

Millbrook

9 & 39 Medford Street

Somerville, Massachusetts



Traffic Impact & Access Study



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Executive Summary

This Traffic Impact & Access Study has been prepared to evaluate the potential impacts associated with the proposed residential redevelopment project at 9 and 39 Medford Street, Somerville, Massachusetts. The proposed improvements include the renovation of the existing building to include 100 residential apartment units with 100 parking spaces. The proposed project will be served by two driveways. A primary driveway at 9 Medford Street will provide access to the apartments and 81 parking spaces, 16 of which will be located in the basement. A second, driveway will provide access to an existing parking area at 39 Medford Street which will be reconfigured to provide 19 parking spaces.

This study includes a review of the existing traffic and roadway conditions in the vicinity of the project site, as well as a review of the accident history at each study intersection. This study identifies background growth for the local roadway network, estimates the additional vehicular traffic generated by the proposed development project, and evaluates the expected future roadway and intersection operations, both with and without the proposed development project in place.

Summary of Results

- Based on the Institute of Transportation Engineers (ITE) methodology, the proposed development is expected to generate 46 vehicles-trips during the weekday morning peak hour (9 entering, 37 exiting), and 56 vehicle-trips during the weekday afternoon peak hour (36 entering, and 20 exiting). Over the course of a typical weekday, approximately 599 vehicle-trips are expected.
- There are several transportation alternatives in the vicinity of the project that will reduce the resident's dependence on automobile trips. These include the close proximity of at Lechmere Station and three bus routes which travel in the immediate vicinity of the project site.
- The existing crash rate at all study intersections except one is below the MassDOT District 4 and statewide averages. The crash rate at the Medford Street/Somerville Avenue/McGrath Highway intersection is significantly higher than the District 4 average due to the antiquated traffic signal controls and the complexity of the McGrath Highway southbound approach to the intersection.
- The available stopping sight distance (SSD) for the driveways on the connector road and on Eastern Avenue are sufficient for vehicles traveling at 30 MPH on Medford Street.
- The intersection capacity analyses conducted at each study intersection indicate that the project-generated traffic is not expected to have any significant impacts on intersection and roadway operations.

This study indicates that the existing roadway network and infrastructure can accommodate the additional vehicular traffic generated by the proposed development project, with minimal impacts on traffic operations.

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1. Introduction

Design Consultants, Inc. (DCI) has prepared this traffic impact and access study to evaluate the potential impacts on the local transportation network associated with the proposed development at 9 and 39 Medford Street in the City of Somerville. The project site currently consists of a vacant cold storage warehouse and associated parking and loading areas. The proposed development will renovate the existing seven story building into 100 residential apartments. This study includes a review of the existing traffic and roadway conditions in the vicinity of the project site, identifies background traffic growth, estimates additional traffic generated by the proposed development and evaluates the future traffic operations on the surrounding roadway network.

2. Existing Conditions

Project Site

The project site is presently occupied by a cold storage building containing approximately 106,000 sf of warehouse space and associated loading and parking areas. The cold storage warehouse known as Millbrook cold storage had a robust business through 2012. In March of 2013, the cold storage facility was decommissioned, the cooling systems dismantled and the cork insulation removed. The building is currently a shell, ready for renovations.

The facility supported nine (9) frontal loading bays and three others located on the sides. All 12 loading bays facilitated truck transport. There were side bays for rail loading, but it appears that those were decommissioned years ago and the spur lines were paved over. In front of the building is a very large parking area, the area was used for queuing of trucks waiting to unload. The area encompasses 15,000 square feet and is 150 feet deep from the bays to Medford Street. Along both sides of the building are paved areas used for loading and employee parking.

The site is serviced by a single 24-foot wide curb cut. Although the curb cut is 24 feet in practicality the entire frontage along Medford Street serves as the curb cut. The reason for this is twofold. First, the curb reveal is almost non-existent and what curb is present is severely rounded over. Secondly, there is not a definable sidewalk, the area between

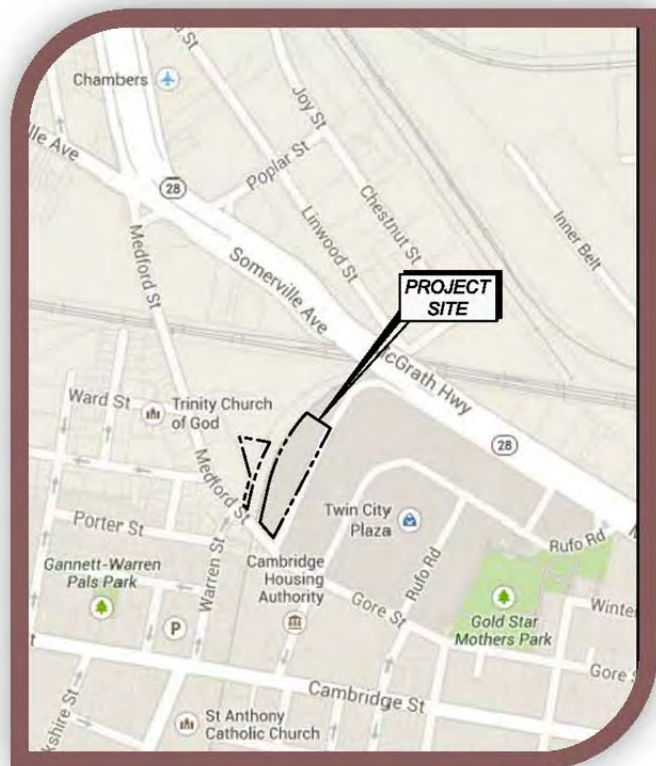


Figure 1: Project Location Map

the road curb and parking area is asphalt making it nearly impossible to identify as a sidewalk. Given the lack of vertical curb definition and sidewalk color contrast, vehicle operators have no geometric guidance. As a result, vehicles access and egress the site from all different directions and angles.

Study Area

The study area was determined in concert with Terence Smith of Somerville's Traffic & Parking Department. From the meetings with Traffic & Parking, five intersections were designated for study. Additionally the roads that link these intersections were also studied. The intersections were as follows:

- Medford Street/Somerville Avenue/McGrath Highway
- Medford Street/Ward Street
- Medford Street/South Street
- South Street/Windsor Street
- Medford Street/Warren Street
- Medford Street/Site Drive

A field inventory of the adjacent roadway network was conducted in September and October of 2013. This inventory included a collection of existing roadway geometry, traffic control, and traffic volumes for the study area roadways and intersections.

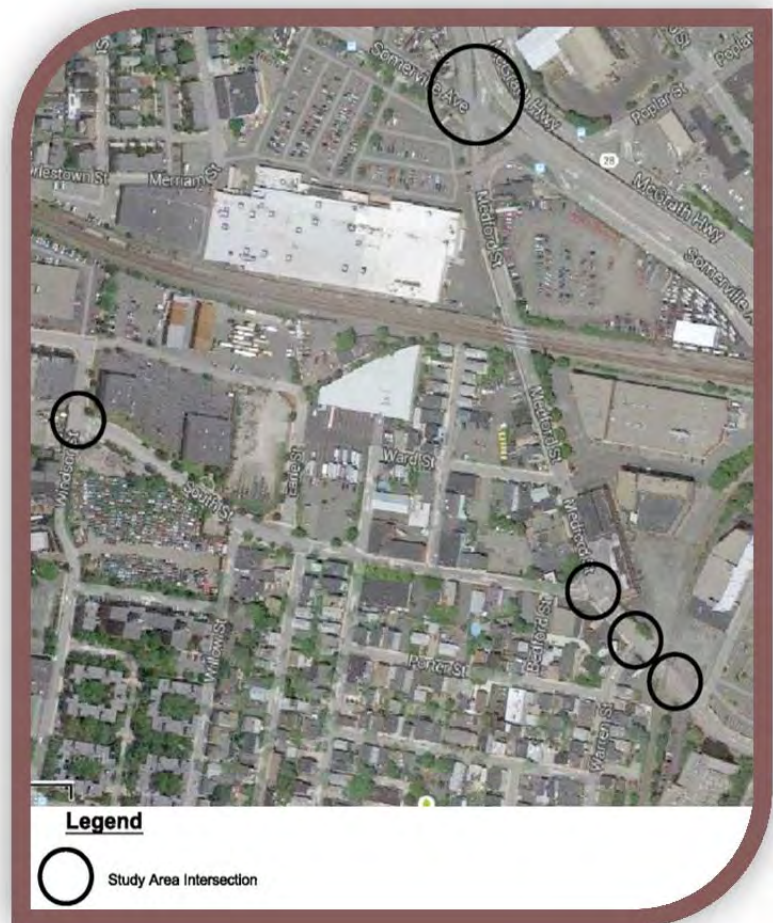


Figure 2: Study Area Intersections

Medford Street/Somerville Ave/McGrath Highway

Medford Street is a major collector road travelling north-south from Somerville Avenue to Gore Street. The Street is municipally owned and has a Right of Way (ROW) of approximately 50 feet in the vicinity of the site. The ROW is allocated into a 34-foot wide carriageway and 8 foot sidewalks. The carriage width provides one travel lane in each direction with either bicycle accommodation or parking depending on one's location along Medford Street. Parking is prohibited along both sides of Medford Street from Somerville Avenue to Ward Street, however a 5-foot wide bike lane is provided on both sides. From Ward Street to South Street parking is permitted, it is unregulated on the east side and is regulated to a 2 hour maximum on the west side. Immediately adjacent to the site is a signalized rail crossing of Medford Street. The crossing is seldom used as indicative of the condition of the rails. One other noteworthy transportation element along Medford Street is the actuated flashing beacon near South Street. The flashing beacon is pedestrian actuated and should call attention to a yield sign. At this particular location the yield signs are not present.

To the north of the subject site Medford Street intersects Somerville Avenue and McGrath Highway forming a four legged signalize intersection.

Somerville Avenue is a City owned arterial roadway travelling east-west from Porter Square in Cambridge through Union Square to its signalized intersection with McGrath Highway and Medford Street. It appears that in proximity to the intersection, Somerville Avenue is contained within a 75 foot ROW. The ROW is distributed into a 53 feet wide carriage width and approximately 12-foot sidewalks. The carriage width provides for parking on both sides, a 5 foot



Intersection of Somerville Avenue and Medford Street at McGrath Highway

bike lane and one travel lane in each direction. As vehicles approach the intersection the bike lane ends and vehicles use the eastbound approach as 2 shared lanes.

McGrath Highway (Route 28) is a DRC owned major arterial roadway travelling north-south from I-93 to Memorial Drive in Cambridge. At its intersection with Somerville Avenue and Medford Street, the McGrath Highway approach is poorly defined and appears to provide three lanes. The right most lane is separated by a low profile island and appears to function as a shared lane. The right lane appears to provide for right turns to Somerville Avenue westbound and through movements to southbound Medford Street. The Middle lane appears to be shared with southbound movements to Medford Street and McGrath Highway. The left lane appears to facilitate McGrath Highway southbound movements.

This intersection is controlled by a 3-phase traffic signal providing exclusive movements for the three approaches.

Medford Street/Ward Street

Ward Street intersects Medford Street forming a 3-legged unsignalized intersection. As described previously, Medford Street at this location is 36 feet wide providing one lane in each direction and 8 foot sidewalks. Parking exists on both sides of Medford Street south of the intersection and sharrow. The parking is regulated to a 2-hour limit. North of the intersection the additional pavement width is utilized to facilitate bicycle accommodations.

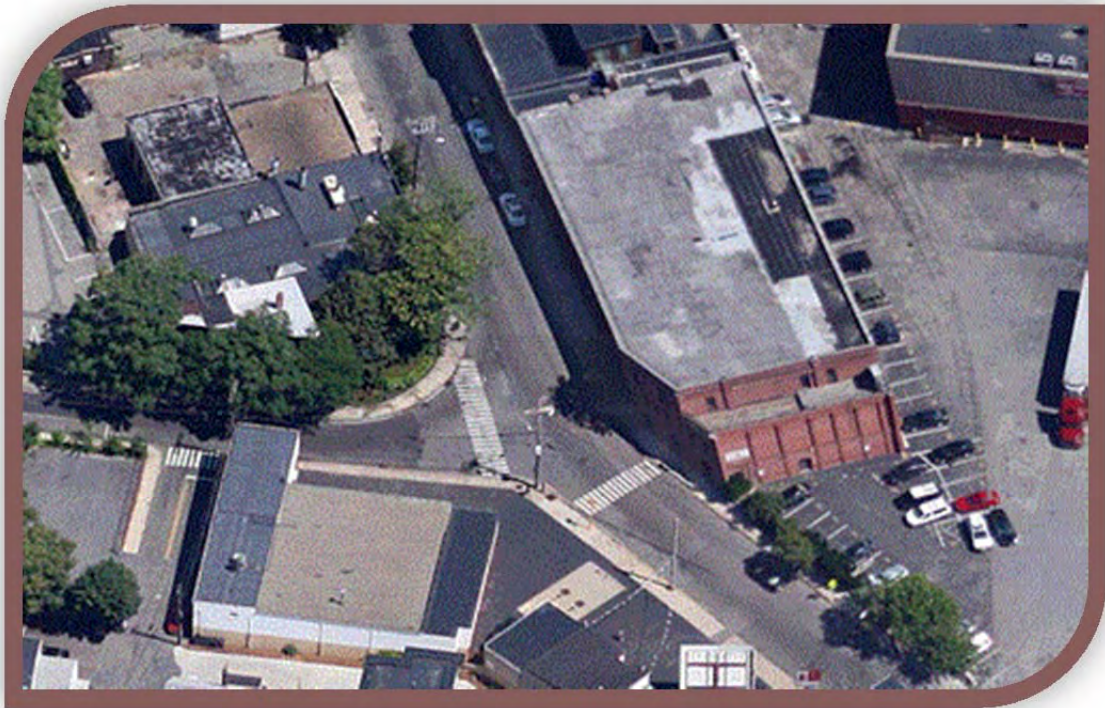
Ward Street's ROW is limited, it appears to be only 30 feet wide and supports a 20 foot wide carriage width and 5-6 foot wide sidewalks. Ward Street is one way eastbound from Boynton Yards to Medford

Street. Ward Street works as a one-way pair with South Street to provide circulation through the neighborhood. The pavement accommodates parking on the north side and is restricted to resident parking only.



Medford Street/South Street

South Street intersects Medford Street forming a 3-legged unsignalized intersection. As described previously, Medford Street at this location is 36 feet wide providing one lane in each direction and 8 foot sidewalks. South Street's ROW is limited it appears to be only 30 feet and supports a 20 foot wide carriage width and 5-6 foot wide sidewalks. South Street is one way westbound from Medford Street to Harding Street where it becomes two-way to its intersection with Windsor Place. South Street accommodates parking on the south side and is restricted to resident parking only. South Street was reconstructed in the late 80's to support the redevelopment of Boynton Yards. As a result, South Street's ROW becomes 50 feet near Harding Street and it is one-way paired with Ward Street to facilitate the Boynton yard traffic. As discussed earlier, there is a flashing beacon for the crosswalk at the intersection.

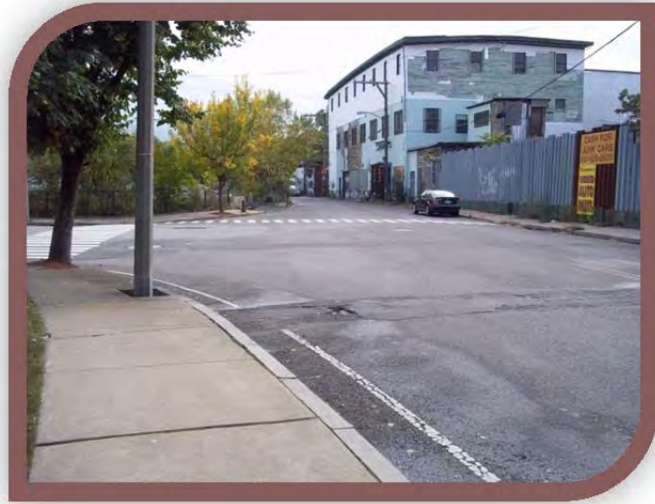


Intersection of South Street with Medford Street

South Street/Windsor Street

The west end of South street intersects with Windsor Street in the heart of the Boynton Yards redevelopment area. Because this area was reconstructed in the late 90's through an Economic Redevelopment Grant, the intersection geometry and roadway characteristics are consistent with today's design criteria. The South Street ROW is 50 feet with a 34-foot carriage width and 8 foot sidewalks. The roadway section is divided into one 13-foot travel lane in each direction and a 5-foot parking lane on the south side.

Windsor Street is a variable ROW at approximately 45 feet near the intersection with South Street. The pavement width is 33 feet and sidewalks are minimal at approximately 6 feet wide. Parking is permitted on the west side of Windsor Street and is unregulated near the intersection.



Medford Street/Warren Street

The intersection of Warren Street and Medford Street forms an unsignalized 3-legged "T" intersection. This intersection is the closest intersection to the subject site, just 150 feet north and on the opposite side of Medford Street from the existing and proposed site driveways. Warren Street is also opposite the egress for the small secondary surface lot for the subject site and parking field for the abutting property at 35 Medford Street.

As discussed earlier Medford Street in this vicinity is a 50-foot Right of way with 34 feet of pavement and approximately 8-foot sidewalks. There is no parking in close proximity to the intersection.

Warren Street is one way to the east and flows into Medford Street. Near the intersection the Warren Street ROW appears to be 40 feet with 27 feet of pavement and sidewalks. Parking is permitted on both



3. Traffic Volumes



4. Safety Analysis

To identify vehicle crash trends at the study intersections, accident data was obtained from MassDOT for the three latest years on record, 2009 – 2011. A review of the data indicated that the total number of crashes each year has been decreasing from 2009 to 2011. MassDOT notes the following causes for decreased levels in the total crashes:

The decrease in the total number of crashes in recent years is in part attributable to different reporting rates by different police jurisdictions, in some cases due to difficulties that some local police departments have experienced with electronic reporting, but also to the declining number of operator-only reports (reports submitted by motorists who are involved in crashes, for which no police report was submitted) that were entered in the Crash Data Systems (CDS) by the Registry of Motor Vehicles (RMV) in recent years.¹

The crash rates calculated below are based on the three year period from 2008 through 2010.

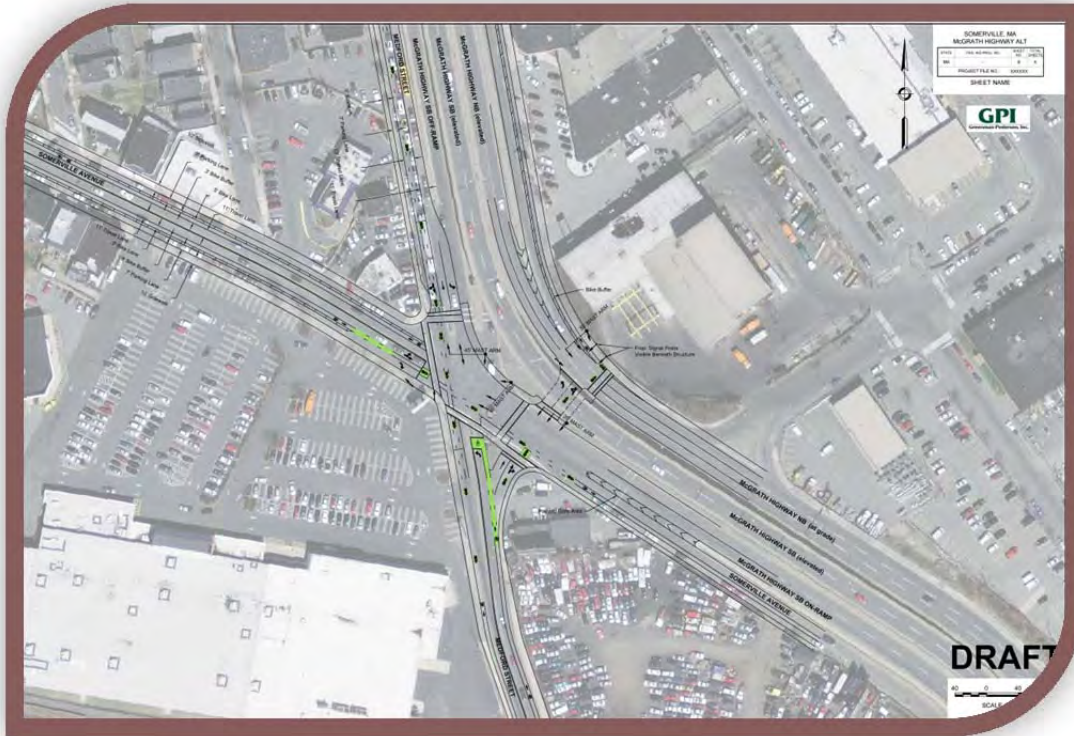
Crash rates for the study area intersections are calculated based upon the number of crashes at an intersection and the volume of traffic travelling through an intersection on a daily basis. The MassDOT average crash rates are based upon the average number of crashes occurring per million vehicles entering signalized and unsignalized intersections. The average crash rates for MassDOT District 4 (which includes the City of Somerville) are 0.77 and 0.58 for signalized and unsignalized intersections, respectively. The MassDOT statewide average crash rates are 0.80 and 0.60 for signalized and unsignalized intersections, respectively. The crash data for all study intersections are summarized in Table 3.

**Table 3: Intersection Crash Data
Number of Accidents**

Location	2009	2010	2012	Crash Rate
Medford Street/Somerville Avenue/McGrath Highway	10	13	5	1.28
Medford Street/South Street	0	0	0	0
Medford Street/Warren Street	1	0	1	0.15
South Street/Windsor Street	1	1	0	0.35

¹ From the MassDOT document “Support Information for Using Year 2002 through 2011 MassDOT (formerly MassHighway) Crash Data Files, as of 7/24/2013

As indicated in Table 3, the crash rate at the Medford Street/Somerville Avenue/McGrath Highway intersection is 1.28 which is significantly higher than the District 4 average crash rate (0.77) for signalized intersections. This can be attributed to the antiquated traffic control system and the confusing and difficult weaving maneuvers for McGrath Highway southbound drivers as they approach Somerville Avenue and Medford Street. Additionally, work is planned for this intersection by MassDOT. A short term plan to reduce accidents is currently under design, see below.



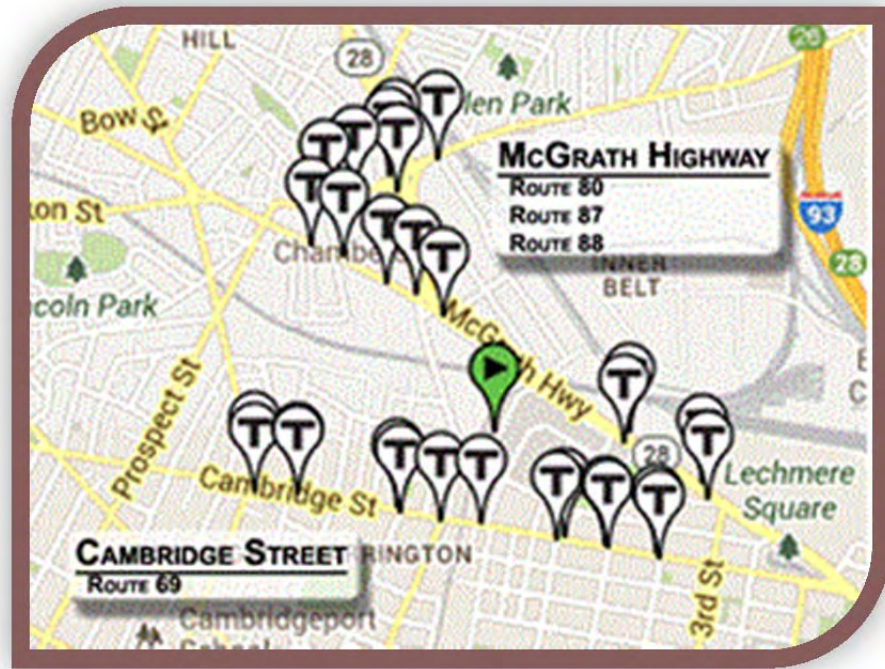
The crash rates for the other study areas intersections are well below the District 4 average crash (0.58) rate for unsignalized intersection and therefore are not considered hazardous locations

5. Public Transportation

The project area is well served by public transportation. The project site is less than a half mile (1/2) from the Lechmere Station, with a walking time of approximately 8 minutes. This multimodal station provides access to the MBTA Green Line light rail subway, as well as 13 MBTA bus routes. Additionally, with the Green Line extension funding approved, a second station is proposed on the East side of Union Square slightly less than a half mile west of the site.

In addition to the proximity of Lechmere Station, there are three MBTA bus routes that travel in the immediate vicinity of the project site. The MBTA bus routes 80, 87 and 88 travel between Lechmere Station and points west.

The 80 and 88 travel through to Arlington center and the 87 bus stops at Clarendon Hill. Bus stops are located on both sides of the McGrath Highway north of the entrance to Twin City Plaza, less than 1000 feet from the project site. Also the MBTA Bus route 69 travels from Lechmere to Harvard



Square via Cambridge Street and the bus stops are located less than 800 feet from the subject site. The headways between Route 105 buses typically range from 30-40 minutes during the weekday peak periods.

- Bus 69 - Harvard/Holyoke Gate-Lechmere Station (Cambridge Street)
- Bus 80 - Arlington Center - Lechmere Station (McGrath Highway)
- Bus 85 - Spring Hill Kendall/M.I.T. Station
- Bus 86 - Sullivan Sq. Station - Reservoir
- Bus 87 - Arlington Center or Clarendon Hill (McGrath Highway)
- Bus 88 - Clarendon Hill - Lechmere Station (McGrath Highway)
- Bus 91 - Sullivan Sq. Station - Central Square
- Bus CT2 - Sullivan Station - Ruggles Station

In aggregate, the various bus and subway transportation options within the vicinity of the project site are expected to reduce the dependence of residents on automobile travel and reduce the number of vehicle-trips going to and coming from the project site.

6. Future Conditions

Future Traffic Volumes

The future year 2018 No-build traffic volume projections are shown in Figure 4

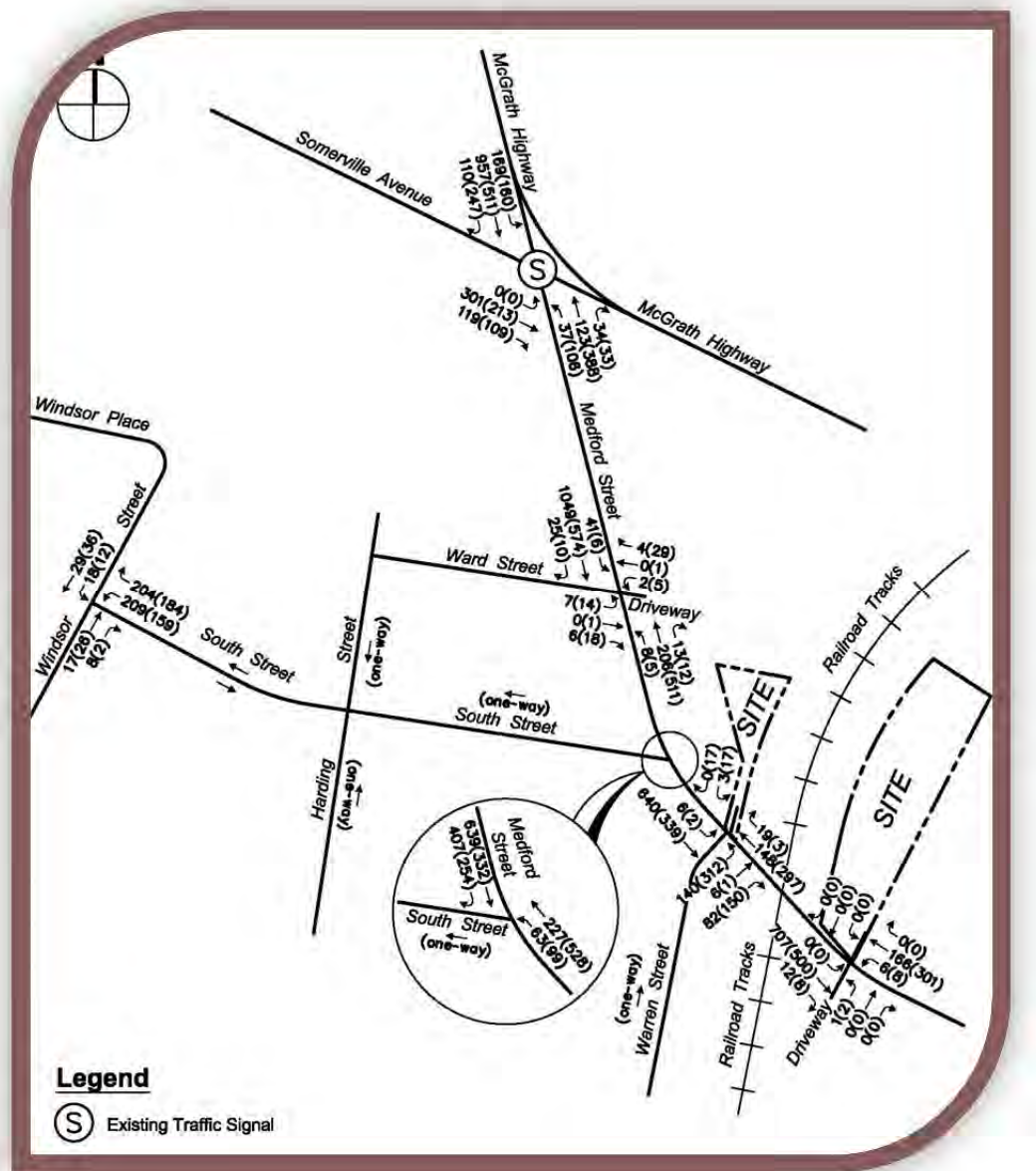
Future traffic volume projections to the year 2018, five years in the future. Future traffic volume projections typically consist of the application of a general background growth rate, and

the addition of trips generated by specific planned development projects. At this time, there is no other specific development sites planned within the study area.

Background Growth Rate

Based upon comparisons of prior data to more recent data collected by DCI throughout Somerville, traffic volumes on major arterials have remained level or decreased slightly over the past few years. To present a conservative analyses, an annual growth factor of 0.5 per year has been utilized to adjust the existing 2013 peak hour volumes to the 2018 No-build volumes.

The future year 2018 No-build traffic volume projections are shown in Figure 4.



Project-Generated Vehicle-Trips

To estimate the trip generation characteristics of the proposed project, the Institute of Transportation Engineers (ITE) Trip Generation Manual (9th edition, 2012) was used. This manual provides vehicle-trip generation projections for various land-uses, based on research and data conducted by public agencies, developers, consulting firms, and professional associations. The trips generated by the proposed project were estimated through the use of the trip generation rates and fitted curve equations for ITE Land Use 220 – Apartment.

Table 6: Trip Generation

Proposed Use - Base Trip generation			
Land Use: 220, Apartment			
Number of units:	100		
	AM Peak	PM Peak	Weekday Daily
Average Rate (per num. of dwelling	0.51	0.62	6.65
Percent Entering	20%	65%	50%
Percent Exiting	80%	35%	50%
Total Trips	51	62	665
Entering Trips	10	40	333
Exiting Trips	41	22	332
10% reduction for public	AM Peak	PM Peak	Weekday Daily
Total Trips	5	6	66
Entering Trips	1	4	33
Exiting Trips	4	2	33
Net New Trips	AM Peak	PM Peak	Weekday Daily
Total Trips	46	56	599
Entering Trips	9	36	300
Exiting Trips	37	20	299

As indicated in Table 6, the proposed project is expected to generate a total of 46 vehicle-trips during the weekday morning peak hour, 56 vehicle-trips during the weekday afternoon peak hour, and 599 vehicle-trips over the course of a typical weekday.

The project-generated vehicle trips were then distributed onto the roadway network based upon existing peak hour travel patterns. The trip distribution pattern used to apply the new vehicle-trips to the roadway network is displayed in Figure 5. The new weekday morning and

afternoon peak hour site-generated vehicle-trips are displayed in Figure 6 and, and the year 2018 Future Build Peak Hour traffic volumes are shown in Figure 7.

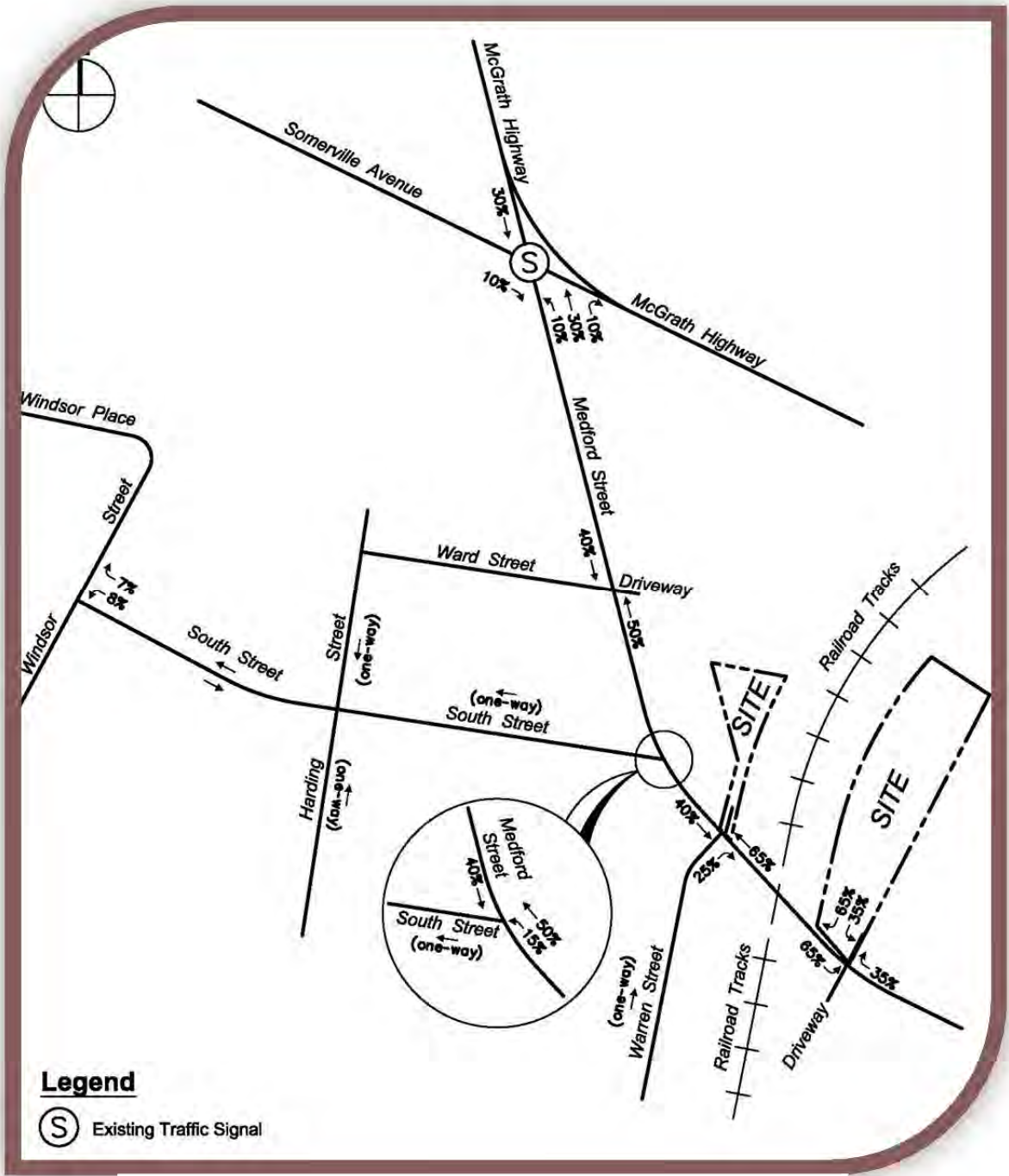


Figure 5: Trip Generation

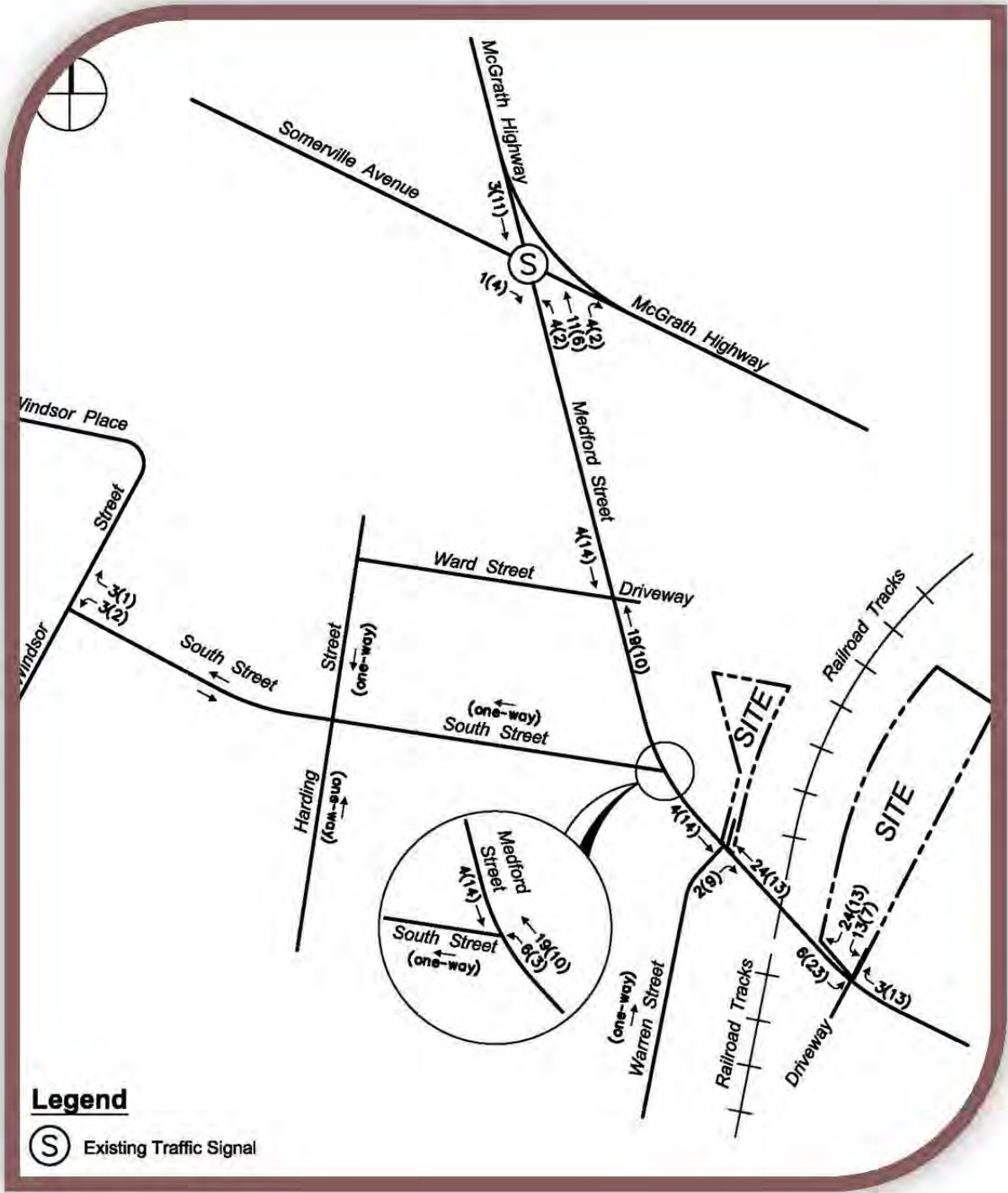


Figure 6: Site-Generated Vehicle-Trips AM(PM)

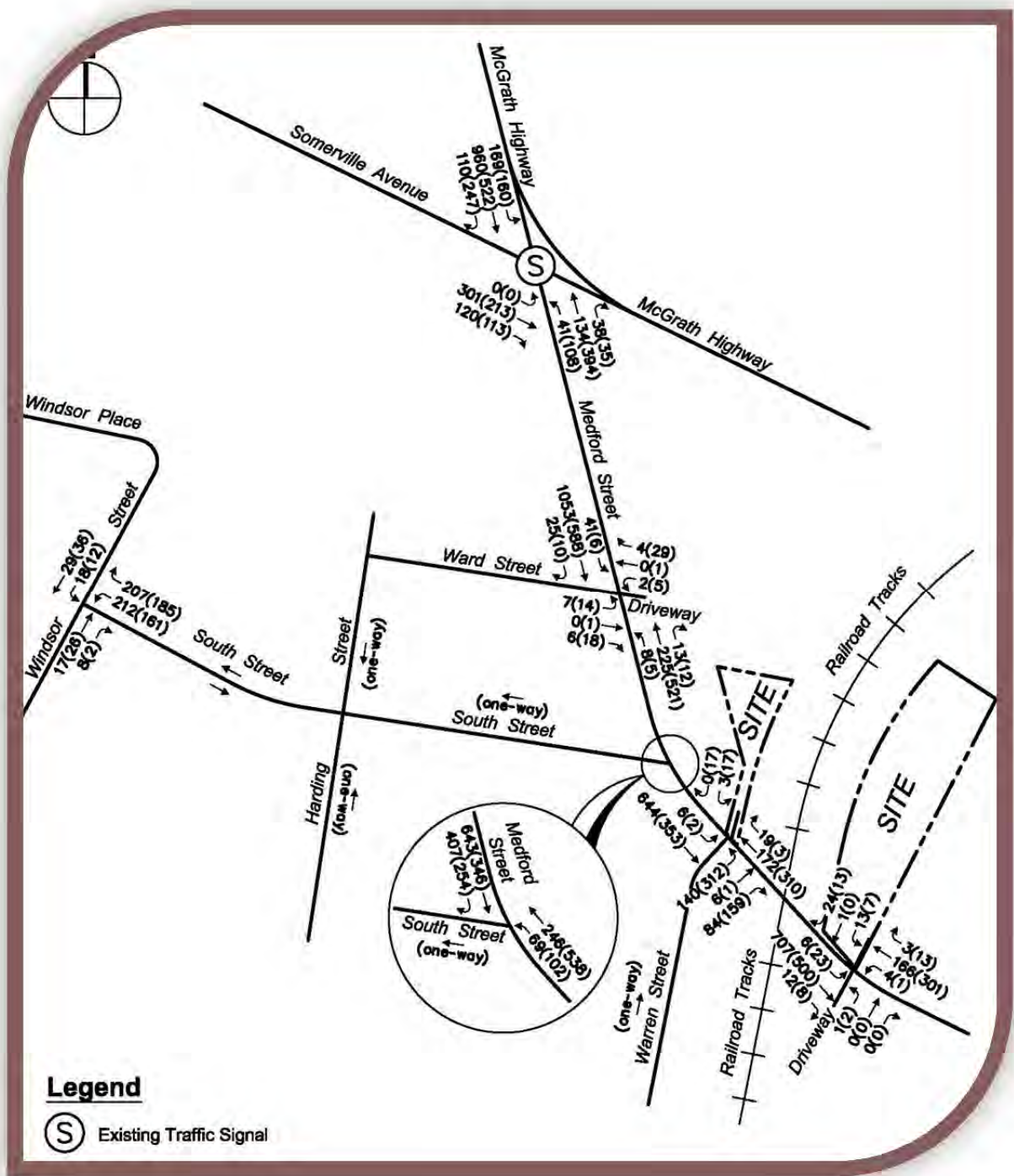


Figure 7: 2018 Build Traffic Volumes AM(PM)

Site Access

The proposed redevelopment at 9 and 39 Medford Street will be serviced by a single 22-foot wide two-way driveway to the apartments at 39 Medford Street. A second 22-foot wide two-way driveway to the ancillary parking lot at 9 Medford Street will be located opposite Ward Street.

Sight Distance

The sight distance was measured at each of the proposed driveway locations on Medford Street.

The required sight distance is a function of perception/reaction time of the approaching motorist and the required braking distance, which is based on vehicular speed. The available sight distance at the proposed driveways were recorded in conformance with the procedures established in the American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets (6th ed., 2011). The available sight distance was then compared to the minimum requirements for two sight distance criteria: Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD).

SSD is the distance required for vehicles on the major road to stop in time to avoid a collision with a stationary object (vehicle) in the roadway. The SSD was recorded from the edge of the travel way on the major roadway. This is the point at which an object becomes an obstruction to a moving vehicle. ISD is the distance needed for a vehicle to enter the major roadway from the minor roadway without interfering with traffic operations on the major roadway. ISD is often desirable to improve traffic operations and to provide convenience for vehicles exiting the minor roadway, but it is not required. In accordance with the procedure stated in the AASHTO A Policy on Geometric Design of Highways and Streets, the ISD was recorded 15 feet back from the edge of the travel way. This point forms one vertex of the “clear sight triangle”. The sight triangle is the area that must be clear from obstructions to provide sufficient ISD for a stopped driver on a minor road approach to depart from the intersection and enter the major roadway.

A travel speed of 30 MPH along Medford Street was used at all driveway locations. Table 7 compares the available sight distance at the proposed site driveway location, as recorded in the field, to the minimum requirements for SSD and ISD.

Table 7: Sight Distance Analysis

Location	Available Sight Distance		Minimum Required SSD	Minimum Desirable ISD	Available SSD sufficient for vehicles traveling at
	SSD	ISD			
Driveway @ 9 (A)	225 ft	225 ft	200 ft	335 ft	30 MPH
Driveway @ 9 (B)	340 ft	280 ft	200 ft	335 ft	30 MPH
Driveway @ 39 (A)	>300 ft	>350 ft	200 ft	335 ft	30 MPH
Driveway @ 39 (B)	200 ft	150 ft	200 ft	335 ft	30 MPH

A SSD for southbound drivers, ISD is looking to the north from the driveways

B SSD for northbound drivers, ISD is looking to the south from the driveways

As shown in Table 7, SSD at both driveways satisfy the requirements for 30 MPH travel along Medford Street. In three instances, ISD falls considerably short of desirable distances but this is typical within urban areas due to buildings, fences, and shrubs located along back of sidewalks. It should again be noted that SSD is related to safety while ISD is related to traffic operation along the major street.

Intersection Capacity Analysis

To assess quality of traffic flow, intersection capacity analyses were conducted for the study intersections for the following three scenarios:

- 2013 Existing Conditions
- 2018 Future No-Build Conditions
- 2018 Future Build Conditions

Within each scenario, analyses were conducted for the weekday morning and afternoon peak hours. The intersection capacity analyses determine vehicular delays, vehicular queuing, and intersection capacity based on the intersection geometry, traffic signal timing and phasing, and vehicular volumes.

“Level of Service” is used to denote the different operating conditions for roadways and intersections under various traffic volume loads. LOS designations range from “A” at best with little or no delays to “F” at worst with long delays and forced flow conditions. LOS ratings for an intersection are based upon the average delay per approaching vehicle.

Definitions of Levels of Service at signalized and unsignalized intersections are defined in the 2010 Highway Capacity Manual. The following tables summarize the relationship between Level of Service, delay, and qualitative traffic flow. It is noted that the delay thresholds in the table below correspond with a volume-to-capacity (v/c) ratio of less than 1.0. For any v/c ratio of greater than 1.0, a LOS F is assigned, regardless of the vehicular delay.

Table 8: Level of Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec)	Qualitative Description
A	≤ 10	Good progression, few stops and short cycle lengths.
B	> 10-20	Good progression and/or short cycle lengths; more vehicle stops.
C	> 20-35	Fair progression and/or longer cycle lengths; some cycle failures; significant portion of vehicles must stop.
D	> 35-55	Congestion becomes noticeable; high-volume-to-capacity ratio; longer delays; noticeable cycle failures.
E	> 55-80	At or beyond limit of acceptable delay; poor progression; long cycles; high volumes; long queues.
F	> 80	Unacceptable to drivers. Arrival volumes greater than discharge capacity; long cycle lengths; unstable-unpredictable flows.

SOURCE: HCM2010: Highway Capacity Manual, published by the Transportation Research Board, 2010.

The delay thresholds that define LOS at unsignalized intersections differ from those at signalized intersections, primarily due to different driver expectations. At unsignalized intersections, the LOS is not defined for the intersection as a whole, as a high volume of vehicles on the major roadway typically experience no delay, and would heavily skew any weighted average of delays. Similar to the thresholds for signalized intersections, the delay thresholds in the table below correspond with a volume-to-capacity (v/c) ratio of less than 1.0. For any v/c ratio of greater than 1.0, a LOS F is assigned, regardless of the vehicular delay.

Table 9: Level of Service Criteria for Unsignalized Intersections

Level of Service	Delay per Vehicle (sec)
A	< 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

SOURCE: HCM2010: Highway Capacity Manual, published by the Transportation Research Board, 2010.

Detailed traffic analysis networks for the weekday morning and afternoon peak hours were developed to perform the capacity analyses, which utilized the Synchro v8 software. A summary of the intersection capacity analysis is shown in Tables 10 and 11. The detailed capacity analysis worksheets are contained in the Appendix.

It is noted that the 2018 Build analyses include all study intersections, and the proposed site driveways on Medford Street.

Table 10: Intersection Capacity Analysis Summary – Weekday AM Peak Hour

	2013 Existing			2018 No-Build			2018 Build		
	Delay	LOS	95 th Q	Delay	LOS	95 th Q	Delay	LOS	95 th Q
Warren St / Driveway/ Medford St									
Medford St SEB L	7.7	A	0.015 (veh)	7.7	A	0.015 (veh)	7.8	A	0.016 (veh)
Medford St SEB T	0	A	-	0	A	-	0	A	-
Medford St NWB T	-	-	-	-	-	-	-	-	-
Medford St NWB R	-	-	-	-	-	-	-	-	-
Warren St NEB L	70.4	F	7.984	82.7	F	8.873	95.7	F	9.638
Warren St NEB T	-	-	-	-	-	-	-	-	-
Warren St NEB R	-	-	-	-	-	-	-	-	-
Driveway SWB L	26.5	D	0.141	27.8	D	0.149	29.3	D	0.159
Driveway SWB R	-	-	-	-	-	-	-	-	-
<i>Overall Intersection</i>	15.4 s/veh	-	-	18 s/veh	-	-	20.4 s/veh	-	-
Medford St / South St									
Medford St NB L	5.4	A	14 (ft)	5.8	A	15 (ft)	6.2	A	17 (ft)
Medford St NB T	-	-	-	-	-	-	-	-	-
Medford St SB T	0	-	0	0	-	0	0	-	0

Medford St SB R	-	-	-	-	-	-	-	-	-
<i>Overall Intersection</i>	<i>1.2</i>	<i>A</i>	<i>-</i>	<i>1.3</i>	<i>A</i>	<i>-</i>	<i>1.4</i>	<i>A</i>	<i>-</i>
Medford St / Ward St / Driveway									
Ward St EB L	36.3	E	0.407 (veh)	38.3	E	0.432 (veh)	39.6	E	0.448 (veh)
Ward St EB T	-	-	-	-	-	-	-	-	-
Ward St EB R	-	-	-	-	-	-	-	-	-
Driveway WB L	22.9	C	0.178	23.8	C	0.187	24.8	C	0.196
Driveway WB T	-	-	-	-	-	-	-	-	-
Driveway WB R	-	-	-	-	-	-	-	-	-
Medford St NB L	11.3	B	0.046	11.5	B	-	11.5	B	0.048
Medford St NB T	0	A	-	0	A	-	0	A	-
Medford St NB R	-	-	-	-	-	-	-	-	-
Medford St SB L	7.9	A	0.103	7.9	A	0.106	8.0	A	0.108
Medford St SB T	0	A	-	0	A	-	0	A	-
Medford St SB R	-	-	-	-	-	-	-	-	-
<i>Overall Intersection</i>	<i>0.9 s/veh</i>	<i>-</i>	<i>-</i>	<i>0.9 s/veh</i>	<i>-</i>	<i>-</i>	<i>0.9 s/veh</i>	<i>-</i>	<i>-</i>
Medford St / Somerville Ave/ McGrath Highway									
Somerville Ave EB L	-	-	-	-	-	-	-	-	-
Somerville Ave EB T	36.5	D	175 (ft)	37.0	D	180 (ft)	37.1	D	181 (ft)
Somerville Ave EB R	-	-	-	-	-	-	-	-	-
Medford St NB L	33.4	C	48	33.4	C	48	33.7	C	52
Medford St NB T	39.9	D	148	40.5	D	152	42.8	D	166
Medford St NB R	-	-	-	-	-	-	-	-	-
McGrath Hwy SB L	20.5	C	120	20.5	C	121	20.5	C	121
McGrath Hwy SB T	33.6	C	430	35.2	D	461	35.4	D	465
McGrath Hwy SB R	-	-	-	-	-	-	-	-	-
<i>Overall Intersection</i>	<i>33.8</i>	<i>C</i>	<i>-</i>	<i>34.9</i>	<i>C</i>	<i>-</i>	<i>35.4</i>	<i>D</i>	<i>-</i>
Miller's River Apartments Driveway / Millbrook Driveway / Medford St									
Medford St EB L	0	A	0	0	A	0	7.7	A	0.015
Medford St EB T	-	-	-	-	-	-	-	-	-
Medford St EB R	-	-	-	-	-	-	-	-	-
Medford St WB L	9.6	A	0.025 (veh)	9.7	A	0.025 (veh)	9.7	A	0.025 (veh)
Medford St WB T	0	A	-	0	A	-	0	A	-
Medford St WB R	-	-	-	-	-	-	-	-	-
Miller's River Apts NB L	21.5	C	0.055	22.1	C	0.057	23.6	C	0.062
Miller's River Apts NB T	-	-	-	-	-	-	-	-	-
Miller's River Apts NB R	-	-	-	-	-	-	-	-	-
Millbrook Driveway SB L	0	A	-	0	A	-	15	C	0.333
Millbrook Driveway SB T	-	-	-	-	-	-	-	-	-
Millbrook Driveway SB R	-	-	-	-	-	-	-	-	-
<i>Overall Intersection</i>	<i>0.8 s/veh</i>	<i>-</i>	<i>-</i>	<i>0.1 s/veh</i>	<i>-</i>	<i>-</i>	<i>0.8 s/veh</i>	<i>-</i>	<i>-</i>
Windsor St / South St									

South St WB L	13.0	B	3.139 (veh)	13.3	B	3.301 (veh)	13.4	B	3.397 (veh)
South St WB R	-	-	-	-	-	-	-	-	-
Windsor St NB T	-	-	-	-	-	-	-	-	-
Windsor St NB R	-	-	-	-	-	-	-	-	-
Windsor St SB L	7.4	A	0.04	7.4	A	0.04	7.4	A	0.04
Windsor St SB T	0	A	-	0	A	-	0	A	-
Overall Intersection	11.1	-	-	11.3	-	-	11.4	-	-

Notes and Abbreviations: * Results not reported in HCM 2010 analysis. HCM 2000 results reported in this table.

Delay = Average Delay per vehicle, measured in seconds
 LOS = Level of Service
 50th Q = 50th Percentile Queue, measured in feet
 95th Q = 95th Percentile Queue, measured in feet
 (vehicle queue calculations assume 25ft per vehicle)

EB = Eastbound
 WB = Westbound
 NB = Northbound
 SB = Southbound

L = Left
 T = Through
 R = Right

LT = Left, Through
 TR = Through, Right
 LR = Left, Right
 LTR = Left, Through, Right

Table 11: Intersection Capacity Analysis Summary – Weekday PM Peak Hour

	2013 Existing			2018 No-Build			2018 Build		
	Delay	LOS	95 th Q	Delay	LOS	95 th Q	Delay	LOS	95 th Q
Warren St / Driveway/ Medford St									
Medford St SEB L	8.0	A	0.005 (veh)	8.0	A	0.005 (veh)	8.1	A	0.005 (veh)
Medford St SEB T	0	A	-	0	A	-	0	A	-
Medford St NWB T	-	-	-	-	-	-	-	-	-
Medford St NWB R	-	-	-	-	-	-	-	-	-
Warren St NEB L	157.6	F	20.0	181.9	F	22.0	210.9	F	24.107
Warren St NEB T	-	-	-	-	-	-	-	-	-
Warren St NEB R	-	-	-	-	-	-	-	-	-
Driveway SWB L	17.6	C	0.452	18.1	C	0.47	19.1	C	0.506
Driveway SWB R	-	-	-	-	-	-	-	-	-
Overall Intersection	63.6 s/veh	-	-	73.1 s/veh	-	-	83.7 s/veh	-	-
Medford St / South St									
Medford St NB L	2.9	A	10 (ft)	3.0	A	10 (ft)	3.1	A	11 (ft)
Medford St NB T	-	-	-	-	-	-	-	-	-
Medford St SB T	0	-	0	0	-	0	0	-	0
Medford St SB R	-	-	-	-	-	-	-	-	-
Overall Intersection	1.5	A	-	1.6	A	-	1.6	A	-
Medford St / Ward St / Driveway									
Ward St EB L	29.5	D	1.159 (veh)	31.1	D	1.226 (veh)	32.3	D	1.275 (veh)
Ward St EB T	-	-	-	-	-	-	-	-	-
Ward St EB R	-	-	-	-	-	-	-	-	-
Driveway WB L	19.0	C	0.600	19.4	C	0.635	19.9	C	0.656
Driveway WB T	-	-	-	-	-	-	-	-	-
Driveway WB R	-	-	-	-	-	-	-	-	-
Medford St NB L	9.1	A	0.018	9.1	A	0.018	9.2	A	0.019

Medford St NB T	0	A	-	0	A	-	0	A	-
Medford St NB R	-	-	-	-	-	-	-	-	-
Medford St SB L	8.9	A	0.021	9.0	A	0.021	9.0	A	0.021
Medford St SB T	0	A	-	0	A	-	0	A	-
Medford St SB R	-	-	-	-	-	-	-	-	-
<i>Overall Intersection</i>	2.3 s/veh	-	-	2.3 s/veh	-	-	2.4 s/veh	-	-
Medford St / Somerville Ave/ McGrath Highway									
Somerville Ave EB L	-	-	-	-	-	-	-	-	-
Somerville Ave EB T	28.9	C	120 (ft)	29.4	C	124 (ft)	28.8	C	122 (ft)
Somerville Ave EB R	-	-	-	-	-	-	-	-	-
Medford St NB L	35.9	D	111	36.1	D	114	36.2	D	116
Medford St NB T	142.3	F	539	153.8	F	557	162.7	F	571
Medford St NB R	-	-	-	-	-	-	-	-	-
McGrath Hwy SB L	20.2	C	114	20.3	C	116	20.3	C	116
McGrath Hwy SB T	22.8	C	260	23.8	C	270	24.1	C	276
McGrath Hwy SB R	-	-	-	-	-	-	-	-	-
<i>Overall Intersection</i>	53.7	D	-	56.8	E	-	59.2	E	-
Miller's River Apartments Driveway / Millbrook Driveway / Medford St									
Medford St EB L	0	A	0	0	A	0	8.4	A	0.07
Medford St EB T	-	-	-	-	-	-	-	-	-
Medford St EB R	-	-	-	-	-	-	-	-	-
Medford St WB L	8.9	A	0.029	8.9	A	0.029	8.9	A	0.029
Medford St WB T	0	A	-	0	A	-	0	A	-
Medford St WB R	-	-	-	-	-	-	-	-	-
Miller's River Apts NB L	22.0	C	0.113	22.6	C	0.117	25.7	D	0.137
Miller's River Apts NB T	-	-	-	-	-	-	-	-	-
Miller's River Apts NB R	-	-	-	-	-	-	-	-	-
Millbrook Driveway SB L	0	A	-	0	A	-	16.9	C	0.214
Millbrook Driveway SB T	-	-	-	-	-	-	-	-	-
Millbrook Driveway SB R	-	-	-	-	-	-	-	-	-
<i>Overall Intersection</i>	0.3 s/veh	-	-	0.3 s/veh	-	-	0.9 s/veh	-	-
Windsor St / South St									
South St WB L	11.3	B	1.812	11.4	B	1.893	11.4	B	1.92
South St WB R	-	-	-	-	-	-	-	-	-
Windsor St NB T	-	-	-	-	-	-	-	-	-
Windsor St NB R	-	-	-	-	-	-	-	-	-
Windsor St SB L	7.4	A	0.034	7.4	A	0.034	7.4	A	0.034
Windsor St SB T	0	A	-	0	A	-	0	A	-
<i>Overall Intersection</i>	9.0 s/veh	-	-	9.1 s/veh	-	-	9.1 s/veh	-	-
Notes and Abbreviations:				<i>* Results not reported in HCM 2010 analysis. HCM 2000 results reported in this table.</i>					
Delay = Average Delay per vehicle, measured in seconds				EB = Eastbound		L = Left		LT = Left, Through	
LOS = Level of Service				WB = Westbound		T = Through		TR = Through,	
50 th Q = 50 th Percentile Queue, measured in feet				NB = Northbound		R = Right			

95 th Q = 95 th Percentile Queue, measured in feet (vehicle queue calculations assume 25ft per vehicle)	SB = Southbound		Right LR = Left, Right LTR = Left, Through, Right
--	-----------------	--	--

As indicated in Tables 10 and 11, the addition of the project-generated vehicle-trips to the roadway network does not have any significant impacts on the study intersections. The anticipated overall LOS at each intersection in the 2018 Build scenario remains unchanged relative to the overall LOS in the 2018 No-Build. The exceptions are the Miller's River Apartments northbound left out which changes from LOS "C" to "D" in the PM peak hour with only a slight increase in delays. The Millbrook site driveway drops to LOS "C" due to the new apartment traffic. The overall LOS out of the Medford Street/Somerville Avenue/McGrath Highway intersection drops from "C" to "D" in the AM peak hour with only a minimum estimated increase in delays of 0.5 seconds.

The incremental increases in vehicle queuing to the addition of project-generated vehicle trips is also minimal.

The results of these intersection capacity analyses indicate that the proposed project will have a negligible impact on traffic operations at the surrounding intersections, and that the existing transportation infrastructure will be able to accommodate the proposed development project.

7. Conclusion

The various traffic operation and safety analyses that have been included in this report all indicate that the proposed 100 residential apartment units at 39 Medford Street will have minimal impacts to the surrounding roadways and intersections. The minimal impacts as stated in the report are conservative in that no credit was taken for the prior use. The report illustrates a worst case scenario. As stated earlier Millbrook cold storage was a robust business with significant truck trips. Subtracting those trips would reduce newly generated AM, PM and daily estimates trips by 60% -70%.

Most of the study intersections experience a crash rate below the MassDOT District 4 average, and the proposed project is not expected to exacerbate any existing safety conditions at the those locations. The one intersection at Somerville Avenue and Medford Street with McGrath Highway that exceeds the MassDot crash rate is under redesign by the state and is proposed to be reconstructed by the state to enhance safety of the intersection.

The available stopping sight distances for the driveways on the Medford Street are sufficient for vehicles traveling at 30 MPH.

As mitigation DCI is recommending that new pedestrian warning signs be installed to current MUTCD standards. The signs should be placed on the existing flashing Beacon as well as in advance of the crossing at the intersection of South Street and Medford Street. Standard W11-2 signs should be used.

Lastly, the intersection capacity analyses indicate's that the additional vehicle-trips that are expected to be generated by the project site can easily be accommodated by the existing transportation infrastructure, with minimal impacts on traffic operations. This finding is consistent for both analysis periods, the weekday morning and afternoon peak hours.

Appendices

Appendix A: Traffic Count Data

Appendix B: Crash Rate Worksheets

Appendix C: Intersection Capacity Analysis

Appendix A

Traffic Count Data



Traffic Counts with Precision



Somerville, MA



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N/S: Medford Street
E/W: Storage Driveway/ Warren Street
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 A
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Warren Street From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	0	125	0	0	1	0	2	0	0	20	0	0	11	1	27	0	187
07:15 AM	0	107	0	0	0	0	2	0	2	23	0	0	18	1	22	0	175
07:30 AM	0	115	1	0	1	0	0	0	0	41	0	0	15	0	29	0	202
07:45 AM	0	130	0	0	0	0	0	0	2	39	0	0	21	0	34	0	226
Total	0	477	1	0	2	0	4	0	4	123	0	0	65	2	112	0	790
08:00 AM	0	176	1	0	0	0	0	0	3	44	0	0	25	2	35	0	286
08:15 AM	0	161	0	0	0	0	0	0	6	37	0	0	16	2	30	0	252
08:30 AM	0	148	1	0	0	0	2	0	5	28	0	0	20	0	33	0	237
08:45 AM	0	139	4	0	0	0	1	0	5	35	0	0	19	2	39	0	244
Total	0	624	6	0	0	0	3	0	19	144	0	0	80	6	137	0	1019
Grand Total	0	1101	7	0	2	0	7	0	23	267	0	0	145	8	249	0	1809
Apprch %	0	99.4	0.6	0	22.2	0	77.8	0	7.9	92.1	0	0	36.1	2	61.9	0	
Total %	0	60.9	0.4	0	0.1	0	0.4	0	1.3	14.8	0	0	8	0.4	13.8	0	
Cars	0	1060	7	0	2	0	7	0	22	253	0	0	125	8	228	0	1712
% Cars	0	96.3	100	0	100	0	100	0	95.7	94.8	0	0	86.2	100	91.6	0	94.6
Heavy Vehicles	0	41	0	0	0	0	0	0	1	14	0	0	20	0	21	0	97
% Heavy Vehicles	0	3.7	0	0	0	0	0	0	4.3	5.2	0	0	13.8	0	8.4	0	5.4

	Medford Street From North					Storage Driveway From East					Medford Street From South					Warren Street From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	176	1	0	177	0	0	0	0	0	3	44	0	0	47	25	2	35	0	62	286
08:15 AM	0	161	0	0	161	0	0	0	0	0	6	37	0	0	43	16	2	30	0	48	252
08:30 AM	0	148	1	0	149	0	0	2	0	2	5	28	0	0	33	20	0	33	0	53	237
08:45 AM	0	139	4	0	143	0	0	1	0	1	5	35	0	0	40	19	2	39	0	60	244
Total Volume	0	624	6	0	630	0	0	3	0	3	19	144	0	0	163	80	6	137	0	223	1019
% App. Total	0	99	1	0		0	0	100	0		11.7	88.3	0	0		35.9	2.7	61.4	0		
PHF	.000	.886	.375	.000	.890	.000	.000	.375	.000	.375	.792	.818	.000	.000	.867	.800	.750	.878	.000	.899	.891
Cars	0	595	6	0	601	0	0	3	0	3	18	133	0	0	151	71	6	120	0	197	952
% Cars	0	95.4	100	0	95.4	0	0	100	0	100	94.7	92.4	0	0	92.6	88.8	100	87.6	0	88.3	93.4
Heavy Vehicles	0	29	0	0	29	0	0	0	0	0	1	11	0	0	12	9	0	17	0	26	67
% Heavy Vehicles	0	4.6	0	0	4.6	0	0	0	0	0	5.3	7.6	0	0	7.4	11.3	0	12.4	0	11.7	6.6



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Groups Printed- Cars

	Medford Street From North				Storage Driveway From East				Medford Street From South				Warren Street From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	0	120	0	0	1	0	2	0	0	20	0	0	9	1	27	0	180
07:15 AM	0	105	0	0	0	0	2	0	2	20	0	0	15	1	21	0	166
07:30 AM	0	115	1	0	1	0	0	0	0	41	0	0	12	0	29	0	199
07:45 AM	0	125	0	0	0	0	0	0	2	39	0	0	18	0	31	0	215
Total	0	465	1	0	2	0	4	0	4	120	0	0	54	2	108	0	760
08:00 AM	0	161	1	0	0	0	0	0	3	44	0	0	22	2	34	0	267
08:15 AM	0	155	0	0	0	0	0	0	5	35	0	0	14	2	23	0	234
08:30 AM	0	145	1	0	0	0	2	0	5	23	0	0	19	0	30	0	225
08:45 AM	0	134	4	0	0	0	1	0	5	31	0	0	16	2	33	0	226
Total	0	595	6	0	0	0	3	0	18	133	0	0	71	6	120	0	952
Grand Total	0	1060	7	0	2	0	7	0	22	253	0	0	125	8	228	0	1712
Apprch %	0	99.3	0.7	0	22.2	0	77.8	0	8	92	0	0	34.6	2.2	63.2	0	
Total %	0	61.9	0.4	0	0.1	0	0.4	0	1.3	14.8	0	0	7.3	0.5	13.3	0	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Warren Street From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	161	1	0	162	0	0	0	0	0	3	44	0	0	47	22	2	34	0	58	267
08:15 AM	0	155	0	0	155	0	0	0	0	0	5	35	0	0	40	14	2	23	0	39	234
08:30 AM	0	145	1	0	146	0	0	2	0	2	5	23	0	0	28	19	0	30	0	49	225
08:45 AM	0	134	4	0	138	0	0	1	0	1	5	31	0	0	36	16	2	33	0	51	226
Total Volume	0	595	6	0	601	0	0	3	0	3	18	133	0	0	151	71	6	120	0	197	952
% App. Total	0	99	1	0		0	0	100	0		11.9	88.1	0	0		36	3	60.9	0		
PHF	.000	.924	.375	.000	.927	.000	.000	.375	.000	.375	.900	.756	.000	.000	.803	.807	.750	.882	.000	.849	.891



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Groups Printed- Heavy Vehicles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Warren Street From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	0	5	0	0	0	0	0	0	0	0	0	0	2	0	0	0	7
07:15 AM	0	2	0	0	0	0	0	0	0	3	0	0	3	0	1	0	9
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3
07:45 AM	0	5	0	0	0	0	0	0	0	0	0	0	3	0	3	0	11
Total	0	12	0	0	0	0	0	0	0	3	0	0	11	0	4	0	30
08:00 AM	0	15	0	0	0	0	0	0	0	0	0	0	3	0	1	0	19
08:15 AM	0	6	0	0	0	0	0	0	1	2	0	0	2	0	7	0	18
08:30 AM	0	3	0	0	0	0	0	0	0	5	0	0	1	0	3	0	12
08:45 AM	0	5	0	0	0	0	0	0	0	4	0	0	3	0	6	0	18
Total	0	29	0	0	0	0	0	0	1	11	0	0	9	0	17	0	67
Grand Total	0	41	0	0	0	0	0	0	1	14	0	0	20	0	21	0	97
Apprch %	0	100	0	0	0	0	0	0	6.7	93.3	0	0	48.8	0	51.2	0	
Total %	0	42.3	0	0	0	0	0	0	1	14.4	0	0	20.6	0	21.6	0	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Warren Street From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	15	0	0	15	0	0	0	0	0	0	0	0	0	0	3	0	1	0	4	19
08:15 AM	0	6	0	0	6	0	0	0	0	0	1	2	0	0	3	2	0	7	0	9	18
08:30 AM	0	3	0	0	3	0	0	0	0	0	0	5	0	0	5	1	0	3	0	4	12
08:45 AM	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	3	0	6	0	9	18
Total Volume	0	29	0	0	29	0	0	0	0	0	1	11	0	0	12	9	0	17	0	26	67
% App. Total	0	100	0	0		0	0	0	0		8.3	91.7	0	0		34.6	0	65.4	0		
PHF	.000	.483	.000	.000	.483	.000	.000	.000	.000	.000	.250	.550	.000	.000	.600	.750	.000	.607	.000	.722	.882



PRECISION
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INDUSTRIES, LLC

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N/S: Medford Street
E/W: Storage Driveway/ Warren Street
City, State: Somerville, MA
Client: Design Consultants/ D. Giangrande

File Name : 133536 A
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Peds and Bicycles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Warren Street From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	6	0	0	0	0	0	7	0	0	0	4	0	0	1	5	23
07:15 AM	0	5	0	0	0	0	0	2	0	0	0	2	0	0	0	9	18
07:30 AM	0	12	0	0	0	0	0	4	0	2	0	1	1	0	0	10	30
07:45 AM	0	10	0	0	0	0	0	4	0	0	0	3	0	0	0	11	28
Total	0	33	0	0	0	0	0	17	0	2	0	10	1	0	1	35	99
08:00 AM	0	4	0	0	0	0	0	6	0	2	0	2	0	0	0	3	17
08:15 AM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	4	7
08:30 AM	0	0	0	0	0	0	0	6	1	0	0	0	0	0	0	7	14
08:45 AM	0	1	1	0	0	0	0	8	0	3	0	1	0	0	0	6	20
Total	0	5	1	0	0	0	0	21	1	6	0	3	0	0	1	20	58
Grand Total	0	38	1	0	0	0	0	38	1	8	0	13	1	0	2	55	157
Apprch %	0	97.4	2.6	0	0	0	0	100	4.5	36.4	0	59.1	1.7	0	3.4	94.8	
Total %	0	24.2	0.6	0	0	0	0	24.2	0.6	5.1	0	8.3	0.6	0	1.3	35	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Warren Street From West					Int. Total
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	6	0	0	6	0	0	0	7	7	0	0	0	4	4	0	0	1	5	6	23
07:15 AM	0	5	0	0	5	0	0	0	2	2	0	0	0	2	2	0	0	0	9	9	18
07:30 AM	0	12	0	0	12	0	0	0	4	4	0	2	0	1	3	1	0	0	10	11	30
07:45 AM	0	10	0	0	10	0	0	0	4	4	0	0	0	3	3	0	0	0	11	11	28
Total Volume	0	33	0	0	33	0	0	0	17	17	0	2	0	10	12	1	0	1	35	37	99
% App. Total	0	100	0	0		0	0	0	100		0	16.7	0	83.3		2.7	0	2.7	94.6		
PHF	.000	.688	.000	.000	.688	.000	.000	.000	.607	.607	.000	.250	.000	.625	.750	.250	.000	.250	.795	.841	.825



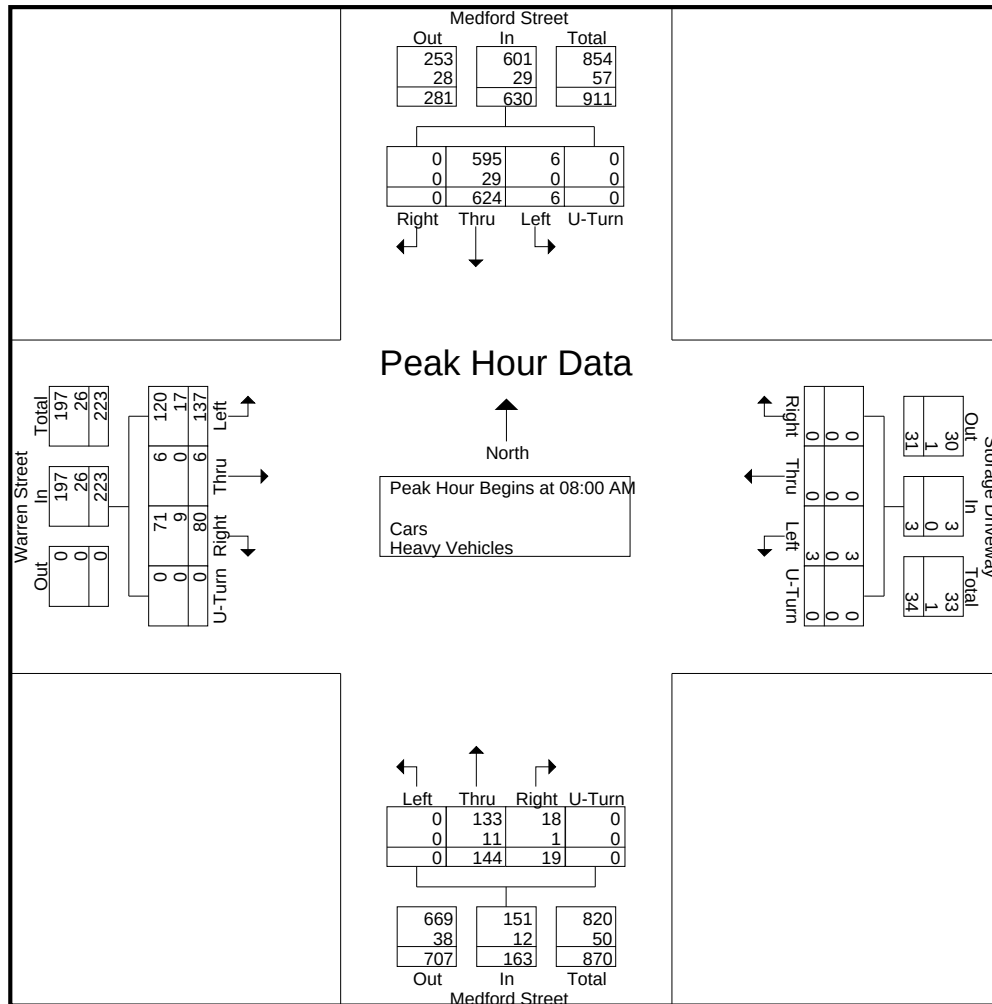
PRECISION
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N/S: Medford Street
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Client: Design Consultants/D. Giangrande

File Name : 133536 A
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Page No : 1

	Medford Street From North					Storage Driveway From East					Medford Street From South					Warren Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	176	1	0	177	0	0	0	0	0	3	44	0	0	47	25	2	35	0	62	286
08:15 AM	0	161	0	0	161	0	0	0	0	0	6	37	0	0	43	16	2	30	0	48	252
08:30 AM	0	148	1	0	149	0	0	2	0	2	5	28	0	0	33	20	0	33	0	53	237
08:45 AM	0	139	4	0	143	0	0	1	0	1	5	35	0	0	40	19	2	39	0	60	244
Total Volume	0	624	6	0	630	0	0	3	0	3	19	144	0	0	163	80	6	137	0	223	1019
% App. Total	0	99	1	0		0	0	100	0		11.7	88.3	0	0		35.9	2.7	61.4	0		
PHF	.000	.886	.375	.000	.890	.000	.000	.375	.000	.375	.792	.818	.000	.000	.867	.800	.750	.878	.000	.899	.891
Cars	0	595	6	0	601	0	0	3	0	3	18	133	0	0	151	71	6	120	0	197	952
% Cars	0	95.4	100	0	95.4	0	0	100	0	100	94.7	92.4	0	0	92.6	88.8	100	87.6	0	88.3	93.4
Heavy Vehicles	0	29	0	0	29	0	0	0	0	0	1	11	0	0	12	9	0	17	0	26	67
% Heavy Vehicles	0	4.6	0	0	4.6	0	0	0	0	0	5.3	7.6	0	0	7.4	11.3	0	12.4	0	11.7	6.6





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File Name : 133536 AA
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Warren Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	69	0	0	2	0	4	0	0	56	0	0	26	0	77	0	234
04:15 PM	0	63	0	0	0	0	3	0	0	60	0	0	21	0	71	0	218
04:30 PM	0	78	0	0	4	0	0	0	1	63	0	0	27	2	70	0	245
04:45 PM	0	85	0	0	5	0	2	0	2	51	0	0	24	0	74	0	243
Total	0	295	0	0	11	0	9	0	3	230	0	0	98	2	292	0	940
05:00 PM	0	78	2	0	5	0	2	0	1	74	0	0	37	1	80	0	280
05:15 PM	0	89	0	0	3	0	6	0	2	77	0	0	37	0	68	0	282
05:30 PM	0	78	0	0	2	0	2	0	0	62	0	0	39	0	75	0	258
05:45 PM	0	86	0	0	1	0	7	0	0	77	0	0	33	0	81	0	285
Total	0	331	2	0	11	0	17	0	3	290	0	0	146	1	304	0	1105
Grand Total	0	626	2	0	22	0	26	0	6	520	0	0	244	3	596	0	2045
Apprch %	0	99.7	0.3	0	45.8	0	54.2	0	1.1	98.9	0	0	28.9	0.4	70.7	0	
Total %	0	30.6	0.1	0	1.1	0	1.3	0	0.3	25.4	0	0	11.9	0.1	29.1	0	
Cars	0	618	2	0	21	0	24	0	5	509	0	0	243	2	583	0	2007
% Cars	0	98.7	100	0	95.5	0	92.3	0	83.3	97.9	0	0	99.6	66.7	97.8	0	98.1
Heavy Vehicles	0	8	0	0	1	0	2	0	1	11	0	0	1	1	13	0	38
% Heavy Vehicles	0	1.3	0	0	4.5	0	7.7	0	16.7	2.1	0	0	0.4	33.3	2.2	0	1.9

	Medford Street From North					Storage Driveway From East					Medford Street From South					Warren Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	78	2	0	80	5	0	2	0	7	1	74	0	0	75	37	1	80	0	118	280
05:15 PM	0	89	0	0	89	3	0	6	0	9	2	77	0	0	79	37	0	68	0	105	282
05:30 PM	0	78	0	0	78	2	0	2	0	4	0	62	0	0	62	39	0	75	0	114	258
05:45 PM	0	86	0	0	86	1	0	7	0	8	0	77	0	0	77	33	0	81	0	114	285
Total Volume	0	331	2	0	333	11	0	17	0	28	3	290	0	0	293	146	1	304	0	451	1105
% App. Total	0	99.4	0.6	0		39.3	0	60.7	0		1	99	0	0		32.4	0.2	67.4	0		
PHF	.000	.930	.250	.000	.935	.550	.000	.607	.000	.778	.375	.942	.000	.000	.927	.936	.250	.938	.000	.956	.969
Cars	0	330	2	0	332	11	0	16	0	27	3	288	0	0	291	145	1	301	0	447	1097
% Cars	0	99.7	100	0	99.7	100	0	94.1	0	96.4	100	99.3	0	0	99.3	99.3	100	99.0	0	99.1	99.3
Heavy Vehicles	0	1	0	0	1	0	0	1	0	1	0	2	0	0	2	1	0	3	0	4	8
% Heavy Vehicles	0	0.3	0	0	0.3	0	0	5.9	0	3.6	0	0.7	0	0	0.7	0.7	0	1.0	0	0.9	0.7



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City, State: Somerville, MA
Client: Design Consultants/ D. Giangrande

File Name : 133536 AA
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars

	Medford Street From North				Storage Driveway From East				Medford Street From South				Warren Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	68	0	0	2	0	3	0	0	55	0	0	26	0	77	0	231
04:15 PM	0	60	0	0	0	0	3	0	0	54	0	0	21	0	68	0	206
04:30 PM	0	76	0	0	4	0	0	0	1	61	0	0	27	1	65	0	235
04:45 PM	0	84	0	0	4	0	2	0	1	51	0	0	24	0	72	0	238
Total	0	288	0	0	10	0	8	0	2	221	0	0	98	1	282	0	910
05:00 PM	0	78	2	0	5	0	2	0	1	72	0	0	37	1	80	0	278
05:15 PM	0	89	0	0	3	0	5	0	2	77	0	0	36	0	68	0	280
05:30 PM	0	78	0	0	2	0	2	0	0	62	0	0	39	0	73	0	256
05:45 PM	0	85	0	0	1	0	7	0	0	77	0	0	33	0	80	0	283
Total	0	330	2	0	11	0	16	0	3	288	0	0	145	1	301	0	1097
Grand Total	0	618	2	0	21	0	24	0	5	509	0	0	243	2	583	0	2007
Apprch %	0	99.7	0.3	0	46.7	0	53.3	0	1	99	0	0	29.3	0.2	70.4	0	
Total %	0	30.8	0.1	0	1	0	1.2	0	0.2	25.4	0	0	12.1	0.1	29	0	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Warren Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	78	2	0	80	5	0	2	0	7	1	72	0	0	73	37	1	80	0	118	278
05:15 PM	0	89	0	0	89	3	0	5	0	8	2	77	0	0	79	36	0	68	0	104	280
05:30 PM	0	78	0	0	78	2	0	2	0	4	0	62	0	0	62	39	0	73	0	112	256
05:45 PM	0	85	0	0	85	1	0	7	0	8	0	77	0	0	77	33	0	80	0	113	283
Total Volume	0	330	2	0	332	11	0	16	0	27	3	288	0	0	291	145	1	301	0	447	1097
% App. Total	0	99.4	0.6	0		40.7	0	59.3	0		1	99	0	0		32.4	0.2	67.3	0		
PHF	.000	.927	.250	.000	.933	.550	.000	.571	.000	.844	.375	.935	.000	.000	.921	.929	.250	.941	.000	.947	.969



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File Name : 133536 AA
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Groups Printed- Heavy Vehicles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Warren Street From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3
04:15 PM	0	3	0	0	0	0	0	0	0	6	0	0	0	0	3	0	12
04:30 PM	0	2	0	0	0	0	0	0	0	2	0	0	0	1	5	0	10
04:45 PM	0	1	0	0	1	0	0	0	1	0	0	0	0	0	2	0	5
Total	0	7	0	0	1	0	1	0	1	9	0	0	0	1	10	0	30
05:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
05:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
Total	0	1	0	0	0	0	1	0	0	2	0	0	1	0	3	0	8
Grand Total	0	8	0	0	1	0	2	0	1	11	0	0	1	1	13	0	38
Apprch %	0	100	0	0	33.3	0	66.7	0	8.3	91.7	0	0	6.7	6.7	86.7	0	
Total %	0	21.1	0	0	2.6	0	5.3	0	2.6	28.9	0	0	2.6	2.6	34.2	0	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Warren Street From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	1	0	0	1	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	3
04:15 PM	0	3	0	0	3	0	0	0	0	0	0	6	0	0	6	0	0	3	0	3	12
04:30 PM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	0	1	5	0	6	10
04:45 PM	0	1	0	0	1	1	0	0	0	1	1	0	0	0	1	0	0	2	0	2	5
Total Volume	0	7	0	0	7	1	0	1	0	2	1	9	0	0	10	0	1	10	0	11	30
% App. Total	0	100	0	0		50	0	50	0		10	90	0	0		0	9.1	90.9	0		
PHF	.000	.583	.000	.000	.583	.250	.000	.250	.000	.500	.250	.375	.000	.000	.417	.000	.250	.500	.000	.458	.625



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Groups Printed- Peds and Bicycles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Warren Street From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	0	2	0	0	0	0	0	11	0	3	0	0	0	0	3	11	30
04:15 PM	0	1	0	0	0	0	0	7	0	4	0	0	0	0	2	8	22
04:30 PM	0	5	0	0	1	0	0	8	0	5	0	0	1	0	2	13	35
04:45 PM	0	3	0	0	0	0	0	10	0	7	0	8	2	0	1	7	38
Total	0	11	0	0	1	0	0	36	0	19	0	8	3	0	8	39	125
05:00 PM	0	4	0	0	0	0	0	12	0	9	0	0	1	0	6	11	43
05:15 PM	0	5	0	0	0	0	0	10	0	6	0	5	0	0	2	13	41
05:30 PM	0	3	0	0	0	0	0	19	0	11	0	2	0	0	7	12	54
05:45 PM	0	5	0	0	0	0	0	16	0	9	0	3	1	0	2	14	50
Total	0	17	0	0	0	0	0	57	0	35	0	10	2	0	17	50	188
Grand Total	0	28	0	0	1	0	0	93	0	54	0	18	5	0	25	89	313
Apprch %	0	100	0	0	1.1	0	0	98.9	0	75	0	25	4.2	0	21	74.8	
Total %	0	8.9	0	0	0.3	0	0	29.7	0	17.3	0	5.8	1.6	0	8	28.4	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Warren Street From West					Int. Total
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	4	0	0	4	0	0	0	12	12	0	9	0	0	9	1	0	6	11	18	43
05:15 PM	0	5	0	0	5	0	0	0	10	10	0	6	0	5	11	0	0	2	13	15	41
05:30 PM	0	3	0	0	3	0	0	0	19	19	0	11	0	2	13	0	0	7	12	19	54
05:45 PM	0	5	0	0	5	0	0	0	16	16	0	9	0	3	12	1	0	2	14	17	50
Total Volume	0	17	0	0	17	0	0	0	57	57	0	35	0	10	45	2	0	17	50	69	188
% App. Total	0	100	0	0		0	0	0	100		0	77.8	0	22.2		2.9	0	24.6	72.5		
PHF	.000	.850	.000	.000	.850	.000	.000	.000	.750	.750	.000	.795	.000	.500	.865	.500	.000	.607	.893	.908	.870



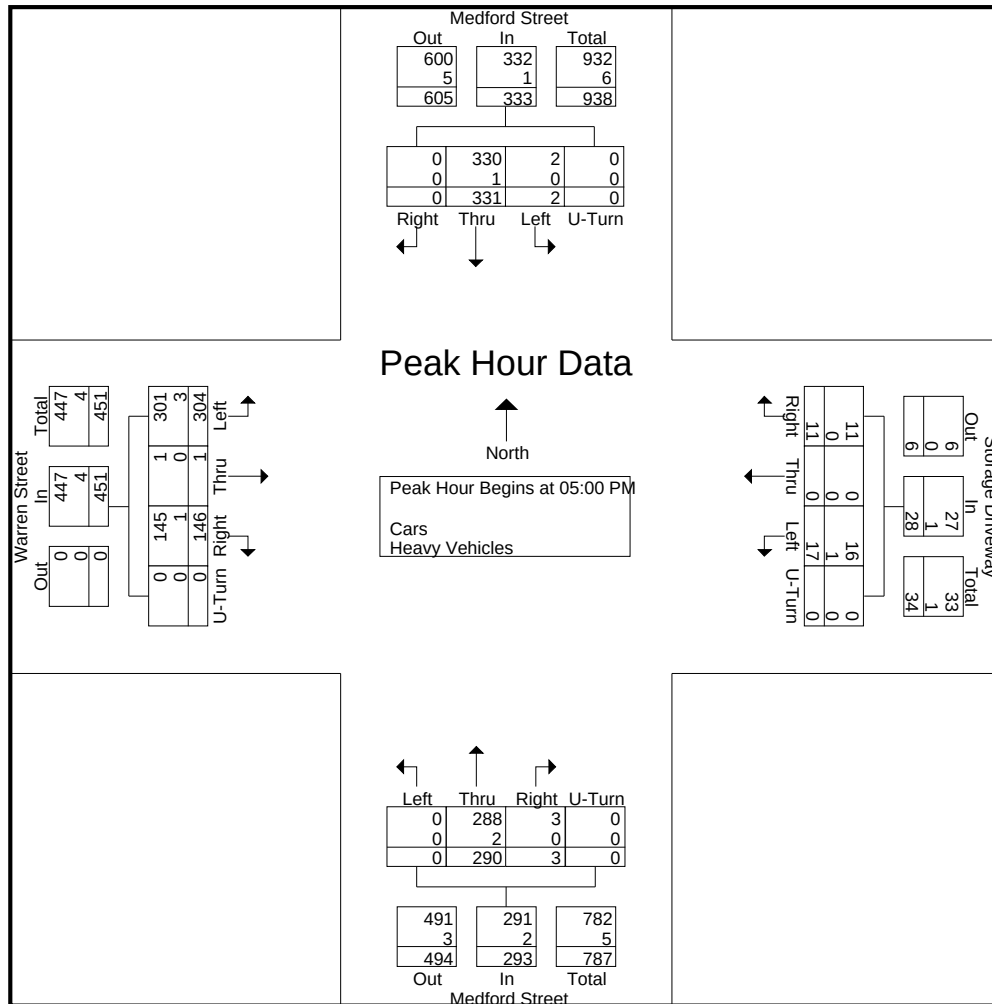
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Page No : 1

	Medford Street From North					Storage Driveway From East					Medford Street From South					Warren Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	78	2	0	80	5	0	2	0	7	1	74	0	0	75	37	1	80	0	118	280
05:15 PM	0	89	0	0	89	3	0	6	0	9	2	77	0	0	79	37	0	68	0	105	282
05:30 PM	0	78	0	0	78	2	0	2	0	4	0	62	0	0	62	39	0	75	0	114	258
05:45 PM	0	86	0	0	86	1	0	7	0	8	0	77	0	0	77	33	0	81	0	114	285
Total Volume	0	331	2	0	333	11	0	17	0	28	3	290	0	0	293	146	1	304	0	451	1105
% App. Total	0	99.4	0.6	0		39.3	0	60.7	0		1	99	0	0		32.4	0.2	67.4	0		
PHF	.000	.930	.250	.000	.935	.550	.000	.607	.000	.778	.375	.942	.000	.000	.927	.936	.250	.938	.000	.956	.969
Cars	0	330	2	0	332	11	0	16	0	27	3	288	0	0	291	145	1	301	0	447	1097
% Cars	0	99.7	100	0	99.7	100	0	94.1	0	96.4	100	99.3	0	0	99.3	99.3	100	99.0	0	99.1	99.3
Heavy Vehicles	0	1	0	0	1	0	0	1	0	1	0	2	0	0	2	1	0	3	0	4	8
% Heavy Vehicles	0	0.3	0	0	0.3	0	0	5.9	0	3.6	0	0.7	0	0	0.7	0.7	0	1.0	0	0.9	0.7





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W: South Street
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 B
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Medford Street From North			Medford Street From South			South Street From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
07:00 AM	61	122	0	39	9	0	0	0	0	231
07:15 AM	77	108	0	38	6	0	0	0	0	229
07:30 AM	114	119	0	57	18	0	0	0	0	308
07:45 AM	133	130	0	53	22	0	0	0	0	338
Total	385	479	0	187	55	0	0	0	0	1106
08:00 AM	107	171	0	60	17	0	0	0	0	355
08:15 AM	100	159	0	55	15	0	0	0	0	329
08:30 AM	88	150	0	45	14	0	0	0	0	297
08:45 AM	102	143	0	61	15	0	0	0	0	321
Total	397	623	0	221	61	0	0	0	0	1302
Grand Total	782	1102	0	408	116	0	0	0	0	2408
Apprch %	41.5	58.5	0	77.9	22.1	0	0	0	0	
Total %	32.5	45.8	0	16.9	4.8	0	0	0	0	
Cars	755	1062	0	376	114	0	0	0	0	2307
% Cars	96.5	96.4	0	92.2	98.3	0	0	0	0	95.8
Heavy Vehicles	27	40	0	32	2	0	0	0	0	101
% Heavy Vehicles	3.5	3.6	0	7.8	1.7	0	0	0	0	4.2

	Medford Street From North				Medford Street From South				South Street From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	114	119	0	233	57	18	0	75	0	0	0	0	308
07:45 AM	133	130	0	263	53	22	0	75	0	0	0	0	338
08:00 AM	107	171	0	278	60	17	0	77	0	0	0	0	355
08:15 AM	100	159	0	259	55	15	0	70	0	0	0	0	329
Total Volume	454	579	0	1033	225	72	0	297	0	0	0	0	1330
% App. Total	43.9	56.1	0		75.8	24.2	0		0	0	0		
PHF	.853	.846	.000	.929	.938	.818	.000	.964	.000	.000	.000	.000	.937
Cars	441	552	0	993	214	71	0	285	0	0	0	0	1278
% Cars	97.1	95.3	0	96.1	95.1	98.6	0	96.0	0	0	0	0	96.1
Heavy Vehicles	13	27	0	40	11	1	0	12	0	0	0	0	52
% Heavy Vehicles	2.9	4.7	0	3.9	4.9	1.4	0	4.0	0	0	0	0	3.9



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Page No : 1

Groups Printed- Cars

	Medford Street From North			Medford Street From South			South Street From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
07:00 AM	57	117	0	39	9	0	0	0	0	222
07:15 AM	73	106	0	34	6	0	0	0	0	219
07:30 AM	111	119	0	57	18	0	0	0	0	305
07:45 AM	127	123	0	51	22	0	0	0	0	323
Total	368	465	0	181	55	0	0	0	0	1069
08:00 AM	104	157	0	59	17	0	0	0	0	337
08:15 AM	99	153	0	47	14	0	0	0	0	313
08:30 AM	86	148	0	37	14	0	0	0	0	285
08:45 AM	98	139	0	52	14	0	0	0	0	303
Total	387	597	0	195	59	0	0	0	0	1238
Grand Total	755	1062	0	376	114	0	0	0	0	2307
Apprch %	41.6	58.4	0	76.7	23.3	0	0	0	0	
Total %	32.7	46	0	16.3	4.9	0	0	0	0	

	Medford Street From North				Medford Street From South				South Street From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	111	119	0	230	57	18	0	75	0	0	0	0	305
07:45 AM	127	123	0	250	51	22	0	73	0	0	0	0	323
08:00 AM	104	157	0	261	59	17	0	76	0	0	0	0	337
08:15 AM	99	153	0	252	47	14	0	61	0	0	0	0	313
Total Volume	441	552	0	993	214	71	0	285	0	0	0	0	1278
% App. Total	44.4	55.6	0		75.1	24.9	0		0	0	0		
PHF	.868	.879	.000	.951	.907	.807	.000	.938	.000	.000	.000	.000	.948



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Start Date : 9/17/2013
Page No : 1

Groups Printed- Heavy Vehicles

	Medford Street From North			Medford Street From South			South Street From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
07:00 AM	4	5	0	0	0	0	0	0	0	9
07:15 AM	4	2	0	4	0	0	0	0	0	10
07:30 AM	3	0	0	0	0	0	0	0	0	3
07:45 AM	6	7	0	2	0	0	0	0	0	15
Total	17	14	0	6	0	0	0	0	0	37
08:00 AM	3	14	0	1	0	0	0	0	0	18
08:15 AM	1	6	0	8	1	0	0	0	0	16
08:30 AM	2	2	0	8	0	0	0	0	0	12
08:45 AM	4	4	0	9	1	0	0	0	0	18
Total	10	26	0	26	2	0	0	0	0	64
Grand Total	27	40	0	32	2	0	0	0	0	101
Apprch %	40.3	59.7	0	94.1	5.9	0	0	0	0	
Total %	26.7	39.6	0	31.7	2	0	0	0	0	

	Medford Street From North				Medford Street From South				South Street From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	3	14	0	17	1	0	0	1	0	0	0	0	18
08:15 AM	1	6	0	7	8	1	0	9	0	0	0	0	16
08:30 AM	2	2	0	4	8	0	0	8	0	0	0	0	12
08:45 AM	4	4	0	8	9	1	0	10	0	0	0	0	18
Total Volume	10	26	0	36	26	2	0	28	0	0	0	0	64
% App. Total	27.8	72.2	0		92.9	7.1	0		0	0	0		
PHF	.625	.464	.000	.529	.722	.500	.000	.700	.000	.000	.000	.000	.889



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Groups Printed- Peds and Bicycles

	Medford Street From North			Medford Street From South			South Street From West			
Start Time	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	Int. Total
07:00 AM	1	5	0	1	0	0	0	0	2	9
07:15 AM	0	8	1	0	0	1	0	0	5	15
07:30 AM	1	11	0	1	1	0	0	0	8	22
07:45 AM	2	13	0	1	0	0	0	0	8	24
Total	4	37	1	3	1	1	0	0	23	70
08:00 AM	0	18	0	1	1	5	0	0	7	32
08:15 AM	0	26	0	2	0	2	0	0	8	38
08:30 AM	1	29	0	1	0	2	0	0	11	44
08:45 AM	0	19	0	3	1	2	0	0	12	37
Total	1	92	0	7	2	11	0	0	38	151
Grand Total	5	129	1	10	3	12	0	0	61	221
Apprch %	3.7	95.6	0.7	40	12	48	0	0	100	
Total %	2.3	58.4	0.5	4.5	1.4	5.4	0	0	27.6	

	Medford Street From North				Medford Street From South				South Street From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	0	18	0	18	1	1	5	7	0	0	7	7	32
08:15 AM	0	26	0	26	2	0	2	4	0	0	8	8	38
08:30 AM	1	29	0	30	1	0	2	3	0	0	11	11	44
08:45 AM	0	19	0	19	3	1	2	6	0	0	12	12	37
Total Volume	1	92	0	93	7	2	11	20	0	0	38	38	151
% App. Total	1.1	98.9	0		35	10	55		0	0	100		
PHF	.250	.793	.000	.775	.583	.500	.550	.714	.000	.000	.792	.792	.858



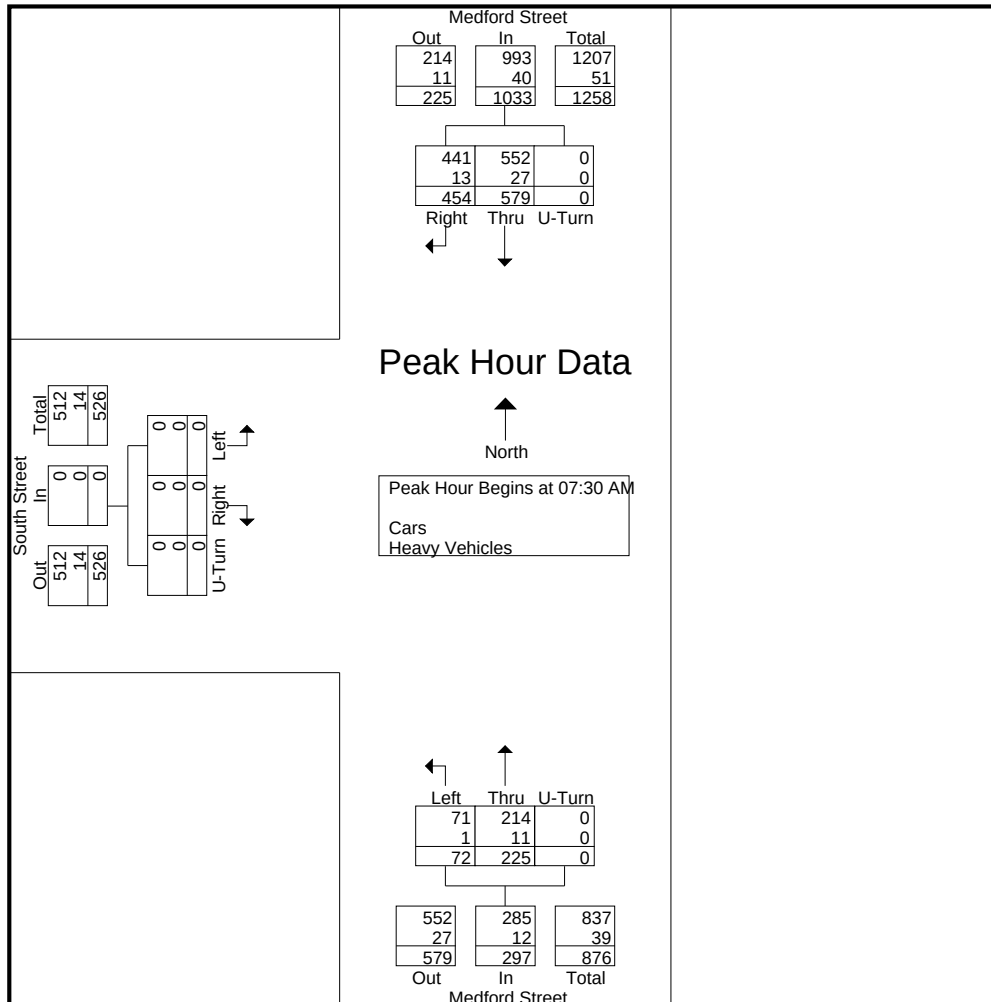
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	Medford Street From North				Medford Street From South				South Street From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	114	119	0	233	57	18	0	75	0	0	0	0	308
07:45 AM	133	130	0	263	53	22	0	75	0	0	0	0	338
08:00 AM	107	171	0	278	60	17	0	77	0	0	0	0	355
08:15 AM	100	159	0	259	55	15	0	70	0	0	0	0	329
Total Volume	454	579	0	1033	225	72	0	297	0	0	0	0	1330
% App. Total	43.9	56.1	0		75.8	24.2	0		0	0	0		
PHF	.853	.846	.000	.929	.938	.818	.000	.964	.000	.000	.000	.000	.937
Cars	441	552	0	993	214	71	0	285	0	0	0	0	1278
% Cars	97.1	95.3	0	96.1	95.1	98.6	0	96.0	0	0	0	0	96.1
Heavy Vehicles	13	27	0	40	11	1	0	12	0	0	0	0	52
% Heavy Vehicles	2.9	4.7	0	3.9	4.9	1.4	0	4.0	0	0	0	0	3.9





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Groups Printed- Cars - Heavy Vehicles

	Medford Street From North			Medford Street From South			South Street From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
04:00 PM	57	74	0	126	8	0	0	0	0	265
04:15 PM	46	64	0	113	20	0	0	0	0	243
04:30 PM	65	77	0	114	24	0	0	0	0	280
04:45 PM	65	83	0	105	21	0	0	0	0	274
Total	233	298	0	458	73	0	0	0	0	1062
05:00 PM	66	76	0	137	26	0	0	0	0	305
05:15 PM	59	88	0	121	30	0	0	0	0	298
05:30 PM	67	76	0	120	20	0	0	0	0	283
05:45 PM	56	84	0	137	21	0	0	0	0	298
Total	248	324	0	515	97	0	0	0	0	1184
Grand Total	481	622	0	973	170	0	0	0	0	2246
Apprch %	43.6	56.4	0	85.1	14.9	0	0	0	0	
Total %	21.4	27.7	0	43.3	7.6	0	0	0	0	
Cars	464	611	0	960	157	0	0	0	0	2192
% Cars	96.5	98.2	0	98.7	92.4	0	0	0	0	97.6
Heavy Vehicles	17	11	0	13	13	0	0	0	0	54
% Heavy Vehicles	3.5	1.8	0	1.3	7.6	0	0	0	0	2.4

	Medford Street From North				Medford Street From South				South Street From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	66	76	0	142	137	26	0	163	0	0	0	0	305
05:15 PM	59	88	0	147	121	30	0	151	0	0	0	0	298
05:30 PM	67	76	0	143	120	20	0	140	0	0	0	0	283
05:45 PM	56	84	0	140	137	21	0	158	0	0	0	0	298
Total Volume	248	324	0	572	515	97	0	612	0	0	0	0	1184
% App. Total	43.4	56.6	0		84.2	15.8	0		0	0	0	0	
PHF	.925	.920	.000	.973	.940	.808	.000	.939	.000	.000	.000	.000	.970
Cars	237	321	0	558	512	94	0	606	0	0	0	0	1164
% Cars	95.6	99.1	0	97.6	99.4	96.9	0	99.0	0	0	0	0	98.3
Heavy Vehicles	11	3	0	14	3	3	0	6	0	0	0	0	20
% Heavy Vehicles	4.4	0.9	0	2.4	0.6	3.1	0	1.0	0	0	0	0	1.7



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Groups Printed- Cars

	Medford Street From North			Medford Street From South			South Street From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
04:00 PM	54	72	0	125	7	0	0	0	0	258
04:15 PM	45	61	0	110	16	0	0	0	0	232
04:30 PM	63	75	0	109	22	0	0	0	0	269
04:45 PM	65	82	0	104	18	0	0	0	0	269
Total	227	290	0	448	63	0	0	0	0	1028
05:00 PM	63	76	0	136	24	0	0	0	0	299
05:15 PM	54	88	0	121	30	0	0	0	0	293
05:30 PM	67	74	0	119	19	0	0	0	0	279
05:45 PM	53	83	0	136	21	0	0	0	0	293
Total	237	321	0	512	94	0	0	0	0	1164
Grand Total	464	611	0	960	157	0	0	0	0	2192
Apprch %	43.2	56.8	0	85.9	14.1	0	0	0	0	
Total %	21.2	27.9	0	43.8	7.2	0	0	0	0	

	Medford Street From North				Medford Street From South				South Street From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	63	76	0	139	136	24	0	160	0	0	0	0	299
05:15 PM	54	88	0	142	121	30	0	151	0	0	0	0	293
05:30 PM	67	74	0	141	119	19	0	138	0	0	0	0	279
05:45 PM	53	83	0	136	136	21	0	157	0	0	0	0	293
Total Volume	237	321	0	558	512	94	0	606	0	0	0	0	1164
% App. Total	42.5	57.5	0		84.5	15.5	0		0	0	0		
PHF	.884	.912	.000	.982	.941	.783	.000	.947	.000	.000	.000	.000	.973



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Groups Printed- Heavy Vehicles

	Medford Street From North			Medford Street From South			South Street From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
04:00 PM	3	2	0	1	1	0	0	0	0	7
04:15 PM	1	3	0	3	4	0	0	0	0	11
04:30 PM	2	2	0	5	2	0	0	0	0	11
04:45 PM	0	1	0	1	3	0	0	0	0	5
Total	6	8	0	10	10	0	0	0	0	34
05:00 PM	3	0	0	1	2	0	0	0	0	6
05:15 PM	5	0	0	0	0	0	0	0	0	5
05:30 PM	0	2	0	1	1	0	0	0	0	4
05:45 PM	3	1	0	1	0	0	0	0	0	5
Total	11	3	0	3	3	0	0	0	0	20
Grand Total	17	11	0	13	13	0	0	0	0	54
Apprch %	60.7	39.3	0	50	50	0	0	0	0	
Total %	31.5	20.4	0	24.1	24.1	0	0	0	0	

	Medford Street From North				Medford Street From South				South Street From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	3	2	0	5	1	1	0	2	0	0	0	0	7
04:15 PM	1	3	0	4	3	4	0	7	0	0	0	0	11
04:30 PM	2	2	0	4	5	2	0	7	0	0	0	0	11
04:45 PM	0	1	0	1	1	3	0	4	0	0	0	0	5
Total Volume	6	8	0	14	10	10	0	20	0	0	0	0	34
% App. Total	42.9	57.1	0		50	50	0		0	0	0		
PHF	.500	.667	.000	.700	.500	.625	.000	.714	.000	.000	.000	.000	.773



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N/S: Medford Street
W: South Street
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 BB
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Peds and Bicycles

	Medford Street From North			Medford Street From South			South Street From West			
Start Time	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	Int. Total
04:00 PM	1	1	1	6	0	0	0	0	11	20
04:15 PM	0	1	2	4	1	4	0	0	15	27
04:30 PM	0	4	0	9	0	1	0	0	7	21
04:45 PM	0	5	2	6	0	0	0	0	16	29
Total	1	11	5	25	1	5	0	0	49	97
05:00 PM	0	4	0	12	0	6	0	0	12	34
05:15 PM	0	3	0	8	0	6	0	0	17	34
05:30 PM	1	2	1	17	0	2	0	0	21	44
05:45 PM	1	4	0	15	0	9	0	0	19	48
Total	2	13	1	52	0	23	0	0	69	160
Grand Total	3	24	6	77	1	28	0	0	118	257
Apprch %	9.1	72.7	18.2	72.6	0.9	26.4	0	0	100	
Total %	1.2	9.3	2.3	30	0.4	10.9	0	0	45.9	

	Medford Street From North				Medford Street From South				South Street From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	0	4	0	4	12	0	6	18	0	0	12	12	34
05:15 PM	0	3	0	3	8	0	6	14	0	0	17	17	34
05:30 PM	1	2	1	4	17	0	2	19	0	0	21	21	44
05:45 PM	1	4	0	5	15	0	9	24	0	0	19	19	48
Total Volume	2	13	1	16	52	0	23	75	0	0	69	69	160
% App. Total	12.5	81.2	6.2		69.3	0	30.7		0	0	100		
PHF	.500	.813	.250	.800	.765	.000	.639	.781	.000	.000	.821	.821	.833



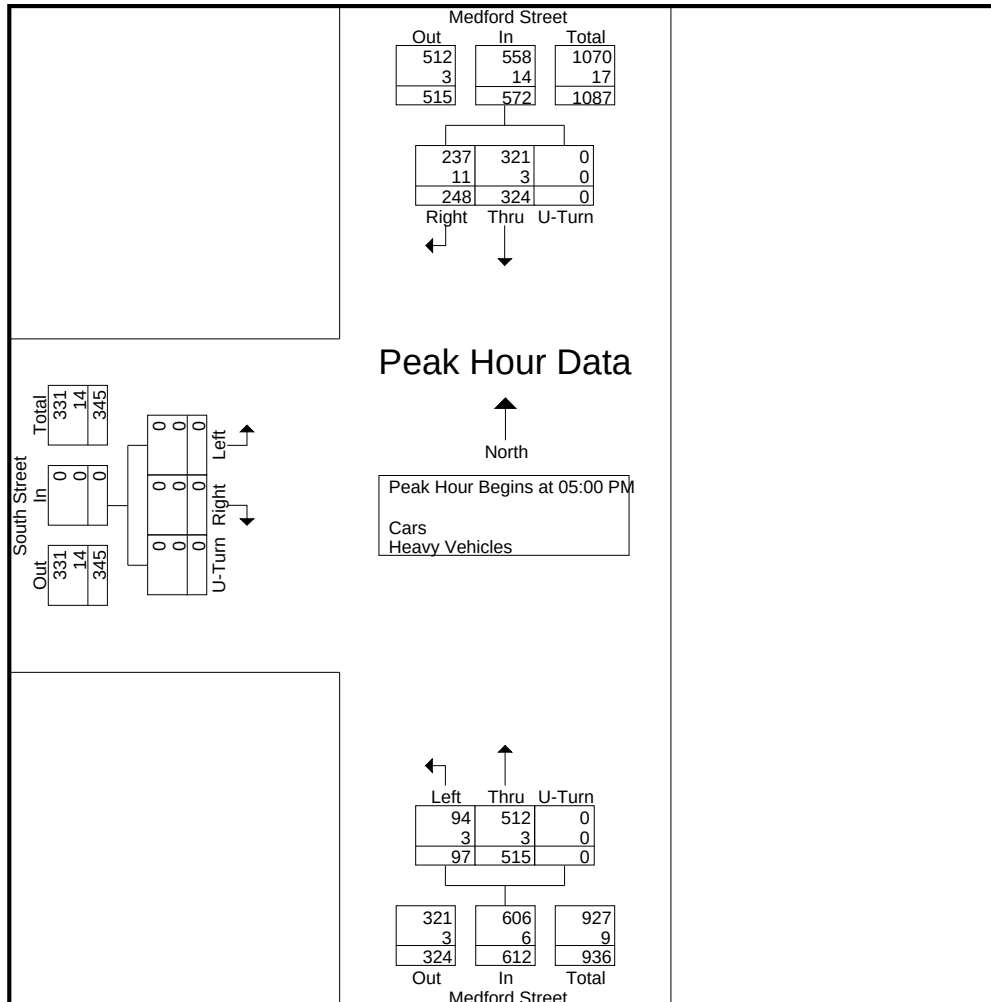
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N/S: Medford Street
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File Name : 133536 BB
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Page No : 1

	Medford Street From North				Medford Street From South				South Street From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	66	76	0	142	137	26	0	163	0	0	0	0	305
05:15 PM	59	88	0	147	121	30	0	151	0	0	0	0	298
05:30 PM	67	76	0	143	120	20	0	140	0	0	0	0	283
05:45 PM	56	84	0	140	137	21	0	158	0	0	0	0	298
Total Volume	248	324	0	572	515	97	0	612	0	0	0	0	1184
% App. Total	43.4	56.6	0		84.2	15.8	0		0	0	0		
PHF	.925	.920	.000	.973	.940	.808	.000	.939	.000	.000	.000	.000	.970
Cars	237	321	0	558	512	94	0	606	0	0	0	0	1164
% Cars	95.6	99.1	0	97.6	99.4	96.9	0	99.0	0	0	0	0	98.3
Heavy Vehicles	11	3	0	14	3	3	0	6	0	0	0	0	20
% Heavy Vehicles	4.4	0.9	0	2.4	0.6	3.1	0	1.0	0	0	0	0	1.7





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E/W: Storage Driveway/ Ward Street
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 C
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Medford Street From North					Storage Driveway From East					Medford Street From South					Ward Street From West					
Start Time	Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Int. Total
07:00 AM	5	187	3	0		0	0	0	0		0	37	0	0		2	0	0	0		234
07:15 AM	2	182	7	0		0	0	0	0		2	38	1	0		4	0	2	0		238
07:30 AM	5	240	4	0		0	0	0	0		4	53	0	0		0	0	1	0		307
07:45 AM	1	262	9	0		1	0	0	0		5	49	0	0		1	0	7	0		335
Total	13	871	23	0		1	0	0	0		11	177	1	0		7	0	10	0		1114
08:00 AM	2	275	9	0		0	0	0	0		6	54	1	0		3	0	1	0		351
08:15 AM	5	258	8	0		1	0	1	0		2	50	3	0		2	0	1	0		331
08:30 AM	6	240	10	0		0	0	1	0		2	42	1	0		1	0	3	0		306
08:45 AM	11	250	12	1		3	0	0	0		3	55	3	0		0	0	2	0		340
Total	24	1023	39	1		4	0	2	0		13	201	8	0		6	0	7	0		1328
Grand Total	37	1894	62	1		5	0	2	0		24	378	9	0		13	0	17	0		2442
Apprch %	1.9	95	3.1	0.1		71.4	0	28.6	0		5.8	92	2.2	0		43.3	0	56.7	0		
Total %	1.5	77.6	2.5	0		0.2	0	0.1	0		1	15.5	0.4	0		0.5	0	0.7	0		
Cars	34	1831	60	1		3	0	2	0		24	348	7	0		13	0	13	0		2336
% Cars	91.9	96.7	96.8	100		60	0	100	0		100	92.1	77.8	0		100	0	76.5	0		95.7
Heavy Vehicles	3	63	2	0		2	0	0	0		0	30	2	0		0	0	4	0		106
% Heavy Vehicles	8.1	3.3	3.2	0		40	0	0	0		0	7.9	22.2	0		0	0	23.5	0		4.3

	Medford Street From North						Storage Driveway From East						Medford Street From South						Ward Street From West						
Start Time	Right	Thru	Left	U-Turn	App. Total		Right	Thru	Left	U-Turn	App. Total		Right	Thru	Left	U-Turn	App. Total		Right	Thru	Left	U-Turn	App. Total		Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 08:00 AM																									
08:00 AM	2	275	9	0	286		0	0	0	0	0		6	54	1	0	61		3	0	1	0	4		351
08:15 AM	5	258	8	0	271		1	0	1	0	2		2	50	3	0	55		2	0	1	0	3		331
08:30 AM	6	240	10	0	256		0	0	1	0	1		2	42	1	0	45		1	0	3	0	4		306
08:45 AM	11	250	12	1	274		3	0	0	0	3		3	55	3	0	61		0	0	2	0	2		340
Total Volume	24	1023	39	1	1087		4	0	2	0	6		13	201	8	0	222		6	0	7	0	13		1328
% App. Total	2.2	94.1	3.6	0.1			66.7	0	33.3	0			5.9	90.5	3.6	0			46.2	0	53.8	0			
PHF	.545	.930	.813	.250	.950		.333	.000	.500	.000	.500		.542	.914	.667	.000	.910		.500	.000	.583	.000	.813		.946
Cars	21	984	38	1	1044		3	0	2	0	5		13	177	6	0	196		6	0	6	0	12		1257
% Cars	87.5	96.2	97.4	100	96.0		75.0	0	100	0	83.3		100	88.1	75.0	0	88.3		100	0	85.7	0	92.3		94.7
Heavy Vehicles	3	39	1	0	43		1	0	0	0	1		0	24	2	0	26		0	0	1	0	1		71
% Heavy Vehicles	12.5	3.8	2.6	0	4.0		25.0	0	0	0	16.7		0	11.9	25.0	0	11.7		0	0	14.3	0	7.7		5.3



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E/W: Storage Driveway/ Ward Street
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 C
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars

	Medford Street From North				Storage Driveway From East				Medford Street From South				Ward Street From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	5	178	2	0	0	0	0	0	0	37	0	0	2	0	0	0	224
07:15 AM	2	177	7	0	0	0	0	0	2	34	1	0	4	0	1	0	228
07:30 AM	5	238	4	0	0	0	0	0	4	53	0	0	0	0	1	0	305
07:45 AM	1	254	9	0	0	0	0	0	5	47	0	0	1	0	5	0	322
Total	13	847	22	0	0	0	0	0	11	171	1	0	7	0	7	0	1079
08:00 AM	2	258	9	0	0	0	0	0	6	52	1	0	3	0	0	0	331
08:15 AM	4	248	8	0	1	0	1	0	2	44	2	0	2	0	1	0	313
08:30 AM	5	236	10	0	0	0	1	0	2	34	1	0	1	0	3	0	293
08:45 AM	10	242	11	1	2	0	0	0	3	47	2	0	0	0	2	0	320
Total	21	984	38	1	3	0	2	0	13	177	6	0	6	0	6	0	1257
Grand Total	34	1831	60	1	3	0	2	0	24	348	7	0	13	0	13	0	2336
Apprch %	1.8	95.1	3.1	0.1	60	0	40	0	6.3	91.8	1.8	0	50	0	50	0	
Total %	1.5	78.4	2.6	0	0.1	0	0.1	0	1	14.9	0.3	0	0.6	0	0.6	0	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Ward Street From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	5	238	4	0	247	0	0	0	0	0	4	53	0	0	57	0	0	1	0	1	305
07:45 AM	1	254	9	0	264	0	0	0	0	0	5	47	0	0	52	1	0	5	0	6	322
08:00 AM	2	258	9	0	269	0	0	0	0	0	6	52	1	0	59	3	0	0	0	3	331
08:15 AM	4	248	8	0	260	1	0	1	0	2	2	44	2	0	48	2	0	1	0	3	313
Total Volume	12	998	30	0	1040	1	0	1	0	2	17	196	3	0	216	6	0	7	0	13	1271
% App. Total	1.2	96	2.9	0		50	0	50	0		7.9	90.7	1.4	0		46.2	0	53.8	0		
PHF	.600	.967	.833	.000	.967	.250	.000	.250	.000	.250	.708	.925	.375	.000	.915	.500	.000	.350	.000	.542	.960



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File Name : 133536 C
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Heavy Vehicles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Ward Street From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	0	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10
07:15 AM	0	5	0	0	0	0	0	0	0	4	0	0	0	0	1	0	10
07:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:45 AM	0	8	0	0	1	0	0	0	0	2	0	0	0	0	2	0	13
Total	0	24	1	0	1	0	0	0	0	6	0	0	0	0	3	0	35
08:00 AM	0	17	0	0	0	0	0	0	0	2	0	0	0	0	1	0	20
08:15 AM	1	10	0	0	0	0	0	0	0	6	1	0	0	0	0	0	18
08:30 AM	1	4	0	0	0	0	0	0	0	8	0	0	0	0	0	0	13
08:45 AM	1	8	1	0	1	0	0	0	0	8	1	0	0	0	0	0	20
Total	3	39	1	0	1	0	0	0	0	24	2	0	0	0	1	0	71
Grand Total	3	63	2	0	2	0	0	0	0	30	2	0	0	0	4	0	106
Apprch %	4.4	92.6	2.9	0	100	0	0	0	0	93.8	6.2	0	0	0	100	0	
Total %	2.8	59.4	1.9	0	1.9	0	0	0	0	28.3	1.9	0	0	0	3.8	0	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Ward Street From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	17	0	0	17	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	20
08:15 AM	1	10	0	0	11	0	0	0	0	0	0	6	1	0	7	0	0	0	0	0	18
08:30 AM	1	4	0	0	5	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	13
08:45 AM	1	8	1	0	10	1	0	0	0	1	0	8	1	0	9	0	0	0	0	0	20
Total Volume	3	39	1	0	43	1	0	0	0	1	0	24	2	0	26	0	0	1	0	1	71
% App. Total	7	90.7	2.3	0		100	0	0	0		0	92.3	7.7	0		0	0	100	0		
PHF	.750	.574	.250	.000	.632	.250	.000	.000	.000	.250	.000	.750	.500	.000	.722	.000	.000	.250	.000	.250	.888



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Groups Printed- Peds and Bicycles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Ward Street From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	4	0	0	0	0	0	2	0	1	0	0	0	0	0	3	10
07:15 AM	3	8	0	0	0	0	0	0	0	0	0	0	0	0	0	2	13
07:30 AM	0	12	0	1	0	0	0	3	0	0	0	1	0	0	0	15	32
07:45 AM	0	10	0	1	0	0	0	3	0	0	0	0	0	0	0	6	20
Total	3	34	0	2	0	0	0	8	0	1	0	1	0	0	0	26	75
08:00 AM	0	17	0	0	0	0	0	5	0	1	0	0	0	0	0	6	29
08:15 AM	0	26	0	0	0	0	0	2	0	1	0	0	0	0	0	7	36
08:30 AM	1	33	0	0	0	0	0	1	0	1	0	0	2	0	0	9	47
08:45 AM	0	16	1	0	0	0	0	2	0	3	0	3	0	0	0	18	43
Total	1	92	1	0	0	0	0	10	0	6	0	3	2	0	0	40	155
Grand Total	4	126	1	2	0	0	0	18	0	7	0	4	2	0	0	66	230
Apprch %	3	94.7	0.8	1.5	0	0	0	100	0	63.6	0	36.4	2.9	0	0	97.1	
Total %	1.7	54.8	0.4	0.9	0	0	0	7.8	0	3	0	1.7	0.9	0	0	28.7	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Ward Street From West					Int. Total
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	17	0	0	17	0	0	0	5	5	0	1	0	0	1	0	0	0	6	6	29
08:15 AM	0	26	0	0	26	0	0	0	2	2	0	1	0	0	1	0	0	0	7	7	36
08:30 AM	1	33	0	0	34	0	0	0	1	1	0	1	0	0	1	2	0	0	9	11	47
08:45 AM	0	16	1	0	17	0	0	0	2	2	0	3	0	3	6	0	0	0	18	18	43
Total Volume	1	92	1	0	94	0	0	0	10	10	0	6	0	3	9	2	0	0	40	42	155
% App. Total	1.1	97.9	1.1	0		0	0	0	100		0	66.7	0	33.3		4.8	0	0	95.2		
PHF	.250	.697	.250	.000	.691	.000	.000	.000	.500	.500	.000	.500	.000	.250	.375	.250	.000	.000	.556	.583	.824



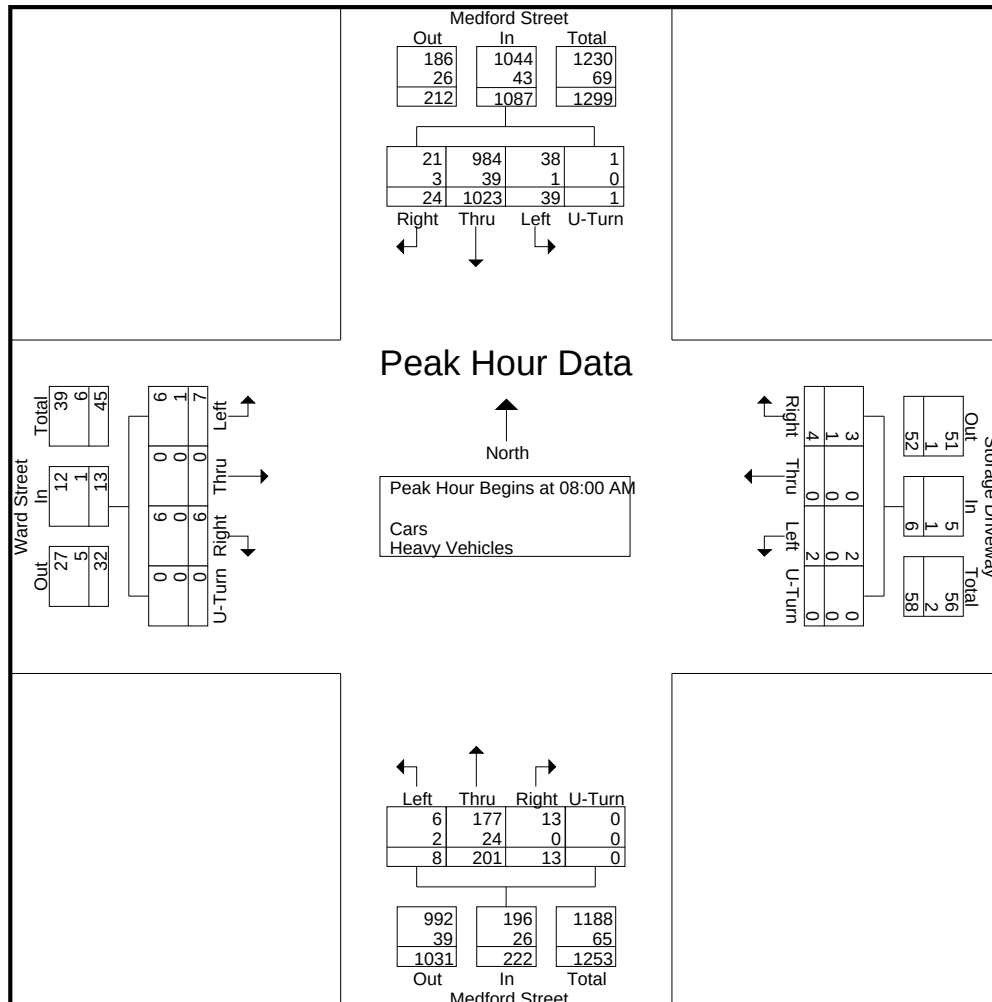
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	Medford Street From North					Storage Driveway From East					Medford Street From South					Ward Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	2	275	9	0	286	0	0	0	0	0	6	54	1	0	61	3	0	1	0	4	351
08:15 AM	5	258	8	0	271	1	0	1	0	2	2	50	3	0	55	2	0	1	0	3	331
08:30 AM	6	240	10	0	256	0	0	1	0	1	2	42	1	0	45	1	0	3	0	4	306
08:45 AM	11	250	12	1	274	3	0	0	0	3	3	55	3	0	61	0	0	2	0	2	340
Total Volume	24	1023	39	1	1087	4	0	2	0	6	13	201	8	0	222	6	0	7	0	13	1328
% App. Total	2.2	94.1	3.6	0.1		66.7	0	33.3	0		5.9	90.5	3.6	0		46.2	0	53.8	0		
PHF	.545	.930	.813	.250	.950	.333	.000	.500	.000	.500	.542	.914	.667	.000	.910	.500	.000	.583	.000	.813	.946
Cars	21	984	38	1	1044	3	0	2	0	5	13	177	6	0	196	6	0	6	0	12	1257
% Cars	87.5	96.2	97.4	100	96.0	75.0	0	100	0	83.3	100	88.1	75.0	0	88.3	100	0	85.7	0	92.3	94.7
Heavy Vehicles	3	39	1	0	43	1	0	0	0	1	0	24	2	0	26	0	0	1	0	1	71
% Heavy Vehicles	12.5	3.8	2.6	0	4.0	25.0	0	0	0	16.7	0	11.9	25.0	0	11.7	0	0	14.3	0	7.7	5.3





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N/S: Medford Street
E/W: Storage Driveway/ Ward Street
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 CC
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Ward Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	4	119	2	0	8	0	4	0	1	121	3	0	7	0	0	0	269
04:15 PM	2	107	4	0	6	0	1	0	1	108	3	0	1	0	0	0	233
04:30 PM	1	139	3	0	2	0	2	0	0	108	3	0	1	0	0	0	259
04:45 PM	5	140	0	0	3	0	0	0	1	103	3	0	2	0	0	0	257
Total	12	505	9	0	19	0	7	0	3	440	12	0	11	0	0	0	1018
05:00 PM	1	137	2	0	9	1	3	0	2	127	4	0	9	1	5	0	301
05:15 PM	5	144	1	0	9	0	0	0	1	120	3	0	4	0	4	0	291
05:30 PM	2	137	2	0	2	0	1	0	1	117	2	0	3	0	0	0	267
05:45 PM	2	142	1	0	8	0	1	0	1	134	3	0	2	0	5	0	299
Total	10	560	6	0	28	1	5	0	5	498	12	0	18	1	14	0	1158
Grand Total	22	1065	15	0	47	1	12	0	8	938	24	0	29	1	14	0	2176
Apprch %	2	96.6	1.4	0	78.3	1.7	20	0	0.8	96.7	2.5	0	65.9	2.3	31.8	0	
Total %	1	48.9	0.7	0	2.2	0	0.6	0	0.4	43.1	1.1	0	1.3	0	0.6	0	
Cars	19	1041	11	0	47	1	12	0	7	925	24	0	27	1	14	0	2129
% Cars	86.4	97.7	73.3	0	100	100	100	0	87.5	98.6	100	0	93.1	100	100	0	97.8
Heavy Vehicles	3	24	4	0	0	0	0	0	1	13	0	0	2	0	0	0	47
% Heavy Vehicles	13.6	2.3	26.7	0	0	0	0	0	12.5	1.4	0	0	6.9	0	0	0	2.2

	Medford Street From North					Storage Driveway From East					Medford Street From South					Ward Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	137	2	0	140	9	1	3	0	13	2	127	4	0	133	9	1	5	0	15	301
05:15 PM	5	144	1	0	150	9	0	0	0	9	1	120	3	0	124	4	0	4	0	8	291
05:30 PM	2	137	2	0	141	2	0	1	0	3	1	117	2	0	120	3	0	0	0	3	267
05:45 PM	2	142	1	0	145	8	0	1	0	9	1	134	3	0	138	2	0	5	0	7	299
Total Volume	10	560	6	0	576	28	1	5	0	34	5	498	12	0	515	18	1	14	0	33	1158
% App. Total	1.7	97.2	1	0		82.4	2.9	14.7	0		1	96.7	2.3	0		54.5	3	42.4	0		
PHF	.500	.972	.750	.000	.960	.778	.250	.417	.000	.654	.625	.929	.750	.000	.933	.500	.250	.700	.000	.550	.962
Cars	8	546	5	0	559	28	1	5	0	34	5	495	12	0	512	18	1	14	0	33	1138
% Cars	80.0	97.5	83.3	0	97.0	100	100	100	0	100	100	99.4	100	0	99.4	100	100	100	0	100	98.3
Heavy Vehicles	2	14	1	0	17	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	20
% Heavy Vehicles	20.0	2.5	16.7	0	3.0	0	0	0	0	0	0	0.6	0	0	0.6	0	0	0	0	0	1.7



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N/S: Medford Street
E/W: Storage Driveway/ Ward Street
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 CC
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars

	Medford Street From North				Storage Driveway From East				Medford Street From South				Ward Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	4	115	0	0	8	0	4	0	1	120	3	0	7	0	0	0	262
04:15 PM	1	105	3	0	6	0	1	0	0	105	3	0	0	0	0	0	224
04:30 PM	1	135	3	0	2	0	2	0	0	103	3	0	1	0	0	0	250
04:45 PM	5	140	0	0	3	0	0	0	1	102	3	0	1	0	0	0	255
Total	11	495	6	0	19	0	7	0	2	430	12	0	9	0	0	0	991
05:00 PM	1	134	2	0	9	1	3	0	2	126	4	0	9	1	5	0	297
05:15 PM	3	141	1	0	9	0	0	0	1	120	3	0	4	0	4	0	286
05:30 PM	2	136	1	0	2	0	1	0	1	116	2	0	3	0	0	0	264
05:45 PM	2	135	1	0	8	0	1	0	1	133	3	0	2	0	5	0	291
Total	8	546	5	0	28	1	5	0	5	495	12	0	18	1	14	0	1138
Grand Total	19	1041	11	0	47	1	12	0	7	925	24	0	27	1	14	0	2129
Apprch %	1.8	97.2	1	0	78.3	1.7	20	0	0.7	96.8	2.5	0	64.3	2.4	33.3	0	
Total %	0.9	48.9	0.5	0	2.2	0	0.6	0	0.3	43.4	1.1	0	1.3	0	0.7	0	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Ward Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	134	2	0	137	9	1	3	0	13	2	126	4	0	132	9	1	5	0	15	297
05:15 PM	3	141	1	0	145	9	0	0	0	9	1	120	3	0	124	4	0	4	0	8	286
05:30 PM	2	136	1	0	139	2	0	1	0	3	1	116	2	0	119	3	0	0	0	3	264
05:45 PM	2	135	1	0	138	8	0	1	0	9	1	133	3	0	137	2	0	5	0	7	291
Total Volume	8	546	5	0	559	28	1	5	0	34	5	495	12	0	512	18	1	14	0	33	1138
% App. Total	1.4	97.7	0.9	0		82.4	2.9	14.7	0		1	96.7	2.3	0		54.5	3	42.4	0		
PHF	.667	.968	.625	.000	.964	.778	.250	.417	.000	.654	.625	.930	.750	.000	.934	.500	.250	.700	.000	.550	.958



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File Name : 133536 CC
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Heavy Vehicles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Ward Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	4	2	0	0	0	0	0	0	1	0	0	0	0	0	0	7
04:15 PM	1	2	1	0	0	0	0	0	1	3	0	0	1	0	0	0	9
04:30 PM	0	4	0	0	0	0	0	0	0	5	0	0	0	0	0	0	9
04:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2
Total	1	10	3	0	0	0	0	0	1	10	0	0	2	0	0	0	27
05:00 PM	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4
05:15 PM	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
05:30 PM	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	3
05:45 PM	0	7	0	0	0	0	0	0	0	1	0	0	0	0	0	0	8
Total	2	14	1	0	0	0	0	0	0	3	0	0	0	0	0	0	20
Grand Total	3	24	4	0	0	0	0	0	1	13	0	0	2	0	0	0	47
Apprch %	9.7	77.4	12.9	0	0	0	0	0	7.1	92.9	0	0	100	0	0	0	
Total %	6.4	51.1	8.5	0	0	0	0	0	2.1	27.7	0	0	4.3	0	0	0	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Ward Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	4	2	0	6	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	7
04:15 PM	1	2	1	0	4	0	0	0	0	0	1	3	0	0	4	1	0	0	0	1	9
04:30 PM	0	4	0	0	4	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	9
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	2
Total Volume	1	10	3	0	14	0	0	0	0	0	1	10	0	0	11	2	0	0	0	2	27
% App. Total	7.1	71.4	21.4	0		0	0	0	0		9.1	90.9	0	0		100	0	0	0		
PHF	.250	.625	.375	.000	.583	.000	.000	.000	.000	.000	.250	.500	.000	.000	.550	.500	.000	.000	.000	.500	.750



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Client: Design Consultants/D. Giangrande

File Name : 133536 CC
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Peds and Bicycles

	Medford Street From North				Storage Driveway From East				Medford Street From South				Ward Street From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	0	2	0	0	0	0	0	7	0	7	0	1	0	0	0	19	36
04:15 PM	0	1	0	0	0	1	0	3	0	4	0	2	0	0	0	17	28
04:30 PM	0	4	0	3	0	0	0	4	0	6	0	0	0	0	0	13	30
04:45 PM	0	3	0	1	0	0	0	4	0	4	0	1	1	0	0	25	39
Total	0	10	0	4	0	1	0	18	0	21	0	4	1	0	0	74	133
05:00 PM	0	6	0	0	0	0	0	7	0	10	0	4	0	0	0	22	49
05:15 PM	0	4	0	1	0	0	0	10	0	6	0	4	0	0	0	20	45
05:30 PM	0	3	0	3	0	0	0	3	0	18	0	6	0	0	0	33	66
05:45 PM	0	6	0	0	0	0	0	11	0	13	0	3	0	0	1	25	59
Total	0	19	0	4	0	0	0	31	0	47	0	17	0	0	1	100	219
Grand Total	0	29	0	8	0	1	0	49	0	68	0	21	1	0	1	174	352
Apprch %	0	78.4	0	21.6	0	2	0	98	0	76.4	0	23.6	0.6	0	0.6	98.9	
Total %	0	8.2	0	2.3	0	0.3	0	13.9	0	19.3	0	6	0.3	0	0.3	49.4	

	Medford Street From North					Storage Driveway From East					Medford Street From South					Ward Street From West					Int. Total
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	6	0	0	6	0	0	0	7	7	0	10	0	4	14	0	0	0	22	22	49
05:15 PM	0	4	0	1	5	0	0	0	10	10	0	6	0	4	10	0	0	0	20	20	45
05:30 PM	0	3	0	3	6	0	0	0	3	3	0	18	0	6	24	0	0	0	33	33	66
05:45 PM	0	6	0	0	6	0	0	0	11	11	0	13	0	3	16	0	0	1	25	26	59
Total Volume	0	19	0	4	23	0	0	0	31	31	0	47	0	17	64	0	0	1	100	101	219
% App. Total	0	82.6	0	17.4		0	0	0	100		0	73.4	0	26.6		0	0	1	99		
PHF	.000	.792	.000	.333	.958	.000	.000	.000	.705	.705	.000	.653	.000	.708	.667	.000	.000	.250	.758	.765	.830



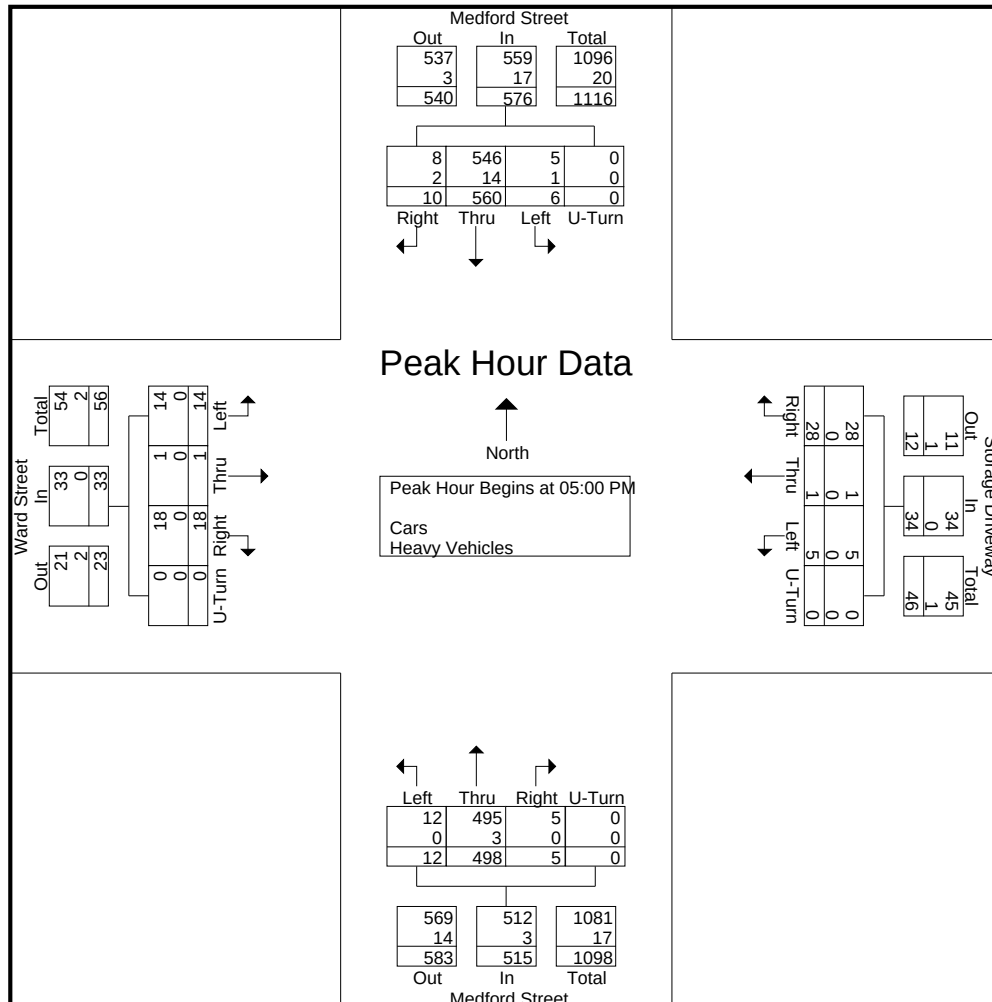
PRECISION
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	Medford Street From North					Storage Driveway From East					Medford Street From South					Ward Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	137	2	0	140	9	1	3	0	13	2	127	4	0	133	9	1	5	0	15	301
05:15 PM	5	144	1	0	150	9	0	0	0	9	1	120	3	0	124	4	0	4	0	8	291
05:30 PM	2	137	2	0	141	2	0	1	0	3	1	117	2	0	120	3	0	0	0	3	267
05:45 PM	2	142	1	0	145	8	0	1	0	9	1	134	3	0	138	2	0	5	0	7	299
Total Volume	10	560	6	0	576	28	1	5	0	34	5	498	12	0	515	18	1	14	0	33	1158
% App. Total	1.7	97.2	1	0		82.4	2.9	14.7	0		1	96.7	2.3	0		54.5	3	42.4	0		
PHF	.500	.972	.750	.000	.960	.778	.250	.417	.000	.654	.625	.929	.750	.000	.933	.500	.250	.700	.000	.550	.962
Cars	8	546	5	0	559	28	1	5	0	34	5	495	12	0	512	18	1	14	0	33	1138
% Cars	80.0	97.5	83.3	0	97.0	100	100	100	0	100	100	99.4	100	0	99.4	100	100	100	0	100	98.3
Heavy Vehicles	2	14	1	0	17	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	20
% Heavy Vehicles	20.0	2.5	16.7	0	3.0	0	0	0	0	0	0	0.6	0	0	0.6	0	0	0	0	0	1.7





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N/S: McGrath Highway/ Medford Street
E/W: Somerville Avenue
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 D
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	McGrath Highway From North					Somerville Avenue From East					Medford Street From South					Somerville Avenue From West					
Start Time	Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Int. Total
07:00 AM	26	176	41	0		0	0	0	0		5	24	7	0		19	49	0	0		347
07:15 AM	22	170	50	0		0	0	0	0		8	28	7	0		13	76	0	0		374
07:30 AM	22	221	44	0		0	0	0	0		6	36	12	0		26	63	0	0		430
07:45 AM	22	248	44	0		0	0	0	0		7	38	7	0		22	63	0	0		451
Total	92	815	179	0		0	0	0	0		26	126	33	0		80	251	0	0		1602
08:00 AM	17	254	35	0		0	0	0	0		5	32	8	0		35	65	0	0		451
08:15 AM	33	234	51	0		0	0	0	0		8	33	5	0		26	74	0	0		464
08:30 AM	36	215	41	0		0	0	0	0		9	19	10	0		26	70	0	0		426
08:45 AM	21	230	38	0		0	0	0	0		11	36	13	0		29	85	0	0		463
Total	107	933	165	0		0	0	0	0		33	120	36	0		116	294	0	0		1804
Grand Total	199	1748	344	0		0	0	0	0		59	246	69	0		196	545	0	0		3406
Apprch %	8.7	76.3	15	0		0	0	0	0		15.8	65.8	18.4	0		26.5	73.5	0	0		
Total %	5.8	51.3	10.1	0		0	0	0	0		1.7	7.2	2	0		5.8	16	0	0		
Cars	179	1693	298	0		0	0	0	0		44	236	62	0		189	513	0	0		3214
% Cars	89.9	96.9	86.6	0		0	0	0	0		74.6	95.9	89.9	0		96.4	94.1	0	0		94.4
Heavy Vehicles	20	55	46	0		0	0	0	0		15	10	7	0		7	32	0	0		192
% Heavy Vehicles	10.1	3.1	13.4	0		0	0	0	0		25.4	4.1	10.1	0		3.6	5.9	0	0		5.6

	McGrath Highway From North						Somerville Avenue From East						Medford Street From South						Somerville Avenue From West						
Start Time	Right	Thru	Left	U-Turn	App. Total		Right	Thru	Left	U-Turn	App. Total		Right	Thru	Left	U-Turn	App. Total		Right	Thru	Left	U-Turn	App. Total		Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 08:00 AM																									
08:00 AM	17	254	35	0	306		0	0	0	0	0		5	32	8	0	45		35	65	0	0	100		451
08:15 AM	33	234	51	0	318		0	0	0	0	0		8	33	5	0	46		26	74	0	0	100		464
08:30 AM	36	215	41	0	292		0	0	0	0	0		9	19	10	0	38		26	70	0	0	96		426
08:45 AM	21	230	38	0	289		0	0	0	0	0		11	36	13	0	60		29	85	0	0	114		463
Total Volume	107	933	165	0	1205		0	0	0	0	0		33	120	36	0	189		116	294	0	0	410		1804
% App. Total	8.9	77.4	13.7	0			0	0	0	0			17.5	63.5	19	0			28.3	71.7	0	0			
PHF	.743	.918	.809	.000	.947		.000	.000	.000	.000	.000		.750	.833	.692	.000	.788		.829	.865	.000	.000	.899		.972
Cars	94	897	138	0	1129		0	0	0	0	0		19	115	32	0	166		112	269	0	0	381		1676
% Cars	87.9	96.1	83.6	0	93.7		0	0	0	0	0		57.6	95.8	88.9	0	87.8		96.6	91.5	0	0	92.9		92.9
Heavy Vehicles	13	36	27	0	76		0	0	0	0	0		14	5	4	0	23		4	25	0	0	29		128
% Heavy Vehicles	12.1	3.9	16.4	0	6.3		0	0	0	0	0		42.4	4.2	11.1	0	12.2		3.4	8.5	0	0	7.1		7.1



PRECISION
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N/S: McGrath Highway/ Medford Street
E/W: Somerville Avenue
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 D
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars

	McGrath Highway From North				Somerville Avenue From East				Medford Street From South				Somerville Avenue From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	24	169	34	0	0	0	0	0	5	23	7	0	19	49	0	0	330
07:15 AM	22	166	43	0	0	0	0	0	8	26	4	0	13	74	0	0	356
07:30 AM	18	219	43	0	0	0	0	0	6	36	12	0	26	62	0	0	422
07:45 AM	21	242	40	0	0	0	0	0	6	36	7	0	19	59	0	0	430
Total	85	796	160	0	0	0	0	0	25	121	30	0	77	244	0	0	1538
08:00 AM	17	241	28	0	0	0	0	0	5	31	8	0	34	60	0	0	424
08:15 AM	30	224	45	0	0	0	0	0	5	32	5	0	26	67	0	0	434
08:30 AM	31	211	38	0	0	0	0	0	1	19	10	0	25	67	0	0	402
08:45 AM	16	221	27	0	0	0	0	0	8	33	9	0	27	75	0	0	416
Total	94	897	138	0	0	0	0	0	19	115	32	0	112	269	0	0	1676
Grand Total	179	1693	298	0	0	0	0	0	44	236	62	0	189	513	0	0	3214
Apprch %	8.2	78	13.7	0	0	0	0	0	12.9	69	18.1	0	26.9	73.1	0	0	
Total %	5.6	52.7	9.3	0	0	0	0	0	1.4	7.3	1.9	0	5.9	16	0	0	

	McGrath Highway From North					Somerville Avenue From East					Medford Street From South					Somerville Avenue From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	18	219	43	0	280	0	0	0	0	0	6	36	12	0	54	26	62	0	0	88	422
07:45 AM	21	242	40	0	303	0	0	0	0	0	6	36	7	0	49	19	59	0	0	78	430
08:00 AM	17	241	28	0	286	0	0	0	0	0	5	31	8	0	44	34	60	0	0	94	424
08:15 AM	30	224	45	0	299	0	0	0	0	0	5	32	5	0	42	26	67	0	0	93	434
Total Volume	86	926	156	0	1168	0	0	0	0	0	22	135	32	0	189	105	248	0	0	353	1710
% App. Total	7.4	79.3	13.4	0		0	0	0	0		11.6	71.4	16.9	0		29.7	70.3	0	0		
PHF	.717	.957	.867	.000	.964	.000	.000	.000	.000	.000	.917	.938	.667	.000	.875	.772	.925	.000	.000	.939	.985



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N/S: McGrath Highway/ Medford Street
E/W: Somerville Avenue
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 D
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Heavy Vehicles

	McGrath Highway From North				Somerville Avenue From East				Medford Street From South				Somerville Avenue From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	2	7	7	0	0	0	0	0	0	1	0	0	0	0	0	0	17
07:15 AM	0	4	7	0	0	0	0	0	0	2	3	0	0	2	0	0	18
07:30 AM	4	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	8
07:45 AM	1	6	4	0	0	0	0	0	1	2	0	0	3	4	0	0	21
Total	7	19	19	0	0	0	0	0	1	5	3	0	3	7	0	0	64
08:00 AM	0	13	7	0	0	0	0	0	0	1	0	0	1	5	0	0	27
08:15 AM	3	10	6	0	0	0	0	0	3	1	0	0	0	7	0	0	30
08:30 AM	5	4	3	0	0	0	0	0	8	0	0	0	1	3	0	0	24
08:45 AM	5	9	11	0	0	0	0	0	3	3	4	0	2	10	0	0	47
Total	13	36	27	0	0	0	0	0	14	5	4	0	4	25	0	0	128
Grand Total	20	55	46	0	0	0	0	0	15	10	7	0	7	32	0	0	192
Apprch %	16.5	45.5	38	0	0	0	0	0	46.9	31.2	21.9	0	17.9	82.1	0	0	
Total %	10.4	28.6	24	0	0	0	0	0	7.8	5.2	3.6	0	3.6	16.7	0	0	

	McGrath Highway From North					Somerville Avenue From East					Medford Street From South					Somerville Avenue From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	13	7	0	20	0	0	0	0	0	0	1	0	0	1	1	5	0	0	6	27
08:15 AM	3	10	6	0	19	0	0	0	0	0	3	1	0	0	4	0	7	0	0	7	30
08:30 AM	5	4	3	0	12	0	0	0	0	0	8	0	0	0	8	1	3	0	0	4	24
08:45 AM	5	9	11	0	25	0	0	0	0	0	3	3	4	0	10	2	10	0	0	12	47
Total Volume	13	36	27	0	76	0	0	0	0	0	14	5	4	0	23	4	25	0	0	29	128
% App. Total	17.1	47.4	35.5	0		0	0	0	0		60.9	21.7	17.4	0		13.8	86.2	0	0		
PHF	.650	.692	.614	.000	.760	.000	.000	.000	.000	.000	.438	.417	.250	.000	.575	.500	.625	.000	.000	.604	.681



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Client: Design Consultants/D. Giangrande

File Name : 133536 D
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Peds and Bicycles

	McGrath Highway From North				Somerville Avenue From East				Medford Street From South				Somerville Avenue From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	8	1	1	0	0	0	1	0	1	0	1	1	0	0	3	17
07:15 AM	3	4	0	0	0	0	0	0	0	0	0	1	3	1	0	3	15
07:30 AM	1	10	0	0	0	0	0	0	0	0	0	7	1	1	0	10	30
07:45 AM	0	8	0	0	0	0	0	0	0	0	1	3	3	1	0	6	22
Total	4	30	1	1	0	0	0	1	0	1	1	12	8	3	0	22	84
08:00 AM	2	9	0	0	0	0	0	0	0	0	0	2	6	0	0	4	23
08:15 AM	0	20	0	0	0	0	0	0	0	0	0	2	3	0	0	6	31
08:30 AM	0	23	0	0	0	0	0	0	0	2	0	2	8	2	0	6	43
08:45 AM	1	5	1	0	0	0	0	0	0	0	3	3	10	0	0	7	30
Total	3	57	1	0	0	0	0	0	0	2	3	9	27	2	0	23	127
Grand Total	7	87	2	1	0	0	0	1	0	3	4	21	35	5	0	45	211
Apprch %	7.2	89.7	2.1	1	0	0	0	100	0	10.7	14.3	75	41.2	5.9	0	52.9	
Total %	3.3	41.2	0.9	0.5	0	0	0	0.5	0	1.4	1.9	10	16.6	2.4	0	21.3	

	McGrath Highway From North					Somerville Avenue From East					Medford Street From South					Somerville Avenue From West					Int. Total
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	2	9	0	0	11	0	0	0	0	0	0	0	0	2	2	6	0	0	4	10	23
08:15 AM	0	20	0	0	20	0	0	0	0	0	0	0	0	2	2	3	0	0	6	9	31
08:30 AM	0	23	0	0	23	0	0	0	0	0	0	2	0	2	4	8	2	0	6	16	43
08:45 AM	1	5	1	0	7	0	0	0	0	0	0	0	3	3	6	10	0	0	7	17	30
Total Volume	3	57	1	0	61	0	0	0	0	0	0	2	3	9	14	27	2	0	23	52	127
% App. Total	4.9	93.4	1.6	0		0	0	0	0		0	14.3	21.4	64.3		51.9	3.8	0	44.2		
PHF	.375	.620	.250	.000	.663	.000	.000	.000	.000	.000	.000	.250	.250	.750	.583	.675	.250	.000	.821	.765	.738



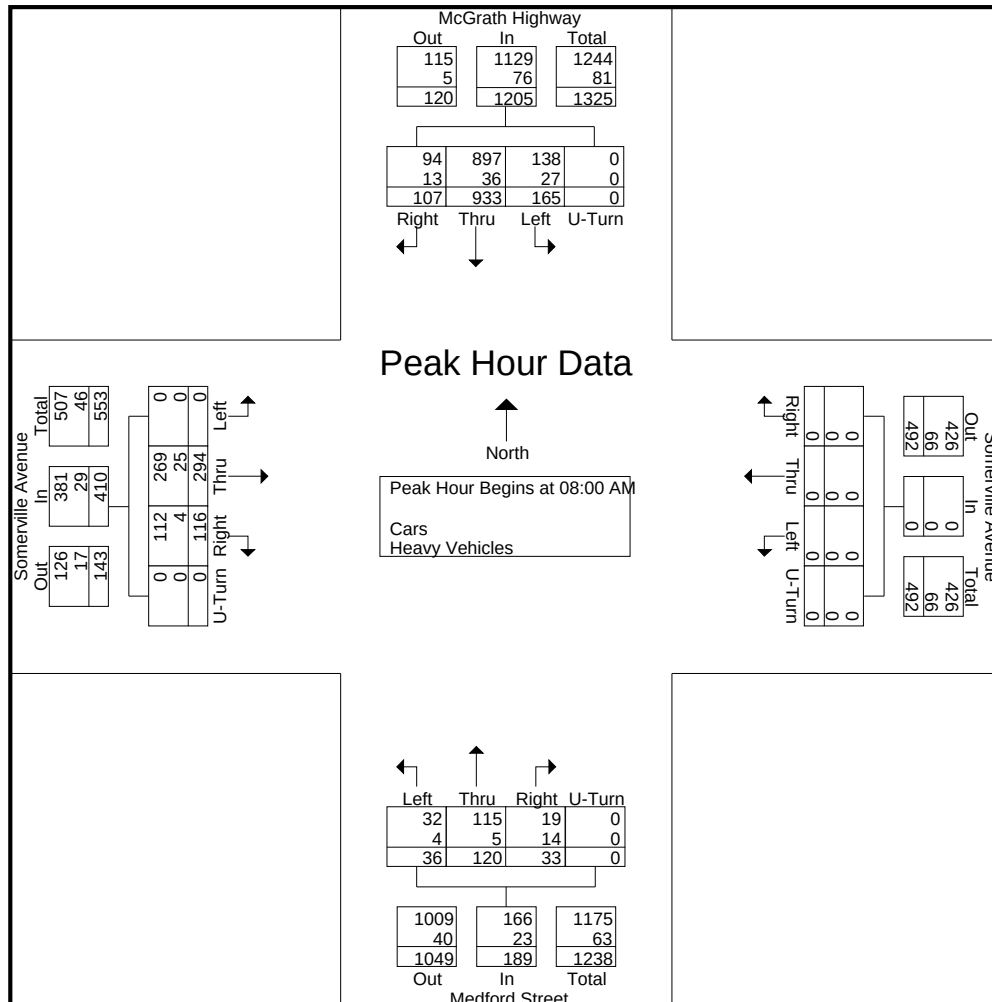
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File Name : 133536 D
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	McGrath Highway From North					Somerville Avenue From East					Medford Street From South					Somerville Avenue From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	17	254	35	0	306	0	0	0	0	0	5	32	8	0	45	35	65	0	0	100	451
08:15 AM	33	234	51	0	318	0	0	0	0	0	8	33	5	0	46	26	74	0	0	100	464
08:30 AM	36	215	41	0	292	0	0	0	0	0	9	19	10	0	38	26	70	0	0	96	426
08:45 AM	21	230	38	0	289	0	0	0	0	0	11	36	13	0	60	29	85	0	0	114	463
Total Volume	107	933	165	0	1205	0	0	0	0	0	33	120	36	0	189	116	294	0	0	410	1804
% App. Total	8.9	77.4	13.7	0		0	0	0	0	0	17.5	63.5	19	0		28.3	71.7	0	0		
PHF	.743	.918	.809	.000	.947	.000	.000	.000	.000	.000	.750	.833	.692	.000	.788	.829	.865	.000	.000	.899	.972
Cars	94	897	138	0	1129	0	0	0	0	0	19	115	32	0	166	112	269	0	0	381	1676
% Cars	87.9	96.1	83.6	0	93.7	0	0	0	0	0	57.6	95.8	88.9	0	87.8	96.6	91.5	0	0	92.9	92.9
Heavy Vehicles	13	36	27	0	76	0	0	0	0	0	14	5	4	0	23	4	25	0	0	29	128
% Heavy Vehicles	12.1	3.9	16.4	0	6.3	0	0	0	0	0	42.4	4.2	11.1	0	12.2	3.4	8.5	0	0	7.1	7.1





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Client: Design Consultants/D. Giangrande

File Name : 133536 DD
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	McGrath Highway From North				Somerville Avenue From East				Medford Street From South				Somerville Avenue From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	42	102	54	0	0	0	0	0	25	83	14	0	11	56	0	0	387
04:15 PM	32	110	47	0	0	0	0	0	20	72	19	0	13	44	0	0	357
04:30 PM	43	112	37	0	0	0	0	0	14	79	12	0	18	52	0	0	367
04:45 PM	45	127	37	0	0	0	0	0	7	67	11	0	14	47	0	0	355
Total	162	451	175	0	0	0	0	0	66	301	56	0	56	199	0	0	1466
05:00 PM	68	121	40	0	0	0	0	0	9	98	26	0	19	49	0	0	430
05:15 PM	46	116	29	0	0	0	0	0	11	109	22	0	36	54	0	0	423
05:30 PM	59	127	52	0	0	0	0	0	6	85	22	0	21	48	0	0	420
05:45 PM	68	134	35	0	0	0	0	0	6	86	33	0	30	57	0	0	449
Total	241	498	156	0	0	0	0	0	32	378	103	0	106	208	0	0	1722
Grand Total	403	949	331	0	0	0	0	0	98	679	159	0	162	407	0	0	3188
Apprch %	23.9	56.4	19.7	0	0	0	0	0	10.5	72.5	17	0	28.5	71.5	0	0	
Total %	12.6	29.8	10.4	0	0	0	0	0	3.1	21.3	5	0	5.1	12.8	0	0	
Cars	385	921	309	0	0	0	0	0	93	672	158	0	159	396	0	0	3093
% Cars	95.5	97	93.4	0	0	0	0	0	94.9	99	99.4	0	98.1	97.3	0	0	97
Heavy Vehicles	18	28	22	0	0	0	0	0	5	7	1	0	3	11	0	0	95
% Heavy Vehicles	4.5	3	6.6	0	0	0	0	0	5.1	1	0.6	0	1.9	2.7	0	0	3

	McGrath Highway From North					Somerville Avenue From East					Medford Street From South					Somerville Avenue From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	68	121	40	0	229	0	0	0	0	0	9	98	26	0	133	19	49	0	0	68	430
05:15 PM	46	116	29	0	191	0	0	0	0	0	11	109	22	0	142	36	54	0	0	90	423
05:30 PM	59	127	52	0	238	0	0	0	0	0	6	85	22	0	113	21	48	0	0	69	420
05:45 PM	68	134	35	0	237	0	0	0	0	0	6	86	33	0	125	30	57	0	0	87	449
Total Volume	241	498	156	0	895	0	0	0	0	0	32	378	103	0	513	106	208	0	0	314	1722
% App. Total	26.9	55.6	17.4	0		0	0	0	0		6.2	73.7	20.1	0		33.8	66.2	0	0		
PHF	.886	.929	.750	.000	.940	.000	.000	.000	.000	.000	.727	.867	.780	.000	.903	.736	.912	.000	.000	.872	.959
Cars	234	483	147	0	864	0	0	0	0	0	31	377	103	0	511	103	200	0	0	303	1678
% Cars	97.1	97.0	94.2	0	96.5	0	0	0	0	0	96.9	99.7	100	0	99.6	97.2	96.2	0	0	96.5	97.4
Heavy Vehicles	7	15	9	0	31	0	0	0	0	0	1	1	0	0	2	3	8	0	0	11	44
% Heavy Vehicles	2.9	3.0	5.8	0	3.5	0	0	0	0	0	3.1	0.3	0	0	0.4	2.8	3.8	0	0	3.5	2.6



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Groups Printed- Cars

	McGrath Highway From North				Somerville Avenue From East				Medford Street From South				Somerville Avenue From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	41	97	50	0	0	0	0	0	24	82	14	0	11	55	0	0	374
04:15 PM	29	105	43	0	0	0	0	0	20	70	18	0	13	43	0	0	341
04:30 PM	40	110	34	0	0	0	0	0	12	77	12	0	18	51	0	0	354
04:45 PM	41	126	35	0	0	0	0	0	6	66	11	0	14	47	0	0	346
Total	151	438	162	0	0	0	0	0	62	295	55	0	56	196	0	0	1415
05:00 PM	65	117	38	0	0	0	0	0	9	98	26	0	19	46	0	0	418
05:15 PM	46	113	27	0	0	0	0	0	11	109	22	0	33	52	0	0	413
05:30 PM	56	125	48	0	0	0	0	0	5	85	22	0	21	47	0	0	409
05:45 PM	67	128	34	0	0	0	0	0	6	85	33	0	30	55	0	0	438
Total	234	483	147	0	0	0	0	0	31	377	103	0	103	200	0	0	1678
Grand Total	385	921	309	0	0	0	0	0	93	672	158	0	159	396	0	0	3093
Apprch %	23.8	57	19.1	0	0	0	0	0	10.1	72.8	17.1	0	28.6	71.4	0	0	
Total %	12.4	29.8	10	0	0	0	0	0	3	21.7	5.1	0	5.1	12.8	0	0	

	McGrath Highway From North					Somerville Avenue From East					Medford Street From South					Somerville Avenue From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	65	117	38	0	220	0	0	0	0	0	9	98	26	0	133	19	46	0	0	65	418
05:15 PM	46	113	27	0	186	0	0	0	0	0	11	109	22	0	142	33	52	0	0	85	413
05:30 PM	56	125	48	0	229	0	0	0	0	0	5	85	22	0	112	21	47	0	0	68	409
05:45 PM	67	128	34	0	229	0	0	0	0	0	6	85	33	0	124	30	55	0	0	85	438
Total Volume	234	483	147	0	864	0	0	0	0	0	31	377	103	0	511	103	200	0	0	303	1678
% App. Total	27.1	55.9	17	0		0	0	0	0		6.1	73.8	20.2	0		34	66	0	0		
PHF	.873	.943	.766	.000	.943	.000	.000	.000	.000	.000	.705	.865	.780	.000	.900	.780	.909	.000	.000	.891	.958



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N/S: McGrath Highway/ Medford Street
E/W: Somerville Avenue
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 DD
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Heavy Vehicles

	McGrath Highway From North				Somerville Avenue From East				Medford Street From South				Somerville Avenue From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	1	5	4	0	0	0	0	0	1	1	0	0	0	1	0	0	13
04:15 PM	3	5	4	0	0	0	0	0	0	2	1	0	0	1	0	0	16
04:30 PM	3	2	3	0	0	0	0	0	2	2	0	0	0	1	0	0	13
04:45 PM	4	1	2	0	0	0	0	0	1	1	0	0	0	0	0	0	9
Total	11	13	13	0	0	0	0	0	4	6	1	0	0	3	0	0	51
05:00 PM	3	4	2	0	0	0	0	0	0	0	0	0	0	3	0	0	12
05:15 PM	0	3	2	0	0	0	0	0	0	0	0	0	3	2	0	0	10
05:30 PM	3	2	4	0	0	0	0	0	1	0	0	0	0	1	0	0	11
05:45 PM	1	6	1	0	0	0	0	0	0	1	0	0	0	2	0	0	11
Total	7	15	9	0	0	0	0	0	1	1	0	0	3	8	0	0	44
Grand Total	18	28	22	0	0	0	0	0	5	7	1	0	3	11	0	0	95
Apprch %	26.5	41.2	32.4	0	0	0	0	0	38.5	53.8	7.7	0	21.4	78.6	0	0	
Total %	18.9	29.5	23.2	0	0	0	0	0	5.3	7.4	1.1	0	3.2	11.6	0	0	

	McGrath Highway From North					Somerville Avenue From East					Medford Street From South					Somerville Avenue From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	1	5	4	0	10	0	0	0	0	0	1	1	0	0	2	0	1	0	0	1	13
04:15 PM	3	5	4	0	12	0	0	0	0	0	0	2	1	0	3	0	1	0	0	1	16
04:30 PM	3	2	3	0	8	0	0	0	0	0	2	2	0	0	4	0	1	0	0	1	13
04:45 PM	4	1	2	0	7	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	9
Total Volume	11	13	13	0	37	0	0	0	0	0	4	6	1	0	11	0	3	0	0	3	51
% App. Total	29.7	35.1	35.1	0		0	0	0	0		36.4	54.5	9.1	0		0	100	0	0		
PHF	.688	.650	.813	.000	.771	.000	.000	.000	.000	.000	.500	.750	.250	.000	.688	.000	.750	.000	.000	.750	.797



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N/S: McGrath Highway/ Medford Street
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Client: Design Consultants/D. Giangrande

File Name : 133536 DD
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Peds and Bicycles

	McGrath Highway From North				Somerville Avenue From East				Medford Street From South				Somerville Avenue From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	0	3	0	0	0	0	0	0	0	1	0	0	1	0	0	8	13
04:15 PM	0	0	0	0	0	0	0	0	0	3	1	1	0	1	0	6	12
04:30 PM	1	1	0	0	0	0	0	0	0	2	2	0	0	0	0	12	18
04:45 PM	0	2	0	0	0	0	0	0	1	0	1	1	0	0	0	12	17
Total	1	6	0	0	0	0	0	0	1	6	4	2	1	1	0	38	60
05:00 PM	0	2	0	0	0	0	0	0	0	9	1	0	0	0	0	11	23
05:15 PM	1	0	0	2	0	0	0	0	0	2	2	0	0	0	0	15	22
05:30 PM	0	1	0	0	0	0	0	0	2	8	0	0	0	2	0	15	28
05:45 PM	0	1	0	0	0	0	0	0	1	4	2	0	0	0	0	19	27
Total	1	4	0	2	0	0	0	0	3	23	5	0	0	2	0	60	100
Grand Total	2	10	0	2	0	0	0	0	4	29	9	2	1	3	0	98	160
Apprch %	14.3	71.4	0	14.3	0	0	0	0	9.1	65.9	20.5	4.5	1	2.9	0	96.1	
Total %	1.2	6.2	0	1.2	0	0	0	0	2.5	18.1	5.6	1.2	0.6	1.9	0	61.2	

	McGrath Highway From North					Somerville Avenue From East					Medford Street From South					Somerville Avenue From West					Int. Total
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	2	0	0	2	0	0	0	0	0	0	9	1	0	10	0	0	0	11	11	23
05:15 PM	1	0	0	2	3	0	0	0	0	0	0	2	2	0	4	0	0	0	15	15	22
05:30 PM	0	1	0	0	1	0	0	0	0	0	2	8	0	0	10	0	2	0	15	17	28
05:45 PM	0	1	0	0	1	0	0	0	0	0	1	4	2	0	7	0	0	0	19	19	27
Total Volume	1	4	0	2	7	0	0	0	0	0	3	23	5	0	31	0	2	0	60	62	100
% App. Total	14.3	57.1	0	28.6		0	0	0	0		9.7	74.2	16.1	0		0	3.2	0	96.8		
PHF	.250	.500	.000	.250	.583	.000	.000	.000	.000	.000	.375	.639	.625	.000	.775	.000	.250	.000	.789	.816	.893



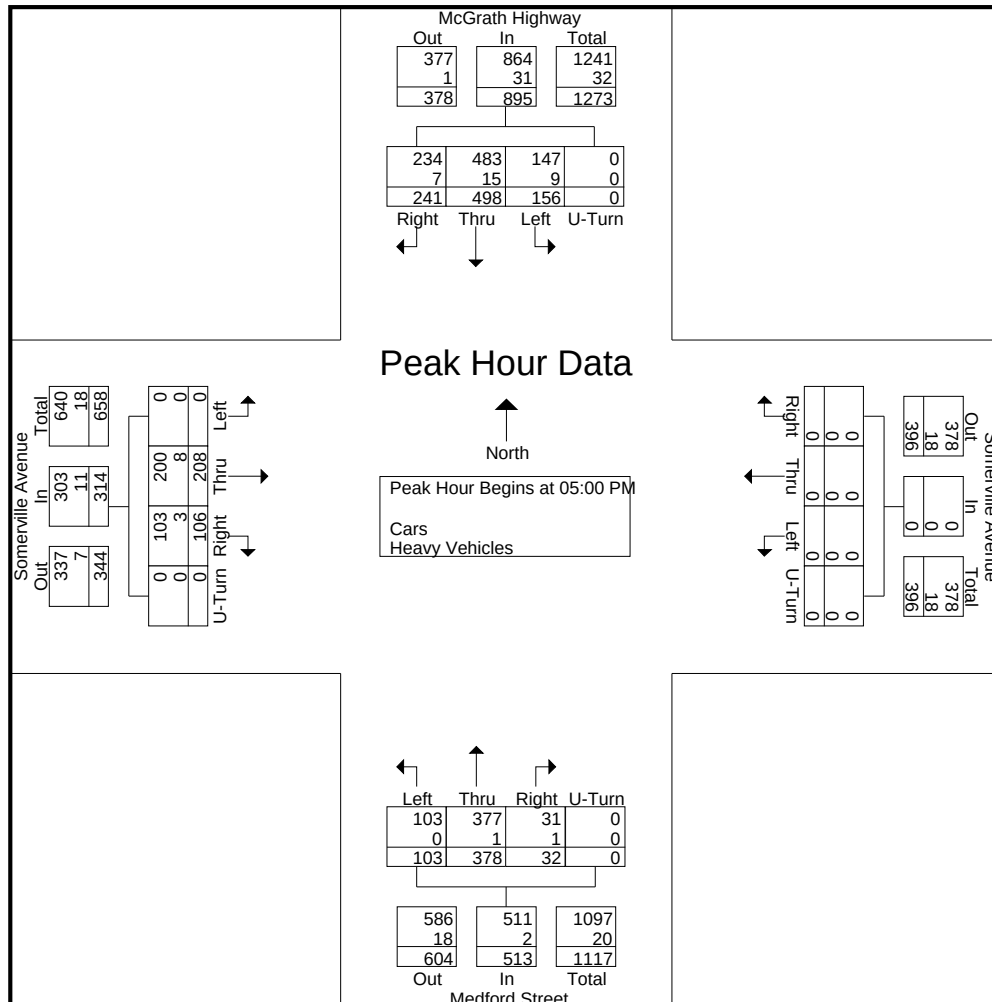
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File Name : 133536 DD
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Page No : 1

	McGrath Highway From North					Somerville Avenue From East					Medford Street From South					Somerville Avenue From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	68	121	40	0	229	0	0	0	0	0	9	98	26	0	133	19	49	0	0	68	430
05:15 PM	46	116	29	0	191	0	0	0	0	0	11	109	22	0	142	36	54	0	0	90	423
05:30 PM	59	127	52	0	238	0	0	0	0	0	6	85	22	0	113	21	48	0	0	69	420
05:45 PM	68	134	35	0	237	0	0	0	0	0	6	86	33	0	125	30	57	0	0	87	449
Total Volume	241	498	156	0	895	0	0	0	0	0	32	378	103	0	513	106	208	0	0	314	1722
% App. Total	26.9	55.6	17.4	0		0	0	0	0	0	6.2	73.7	20.1	0		33.8	66.2	0	0		
PHF	.886	.929	.750	.000	.940	.000	.000	.000	.000	.000	.727	.867	.780	.000	.903	.736	.912	.000	.000	.872	.959
Cars	234	483	147	0	864	0	0	0	0	0	31	377	103	0	511	103	200	0	0	303	1678
% Cars	97.1	97.0	94.2	0	96.5	0	0	0	0	0	96.9	99.7	100	0	99.6	97.2	96.2	0	0	96.5	97.4
Heavy Vehicles	7	15	9	0	31	0	0	0	0	0	1	1	0	0	2	3	8	0	0	11	44
% Heavy Vehicles	2.9	3.0	5.8	0	3.5	0	0	0	0	0	3.1	0.3	0	0	0.4	2.8	3.8	0	0	3.5	2.6





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N/S: Windsor Street
E: South Street
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 E
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Windsor Street From North			South Street From East			Windsor Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	2	1	0	27	34	0	1	3	0	68
07:15 AM	3	1	0	20	47	0	2	0	0	73
07:30 AM	4	8	0	63	48	0	1	2	0	126
07:45 AM	6	7	0	59	64	0	1	6	0	143
Total	15	17	0	169	193	0	5	11	0	410
08:00 AM	4	9	0	41	39	0	5	7	0	105
08:15 AM	4	4	0	36	53	0	1	2	0	100
08:30 AM	9	8	0	29	33	0	0	6	0	85
08:45 AM	3	9	0	39	52	1	2	7	0	113
Total	20	30	0	145	177	1	8	22	0	403
Grand Total	35	47	0	314	370	1	13	33	0	813
Apprch %	42.7	57.3	0	45.8	54	0.1	28.3	71.7	0	
Total %	4.3	5.8	0	38.6	45.5	0.1	1.6	4.1	0	
Cars	33	46	0	300	345	1	12	31	0	768
% Cars	94.3	97.9	0	95.5	93.2	100	92.3	93.9	0	94.5
Heavy Vehicles	2	1	0	14	25	0	1	2	0	45
% Heavy Vehicles	5.7	2.1	0	4.5	6.8	0	7.7	6.1	0	5.5

	Windsor Street From North				South Street From East				Windsor Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	4	8	0	12	63	48	0	111	1	2	0	3	126
07:45 AM	6	7	0	13	59	64	0	123	1	6	0	7	143
08:00 AM	4	9	0	13	41	39	0	80	5	7	0	12	105
08:15 AM	4	4	0	8	36	53	0	89	1	2	0	3	100
Total Volume	18	28	0	46	199	204	0	403	8	17	0	25	474
% App. Total	39.1	60.9	0		49.4	50.6	0		32	68	0		
PHF	.750	.778	.000	.885	.790	.797	.000	.819	.400	.607	.000	.521	.829
Cars	17	27	0	44	190	192	0	382	7	16	0	23	449
% Cars	94.4	96.4	0	95.7	95.5	94.1	0	94.8	87.5	94.1	0	92.0	94.7
Heavy Vehicles	1	1	0	2	9	12	0	21	1	1	0	2	25
% Heavy Vehicles	5.6	3.6	0	4.3	4.5	5.9	0	5.2	12.5	5.9	0	8.0	5.3



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N/S: Windsor Street
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City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 E
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars

Start Time	Windsor Street From North			South Street From East			Windsor Street From South			Int. Total
	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	
07:00 AM	1	1	0	25	30	0	1	3	0	61
07:15 AM	3	1	0	19	41	0	2	0	0	66
07:30 AM	4	7	0	60	44	0	1	2	0	118
07:45 AM	6	7	0	57	62	0	1	6	0	139
Total	14	16	0	161	177	0	5	11	0	384
08:00 AM	4	9	0	38	38	0	4	6	0	99
08:15 AM	3	4	0	35	48	0	1	2	0	93
08:30 AM	9	8	0	28	31	0	0	5	0	81
08:45 AM	3	9	0	38	51	1	2	7	0	111
Total	19	30	0	139	168	1	7	20	0	384
Grand Total	33	46	0	300	345	1	12	31	0	768
Apprch %	41.8	58.2	0	46.4	53.4	0.2	27.9	72.1	0	
Total %	4.3	6	0	39.1	44.9	0.1	1.6	4	0	

	Windsor Street From North				South Street From East				Windsor Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	4	7	0	11	60	44	0	104	1	2	0	3	118
07:45 AM	6	7	0	13	57	62	0	119	1	6	0	7	139
08:00 AM	4	9	0	13	38	38	0	76	4	6	0	10	99
08:15 AM	3	4	0	7	35	48	0	83	1	2	0	3	93
Total Volume	17	27	0	44	190	192	0	382	7	16	0	23	449
% App. Total	38.6	61.4	0		49.7	50.3	0		30.4	69.6	0		
PHF	.708	.750	.000	.846	.792	.774	.000	.803	.438	.667	.000	.575	.808



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File Name : 133536 E
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Heavy Vehicles

	Windsor Street From North			South Street From East			Windsor Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	1	0	0	2	4	0	0	0	0	7
07:15 AM	0	0	0	1	6	0	0	0	0	7
07:30 AM	0	1	0	3	4	0	0	0	0	8
07:45 AM	0	0	0	2	2	0	0	0	0	4
Total	1	1	0	8	16	0	0	0	0	26
08:00 AM	0	0	0	3	1	0	1	1	0	6
08:15 AM	1	0	0	1	5	0	0	0	0	7
08:30 AM	0	0	0	1	2	0	0	1	0	4
08:45 AM	0	0	0	1	1	0	0	0	0	2
Total	1	0	0	6	9	0	1	2	0	19
Grand Total	2	1	0	14	25	0	1	2	0	45
Apprch %	66.7	33.3	0	35.9	64.1	0	33.3	66.7	0	
Total %	4.4	2.2	0	31.1	55.6	0	2.2	4.4	0	

	Windsor Street From North				South Street From East				Windsor Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	1	0	0	1	2	4	0	6	0	0	0	0	7
07:15 AM	0	0	0	0	1	6	0	7	0	0	0	0	7
07:30 AM	0	1	0	1	3	4	0	7	0	0	0	0	8
07:45 AM	0	0	0	0	2	2	0	4	0	0	0	0	4
Total Volume	1	1	0	2	8	16	0	24	0	0	0	0	26
% App. Total	50	50	0		33.3	66.7	0		0	0	0		
PHF	.250	.250	.000	.500	.667	.667	.000	.857	.000	.000	.000	.000	.813



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Groups Printed- Peds and Bicycles

	Windsor Street From North			South Street From East			Windsor Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	1	0	0	0	1	0	0	0	2
07:30 AM	0	0	0	3	0	1	0	0	0	4
07:45 AM	0	0	0	2	0	0	0	1	0	3
Total	0	1	0	5	0	2	0	1	0	9
08:00 AM	0	0	0	2	0	0	0	0	0	2
08:15 AM	1	3	0	0	0	0	0	0	0	4
08:30 AM	1	1	0	0	0	0	0	0	0	2
08:45 AM	2	2	0	1	0	0	0	0	0	5
Total	4	6	0	3	0	0	0	0	0	13
Grand Total	4	7	0	8	0	2	0	1	0	22
Apprch %	36.4	63.6	0	80	0	20	0	100	0	
Total %	18.2	31.8	0	36.4	0	9.1	0	4.5	0	

	Windsor Street From North				South Street From East				Windsor Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	0	0	0	0	3	0	1	4	0	0	0	0	4
07:45 AM	0	0	0	0	2	0	0	2	0	1	0	1	3
08:00 AM	0	0	0	0	2	0	0	2	0	0	0	0	2
08:15 AM	1	3	0	4	0	0	0	0	0	0	0	0	4
Total Volume	1	3	0	4	7	0	1	8	0	1	0	1	13
% App. Total	25	75	0		87.5	0	12.5		0	100	0		
PHF	.250	.250	.000	.250	.583	.000	.250	.500	.000	.250	.000	.250	.813



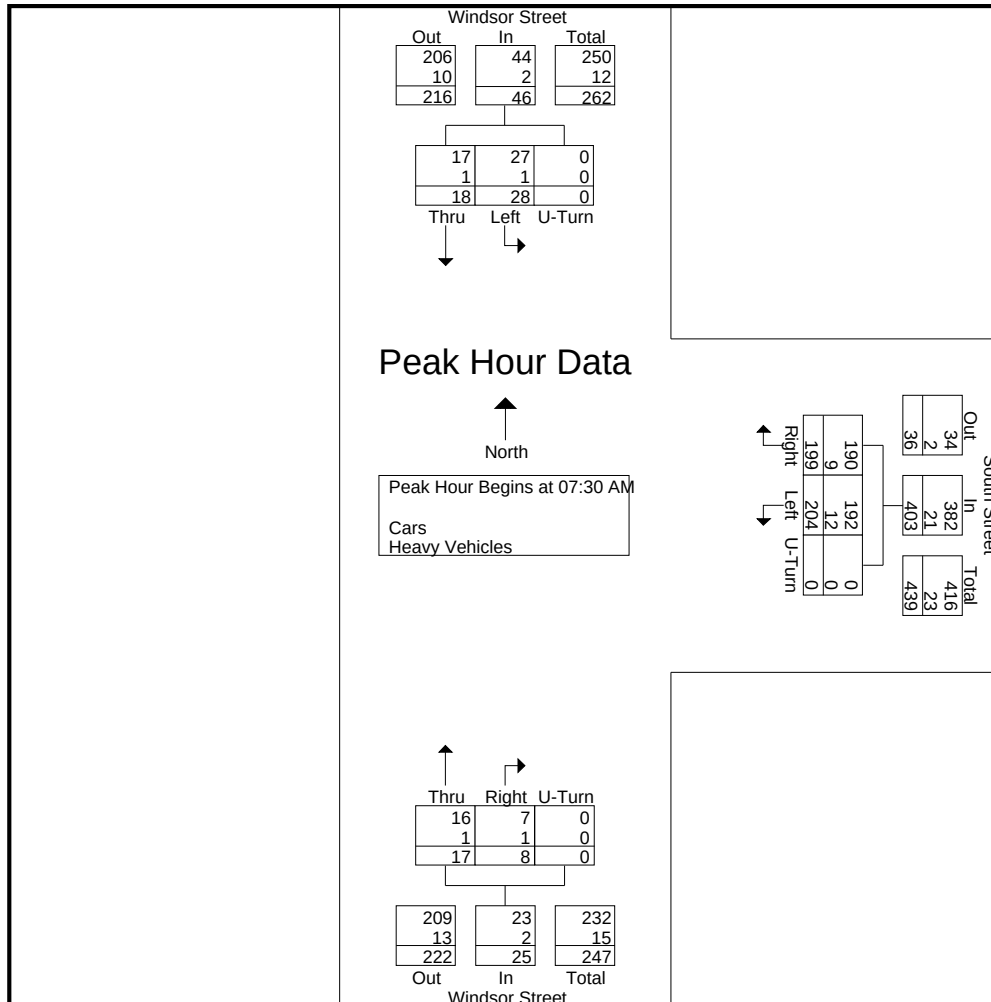
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	Windsor Street From North				South Street From East				Windsor Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	4	8	0	12	63	48	0	111	1	2	0	3	126
07:45 AM	6	7	0	13	59	64	0	123	1	6	0	7	143
08:00 AM	4	9	0	13	41	39	0	80	5	7	0	12	105
08:15 AM	4	4	0	8	36	53	0	89	1	2	0	3	100
Total Volume	18	28	0	46	199	204	0	403	8	17	0	25	474
% App. Total	39.1	60.9	0		49.4	50.6	0		32	68	0		
PHF	.750	.778	.000	.885	.790	.797	.000	.819	.400	.607	.000	.521	.829
Cars	17	27	0	44	190	192	0	382	7	16	0	23	449
% Cars	94.4	96.4	0	95.7	95.5	94.1	0	94.8	87.5	94.1	0	92.0	94.7
Heavy Vehicles	1	1	0	2	9	12	0	21	1	1	0	2	25
% Heavy Vehicles	5.6	3.6	0	4.3	4.5	5.9	0	5.2	12.5	5.9	0	8.0	5.3





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N/S: Windsor Street
E: South Street
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 EE
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Windsor Street From North			South Street From East			Windsor Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	13	3	0	34	28	0	0	2	0	80
04:15 PM	8	3	0	31	28	0	1	5	0	76
04:30 PM	2	6	1	41	40	0	1	2	0	93
04:45 PM	10	3	1	40	37	0	0	5	0	96
Total	33	15	2	146	133	0	2	14	0	345
05:00 PM	14	3	0	49	40	0	1	6	0	113
05:15 PM	6	1	0	46	43	0	0	6	0	102
05:30 PM	5	4	0	44	35	0	1	8	0	97
05:45 PM	7	7	0	36	38	0	1	5	0	94
Total	32	15	0	175	156	0	3	25	0	406
Grand Total	65	30	2	321	289	0	5	39	0	751
Apprch %	67	30.9	2.1	52.6	47.4	0	11.4	88.6	0	
Total %	8.7	4	0.3	42.7	38.5	0	0.7	5.2	0	
Cars	55	29	2	315	282	0	5	38	0	726
% Cars	84.6	96.7	100	98.1	97.6	0	100	97.4	0	96.7
Heavy Vehicles	10	1	0	6	7	0	0	1	0	25
% Heavy Vehicles	15.4	3.3	0	1.9	2.4	0	0	2.6	0	3.3

	Windsor Street From North				South Street From East				Windsor Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	10	3	1	14	40	37	0	77	0	5	0	5	96
05:00 PM	14	3	0	17	49	40	0	89	1	6	0	7	113
05:15 PM	6	1	0	7	46	43	0	89	0	6	0	6	102
05:30 PM	5	4	0	9	44	35	0	79	1	8	0	9	97
Total Volume	35	11	1	47	179	155	0	334	2	25	0	27	408
% App. Total	74.5	23.4	2.1		53.6	46.4	0		7.4	92.6	0		
PHF	.625	.688	.250	.691	.913	.901	.000	.938	.500	.781	.000	.750	.903
Cars	33	11	1	45	175	152	0	327	2	24	0	26	398
% Cars	94.3	100	100	95.7	97.8	98.1	0	97.9	100	96.0	0	96.3	97.5
Heavy Vehicles	2	0	0	2	4	3	0	7	0	1	0	1	10
% Heavy Vehicles	5.7	0	0	4.3	2.2	1.9	0	2.1	0	4.0	0	3.7	2.5



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File Name : 133536 EE
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Page No : 1

Groups Printed- Cars

	Windsor Street From North			South Street From East			Windsor Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	11	3	0	33	27	0	0	2	0	76
04:15 PM	5	3	0	31	28	0	1	5	0	73
04:30 PM	2	6	1	40	39	0	1	2	0	91
04:45 PM	10	3	1	39	37	0	0	5	0	95
Total	28	15	2	143	131	0	2	14	0	335
05:00 PM	13	3	0	47	38	0	1	6	0	108
05:15 PM	6	1	0	45	43	0	0	5	0	100
05:30 PM	4	4	0	44	34	0	1	8	0	95
05:45 PM	4	6	0	36	36	0	1	5	0	88
Total	27	14	0	172	151	0	3	24	0	391
Grand Total	55	29	2	315	282	0	5	38	0	726
Apprch %	64	33.7	2.3	52.8	47.2	0	11.6	88.4	0	
Total %	7.6	4	0.3	43.4	38.8	0	0.7	5.2	0	

	Windsor Street From North				South Street From East				Windsor Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	10	3	1	14	39	37	0	76	0	5	0	5	95
05:00 PM	13	3	0	16	47	38	0	85	1	6	0	7	108
05:15 PM	6	1	0	7	45	43	0	88	0	5	0	5	100
05:30 PM	4	4	0	8	44	34	0	78	1	8	0	9	95
Total Volume	33	11	1	45	175	152	0	327	2	24	0	26	398
% App. Total	73.3	24.4	2.2		53.5	46.5	0		7.7	92.3	0		
PHF	.635	.688	.250	.703	.931	.884	.000	.929	.500	.750	.000	.722	.921



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Page No : 1

Groups Printed- Heavy Vehicles

	Windsor Street From North			South Street From East			Windsor Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	2	0	0	1	1	0	0	0	0	4
04:15 PM	3	0	0	0	0	0	0	0	0	3
04:30 PM	0	0	0	1	1	0	0	0	0	2
04:45 PM	0	0	0	1	0	0	0	0	0	1
Total	5	0	0	3	2	0	0	0	0	10
05:00 PM	1	0	0	2	2	0	0	0	0	5
05:15 PM	0	0	0	1	0	0	0	1	0	2
05:30 PM	1	0	0	0	1	0	0	0	0	2
05:45 PM	3	1	0	0	2	0	0	0	0	6
Total	5	1	0	3	5	0	0	1	0	15
Grand Total	10	1	0	6	7	0	0	1	0	25
Apprch %	90.9	9.1	0	46.2	53.8	0	0	100	0	
Total %	40	4	0	24	28	0	0	4	0	

	Windsor Street From North				South Street From East				Windsor Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	1	0	0	1	2	2	0	4	0	0	0	0	5
05:15 PM	0	0	0	0	1	0	0	1	0	1	0	1	2
05:30 PM	1	0	0	1	0	1	0	1	0	0	0	0	2
05:45 PM	3	1	0	4	0	2	0	2	0	0	0	0	6
Total Volume	5	1	0	6	3	5	0	8	0	1	0	1	15
% App. Total	83.3	16.7	0		37.5	62.5	0		0	100	0		
PHF	.417	.250	.000	.375	.375	.625	.000	.500	.000	.250	.000	.250	.625



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Groups Printed- Peds and Bicycles

	Windsor Street From North			South Street From East			Windsor Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
04:00 PM	0	0	1	0	1	2	0	0	1	5
04:15 PM	0	0	0	1	0	0	0	0	0	1
04:30 PM	0	2	0	0	0	1	1	0	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	2	1	1	1	3	1	0	1	10
05:00 PM	0	0	0	3	0	0	0	1	0	4
05:15 PM	0	0	2	0	1	0	0	0	1	4
05:30 PM	1	2	1	0	2	2	0	0	0	8
05:45 PM	0	0	1	0	0	1	1	0	0	3
Total	1	2	4	3	3	3	1	1	1	19
Grand Total	1	4	5	4	4	6	2	1	2	29
Apprch %	10	40	50	28.6	28.6	42.9	40	20	40	
Total %	3.4	13.8	17.2	13.8	13.8	20.7	6.9	3.4	6.9	

	Windsor Street From North				South Street From East				Windsor Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	0	0	0	0	3	0	0	3	0	1	0	1	4
05:15 PM	0	0	2	2	0	1	0	1	0	0	1	1	4
05:30 PM	1	2	1	4	0	2	2	4	0	0	0	0	8
05:45 PM	0	0	1	1	0	0	1	1	1	0	0	1	3
Total Volume	1	2	4	7	3	3	3	9	1	1	1	3	19
% App. Total	14.3	28.6	57.1		33.3	33.3	33.3		33.3	33.3	33.3		
PHF	.250	.250	.500	.438	.250	.375	.375	.563	.250	.250	.250	.750	.594



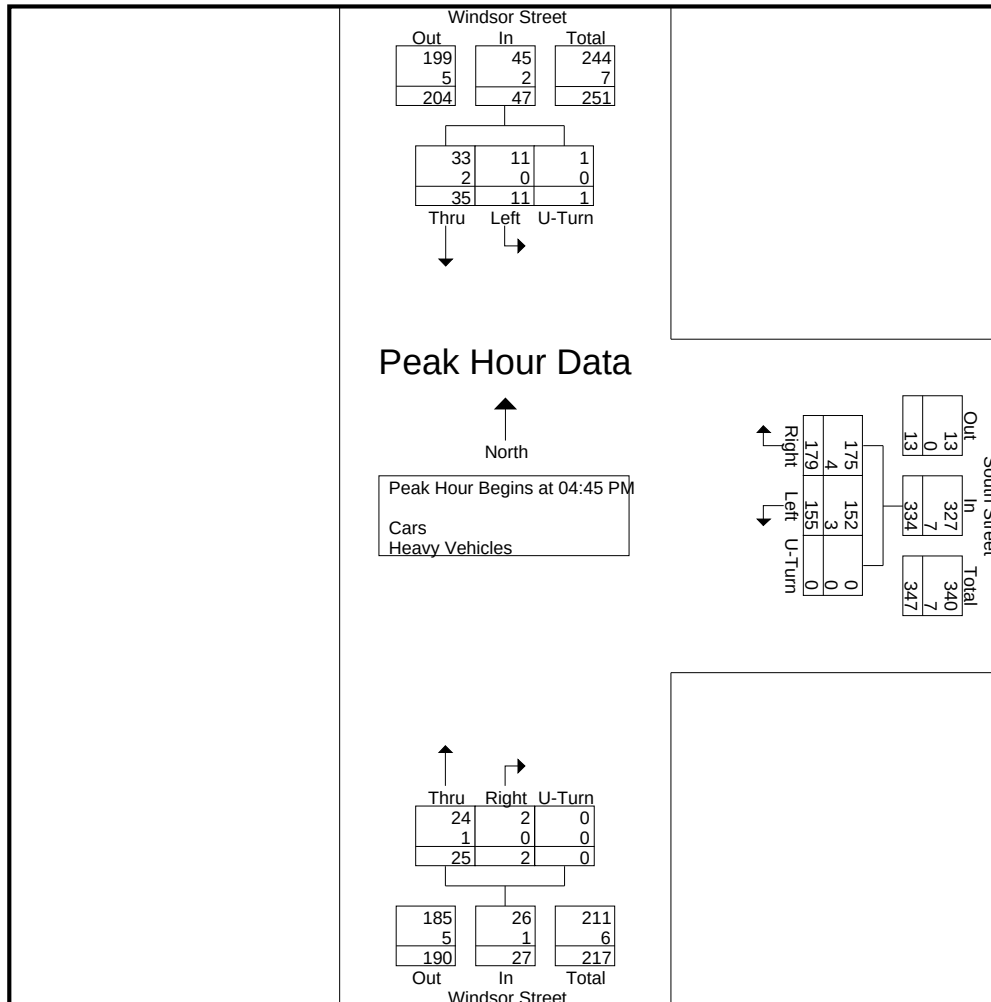
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	Windsor Street From North				South Street From East				Windsor Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	10	3	1	14	40	37	0	77	0	5	0	5	96
05:00 PM	14	3	0	17	49	40	0	89	1	6	0	7	113
05:15 PM	6	1	0	7	46	43	0	89	0	6	0	6	102
05:30 PM	5	4	0	9	44	35	0	79	1	8	0	9	97
Total Volume	35	11	1	47	179	155	0	334	2	25	0	27	408
% App. Total	74.5	23.4	2.1		53.6	46.4	0		7.4	92.6	0		
PHF	.625	.688	.250	.691	.913	.901	.000	.938	.500	.781	.000	.750	.903
Cars	33	11	1	45	175	152	0	327	2	24	0	26	398
% Cars	94.3	100	100	95.7	97.8	98.1	0	97.9	100	96.0	0	96.3	97.5
Heavy Vehicles	2	0	0	2	4	3	0	7	0	1	0	1	10
% Heavy Vehicles	5.7	0	0	4.3	2.2	1.9	0	2.1	0	4.0	0	3.7	2.5





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E/W: Cold Storage Drives/ Millers River
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 F
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Medford Street From North				Millbrook Cold Storage Driveways From East				Medford Street From South				Miller's River Apartments Driveway From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	1	136	0	0	5	1	0	0	0	15	0	0	0	0	1	0	159
07:15 AM	1	129	0	0	10	2	0	0	0	16	0	0	0	0	0	0	158
07:30 AM	0	127	0	0	14	0	0	0	0	27	0	0	0	0	0	0	168
07:45 AM	2	147	0	0	11	1	0	0	0	31	0	0	0	0	0	0	192
Total	4	539	0	0	40	4	0	0	0	89	0	0	0	0	1	0	677
08:00 AM	5	177	0	0	20	0	0	0	0	25	3	0	0	0	0	0	230
08:15 AM	1	181	0	0	15	1	0	0	0	28	0	0	0	0	0	0	226
08:30 AM	3	163	0	0	8	0	0	0	1	24	0	0	0	0	1	0	200
08:45 AM	3	156	0	0	12	0	1	0	0	26	1	0	1	0	1	0	201
Total	12	677	0	0	55	1	1	0	1	103	4	0	1	0	2	0	857
Grand Total	16	1216	0	0	95	5	1	0	1	192	4	0	1	0	3	0	1534
Apprch %	1.3	98.7	0	0	94.1	5	1	0	0.5	97.5	2	0	25	0	75	0	
Total %	1	79.3	0	0	6.2	0.3	0.1	0	0.1	12.5	0.3	0	0.1	0	0.2	0	
Cars	15	1162	0	0	88	5	0	0	1	183	4	0	1	0	3	0	1462
% Cars	93.8	95.6	0	0	92.6	100	0	0	100	95.3	100	0	100	0	100	0	95.3
Heavy Vehicles	1	54	0	0	7	0	1	0	0	9	0	0	0	0	0	0	72
% Heavy Vehicles	6.2	4.4	0	0	7.4	0	100	0	0	4.7	0	0	0	0	0	0	4.7

	Medford Street From North					Millbrook Cold Storage Driveways From East					Medford Street From South					Miller's River Apartments Driveway From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	5	177	0	0	182	20	0	0	0	20	0	25	3	0	28	0	0	0	0	0	230
08:15 AM	1	181	0	0	182	15	1	0	0	16	0	28	0	0	28	0	0	0	0	0	226
08:30 AM	3	163	0	0	166	8	0	0	0	8	1	24	0	0	25	0	0	1	0	1	200
08:45 AM	3	156	0	0	159	12	0	1	0	13	0	26	1	0	27	1	0	1	0	2	201
Total Volume	12	677	0	0	689	55	1	1	0	57	1	103	4	0	108	1	0	2	0	3	857
% App. Total	1.7	98.3	0	0		96.5	1.8	1.8	0		0.9	95.4	3.7	0		33.3	0	66.7	0		
PHF	.600	.935	.000	.000	.946	.688	.250	.250	.000	.713	.250	.920	.333	.000	.964	.250	.000	.500	.000	.375	.932
Cars	11	647	0	0	658	52	1	0	0	53	1	94	4	0	99	1	0	2	0	3	813
% Cars	91.7	95.6	0	0	95.5	94.5	100	0	0	93.0	100	91.3	100	0	91.7	100	0	100	0	100	94.9
Heavy Vehicles	1	30	0	0	31	3	0	1	0	4	0	9	0	0	9	0	0	0	0	0	44
% Heavy Vehicles	8.3	4.4	0	0	4.5	5.5	0	100	0	7.0	0	8.7	0	0	8.3	0	0	0	0	0	5.1



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Page No : 1

Groups Printed- Cars

	Medford Street From North				Millbrook Cold Storage Driveways From East				Medford Street From South				Miller's River Apartments Driveway From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	1	128	0	0	4	1	0	0	0	15	0	0	0	0	1	0	150
07:15 AM	1	124	0	0	7	2	0	0	0	16	0	0	0	0	0	0	150
07:30 AM	0	124	0	0	14	0	0	0	0	27	0	0	0	0	0	0	165
07:45 AM	2	139	0	0	11	1	0	0	0	31	0	0	0	0	0	0	184
Total	4	515	0	0	36	4	0	0	0	89	0	0	0	0	1	0	649
08:00 AM	4	163	0	0	20	0	0	0	0	25	3	0	0	0	0	0	215
08:15 AM	1	173	0	0	13	1	0	0	0	27	0	0	0	0	0	0	215
08:30 AM	3	160	0	0	7	0	0	0	1	20	0	0	0	0	1	0	192
08:45 AM	3	151	0	0	12	0	0	0	0	22	1	0	1	0	1	0	191
Total	11	647	0	0	52	1	0	0	1	94	4	0	1	0	2	0	813
Grand Total	15	1162	0	0	88	5	0	0	1	183	4	0	1	0	3	0	1462
Apprch %	1.3	98.7	0	0	94.6	5.4	0	0	0.5	97.3	2.1	0	25	0	75	0	
Total %	1	79.5	0	0	6	0.3	0	0	0.1	12.5	0.3	0	0.1	0	0.2	0	

	Medford Street From North					Millbrook Cold Storage Driveways From East					Medford Street From South					Miller's River Apartments Driveway From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	4	163	0	0	167	20	0	0	0	20	0	25	3	0	28	0	0	0	0	0	215
08:15 AM	1	173	0	0	174	13	1	0	0	14	0	27	0	0	27	0	0	0	0	0	215
08:30 AM	3	160	0	0	163	7	0	0	0	7	1	20	0	0	21	0	0	1	0	1	192
08:45 AM	3	151	0	0	154	12	0	0	0	12	0	22	1	0	23	1	0	1	0	2	191
Total Volume	11	647	0	0	658	52	1	0	0	53	1	94	4	0	99	1	0	2	0	3	813
% App. Total	1.7	98.3	0	0		98.1	1.9	0	0		1	94.9	4	0		33.3	0	66.7	0		
PHF	.688	.935	.000	.000	.945	.650	.250	.000	.000	.663	.250	.870	.333	.000	.884	.250	.000	.500	.000	.375	.945



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Groups Printed- Heavy Vehicles

	Medford Street From North				Millbrook Cold Storage Driveways From East				Medford Street From South				Miller's River Apartments Driveway From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	8	0	0	1	0	0	0	0	0	0	0	0	0	0	0	9
07:15 AM	0	5	0	0	3	0	0	0	0	0	0	0	0	0	0	0	8
07:30 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
07:45 AM	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Total	0	24	0	0	4	0	0	0	0	0	0	0	0	0	0	0	28
08:00 AM	1	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
08:15 AM	0	8	0	0	2	0	0	0	0	1	0	0	0	0	0	0	11
08:30 AM	0	3	0	0	1	0	0	0	0	4	0	0	0	0	0	0	8
08:45 AM	0	5	0	0	0	0	1	0	0	4	0	0	0	0	0	0	10
Total	1	30	0	0	3	0	1	0	0	9	0	0	0	0	0	0	44
Grand Total	1	54	0	0	7	0	1	0	0	9	0	0	0	0	0	0	72
Apprch %	1.8	98.2	0	0	87.5	0	12.5	0	0	100	0	0	0	0	0	0	
Total %	1.4	75	0	0	9.7	0	1.4	0	0	12.5	0	0	0	0	0	0	

	Medford Street From North					Millbrook Cold Storage Driveways From East					Medford Street From South					Miller's River Apartments Driveway From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	1	14	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
08:15 AM	0	8	0	0	8	2	0	0	0	2	0	1	0	0	1	0	0	0	0	0	11
08:30 AM	0	3	0	0	3	1	0	0	0	1	0	4	0	0	4	0	0	0	0	0	8
08:45 AM	0	5	0	0	5	0	0	1	0	1	0	4	0	0	4	0	0	0	0	0	10
Total Volume	1	30	0	0	31	3	0	1	0	4	0	9	0	0	9	0	0	0	0	0	44
% App. Total	3.2	96.8	0	0		75	0	25	0		0	100	0	0		0	0	0	0		
PHF	.250	.536	.000	.000	.517	.375	.000	.250	.000	.500	.000	.563	.000	.000	.563	.000	.000	.000	.000	.000	.733



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N/S: Medford Street
E/W: Cold Storage Drives/ Millers River
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 F
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

Groups Printed- Peds and Bicycles

	Medford Street From North				Millbrook Cold Storage Driveways From East				Medford Street From South				Miller's River Apartments Driveway From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	5	0	0	0	0	0	7	0	0	0	1	0	0	0	5	18
07:15 AM	0	4	0	2	0	0	0	4	0	1	0	0	0	0	0	9	20
07:30 AM	0	12	0	1	0	0	0	3	0	2	0	0	0	0	0	10	28
07:45 AM	0	10	0	0	0	0	0	7	0	0	0	2	0	0	0	8	27
Total	0	31	0	3	0	0	0	21	0	3	0	3	0	0	0	32	93
08:00 AM	0	20	0	0	0	0	0	6	0	2	0	0	0	0	0	5	33
08:15 AM	0	22	0	0	0	0	0	1	0	1	0	1	0	0	0	4	29
08:30 AM	0	29	0	2	0	0	0	5	0	1	0	0	0	0	0	8	45
08:45 AM	0	21	0	2	0	0	0	8	0	3	0	0	0	0	0	7	41
Total	0	92	0	4	0	0	0	20	0	7	0	1	0	0	0	24	148
Grand Total	0	123	0	7	0	0	0	41	0	10	0	4	0	0	0	56	241
Apprch %	0	94.6	0	5.4	0	0	0	100	0	71.4	0	28.6	0	0	0	100	
Total %	0	51	0	2.9	0	0	0	17	0	4.1	0	1.7	0	0	0	23.2	

	Medford Street From North					Millbrook Cold Storage Driveways From East					Medford Street From South					Miller's River Apartments Driveway From West					Int. Total
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	20	0	0	20	0	0	0	6	6	0	2	0	0	2	0	0	0	5	5	33
08:15 AM	0	22	0	0	22	0	0	0	1	1	0	1	0	1	2	0	0	0	4	4	29
08:30 AM	0	29	0	2	31	0	0	0	5	5	0	1	0	0	1	0	0	0	8	8	45
08:45 AM	0	21	0	2	23	0	0	0	8	8	0	3	0	0	3	0	0	0	7	7	41
Total Volume	0	92	0	4	96	0	0	0	20	20	0	7	0	1	8	0	0	0	24	24	148
% App. Total	0	95.8	0	4.2		0	0	0	100		0	87.5	0	12.5		0	0	0	100		
PHF	.000	.793	.000	.500	.774	.000	.000	.000	.625	.625	.000	.583	.000	.250	.667	.000	.000	.000	.750	.750	.822



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Peak Hour for Entire Intersection Begins at 08:00 AM



Peak Hour Begins at 08:00 AM
Cars
Heavy Vehicles



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File Name : 133536 FF
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Start Date : 9/17/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Medford Street From North				Millbrook Cold Storage Driveways From East				Medford Street From South				Miller's River Apartments Driveway From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	4	84	1	0	8	0	0	0	1	46	1	0	1	0	0	0	146
04:15 PM	3	66	1	0	18	0	0	0	0	39	0	0	0	0	0	0	127
04:30 PM	4	83	1	0	15	0	0	0	0	49	0	0	1	0	0	0	153
04:45 PM	0	89	0	1	9	0	1	0	0	39	1	0	1	0	2	0	143
Total	11	322	3	1	50	0	1	0	1	173	2	0	3	0	2	0	569
05:00 PM	1	90	0	0	5	0	0	0	0	58	1	0	0	0	0	0	155
05:15 PM	1	89	0	0	8	0	0	0	0	50	0	0	0	0	2	0	150
05:30 PM	3	90	0	0	2	0	0	0	0	55	0	0	0	0	0	0	150
05:45 PM	0	93	0	0	2	0	0	0	0	62	0	0	0	0	0	0	157
Total	5	362	0	0	17	0	0	0	0	225	1	0	0	0	2	0	612
Grand Total	16	684	3	1	67	0	1	0	1	398	3	0	3	0	4	0	1181
Apprch %	2.3	97.2	0.4	0.1	98.5	0	1.5	0	0.2	99	0.7	0	42.9	0	57.1	0	
Total %	1.4	57.9	0.3	0.1	5.7	0	0.1	0	0.1	33.7	0.3	0	0.3	0	0.3	0	
Cars	16	674	3	1	63	0	1	0	1	394	3	0	3	0	4	0	1163
% Cars	100	98.5	100	100	94	0	100	0	100	99	100	0	100	0	100	0	98.5
Heavy Vehicles	0	10	0	0	4	0	0	0	0	4	0	0	0	0	0	0	18
% Heavy Vehicles	0	1.5	0	0	6	0	0	0	0	1	0	0	0	0	0	0	1.5

	Medford Street From North					Millbrook Cold Storage Driveways From East					Medford Street From South					Miller's River Apartments Driveway From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	90	0	0	91	5	0	0	0	5	0	58	1	0	59	0	0	0	0	0	155
05:15 PM	1	89	0	0	90	8	0	0	0	8	0	50	0	0	50	0	0	2	0	2	150
05:30 PM	3	90	0	0	93	2	0	0	0	2	0	55	0	0	55	0	0	0	0	0	150
05:45 PM	0	93	0	0	93	2	0	0	0	2	0	62	0	0	62	0	0	0	0	0	157
Total Volume	5	362	0	0	367	17	0	0	0	17	0	225	1	0	226	0	0	2	0	2	612
% App. Total	1.4	98.6	0	0		100	0	0	0		0	99.6	0.4	0		0	0	100	0		
PHF	.417	.973	.000	.000	.987	.531	.000	.000	.000	.531	.000	.907	.250	.000	.911	.000	.000	.250	.000	.250	.975
Cars	5	359	0	0	364	17	0	0	0	17	0	225	1	0	226	0	0	2	0	2	609
% Cars	100	99.2	0	0	99.2	100	0	0	0	100	0	100	100	0	100	0	0	100	0	100	99.5
Heavy Vehicles	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
% Heavy Vehicles	0	0.8	0	0	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5



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Page No : 1

Groups Printed- Cars

	Medford Street From North				Millbrook Cold Storage Driveways From East				Medford Street From South				Miller's River Apartments Driveway From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	4	83	1	0	8	0	0	0	1	45	1	0	1	0	0	0	144
04:15 PM	3	63	1	0	15	0	0	0	0	37	0	0	0	0	0	0	119
04:30 PM	4	81	1	0	14	0	0	0	0	49	0	0	1	0	0	0	150
04:45 PM	0	88	0	1	9	0	1	0	0	38	1	0	1	0	2	0	141
Total	11	315	3	1	46	0	1	0	1	169	2	0	3	0	2	0	554
05:00 PM	1	90	0	0	5	0	0	0	0	58	1	0	0	0	0	0	155
05:15 PM	1	87	0	0	8	0	0	0	0	50	0	0	0	0	2	0	148
05:30 PM	3	90	0	0	2	0	0	0	0	55	0	0	0	0	0	0	150
05:45 PM	0	92	0	0	2	0	0	0	0	62	0	0	0	0	0	0	156
Total	5	359	0	0	17	0	0	0	0	225	1	0	0	0	2	0	609
Grand Total	16	674	3	1	63	0	1	0	1	394	3	0	3	0	4	0	1163
Apprch %	2.3	97.1	0.4	0.1	98.4	0	1.6	0	0.3	99	0.8	0	42.9	0	57.1	0	
Total %	1.4	58	0.3	0.1	5.4	0	0.1	0	0.1	33.9	0.3	0	0.3	0	0.3	0	

	Medford Street From North					Millbrook Cold Storage Driveways From East					Medford Street From South					Miller's River Apartments Driveway From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	90	0	0	91	5	0	0	0	5	0	58	1	0	59	0	0	0	0	0	155
05:15 PM	1	87	0	0	88	8	0	0	0	8	0	50	0	0	50	0	0	2	0	2	148
05:30 PM	3	90	0	0	93	2	0	0	0	2	0	55	0	0	55	0	0	0	0	0	150
05:45 PM	0	92	0	0	92	2	0	0	0	2	0	62	0	0	62	0	0	0	0	0	156
Total Volume	5	359	0	0	364	17	0	0	0	17	0	225	1	0	226	0	0	2	0	2	609
% App. Total	1.4	98.6	0	0		100	0	0	0		0	99.6	0.4	0		0	0	100	0		
PHF	.417	.976	.000	.000	.978	.531	.000	.000	.000	.531	.000	.907	.250	.000	.911	.000	.000	.250	.000	.250	.976



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Groups Printed- Heavy Vehicles

	Medford Street From North				Millbrook Cold Storage Driveways From East				Medford Street From South				Miller's River Apartments Driveway From West				Int. Total
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
04:15 PM	0	3	0	0	3	0	0	0	0	2	0	0	0	0	0	0	8
04:30 PM	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
04:45 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Total	0	7	0	0	4	0	0	0	0	4	0	0	0	0	0	0	15
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Grand Total	0	10	0	0	4	0	0	0	0	4	0	0	0	0	0	0	18
Apprch %	0	100	0	0	100	0	0	0	0	100	0	0	0	0	0	0	
Total %	0	55.6	0	0	22.2	0	0	0	0	22.2	0	0	0	0	0	0	

	Medford Street From North					Millbrook Cold Storage Driveways From East					Medford Street From South					Miller's River Apartments Driveway From West					Int. Total
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
04:15 PM	0	3	0	0	3	3	0	0	0	3	0	2	0	0	2	0	0	0	0	0	8
04:30 PM	0	2	0	0	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
04:45 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Total Volume	0	7	0	0	7	4	0	0	0	4	0	4	0	0	4	0	0	0	0	0	15
% App. Total	0	100	0	0		100	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.583	.000	.000	.583	.333	.000	.000	.000	.333	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.469



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Groups Printed- Peds and Bicycles

	Medford Street From North				Millbrook Cold Storage Driveways From East				Medford Street From South				Miller's River Apartments Driveway From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	0	2	0	1	0	0	0	17	0	3	0	1	0	0	0	5	29
04:15 PM	0	0	1	1	1	0	0	13	0	4	0	0	0	0	0	12	32
04:30 PM	0	4	0	4	0	0	0	15	0	6	0	0	0	0	0	9	38
04:45 PM	0	3	0	2	1	0	0	21	0	4	0	0	0	0	0	13	44
Total	0	9	1	8	2	0	0	66	0	17	0	1	0	0	0	39	143
05:00 PM	0	3	0	4	0	0	0	17	0	7	0	1	0	0	0	9	41
05:15 PM	0	2	0	10	0	0	0	13	0	5	0	0	0	0	0	17	47
05:30 PM	0	4	0	3	0	0	0	22	0	8	0	0	0	0	0	15	52
05:45 PM	0	5	0	6	0	0	0	26	0	9	0	0	0	0	0	12	58
Total	0	14	0	23	0	0	0	78	0	29	0	1	0	0	0	53	198
Grand Total	0	23	1	31	2	0	0	144	0	46	0	2	0	0	0	92	341
Apprch %	0	41.8	1.8	56.4	1.4	0	0	98.6	0	95.8	0	4.2	0	0	0	100	
Total %	0	6.7	0.3	9.1	0.6	0	0	42.2	0	13.5	0	0.6	0	0	0	27	

	Medford Street From North					Millbrook Cold Storage Driveways From East					Medford Street From South					Miller's River Apartments Driveway From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	3	0	4	7	0	0	0	17	17	0	7	0	1	8	0	0	0	9	9	41
05:15 PM	0	2	0	10	12	0	0	0	13	13	0	5	0	0	5	0	0	0	17	17	47
05:30 PM	0	4	0	3	7	0	0	0	22	22	0	8	0	0	8	0	0	0	15	15	52
05:45 PM	0	5	0	6	11	0	0	0	26	26	0	9	0	0	9	0	0	0	12	12	58
Total Volume	0	14	0	23	37	0	0	0	78	78	0	29	0	1	30	0	0	0	53	53	198
% App. Total	0	37.8	0	62.2		0	0	0	100		0	96.7	0	3.3		0	0	0	100		
PHF	.000	.700	.000	.575	.771	.000	.000	.000	.750	.750	.000	.806	.000	.250	.833	.000	.000	.000	.779	.779	.853



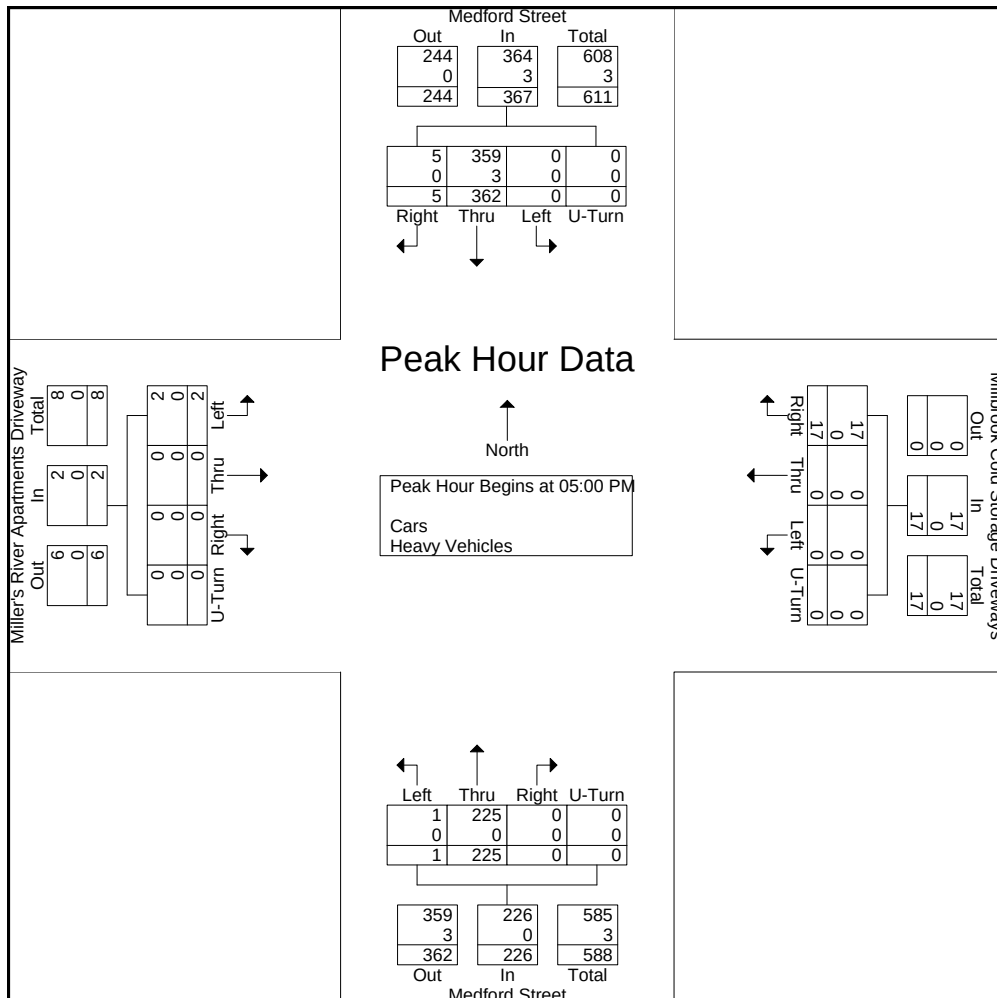
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E/W: Cold Storage Drives/ Millers River
City, State: Somerville, MA
Client: Design Consultants/D. Giangrande

File Name : 133536 FF
Site Code : TBA
Start Date : 9/17/2013
Page No : 1

	Medford Street From North					Millbrook Cold Storage Driveways From East					Medford Street From South					Miller's River Apartments Driveway From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	90	0	0	91	5	0	0	0	5	0	58	1	0	59	0	0	0	0	0	155
05:15 PM	1	89	0	0	90	8	0	0	0	8	0	50	0	0	50	0	0	2	0	2	150
05:30 PM	3	90	0	0	93	2	0	0	0	2	0	55	0	0	55	0	0	0	0	0	150
05:45 PM	0	93	0	0	93	2	0	0	0	2	0	62	0	0	62	0	0	0	0	0	157
Total Volume	5	362	0	0	367	17	0	0	0	17	0	225	1	0	226	0	0	2	0	2	612
% App. Total	1.4	98.6	0	0		100	0	0	0		0	99.6	0.4	0		0	0	100	0		
PHF	.417	.973	.000	.000	.987	.531	.000	.000	.000	.531	.000	.907	.250	.000	.911	.000	.000	.250	.000	.250	.975
Cars	5	359	0	0	364	17	0	0	0	17	0	225	1	0	226	0	0	2	0	2	609
% Cars	100	99.2	0	0	99.2	100	0	0	0	100	0	100	100	0	100	0	0	100	0	100	99.5
Heavy Vehicles	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
% Heavy Vehicles	0	0.8	0	0	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5



Appendix B

Crash Rate Worksheets

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Somerville, MA COUNT DATE : September 2013

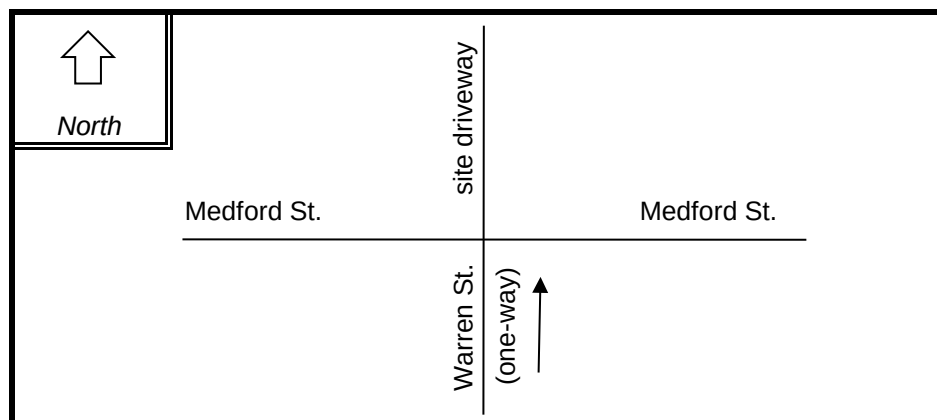
DISTRICT : 4 UNSIGNALIZED : ☒ X SIGNALIZED : ☐

~ INTERSECTION DATA ~

MAJOR STREET : Medford St., Warren St.

MINOR STREET(S) : _____

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	SB	NB		
PEAK HOURLY VOLUMES (PM) :	494	605	0	6		1,105

" K " FACTOR :

0.090

INTERSECTION ADT (V) = TOTAL DAILY
APPROACH VOLUME :

12,278

TOTAL # OF CRASHES :

2

OF
YEARS :

3

AVERAGE # OF
CRASHES PER YEAR (A) :

0.67

CRASH RATE CALCULATION :

0.15

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : MassDOT D4 average crash rate for unsignalized intersections = 0.58

Project Title & Date : 9 & 39 Medford St., Somerville, MA October 7, 2013

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Somerville, MA COUNT DATE : September 2013

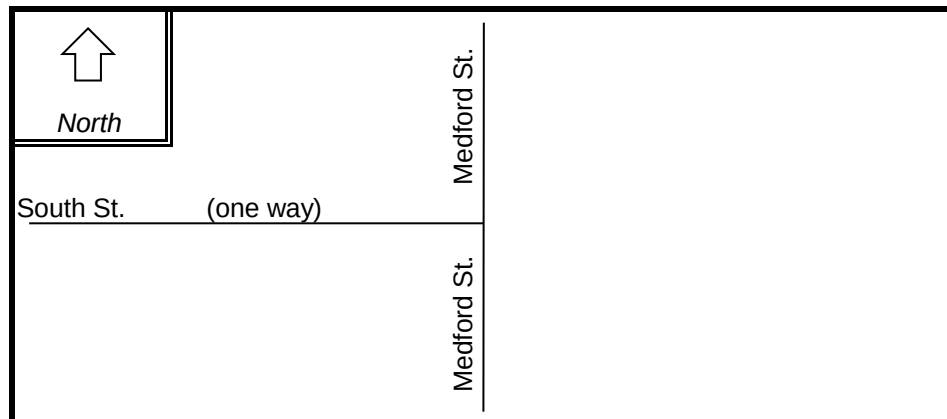
DISTRICT : 4 UNSIGNALIZED : ☒ SIGNALIZED : ☐

~ INTERSECTION DATA ~

MAJOR STREET : Medford St., South St.

MINOR STREET(S) : _____

INTERSECTION
DIAGRAM
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	0	526	225	579		1,330

" K " FACTOR :

0.090

INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

14,778

TOTAL # OF CRASHES :

0

OF YEARS :

3

AVERAGE # OF CRASHES PER YEAR (A) :

0.00

CRASH RATE CALCULATION :

0.00

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : MassDOT D4 average crash rate for unsignalized intersections = 0.58

Project Title & Date : 9 & 39 Medford Street - Somerville, MA October 7 , 2013

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Somerville, MA COUNT DATE : September 2013

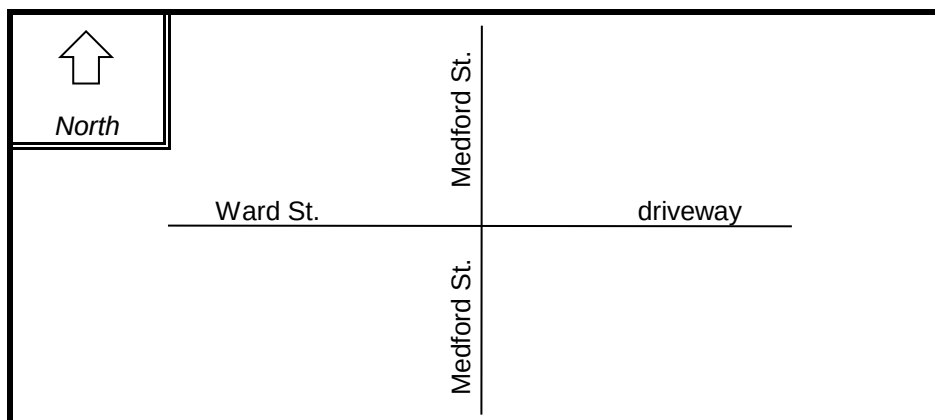
DISTRICT : 4 UNSIGNALIZED : ☒ X SIGNALIZED : ☐

~ INTERSECTION DATA ~

MAJOR STREET : Medford St., Ward St.

MINOR STREET(S) : _____

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	NB	SB	WB		
PEAK HOURLY VOLUMES (AM) :	13	222	1,086	6		1,327

" K " FACTOR :

0.090

INTERSECTION ADT (V) = TOTAL DAILY
APPROACH VOLUME :

14,744

TOTAL # OF CRASHES :

0

OF
YEARS :

3

AVERAGE # OF
CRASHES PER YEAR (A) :

0.00

CRASH RATE CALCULATION :

0.00

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : MassDOT D4 average crash rate for unsignalized intersections = 0.58

Project Title & Date: 180 Eastern Ave - Malden, MA August 21, 2013

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Somerville, MA COUNT DATE : September 2013

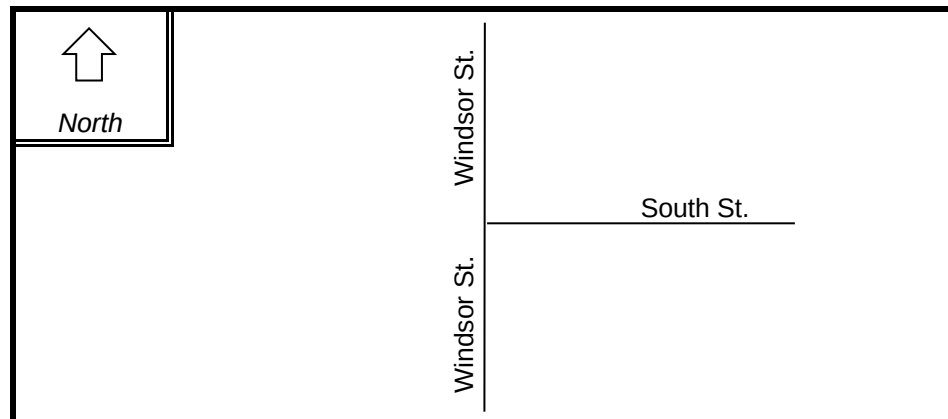
DISTRICT : 4 UNSIGNALIZED : ☒ X SIGNALIZED : ☐

~ INTERSECTION DATA ~

MAJOR STREET : South St., Windsor St.

MINOR STREET(S) : _____

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	36	403	17	18		474

" K " FACTOR :

0.090

INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

5,267

TOTAL # OF CRASHES :

2

OF YEARS :

3

AVERAGE # OF CRASHES PER YEAR (A) :

0.67

CRASH RATE CALCULATION :

0.35

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : MassDOT D4 average crash rate for unsignalized intersections = 0.58

Project Title & Date : 9 & 39 Medford Street, Somerville, MA October 7, 2013

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden, MA COUNT DATE : Sep-13

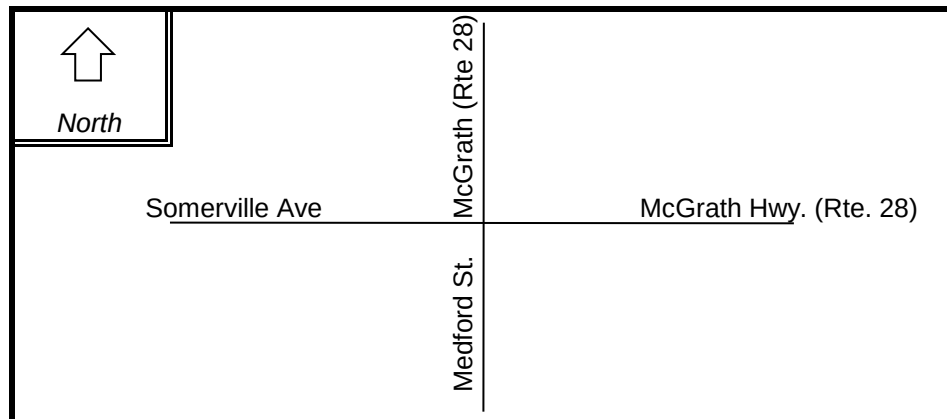
DISTRICT : 4 UNSIGNALIZED : ☐ SIGNALIZED : ☒

~ INTERSECTION DATA ~

MAJOR STREET : McGrath Hwy, Somerville Ave, Medford St.

MINOR STREET(S) :

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	410	0	189	1,205		1,804

" K " FACTOR : 0.090 INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME : 20,044

TOTAL # OF CRASHES : 28 # OF YEARS : 3 AVERAGE # OF CRASHES PER YEAR (A) : 9.33

CRASH RATE CALCULATION :

1.28

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : MassDOT D4 average crash rate for signalized intersections = 0.77

Project Title & Date : 9 & 39 Medford Street, Somerville October 7, 2013

Appendix C

Intersection Capacity Analysis

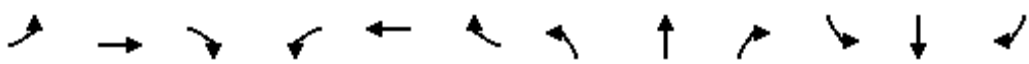
Intersection Capacity Analysis

2013 Existing Conditions

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔					↗	↘		↗	↔↔	
Volume (vph)	0	294	116	0	0	0	36	120	33	165	933	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	75		0	0		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3211	0	0	0	0	1612	1637	0	1550	3187	0
Flt Permitted							0.950			0.950	0.999	
Satd. Flow (perm)	0	3211	0	0	0	0	1612	1637	0	1550	3187	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54						13			14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		566			362			412			307	
Travel Time (s)		12.9			8.2			9.4			7.0	
Confl. Bikes (#/hr)			2						2			57
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.79	0.79	0.79	0.95	0.95	0.95
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	12%	12%	12%	6%	6%	6%
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	456	0	0	0	0	46	194	0	157	1112	0
Turn Type	Perm	NA					Split	NA		Split	NA	
Protected Phases		2					4	4		8	8	
Permitted Phases	2											
Minimum Split (s)	26.0	26.0					26.0	26.0		26.0	26.0	
Total Split (s)	26.0	26.0					26.0	26.0		46.0	46.0	
Total Split (%)	26.5%	26.5%					26.5%	26.5%		46.9%	46.9%	
Yellow Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0					2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0					0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0					6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		20.0					20.0	20.0		40.0	40.0	
Actuated g/C Ratio		0.20					0.20	0.20		0.41	0.41	
v/c Ratio		0.65					0.14	0.56		0.25	0.85	
Control Delay		36.5					33.4	39.9		20.5	33.6	
Queue Delay		0.0					0.0	0.0		0.0	0.0	
Total Delay		36.5					33.4	39.9		20.5	33.6	
LOS		D					C	D		C	C	
Approach Delay		36.5						38.6			32.0	
Approach LOS		D						D			C	
Queue Length 50th (ft)		122					24	102		69	334	
Queue Length 95th (ft)		175					48	148		120	430	
Internal Link Dist (ft)		486			282			332			227	
Turn Bay Length (ft)							75					
Base Capacity (vph)		698					328	344		632	1309	
Starvation Cap Reductn		0					0	0		0	0	
Spillback Cap Reductn		0					0	0		0	0	
Storage Cap Reductn		0					0	0		0	0	
Reduced v/c Ratio		0.65					0.14	0.56		0.25	0.85	

Millbrook - 2013 Existing AM Peak Hour

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

Intersection Summary

Area Type: Other
 Cycle Length: 98
 Actuated Cycle Length: 98
 Offset: 20 (20%), Referenced to phase 2:EBTL and 6:, Start of Green
 Natural Cycle: 90
 Control Type: Pretimed
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 33.8
 Intersection LOS: C
 Intersection Capacity Utilization 61.4%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 4: Medford Street & Somerville Ave & McGrath Highway



Synchro 8: HCM 2010 TWSC
1: Warren Street/Driveway & Medford Street

10/3/2013

Intersection												
Intersection Delay, s/veh	15.4											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Vol, veh/h	6	624	0	0	144	19	137	6	80	3	0	0
Conflicting Peds, #/hr	17	0	0	0	0	17	0	0	12	12	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	87	87	87	90	90	90	38	38	38
Heavy Vehicles, %	5	5	5	7	7	7	12	12	12	0	0	0
Mvmt Flow	7	701	0	0	166	22	152	7	89	8	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	199	0	0	713	0	0	915	926	730	962	915	205
Stage 1	-	-	-	-	-	-	727	727	-	188	188	-
Stage 2	-	-	-	-	-	-	188	199	-	774	727	-
Follow-up Headway	2.245	-	-	2.263	-	-	3.608	4.108	3.408	3.5	4	3.3
Pot Capacity-1 Maneuver	1356	-	-	864	-	-	243	259	406	237	275	841
Stage 1	-	-	-	-	-	-	400	415	-	818	748	-
Stage 2	-	-	-	-	-	-	791	718	-	394	432	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1337	-	-	852	-	-	236	252	396	175	267	821
Mov Capacity-2 Maneuver	-	-	-	-	-	-	236	252	-	175	267	-
Stage 1	-	-	-	-	-	-	392	407	-	803	741	-
Stage 2	-	-	-	-	-	-	780	711	-	294	424	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.1			0			70.4			26.5		
HCM LOS							F			D		
Minor Lane / Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1				
Capacity (veh/h)	277	852	-	-	1337	-	-	175				
HCM Lane V/C Ratio	0.895	-	-	-	0.005	-	-	0.045				
HCM Control Delay (s)	70.4	0	-	-	7.706	0	-	26.5				
HCM Lane LOS	F	A			A	A		D				
HCM 95th %tile Q(veh)	7.984	0	-	-	0.015	-	-	0.141				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

HCM research expects at least one 'Stop' controlled approach at the intersection.

Synchro 8: HCM 2010 TWSC
3: Medford Street & Ward Street/Driveway

10/3/2013

Intersection												
Intersection Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	0	6	2	0	4	8	201	13	40	1023	24
Conflicting Peds, #/hr	0	0	3	3	0	0	40	0	10	10	0	40
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	50	50	50	91	91	91	95	95	95
Heavy Vehicles, %	8	8	8	17	17	17	12	12	12	4	4	4
Mvmt Flow	9	0	7	4	0	8	9	221	14	42	1077	25
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	1430	1433	1132	1429	1438	271	1105	0	0	238	0	0
Stage 1	1177	1177	-	249	249	-	-	-	-	-	-	-
Stage 2	253	256	-	1180	1189	-	-	-	-	-	-	-
Follow-up Headway	3.572	4.072	3.372	3.653	4.153	3.453	2.308	-	-	2.236	-	-
Pot Capacity-1 Maneuver	109	130	240	104	124	733	596	-	-	1317	-	-
Stage 1	227	258	-	723	674	-	-	-	-	-	-	-
Stage 2	738	685	-	217	245	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-		-	-
Mov Capacity-1 Maneuver	96	116	231	89	111	707	576	-	-	1273	-	-
Mov Capacity-2 Maneuver	96	116	-	89	111	-	-	-	-	-	-	-
Stage 1	222	235	-	708	660	-	-	-	-	-	-	-
Stage 2	693	671	-	186	223	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	36.3		22.9			0.4			0.3			
HCM LOS	E		C									
Minor Lane / Major Mvmt		NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)		576	-	-	131	213	1273	-	-			
HCM Lane V/C Ratio		0.015	-	-	0.123	0.056	0.033	-	-			
HCM Control Delay (s)		11.347	0	-	36.3	22.9	7.925	0	-			
HCM Lane LOS		B	A		E	C	A	A				
HCM 95th %tile Q(veh)		0.046	-	-	0.407	0.178	0.103	-	-			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection												
Intersection Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	690	12	6	162	0	1	0	0	0	0	0
Conflicting Peds, #/hr	23	0	24	24	0	23	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	93	93	93	25	25	25	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	2	2	2
Mvmt Flow	0	784	14	6	174	0	4	0	0	0	0	0
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	177	0	0	801	0	0	984	984	818	984	991	201
Stage 1	-	-	-	-	-	-	794	794	-	190	190	-
Stage 2	-	-	-	-	-	-	190	190	-	794	801	-
Follow-up Headway	2.245	-	-	2.245	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Capacity-1 Maneuver	1381	-	-	809	-	-	229	250	379	228	246	840
Stage 1	-	-	-	-	-	-	384	403	-	812	743	-
Stage 2	-	-	-	-	-	-	816	747	-	381	397	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1353	-	-	793	-	-	222	247	370	222	243	821
Mov Capacity-2 Maneuver	-	-	-	-	-	-	222	247	-	222	243	-
Stage 1	-	-	-	-	-	-	383	402	-	810	735	-
Stage 2	-	-	-	-	-	-	793	739	-	373	396	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0		0.3			21.5			0			
HCM LOS						C			A			
Minor Lane / Major Mvmt	NBLn1		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	222		1353	-	-	793	-	-	0			
HCM Lane V/C Ratio	0.018		-	-	-	0.008	-	-	+			
HCM Control Delay (s)	21.5		0	-	-	9.577	0	-	0			
HCM Lane LOS	C		A			A	A		A			
HCM 95th %tile Q(veh)	0.055		0	-	-	0.025	-	-	+			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Synchro 8: HCM 2010 TWSC
17: Windsor Street & South Street

10/3/2013

Intersection						
Intersection Delay, s/veh	11.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	204	199	17	8	18	28
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	52	52	89	89
Heavy Vehicles, %	5	5	8	8	4	4
Mvmt Flow	249	243	33	15	20	31
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	112	41	0	0	48	0
Stage 1	40	-	-	-	-	-
Stage 2	72	-	-	-	-	-
Follow-up Headway	3.545	3.345	-	-	2.236	-
Pot Capacity-1 Maneuver	878	1022	-	-	1546	-
Stage 1	975	-	-	-	-	-
Stage 2	943	-	-	-	-	-
Time blocked-Platoon, %			-	-		-
Mov Capacity-1 Maneuver	866	1021	-	-	1545	-
Mov Capacity-2 Maneuver	866	-	-	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13	0		2.9		
HCM LOS	B					
Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	936	1545	-	
HCM Lane V/C Ratio	-	-	0.525	0.013	-	
HCM Control Delay (s)	-	-	13	7.361	0	
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	3.139	0.04	-	
Notes						
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined						

Synchro 8: HCM Unsignalized Intersection Capacity Analysis

2: Medford Street & South Street

10/3/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↔	↔	
Volume (veh/h)	0	0	61	221	623	397
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	66	240	677	432
Pedestrians	38					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					1192	
pX, platoon unblocked	0.59	0.59	0.59			
vC, conflicting volume	1304	931	1147			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1169	540	904			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	84			
cM capacity (veh/h)	107	321	427			
Direction, Lane #	NB 1	SB 1				
Volume Total	307	1109				
Volume Left	66	0				
Volume Right	0	432				
cSH	427	1700				
Volume to Capacity	0.16	0.65				
Queue Length 95th (ft)	14	0				
Control Delay (s)	5.4	0.0				
Lane LOS	A					
Approach Delay (s)	5.4	0.0				
Approach LOS						
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			67.8%	ICU Level of Service		C
Analysis Period (min)			15			

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔					↗	↘		↗	↔↔	
Volume (vph)	0	208	106	0	0	0	103	378	32	156	498	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	75		0	0		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3268	0	0	0	0	1805	1872	0	1579	2958	0
Flt Permitted							0.950			0.950	0.999	
Satd. Flow (perm)	0	3268	0	0	0	0	1696	1872	0	1579	2958	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		83						4			86	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		566			362			412			307	
Travel Time (s)		12.9			8.2			9.4			7.0	
Confl. Peds. (#/hr)							60					60
Confl. Bikes (#/hr)			2						23			4
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.90	0.90	0.90	0.94	0.94	0.94
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	361	0	0	0	0	114	456	0	149	803	0
Turn Type	Perm	NA					Split	NA		Split	NA	
Protected Phases		2					4	4		8	8	
Permitted Phases	2											
Minimum Split (s)	26.0	26.0					26.0	26.0		26.0	26.0	
Total Split (s)	26.0	26.0					26.0	26.0		46.0	46.0	
Total Split (%)	26.5%	26.5%					26.5%	26.5%		46.9%	46.9%	
Yellow Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0					2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0					0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0					6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		20.0					20.0	20.0		40.0	40.0	
Actuated g/C Ratio		0.20					0.20	0.20		0.41	0.41	
v/c Ratio		0.49					0.31	1.18		0.23	0.64	
Control Delay		28.9					35.9	142.3		20.2	23.3	
Queue Delay		0.0					0.0	0.0		0.0	0.0	
Total Delay		28.9					35.9	142.3		20.2	23.3	
LOS		C					D	F		C	C	
Approach Delay		28.9						121.0			22.8	
Approach LOS		C						F			C	
Queue Length 50th (ft)		80					61	~344		64	192	
Queue Length 95th (ft)		120					111	#539		114	260	
Internal Link Dist (ft)		486			282			332			227	
Turn Bay Length (ft)							75					
Base Capacity (vph)		733					368	385		644	1258	
Starvation Cap Reductn		0					0	0		0	0	
Spillback Cap Reductn		0					0	0		0	0	
Storage Cap Reductn		0					0	0		0	0	

Millbrook - 2013 Existing PM Peak Hour

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.49					0.31	1.18		0.23	0.64	

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 98

Offset: 20 (20%), Referenced to phase 2:EBTL and 6:, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 53.7

Intersection LOS: D

Intersection Capacity Utilization 64.5%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Medford Street & Somerville Ave & McGrath Highway



Synchro 8: HCM 2010 TWSC
1: Warren Street/Driveway & Medford Street

10/3/2013

Intersection												
Intersection Delay, s/veh		63.3										
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Vol, veh/h	2	331	0	0	290	3	304	1	146	17	0	17
Conflicting Peds, #/hr	57	0	0	0	0	57	0	0	10	10	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	93	93	93	96	96	96	78	78	78
Heavy Vehicles, %	0	0	0	1	1	1	1	1	1	4	4	4
Mvmt Flow	2	352	0	0	312	3	317	1	152	22	0	22
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	325	0	0	362	0	0	700	691	419	766	689	380
Stage 1	-	-	-	-	-	-	366	366	-	323	323	-
Stage 2	-	-	-	-	-	-	334	325	-	443	366	-
Follow-up Headway	2.2	-	-	2.209	-	-	3.509	4.009	3.309	3.536	4.036	3.336
Pot Capacity-1 Maneuver	1246	-	-	1202	-	-	355	369	636	317	366	663
Stage 1	-	-	-	-	-	-	655	624	-	685	647	-
Stage 2	-	-	-	-	-	-	682	651	-	590	619	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1187	-	-	1145	-	-	323	362	601	223	359	626
Mov Capacity-2 Maneuver	-	-	-	-	-	-	323	362	-	223	359	-
Stage 1	-	-	-	-	-	-	648	618	-	678	642	-
Stage 2	-	-	-	-	-	-	627	646	-	418	613	-
Approach	SE		NW			NE			SW			
HCM Control Delay, s	0		0			157.6			17.6			
HCM LOS						F			C			
Minor Lane / Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1				
Capacity (veh/h)	380	1145	-	-	1187	-	-	329				
HCM Lane V/C Ratio	1.236	-	-	-	0.002	-	-	0.132				
HCM Control Delay (s)	157.6	0	-	-	8.038	0	-	17.6				
HCM Lane LOS	F	A			A	A		C				
HCM 95th %tile Q(veh)	20.023	0	-	-	0.005	-	-	0.452				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

HCM research expects at least one 'Stop' controlled approach at the intersection.

Synchro 8: HCM 2010 TWSC
3: Medford Street & Ward Street/Driveway

10/3/2013

Intersection												
Intersection Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	1	18	5	1	28	5	498	12	6	560	10
Conflicting Peds, #/hr	4	0	17	17	0	4	100	0	31	31	0	100
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	55	55	55	65	65	65	93	93	93	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	3	3	3
Mvmt Flow	25	2	33	8	2	43	5	535	13	6	583	10
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	1210	1194	706	1205	1193	659	611	0	0	565	0	0
Stage 1	618	618	-	570	570	-	-	-	-	-	-	-
Stage 2	592	576	-	635	623	-	-	-	-	-	-	-
Follow-up Headway	3.5	4	3.3	3.5	4	3.3	2.209	-	-	2.227	-	-
Pot Capacity-1 Maneuver	161	188	439	162	188	467	973	-	-	1002	-	-
Stage 1	480	484	-	510	509	-	-	-	-	-	-	-
Stage 2	496	505	-	470	481	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-		-	-
Mov Capacity-1 Maneuver	128	179	397	131	179	422	892	-	-	919	-	-
Mov Capacity-2 Maneuver	128	179	-	131	179	-	-	-	-	-	-	-
Stage 1	469	472	-	499	498	-	-	-	-	-	-	-
Stage 2	404	494	-	390	469	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	29.5		19			0.1			0.1			
HCM LOS	D		C									
Minor Lane / Major Mvmt	NBL		NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)	892		-	-	206	309	919	-	-			
HCM Lane V/C Ratio	0.006		-	-	0.291	0.169	0.007	-	-			
HCM Control Delay (s)	9.06		0	-	29.5	19	8.944	0	-			
HCM Lane LOS	A		A		D	C	A	A				
HCM 95th %tile Q(veh)	0.018		-	-	1.159	0.6	0.021	-	-			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection												
Intersection Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	488	8	8	293	0	2	0	0	0	0	0
Conflicting Peds, #/hr	90	0	56	56	0	90	31	0	1	1	0	31
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	90	90	90	25	25	25	92	92	92
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	2	2	2
Mvmt Flow	0	530	9	9	326	0	8	0	0	0	0	0
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	357	0	0	570	0	0	940	940	656	940	944	447
Stage 1	-	-	-	-	-	-	566	566	-	374	374	-
Stage 2	-	-	-	-	-	-	374	374	-	566	570	-
Follow-up Headway	2.209	-	-	2.2	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Capacity-1 Maneuver	1207	-	-	1013	-	-	246	266	469	244	262	612
Stage 1	-	-	-	-	-	-	513	511	-	647	618	-
Stage 2	-	-	-	-	-	-	651	621	-	509	505	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1116	-	-	937	-	-	220	249	423	218	246	551
Mov Capacity-2 Maneuver	-	-	-	-	-	-	220	249	-	218	246	-
Stage 1	-	-	-	-	-	-	500	498	-	630	595	-
Stage 2	-	-	-	-	-	-	595	598	-	471	492	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0		0.2			22			0			
HCM LOS						C			A			
Minor Lane / Major Mvmt	NBLn1		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	220		1116	-	-	937	-	-	0			
HCM Lane V/C Ratio	0.036		-	-	-	0.009	-	-	+			
HCM Control Delay (s)	22		0	-	-	8.879	0	-	0			
HCM Lane LOS	C		A			A	A		A			
HCM 95th %tile Q(veh)	0.113		0	-	-	0.029	-	-	+			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Synchro 8: HCM 2010 TWSC
17: Windsor Street & South Street

10/3/2013

Intersection						
Intersection Delay, s/veh	9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	155	179	25	2	12	35
Conflicting Peds, #/hr	1	4	0	9	9	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	75	75	69	69
Heavy Vehicles, %	2	2	4	4	4	4
Mvmt Flow	165	190	33	3	17	51
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	125	48	0	0	40	0
Stage 1	39	-	-	-	-	-
Stage 2	86	-	-	-	-	-
Follow-up Headway	3.518	3.318	-	-	2.236	-
Pot Capacity-1 Maneuver	870	1021	-	-	1557	-
Stage 1	983	-	-	-	-	-
Stage 2	937	-	-	-	-	-
Time blocked-Platoon, %			-	-		-
Mov Capacity-1 Maneuver	851	1010	-	-	1545	-
Mov Capacity-2 Maneuver	851	-	-	-	-	-
Stage 1	980	-	-	-	-	-
Stage 2	920	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	11.3		0		1.9	
HCM LOS	B					
Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	929	1545	-	
HCM Lane V/C Ratio	-	-	0.382	0.011	-	
HCM Control Delay (s)	-	-	11.3	7.357	0	
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	1.812	0.034	-	
Notes						
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined						

Synchro 8: HCM Unsignalized Intersection Capacity Analysis

2: Medford Street & South Street

10/3/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↔	↔	
Volume (veh/h)	0	0	97	515	324	248
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.94	0.94	0.97	0.97
Hourly flow rate (vph)	0	0	103	548	334	256
Pedestrians	69					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					1192	
pX, platoon unblocked	0.81	0.81	0.81			
vC, conflicting volume	1285	531	659			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1236	309	466			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	88			
cM capacity (veh/h)	140	595	896			
Direction, Lane #	NB 1	SB 1				
Volume Total	651	590				
Volume Left	103	0				
Volume Right	0	256				
cSH	896	1700				
Volume to Capacity	0.12	0.35				
Queue Length 95th (ft)	10	0				
Control Delay (s)	2.9	0.0				
Lane LOS	A					
Approach Delay (s)	2.9	0.0				
Approach LOS						
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			73.5%	ICU Level of Service		D
Analysis Period (min)			15			

Intersection Capacity Analysis

2018 Future No-Build Conditions

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔					↔	↔		↔	↔↔	
Volume (vph)	0	301	119	0	0	0	37	123	34	169	957	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	75		0	0		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3210	0	0	0	0	1612	1637	0	1550	3187	0
Flt Permitted							0.950			0.950	0.999	
Satd. Flow (perm)	0	3210	0	0	0	0	1612	1637	0	1550	3187	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54						13			14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		566			362			412			307	
Travel Time (s)		12.9			8.2			9.4			7.0	
Confl. Bikes (#/hr)			2						2			57
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.79	0.79	0.79	0.95	0.95	0.95
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	12%	12%	12%	6%	6%	6%
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	466	0	0	0	0	47	199	0	160	1141	0
Turn Type	Perm	NA					Split	NA		Split	NA	
Protected Phases		2					4	4		8	8	
Permitted Phases	2											
Minimum Split (s)	26.0	26.0					26.0	26.0		26.0	26.0	
Total Split (s)	26.0	26.0					26.0	26.0		46.0	46.0	
Total Split (%)	26.5%	26.5%					26.5%	26.5%		46.9%	46.9%	
Yellow Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0					2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0					0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0					6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		20.0					20.0	20.0		40.0	40.0	
Actuated g/C Ratio		0.20					0.20	0.20		0.41	0.41	
v/c Ratio		0.67					0.14	0.58		0.25	0.87	
Control Delay		37.0					33.4	40.5		20.5	35.2	
Queue Delay		0.0					0.0	0.0		0.0	0.0	
Total Delay		37.0					33.4	40.5		20.5	35.2	
LOS		D					C	D		C	D	
Approach Delay		37.0						39.1			33.4	
Approach LOS		D						D			C	
Queue Length 50th (ft)		125					24	105		70	347	
Queue Length 95th (ft)		180					48	152		121	#461	
Internal Link Dist (ft)		486			282			332			227	
Turn Bay Length (ft)							75					
Base Capacity (vph)		698					328	344		632	1309	
Starvation Cap Reductn		0					0	0		0	0	
Spillback Cap Reductn		0					0	0		0	0	
Storage Cap Reductn		0					0	0		0	0	
Reduced v/c Ratio		0.67					0.14	0.58		0.25	0.87	

Millbrook - 2018 No-Build AM Peak Hour

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 98

Offset: 20 (20%), Referenced to phase 2:EBTL and 6:, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 34.9

Intersection LOS: C

Intersection Capacity Utilization 62.5%

ICU Level of Service B

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Medford Street & Somerville Ave & McGrath Highway



Synchro 8: HCM 2010 TWSC
1: Warren Street/Driveway & Medford Street

10/3/2013

Intersection												
Intersection Delay, s/veh	18											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Vol, veh/h	6	640	0	0	148	19	140	6	82	3	0	0
Conflicting Peds, #/hr	17	0	0	0	0	17	0	0	12	12	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	87	87	87	90	90	90	38	38	38
Heavy Vehicles, %	5	5	5	7	7	7	12	12	12	0	0	0
Mvmt Flow	7	719	0	0	170	22	156	7	91	8	0	0
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	204	0	0	731	0	0	938	949	748	986	938	210
Stage 1	-	-	-	-	-	-	745	745	-	193	193	-
Stage 2	-	-	-	-	-	-	193	204	-	793	745	-
Follow-up Headway	2.245	-	-	2.263	-	-	3.608	4.108	3.408	3.5	4	3.3
Pot Capacity-1 Maneuver	1350	-	-	851	-	-	235	251	396	229	266	835
Stage 1	-	-	-	-	-	-	391	407	-	813	745	-
Stage 2	-	-	-	-	-	-	786	714	-	385	424	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1331	-	-	839	-	-	228	244	386	166	258	815
Mov Capacity-2 Maneuver	-	-	-	-	-	-	228	244	-	166	258	-
Stage 1	-	-	-	-	-	-	384	399	-	798	738	-
Stage 2	-	-	-	-	-	-	775	707	-	283	416	-
Approach	SE		NW			NE			SW			
HCM Control Delay, s	0.1		0			82.7			27.8			
HCM LOS						F			D			
Minor Lane / Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1				
Capacity (veh/h)	268	839	-	-	1331	-	-	166				
HCM Lane V/C Ratio	0.945	-	-	-	0.005	-	-	0.048				
HCM Control Delay (s)	82.7	0	-	-	7.719	0	-	27.8				
HCM Lane LOS	F	A			A	A		D				
HCM 95th %tile Q(veh)	8.873	0	-	-	0.015	-	-	0.149				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

HCM research expects at least one 'Stop' controlled approach at the intersection.

Synchro 8: HCM 2010 TWSC
3: Medford Street & Ward Street/Driveway

10/3/2013

Intersection												
Intersection Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	0	6	2	0	4	8	206	13	41	1049	25
Conflicting Peds, #/hr	0	0	3	3	0	0	40	0	10	10	0	40
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	50	50	50	91	91	91	95	95	95
Heavy Vehicles, %	8	8	8	17	17	17	12	12	12	4	4	4
Mvmt Flow	9	0	7	4	0	8	9	226	14	43	1104	26
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	1465	1468	1160	1464	1474	277	1134	0	0	244	0	0
Stage 1	1207	1207	-	254	254	-	-	-	-	-	-	-
Stage 2	258	261	-	1210	1220	-	-	-	-	-	-	-
Follow-up Headway	3.572	4.072	3.372	3.653	4.153	3.453	2.308	-	-	2.236	-	-
Pot Capacity-1 Maneuver	103	124	231	98	117	727	581	-	-	1311	-	-
Stage 1	218	250	-	718	670	-	-	-	-	-	-	-
Stage 2	734	681	-	208	236	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-		-	-
Mov Capacity-1 Maneuver	90	110	223	84	104	701	562	-	-	1267	-	-
Mov Capacity-2 Maneuver	90	110	-	84	104	-	-	-	-	-	-	-
Stage 1	213	226	-	703	656	-	-	-	-	-	-	-
Stage 2	688	666	-	177	214	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	38.3		23.8			0.4			0.3			
HCM LOS	E		C									
Minor Lane / Major Mvmt	NBL		NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)	562		-	-	124	203	1267	-	-			
HCM Lane V/C Ratio	0.016		-	-	0.129	0.059	0.034	-	-			
HCM Control Delay (s)	11.507		0	-	38.3	23.8	7.942	0	-			
HCM Lane LOS	B		A		E	C	A	A				
HCM 95th %tile Q(veh)	0.048		-	-	0.432	0.187	0.106	-	-			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection												
Intersection Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	707	12	6	166	0	1	0	0	0	0	0
Conflicting Peds, #/hr	23	0	24	24	0	23	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	93	93	93	25	25	25	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	2	2	2
Mvmt Flow	0	803	14	6	178	0	4	0	0	0	0	0
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	181	0	0	820	0	0	1007	1007	837	1007	1014	205
Stage 1	-	-	-	-	-	-	813	813	-	194	194	-
Stage 2	-	-	-	-	-	-	194	194	-	813	820	-
Follow-up Headway	2.245	-	-	2.245	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Capacity-1 Maneuver	1376	-	-	796	-	-	221	243	370	219	239	836
Stage 1	-	-	-	-	-	-	375	395	-	808	740	-
Stage 2	-	-	-	-	-	-	812	744	-	372	389	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1348	-	-	780	-	-	215	240	362	213	236	817
Mov Capacity-2 Maneuver	-	-	-	-	-	-	215	240	-	213	236	-
Stage 1	-	-	-	-	-	-	374	394	-	806	732	-
Stage 2	-	-	-	-	-	-	789	735	-	365	388	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0		0.3			22.1			0			
HCM LOS						C			A			
Minor Lane / Major Mvmt	NBLn1		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	215		1348	-	-	780	-	-	0			
HCM Lane V/C Ratio	0.019		-	-	-	0.008	-	-	+			
HCM Control Delay (s)	22.1		0	-	-	9.654	0	-	0			
HCM Lane LOS	C		A			A	A		A			
HCM 95th %tile Q(veh)	0.057		0	-	-	0.025	-	-	+			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Synchro 8: HCM 2010 TWSC
17: Windsor Street & South Street

10/3/2013

Intersection						
Intersection Delay, s/veh	11.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	209	204	17	8	18	29
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	52	52	89	89
Heavy Vehicles, %	5	5	8	8	4	4
Mvmt Flow	255	249	33	15	20	33
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	113	41	0	0	48	0
Stage 1	40	-	-	-	-	-
Stage 2	73	-	-	-	-	-
Follow-up Headway	3.545	3.345	-	-	2.236	-
Pot Capacity-1 Maneuver	876	1022	-	-	1546	-
Stage 1	975	-	-	-	-	-
Stage 2	942	-	-	-	-	-
Time blocked-Platoon, %			-	-		-
Mov Capacity-1 Maneuver	864	1021	-	-	1545	-
Mov Capacity-2 Maneuver	864	-	-	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	929	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13.3	0		2.8		
HCM LOS	B					
Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	935	1545	-	
HCM Lane V/C Ratio	-	-	0.539	0.013	-	
HCM Control Delay (s)	-	-	13.3	7.361	0	
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	3.301	0.04	-	
Notes						
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined						

Synchro 8: HCM Unsignalized Intersection Capacity Analysis

2: Medford Street & South Street

10/3/2013

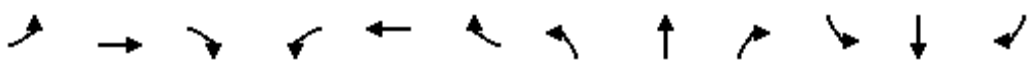


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↔	↔	
Volume (veh/h)	0	0	63	227	639	407
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	68	247	695	442
Pedestrians	38					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					1192	
pX, platoon unblocked	0.59	0.59	0.59			
vC, conflicting volume	1337	954	1175			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1223	568	946			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	83			
cM capacity (veh/h)	97	306	407			
Direction, Lane #	NB 1	SB 1				
Volume Total	315	1137				
Volume Left	68	0				
Volume Right	0	442				
cSH	407	1700				
Volume to Capacity	0.17	0.67				
Queue Length 95th (ft)	15	0				
Control Delay (s)	5.8	0.0				
Lane LOS	A					
Approach Delay (s)	5.8	0.0				
Approach LOS						
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			69.9%	ICU Level of Service		C
Analysis Period (min)			15			

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕					↕	↕		↕	↕↕	
Volume (vph)	0	213	109	0	0	0	106	388	33	160	511	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	75		0	0		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3268	0	0	0	0	1805	1872	0	1579	2957	0
Flt Permitted							0.950			0.950	0.999	
Satd. Flow (perm)	0	3268	0	0	0	0	1698	1872	0	1579	2957	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82						4			86	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		566			362			412			307	
Travel Time (s)		12.9			8.2			9.4			7.0	
Confl. Peds. (#/hr)							60					60
Confl. Bikes (#/hr)			2						23			4
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.90	0.90	0.90	0.94	0.94	0.94
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	370	0	0	0	0	118	468	0	153	824	0
Turn Type	Perm	NA					Split	NA		Split	NA	
Protected Phases		2					4	4		8	8	
Permitted Phases	2											
Minimum Split (s)	26.0	26.0					26.0	26.0		26.0	26.0	
Total Split (s)	26.0	26.0					26.0	26.0		46.0	46.0	
Total Split (%)	26.5%	26.5%					26.5%	26.5%		46.9%	46.9%	
Yellow Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0					2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0					0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0					6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		20.0					20.0	20.0		40.0	40.0	
Actuated g/C Ratio		0.20					0.20	0.20		0.41	0.41	
v/c Ratio		0.51					0.32	1.22		0.24	0.66	
Control Delay		29.4					36.1	153.8		20.3	23.8	
Queue Delay		0.0					0.0	0.0		0.0	0.0	
Total Delay		29.4					36.1	153.8		20.3	23.8	
LOS		C					D	F		C	C	
Approach Delay		29.4						130.1			23.2	
Approach LOS		C						F			C	
Queue Length 50th (ft)		83					63	~360		67	200	
Queue Length 95th (ft)		124					114	#557		116	270	
Internal Link Dist (ft)		486			282			332			227	
Turn Bay Length (ft)							75					
Base Capacity (vph)		732					368	385		644	1257	
Starvation Cap Reductn		0					0	0		0	0	
Spillback Cap Reductn		0					0	0		0	0	
Storage Cap Reductn		0					0	0		0	0	

Millbrook - 2018 No-Build PM Peak Hour

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.51					0.32	1.22		0.24	0.66	

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 98

Offset: 20 (20%), Referenced to phase 2:EBTL and 6:, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.22

Intersection Signal Delay: 56.8

Intersection LOS: E

Intersection Capacity Utilization 65.8%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Medford Street & Somerville Ave & McGrath Highway



Synchro 8: HCM 2010 TWSC
1: Warren Street/Driveway & Medford Street

10/3/2013

Intersection												
Intersection Delay, s/veh	73.1											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Vol, veh/h	2	339	0	0	297	3	312	1	150	17	0	17
Conflicting Peds, #/hr	57	0	0	0	0	57	0	0	10	10	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	93	93	93	96	96	96	78	78	78
Heavy Vehicles, %	0	0	0	1	1	1	1	1	1	4	4	4
Mvmt Flow	2	361	0	0	319	3	325	1	156	22	0	22
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	333	0	0	371	0	0	717	708	428	785	706	388
Stage 1	-	-	-	-	-	-	375	375	-	331	331	-
Stage 2	-	-	-	-	-	-	342	333	-	454	375	-
Follow-up Headway	2.2	-	-	2.209	-	-	3.509	4.009	3.309	3.536	4.036	3.336
Pot Capacity-1 Maneuver	1238	-	-	1193	-	-	346	361	629	308	358	656
Stage 1	-	-	-	-	-	-	648	619	-	678	642	-
Stage 2	-	-	-	-	-	-	675	646	-	582	614	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1179	-	-	1136	-	-	# 315	354	594	214	351	620
Mov Capacity-2 Maneuver	-	-	-	-	-	-	# 315	354	-	214	351	-
Stage 1	-	-	-	-	-	-	641	613	-	671	637	-
Stage 2	-	-	-	-	-	-	620	641	-	407	608	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0			0			181.9			18.1		
HCM LOS							F			C		
Minor Lane / Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1				
Capacity (veh/h)	372	1136	-	-	1179	-	-	318				
HCM Lane V/C Ratio	1.296	-	-	-	0.002	-	-	0.137				
HCM Control Delay (s)	181.9	0	-	-	8.059	0	-	18.1				
HCM Lane LOS	F	A			A	A		C				
HCM 95th %tile Q(veh)	22.005	0	-	-	0.005	-	-	0.47				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

HCM research expects at least one 'Stop' controlled approach at the intersection.

Synchro 8: HCM 2010 TWSC
3: Medford Street & Ward Street/Driveway

10/3/2013

Intersection												
Intersection Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	1	18	5	1	29	5	511	12	6	574	10
Conflicting Peds, #/hr	4	0	17	17	0	4	100	0	31	31	0	100
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	55	55	55	65	65	65	93	93	93	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	3	3	3
Mvmt Flow	25	2	33	8	2	45	5	549	13	6	598	10
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	1240	1223	720	1234	1222	673	625	0	0	579	0	0
Stage 1	633	633	-	584	584	-	-	-	-	-	-	-
Stage 2	607	590	-	650	638	-	-	-	-	-	-	-
Follow-up Headway	3.5	4	3.3	3.5	4	3.3	2.209	-	-	2.227	-	-
Pot Capacity-1 Maneuver	153	181	431	155	181	459	961	-	-	990	-	-
Stage 1	471	476	-	501	501	-	-	-	-	-	-	-
Stage 2	487	498	-	461	474	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-		-	-
Mov Capacity-1 Maneuver	121	173	389	126	173	415	881	-	-	908	-	-
Mov Capacity-2 Maneuver	121	173	-	126	173	-	-	-	-	-	-	-
Stage 1	461	465	-	490	490	-	-	-	-	-	-	-
Stage 2	394	487	-	382	463	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	31.1		19.4			0.1			0.1			
HCM LOS	D		C									
Minor Lane / Major Mvmt	NBL		NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)	881		-	-	197	303	908	-	-			
HCM Lane V/C Ratio	0.006		-	-	0.305	0.178	0.007	-	-			
HCM Control Delay (s)	9.111		0	-	31.1	19.4	8.992	0	-			
HCM Lane LOS	A		A		D	C	A	A				
HCM 95th %tile Q(veh)	0.018		-	-	1.226	0.635	0.021	-	-			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection												
Intersection Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	500	8	8	301	0	2	0	0	0	0	0
Conflicting Peds, #/hr	90	0	56	56	0	90	31	0	1	1	0	31
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	90	90	90	25	25	25	92	92	92
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	2	2	2
Mvmt Flow	0	543	9	9	334	0	8	0	0	0	0	0
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	365	0	0	583	0	0	962	962	669	962	966	455
Stage 1	-	-	-	-	-	-	579	579	-	383	383	-
Stage 2	-	-	-	-	-	-	383	383	-	579	583	-
Follow-up Headway	2.209	-	-	2.2	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Capacity-1 Maneuver	1199	-	-	1001	-	-	237	258	461	235	255	605
Stage 1	-	-	-	-	-	-	504	504	-	640	612	-
Stage 2	-	-	-	-	-	-	644	616	-	501	499	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1109	-	-	926	-	-	212	242	415	210	239	545
Mov Capacity-2 Maneuver	-	-	-	-	-	-	212	242	-	210	239	-
Stage 1	-	-	-	-	-	-	491	491	-	623	589	-
Stage 2	-	-	-	-	-	-	589	593	-	463	486	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0		0.2			22.6			0			
HCM LOS						C			A			
Minor Lane / Major Mvmt	NBLn1		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	212		1109	-	-	926	-	-	0			
HCM Lane V/C Ratio	0.038		-	-	-	0.01	-	-	+			
HCM Control Delay (s)	22.6		0	-	-	8.925	0	-	0			
HCM Lane LOS	C		A			A	A		A			
HCM 95th %tile Q(veh)	0.117		0	-	-	0.029	-	-	+			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Synchro 8: HCM 2010 TWSC
17: Windsor Street & South Street

10/3/2013

Intersection						
Intersection Delay, s/veh	9.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	159	184	26	2	12	36
Conflicting Peds, #/hr	1	4	0	9	9	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	75	75	69	69
Heavy Vehicles, %	2	2	4	4	4	4
Mvmt Flow	169	196	35	3	17	52
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	127	49	0	0	41	0
Stage 1	40	-	-	-	-	-
Stage 2	87	-	-	-	-	-
Follow-up Headway	3.518	3.318	-	-	2.236	-
Pot Capacity-1 Maneuver	868	1020	-	-	1556	-
Stage 1	982	-	-	-	-	-
Stage 2	936	-	-	-	-	-
Time blocked-Platoon, %			-	-		-
Mov Capacity-1 Maneuver	849	1009	-	-	1544	-
Mov Capacity-2 Maneuver	849	-	-	-	-	-
Stage 1	979	-	-	-	-	-
Stage 2	919	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11.4	0		1.8		
HCM LOS	B					
Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	928	1544	-	
HCM Lane V/C Ratio	-	-	0.393	0.011	-	
HCM Control Delay (s)	-	-	11.4	7.358	0	
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	1.893	0.034	-	
Notes						
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined						

Synchro 8: HCM Unsignalized Intersection Capacity Analysis

2: Medford Street & South Street

10/3/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕	↕	
Volume (veh/h)	0	0	99	528	332	254
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.94	0.94	0.97	0.97
Hourly flow rate (vph)	0	0	105	562	342	262
Pedestrians	69					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					1192	
pX, platoon unblocked	0.80	0.80	0.80			
vC, conflicting volume	1315	542	673			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1269	308	471			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	88			
cM capacity (veh/h)	131	588	881			
Direction, Lane #	NB 1	SB 1				
Volume Total	667	604				
Volume Left	105	0				
Volume Right	0	262				
cSH	881	1700				
Volume to Capacity	0.12	0.36				
Queue Length 95th (ft)	10	0				
Control Delay (s)	3.0	0.0				
Lane LOS	A					
Approach Delay (s)	3.0	0.0				
Approach LOS						
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			75.0%	ICU Level of Service	D	
Analysis Period (min)			15			

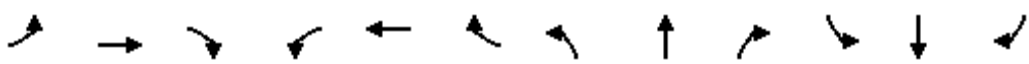
Intersection Capacity Analysis

2018 Future Build Conditions

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔					↔	↔		↔	↔↔	
Volume (vph)	0	301	120	0	0	0	41	134	38	169	960	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	75		0	0		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3207	0	0	0	0	1612	1635	0	1550	3187	0
Flt Permitted							0.950			0.950	0.999	
Satd. Flow (perm)	0	3207	0	0	0	0	1612	1635	0	1550	3187	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54						13			14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		566			362			412			307	
Travel Time (s)		12.9			8.2			9.4			7.0	
Confl. Bikes (#/hr)			2						2			57
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.79	0.79	0.79	0.95	0.95	0.95
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	12%	12%	12%	6%	6%	6%
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	467	0	0	0	0	52	218	0	160	1145	0
Turn Type	Perm	NA					Split	NA		Split	NA	
Protected Phases		2					4	4		8	8	
Permitted Phases	2											
Minimum Split (s)	26.0	26.0					26.0	26.0		26.0	26.0	
Total Split (s)	26.0	26.0					26.0	26.0		46.0	46.0	
Total Split (%)	26.5%	26.5%					26.5%	26.5%		46.9%	46.9%	
Yellow Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0					2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0					0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0					6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		20.0					20.0	20.0		40.0	40.0	
Actuated g/C Ratio		0.20					0.20	0.20		0.41	0.41	
v/c Ratio		0.67					0.16	0.63		0.25	0.87	
Control Delay		37.1					33.7	42.8		20.5	35.4	
Queue Delay		0.0					0.0	0.0		0.0	0.0	
Total Delay		37.1					33.7	42.8		20.5	35.4	
LOS		D					C	D		C	D	
Approach Delay		37.1						41.1			33.6	
Approach LOS		D						D			C	
Queue Length 50th (ft)		125					27	118		70	350	
Queue Length 95th (ft)		181					52	166		121	#465	
Internal Link Dist (ft)		486			282			332			227	
Turn Bay Length (ft)							75					
Base Capacity (vph)		697					328	344		632	1309	
Starvation Cap Reductn		0					0	0		0	0	
Spillback Cap Reductn		0					0	0		0	0	
Storage Cap Reductn		0					0	0		0	0	
Reduced v/c Ratio		0.67					0.16	0.63		0.25	0.87	

Millbrook - 2018 Build AM Peak Hour

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 98

Offset: 20 (20%), Referenced to phase 2:EBTL and 6:, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 35.4

Intersection LOS: D

Intersection Capacity Utilization 63.5%

ICU Level of Service B

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Medford Street & Somerville Ave & McGrath Highway



Synchro 8: HCM 2010 TWSC
1: Warren Street/Driveway & Medford Street

10/3/2013

Intersection												
Intersection Delay, s/veh	20.4											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Vol, veh/h	6	644	0	0	172	19	140	6	84	3	0	0
Conflicting Peds, #/hr	17	0	0	0	0	17	0	0	12	12	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	87	87	87	90	90	90	38	38	38
Heavy Vehicles, %	5	5	5	7	7	7	12	12	12	0	0	0
Mvmt Flow	7	724	0	0	198	22	156	7	93	8	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	232	0	0	736	0	0	970	981	753	1020	970	238
Stage 1	-	-	-	-	-	-	749	749	-	221	221	-
Stage 2	-	-	-	-	-	-	221	232	-	799	749	-
Follow-up Headway	2.245	-	-	2.263	-	-	3.608	4.108	3.408	3.5	4	3.3
Pot Capacity-1 Maneuver	1318	-	-	847	-	-	223	240	394	217	255	806
Stage 1	-	-	-	-	-	-	389	405	-	786	724	-
Stage 2	-	-	-	-	-	-	759	694	-	382	422	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1299	-	-	835	-	-	216	233	385	156	248	787
Mov Capacity-2 Maneuver	-	-	-	-	-	-	216	233	-	156	248	-
Stage 1	-	-	-	-	-	-	382	397	-	771	717	-
Stage 2	-	-	-	-	-	-	748	687	-	278	414	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.1			0			95.7			29.3		
HCM LOS							F			D		
Minor Lane / Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1				
Capacity (veh/h)	258	835	-	-	1299	-	-	156				
HCM Lane V/C Ratio	0.991	-	-	-	0.005	-	-	0.051				
HCM Control Delay (s)	95.7	0	-	-	7.786	0	-	29.3				
HCM Lane LOS	F	A			A	A		D				
HCM 95th %tile Q(veh)	9.638	0	-	-	0.016	-	-	0.159				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

HCM research expects at least one 'Stop' controlled approach at the intersection.

Synchro 8: HCM 2010 TWSC
3: Medford Street & Ward Street/Driveway

10/3/2013

Intersection												
Intersection Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	0	6	2	0	4	8	225	13	41	1053	25
Conflicting Peds, #/hr	0	0	3	3	0	0	40	0	10	10	0	40
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	50	50	50	91	91	91	95	95	95
Heavy Vehicles, %	8	8	8	17	17	17	12	12	12	4	4	4
Mvmt Flow	9	0	7	4	0	8	9	247	14	43	1108	26
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	1490	1493	1165	1490	1499	297	1138	0	0	265	0	0
Stage 1	1211	1211	-	275	275	-	-	-	-	-	-	-
Stage 2	279	282	-	1215	1224	-	-	-	-	-	-	-
Follow-up Headway	3.572	4.072	3.372	3.653	4.153	3.453	2.308	-	-	2.236	-	-
Pot Capacity-1 Maneuver	99	120	230	94	113	708	579	-	-	1287	-	-
Stage 1	217	248	-	700	656	-	-	-	-	-	-	-
Stage 2	715	667	-	207	235	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-		-	-
Mov Capacity-1 Maneuver	86	106	222	80	100	683	560	-	-	1244	-	-
Mov Capacity-2 Maneuver	86	106	-	80	100	-	-	-	-	-	-	-
Stage 1	212	224	-	685	642	-	-	-	-	-	-	-
Stage 2	670	653	-	175	212	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	39.6		24.8			0.4			0.3			
HCM LOS	E		C									
Minor Lane / Major Mvmt	NBL		NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)	560		-	-	120	194	1244	-	-			
HCM Lane V/C Ratio	0.016		-	-	0.134	0.062	0.035	-	-			
HCM Control Delay (s)	11.531		0	-	39.6	24.8	7.998	0	-			
HCM Lane LOS	B		A		E	C	A	A				
HCM 95th %tile Q(veh)	0.048		-	-	0.448	0.196	0.108	-	-			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection												
Intersection Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	6	707	12	6	166	3	1	0	0	13	0	24
Conflicting Peds, #/hr	23	0	24	24	0	23	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	93	93	93	25	25	25	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	2	2	2
Mvmt Flow	7	803	14	6	178	3	4	0	0	14	0	26
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	185	0	0	820	0	0	1036	1025	837	1023	1030	207
Stage 1	-	-	-	-	-	-	827	827	-	196	196	-
Stage 2	-	-	-	-	-	-	209	198	-	827	834	-
Follow-up Headway	2.245	-	-	2.245	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Capacity-1 Maneuver	1372	-	-	796	-	-	212	237	370	214	233	833
Stage 1	-	-	-	-	-	-	369	389	-	806	739	-
Stage 2	-	-	-	-	-	-	798	741	-	366	383	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1345	-	-	780	-	-	198	231	362	206	227	814
Mov Capacity-2 Maneuver	-	-	-	-	-	-	198	231	-	206	227	-
Stage 1	-	-	-	-	-	-	364	384	-	796	731	-
Stage 2	-	-	-	-	-	-	750	732	-	355	378	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0.1		0.3			23.6			15			
HCM LOS						C			C			
Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	198	1345	-	-	780	-	-	400				
HCM Lane V/C Ratio	0.02	0.005	-	-	0.008	-	-	0.101				
HCM Control Delay (s)	23.6	7.69	0	-	9.654	0	-	15				
HCM Lane LOS	C	A	A		A	A		C				
HCM 95th %tile Q(veh)	0.062	0.015	-	-	0.025	-	-	0.333				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Synchro 8: HCM 2010 TWSC
17: Windsor Street & South Street

10/3/2013

Intersection						
Intersection Delay, s/veh	11.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	212	207	17	8	18	29
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	52	52	89	89
Heavy Vehicles, %	5	5	8	8	4	4
Mvmt Flow	259	252	33	15	20	33
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	113	41	0	0	48	0
Stage 1	40	-	-	-	-	-
Stage 2	73	-	-	-	-	-
Follow-up Headway	3.545	3.345	-	-	2.236	-
Pot Capacity-1 Maneuver	876	1022	-	-	1546	-
Stage 1	975	-	-	-	-	-
Stage 2	942	-	-	-	-	-
Time blocked-Platoon, %			-	-		-
Mov Capacity-1 Maneuver	864	1021	-	-	1545	-
Mov Capacity-2 Maneuver	864	-	-	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	929	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13.4	0		2.8		
HCM LOS	B					
Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	935	1545	-	
HCM Lane V/C Ratio	-	-	0.546	0.013	-	
HCM Control Delay (s)	-	-	13.4	7.361	0	
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	3.397	0.04	-	
Notes						
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined						

Synchro 8: HCM Unsignalized Intersection Capacity Analysis

2: Medford Street & South Street

10/3/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕	↕	
Volume (veh/h)	0	0	69	246	643	407
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	75	267	699	442
Pedestrians	38					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					1192	
pX, platoon unblocked	0.59	0.59	0.59			
vC, conflicting volume	1376	958	1179			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1287	574	952			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	81			
cM capacity (veh/h)	86	303	404			
Direction, Lane #	NB 1	SB 1				
Volume Total	342	1141				
Volume Left	75	0				
Volume Right	0	442				
cSH	404	1700				
Volume to Capacity	0.19	0.67				
Queue Length 95th (ft)	17	0				
Control Delay (s)	6.2	0.0				
Lane LOS	A					
Approach Delay (s)	6.2	0.0				
Approach LOS						
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			76.1%	ICU Level of Service	D	
Analysis Period (min)			15			

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔					↔	↔		↔	↔↔	
Volume (vph)	0	213	113	0	0	0	108	394	35	160	522	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	75		0	0		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3264	0	0	0	0	1805	1872	0	1579	2963	0
Flt Permitted							0.950			0.950	0.999	
Satd. Flow (perm)	0	3264	0	0	0	0	1699	1872	0	1579	2963	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90						4			83	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		566			362			412			307	
Travel Time (s)		12.9			8.2			9.4			7.0	
Confl. Peds. (#/hr)							60					60
Confl. Bikes (#/hr)			2						23			4
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.90	0.90	0.90	0.94	0.94	0.94
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	375	0	0	0	0	120	477	0	153	835	0
Turn Type	Perm	NA					Split	NA		Split	NA	
Protected Phases		2					4	4		8	8	
Permitted Phases	2											
Minimum Split (s)	26.0	26.0					26.0	26.0		26.0	26.0	
Total Split (s)	26.0	26.0					26.0	26.0		46.0	46.0	
Total Split (%)	26.5%	26.5%					26.5%	26.5%		46.9%	46.9%	
Yellow Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0					2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0					0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0					6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		20.0					20.0	20.0		40.0	40.0	
Actuated g/C Ratio		0.20					0.20	0.20		0.41	0.41	
v/c Ratio		0.51					0.33	1.24		0.24	0.66	
Control Delay		28.8					36.2	162.7		20.3	24.1	
Queue Delay		0.0					0.0	0.0		0.0	0.0	
Total Delay		28.8					36.2	162.7		20.3	24.1	
LOS		C					D	F		C	C	
Approach Delay		28.8						137.3			23.5	
Approach LOS		C						F			C	
Queue Length 50th (ft)		82					64	~372		67	204	
Queue Length 95th (ft)		122					116	#571		116	276	
Internal Link Dist (ft)		486			282			332			227	
Turn Bay Length (ft)							75					
Base Capacity (vph)		737					368	385		644	1258	
Starvation Cap Reductn		0					0	0		0	0	
Spillback Cap Reductn		0					0	0		0	0	
Storage Cap Reductn		0					0	0		0	0	

Millbrook - 2018 Build PM Peak Hour

Synchro 8: Lanes, Volumes, Timings

4: Medford Street & Somerville Ave & McGrath Highway

10/3/2013

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.51					0.33	1.24		0.24	0.66	

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 98

Offset: 20 (20%), Referenced to phase 2:EBTL and 6:, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.24

Intersection Signal Delay: 59.2

Intersection LOS: E

Intersection Capacity Utilization 66.5%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Medford Street & Somerville Ave & McGrath Highway



Synchro 8: HCM 2010 TWSC
1: Warren Street/Driveway & Medford Street

10/3/2013

Intersection												
Intersection Delay, s/veh	83.7											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Vol, veh/h	2	353	0	0	310	3	312	1	159	17	0	17
Conflicting Peds, #/hr	57	0	0	0	0	57	0	0	10	10	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	93	93	93	96	96	96	78	78	78
Heavy Vehicles, %	0	0	0	1	1	1	1	1	1	4	4	4
Mvmt Flow	2	376	0	0	333	3	325	1	166	22	0	22
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	347	0	0	386	0	0	746	737	443	818	735	402
Stage 1	-	-	-	-	-	-	390	390	-	345	345	-
Stage 2	-	-	-	-	-	-	356	347	-	473	390	-
Follow-up Headway	2.2	-	-	2.209	-	-	3.509	4.009	3.309	3.536	4.036	3.336
Pot Capacity-1 Maneuver	1223	-	-	1178	-	-	331	347	617	292	344	644
Stage 1	-	-	-	-	-	-	636	609	-	666	633	-
Stage 2	-	-	-	-	-	-	664	637	-	568	604	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1165	-	-	1122	-	-	# 301	341	583	197	338	608
Mov Capacity-2 Maneuver	-	-	-	-	-	-	# 301	341	-	197	338	-
Stage 1	-	-	-	-	-	-	629	603	-	659	628	-
Stage 2	-	-	-	-	-	-	610	632	-	386	598	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0			0			210.9			19.1		
HCM LOS							F			C		
Minor Lane / Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1				
Capacity (veh/h)	360	1122	-	-	1165	-	-	298				
HCM Lane V/C Ratio	1.366	-	-	-	0.002	-	-	0.146				
HCM Control Delay (s)	210.9	0	-	-	8.096	0	-	19.1				
HCM Lane LOS	F	A			A	A		C				
HCM 95th %tile Q(veh)	24.107	0	-	-	0.005	-	-	0.506				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

HCM research expects at least one 'Stop' controlled approach at the intersection.

Synchro 8: HCM 2010 TWSC
3: Medford Street & Ward Street/Driveway

10/3/2013

Intersection												
Intersection Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	1	18	5	1	29	5	521	12	6	588	10
Conflicting Peds, #/hr	4	0	17	17	0	4	100	0	31	31	0	100
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	55	55	55	65	65	65	93	93	93	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	3	3	3
Mvmt Flow	25	2	33	8	2	45	5	560	13	6	612	10
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1264	1248	735	1258	1246	684	640	0	0	590	0	0
Stage 1	647	647	-	594	594	-	-	-	-	-	-	-
Stage 2	617	601	-	664	652	-	-	-	-	-	-	-
Follow-up Headway	3.5	4	3.3	3.5	4	3.3	2.209	-	-	2.227	-	-
Pot Capacity-1 Maneuver	148	175	423	149	175	452	949	-	-	981	-	-
Stage 1	463	470	-	495	496	-	-	-	-	-	-	-
Stage 2	481	493	-	453	467	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-		-	-
Mov Capacity-1 Maneuver	117	167	382	120	167	408	870	-	-	899	-	-
Mov Capacity-2 Maneuver	117	167	-	120	167	-	-	-	-	-	-	-
Stage 1	453	459	-	484	485	-	-	-	-	-	-	-
Stage 2	388	482	-	374	456	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	32.3		19.9		0.1		0.1					
HCM LOS	D		C									
Minor Lane / Major Mvmt	NBL		NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)	870		-	-	191	295	899	-	-			
HCM Lane V/C Ratio	0.006		-	-	0.314	0.183	0.007	-	-			
HCM Control Delay (s)	9.164		0	-	32.3	19.9	9.032	0	-			
HCM Lane LOS	A		A		D	C	A	A				
HCM 95th %tile Q(veh)	0.019		-	-	1.275	0.656	0.021	-	-			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection												
Intersection Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	23	500	8	8	301	13	2	0	0	7	0	13
Conflicting Peds, #/hr	90	0	56	56	0	90	31	0	1	1	0	31
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	90	90	90	25	25	25	92	92	92
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	2	2	2
Mvmt Flow	25	543	9	9	334	14	8	0	0	8	0	14
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	380	0	0	583	0	0	1027	1027	669	1019	1023	463
Stage 1	-	-	-	-	-	-	629	629	-	390	390	-
Stage 2	-	-	-	-	-	-	398	398	-	629	633	-
Follow-up Headway	2.209	-	-	2.2	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Capacity-1 Maneuver	1184	-	-	1001	-	-	215	236	461	215	236	599
Stage 1	-	-	-	-	-	-	474	478	-	634	608	-
Stage 2	-	-	-	-	-	-	632	606	-	470	473	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1095	-	-	926	-	-	182	214	415	187	214	540
Mov Capacity-2 Maneuver	-	-	-	-	-	-	182	214	-	187	214	-
Stage 1	-	-	-	-	-	-	447	450	-	597	585	-
Stage 2	-	-	-	-	-	-	562	583	-	420	446	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0.4		0.2			25.7			16.9			
HCM LOS						D			C			
Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	182	1095	-	-	926	-	-	325				
HCM Lane V/C Ratio	0.044	0.023	-	-	0.01	-	-	0.067				
HCM Control Delay (s)	25.7	8.364	0	-	8.925	0	-	16.9				
HCM Lane LOS	D	A	A		A	A		C				
HCM 95th %tile Q(veh)	0.137	0.07	-	-	0.029	-	-	0.214				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Synchro 8: HCM 2010 TWSC
17: Windsor Street & South Street

10/3/2013

Intersection						
Intersection Delay, s/veh	9.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	161	185	26	2	12	36
Conflicting Peds, #/hr	1	4	0	9	9	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	75	75	69	69
Heavy Vehicles, %	2	2	4	4	4	4
Mvmt Flow	171	197	35	3	17	52
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	127	49	0	0	41	0
Stage 1	40	-	-	-	-	-
Stage 2	87	-	-	-	-	-
Follow-up Headway	3.518	3.318	-	-	2.236	-
Pot Capacity-1 Maneuver	868	1020	-	-	1556	-
Stage 1	982	-	-	-	-	-
Stage 2	936	-	-	-	-	-
Time blocked-Platoon, %			-	-		-
Mov Capacity-1 Maneuver	849	1009	-	-	1544	-
Mov Capacity-2 Maneuver	849	-	-	-	-	-
Stage 1	979	-	-	-	-	-
Stage 2	919	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	11.4		0		1.8	
HCM LOS	B					
Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	928	1544	-	
HCM Lane V/C Ratio	-	-	0.397	0.011	-	
HCM Control Delay (s)	-	-	11.4	7.358	0	
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	1.92	0.034	-	
Notes						
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined						

Synchro 8: HCM Unsignalized Intersection Capacity Analysis

2: Medford Street & South Street

10/3/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↔	↔	
Volume (veh/h)	0	0	102	538	346	254
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.94	0.94	0.97	0.97
Hourly flow rate (vph)	0	0	109	572	357	262
Pedestrians	69					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					1192	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	1346	557	688			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1306	313	478			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	87			
cM capacity (veh/h)	123	578	866			
Direction, Lane #	NB 1	SB 1				
Volume Total	681	619				
Volume Left	109	0				
Volume Right	0	262				
cSH	866	1700				
Volume to Capacity	0.13	0.36				
Queue Length 95th (ft)	11	0				
Control Delay (s)	3.1	0.0				
Lane LOS	A					
Approach Delay (s)	3.1	0.0				
Approach LOS						
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			76.4%	ICU Level of Service	D	
Analysis Period (min)			15			