new traffic signals given the 2009 volume conditions. The intersections will also operate at considerably better LOS given the 2029 volume conditions, however, the delay is slightly longer and the queue lengths are also slightly longer.



## CONCLUSIONS AND RECOMMENDATIONS

Based on the information and traffic volume collected and the analysis contained herein, the following improvements are recommended at the project intersections:

- Install fully actuated traffic signal systems with overhead signal mounting for each lane approach at each intersection.
- Reconfigure the lane arrangement at Mass Ave to include a Southbound Thru and Thru Right lanes.
- Restructure the lane arrangement on Mass Ave to supply a four lane cross section. This will allow for ease of stacking in the future and allow the heavy Mass Ave through volumes to move with less constriction. Reconstruct existing driveways to meet the new pavement edge. This will require the narrowing of the existing tree lawn by an average of 2 feet on each side of Mass Ave.
- Reconfigure the islands at Mass Ave @ Pleasant Street to supply more of a wide median. The existing round island will be utilized within the wide median configuration to greatest extent possible to save the existing vegetation. In addition, narrow the amount of pavement in this intersection and reconfigure the entrance of Pleasant Street @ Follen Road.

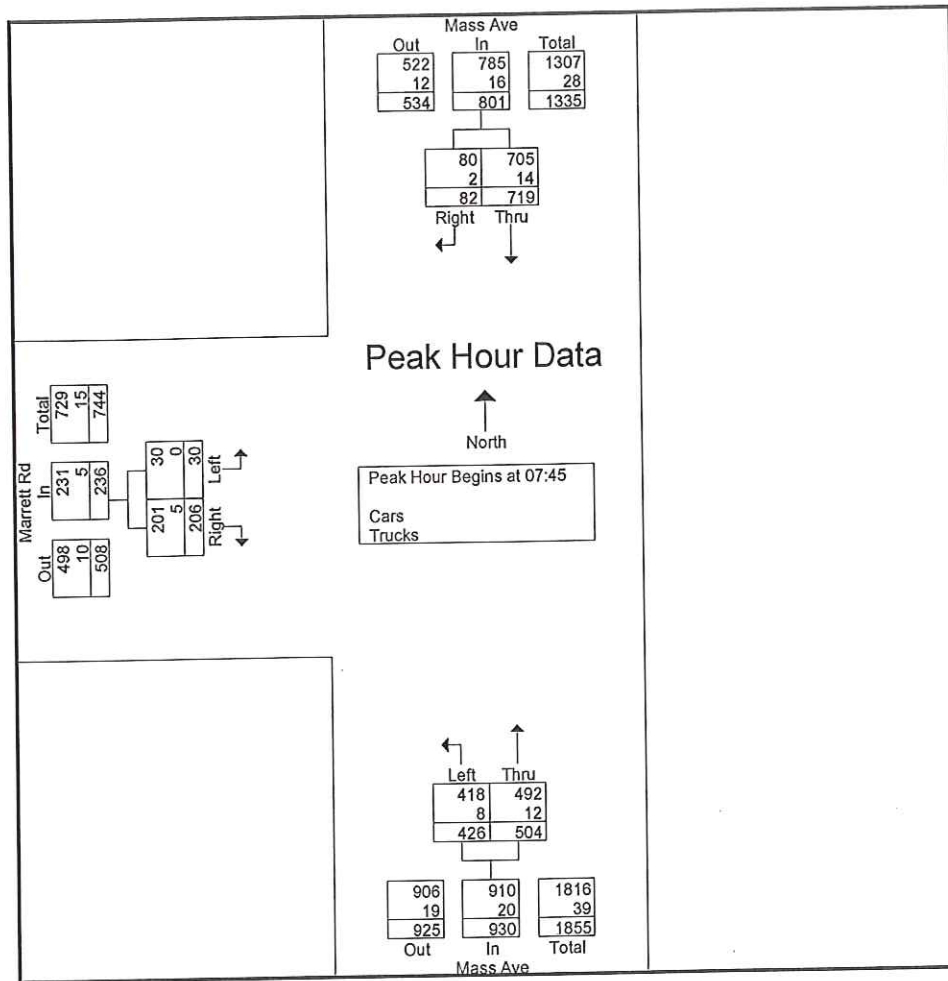
**APPENDIX A**

**TRAFFIC EVALUATION**

**SUPPORTING CALCULATIONS**

Accurate Counts  
978-664-2565

File Name : 07030002  
Site Code : 07030002  
Start Date : 3/31/2009  
Page No : 2



Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:30			08:00			08:00		
+0 mins.	158	15	173	100	113	213	10	55	65
+15 mins.	209	25	234	103	141	244	7	54	61
+30 mins.	179	16	195	105	115	220	8	47	55
+45 mins.	178	21	199	126	147	273	11	46	57
Total Volume	724	77	801	434	516	950	36	202	238
% App. Total	90.4	9.6		45.7	54.3		15.1	84.9	
PHF	.866	.770	.856	.861	.878	.870	.818	.918	.915
Cars	710	76	786	430	506	936	36	200	236
% Cars	98.1	98.7	98.1	99.1	98.1	98.5	100	99	99.2
Trucks	14	1	15	4	10	14	0	2	2
% Trucks	1.9	1.3	1.9	0.9	1.9	1.5	0	1	0.8

N/S Street : Massachusetts Avenue  
 W Street: Marrett Road  
 City/State : Lexington, MA  
 Weather : Clear

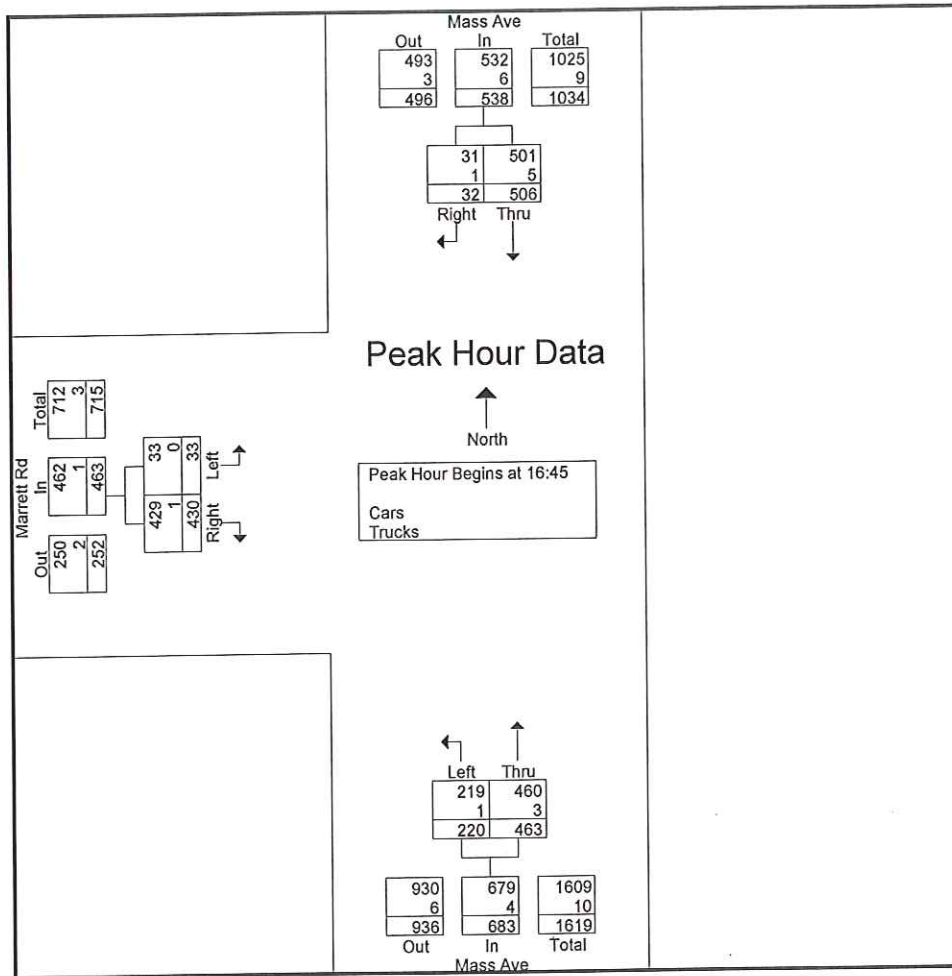
Accurate Counts  
 978-664-2565

File Name : 07030002  
 Site Code : 07030002  
 Start Date : 3/31/2009  
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Mass Ave From North			Mass Ave From South			Marrett Rd From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
07:00	101	4	0	75	64	0	5	33	0	0	282	282
07:15	126	8	0	100	86	0	4	38	1	1	362	363
07:30	158	15	0	127	90	0	3	50	0	0	443	443
07:45	209	25	0	118	135	0	5	50	0	0	542	542
Total	594	52	0	420	375	0	17	171	1	1	1629	1630
08:00	179	16	0	100	113	0	10	55	0	0	473	473
08:15	178	21	0	103	141	0	7	54	0	0	504	504
08:30	153	20	0	105	115	0	8	47	0	0	448	448
08:45	131	13	0	126	147	0	11	46	0	0	474	474
Total	641	70	0	434	516	0	36	202	0	0	1899	1899
Grand Total	1235	122	0	854	891	0	53	373	1	1	3528	3529
Apprch %	91	9		48.9	51.1		12.4	87.6				
Total %	35	3.5		24.2	25.3		1.5	10.6		0	100	
Cars	1206	119		839	868		52	363		0	0	3448
% Cars	97.7	97.5	0	98.2	97.4	0	98.1	97.3	100	0	0	97.7
Trucks	29	3		15	23		1	10		0	0	81
% Trucks	2.3	2.5	0	1.8	2.6	0	1.9	2.7	0	0	0	2.3

Start Time	Mass Ave From North			Mass Ave From South			Marrett Rd From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45										
07:45	209	25	234	118	135	253	5	50	55	542
08:00	179	16	195	100	113	213	10	55	65	473
08:15	178	21	199	103	141	244	7	54	61	504
08:30	153	20	173	105	115	220	8	47	55	448
Total Volume	719	82	801	426	504	930	30	206	236	1967
% App. Total	89.8	10.2		45.8	54.2		12.7	87.3		
PHF	.860	.820	.856	.903	.894	.919	.750	.936	.908	.907
Cars	705	80	785	418	492	910	30	201	231	1926
% Cars	98.1	97.6	98.0	98.1	97.6	97.8	100	97.6	97.9	97.9
Trucks	14	2	16	8	12	20	0	5	5	41
% Trucks	1.9	2.4	2.0	1.9	2.4	2.2	0	2.4	2.1	2.1



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

	17:00			16:00			17:00		
+0 mins.	129	9	138	48	111	159	6	108	114
+15 mins.	134	8	142	53	125	178	5	108	113
+30 mins.	124	6	130	67	116	183	12	126	138
+45 mins.	128	8	136	61	128	189	7	109	116
Total Volume	515	31	546	229	480	709	30	451	481
% App. Total	94.3	5.7		32.3	67.7		6.2	93.8	
PHF	.961	.861	.961	.854	.938	.938	.625	.895	.871
Cars	511	31	542	229	473	702	30	451	481
% Cars	99.2	100	99.3	100	98.5	99	100	100	100
Trucks	4	0	4	0	7	7	0	0	0
% Trucks	0.8	0	0.7	0	1.5	1	0	0	0

N/S Street : Massachusetts Avenue  
 E/W Street: Marrett Road  
 City/State : Lexington, MA  
 Weather : Clear

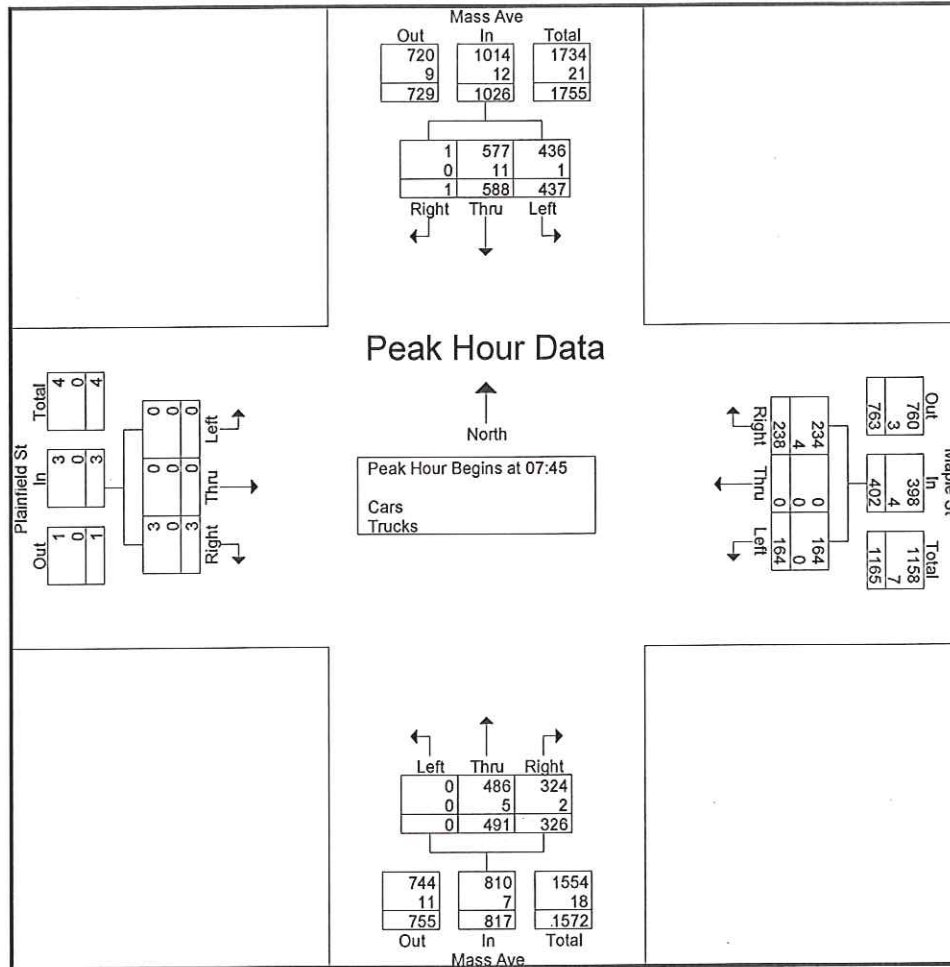
Accurate Counts  
 978-664-2565

File Name : 07030002  
 Site Code : 07030002  
 Start Date : 3/31/2009  
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Mass Ave From North			Mass Ave From South			Marrett Rd From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
16:00	115	12	0	48	111	0	12	66	0	0	364	364
16:15	126	7	0	53	125	0	12	87	0	0	410	410
16:30	115	5	0	67	116	0	10	98	0	0	411	411
16:45	119	9	0	61	128	0	10	88	0	0	415	415
Total	475	33	0	229	480	0	44	339	0	0	1600	1600
17:00	129	9	0	46	103	0	6	108	0	0	401	401
17:15	134	8	0	56	124	0	5	108	0	0	435	435
17:30	124	6	0	57	108	0	12	126	0	0	433	433
17:45	128	8	0	47	109	0	7	109	0	0	408	408
Total	515	31	0	206	444	0	30	451	0	0	1677	1677
Grand Total	990	64	0	435	924	0	74	790	0	0	3277	3277
Apprch %	93.9	6.1		32	68		8.6	91.4				
Total %	30.2	2		13.3	28.2		2.3	24.1		0	100	
Cars	983	63		434	913		74	789		0	0	3256
% Cars	99.3	98.4	0	99.8	98.8	0	100	99.9	0	0	0	99.4
Trucks	7	1		1	11		0	1		0	0	21
% Trucks	0.7	1.6	0	0.2	1.2	0	0	0.1	0	0	0	0.6

Start Time	Mass Ave From North			Mass Ave From South			Marrett Rd From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	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	119	9	128	61	128	189	10	88	98	415
17:00	129	9	138	46	103	149	6	108	114	401
17:15	134	8	142	56	124	180	5	108	113	435
17:30	124	6	130	57	108	165	12	126	138	433
Total Volume	506	32	538	220	463	683	33	430	463	1684
% App. Total	94.1	5.9		32.2	67.8		7.1	92.9		
PHF	.944	.889	.947	.902	.904	.903	.688	.853	.839	.968
Cars	501	31	532	219	460	679	33	429	462	1673
% Cars	99.0	96.9	98.9	99.5	99.4	99.4	100	99.8	99.8	99.3
Trucks	5	1	6	1	3	4	0	1	1	11
% Trucks	1.0	3.1	1.1	0.5	0.6	0.6	0	0.2	0.2	0.7



Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	08:00				07:00				07:45				07:30			
+0 mins.	104	147	0	251	53	0	53	106	0	130	76	206	1	0	0	1
+15 mins.	119	139	0	258	34	0	61	95	0	116	79	195	0	0	0	0
+30 mins.	127	157	1	285	36	0	69	105	0	137	85	222	0	0	1	1
+45 mins.	109	144	0	253	40	0	62	102	0	108	86	194	0	0	1	1
Total Volume	459	587	1	1047	163	0	245	408	0	491	326	817	1	0	2	3
% App. Total	43.8	56.1	0.1		40	0	60		0	60.1	39.9		33.3	0	66.7	
PHF	.904	.935	.250	.918	.769	.000	.888	.962	.000	.896	.948	.920	.250	.000	.500	.750
Cars	458	578	1	1037	161	0	241	402	0	486	324	810	1	0	2	3
% Cars	99.8	98.5	100	99	98.8	0	98.4	98.5	0	99	99.4	99.1	100	0	100	100
Trucks	1	9	0	10	2	0	4	6	0	5	2	7	0	0	0	0
% Trucks	0.2	1.5	0	1	1.2	0	1.6	1.5	0	1	0.6	0.9	0	0	0	0

N/S Street : Massachusetts Avenue  
 E/W Street: Plainfield Street / MAPLE  
 City/State : Lexington, MA  
 Weather : Clear

Accurate Counts  
 978-664-2565

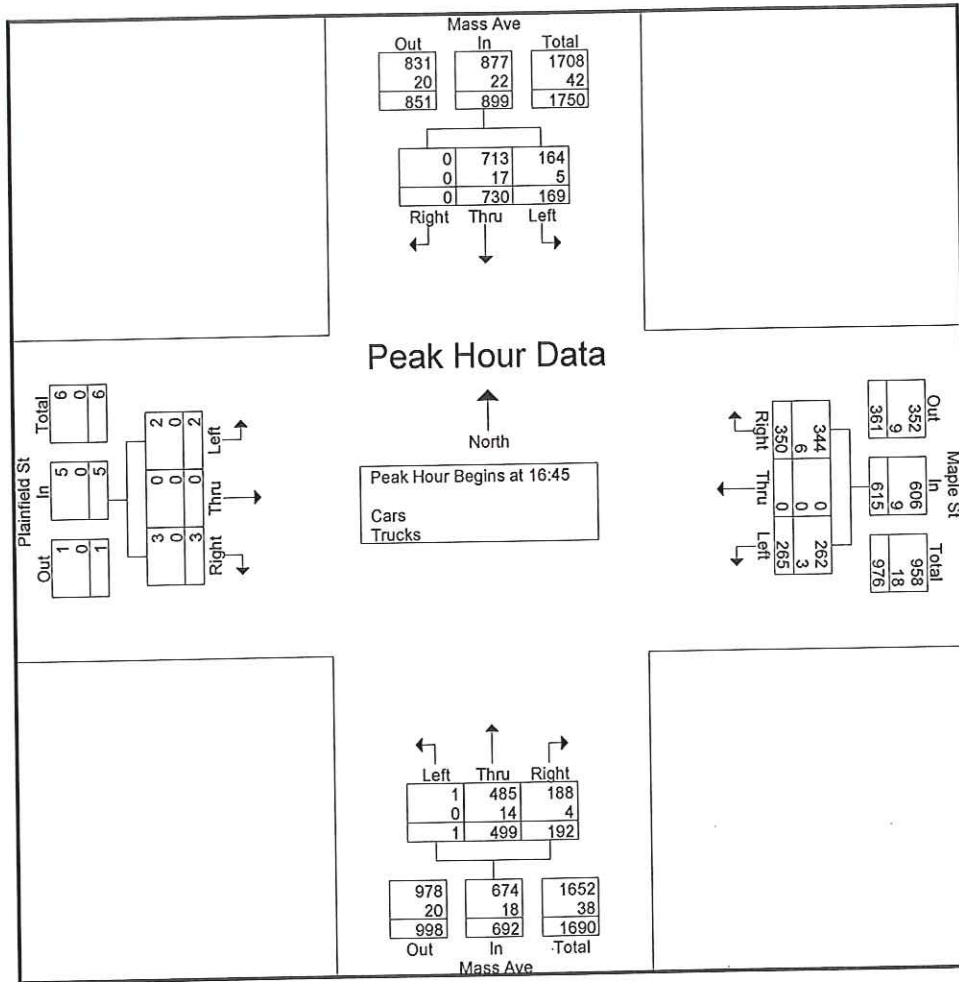
File Name : 07030003  
 Site Code : 07030003  
 Start Date : 3/31/2009  
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Mass Ave From North				Maple St From East				Mass Ave From South				Plainfield St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	77	115	0	0	53	0	53	1	0	122	73	0	1	0	0	3	4	494	498
07:15	101	126	0	0	34	0	61	1	0	129	75	0	0	0	0	0	1	526	527
07:30	95	125	2	0	36	0	69	0	1	113	72	0	1	0	0	0	0	514	514
07:45	87	145	0	0	40	0	62	1	0	130	76	0	0	0	0	0	1	540	541
Total	360	511	2	0	163	0	245	3	1	494	296	0	2	0	0	3	6	2074	2080
08:00	104	147	0	0	50	0	45	1	0	116	79	0	0	0	1	0	1	542	543
08:15	119	139	0	0	32	0	58	0	0	137	85	0	0	0	1	0	0	571	571
08:30	127	157	1	0	42	0	73	0	0	108	86	0	0	0	1	0	0	595	595
08:45	109	144	0	0	42	0	65	0	3	106	67	3	0	0	0	0	3	536	539
Total	459	587	1	0	166	0	241	1	3	467	317	3	0	0	3	0	4	2244	2248
Grand Total	819	1098	3	0	329	0	486	4	4	961	613	3	2	0	3	3	10	4318	4328
Apprch %	42.7	57.2	0.2		40.4	0	59.6		0.3	60.9	38.8		40	0	60				
Total %	19	25.4	0.1		7.6	0	11.3		0.1	22.3	14.2		0	0	0.1		0.2	99.8	
Cars	814	1079	3		326	0	481		4	944	607		2	0	3		0	0	4273
% Cars	99.4	98.3	100	0	99.1	0	99	100	100	98.2	99	100	100	0	100	100	0	0	98.7
Trucks	5	19	0		3	0	5		0	17	6		0	0	0		0	0	55
% Trucks	0.6	1.7	0	0	0.9	0	1	0	0	1.8	1	0	0	0	0	0	0	0	1.3

Start Time	Mass Ave From North				Maple St From East				Mass Ave From South				Plainfield 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 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45																	
07:45	87	145	0	232	40	0	62	102	0	130	76	206	0	0	0	0	540
08:00	104	147	0	251	50	0	45	95	0	116	79	195	0	0	1	1	542
08:15	119	139	0	258	32	0	58	90	0	137	85	222	0	0	1	1	571
08:30	127	157	1	285	42	0	73	115	0	108	86	194	0	0	1	1	595
Total Volume	437	588	1	1026	164	0	238	402	0	491	326	817	0	0	3	3	2248
% App. Total	42.6	57.3	0.1		40.8	0	59.2		0	60.1	39.9		0	0	100		
PHF	.860	.936	.250	.900	.820	.000	.815	.874	.000	.896	.948	.920	.000	.000	.750	.750	.945
Cars	436	577	1	1014	164	0	234	398	0	486	324	810	0	0	3	3	2225
% Cars	99.8	98.1	100	98.8	100	0	98.3	99.0	0	99.0	99.4	99.1	0	0	100	100	99.0
Trucks	1	11	0	12	0	0	4	4	0	5	2	7	0	0	0	0	23
% Trucks	0.2	1.9	0	1.2	0	0	1.7	1.0	0	1.0	0.6	0.9	0	0	0	0	1.0





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

	16:45				17:00				17:00				16:45			
+0 mins.	47	210	0	257	68	0	74	142	1	95	57	153	0	0	1	1
+15 mins.	40	180	0	220	66	0	86	152	0	146	50	196	1	0	0	1
+30 mins.	51	173	0	224	64	0	96	160	0	120	49	169	1	0	1	2
+45 mins.	31	167	0	198	64	0	132	196	1	129	49	179	0	0	1	1
Total Volume	169	730	0	899	262	0	388	650	2	490	205	697	2	0	3	5
% App. Total	18.8	81.2	0		40.3	0	59.7		0.3	70.3	29.4		40	0	60	
PHF	.828	.869	.000	.875	.963	.000	.735	.829	.500	.839	.899	.889	.500	.000	.750	.625
Cars	164	713	0	877	259	0	384	643	2	480	201	683	2	0	3	5
% Cars	97	97.7	0	97.6	98.9	0	99	98.9	100	98	98	98	100	0	100	100
Trucks	5	17	0	22	3	0	4	7	0	10	4	14	0	0	0	0
% Trucks	3	2.3	0	2.4	1.1	0	1	1.1	0	2	2	2	0	0	0	0

N/S Street : Massachusetts Avenue  
 E/W Street: Plainfield Street/MAPLE  
 City/State : Lexington, MA  
 Weather : Clear

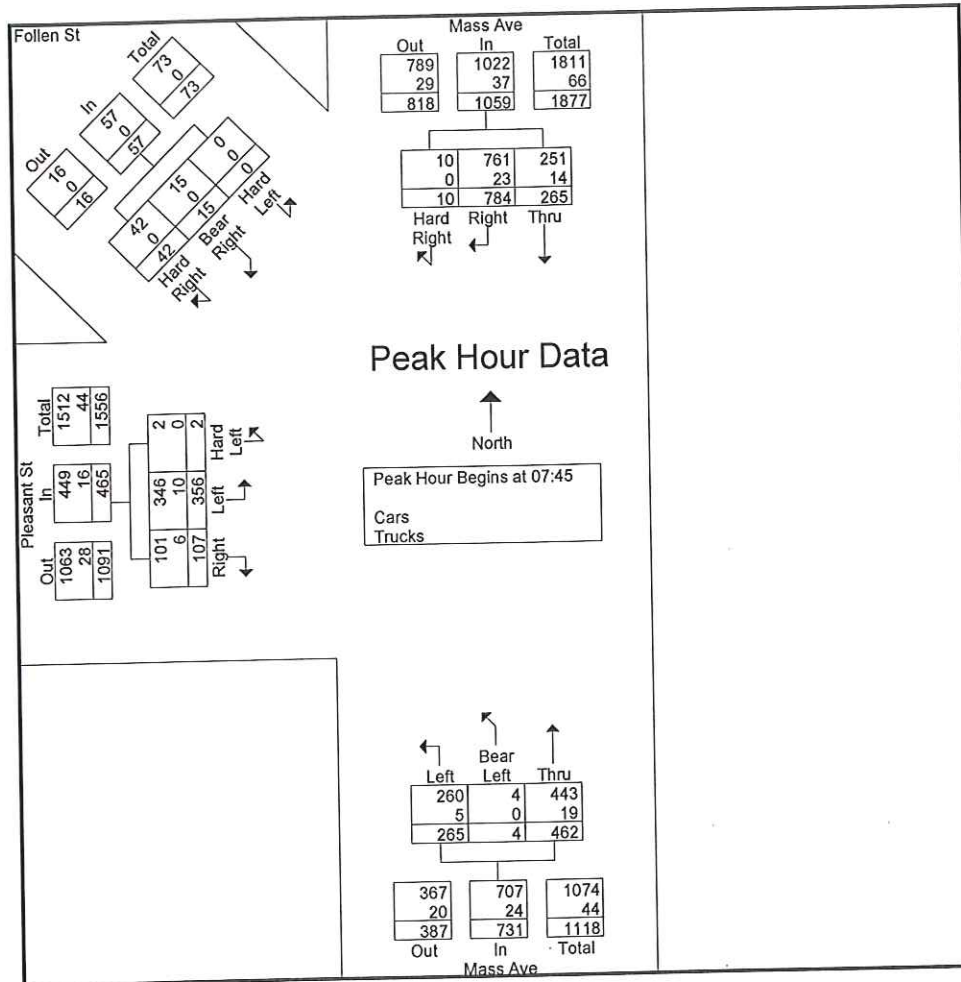
Accurate Counts  
 978-664-2565

File Name : 07030003  
 Site Code : 07030003  
 Start Date : 3/31/2009  
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Mass Ave From North				Maple St From East				Mass Ave From South				Plainfield St From West				Exclu. Total	Inclu. Total	Int. Total	
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds				
16:00	28	110	0	0	79	0	65	0	0	64	22	0	0	0	0	0	0	0	368	368
16:15	32	120	0	0	76	0	85	0	0	81	32	0	0	0	0	0	0	0	426	426
16:30	49	146	0	0	71	0	101	0	0	95	45	0	0	0	0	0	0	0	507	507
16:45	47	210	0	0	67	0	94	0	0	138	36	0	0	0	1	0	0	0	593	593
Total	156	586	0	0	293	0	345	0	0	378	135	0	0	0	1	0	0	0	1894	1894
17:00	40	180	0	0	68	0	74	0	1	95	57	0	1	0	0	0	0	0	516	516
17:15	51	173	0	0	66	0	86	0	0	146	50	2	1	0	1	0	0	2	574	576
17:30	31	167	0	0	64	0	96	0	0	120	49	1	0	0	1	0	0	1	528	529
17:45	40	146	0	0	64	0	132	0	1	129	49	0	0	0	0	0	0	0	561	561
Total	162	666	0	0	262	0	388	0	2	490	205	3	2	0	2	0	0	3	2179	2182
Grand Total	318	1252	0	0	555	0	733	0	2	868	340	3	2	0	3	0	0	3	4073	4076
Apprch %	20.3	79.7	0	0	43.1	0	56.9	0	0.2	71.7	28.1	0	40	0	60	0	0	0	99.9	99.9
Total %	7.8	30.7	0	0	13.6	0	18	0	0	21.3	8.3	0	0	0	0.1	0	0	0.1	99.9	99.9
Cars	308	1221	0	0	550	0	721	0	2	840	333	3	2	0	3	0	0	0	3983	3983
% Cars	96.9	97.5	0	0	99.1	0	98.4	0	100	96.8	97.9	100	100	0	100	0	0	0	97.7	97.7
Trucks	10	31	0	0	5	0	12	0	0	28	7	0	0	0	0	0	0	0	93	93
% Trucks	3.1	2.5	0	0	0.9	0	1.6	0	0	3.2	2.1	0	0	0	0	0	0	0	2.3	2.3

Start Time	Mass Ave From North				Maple St From East				Mass Ave From South				Plainfield 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	47	210	0	257	67	0	94	161	0	138	36	174	0	0	1	1	593
17:00	40	180	0	220	68	0	74	142	1	95	57	153	1	0	0	1	516
17:15	51	173	0	224	66	0	86	152	0	146	50	196	1	0	1	2	574
17:30	31	167	0	198	64	0	96	160	0	120	49	169	0	0	1	1	528
Total Volume	169	730	0	899	265	0	350	615	1	499	192	692	2	0	3	5	2211
% App. Total	18.8	81.2	0		43.1	0	56.9		0.1	72.1	27.7		40	0	60		
PHF	.828	.869	.000	.875	.974	.000	.911	.955	.250	.854	.842	.883	.500	.000	.750	.625	.932
Cars	164	713	0	877	262	0	344	606	1	485	188	674	2	0	3	5	2162
% Cars	97.0	97.7	0	97.6	98.9	0	98.3	98.5	100	97.2	97.9	97.4	100	0	100	100	97.8
Trucks	5	17	0	22	3	0	6	9	0	14	4	18	0	0	0	0	49
% Trucks	3.0	2.3	0	2.4	1.1	0	1.7	1.5	0	2.8	2.1	2.6	0	0	0	0	2.2



Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:45				07:45				08:00				08:00			
+0 mins.	58	207	3	268	69	2	119	190	0	83	24	107	0	5	11	16
+15 mins.	48	213	3	264	63	1	133	197	1	88	18	107	0	3	8	11
+30 mins.	82	181	3	266	57	1	115	173	1	93	40	134	0	5	10	15
+45 mins.	77	183	1	261	76	0	95	171	2	100	28	130	0	5	12	17
Total Volume	265	784	10	1059	265	4	462	731	4	364	110	478	0	18	41	59
% App. Total	25	74	0.9	36.3	0.5	63.2	0.8	76.2	23	500	910	892	0.000	900	854	868
PHF	.808	.920	.833	.988	.872	.500	.868	.928	.500	.910	.688	.892	.000	.900	.854	.868
Cars	251	761	10	1022	260	4	443	707	4	351	104	459	0	18	41	59
% Cars	94.7	97.1	100	96.5	98.1	100	95.9	96.7	100	96.4	94.5	96	0	100	100	100
Trucks	14	23	0	37	5	0	19	24	0	13	6	19	0	0	0	0
% Trucks	5.3	2.9	0	3.5	1.9	0	4.1	3.3	0	3.6	5.5	4	0	0	0	0

N/S Street : Massachusetts Avenue  
 E/W Street : Pleasant Street  
 City/State : Lexington, MA  
 Weather : Clear

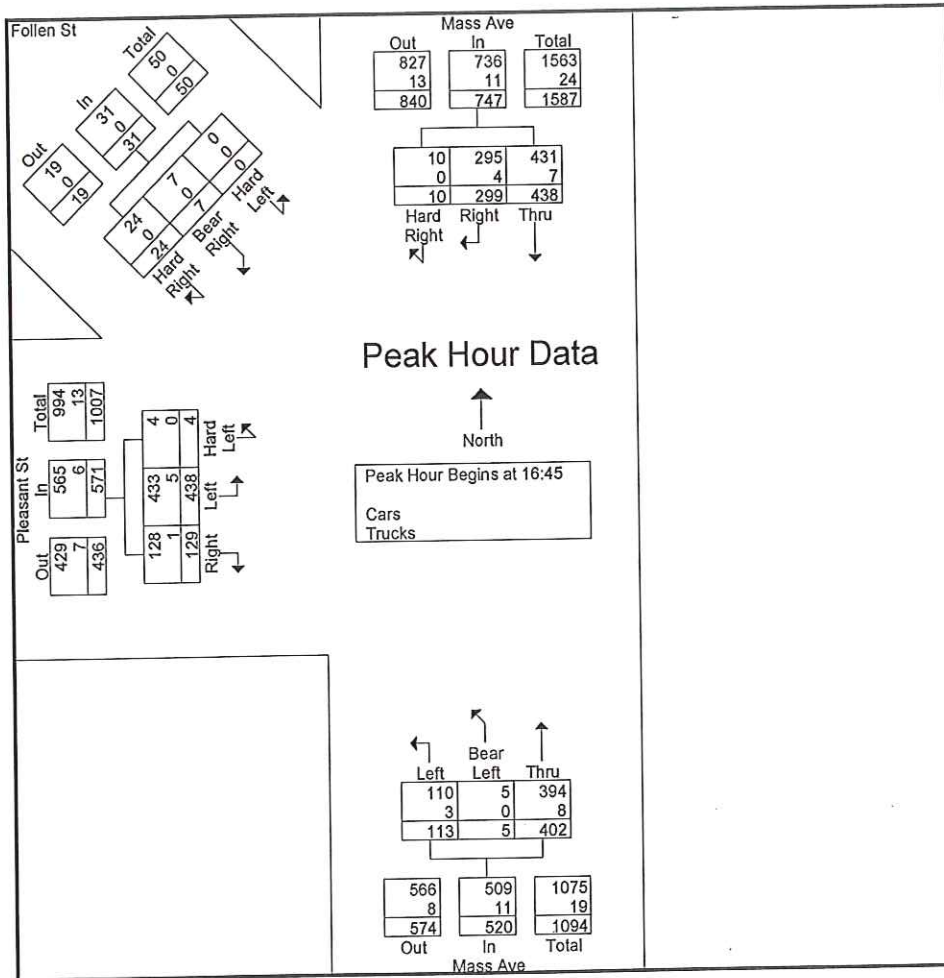
Accurate Counts  
 978-664-2565

File Name : 07030001  
 Site Code : 07030001  
 Start Date : 3/31/2009  
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Mass Ave From North				Mass Ave From South				Pleasant St From West				Follen St From Northwest				Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Hard Right	Peds	Left	Bear Left	Thru	Peds	Hard Left	Left	Right	Peds	Hard Left	Bear Right	Hard Right	Peds			
07:00	33	151	2	0	20	1	64	1	3	37	10	0	0	2	6	0	1	329	330
07:15	37	164	1	0	41	0	64	0	1	55	29	1	0	2	8	2	3	402	405
07:30	47	189	5	0	59	3	84	0	0	73	23	0	0	2	9	0	0	494	494
07:45	58	207	3	0	69	2	119	0	0	92	25	0	0	2	13	1	1	590	591
Total	175	711	11	0	189	6	331	1	4	257	87	1	0	8	36	3	5	1815	1820
08:00	48	213	3	0	63	1	133	0	0	83	24	0	0	5	11	1	1	584	585
08:15	82	181	3	0	57	1	115	0	1	88	18	0	0	3	8	0	0	557	557
08:30	77	183	1	0	76	0	95	0	1	93	40	0	0	5	10	0	0	581	581
08:45	68	148	1	1	44	0	103	0	2	100	28	0	0	5	12	2	3	511	514
Total	275	725	8	1	240	2	446	0	4	364	110	0	0	18	41	3	4	2233	2237
Grand Total	450	1436	19	1	429	8	777	1	8	621	197	1	0	26	77	6	9	4048	4057
Apprch %	23.6	75.4	1		35.3	0.7	64		1	75.2	23.8		0	25.2	74.8				
Total %	11.1	35.5	0.5		10.6	0.2	19.2		0.2	15.3	4.9		0	0.6	1.9		0.2	99.8	
Cars	423	1401	19		418	8	742		8	600	187		0	26	77		0	0	3918
% Cars	94	97.6	100	100	97.4	100	95.5	100	100	96.6	94.9	100	0	100	100	100	0	0	96.6
Trucks	27	35	0		11	0	35		0	21	10		0	0	0		0	0	139
% Trucks	6	2.4	0	0	2.6	0	4.5	0	0	3.4	5.1	0	0	0	0	0	0	0	3.4

Start Time	Mass Ave From North				Mass Ave From South				Pleasant St From West				Follen St From Northwest				Int. Total
	Thru	Right	Hard Right	App. Total	Left	Bear Left	Thru	App. Total	Hard Left	Left	Right	App. Total	Hard Left	Bear Right	Hard Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45																	
07:45	58	207	3	268	69	2	119	190	0	92	25	117	0	2	13	15	590
08:00	48	213	3	264	63	1	133	197	0	83	24	107	0	5	11	16	584
08:15	82	181	3	266	57	1	115	173	1	88	18	107	0	3	8	11	557
08:30	77	183	1	261	76	0	95	171	1	93	40	134	0	5	10	15	581
Total Volume	265	784	10	1059	265	4	462	731	2	356	107	465	0	15	42	57	2312
% App. Total	25	74	0.9		36.3	0.5	63.2		0.4	76.6	23		0	26.3	73.7		
PHF	.808	.920	.833	.988	.872	.500	.868	.928	.500	.957	.669	.868	.000	.750	.808	.891	.980
Cars	251	761	10	1022	260	4	443	707	2	346	101	449	0	15	42	57	2235
% Cars	94.7	97.1	100	96.5	98.1	100	95.9	96.7	100	97.2	94.4	96.6	0	100	100	100	96.7
Trucks	14	23	0	37	5	0	19	24	0	10	6	16	0	0	0	0	77
% Trucks	5.3	2.9	0	3.5	1.9	0	4.1	3.3	0	2.8	5.6	3.4	0	0	0	0	3.3



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

	16:45				16:15				16:45				16:30			
+0 mins.	116	64	2	182	42	1	105	148	0	107	36	143	0	6	4	10
+15 mins.	97	90	3	190	26	3	87	116	2	118	19	139	0	1	5	6
+30 mins.	106	73	3	182	29	1	118	148	0	111	37	148	0	0	10	10
+45 mins.	119	72	2	193	33	1	95	129	2	102	37	141	0	3	6	9
Total Volume	438	299	10	747	130	6	405	541	4	438	129	571	0	10	25	35
% App. Total	58.6	40	1.3		24	1.1	74.9		0.7	76.7	22.6		0	28.6	71.4	
PHF	.920	.831	.833	.968	.774	.500	.858	.914	.500	.928	.872	.965	.000	.417	.625	.875
Cars	431	295	10	736	128	6	388	522	4	433	128	565	0	10	25	35
% Cars	98.4	98.7	100	98.5	98.5	100	95.8	96.5	100	98.9	99.2	98.9	0	100	100	100
Trucks	7	4	0	11	2	0	17	19	0	5	1	6	0	0	0	0
% Trucks	1.6	1.3	0	1.5	1.5	0	4.2	3.5	0	1.1	0.8	1.1	0	0	0	0

N/S Street : Massachusetts Avenue  
 E/W Street : Pleasant Street  
 City/State : Lexington, MA  
 Weather : Clear

Accurate Counts  
 978-664-2565

File Name : 07030001  
 Site Code : 07030001  
 Start Date : 3/31/2009  
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Mass Ave From North				Mass Ave From South				Pleasant St From West				Follen St From Northwest				Excls. Total	Inclu. Total	Int. Total
	Thru	Right	Hard Right	Peds	Left	Bear Left	Thru	Peds	Hard Left	Left	Right	Peds	Hard Left	Bear Right	Hard Right	Peds			
16:00	78	70	2	3	31	2	77	0	1	94	40	0	0	2	5	4	7	402	409
16:15	79	69	4	1	42	1	105	0	1	92	33	1	0	4	1	2	4	431	435
16:30	91	73	4	0	26	3	87	0	1	98	29	0	0	6	4	1	1	422	423
16:45	116	64	2	1	29	1	118	0	0	107	36	0	0	1	5	1	2	479	481
Total	364	276	12	5	128	7	387	0	3	391	138	1	0	13	15	8	14	1734	1748
17:00	97	90	3	0	33	1	95	1	2	118	19	0	0	0	10	1	2	468	470
17:15	106	73	3	0	26	2	100	0	0	111	37	0	0	3	6	2	2	467	469
17:30	119	72	2	0	25	1	89	0	2	102	37	0	0	3	3	0	0	455	455
17:45	104	71	2	1	31	0	89	0	1	78	35	0	0	1	5	0	1	417	418
Total	426	306	10	1	115	4	373	1	5	409	128	0	0	7	24	3	5	1807	1812
Grand Total	790	582	22	6	243	11	760	1	8	800	266	1	0	20	39	11	19	3541	3560
Approch %	56.7	41.8	1.6		24	1.1	75		0.7	74.5	24.8		0	33.9	66.1				
Total %	22.3	16.4	0.6		6.9	0.3	21.5		0.2	22.6	7.5		0	0.6	1.1		0.5	99.5	
Cars	778	571	22		238	11	739		8	790	261		0	20	39		0	0	3496
% Cars	98.5	98.1	100	100	97.9	100	97.2	100	100	98.8	98.1	100	0	100	100	100	0	0	98.2
Trucks	12	11	0		5	0	21		0	10	5		0	0	0		0	0	64
% Trucks	1.5	1.9	0	0	2.1	0	2.8	0	0	1.2	1.9	0	0	0	0	0	0	0	1.8

Start Time	Mass Ave From North				Mass Ave From South				Pleasant St From West				Follen St From Northwest				Int. Total
	Thru	Right	Hard Right	App. Total	Left	Bear Left	Thru	App. Total	Hard Left	Left	Right	App. Total	Hard Left	Bear Right	Hard 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	116	64	2	182	29	1	118	148	0	107	36	143	0	1	5	6	479
17:00	97	90	3	190	33	1	95	129	2	118	19	139	0	0	10	10	468
17:15	106	73	3	182	26	2	100	128	0	111	37	148	0	3	6	9	467
17:30	119	72	2	193	25	1	89	115	2	102	37	141	0	3	3	6	455
Total Volume	438	299	10	747	113	5	402	520	4	438	129	571	0	7	24	31	1869
% App. Total	58.6	40	1.3		21.7	1	77.3		0.7	76.7	22.6		0	22.6	77.4		
PHF	.920	.831	.833	.968	.856	.625	.852	.878	.500	.928	.872	.965	.000	.583	.600	.775	.975
Cars	431	295	10	736	110	5	394	509	4	433	128	565	0	7	24	31	1841
% Cars	98.4	98.7	100	98.5	97.3	100	98.0	97.9	100	98.9	99.2	98.9	0	100	100	100	98.5
Trucks	7	4	0	11	3	0	8	11	0	5	1	6	0	0	0	0	28
% Trucks	1.6	1.3	0	1.5	2.7	0	2.0	2.1	0	1.1	0.8	1.1	0	0	0	0	1.5

Accurate Counts  
978-664-2565

Location : Massachusetts Avenue North  
Location : of Marrett Road  
City/State: Lexington, MA  
Counter : 15841

070300V1  
Site Code: 07030001

Start Time	31-Mar-09 Tue	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		5	94			2	124				
12:15		8	101			5	103				
12:30		3	113			3	107				
12:45		3	127	19	435	4	87	14	421	33	856
01:00		1	136			3	88				
01:15		4	108			3	99				
01:30		3	88			2	99				
01:45		0	121	8	453	1	90	9	376	17	829
02:00		1	85			4	119				
02:15		0	106			3	91				
02:30		2	120			1	128				
02:45		1	121	4	432	2	133	10	471	14	903
03:00		0	134			0	160				
03:15		2	121			1	147				
03:30		4	144			1	129				
03:45		2	137	8	536	1	111	3	547	11	1083
04:00		2	135			3	118				
04:15		1	133			2	127				
04:30		5	132			1	128				
04:45		7	124	15	524	2	123	8	496	23	1020
05:00		5	123			5	132				
05:15		6	111			8	138				
05:30		12	136			7	140				
05:45		14	107	37	477	13	148	33	558	70	1035
06:00		13	133			20	142				
06:15		24	122			28	158				
06:30		28	134			52	106				
06:45		41	110	106	499	74	114	174	520	280	1019
07:00		71	92			96	98				
07:15		88	91			122	91				
07:30		85	81			159	108				
07:45		119	75	363	339	203	77	580	374	943	713
08:00		128	63			204	78				
08:15		119	57			180	76				
08:30		126	63			173	55				
08:45		162	39	535	222	155	71	712	280	1247	502
09:00		151	49			126	67				
09:15		117	50			125	79				
09:30		126	52			105	53				
09:45		95	50	489	201	106	52	462	251	951	452
10:00		109	19			99	43				
10:15		103	16			78	21				
10:30		101	23			81	19				
10:45		88	18	401	76	96	22	354	105	755	181
11:00		106	15			94	15				
11:15		77	12			105	12				
11:30		100	11			91	14				
11:45		120	9	403	47	111	3	401	44	804	91
Total		2388	4241			2760	4443			5148	8684
Percent		36.0%	64.0%			38.3%	61.7%			37.2%	62.8%
Grand Total		2388	4241			2760	4443			5148	8684
Grand Percent		36.0%	64.0%			38.3%	61.7%			37.2%	62.8%

ADT ADT 13,832 AADT 13,832

**Accurate Counts**  
978-664-2565

Location : Massachusetts Avenue South  
Location : of Marrett Road  
City/State: Lexington, MA  
Counter : 16193

070300V4  
Site Code: 07030004

Start Time	31-Mar-09 Tue	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		6	107			7	158				
12:15		7	139			6	151				
12:30		4	143			4	129				
12:45		2	142	19	531	7	122	24	560	43	1091
01:00		4	137			2	142				
01:15		3	137			4	119				
01:30		3	114			1	132				
01:45		0	126	10	514	2	131	9	524	19	1038
02:00		1	116			5	141				
02:15		0	162			3	134				
02:30		3	144			2	184				
02:45		1	165	5	587	3	192	13	651	18	1238
03:00		2	150			0	220				
03:15		3	159			2	189				
03:30		6	190			2	156				
03:45		2	146	13	645	4	186	8	751	21	1396
04:00		1	151			3	175				
04:15		8	174			2	210				
04:30		5	162			1	201				
04:45		12	171	26	658	3	199	9	785	35	1443
05:00		9	133			12	240				
05:15		12	181			9	235				
05:30		17	149			12	252				
05:45		26	151	64	614	19	233	52	960	116	1574
06:00		39	162			38	245				
06:15		46	156			54	187				
06:30		71	138			61	179				
06:45		102	132	258	588	108	156	261	767	519	1355
07:00		155	109			140	137				
07:15		180	108			159	139				
07:30		178	92			177	115				
07:45		167	88	680	397	160	104	636	495	1316	892
08:00		181	61			185	100				
08:15		184	67			172	89				
08:30		208	76			176	93				
08:45		253	56	826	260	148	69	681	351	1507	611
09:00		180	56			156	105				
09:15		173	58			135	90				
09:30		133	56			124	65				
09:45		137	36	623	206	111	65	526	325	1149	531
10:00		131	34			137	41				
10:15		156	27			116	31				
10:30		131	29			124	30				
10:45		140	23	558	113	124	28	501	130	1059	243
11:00		104	21			105	23				
11:15		117	14			163	16				
11:30		163	9			135	16				
11:45		138	11	522	55	163	6	566	61	1088	116
Total		3604	5168			3286	6360			6890	11528
Percent		41.1%	58.9%			34.1%	65.9%			37.4%	62.6%
Grand Total		3604	5168			3286	6360			6890	11528
Percent		41.1%	58.9%			34.1%	65.9%			37.4%	62.6%

ADT                      ADT 18,418                      AADT 18,418



Accurate Counts  
978-664-2565

Location : Marrett Road West of  
Location : Massachusetts Avenue  
City/State: Lexington, MA  
Counter : 15971

070300V3  
Site Code: 07030003

Start Time	31-Mar-09 Tue	EB		Hour Totals		NB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		5	70			1	45				
12:15		2	60			1	53				
12:30		3	60			2	42				
12:45		2	54	12	244	0	35	4	175	16	419
01:00		1	63			2	44				
01:15		2	46			0	52				
01:30		1	57			2	41				
01:45		1	46	5	212	0	42	4	179	9	391
02:00		0	54			0	35				
02:15		0	59			0	62				
02:30		1	78			0	64				
02:45		2	87	3	278	1	78	1	239	4	517
03:00		0	106			1	66				
03:15		0	85			0	74				
03:30		2	78			2	69				
03:45		2	97	4	366	0	70	3	279	7	645
04:00		0	85			0	57				
04:15		0	114			3	67				
04:30		0	96			0	62				
04:45		1	100	1	395	4	79	7	265	8	660
05:00		4	123			2	46				
05:15		1	129			6	66				
05:30		2	128			3	53				
05:45		5	120	12	500	13	50	24	215	36	715
06:00		12	117			21	63				
06:15		13	86			23	49				
06:30		11	70			37	48				
06:45		29	66	65	339	58	39	139	199	204	538
07:00		48	50			84	35				
07:15		42	57			119	39				
07:30		51	35			139	20				
07:45		53	33	194	175	137	37	479	131	673	306
08:00		66	37			117	21				
08:15		62	36			115	18				
08:30		60	30			136	23				
08:45		58	22	246	125	122	18	490	80	736	205
09:00		59	28			84	18				
09:15		45	29			82	13				
09:30		43	22			54	14				
09:45		32	19	179	98	51	7	271	52	450	150
10:00		54	11			56	14				
10:15		51	10			64	12				
10:30		49	12			58	10				
10:45		47	12	201	45	49	6	227	42	428	87
11:00		48	7			39	6				
11:15		66	7			47	6				
11:30		54	8			56	3				
11:45		54	3	222	25	48	4	190	19	412	44
Total		1144	2802			1839	1875			2983	4677
Percent		29.0%	71.0%			49.5%	50.5%			38.9%	61.1%
Grand Total		1144	2802			1839	1875			2983	4677
Percent		29.0%	71.0%			49.5%	50.5%			38.9%	61.1%

ADT

ADT 7,660

AADT 7,660

**Accurate Counts**  
978-664-2565

Location : Massachusetts Avenue South  
Location : of Pleasant Street  
City/State: Lexington, MA  
Counter : 16429

070300V2  
Site Code: 07030002

Start Time	31-Mar-09 Tue	SB		Hour Totals		NB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		10	114			3	86				
12:15		3	97			5	109				
12:30		4	96			3	82				
12:45		5	100	22	407	1	103	12	380	34	787
01:00		1	100			0	104				
01:15		1	91			1	109				
01:30		1	105			2	94				
01:45		2	86	5	382	0	89	3	396	8	778
02:00		5	104			2	92				
02:15		3	103			0	115				
02:30		2	110			2	114				
02:45		3	113	13	430	1	117	5	438	18	868
03:00		0	109			1	121				
03:15		2	115			2	119				
03:30		3	109			5	115				
03:45		3	127	8	460	4	110	12	465	20	925
04:00		1	120			1	109				
04:15		1	110			6	131				
04:30		4	112			7	110				
04:45		6	138	12	480	11	122	25	472	37	952
05:00		10	121			6	111				
05:15		6	135			8	112				
05:30		13	153			15	102				
05:45		13	128	42	537	19	120	48	445	90	982
06:00		16	135			27	122				
06:15		23	117			33	96				
06:30		30	103			44	99				
06:45		57	94	126	449	67	88	171	405	297	854
07:00		45	94			81	71				
07:15		63	94			104	91				
07:30		72	84			137	74				
07:45		78	77	258	349	174	74	496	310	754	659
08:00		77	66			184	51				
08:15		94	65			173	46				
08:30		106	61			152	50				
08:45		92	57	369	249	136	47	645	194	1014	443
09:00		75	60			124	41				
09:15		106	72			118	34				
09:30		82	51			112	41				
09:45		83	40	346	223	94	24	448	140	794	363
10:00		96	31			95	25				
10:15		83	20			93	15				
10:30		93	19			103	25				
10:45		88	19	360	89	102	12	393	77	753	166
11:00		95	12			84	10				
11:15		95	10			102	8				
11:30		105	13			93	7				
11:45		101	8	396	43	123	5	402	30	798	73
Total		1957	4098			2660	3752			4617	7850
Percent		32.3%	67.7%			41.5%	58.5%			37.0%	63.0%
Grand Total		1957	4098			2660	3752			4617	7850
Percent		32.3%	67.7%			41.5%	58.5%			37.0%	63.0%

ADT                      ADT 12,467                      AADT 12,467

Accurate Counts  
978-664-2565

Location : Maple Street East of  
Location : Massachusetts Avenue  
City/State: Lexington, MA  
Counter : 18142

070300V5  
Site Code: 07030005

Start Time	31-Mar-09 Tue	WB		Hour Totals		EB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		3	70			5	74				
12:15		3	87			5	104				
12:30		2	76			1	73				
12:45		4	87	12	320	3	68	14	319	26	639
01:00		2	66			3	79				
01:15		2	60			4	74				
01:30		1	71			1	77				
01:45		0	95	5	292	1	91	9	321	14	613
02:00		0	58			2	84				
02:15		0	88			0	91				
02:30		0	91			2	109				
02:45		1	133	1	370	1	114	5	398	6	768
03:00		2	117			2	151				
03:15		1	99			0	130				
03:30		2	133			1	146				
03:45		0	101	5	450	1	159	4	586	9	1036
04:00		2	96			2	139				
04:15		1	98			1	171				
04:30		1	99			0	153				
04:45		5	113	9	406	5	168	8	631	17	1037
05:00		5	87			2	186				
05:15		11	102			1	202				
05:30		15	107			12	194				
05:45		30	93	61	389	8	181	23	763	84	1152
06:00		31	98			16	182				
06:15		46	75			26	142				
06:30		80	90			25	119				
06:45		117	67	274	330	33	110	100	553	374	883
07:00		140	74			54	96				
07:15		178	64			68	94				
07:30		200	45			83	109				
07:45		166	52	684	235	49	71	254	370	938	605
08:00		132	52			83	71				
08:15		154	29			102	64				
08:30		177	29			77	54				
08:45		180	35	643	145	91	41	353	230	996	375
09:00		143	31			98	57				
09:15		130	32			59	53				
09:30		87	28			69	40				
09:45		89	18	449	109	64	44	290	194	739	303
10:00		89	27			68	32				
10:15		84	14			70	27				
10:30		82	15			63	27				
10:45		69	11	324	67	69	28	270	114	594	181
11:00		76	12			66	19				
11:15		73	8			77	17				
11:30		76	6			74	4				
11:45		81	12	306	38	85	15	302	55	608	93
Total		2773	3151			1632	4534			4405	7685
Percent		46.8%	53.2%			26.5%	73.5%			36.4%	63.6%
Grand Total		2773	3151			1632	4534			4405	7685
Percent		46.8%	53.2%			26.5%	73.5%			36.4%	63.6%

ADT

ADT 12,131

AADT 12,131

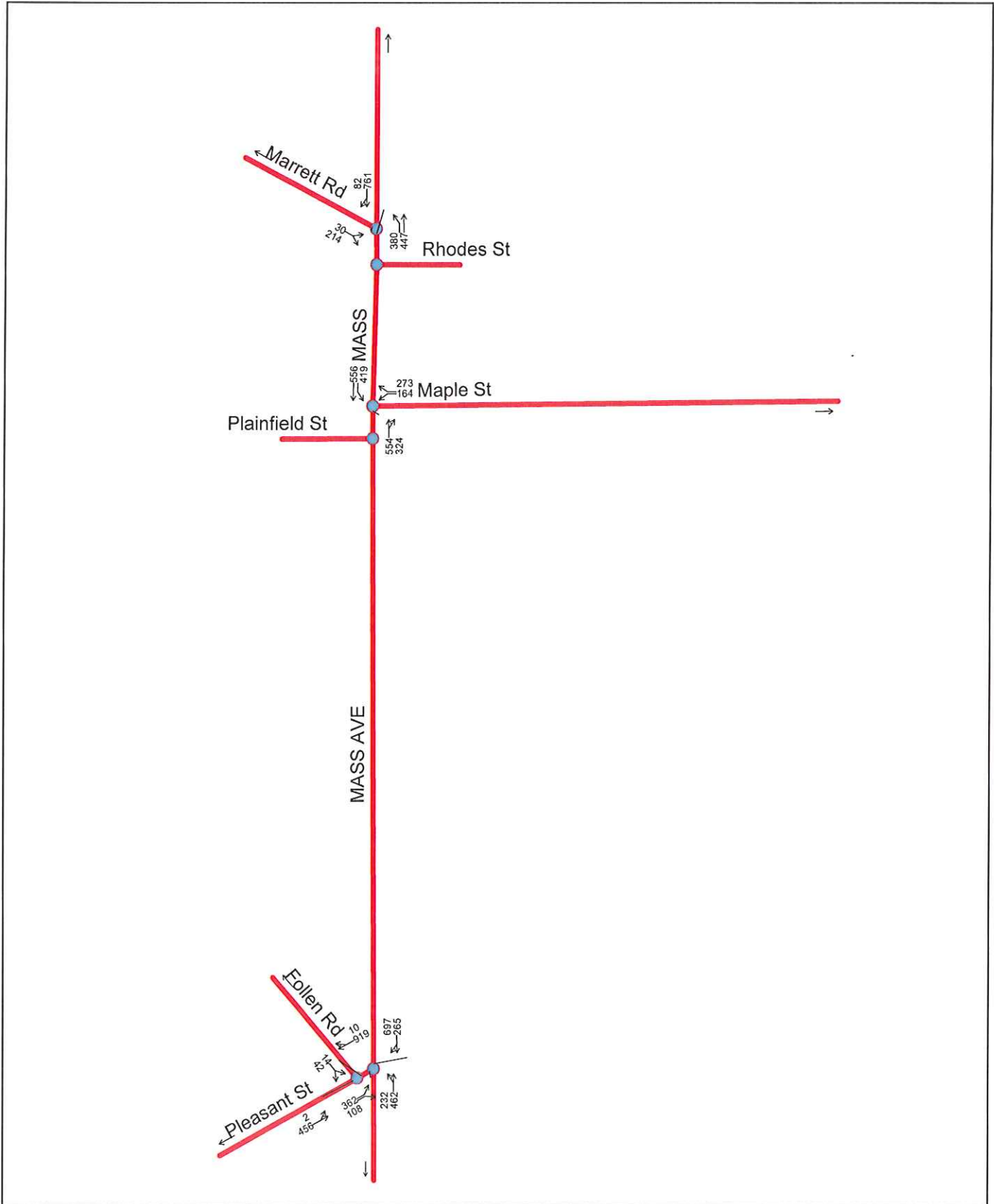
**Accurate Counts**  
978-664-2565

Location : Pleasant Street South of  
Location : Fern Street  
City/State: Lexington, MA  
Counter : 15169

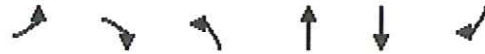
070300V6  
Site Code: 07030006

Start Time	31-Mar-09 Tue	SB		Hour Totals		NB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		2	108			8	78				
12:15		5	87			6	89				
12:30		2	80			4	74				
12:45		5	98	14	373	2	82	20	323	34	696
01:00		1	72			8	78				
01:15		3	73			1	81				
01:30		0	86			0	83				
01:45		0	87	4	318	4	88	13	330	17	648
02:00		2	90			2	81				
02:15		0	84			1	109				
02:30		0	110			2	98				
02:45		1	114	3	398	2	104	7	392	10	790
03:00		1	127			1	127				
03:15		1	101			2	132				
03:30		1	77			1	134				
03:45		3	99	6	404	2	108	6	501	12	905
04:00		2	105			0	124				
04:15		2	99			1	125				
04:30		3	92			2	130				
04:45		8	103	15	399	10	133	13	512	28	911
05:00		6	117			3	128				
05:15		12	95			7	135				
05:30		23	99			15	131				
05:45		35	92	76	403	8	125	33	519	109	922
06:00		45	110			14	128				
06:15		63	95			24	132				
06:30		97	83			24	100				
06:45		140	77	345	365	52	105	114	465	459	830
07:00		170	81			54	106				
07:15		218	76			74	89				
07:30		263	54			94	104				
07:45		254	50	905	261	91	85	313	384	1218	645
08:00		268	53			95	61				
08:15		257	28			82	77				
08:30		240	45			100	55				
08:45		189	43	954	169	110	50	387	243	1341	412
09:00		167	49			74	51				
09:15		129	49			68	57				
09:30		106	26			76	36				
09:45		114	29	516	153	79	37	297	181	813	334
10:00		87	26			84	41				
10:15		80	13			69	33				
10:30		90	12			66	28				
10:45		82	9	339	60	78	26	297	128	636	188
11:00		91	16			75	31				
11:15		107	8			69	12				
11:30		83	7			98	12				
11:45		101	3	382	34	95	16	337	71	719	105
Total		3559	3337			1837	4049			5396	7386
Percent		51.6%	48.4%			31.2%	68.8%			42.2%	57.8%
Grand Total		3559	3337			1837	4049			5396	7386
Percent		51.6%	48.4%			31.2%	68.8%			42.2%	57.8%

ADT                      ADT 12,782                      AADT 12,782



MASS AVE - Lex



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	4%			0%	0%	
Volume (veh/h)	30	214	380	447	761	82
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	33	238	422	497	846	91
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2232	891	937			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2232	891	937			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	30	42			
cM capacity (veh/h)	20	341	731			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	271	422	497	937
Volume Left	33	422	0	0
Volume Right	238	0	0	91
cSH	114	731	1700	1700
Volume to Capacity	2.38	0.58	0.29	0.55
Queue Length (ft)	598	93	0	0
Control Delay (s)	710.2	16.4	0.0	0.0
Lane LOS	F	C		
Approach Delay (s)	710.2	7.5		0.0
Approach LOS	F			

Intersection Summary			
Average Delay		93.8	
Intersection Capacity Utilization		91.0%	ICU Level of Service E
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	164	273	554	324	419	556
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	182	303	616	360	466	618
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		3				
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2344	796			976	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2344	796			976	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	22			34	
cM capacity (veh/h)	14	387			707	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	486	976	466	618
Volume Left	182	0	466	0
Volume Right	303	360	0	0
cSH	34	1700	707	1700
Volume to Capacity	14.16	0.57	0.66	0.36
Queue Length (ft)	Err	0	124	0
Control Delay (s)	Err	0.0	19.3	0.0
Lane LOS	F		C	
Approach Delay (s)	Err	0.0	8.3	
Approach LOS	F			

Intersection Summary			
Average Delay		1911.6	
Intersection Capacity Utilization		91.2%	ICU Level of Service F
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	362	108	232	462	265	697
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	402	120	258	513	294	774
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1711	682	1069			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1711	682	1069			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	73	60			
cM capacity (veh/h)	60	450	652			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	522	771	1069
Volume Left	402	258	0
Volume Right	120	0	774
cSH	75	652	1700
Volume to Capacity	6.94	0.40	0.63
Queue Length (ft)	Err	47	0
Control Delay (s)	Err	10.0	0.0
Lane LOS	F	B	
Approach Delay (s)	Err	10.0	0.0
Approach LOS	F		

Intersection Summary			
Average Delay		2213.8	
Intersection Capacity Utilization	124.0%		ICU Level of Service H
Analysis Period (min)		15	

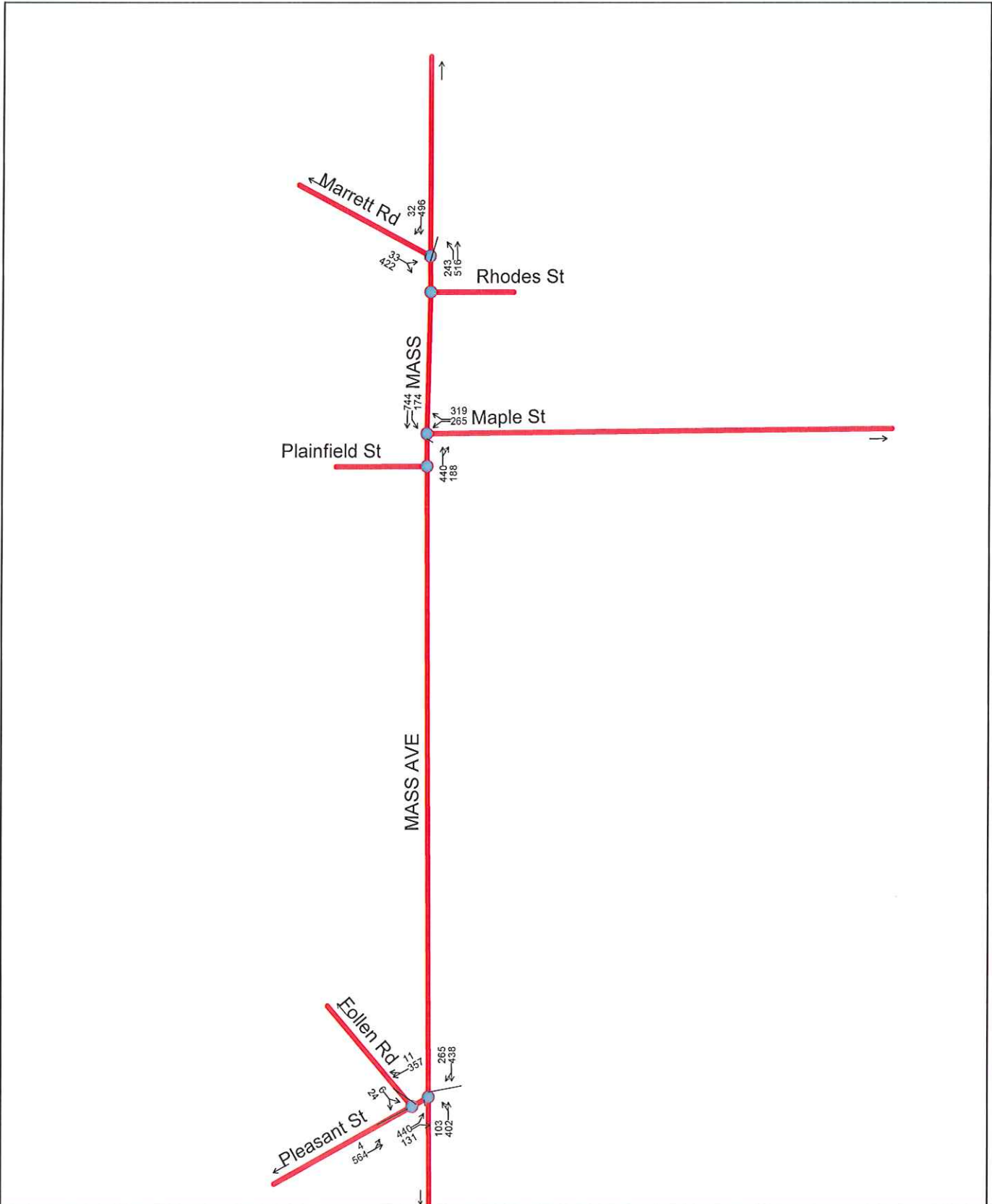




Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	2	456	919	10	14	42
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	507	1021	11	16	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1032				1538	1027
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1032				1538	1027
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				88	84
cM capacity (veh/h)	673				127	285

Direction, Lane #	EB 1	WB 1	SE 1
Volume Total	509	1032	62
Volume Left	2	0	16
Volume Right	0	11	47
cSH	673	1700	217
Volume to Capacity	0.00	0.61	0.29
Queue Length (ft)	0	0	28
Control Delay (s)	0.1	0.0	28.1
Lane LOS	A		D
Approach Delay (s)	0.1	0.0	28.1
Approach LOS			D

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization	59.0%		ICU Level of Service B
Analysis Period (min)		15	



MASS AVE - Lex



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	4%			0%	0%	
Volume (veh/h)	33	422	243	516	496	32
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	37	469	270	573	551	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1682	569	587			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1682	569	587			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	51	10	73			
cM capacity (veh/h)	75	521	988			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	506	270	573	587
Volume Left	37	270	0	0
Volume Right	469	0	0	36
cSH	364	988	1700	1700
Volume to Capacity	1.39	0.27	0.34	0.35
Queue Length (ft)	629	28	0	0
Control Delay (s)	219.2	10.0	0.0	0.0
Lane LOS	F	B		
Approach Delay (s)	219.2	3.2		0.0
Approach LOS	F			

Intersection Summary			
Average Delay		58.7	
Intersection Capacity Utilization		79.4%	ICU Level of Service D
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	265	319	440	188	174	744
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	294	354	489	209	193	827
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		3				
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1807	593			698	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1807	593			698	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	30			78	
cM capacity (veh/h)	68	505			899	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	649	698	193	827
Volume Left	294	0	193	0
Volume Right	354	209	0	0
cSH	130	1700	899	1700
Volume to Capacity	5.00	0.41	0.22	0.49
Queue Length (ft)	Err	0	20	0
Control Delay (s)	Err	0.0	10.1	0.0
Lane LOS	F		B	
Approach Delay (s)	Err	0.0	1.9	
Approach LOS	F			

Intersection Summary			
Average Delay		2742.3	
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)		15	



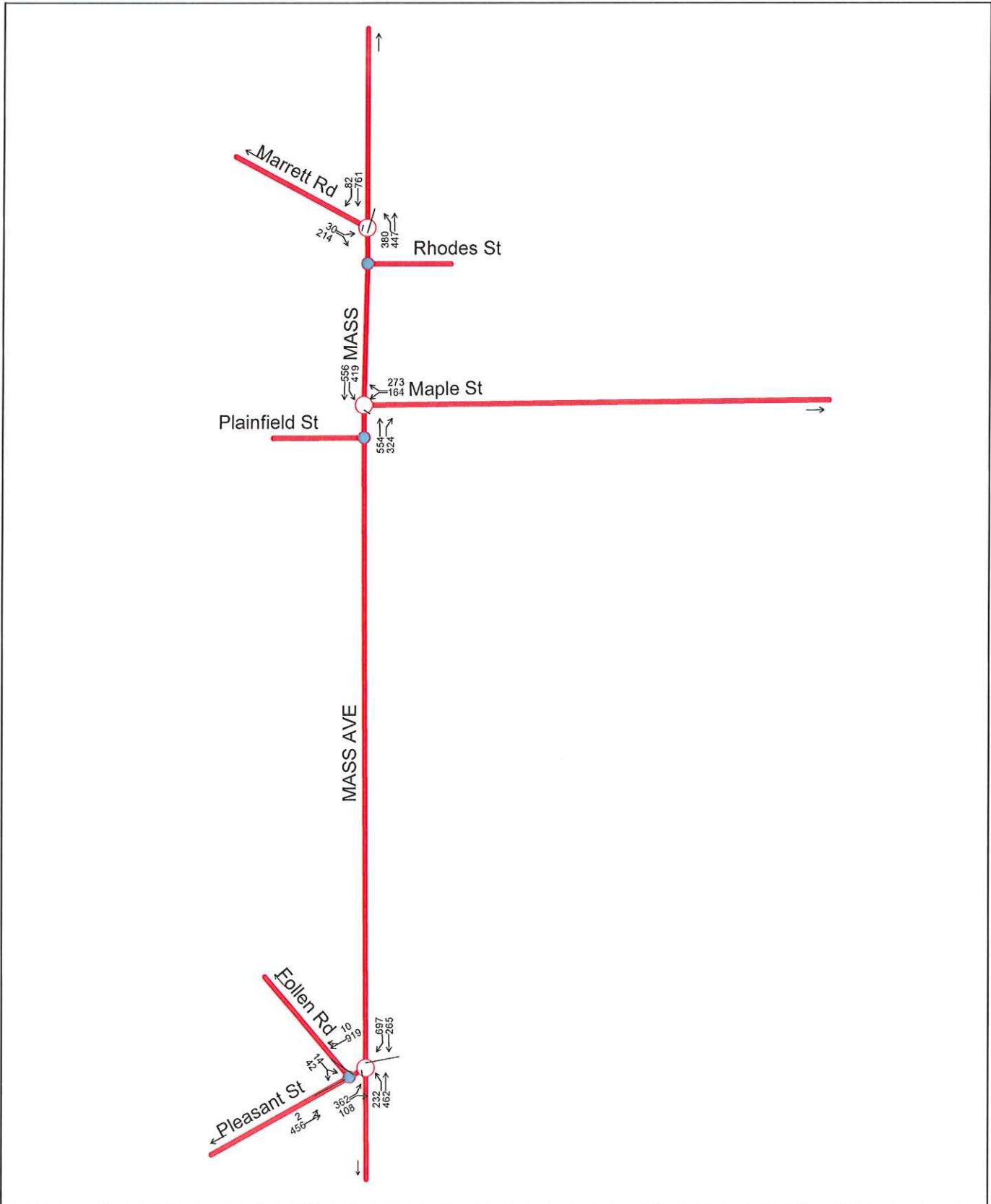
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	440	131	103	402	438	265
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	489	146	114	447	487	294
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type	None					
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1309	634	781			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1309	634	781			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	70	86			
cM capacity (veh/h)	152	479	836			
<b>Direction, Lane #</b>						
	EB 1	NB 1	SB 1			
Volume Total	634	561	781			
Volume Left	489	114	0			
Volume Right	146	0	294			
cSH	180	836	1700			
Volume to Capacity	3.52	0.14	0.46			
Queue Length (ft)	Err	12	0			
Control Delay (s)	Err	3.5	0.0			
Lane LOS	F	A				
Approach Delay (s)	Err	3.5	0.0			
Approach LOS	F					
<b>Intersection Summary</b>						
Average Delay		3210.3				
Intersection Capacity Utilization		100.4%		ICU Level of Service	G	
Analysis Period (min)		15				















Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	4	564	357	11	6	24
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	627	397	12	7	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	409			1038	403	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	409			1038	403	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			97	96	
cM capacity (veh/h)	1150			255	648	

Direction, Lane #	EB 1	WB 1	SE 1
Volume Total	631	409	33
Volume Left	4	0	7
Volume Right	0	12	27
cSH	1150	1700	495
Volume to Capacity	0.00	0.24	0.07
Queue Length (ft)	0	0	5
Control Delay (s)	0.1	0.0	12.8
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	12.8
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		



MASS AVE - Lex

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	4%			0%	0%	
Storage Length (ft)	0	25	142			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1734	1552	1770	1863	1863	1583
Fl <sub>t</sub> Permitted	0.950		0.119			
Satd. Flow (perm)	1734	1552	222	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						91
Headway Factor	1.03	1.03	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	597			142	790	
Travel Time (s)	13.6			3.2	18.0	
Volume (vph)	30	214	380	447	761	82
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	238	422	497	846	91
Lane Group Flow (vph)	33	238	422	497	846	91
Turn Type		custom	pm+pt			Perm
Protected Phases	4	4 5	5	2	6	
Permitted Phases		2	2			6
Detector Phases	4	4 5	5	2	6	6
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		8.0	20.0	20.0	20.0
Total Split (s)	20.0	36.0	16.0	70.0	54.0	54.0
Total Split (%)	22.2%	40.0%	17.8%	77.8%	60.0%	60.0%
Maximum Green (s)	16.0		12.0	66.0	50.0	50.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	Min	Min	Min
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	7.1	66.8	51.4	51.4	34.8	34.8
Actuated g/C Ratio	0.11	1.00	0.77	0.77	0.52	0.52
v/c Ratio	0.18	0.15	0.92	0.35	0.87	0.10
Uniform Delay, d <sub>1</sub>	27.0	0.0	13.9	2.3	13.7	0.0
Control Delay	32.4	0.2	45.3	3.0	17.9	2.0
Queue Delay	0.0	0.0	0.6	0.0	0.0	0.0

















Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	32.4	0.2	46.0	3.0	17.9	2.0
LOS	C	A	D	A	B	A
Approach Delay	4.2			22.7	16.4	
Approach LOS	A			C	B	
90th %ile Green (s)	9.2		12.0	66.0	50.0	50.0
90th %ile Term Code	Gap		Max	Hold	Max	Max
70th %ile Green (s)	7.8		12.0	61.4	45.4	45.4
70th %ile Term Code	Gap		Max	Hold	Gap	Gap
50th %ile Green (s)	6.7		12.0	52.2	36.2	36.2
50th %ile Term Code	Gap		Max	Hold	Gap	Gap
30th %ile Green (s)	6.0		12.0	44.1	28.1	28.1
30th %ile Term Code	Gap		Max	Hold	Gap	Gap
10th %ile Green (s)	5.6		12.0	35.0	19.0	19.0
10th %ile Term Code	Gap		Max	Hold	Gap	Gap
Stops (vph)	30	0	179	110	593	8
Fuel Used(gal)	1	1	5	1	11	1
CO Emissions (g/hr)	35	70	344	96	751	41
NOx Emissions (g/hr)	7	14	67	19	146	8
VOC Emissions (g/hr)	8	16	80	22	174	9
Dilemma Vehicles (#)	0	0	0	0	0	0
Queue Length 50th (ft)	13	0	107	41	266	0
Queue Length 95th (ft)	43	0	#340	80	450	17
Internal Link Dist (ft)	517			62	710	
Turn Bay Length (ft)		25	142			
Base Capacity (vph)	375	1552	459	1517	1149	1012
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	197	3	68	0	0
Reduced v/c Ratio	0.09	0.18	0.93	0.34	0.74	0.09

**Intersection Summary**

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 66.8  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.92  
 Intersection Signal Delay: 17.6  
 Intersection LOS: B  
 Intersection Capacity Utilization 74.4%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 90th %ile Actuated Cycle: 83.2  
 70th %ile Actuated Cycle: 77.2  
 50th %ile Actuated Cycle: 66.9  
 30th %ile Actuated Cycle: 58.1  
 10th %ile Actuated Cycle: 48.6  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Marrett Rd & MASS AVE



						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	65		50	145	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr't		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.950				0.234	
Satd. Flow (perm)	1770	1583	1863	1583	436	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		226		143		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	1862		129			561
Travel Time (s)	42.3		2.9			12.8
Volume (vph)	164	273	554	324	419	556
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	182	303	616	360	466	618
Lane Group Flow (vph)	182	303	616	360	466	618
Turn Type		pt+ov		Prot	pm+pt	
Protected Phases	8	1 8	2	2	1	6
Permitted Phases					6	
Detector Phases	8	1 8	2	2	1	6
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		20.0	20.0	8.0	20.0
Total Split (s)	20.0	40.0	50.0	50.0	20.0	70.0
Total Split (%)	22.2%	44.4%	55.6%	55.6%	22.2%	77.8%
Maximum Green (s)	16.0		46.0	46.0	16.0	66.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	5.0		5.0	5.0		5.0
Flash Dont Walk (s)	11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	11.5	29.8	27.1	27.1	45.4	45.4
Actuated g/C Ratio	0.18	0.45	0.41	0.41	0.69	0.69
v/c Ratio	0.59	0.36	0.80	0.49	0.80	0.48
Uniform Delay, d1	24.5	2.6	16.1	7.6	5.3	4.4
Control Delay	32.5	5.8	19.5	9.4	18.0	5.7
Queue Delay	0.0	0.0	0.1	0.0	0.2	0.0
Total Delay	32.5	5.8	19.6	9.4	18.2	5.7



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	C	A	B	A	B	A
Approach Delay	15.8		15.8			11.1
Approach LOS	B		B			B
90th %ile Green (s)	16.0		46.0	46.0	16.0	66.0
90th %ile Term Code	Max		Max	Max	Max	Hold
70th %ile Green (s)	15.4		36.6	36.6	16.0	56.6
70th %ile Term Code	Gap		Gap	Gap	Max	Hold
50th %ile Green (s)	12.3		28.6	28.6	16.0	48.6
50th %ile Term Code	Gap		Gap	Gap	Max	Hold
30th %ile Green (s)	8.9		19.6	19.6	11.4	35.0
30th %ile Term Code	Gap		Gap	Gap	Gap	Hold
10th %ile Green (s)	5.8		11.3	11.3	8.5	23.8
10th %ile Term Code	Gap		Gap	Gap	Gap	Hold
Stops (vph)	136	51	426	120	172	211
Fuel Used(gal)	4	5	5	2	4	4
CO Emissions (g/hr)	295	319	357	112	302	297
NOx Emissions (g/hr)	57	62	70	22	59	58
VOC Emissions (g/hr)	68	74	83	26	70	69
Dilemma Vehicles (#)	0	0	0	0	0	0
Queue Length 50th (ft)	71	17	219	60	72	92
Queue Length 95th (ft)	164	84	360	130	#167	172
Internal Link Dist (ft)	1782		49			481
Turn Bay Length (ft)		65		50	145	
Base Capacity (vph)	426	921	1037	944	620	1438
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	5	0	25	0	9	10
Reduced v/c Ratio	0.43	0.33	0.61	0.38	0.76	0.43

**Intersection Summary**

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 65.7

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 13.8

Intersection LOS: B

Intersection Capacity Utilization 71.5%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 90

70th %ile Actuated Cycle: 80

50th %ile Actuated Cycle: 68.9

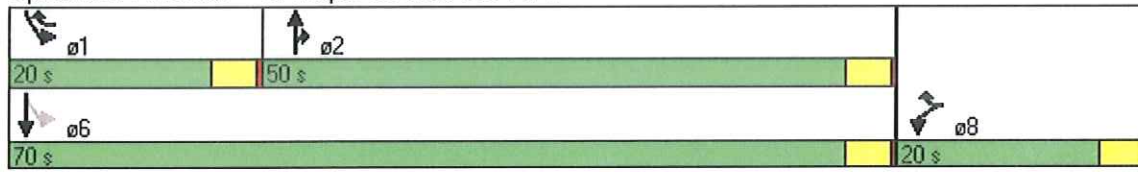
30th %ile Actuated Cycle: 51.9

10th %ile Actuated Cycle: 37.6

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Maple St & MASS AVE





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	0			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Fl <sub>t</sub> Permitted	0.950		0.250			
Satd. Flow (perm)	1770	1583	466	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		115				300
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	76			442	2500	
Travel Time (s)	1.7			10.0	56.8	
Volume (vph)	362	108	232	462	265	697
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	402	120	258	513	294	774
Lane Group Flow (vph)	402	120	258	513	294	774
Turn Type		pm+ov	pm+pt			pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phases	4	5	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	8.0	8.0	20.0	20.0	20.0
Total Split (s)	45.0	21.0	21.0	45.0	24.0	45.0
Total Split (%)	50.0%	23.3%	23.3%	50.0%	26.7%	50.0%
Maximum Green (s)	41.0	17.0	17.0	41.0	20.0	41.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	21.0	36.0	28.0	28.3	15.5	43.5
Actuated g/C Ratio	0.35	0.59	0.46	0.48	0.26	0.73
v/c Ratio	0.64	0.12	0.54	0.58	0.60	0.62
Uniform Delay, d <sub>1</sub>	15.4	0.2	8.4	9.9	18.6	2.6
Control Delay	18.9	1.5	13.4	13.7	26.8	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	1.5	13.4	13.7	26.8	5.7



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	B	A	B	B	C	A
Approach Delay	14.9			13.6	11.5	
Approach LOS	B			B	B	
90th %ile Green (s)	36.8	17.0	17.0	41.0	20.0	36.8
90th %ile Term Code	Gap	Max	Max	Hold	Max	Gap
70th %ile Green (s)	29.3	17.0	17.0	41.0	20.0	29.3
70th %ile Term Code	Gap	Max	Max	Hold	Max	Gap
50th %ile Green (s)	21.0	12.9	12.9	31.8	14.9	21.0
50th %ile Term Code	Gap	Gap	Gap	Hold	Gap	Gap
30th %ile Green (s)	15.0	9.6	9.6	24.5	10.9	15.0
30th %ile Term Code	Gap	Gap	Gap	Hold	Gap	Gap
10th %ile Green (s)	7.3	0.0	0.0	8.1	8.1	7.3
10th %ile Term Code	Gap	Skip	Skip	Gap	Hold	Gap
Stops (vph)	262	8	121	284	213	220
Fuel Used(gal)	3	0	2	4	8	16
CO Emissions (g/hr)	214	10	147	311	544	1091
NOx Emissions (g/hr)	42	2	29	60	106	212
VOC Emissions (g/hr)	49	2	34	72	126	253
Dilemma Vehicles (#)	0	0	0	0	0	0
Queue Length 50th (ft)	122	1	48	113	97	72
Queue Length 95th (ft)	241	16	133	288	231	192
Internal Link Dist (ft)	1			362	2420	
Turn Bay Length (ft)		50				
Base Capacity (vph)	954	973	574	1101	638	1313
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	51	0	0	0	0
Reduced v/c Ratio	0.42	0.13	0.45	0.47	0.46	0.59

**Intersection Summary**

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 59.2

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 12.9

Intersection LOS: B

Intersection Capacity Utilization 62.7%

ICU Level of Service B

Analysis Period (min) 15

90th %ile Actuated Cycle: 85.8

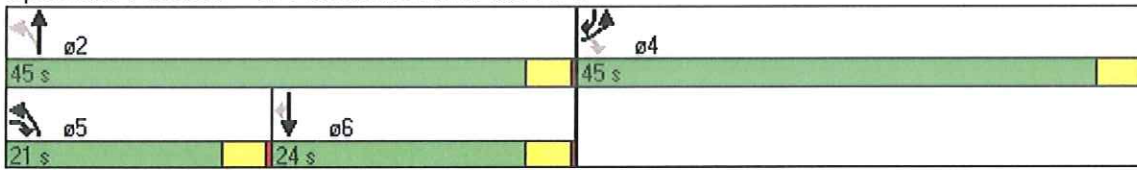
70th %ile Actuated Cycle: 78.3

50th %ile Actuated Cycle: 60.8

30th %ile Actuated Cycle: 47.5

10th %ile Actuated Cycle: 23.4

Splits and Phases: 2: Pleasant St & MASS AVE



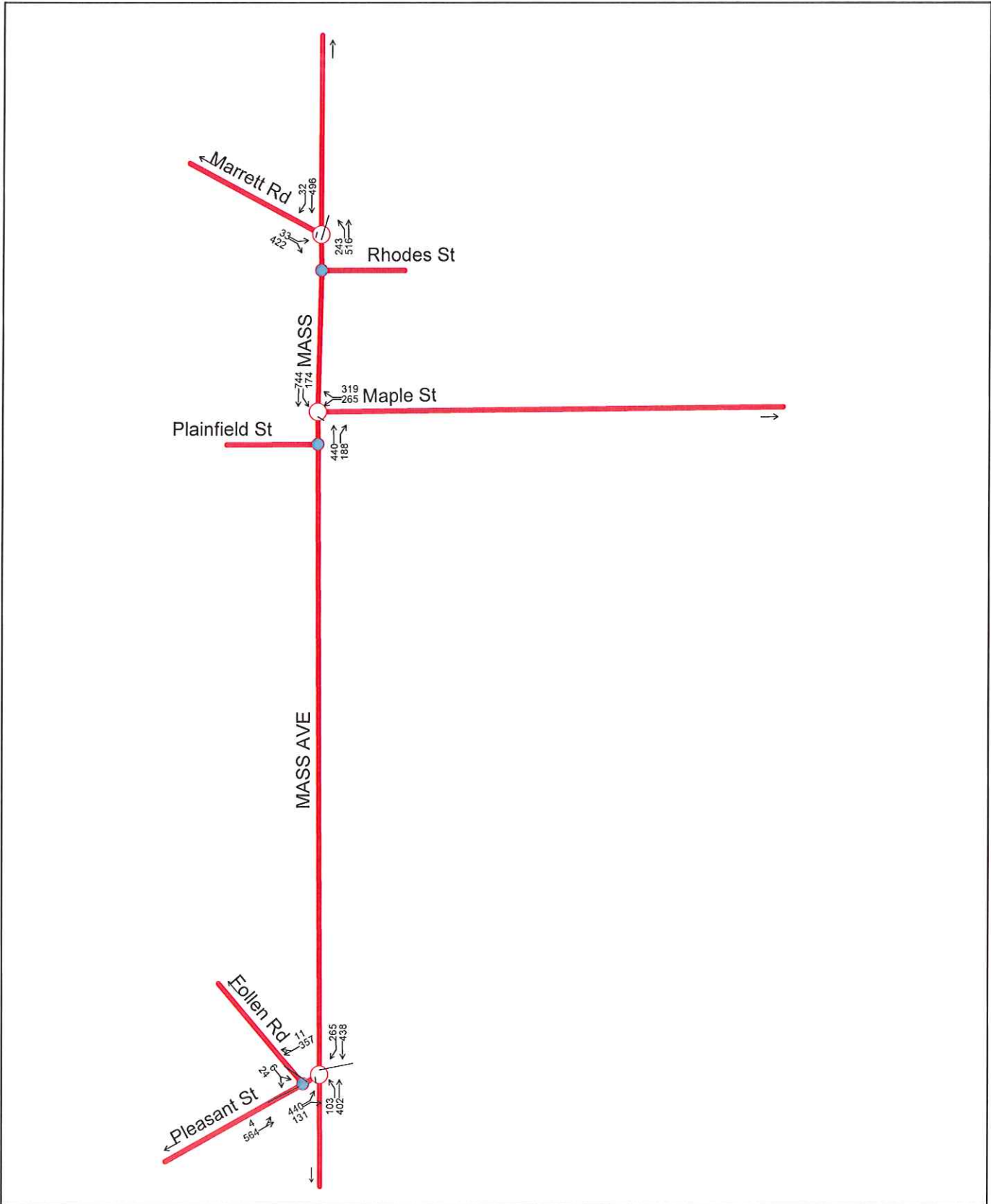




Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	2	456	919	10	14	42
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	507	1021	11	16	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			76			
pX, platoon unblocked						
vC, conflicting volume	1032				1538	1027
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1032				1538	1027
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				88	84
cM capacity (veh/h)	673				127	285

Direction, Lane #	EB 1	WB 1	SE 1
Volume Total	509	1032	62
Volume Left	2	0	16
Volume Right	0	11	47
cSH	673	1700	217
Volume to Capacity	0.00	0.61	0.29
Queue Length (ft)	0	0	28
Control Delay (s)	0.1	0.0	28.1
Lane LOS	A		D
Approach Delay (s)	0.1	0.0	28.1
Approach LOS			D

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)		15	



MASS AVE - Lex



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	4%			0%	0%	
Storage Length (ft)	0	25	142			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1734	1552	1770	1863	1863	1583
Fl <sub>t</sub> Permitted	0.950		0.256			
Satd. Flow (perm)	1734	1552	477	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						36
Headway Factor	1.03	1.03	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	597			142	790	
Travel Time (s)	13.6			3.2	18.0	
Volume (vph)	33	422	243	516	496	32
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	37	469	270	573	551	36
Lane Group Flow (vph)	37	469	270	573	551	36
Turn Type		custom	pm+pt			Perm
Protected Phases	4	4 5	5	2	6	
Permitted Phases		2	2			6
Detector Phases	4	4 5	5	2	6	6
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		8.0	20.0	20.0	20.0
Total Split (s)	22.0	43.0	21.0	68.0	47.0	47.0
Total Split (%)	24.4%	47.8%	23.3%	75.6%	52.2%	52.2%
Maximum Green (s)	18.0		17.0	64.0	43.0	43.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	Min	Min	Min
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	8.0	54.4	37.8	37.8	20.9	20.9
Actuated g/C Ratio	0.15	1.00	0.69	0.69	0.38	0.38
v/c Ratio	0.15	0.30	0.43	0.44	0.77	0.06
Uniform Delay, d <sub>1</sub>	19.9	0.0	2.8	3.4	13.9	0.0
Control Delay	26.4	0.7	4.4	4.2	16.7	4.3
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0

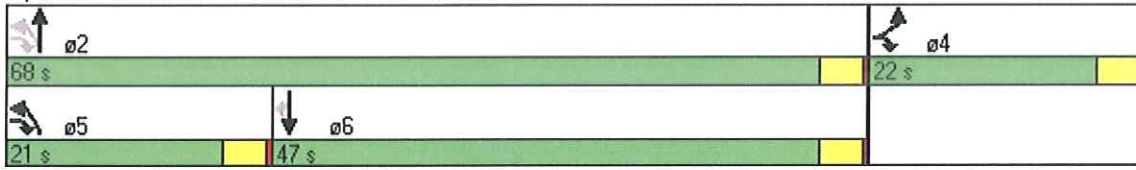


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	26.4	0.8	4.4	4.2	16.7	4.3
LOS	C	A	A	A	B	A
Approach Delay	2.6			4.2	15.9	
Approach LOS	A			A	B	
90th %ile Green (s)	10.2		17.0	57.2	36.2	36.2
90th %ile Term Code	Gap		Max	Hold	Gap	Gap
70th %ile Green (s)	8.7		17.0	48.6	27.6	27.6
70th %ile Term Code	Gap		Max	Hold	Gap	Gap
50th %ile Green (s)	7.2		13.8	38.3	20.5	20.5
50th %ile Term Code	Gap		Gap	Hold	Gap	Gap
30th %ile Green (s)	6.7		9.5	28.6	15.1	15.1
30th %ile Term Code	Gap		Gap	Hold	Gap	Gap
10th %ile Green (s)	6.1		6.5	20.5	10.0	10.0
10th %ile Term Code	Gap		Gap	Hold	Gap	Gap
Stops (vph)	29	0	64	173	381	6
Fuel Used(gal)	0	2	1	2	7	0
CO Emissions (g/hr)	34	141	59	137	479	18
NOx Emissions (g/hr)	7	27	11	27	93	4
VOC Emissions (g/hr)	8	33	14	32	111	4
Dilemma Vehicles (#)	0	0	0	0	0	0
Queue Length 50th (ft)	11	0	20	53	147	0
Queue Length 95th (ft)	41	0	46	109	280	14
Internal Link Dist (ft)	517			62	710	
Turn Bay Length (ft)		25	142			
Base Capacity (vph)	504	1382	692	1495	1066	921
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	190	3	0	0	0
Reduced v/c Ratio	0.07	0.39	0.39	0.38	0.52	0.04

**Intersection Summary**

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 54.4  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.77  
 Intersection Signal Delay: 7.4  
 Intersection LOS: A  
 Intersection Capacity Utilization 58.9%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 90th %ile Actuated Cycle: 75.4  
 70th %ile Actuated Cycle: 65.3  
 50th %ile Actuated Cycle: 53.5  
 30th %ile Actuated Cycle: 43.3  
 10th %ile Actuated Cycle: 34.6

Splits and Phases: 1: Marrett Rd & MASS AVE



	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗	↘	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	65		50	145	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850		0.850		
Fl <sub>t</sub> Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Fl <sub>t</sub> Permitted	0.950				0.288	
Satd. Flow (perm)	1770	1583	1863	1583	536	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		270		94		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	1862		129			561
Travel Time (s)	42.3		2.9			12.8
Volume (vph)	265	319	440	188	174	744
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	294	354	489	209	193	827
Lane Group Flow (vph)	294	354	489	209	193	827
Turn Type		pt+ov		Prot	pm+pt	
Protected Phases	8	1 8	2	2	1	6
Permitted Phases					6	
Detector Phases	8	1 8	2	2	1	6
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		20.0	20.0	8.0	20.0
Total Split (s)	29.0	45.0	45.0	45.0	16.0	61.0
Total Split (%)	32.2%	50.0%	50.0%	50.0%	17.8%	67.8%
Maximum Green (s)	25.0		41.0	41.0	12.0	57.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	5.0		5.0	5.0		5.0
Flash Dont Walk (s)	11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	14.9	28.4	20.9	20.9	34.4	34.4
Actuated g/C Ratio	0.26	0.49	0.36	0.36	0.59	0.59
v/c Ratio	0.65	0.39	0.73	0.33	0.38	0.75
Uniform Delay, d1	18.8	1.9	15.3	6.7	5.2	8.3
Control Delay	24.0	4.4	18.6	9.0	7.9	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	4.4	18.6	9.0	7.9	12.0



Splits and Phases: 3: Maple St & MASS AVE







Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	0			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Fl <sub>t</sub> Permitted	0.950		0.220			
Satd. Flow (perm)	1770	1583	410	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		77				294
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	76			442	2500	
Travel Time (s)	1.7			10.0	56.8	
Volume (vph)	440	131	103	402	438	265
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	489	146	114	447	487	294
Lane Group Flow (vph)	489	146	114	447	487	294
Turn Type		pm+ov	pm+pt			pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phases	4	5	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	8.0	8.0	20.0	20.0	20.0
Total Split (s)	42.0	10.0	10.0	48.0	38.0	42.0
Total Split (%)	46.7%	11.1%	11.1%	53.3%	42.2%	46.7%
Maximum Green (s)	38.0	6.0	6.0	44.0	34.0	38.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	22.4	31.5	27.8	28.1	20.8	50.2
Actuated g/C Ratio	0.37	0.51	0.45	0.47	0.34	0.83
v/c Ratio	0.74	0.17	0.35	0.52	0.76	0.22
Uniform Delay, d <sub>1</sub>	16.0	3.4	8.3	10.2	17.1	0.0
Control Delay	20.5	5.6	13.4	13.3	22.3	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	5.6	13.4	13.3	22.3	0.5



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	C	A	B	B	C	A
Approach Delay	17.1			13.3	14.1	
Approach LOS	B			B	B	
90th %ile Green (s)	38.0	6.0	6.0	44.0	34.0	38.0
90th %ile Term Code	Max	Max	Max	Hold	Max	Max
70th %ile Green (s)	30.4	6.0	6.0	37.8	27.8	30.4
70th %ile Term Code	Gap	Max	Max	Hold	Gap	Gap
50th %ile Green (s)	22.4	6.0	6.0	30.8	20.8	22.4
50th %ile Term Code	Gap	Max	Max	Hold	Gap	Gap
30th %ile Green (s)	16.8	6.0	6.0	25.5	15.5	16.8
30th %ile Term Code	Gap	Max	Max	Hold	Gap	Gap
10th %ile Green (s)	8.1	0.0	0.0	8.0	8.0	8.1
10th %ile Term Code	Gap	Skip	Skip	Hold	Gap	Gap
Stops (vph)	337	31	50	240	346	5
Fuel Used(gal)	4	0	1	4	12	5
CO Emissions (g/hr)	277	28	64	266	870	365
NOx Emissions (g/hr)	54	5	12	52	169	71
VOC Emissions (g/hr)	64	6	15	62	202	85
Dilemma Vehicles (#)	0	0	0	0	0	0
Queue Length 50th (ft)	154	11	21	100	157	0
Queue Length 95th (ft)	326	47	64	246	343	8
Internal Link Dist (ft)	1			362	2420	
Turn Bay Length (ft)		50				
Base Capacity (vph)	923	842	329	1113	902	1402
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	5	0	0	0	0	0
Reduced v/c Ratio	0.53	0.17	0.35	0.40	0.54	0.21

**Intersection Summary**

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 60.4

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 14.9

Intersection LOS: B

Intersection Capacity Utilization 63.1%

ICU Level of Service B

Analysis Period (min) 15

90th %ile Actuated Cycle: 90

70th %ile Actuated Cycle: 76.2

50th %ile Actuated Cycle: 61.2

30th %ile Actuated Cycle: 50.3

10th %ile Actuated Cycle: 24.1

Splits and Phases: 2: Pleasant St & MASS AVE

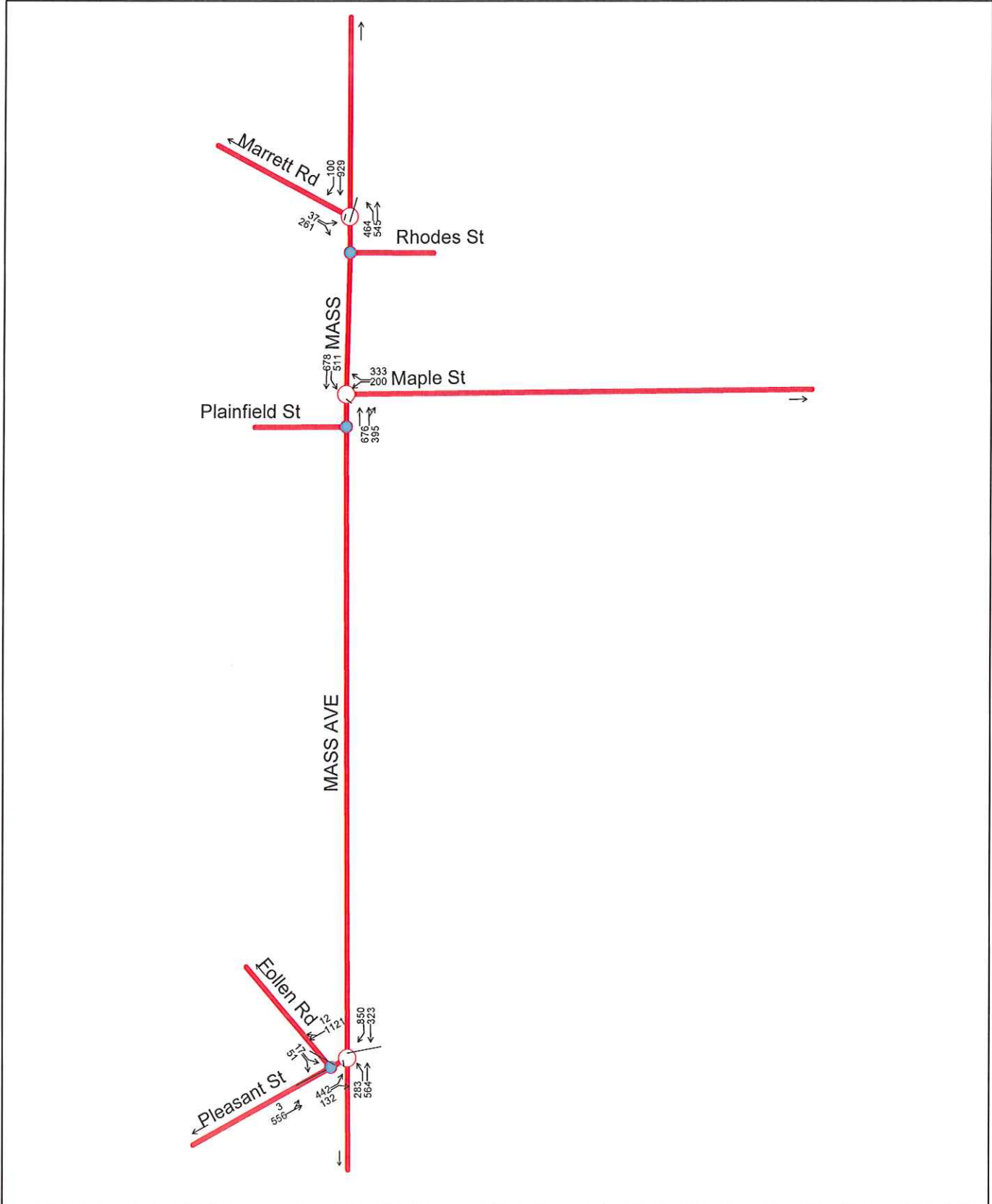




Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	4	564	357	11	6	24
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	627	397	12	7	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)			76			
pX, platoon unblocked						
vC, conflicting volume	409				1038	403
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	409				1038	403
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	96
cM capacity (veh/h)	1150				255	648

Direction, Lane #	EB 1	WB 1	SE 1
Volume Total	631	409	33
Volume Left	4	0	7
Volume Right	0	12	27
cSH	1150	1700	495
Volume to Capacity	0.00	0.24	0.07
Queue Length (ft)	0	0	5
Control Delay (s)	0.1	0.0	12.8
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	12.8
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization	42.9%		ICU Level of Service A
Analysis Period (min)		15	



MASS AVE - Lex 2009 Signalized AM Peak Hour



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	4%			0%	0%	
Storage Length (ft)	0	25	144			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1734	1552	1770	1863	1863	1583
Fl <sub>t</sub> Permitted	0.950		0.051			
Satd. Flow (perm)	1734	1552	95	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						56
Headway Factor	1.03	1.03	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	597			142	790	
Travel Time (s)	13.6			3.2	18.0	
Volume (vph)	37	261	464	545	929	100
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	41	290	516	606	1032	111
Lane Group Flow (vph)	41	290	516	606	1032	111
Turn Type		custom	pm+pt			Perm
Protected Phases	4	4 5	5	2	6	
Permitted Phases		2	2			6
Detector Phases	4	4 5	5	2	6	6
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		8.0	20.0	20.0	20.0
Total Split (s)	20.0	72.0	52.0	130.0	78.0	78.0
Total Split (%)	13.3%	48.0%	34.7%	86.7%	52.0%	52.0%
Maximum Green (s)	16.0		48.0	126.0	74.0	74.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	8.9	142.9	126.0	126.0	80.9	80.9
Actuated g/C Ratio	0.06	1.00	0.88	0.88	0.57	0.57
v/c Ratio	0.38	0.19	0.91	0.37	0.98	0.12
Uniform Delay, d <sub>1</sub>	64.4	0.0	40.4	1.5	30.2	6.9
Control Delay	67.2	0.3	52.7	2.3	54.5	9.3
Queue Delay	0.0	0.3	0.1	0.5	0.0	0.0

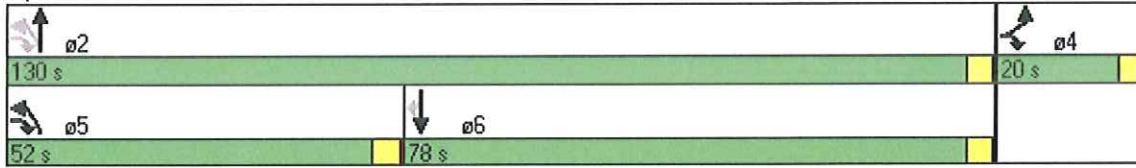


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	67.2	0.6	52.8	2.7	54.5	9.3
LOS	E	A	D	A	D	A
Approach Delay	8.9			25.7	50.1	
Approach LOS	A			C	D	
90th %ile Green (s)	12.2		48.0	126.0	74.0	74.0
90th %ile Term Code	Gap		Max	MaxR	MaxR	MaxR
70th %ile Green (s)	10.2		48.0	126.0	74.0	74.0
70th %ile Term Code	Gap		Max	MaxR	MaxR	MaxR
50th %ile Green (s)	8.8		42.8	126.0	79.2	79.2
50th %ile Term Code	Gap		Gap	MaxR	Hold	Hold
30th %ile Green (s)	7.4		37.8	126.0	84.2	84.2
30th %ile Term Code	Gap		Gap	MaxR	Hold	Hold
10th %ile Green (s)	6.0		29.6	126.0	92.4	92.4
10th %ile Term Code	Gap		Gap	MaxR	Hold	Hold
Stops (vph)	35	0	376	83	730	25
Fuel Used(gal)	1	1	8	1	20	1
CO Emissions (g/hr)	61	86	529	92	1402	66
NOx Emissions (g/hr)	12	17	103	18	273	13
VOC Emissions (g/hr)	14	20	123	21	325	15
Dilemma Vehicles (#)	0	0	0	0	0	0
Queue Length 50th (ft)	37	0	398	68	926	23
Queue Length 95th (ft)	79	0	548	117	#1370	60
Internal Link Dist (ft)	517			62	710	
Turn Bay Length (ft)		25	144			
Base Capacity (vph)	185	1465	618	1643	1054	920
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	675	2	567	0	0
Reduced v/c Ratio	0.22	0.37	0.84	0.56	0.98	0.12

**Intersection Summary**

Area Type: Other  
 Cycle Length: 150  
 Actuated Cycle Length: 142.9  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.98  
 Intersection Signal Delay: 34.3  
 Intersection LOS: C  
 Intersection Capacity Utilization 87.9%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 90th %ile Actuated Cycle: 146.2  
 70th %ile Actuated Cycle: 144.2  
 50th %ile Actuated Cycle: 142.8  
 30th %ile Actuated Cycle: 141.4  
 10th %ile Actuated Cycle: 140  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Marrett Rd & MASS AVE





	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑↗		↘	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	100		50	145	
Storage Lanes	1	1		0	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	50
Trailing Detector (ft)	0	0	0		0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Fr <sub>t</sub>		0.850	0.945			
Fl <sub>t</sub> Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3345	0	1770	1863
Fl <sub>t</sub> Permitted	0.950				0.068	
Satd. Flow (perm)	1770	1583	3345	0	127	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		252	96			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	1862		129			561
Travel Time (s)	42.3		2.9			12.8
Volume (vph)	200	333	676	395	511	678
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	222	370	751	439	568	753
Lane Group Flow (vph)	222	370	1190	0	568	753
Turn Type		Prot			pm+pt	
Protected Phases	8	8	2		1	6
Permitted Phases					6	
Detector Phases	8	8	2		1	6
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0
Minimum Split (s)	20.0	20.0	20.0		8.0	20.0
Total Split (s)	35.0	35.0	66.0	0.0	49.0	115.0
Total Split (%)	23.3%	23.3%	44.0%	0.0%	32.7%	76.7%
Maximum Green (s)	31.0	31.0	62.0		45.0	111.0
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5	0.5		0.5	0.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Min		None	Min
Walk Time (s)	5.0	5.0	5.0			5.0
Flash Dont Walk (s)	11.0	11.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	19.9	19.9	45.5		89.3	89.3
Actuated g/C Ratio	0.17	0.17	0.39		0.76	0.76
v/c Ratio	0.74	0.78	0.88		0.88	0.53
Uniform Delay, d1	46.2	14.1	30.0		29.8	5.6
Control Delay	54.4	22.5	34.6		42.8	7.8
Queue Delay	0.2	0.0	0.0		0.1	0.4
Total Delay	54.6	22.5	34.6		42.9	8.2



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	D	C	C		D	A
Approach Delay	34.5		34.6			23.1
Approach LOS	C		C			C
90th %ile Green (s)	31.0	31.0	62.0		45.0	111.0
90th %ile Term Code	Max	Max	Max		Max	Hold
70th %ile Green (s)	27.0	27.0	59.3		45.0	108.3
70th %ile Term Code	Gap	Gap	Gap		Max	Hold
50th %ile Green (s)	21.3	21.3	50.5		45.0	99.5
50th %ile Term Code	Gap	Gap	Gap		Max	Hold
30th %ile Green (s)	15.6	15.6	38.3		37.0	79.3
30th %ile Term Code	Gap	Gap	Gap		Gap	Hold
10th %ile Green (s)	8.5	8.5	22.0		22.2	48.2
10th %ile Term Code	Gap	Gap	Gap		Gap	Hold
Stops (vph)	176	110	874		368	249
Fuel Used(gal)	6	7	13		9	5
CO Emissions (g/hr)	426	487	941		610	379
NOx Emissions (g/hr)	83	95	183		119	74
VOC Emissions (g/hr)	99	113	218		141	88
Dilemma Vehicles (#)	0	0	0		0	0
Queue Length 50th (ft)	179	95	445		381	205
Queue Length 95th (ft)	293	232	603		#737	380
Internal Link Dist (ft)	1782		49			481
Turn Bay Length (ft)		100			145	
Base Capacity (vph)	446	587	1631		709	1485
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	23	0	0		5	300
Reduced v/c Ratio	0.52	0.63	0.73		0.81	0.64

**Intersection Summary**

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 117.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 29.7

Intersection LOS: C

Intersection Capacity Utilization 80.7%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 150

70th %ile Actuated Cycle: 143.3

50th %ile Actuated Cycle: 128.8

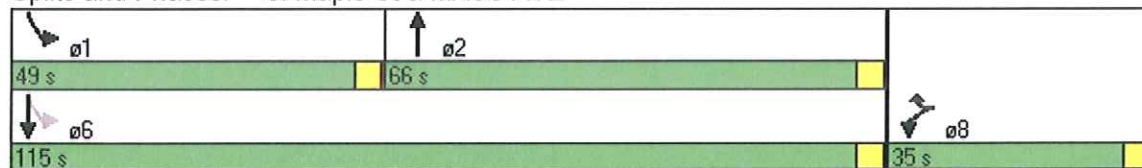
30th %ile Actuated Cycle: 102.9

10th %ile Actuated Cycle: 64.7

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Maple St & MASS AVE





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	0			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Fl <sub>t</sub> Permitted	0.950		0.374			
Satd. Flow (perm)	1770	1583	697	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		45				366
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	76			442	2500	
Travel Time (s)	1.7			10.0	56.8	
Volume (vph)	442	132	283	564	323	850
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	491	147	314	627	359	944
Lane Group Flow (vph)	491	147	314	627	359	944
Turn Type		pm+ov	pm+pt			pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phases	4	5	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	8.0	8.0	20.0	20.0	20.0
Total Split (s)	49.0	33.0	33.0	101.0	68.0	49.0
Total Split (%)	32.7%	22.0%	22.0%	67.3%	45.3%	32.7%
Maximum Green (s)	45.0	29.0	29.0	97.0	64.0	45.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag		Lead	Lead			Lag
Lead-Lag Optimize?		Yes	Yes			Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	34.1	56.7	44.5	44.5	21.9	60.5
Actuated g/C Ratio	0.39	0.65	0.51	0.51	0.25	0.69
v/c Ratio	0.71	0.14	0.55	0.66	0.77	0.78
Uniform Delay, d1	22.0	4.0	12.4	15.4	29.4	4.6
Control Delay	29.0	5.5	16.1	18.0	34.4	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.0	5.6	16.1	18.0	34.4	10.1



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	C	A	B	B	C	B
Approach Delay	23.6			17.4	16.8	
Approach LOS	C			B	B	
90th %ile Green (s)	45.0	29.0	29.0	70.1	37.1	45.0
90th %ile Term Code	Max	Max	Max	Hold	Gap	Max
70th %ile Green (s)	45.0	24.1	24.1	57.7	29.6	45.0
70th %ile Term Code	Max	Gap	Gap	Hold	Gap	Max
50th %ile Green (s)	36.9	18.7	18.7	45.2	22.5	36.9
50th %ile Term Code	Gap	Gap	Gap	Hold	Gap	Gap
30th %ile Green (s)	27.5	13.7	13.7	33.7	16.0	27.5
30th %ile Term Code	Gap	Gap	Gap	Hold	Gap	Gap
10th %ile Green (s)	16.4	7.9	7.9	20.8	8.9	16.4
10th %ile Term Code	Gap	Gap	Gap	Hold	Gap	Gap
Stops (vph)	345	32	147	372	272	351
Fuel Used(gal)	5	0	3	6	10	20
CO Emissions (g/hr)	334	28	190	424	703	1416
NOx Emissions (g/hr)	65	5	37	83	137	275
VOC Emissions (g/hr)	77	7	44	98	163	328
Dilemma Vehicles (#)	0	0	0	0	0	0
Queue Length 50th (ft)	223	19	103	255	190	169
Queue Length 95th (ft)	477	57	183	424	354	461
Internal Link Dist (ft)	1			362	2420	
Turn Bay Length (ft)		50				
Base Capacity (vph)	835	1036	662	1307	946	1260
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	4	187	0	0	0	0
Reduced v/c Ratio	0.59	0.17	0.47	0.48	0.38	0.75

**Intersection Summary**

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	87.7
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	18.5
Intersection LOS:	B
Intersection Capacity Utilization:	75.0%
ICU Level of Service:	D
Analysis Period (min):	15
90th %ile Actuated Cycle:	123.1
70th %ile Actuated Cycle:	110.7
50th %ile Actuated Cycle:	90.1
30th %ile Actuated Cycle:	69.2
10th %ile Actuated Cycle:	45.2

Splits and Phases: 2: Pleasant St & MASS AVE

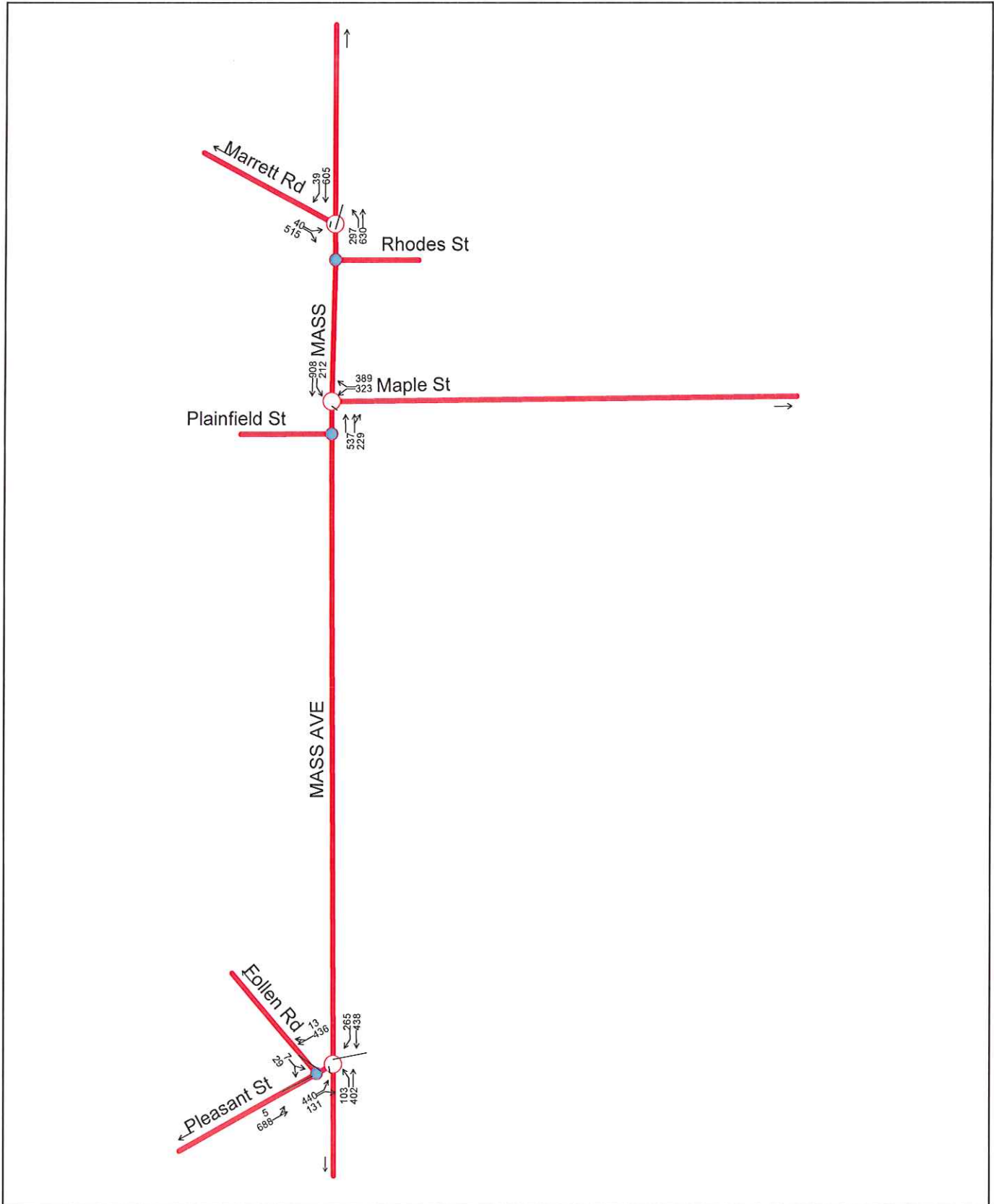




Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	↕
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	556	1121	12	17	51
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	618	1246	13	19	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)			76			
pX, platoon unblocked						
vC, conflicting volume	1259				1877	1252
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1259				1877	1252
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				76	73
cM capacity (veh/h)	552				78	210













Direction, Lane #	EB 1	WB 1	SE 1	SE 2
Volume Total	621	1259	19	57
Volume Left	3	0	19	0
Volume Right	0	13	0	57
cSH	552	1700	78	210
Volume to Capacity	0.01	0.74	0.24	0.27
Queue Length (ft)	0	0	21	26
Control Delay (s)	0.2	0.0	65.2	28.3
Lane LOS	A		F	D
Approach Delay (s)	0.2	0.0	37.5	
Approach LOS			E	

Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization	69.7%		ICU Level of Service C
Analysis Period (min)		15	



MASS AVE - Lex



						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	4%			0%	0%	
Storage Length (ft)	0	25	142			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1734	1552	1770	1863	1863	1583
Flt Permitted	0.950		0.254			
Satd. Flow (perm)	1734	1552	473	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						42
Headway Factor	1.03	1.03	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	597			142	790	
Travel Time (s)	13.6			3.2	18.0	
Volume (vph)	40	515	297	630	605	39
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	572	330	700	672	43
Lane Group Flow (vph)	44	572	330	700	672	43
Turn Type		custom	pm+pt			Perm
Protected Phases	4	4 5	5	2	6	
Permitted Phases		2	2			6
Detector Phases	4	4 5	5	2	6	6
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		8.0	20.0	20.0	20.0
Total Split (s)	36.0	56.0	20.0	114.0	94.0	94.0
Total Split (%)	24.0%	37.3%	13.3%	76.0%	62.7%	62.7%
Maximum Green (s)	32.0		16.0	110.0	90.0	90.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	Min	Min	Min
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	8.9	63.1	45.5	45.5	27.4	27.4
Actuated g/C Ratio	0.14	1.00	0.72	0.72	0.43	0.43
v/c Ratio	0.18	0.37	0.53	0.52	0.83	0.06
Uniform Delay, d1	23.5	0.0	2.8	3.7	15.1	0.2
Control Delay	30.0	0.8	5.7	4.6	17.0	3.6
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0







Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	30.0	0.9	5.7	4.6	17.0	3.6
LOS	C	A	A	A	B	A
Approach Delay	3.0			5.0	16.2	
Approach LOS	A			A	B	
90th %ile Green (s)	12.1		16.0	66.6	46.6	46.6
90th %ile Term Code	Gap		Max	Hold	Gap	Gap
70th %ile Green (s)	9.4		16.0	55.5	35.5	35.5
70th %ile Term Code	Gap		Max	Hold	Gap	Gap
50th %ile Green (s)	8.8		16.0	48.6	28.6	28.6
50th %ile Term Code	Gap		Max	Hold	Gap	Gap
30th %ile Green (s)	7.2		13.1	37.6	20.5	20.5
30th %ile Term Code	Gap		Gap	Hold	Gap	Gap
10th %ile Green (s)	6.3		7.3	23.4	12.1	12.1
10th %ile Term Code	Gap		Gap	Hold	Gap	Gap
Stops (vph)	35	0	77	221	468	6
Fuel Used(gal)	1	2	1	3	8	0
CO Emissions (g/hr)	44	173	77	175	587	21
NOx Emissions (g/hr)	8	34	15	34	114	4
VOC Emissions (g/hr)	10	40	18	41	136	5
Dilemma Vehicles (#)	0	0	0	0	0	0
Queue Length 50th (ft)	16	0	31	84	225	0
Queue Length 95th (ft)	52	0	63	164	372	15
Internal Link Dist (ft)	517			62	710	
Turn Bay Length (ft)		25	142			
Base Capacity (vph)	664	1471	659	1617	1350	1159
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	240	12	0	0	0
Reduced v/c Ratio	0.07	0.46	0.51	0.43	0.50	0.04

**Intersection Summary**

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	63.1
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	7.8
Intersection LOS:	A
Intersection Capacity Utilization:	70.4%
ICU Level of Service:	C
Analysis Period (min):	15
90th %ile Actuated Cycle:	86.7
70th %ile Actuated Cycle:	72.9
50th %ile Actuated Cycle:	65.4
30th %ile Actuated Cycle:	52.8
10th %ile Actuated Cycle:	37.7

Splits and Phases: 1: Marrett Rd & MASS AVE

 ø2	 ø4
114 s	36 s
 ø5	
20 s	 ø6
	94 s



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	65		50	145	
Storage Lanes	1	1		0	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	50
Trailing Detector (ft)	0	0	0		0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Fr <sub>t</sub>		0.850	0.955			
Fl <sub>t</sub> Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3380	0	1770	1863
Fl <sub>t</sub> Permitted	0.950				0.213	
Satd. Flow (perm)	1770	1583	3380	0	397	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		200	59			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	1862		129			561
Travel Time (s)	42.3		2.9			12.8
Volume (vph)	323	389	537	229	212	908
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	359	432	597	254	236	1009
Lane Group Flow (vph)	359	432	851	0	236	1009
Turn Type		pt+ov			pm+pt	
Protected Phases	8	1 8	2		1	6
Permitted Phases					6	
Detector Phases	8	1 8	2		1	6
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	20.0		20.0		8.0	20.0
Total Split (s)	44.0	76.0	74.0	0.0	32.0	106.0
Total Split (%)	29.3%	50.7%	49.3%	0.0%	21.3%	70.7%
Maximum Green (s)	40.0		70.0		28.0	102.0
Yellow Time (s)	3.5		3.5		3.5	3.5
All-Red Time (s)	0.5		0.5		0.5	0.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Min		None	Min
Walk Time (s)	5.0		5.0			5.0
Flash Dont Walk (s)	11.0		11.0			11.0
Pedestrian Calls (#/hr)	0		0			0
Act Effct Green (s)	23.2	40.5	34.8		52.2	52.2
Actuated g/C Ratio	0.27	0.47	0.41		0.61	0.61
v/c Ratio	0.75	0.51	0.60		0.54	0.89
Uniform Delay, d <sub>1</sub>	27.2	7.5	16.5		6.7	12.7
Control Delay	36.1	12.4	17.8		9.5	17.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	36.2	12.4	17.8		9.5	17.7

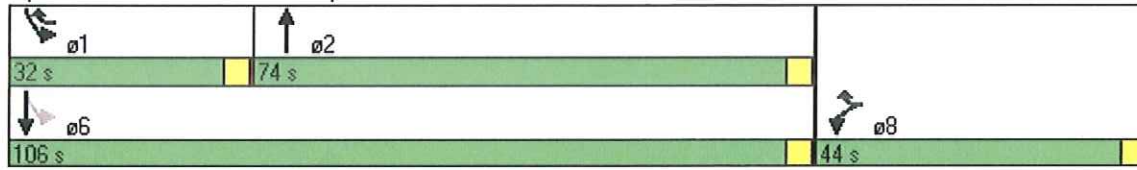


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	D	B	B		A	B
Approach Delay	23.2		17.8			16.2
Approach LOS	C		B			B
90th %ile Green (s)	40.0		79.5		18.5	102.0
90th %ile Term Code	Max		Hold		Gap	Max
70th %ile Green (s)	33.7		53.7		14.3	72.0
70th %ile Term Code	Gap		Hold		Gap	Gap
50th %ile Green (s)	21.8		31.1		11.1	46.2
50th %ile Term Code	Gap		Hold		Gap	Gap
30th %ile Green (s)	14.7		18.4		8.0	30.4
30th %ile Term Code	Gap		Hold		Gap	Gap
10th %ile Green (s)	8.0		9.8		5.9	19.7
10th %ile Term Code	Gap		Gap		Gap	Hold
Stops (vph)	261	131	477		76	666
Fuel Used(gal)	9	7	6		2	11
CO Emissions (g/hr)	595	514	432		123	764
NOx Emissions (g/hr)	116	100	84		24	149
VOC Emissions (g/hr)	138	119	100		28	177
Dilemma Vehicles (#)	0	0	0		0	0
Queue Length 50th (ft)	151	62	148		45	365
Queue Length 95th (ft)	450	278	302		116	856
Internal Link Dist (ft)	1782		49			481
Turn Bay Length (ft)		65			145	
Base Capacity (vph)	753	1077	2102		636	1433
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	15	26	0		10	5
Reduced v/c Ratio	0.49	0.41	0.40		0.38	0.71

**Intersection Summary**

Area Type: Other  
 Cycle Length: 150  
 Actuated Cycle Length: 85.7  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 18.6  
 Intersection LOS: B  
 Intersection Capacity Utilization 72.4%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 90th %ile Actuated Cycle: 150  
 70th %ile Actuated Cycle: 113.7  
 50th %ile Actuated Cycle: 76  
 30th %ile Actuated Cycle: 53.1  
 10th %ile Actuated Cycle: 35.7

Splits and Phases: 3: Maple St & MASS AVE





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	0			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Fl <sub>t</sub> Permitted	0.950		0.093			
Satd. Flow (perm)	1770	1583	173	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		69				294
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	76			442	2500	
Travel Time (s)	1.7			10.0	56.8	
Volume (vph)	440	131	103	402	438	265
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	489	146	114	447	487	294
Lane Group Flow (vph)	489	146	114	447	487	294
Turn Type		pm+ov	pm+pt			pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phases	4	5	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	8.0	8.0	20.0	20.0	20.0
Total Split (s)	86.0	21.0	21.0	64.0	43.0	86.0
Total Split (%)	57.3%	14.0%	14.0%	42.7%	28.7%	57.3%
Maximum Green (s)	82.0	17.0	17.0	60.0	39.0	82.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag		Lead	Lead			Lag
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	28.1	41.0	43.9	44.5	33.5	67.6
Actuated g/C Ratio	0.34	0.49	0.53	0.55	0.41	0.83
v/c Ratio	0.80	0.18	0.40	0.44	0.64	0.22
Uniform Delay, d1	24.3	5.9	8.5	10.4	19.2	0.0
Control Delay	26.6	6.5	14.5	14.2	27.6	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	6.5	14.5	14.2	27.6	0.6



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	C	A	B	B	C	A
Approach Delay	22.0			14.3	17.5	
Approach LOS	C			B	B	
90th %ile Green (s)	49.1	15.6	15.6	58.6	39.0	49.1
90th %ile Term Code	Gap	Gap	Gap	Hold	Max	Gap
70th %ile Green (s)	37.0	12.3	12.3	53.2	36.9	37.0
70th %ile Term Code	Gap	Gap	Gap	Hold	Gap	Gap
50th %ile Green (s)	28.0	9.9	9.9	45.5	31.6	28.0
50th %ile Term Code	Gap	Gap	Gap	Hold	Gap	Gap
30th %ile Green (s)	21.7	8.0	8.0	40.5	28.5	21.7
30th %ile Term Code	Gap	Gap	Gap	Hold	Gap	Gap
10th %ile Green (s)	11.2	0.0	0.0	23.0	23.0	11.2
10th %ile Term Code	Gap	Skip	Skip	Hold	Gap	Gap
Stops (vph)	356	31	46	219	332	6
Fuel Used(gal)	5	0	1	4	13	5
CO Emissions (g/hr)	322	29	64	263	897	366
NOx Emissions (g/hr)	63	6	12	51	175	71
VOC Emissions (g/hr)	75	7	15	61	208	85
Dilemma Vehicles (#)	0	0	0	0	0	0
Queue Length 50th (ft)	223	19	25	123	201	0
Queue Length 95th (ft)	405	52	82	297	457	15
Internal Link Dist (ft)	1			362	2420	
Turn Bay Length (ft)		50				
Base Capacity (vph)	1092	836	398	1168	863	1440
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	4	38	0	0	0	0
Reduced v/c Ratio	0.45	0.18	0.29	0.38	0.56	0.20

**Intersection Summary**

Area Type: Other  
 Cycle Length: 150  
 Actuated Cycle Length: 81.6  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.80  
 Intersection Signal Delay: 18.0                      Intersection LOS: B  
 Intersection Capacity Utilization 63.1%                      ICU Level of Service B  
 Analysis Period (min) 15  
 90th %ile Actuated Cycle: 115.7  
 70th %ile Actuated Cycle: 98.2  
 50th %ile Actuated Cycle: 81.5  
 30th %ile Actuated Cycle: 70.2  
 10th %ile Actuated Cycle: 42.2



Splits and Phases: 2: Pleasant St & MASS AVE





Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	5	688	436	13	7	29
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	764	484	14	8	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)			76			
pX, platoon unblocked						
vC, conflicting volume	499				1267	492
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	499				1267	492
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	94
cM capacity (veh/h)	1065				185	577

Direction, Lane #	EB 1	WB 1	SE 1
Volume Total	770	499	40
Volume Left	6	0	8
Volume Right	0	14	32
cSH	1065	1700	409
Volume to Capacity	0.01	0.29	0.10
Queue Length (ft)	0	0	8
Control Delay (s)	0.1	0.0	14.8
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	14.8
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization	50.2%		ICU Level of Service A
Analysis Period (min)		15	

**TOWN OF LEXINGTON**  
**POLICE DEPARTMENT**  
 (781) 862-1212  
 FAX (781) 863-1291

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**FACSIMILE TRANSMITTAL SHEET**

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TO: <b>JEREMY PECK</b>	FROM: <b>SUSAN (PARKING)</b>
COMPANY: <b>WESTON &amp; SAMPSON</b>	DATE: <b>01/08/09</b>
FAX NUMBER: <b>1-978-573-4169</b>	TOTAL NO. OF PAGES INCLUDING COVER: <b>11</b>
PHONE NUMBER:	

RE:  
**TRAFFIC STUDY**

URGENT  
  FOR REVIEW  
  PLEASE COMMENT  
  PLEASE REPLY  
  PLEASE RECYCLE

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Key for MVA Summary Report Codes

#acid Total number of accidents  
 dow Day of Week  
 hr hour  
 ta type of accident  
 #veh Number of vehicles involved

Number and extent of injuries:

#fat number of fatalities  
 #ija incapacitating (serious visible injury)  
 #ijb non-incapacitating (minor visible injury)  
 #ijc possible (not visible but complains of pain)  
 tc traffic conditions  
 pd property damage ?  
 rs resident ?  
 flt Fault (D)rive (R)oad (A)lcohol

# Over Limit Prop Damage ... Involving damage in excess of \$1000

# All Resident of Town/City – Involved Residents of Lexington

Total Accidents Injury/Fatal – Total number of accidents involving injuries

Fault – Driver error  
 Road conditions  
 Alcohol/Drugs





LPD PD.RACDD  
v5.5c

DETAIL ACCIDENT REPORT

01/08/09 12:21 PAGE 2

TTYP24 -629

date from: 01/01/05 to: 12/31/08

geo code: ALL

street: MASS

x-street: MARRETT

accid typ: ALL

street#	case#	acd	dow	date	hr	ta	#veh	#fat	#ija	#ijb	#ijc	tc	pd	rs	flt
AL/DG =	0				11	=		1	23	=		0			
N/A =	9														

ACCIDENTS BY TYPE:

type	total	description of type
2	20	MV IN TRAFFIC
5	1	OBJECT OFF ROAD

LPD PD.RACD1  
v5.5b

SUMMARY ACCIDENT REPORT

01/08/09 12:22 PAGE 1  
TTYP24 -629

date from: 01/01/05 to: 12/31/08  
street: MASS  
accid typ: ALL

geo code: ALL  
x-street: MAPLE

case #	#accid	dow	date	hr ta	#veh	#fat	#ija	#ijb	#ijc
MASS AV									
	49		subtotal:		99			4	8
	49		total:		99			4	8

ACCIDENTS

# OVER LIMIT PROP DAMAGE = 48  
# ALL RESIDENT OF TOWN/CITY = 29

CONDITION	TOTAL ACCIDENTS	INJURY/FATAL	HOUR				DAY	
			12 AM	12 PM	13	14	SUN	MON
DRY = 40	NONE = 39		12 AM = 0	12 PM = 4	SUN = 3			
WET = 4	INJURY = 10		1 = 0	13 = 2	MON = 5			
SNOW = 2	FATAL = 0		2 = 0	14 = 2	TUE = 7			
ICE = 0			3 = 0	15 = 4	WED = 11			
OTH = 1			4 = 0	16 = 5	THU = 13			
= 2			5 = 0	17 = 4	FRI = 5			
			6 = 0	18 = 6	SAT = 5			
FAULT			7 = 4	19 = 1				
=====			8 = 7	20 = 0				
DRIV = 26			9 = 6	21 = 0				
ROAD = 1			10 = 1	22 = 0				
AL/DG = 0			11 = 3	23 = 0				
N/A = 22								

ACCIDENTS BY TYPE:

type	total	description of type
2	45	MV IN TRAFFIC
3	2	MV PARKED
5	1	OBJECT OFF ROAD
6	1	BICYCLE





LPD PD.RACD1  
v5.5b

SUMMARY ACCIDENT REPORT

01/08/09 12:23 PAGE 1

TTYP24 -629

date from: 01/01/05 to: 12/31/08  
street: MASS  
accid typ: ALL

geo code: ALL  
x-street: PLEASANT

case #	#accid	dow	date	hr	ta	#veh	#fat	#ija	#ijb	#ijc
MASS AV	18					33			1	1
			subtotal:			33			1	1
	18		total:			33			1	1

ACCIDENTS

# OVER LIMIT PROP DAMAGE = 17  
# ALL RESIDENT OF TOWN/CITY = 7

CONDITION	TOTAL ACCIDENTS		HOUR				DAY	
	INJURY	FATAL	12 AM	12 PM	13	14	SUN	
DRY =	14	NONE = 16	12 AM =	0	12 PM =	0	SUN =	4
WET =	2	INJURY = 2	1 =	0	13 =	0	MON =	1
SNOW =	1	FATAL = 0	2 =	0	14 =	1	TUE =	4
ICE =	0		3 =	0	15 =	0	WED =	1
OTH =	0		4 =	0	16 =	3	THU =	1
=	1		5 =	0	17 =	2	FRI =	7
			6 =	0	18 =	2	SAT =	0
			7 =	1	19 =	2		
			8 =	2	20 =	1		
			9 =	0	21 =	0		
			10 =	0	22 =	0		
			11 =	3	23 =	1		

ACCIDENTS BY TYPE:

type	total	description of type
2	15	MV IN TRAFFIC
5	1	OBJECT OFF ROAD
6	2	BICYCLE



LPD PD.RACDD  
v5.5c

DETAIL ACCIDENT REPORT

01/08/09 12:23 PAGE 2

TTYP24 -629

date from: 01/01/05 to: 12/31/08 geo code: ALL  
street: MASS x-street: PLEASANT  
accid typ: ALL

street#	case#	acd	dow	date	hr	ta	#veh	#fat	#ija	#ijb	#ijc	tc	pd	rs	flt
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ACCIDENTS BY TYPE:

type	total	description of type
2	15	MV IN TRAFFIC
5	1	OBJECT OFF ROAD
6	2	BICYCLE