Transportation Impact Assessment

Proposed Medical Office Building
86 Holliston Street
Medway, Massachusetts

Prepared for:

Guerriere & Halnon, Inc.
Franklin, Massachusetts

April 2022

Prepared by:

Vanasse & Associates inc
Transportation Engineers & Planners

35 New England Business Center Drive
Suite 140
Andover, MA 01810

Vanasse & Associates inc
Transportation Engineers & Planners

35 New England Business Center Drive
Suite 140
Andover, MA 01810

Dear Reviewer:

This letter shall certify that this *Transportation Impact Assessment* has been prepared under my direct supervision and responsible charge. I am a Registered Professional Engineer (P.E.) in the Commonwealth of Massachusetts (Massachusetts P.E. No. 38871, Civil) and hold Certification as a Professional Traffic Operations Engineer (PTOE) from the Transportation Professional Certification Board, Inc. (TPCB), an independent affiliate of the Institute of Transportation Engineers (ITE) (PTOE Certificate No. 993). I am also a Fellow of the Institute of Transportation Engineers (FITE).

Sincerely,

VANASSE & ASSOCIATES, INC.

Jeffrey S. Dirk

Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner

CONTENTS

CONTENTS (Contents)

FIGURES

TABLES

EXECUTIVE SUMMARY

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a medical office building to be located at 86 Holliston Street in Medway, Massachusetts (hereafter referred to as the Project). This assessment was prepared in consultation with the Town of Medway and the Massachusetts Department of Transportation (MassDOT), and was performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports.

Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE),[1] the Project is expected to generate approximately 788 vehicle trips on an average weekday and 302 vehicle trips on a Saturday (both two-way volumes over the operational day of the Project), with approximately 61 vehicle trips expected during the weekday morning peak-hour, 86 vehicle trips expected during the weekday evening peak-hour and 66 vehicle trips expected during the Saturday midday peak-hour;

2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition), with overall intersection operations maintained at a level of service (LOS) of D or better, where an LOS of "D" or better is defined as "acceptable" traffic operations;

3. All movements at the Project site driveway intersection with Main Street (Route 109) were shown to operate at a LOS D or better during the peak hours, with vehicle queue increases attributable to the Project shown to range from 0 to 6 vehicles (Route 109 eastbound approach);

4. The study area intersections were found to have a motor vehicle crash rate that is below the MassDOT Highway Division District 3 average crash rate for similar intersections, but above the MassDOT statewide average crash rate. A Road Safety Audit (RSA) has been

[1] *Trip Generation*, 11th Edition; Institute of Transportation Engineers; Washington, DC; 2021.

conducted at the Route 109/Holliston Street intersection and the majority of the improvements recommended therein have been completed;[2] and

5. Lines of sight to and from the Project site driveway intersection were found to exceed the recommended minimum distances for safe and efficient operation based on the appropriate approach speed.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with implementation of the recommendations that follow.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

Project Access

Access to the Project will be provided by way of the existing driveway that serves the abutting commercial property (Walgreens Pharmacy) and intersects the north side of Route 109 opposite the Medway Commons driveway. The intersection operates under traffic signal control. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation, many of which are reflected on the site plans:

- The shared (with Walgreens) access driveway should continue to provide two (2) exiting travel lanes (left-turn lane and a through/right-turn lane) and a two (2) entering travel lanes, with exiting traffic under traffic signal control. The individual driveways that will serve the Project site and internal circulating aisles should be a minimum of 24 feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle as defined by the Medway Fire Department.

- Where perpendicular parking is proposed, the drive aisle behind the parking should be a minimum of 23 feet in order to facilitate parking maneuvers.

- All signs and pavement markings to be installed within the Project site will conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).[3]

- A sidewalk is proposed within the Project site that will extend to the existing sidewalk along the north side of Route 109. Pedestrian crossings that are constructed in conjunction with the Project will include marked crosswalks with Americans with Disabilities Act (ADA) compliant wheelchair ramps.

[2] *Road Safety Audit*, Route 109 (Main Street) at Holliston Street, Howard/Stein-Hudson Associates; January 2014.
[3] *Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of the Project site driveway should be designed and maintained so as not to restrict lines of sight.

- Snow accumulations (windrows) within the sight triangle areas of the Project site driveway should be promptly removed where such accumulations would impede sight lines.

- Electric vehicle (EV) charging stations are provided in accordance with the Town of Medway Zoning Bylaw.

Transportation Demand Management

Regularly scheduled public transportation services are not currently provided in the immediate vicinity of the Project site. To the south of the Project site, the Greater Attleboro-Taunton Regional Transit Authority (GATRA) operates fixed route bus service along Holliston Street by way of the Medway T Shuttle, with a stop at the Medway Middle School, an approximate 13 minute walking distance from the Project site. In addition, GATRA provides Dial-a-Ride paratransit services to eligible persons that cannot use fixed-route transit all or some of the time due to a physical, cognitive or mental disability in compliance with the ADA.

In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles (SOVs), the following Transportation Demand Management (TDM) measures will be implemented as a part of the Project:

- A transportation coordinator will be assigned for the Project to coordinate the TDM program;

- A "welcome packet" will be provided to employees detailing available public transportation services, bicycle and walking alternatives, and commuter options, and should include the contact information for the transportation coordinator;

- Specific amenities will be provided to discourage off-site trips, including providing a break-room equipped with a microwave and refrigerator; offering direct deposit of paychecks; and other such measures to reduce overall traffic volumes and travel during peak traffic volume periods;

- Pedestrian accommodations are incorporated within the Project site; and

- Secure bicycle parking has been provided within the Project site.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing transportation system.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a medical office building to be located at 86 Holliston Street in Medway, Massachusetts (hereafter referred to as the Project). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing traffic conditions and future traffic conditions, both with and without the Project, along Main Street (Route 109) and at the intersections of Route 109 at Holliston Street and Route 109 at the Project site driveway and the Medway Commons driveway.

PROJECT DESCRIPTION

The Project will entail the construction of a 21,900± square foot (sf) medical office building to be located at 86 Holliston Street in Medway, Massachusetts. The Project will be constructed on a portion of a larger parcel of land that extends between the Walgreens Pharmacy and Holliston Street. The parcel that will contain the Project encompasses approximately 2.20± acres of land that is bounded by areas of open and wooded space to the north and west; a commercial property (Walgreens) to the east; and Route 109 to the south. Figure 1 depicts the Project site location in relation to the existing roadway network.

Access to the Project will be provided by way of the existing driveway that serves the abutting Walgreens Pharmacy and intersects the north side of Route 109 opposite the Medway Commons driveway. The intersection operates under traffic signal control.

On-site parking will be provided for 102 vehicles, or a parking ratio of approximately 1.4 parking spaces per 300 sf of floor area, which exceeds the requirements of Section 7.1.1, *Off-Street Parking and Loading*, of the Town of Medway Zoning Bylaw (one (1) space per 300 sf of floor area is required for medical offices or clinics).

Figure 1

Site Location Map

Vanasse & Associates inc

R:\9242\9242SLM.dwg, 3/24/2022 8:47:28 AM

STUDY METHODOLOGY

This study was prepared in consultation with the Town of Medway and MassDOT; was performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports; and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian and bicycle facilities; on-street parking; public transportation services; observations of traffic flow; and collection of pedestrian, bicycle and vehicle counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon was selected for analyses consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in February 2022. The field investigation consisted of an inventory of existing roadway geometrics; pedestrian and bicycle facilities; public transportation services; traffic volumes; and operating characteristics; as well as posted speed limits and land use information within the study area. The study area that was assessed for the Project consisted of Route 109 and the intersections of Route 109 at Holliston Street and Route 109 at the Project site driveway and the Medway Commons driveway.

The following describes the study area roadway and intersections.

ROADWAY

Main Street (Route 109)

- Two-lane urban principal arterial roadway under Town jurisdiction;
- Traverses the study area in a general northeast-southwest direction;
- Provides two 11 to 14-foot wide travel lanes that are separated by a double-yellow centerline with 1 to 2-foot wide marked shoulders and additional turning lanes provided at major intersections;
- The posted speed limit is 35 miles per hour (mph) within the study area;
- Sidewalks are provided along both sides of the roadway west of Holliston Street and along the north side to the east;
- Illumination is provided by way of street lights mounted on wood and steel poles;
- Land use within the study area consists of the Project site, Walgreens Pharmacy, Medway Commons, and residential and commercial properties.

INTERSECTIONS

Table 1 and Figure 2 summarize existing lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections as observed in February 2022.

Table 1
STUDY AREA INTERSECTION DESCRIPTION

Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
Rte. 109/ Holliston St.	TS	1 left-turn lane, 1 through lane, and 1 channelized right-turn lane on Rte. 109; 1 left-turn lane and 1 shared through/right-turn lane on Holliston St. northbound; 1 left-turn lane, 1 through lane, and 1 right-turn lane on Holliston St. southbound	Yes; 1 to 2 feet on Rte. 109; 1 to 4 feet on Holliston St.	Yes, both sides of Rte. 109 west of Holliston St.; north side of Rte. 109 east of Holliston St.; both sides of Holliston St. north of Rte. 109; east side of Holliston St south of Rte. 109; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided as a part of the traffic signal system	Yes; bike lanes and "sharrow" markings along Rte. 109; shared traveled-way[b] along Holliston St.
Rte. 109/ Project Site Dwy./Medway Commons Dwy.	TS	1 left-turn lane, 1 through lane, and 1 right-turn lane on Rte. 109 eastbound; 1 left-turn lane and 1 shared through/right-turn lane on Rte. 109 westbound and the Project site dwy.; 1 shared left-turn/through lane and 1 right-turn lane on Medway Commons dwy.	Yes; 2-feet on Rte. 109	Yes, north side of Rte. 109 and the west side of Medway Commons dwy.; crosswalks provided across the Rte 109 west leg and across the Project site dwy.; pedestrian traffic signal equipment and phasing (exclusive) provided as a part of the traffic signal system	Yes; shared travel-way along Rte. 109

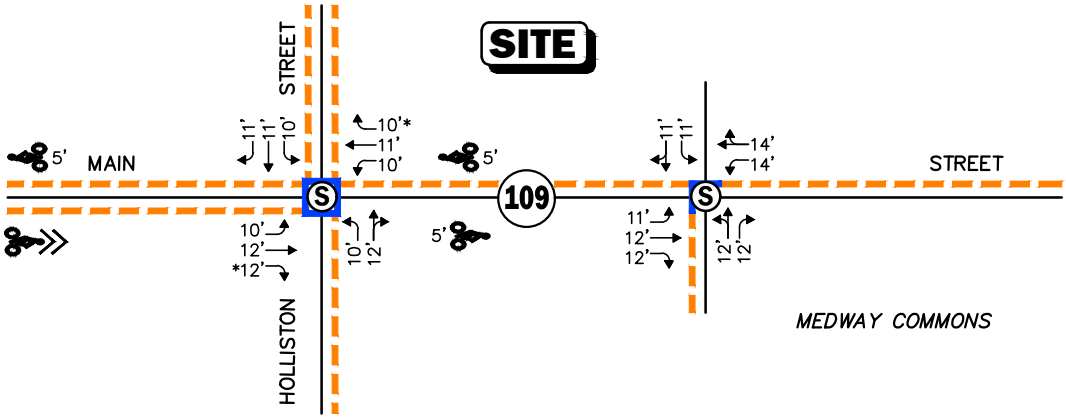
[a]TS = traffic signal control.
[b]Combined shoulder and travel lane width equal to or exceed 14 feet.

TRAFFIC VOLUMES

In order to determine existing traffic-volume demands and flow patterns within the study area, automatic traffic recorder (ATR) counts, turning movement counts (TMCs) and vehicle classification counts were completed in February 2022. The ATR counts were conducted on Route 109 in the vicinity of the Project site on February 17th through 19th, 2022 (Thursday through Saturday, inclusive) in order to record traffic volume and flow conditions over an extended period, with peak period TMCs performed at the study intersections during the weekday morning (7:00 to

Legend:

- Signalized Intersection
- Sidewalk
- Crosswalk
- XX' Lane Use and Travel Lane Width
- *XX' Channelized Right Turn
- Bike Lane
- "Sharrow" Marking



Not To Scale

Figure 2

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

Vanasse & Associates inc

9:00 AM) and evening (4:00 to 6:00 PM) peak periods on Thursday, February 17, 2022, and during the Saturday midday (11:00 AM to 2:00 PM) peak period on February 19, 2022. These time periods were selected for analysis purposes as they are representative of the peak-traffic-volume hours for both the Project and the adjacent roadway network.

Traffic-Volume Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, traffic volume data from MassDOT Continuous Count Station No. 3180 located on Interstate 495 at the Bellingham town line in Medway were reviewed.[4] Based on a review of this data, it was determined that traffic volumes for the month of February are approximately 12.5 percent *below* average-month conditions. As such, the February traffic volumes were adjusted upward by 12.5 percent in order to be representative of average-month conditions.

In order to account for the impact on traffic volumes and trip patterns resulting from the COVID-19 pandemic, the TMCs that were collected as part of this assessment at the Route 109/Project site driveway/Medway Commons driveway were compared to those that were collected at the same intersection in October 2018. The 2018 traffic volumes were expanded to 2022 by applying the traffic growth procedure detailed in the April 2020 "Guidance on Traffic Counting Data" published by MassDOT[5] in order to allow for a comparison of the data. Based on this pre and post COVID-19 traffic-volume comparison, the traffic volume data that was collected as a part of this assessment was found to be representative conditions that existed prior to the onset of the COVID-19 pandemic. As such, further adjustment of the traffic-volume data was not necessary.

The 2022 Existing traffic volumes are summarized in Table 2, with the weekday morning, weekday evening and Saturday midday peak-hour traffic volumes graphically depicted on Figure 3. Note that the peak-hour traffic volumes that are presented in Table 2 were obtained from the aforementioned figures.

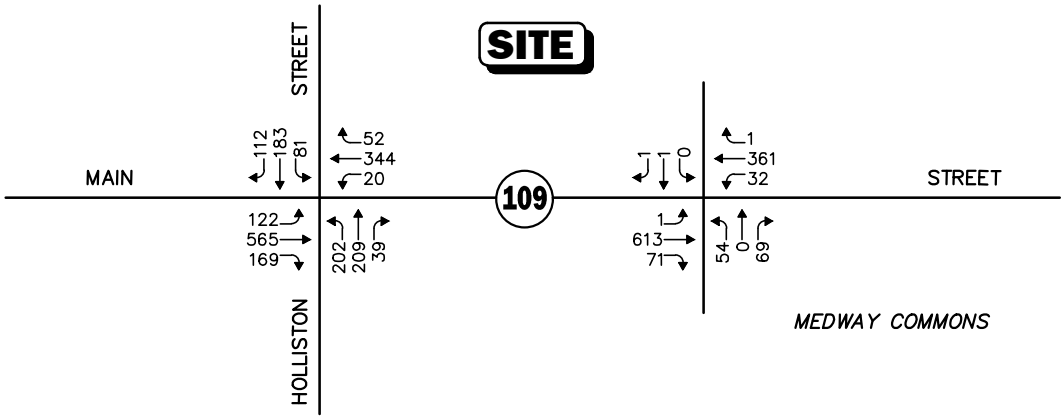
Table 2
2022 EXISTING TRAFFIC VOLUMES

Location/Peak Hour	AWT[a]	Saturday[b]	VPH[c]	K Factor[d]	Directional Distribution[e]
Route 109, east of Holliston Street:	14,365	12,520	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	1,101	7.7	62.2% EB
Weekday Evening (4:30 – 5:30 PM)	--	--	1,202	8.4	51.7% WB
Saturday Midday (11:30 AM – 12:30 PM)	--	--	1,261	10.1	51.5% WB

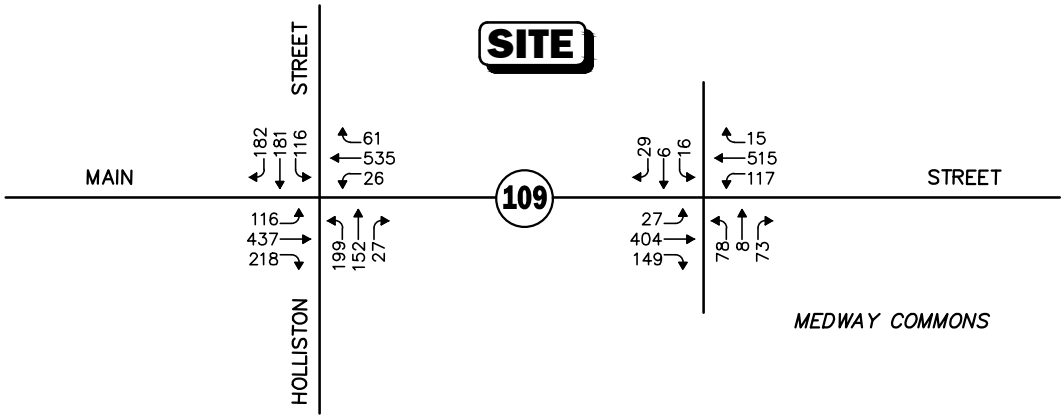
[a]Average weekday traffic in vehicles per day.
[b]Saturday traffic in vehicles.
[c]Vehicles per hour.
[d]Percent of daily traffic occurring during the peak hour.
[e]Percent traveling in peak direction.
EB = eastbound; WB = westbound.

[4]MassDOT Traffic Volumes for the Commonwealth of Massachusetts; 2022.
[5]*Guidance on Traffic Count Data*; MassDOT; revised April 2020.

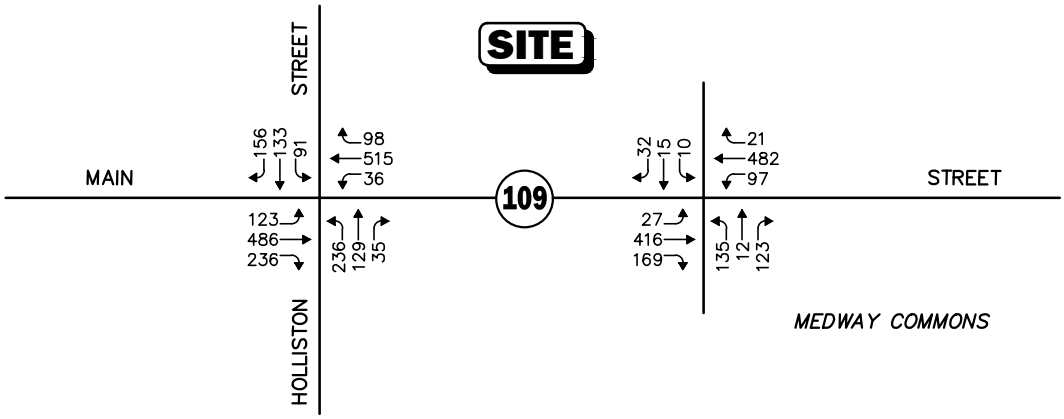
WEEKDAY MORNING PEAK HOUR (7:15 to 8:15 AM)



WEEKDAY EVENING PEAK HOUR (4:00 to 5:00 PM)



SATURDAY MIDDAY PEAK HOUR (11:00 AM to 12:00 PM)



Not To Scale

Figure 3

2022 Existing
Peak-Hour Traffic Volumes

Vanasse & Associates inc

As can be seen in Table 2, Route 109 in the vicinity of the Project site was found to accommodate approximately 14,365 vehicles on an average weekday and 12,520 vehicles on a Saturday (two-way, 24-hour volumes), with approximately 1,101 vehicles per hour (vph) during the weekday morning peak-hour, 1,202 vph during the weekday evening peak-hour and 1,261 vph during the Saturday midday peak-hour.

PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in February 2022. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study area intersections. As detailed on Figure 2, sidewalks are provided along one or both sides of the study area roadways, with marked crosswalks provided for crossing one or more legs of the study area intersections. Pedestrian traffic signal equipment and phasing are provided as a part of the traffic signal system at the study area intersections.

Within the study area, Holliston Street generally provides sufficient width to accommodate bicycle travel in a shared traveled-way configuration (i.e., bicyclists and motor vehicles sharing the traveled-way).[6] A combination of on-road bicycle lanes and "sharrow" pavement markings are provided along Route 109 beginning at a point just east of Holliston Street and proceeding westerly thereafter. Bicycle detection is provided as a part of the traffic signal system at the Route 109/Holliston Street intersection.

PUBLIC TRANSPORTATION

Regularly scheduled public transportation services are not currently provided in the immediate vicinity of the Project site. To the south of the Project site, the Greater Attleboro-Taunton Regional Transit Authority (GATRA) operates fixed route bus service along Holliston Street by way of the Medway T Shuttle, with a stop located at the Medway Middle School, an approximate 13 minute walking distance from the Project site. In addition, GATRA provides Dial-a-Ride paratransit services to eligible persons that cannot use fixed-route transit all or some of the time due to a physical, cognitive or mental disability in compliance with the Americans with Disabilities Act (ADA).

[6] A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared traveled-way condition.

SPOT SPEED MEASUREMENTS

Vehicle travel speed measurements were performed on Route 109 in conjunction with the ATR counts. Table 3 summarizes the vehicle travel speed measurements.

Table 3
VEHICLE TRAVEL SPEED MEASUREMENTS

	Route 109	
	Eastbound	Westbound
Mean Travel Speed (mph)	29	21
85th Percentile Speed (mph)	32	28
Posted Speed Limit (mph)	35	35

mph = miles per hour.

As can be seen in Table 3, the mean vehicle travel speed along Route 109 within the study area was found to be 29 mph in the eastbound direction and 21 mph westbound. The measured 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be 32 mph eastbound and 28 mph westbound, which is 3 to 7 mph below the posted speed limit in the vicinity of the Project site (35 mph). The 85th percentile speed is used as the basis of engineering design and in the evaluation of sight distances, and is often used in establishing posted speed limits.

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2015 through 2019, inclusive) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, and presented in Table 4.

As can be seen in Table 4, the study area intersections were found to have experienced an average of 7.2 or fewer reported motor vehicle crashes over the five-year review period and were found to have a motor vehicle crash rate that is below the MassDOT District average for similar intersections for the MassDOT Highway Division District in which the intersections are located (District 3), but above the MassDOT statewide average. The majority of the crashes were reported to have occurred on a weekday; under clear weather conditions; during daylight; and were reported as rear-end type collisions that resulted in property damage only.

Table 4
MOTOR VEHICLE CRASH DATA SUMMARY[a]

	Rte. 109/ Holliston St.	Rte. 109/ Project Site Dwy./Medway Commons Dwy.
Traffic Control Type:[b]	TS	TS
Year:		
2015	0	8
2016	4	8
2017	10	4
2018	9	5
2019	13	0
Total	36	25
Average	7.2	5.0
Rate[c]	0.79	0.86
MassDOT Crash Rate:[d]	0.78/0.89	0.78/0.89
Significant?[e]	No	No
Type:		
Angle	5	4
Rear-End	23	16
Head-On	0	0
Sideswipe	4	2
Fixed Object	2	3
Pedestrian/Bicycle	0	0
Unknown/Other	2	0
Total	36	25
Conditions:		
Clear	28	19
Cloudy	3	4
Rain	2	0
Snow/Ice	3	2
Total	36	25
Lighting:		
Daylight	24	21
Dawn/Dusk	3	0
Dark (Road Lit)	9	4
Dark (Road Unlit)	0	0
Total	36	25
Day of Week:		
Monday through Friday	26	19
Saturday	6	4
Sunday	4	2
Total	36	25
Severity:		
Property Damage Only	23	16
Personal Injury	7	7
Fatality	0	0
Unknown	6	2
Total	36	25

[a]Source: MassDOT Safety Management/Traffic Operations Unit records, 2015 through 2019.
[b]Traffic Control Type: TS = traffic signal control.
[c]Crash rate per million vehicles entering the intersection.
[d]Statewide/District crash rate.
[e]The intersection crash rate is significant if it is found to exceed the MassDOT crash rate for the MassDOT Highway Division District in which the Project is located (District 3).

A Road Safety Audit (RSA) was conducted at the Route 109/Holliston Street intersection in 2014 in order to identify potential safety enhancements at the intersection.[7] The RSA suggested a number of safety-related improvements that included access management; traffic signal improvements; sign enhancements; and pedestrian and bicyclist improvements; the majority of which appear to have been completed.

A review of the MassDOT statewide High Crash Location List indicated that there are no locations within the Town of Medway that are included on MassDOT's Highway Safety Improvement Program (HSIP) listing as a high crash location. In addition, no fatal motor vehicle crashes were reported to have occurred at the study area intersections over the five-year review period.

The detailed MassDOT Crash Rate Worksheets are provided in the Appendix.

[7] Ibid 2.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2029, which reflects a seven-year planning horizon consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. Independent of the Project, traffic volumes on the roadway network in the year 2029 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2029 No-Build traffic volumes reflect 2029 Build traffic-volume conditions with the Project.

FUTURE TRAFFIC GROWTH

Future traffic growth is a function of the expected land development in the immediate area and the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This procedure produces a more realistic estimate of growth for local traffic; however, potential population growth and development external to the study area would not be accounted for in the resulting traffic projections.

To provide a conservative analysis framework, both procedures were used, the salient components of which are described below.

Specific Development by Others

The Medway Planning and Economic Development Department was contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on this consultation, the following project was identified for inclusion in this assessment:

- ***Proposed Residential Development, 39 Main Street (Route 109), Medway, Massachusetts.*** This proposed project consists of the construction of a 190-unit multifamily residential development to be located at 39 Main Street (Route 109), east of the Project site.

Traffic volumes associated with the aforementioned development project by others were obtained from the traffic study conducted for the specific development.[8] No other developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

General Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count stations located in Medway were reviewed in order to determine general traffic growth trends in the area. This data indicates that traffic volumes have fluctuated over the 10-year period between 2009 and 2019, with an average decrease of 0.86 percent per year. In order to provide a prudent planning condition for the Project, a 1.0 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

Roadway Improvement Projects

The Town of Medway and MassDOT were contacted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2029 within the study area. Based on these discussions, no roadway improvement projects aside from routine maintenance activities were identified to be planned within the study area at this time.

No-Build Traffic Volumes

The 2029 No-Build condition peak-hour traffic volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2022 Existing peak-hour traffic volumes and then adding the traffic volumes associated with the identified specific development project by others. The resulting 2029 No-Build weekday morning, weekday evening and Saturday midday peak-hour traffic volumes are shown on Figure 4.

PROJECT-GENERATED TRAFFIC

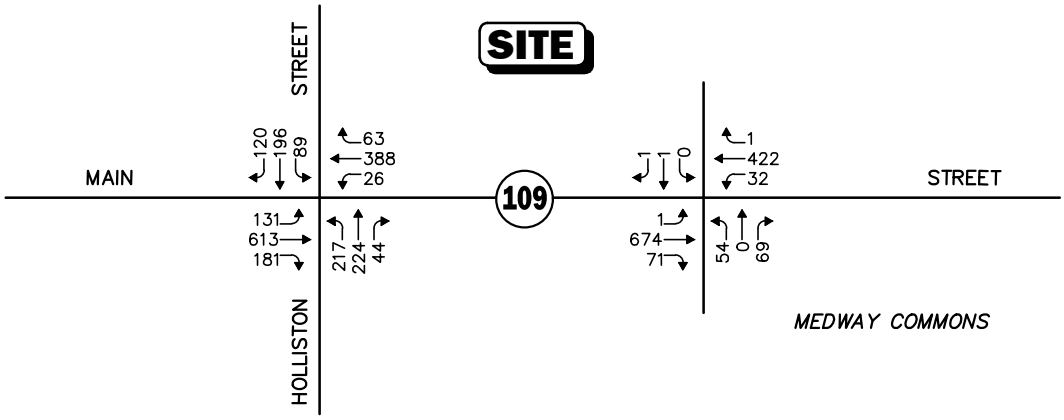
Design year (2029 Build) traffic volumes were determined by estimating Project-generated traffic volumes and assigning those volumes on the study area. The following sections describe the methodology used to develop the anticipated traffic characteristics of the Project.

As proposed, the Project will entail the construction of a 21,900± sf medical office building. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)[9] for a similar land use as that proposed was used. ITE Land Use Code (LUC) 720, *Medical-Dental Office Building*; was used to establish the trip-generation characteristics of the Project, the results of which are summarized in Table 5, with the detailed trip calculations provided in the Appendix.

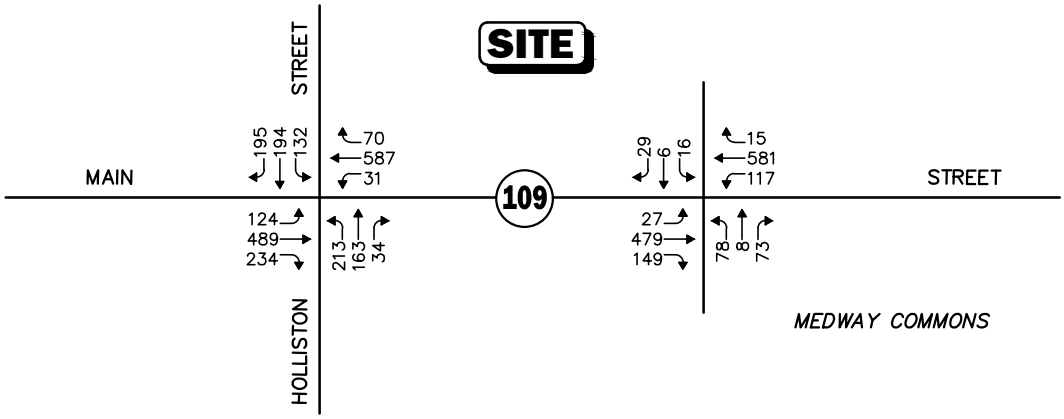
[8] *Transportation Impact Assessment*, Proposed Residential Development; 39 Main Street (Route 109); Medway, Massachusetts; VAI; November 2018.

[9] Ibid 1.

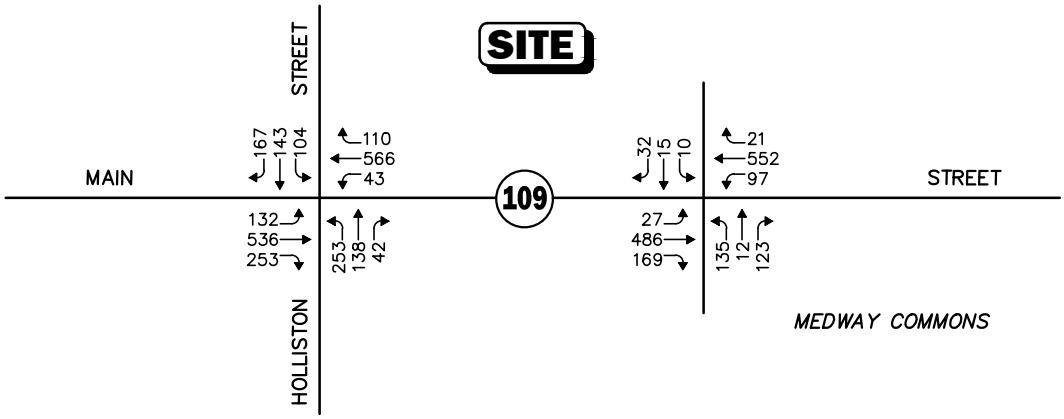
WEEKDAY MORNING PEAK HOUR (7:15 to 8:15 AM)



WEEKDAY EVENING PEAK HOUR (4:00 to 5:00 PM)



SATURDAY MIDDAY PEAK HOUR (11:00 AM to 12:00 PM)



Not To Scale

Figure 4

2029 No-Build
Peak-Hour Traffic Volumes

Vanasse & Associates inc

Table 5
TRIP GENERATION SUMMARY

Time Period	Vehicle Trips[a]		
	Entering	Exiting	Total
Average Weekday:	394	394	788
Weekday Morning Peak-Hour:	48	13	61
Weekday Evening Peak-Hour:	26	60	86
Average Saturday:	151	151	302
Saturday Midday Peak-Hour:	38	28	66

[a]Based on ITE LUC 720, *Medical-Dental Office Building.*

Project-Generated Traffic-Volume Summary

As can be seen in Table 5, the Project is expected to generate approximately 788 vehicle trips on an average weekday and 302 vehicle trips on a Saturday (both two way volumes over the operational day of the Project), with approximately 61 vehicle trips (48 vehicles entering and 13 exiting) expected during the weekday morning peak-hour, 86 vehicle trips (26 vehicles entering and 60 exiting) expected during the weekday evening peak-hour and 66 vehicle trips (38 vehicles entering and 28 exiting) expected during the Saturday midday peak-hour.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of generated trips to and from the Project site was determined based on a review of existing traffic patterns within the study area during the commuter peak periods. The general trip distribution for the Project is graphically depicted on Figure 5. Traffic volumes expected to be generated by the Project were assigned onto the study area roadway network as shown on Figure 6 for the weekday morning, weekday evening and Saturday midday peak hours.

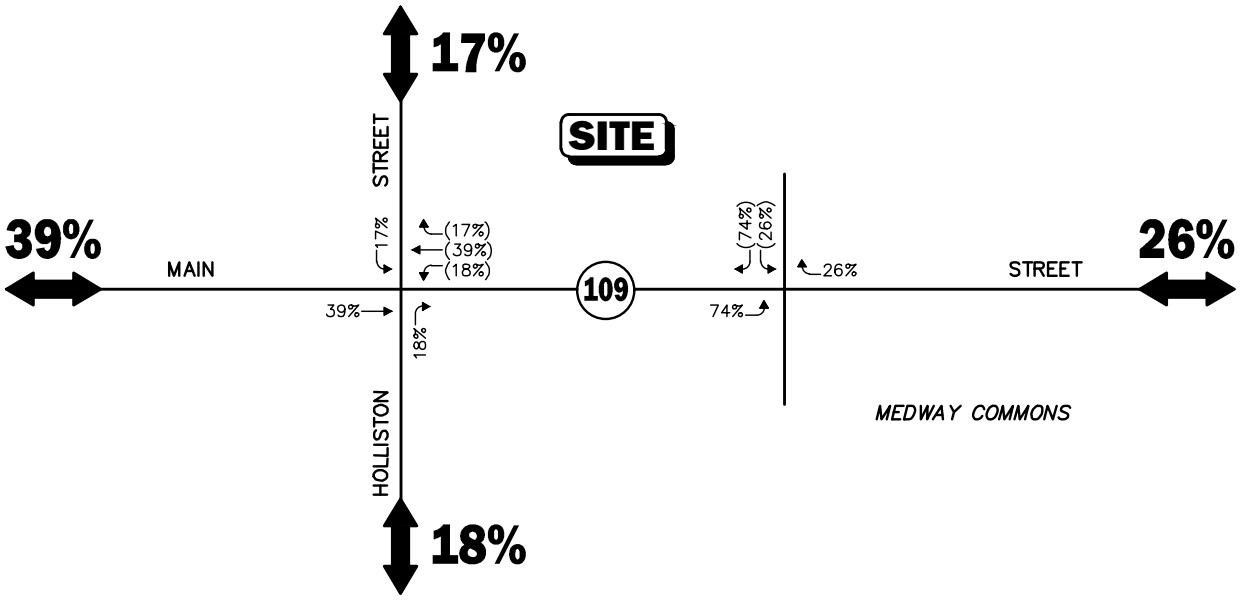
FUTURE TRAFFIC VOLUMES - BUILD CONDITION

The 2029 Build condition traffic volumes consist of the 2029 No-Build traffic volumes with the additional traffic expected to be generated by the Project added to them. The 2029 Build weekday morning, weekday evening and Saturday midday peak-hour traffic volumes are graphically depicted on Figure 7.

A summary of peak-hour projected traffic-volume changes outside of the study area that is the subject of this assessment is shown in Table 6. These changes are a result of the construction of the Project.

Legend:

XX	Entering Trips
(XX)	Exiting Trips



Not To Scale

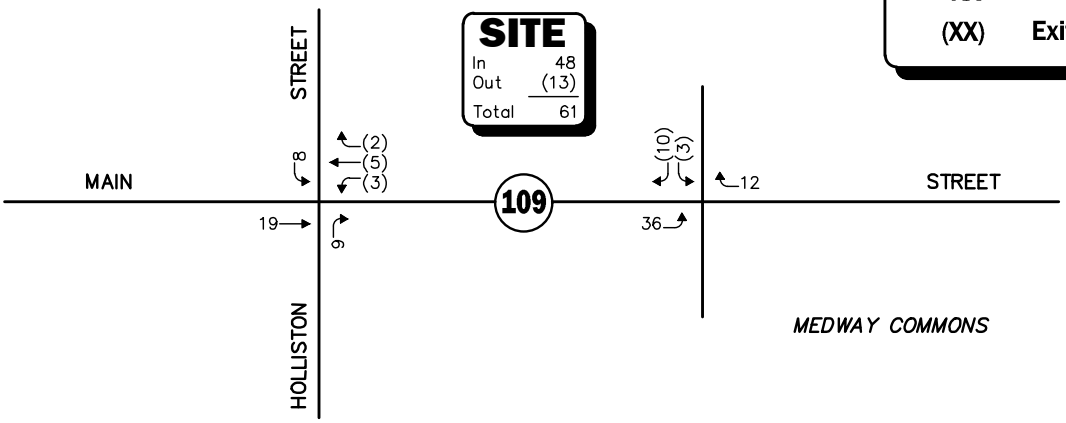
Figure 5

Trip Distribution Map

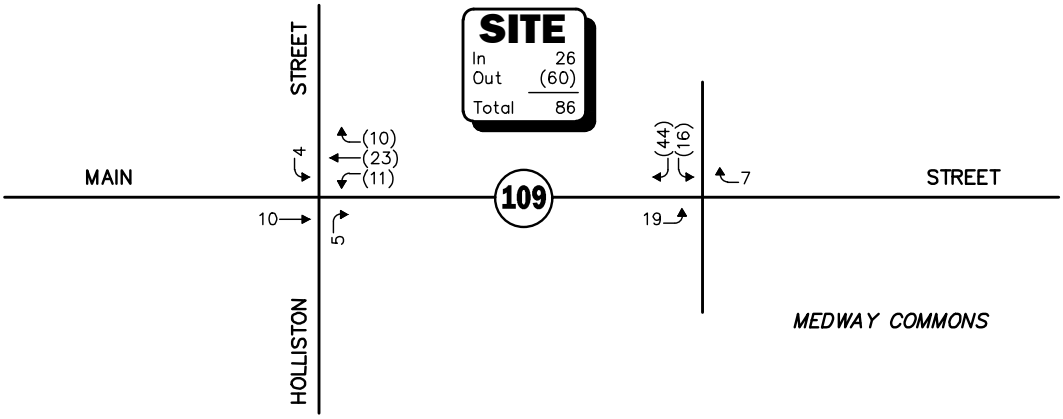
Vanasse & Associates inc

WEEKDAY MORNING PEAK HOUR (7:15 to 8:15 AM)

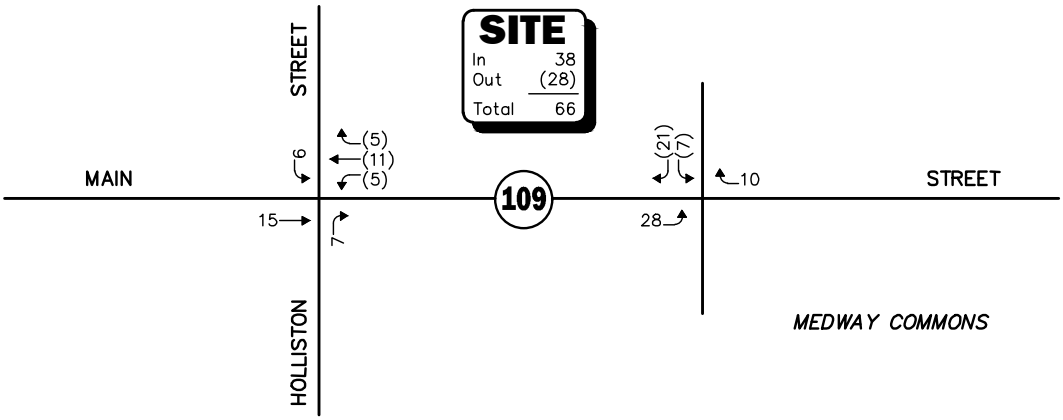
Legend:
XX Entering Trips
(XX) Exiting Trips



WEEKDAY EVENING PEAK HOUR (4:00 to 5:00 PM)



SATURDAY MIDDAY PEAK HOUR (11:00 AM to 12:00 PM)



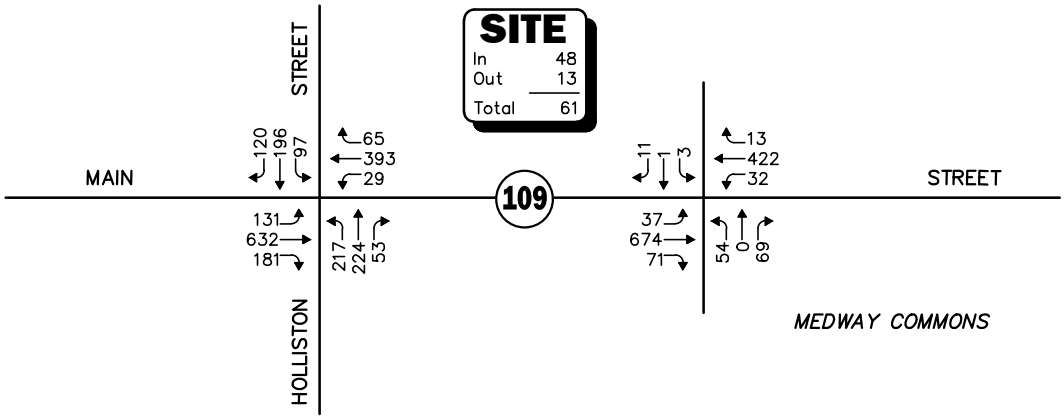
Not To Scale

Figure 6

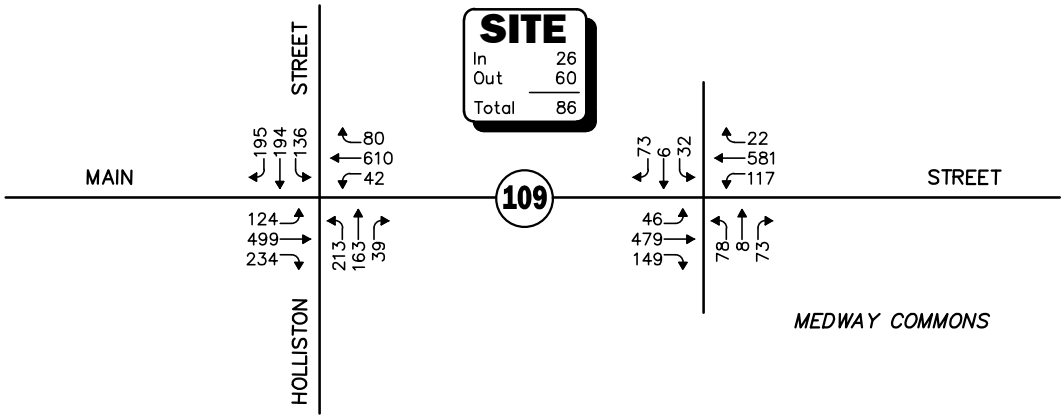
Project-Generated Peak-Hour Traffic Volumes

Vanasse & Associates inc

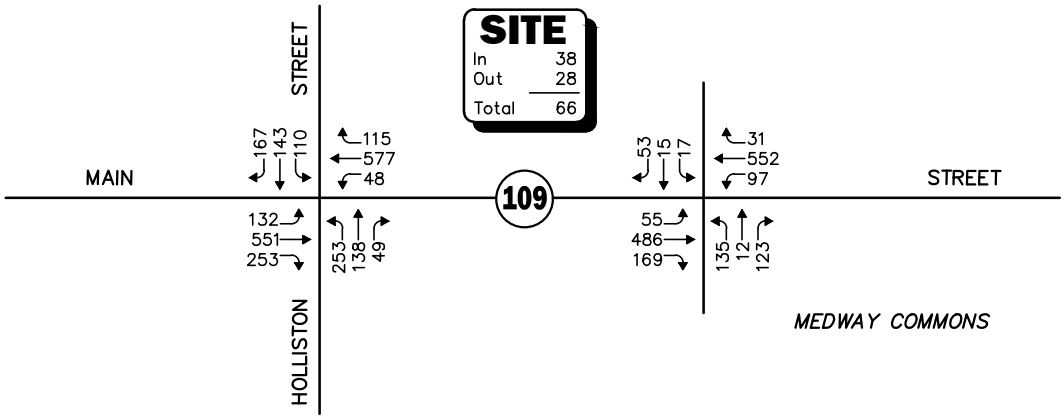
WEEKDAY MORNING PEAK HOUR (7:15 to 8:15 AM)



WEEKDAY EVENING PEAK HOUR (4:00 to 5:00 PM)



SATURDAY MIDDAY PEAK HOUR (11:00 AM to 12:00 PM)



Not To Scale

Figure 7

2029 Build
Peak-Hour Traffic Volumes

Vanasse & Associates inc

Table 6
PEAK-HOUR TRAFFIC-VOLUME INCREASES

Location/Peak Hour	2022 Existing	2029 No-Build	2029 Build	Traffic-Volume Increase Over No-Build	Percent Increase Over No-Build
Route 109, east of the Project site driveway:					
Weekday Morning	1,076	1,198	1,213	15	1.3
Weekday Evening	1,140	1,281	1,304	23	1.8
Saturday Midday	1,149	1,289	1,306	17	1.3
Route 109, west of Holliston Street:					
Weekday Morning	1,514	1,650	1,674	24	1.5
Weekday Evening	1,687	1,842	1,875	33	1.8
Saturday Midday	1,752	1,907	1,933	26	1.4
Holliston Street, north of Route 109:					
Weekday Morning	759	823	833	10	1.2
Weekday Evening	808	878	892	14	1.6
Saturday Midday	730	794	805	11	1.4
Holliston Street, south of Route 109:					
Weekday Morning	822	888	900	12	1.4
Weekday Evening	803	869	885	16	1.8
Saturday Midday	805	872	884	12	1.4

As shown in Table 6, Project-related traffic-volume increases outside of the study area relative to 2029 No-Build conditions are anticipated to range from 1.2 to 1.8 percent during the peak periods, with vehicle increases shown to range from 10 to 33 vehicles. ***When distributed over the peak hour, the predicted traffic-volume increases would not result in a significant impact (increase) on motorist delays or vehicle queuing outside of the immediate study area that is the subject of this assessment.***

TRAFFIC OPERATIONS ANALYSIS

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity and vehicle queue analyses were conducted under Existing, No-Build, and Build traffic-volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.[10] The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best operating conditions and LOS F representing congested or constrained operating conditions.

Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

[10]The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual;* Transportation Research Board; Washington, DC; 2010.

Signalized Intersections

The six levels of service for signalized intersections may be described as follows:

- *LOS A* describes operations with very low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than LOS A.
- *LOS C* describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with oversaturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of service for signalized intersections are calculated using the operational analysis methodology of the 2000 *Highway Capacity Manual*[11] and implemented as a part of the Synchro® 11 software as recommended by MassDOT. This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. Level-of-service designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. Table 7 summarizes the relationship between level of service and control delay. The tabulated control delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

[11] *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000.

Table 7
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS[a]

Level of Service	Control (Signal) Delay Per Vehicle (Seconds)
A	≤10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

[a]Source: *Highway Capacity Manual*, Transportation Research Board; Washington, DC; 2000; page 16-2.

Vehicle Queue Analysis

Vehicle queue analyses are a direct measurement of an intersection's ability to process vehicles under various traffic control and volume scenarios and lane use arrangements. The vehicle queue analysis was performed using the Synchro® intersection capacity analysis software which is based upon the methodology and procedures presented in the 2010 *Highway Capacity Manual*. The Synchro® vehicle queue analysis methodology is a simulation based model which reports the number of vehicles that experience a delay of six seconds or more at an intersection. For signalized intersections, Synchro® reports both the average (50th percentile) the 95th percentile vehicle queue. Vehicle queue lengths are a function of the capacity of the movement under study and the volume of traffic being processed by the intersection during the analysis period. The 95th percentile vehicle queue is the vehicle queue length that will be exceeded only 5 percent of the time, or approximately three minutes out of sixty minutes during the peak one hour of the day (during the remaining fifty-seven minutes, the vehicle queue length will be less than the 95th percentile queue length).

ANALYSIS RESULTS

Level-of-service and vehicle queue analyses were conducted for 2022 Existing, 2029 No-Build, and 2029 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Table 8, with the detailed analysis results presented in the Appendix.

The following is a summary of the level-of-service and vehicle queue analyses for the intersections within the study area. For context, we note that an LOS of "D" or better is generally defined as "acceptable" operating conditions. Project-related impacts at the study area intersections were identified as follows:

Table 8
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak Hour/Movement	2022 Existing				2029 No-Build				2029 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
Route 109 at Holliston Street												
Weekday Morning:												
Route 109 EB LT	0.33	12.6	B	2/3	0.38	13.1	B	2/3	0.39	13.3	B	2/3
Route 109 EB TH	0.84	33.5	C	11/21	0.91	39.4	D	12/24	0.97	51.1	D	19/25
Route 109 EB RT	0.13	0.2	A	0/0	0.14	0.2	A	0/0	0.14	0.2	A	0/0
Route 109 WB LT	0.11	16.3	B	1/1	0.17	16.5	B	1/1	0.17	16.8	B	1/1
Route 109 WB TH	0.55	25.9	C	5/7	0.62	25.9	C	6/8	0.63	25.9	C	6/8
Route 109 WB RT	0.04	0.0	A	0/0	0.05	0.1	A	0/0	0.05	0.1	A	0/0
Holliston Street NB LT	0.69	27.3	C	4/6	0.77	32.1	C	5/7	0.77	32.1	C	5/7
Holliston Street NB TH/RT	0.67	34.8	C	6/9	0.79	43.3	D	7/11	0.82	46.3	D	7/11
Holliston Street SB LT	0.39	26.9	C	2/3	0.46	27.2	C	2/3	0.51	27.5	C	2/3
Holliston Street SB TH	0.81	49.9	D	6/8	0.91	66.3	E	6/9	0.91	66.3	E	6/9
Holliston Street SB RT	0.10	22.1	C	0/1	0.11	22.6	C	0/1	0.11	22.6	C	0/1
Overall	**--**	**27.9**	**C**	**--**	**--**	**32.3**	**C**	**--**	--	**35.5**	**D**	**--**
Weekday Evening:												
Route 109 EB LT	0.35	12.9	B	2/2	0.43	14.8	B	2/3	0.44	15.1	B	2/3
Route 109 EB TH	0.52	18.7	B	6/12	0.60	21.3	C	9/13	0.60	21.3	C	9/14
Route 109 EB RT	0.14	0.2	A	0/0	0.15	0.2	A	0/0	0.15	0.2	A	0/0
Route 109 WB LT	0.07	10.7	B	1/1	0.09	10.9	B	1/1	0.13	11.6	B	1/1
Route 109 WB TH	0.72	24.0	C	9/12	0.79	26.5	C	8/13	0.81	27.2	C	10/13
Route 109 WB RT	0.04	0.0	A	0/0	0.05	0.1	A	0/0	0.06	0.1	A	0/0
Holliston Street NB LT	0.69	31.4	C	4/7	0.76	35.7	D	4/8	0.78	38.4	D	4/8
Holliston Street NB TH/RT	0.58	36.1	D	4/7	0.63	37.5	D	5/8	0.66	39.4	D	5/8
Holliston Street SB LT	0.42	26.8	C	2/4	0.50	27.4	C	3/5	0.53	28.0	C	3/5
Holliston Street SB TH	0.71	43.2	D	5/7	0.74	45.2	D	5/8	0.74	45.2	D	5/8
Holliston Street SB RT	0.14	24.4	C	0/2	0.23	24.9	C	1/3	0.24	25.0	C	1/3
Overall	**--**	**22.9**	**C**	**--**	**--**	**24.8**	**C**	**--**	**--**	**25.3**	**C**	**--**
Saturday Midday:												
Route 109 EB LT	0.39	13.5	B	2/3	0.47	15.4	B	2/4	0.48	15.9	B	2/4
Route 109 EB TH	0.66	20.9	C	9/16	0.72	23.1	C	11/21	0.74	24.0	C	12/22
Route 109 EB RT	0.16	0.2	A	0/0	0.18	0.2	A	0/0	0.18	0.2	A	0/0
Route 109 WB LT	0.12	14.0	B	1/1	0.16	14.9	B	1/1	0.18	15.2	B	1/2
Route 109 WB TH	0.79	29.2	C	10/19	0.85	33.7	C	12/22	0.86	34.8	C	13/23
Route 109 WB RT	0.07	0.1	A	0/0	0.08	0.1	A	0/0	0.08	0.1	A	0/0
Holliston Street NB LT	0.67	27.1	C	5/7	0.74	31.5	C	5/9	0.74	31.8	C	5/9
Holliston Street NB TH/RT	0.45	30.7	C	4/6	0.49	32.0	C	4/7	0.51	32.6	C	4/7
Holliston Street SB LT	0.29	25.0	C	2/3	0.34	26.0	C	2/3	0.37	26.3	C	2/4
Holliston Street SB TH	0.46	32.9	C	3/5	0.48	34.0	C	3/6	0.48	34.2	C	3/6
Holliston Street SB RT	0.11	20.4	C	0/2	0.17	21.6	C	1/3	0.18	21.8	C	1/3
Overall	**--**	**21.3**	**C**	**--**	**--**	**23.7**	**C**	**--**	**--**	**24.3**	**C**	**--**

See notes at end of table.

Table 8 (Continued)
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak Hour/Movement	2022 Existing				2029 No-Build				2029 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
Route 109 at the Project site driveway and the Medway Commons Driveway												
Weekday Morning:												
Route 109 EB LT	0.00	4.9	A	0/0	0.00	4.9	A	0/0	0.06	4.9	A	0/1
Route 109 EB TH	0.52	7.4	A	5/6	0.57	7.4	A	4/5	0.57	8.0	A	4/11
Route 109 EB RT	0.05	9.0	A	0/0	0.05	9.0	A	0/0	0.05	9.0	A	0/0
Route 109 WB LT	0.07	3.7	A	0/1	0.08	4.1	A	0/1	0.08	4.2	A	0/1
Route 109 WB TH/RT	0.31	5.4	A	2/7	0.36	5.7	A	3/7	0.39	6.8	A	5/8
Medway Commons driveway NB LT/TH	0.42	38.5	D	2/3	0.44	38.9	D	2/3	0.45	39.1	D	2/3
Medway Commons driveway NB RT	0.06	35.2	D	0/1	0.06	35.5	D	0/1	0.06	35.5	D	0/1
Project site driveway SB LT	0.00	0.0	A	0/0	0.00	0.0	A	0/0	0.04	35.4	D	0/1
Project site driveway SB TH/RT	0.01	34.9	C	0/0	0.01	35.2	D	0/0	0.02	35.3	D	0/1
Overall	**--**	**10.3**	**B**	**--**	**--**	**10.3**	**B**	**--**	**--**	**10.8**	**B**	**--**
Weekday Evening:												
Route 109 EB LT	0.05	4.3	A	0/1	0.06	4.3	A	0/1	0.10	4.4	A	0/1
Route 109 EB TH	0.37	7.6	A	4/6	0.44	7.6	A	5/6	0.44	7.8	A	5/6
Route 109 EB RT	0.10	4.7	A	0/1	0.11	4.7	A	0/1	0.11	4.7	A	0/1
Route 109 WB LT	0.17	3.7	A	1/2	0.19	4.2	A	1/2	0.19	4.4	A	1/2
Route 109 WB TH/RT	0.42	8.1	A	4/11	0.47	8.7	A	4/13	0.49	8.7	A	8/13
Medway Commons driveway NB LT/TH	0.48	36.5	D	2/4	0.48	36.5	D	2/4	0.50	36.5	D	2/4
Medway Commons driveway NB RT	0.05	32.5	C	0/1	0.05	32.5	C	0/1	0.05	32.5	C	0/1
Project site driveway SB LT	0.10	32.9	C	1/1	0.10	32.9	C	1/1	0.18	33.3	C	1/2
Project site driveway SB TH/RT	0.05	32.5	C	0/1	0.05	32.5	C	0/1	0.08	32.5	C	0/2
Overall	**--**	**11.3**	**B**	**--**	**--**	**11.3**	**B**	**--**	**--**	**12.5**	**B**	**--**
Saturday Midday:												
Route 109 EB LT	0.09	9.1	A	0/1	0.10	9.4	A	0/1	0.20	9.9	A	1/1
Route 109 EB TH	0.58	14.7	B	6/11	0.64	15.6	B	7/13	0.64	15.7	B	7/13
Route 109 EB RT	0.16	11.3	B	1/2	0.17	11.3	B	1/3	0.17	11.3	B	1/3
Route 109 WB LT	0.22	6.8	A	1/2	0.24	7.4	A	1/2	0.24	7.8	A	1/2
Route 109 WB TH/RT	0.62	13.4	B	5/12	0.68	14.3	B	6/14	0.72	16.6	B	10/15
Medway Commons driveway NB LT/TH	0.56	21.9	C	3/5	0.58	24.1	C	3/5	0.60	24.5	C	3/5
Medway Commons driveway NB RT	0.10	17.4	B	0/1	0.10	18.9	B	0/1	0.10	18.9	B	0/1
Project site driveway SB LT	0.05	17.2	B	0/1	0.05	18.6	B	0/1	0.09	18.9	B	1/1
Project site driveway SB TH/RT	0.08	17.3	B	1/1	0.08	18.7	B	1/1	0.10	18.8	B	1/1
Overall	**--**	**14.5**	**B**	**--**	**--**	**15.4**	**B**	**--**	**--**	**16.2**	**B**	**--**

[a]Volume-to-capacity ratio.
[b]Control (signal) delay per vehicle in seconds.
[c]Level-of-Service.
[d]Queue length in vehicles based on 25-feet per vehicle.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Route 109 at Holliston Street

Overall operating conditions were shown to degrade from LOS C to a LOS D during the weekday morning peak-hour as a result of a predicted increase in overall average motorist delay of 3.2 seconds with the addition of Project-related traffic. Vehicle queues at the intersection were shown to increase by up to seven (7) vehicles with the addition of Project-related traffic. Independent of the Project, it was noted that through movements on the Holliston Street southbound approach are predicted to operate at capacity (i.e., LOS "E") during the weekday morning peak-hour under No-Build conditions.

Route 109 at the Project site driveway and the Medway Commons Driveway

No-change in overall level of service is predicted to occur over No-Build conditions; however, the addition of Project-related traffic was shown to result in an increase in average motorist delay (35.4 seconds) that caused a degradation in level-of-service for left-turn movements from the Project site driveway during the weekday morning peak-hour from LOS A to LOS D. Vehicle queues at the intersection were shown to increase by up to six (6) vehicles with the addition of Project-related traffic.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the Project site driveway intersection with Route 109 in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)[12] requirements. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, if the measured ISD is at least equal to the required SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 9 presents the measured SSD and ISD at the subject intersection.

[12] *A Policy on Geometric Design of Highway and Streets,* 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.

Table 9
SIGHT DISTANCE MEASUREMENTS[a]

Intersection/Sight Distance Measurement	Feet		
	Required Minimum (SSD)	Desirable (ISD)[b]	Measured
Route 109 at the Project Site Driveway			
Stopping Sight Distance:			
Route 109 approaching from the east	250	--	500+
Route 109 approaching from the west	250	--	500+
Intersection Sight Distance:			
Looking to the east from the Project Site Driveway	250	335	500+
Looking to the west from the Project Site Driveway	250	415	500+

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets,* 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018; and based on a 35 mph approach speed along Route 109.
[b]Values shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed. The critical gap for left-turn movements exiting the Project site driveway was increased by 0.5 seconds in order to account for the time to cross the left-turn lane along Route 109 westbound.

As can be seen in Table 9, the available lines of sight at the Project site driveway intersection with Route 109 exceed the recommended minimum sight distance to function in a safe (SSD) and efficient (ISD) manner based on a 35 mph approach speed along Route 109, which is 3 to 7 mph above the measured 85th percentile vehicle travel speed approaching the driveway (28/32 mph) and is consistent with the posted speed limit.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

VAI has conducted a TIA in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a medical office building to be located at 86 Holliston Street in Medway, Massachusetts. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE,[13] the Project is expected to generate approximately 788 vehicle trips on an average weekday and 302 vehicle trips on a Saturday (both two-way volumes over the operational day of the Project), with approximately 61 vehicle trips expected during the weekday morning peak-hour, 86 vehicle trips expected during the weekday evening peak-hour and 66 vehicle trips expected during the Saturday midday peak-hour;

2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition), with overall intersection operations maintained at LOS D or better, where an LOS of "D" or better is defined as "acceptable" traffic operations;

3. All movements at the Project site driveway intersection with Main Street (Route 109) were shown to operate at a LOS D or better during the peak hours, with vehicle queue increases attributable to the Project shown to range from 0 to 6 vehicles (Route 109 eastbound approach);

4. The study area intersections were found to have a motor vehicle crash rate that is below the MassDOT Highway Division District 3 average crash rate for similar intersections, but above the MassDOT statewide average crash rate. A Road Safety Audit (RSA) has been conducted at the Route 109/Holliston Street intersection and the majority of the improvements recommended therein have been completed;[14] and

[13] Ibid 1.
[14] Ibid 2.

5. Lines of sight to and from the Project site driveway intersection were found to exceed the recommended minimum distances for safe and efficient operation based on the appropriate approach speed.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with implementation of the recommendations that follow.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

Project Access

Access to the Project will be provided by way of the existing driveway that serves the abutting commercial property (Walgreens Pharmacy) and intersects the north side of Route 109 opposite the Medway Commons driveway. The intersection operates under traffic signal control. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation, many of which are reflected on the site plans:

- The shared (with Walgreens) access driveway should continue to provide two (2) exiting travel lanes (left-turn lane and a through/right-turn lane) and a two (2) entering travel lanes, with exiting traffic under traffic signal control. The individual driveways that will serve the Project site and internal circulating aisles should be a minimum of 24 feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle as defined by the Medway Fire Department.

- Where perpendicular parking is proposed, the drive aisle behind the parking should be a minimum of 23 feet in order to facilitate parking maneuvers.

- All signs and pavement markings to be installed within the Project site will conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).[15]

- A sidewalk is proposed within the Project site that will extend to the existing sidewalk along the north side of Route 109. Pedestrian crossings that are constructed in conjunction with the Project will include marked crosswalks with Americans with Disabilities Act (ADA) compliant wheelchair ramps.

- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of the Project site driveway should be designed and maintained so as not to restrict lines of sight.

- Snow accumulations (windrows) within the sight triangle areas of the Project site driveway should be promptly removed where such accumulations would impede sight lines.

[15] Ibid 3.

- Electric vehicle (EV) charging stations are provided in accordance with the Town of Medway Zoning Bylaw.

Transportation Demand Management

Regularly scheduled public transportation services are not currently provided in the immediate vicinity of the Project site. To the south of the Project site, GATRA operates fixed route bus service along Holliston Street by way of the Medway T Shuttle, with a stop at the Medway Middle School, an approximate 13 minute walking distance from the Project site. In addition, GATRA provides Dial-a-Ride paratransit services to eligible persons that cannot use fixed-route transit all or some of the time due to a physical, cognitive or mental disability in compliance with the ADA.

In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles (SOVs), the following Transportation Demand Management (TDM) measures will be implemented as a part of the Project:

- A transportation coordinator will be assigned for the Project to coordinate the TDM program;
- A "welcome packet" will be provided to employees detailing available public transportation services, bicycle and walking alternatives, and commuter options, and should include the contact information for the transportation coordinator;
- Specific amenities will be provided to discourage off-site trips, including providing a break-room equipped with a microwave and refrigerator; offering direct deposit of paychecks; and other such measures to reduce overall traffic volumes and travel during peak traffic volume periods;
- Pedestrian accommodations are incorporated within the Project site; and
- Secure bicycle parking has been provided within the Project site.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing transportation system.

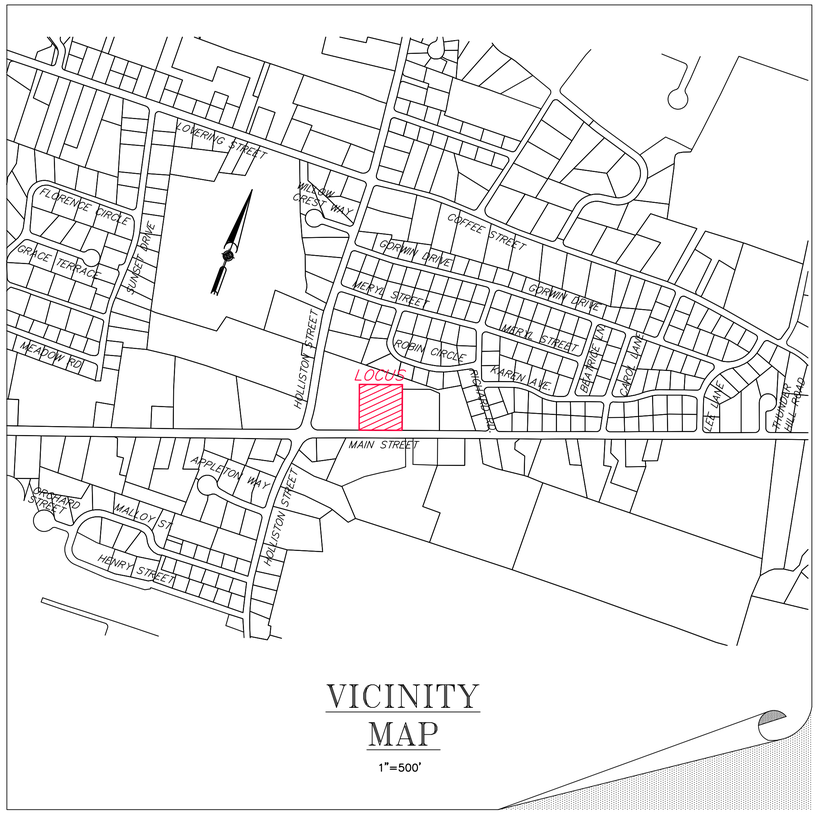
APPENDIX

PROJECT SITE PLAN
AUTOMATIC TRAFFIC RECORDER COUNT DATA
MANUAL TURNING MOVEMENT COUNT DATA
SEASONAL ADJUSTMENT DATA
COVID-19 ADJUSTMENT DATA
VEHICLE TRAVEL SPEED DATA
MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAPPING
GENERAL BACKGROUND TRAFFIC GROWTH
BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS
TRIP-GENERATION CALCULATIONS
SIGHT DISTANCE CALCULATIONS
CAPACITY ANALYSIS WORKSHEETS

PROJECT SITE PLAN

SITE PLAN
86 HOLLISTON STREET
MEDWAY
MASSACHUSETTS

INDEX



VICINITY MAP

1"=500'

WAIVERS REQUESTED

REQUEST FROM THE TOWN MEDWAY PLANNING BOARD
RULES AND REGULATIONS CHAPTER 200

1. SECTION 204–5 B SITE CONTEXT SHEET
2. SECTION 204–5 D.8 LANDSCAPE PLAN
3. SECTION 207–19 LANDSCAPING. B. LANDSCAPE BUFFERS (2)
4. SECTION 207–19 LANDSCAPING. C. PARKING AREAS (1a)
5. SECTION 207–19 LANDSCAPING. H.
6. SECTION 207–12 PARKING SPACE G. (3) LOCATION (a)

I, STEFANY OHANNESIAN, CLERK OF THE TOWN OF MEDWAY, RECEIVED AND RECORDED FROM THE PLANNING BOARD COVENANT APPROVAL OF THIS PLAN ON _____ AND NO APPEAL WAS TAKEN FOR TWENTY DAYS NEXT AFTER RECEIPT AND RECORDING OF SAME.

_____ _____
TOWN CLERK DATE

F4516

APPROVED DATE: _____

MEDWAY PLANNING BOARD

_____

_____

_____

_____

_____

_____

BEING A MAJORITY

LEGAL NOTES

UTILITIES ARE PLOTTED AS A COMPILATION OF RECORD DOCUMENTS, MARKINGS AND OTHER OBSERVED EVIDENCE TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES AND SHOULD BE CONSIDERED APPROXIMATE. LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. ADDITIONAL UTILITIES, NOT EVIDENCED BY RECORD DOCUMENTS OR OBSERVED PHYSICAL EVIDENCE, MAY EXIST. CONTRACTORS (IN ACCORDANCE WITH MASS.G.L. CHAPTER 82 SECTION 40 AS AMENDED) MUST CONTACT ALL UTILITY COMPANIES BEFORE EXCAVATING AND DRILLING AND CALL DIGSAFE AT 1(888)DIG–SAFE(7233).

CONSTRUCTION ON THIS LAND IS SUBJECT TO ANY EASEMENTS, RIGHTS–OF–WAY, RESTRICTIONS, RESERVATIONS, OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY AN EXAMINATION OF THE TITLE.

OWNER

FREIL REALTY II, LLC
DEED BOOK 27992 PAGE 300
PLAN BK. 515, PG 721 OF 2003
A.M. 41 LOT 8

APPLICANT

LOBISSER COMPANIES
1 CHARLESVIEW ROAD
HOPEDALE, MA 01747

SITE PLAN
86 HOLLISTON STREET
MEDWAY
MASSACHUSETTS

COVER SHEET

FEBRUARY 7, 2022

DATE	REVISION DESCRIPTION

GRAPHIC SCALE: 1"=30'

0 10 20 30 40 50 75 FEET
0 5 10 15 20 25 METERS

Guerriere & Halnon, Inc.
ENGINEERING & LAND SURVEYING
55 WEST CENTRAL ST. PH. (508) 528–3221
FRANKLIN, MA 02038 FX. (508) 528–7921
www.gandhengineering.com

SHEET 1 OF 13

JOB NO. F4516

ZONING DISTRICT
CENTRAL BUSINESS

	REQUIRED	PROPOSED
MIN. LOT AREA	10,000 SF	96,000 SF
MIN. LOT FRONTAGE	NA[1]	300.00'
MIN. YARD SETBACKS		
FRONT	10 FT	99'
SIDE	10 FT 25 FT*	58.4'
REAR	25 FT	83.0'
STRUCTURE COVERAGE	80%	22.8%
MAXIMUM IMPERVIOUS COVERAGE**	NA	NA
MINIMUM OPEN SPACE	15%	22.4%

*WHEN ABUTTING A RESIDENTIAL DISTRICT
[1]PROPERTIES IN THE CENTRAL BUSINESS DISTRICT THAT DO NOT HAVE FRONTAGE ON A PUBLIC STREET SHALL BE REQUIRED TO HAVE AN EASEMENT OF AT LEAST 30 FEET IN WIDTH PROVIDING ACCESS TO A PUBLIC STREET.

**MAXIMUM IMPERVIOUS COVERAGE IN A GROUND WATER PROTECTION DISTRICT: ANY USE THAT WILL RENDER IMPERVIOUS MORE THAN 15% OR 2500 SF. OF ANY LOT WHICHEVER IS GREATER.

NOTE

A SPECIAL PERMIT WILL BE REQUIRED BY THE PLANNING BOARD FOR IMPERVIOUS COVERAGE IN A GROUNDWATER PROTECTION DISTRICT

NEW LOT AREA = 96,000±SF.

EXISTING PAVEMENT = 10,263± SF.
PROPOSED BUILDING = 21,900± SF.
PROPOSED PAVEMENT = 42,355± SF.

TOTAL IMPERVIOUS = 74,518± SF.
(77.6%)

LEGEND

⊞	CATCH BASIN	☼	LIGHT POLE
Ⓓ	DRAIN MANHOLE		UTILITY POLE
Ⓔ	ELECTRIC MANHOLE		GUY WIRE
Ⓢ	SEWER MANHOLE		SIGN
○	MANHOLE	•	WETFLAG
GV ⋈	GAS VALVE		UTILITY POLE
	GAS SHUT OFF VALVE	☼	PROP. STREET LIGHTING
WV ⋈	WATER VALVE		
	WATER SHUT OFF VALVE	x 000.0	SPOT ELEVATION
	FIRE HYDRANT		RIPRAP
——— 000 ———	EXISTING CONTOUR		
——— D ———	EXISTING DRAIN LINE		
——— W ———	EXISTING WATER LINE		

PARKING NOTES

ZONED: CENTRAL BUSINESS
PARKING REQUIREMENTS PER ZONING:
TABLE 3. SCHEDULE OF OFF STREET PARKING REQUIREMENTS

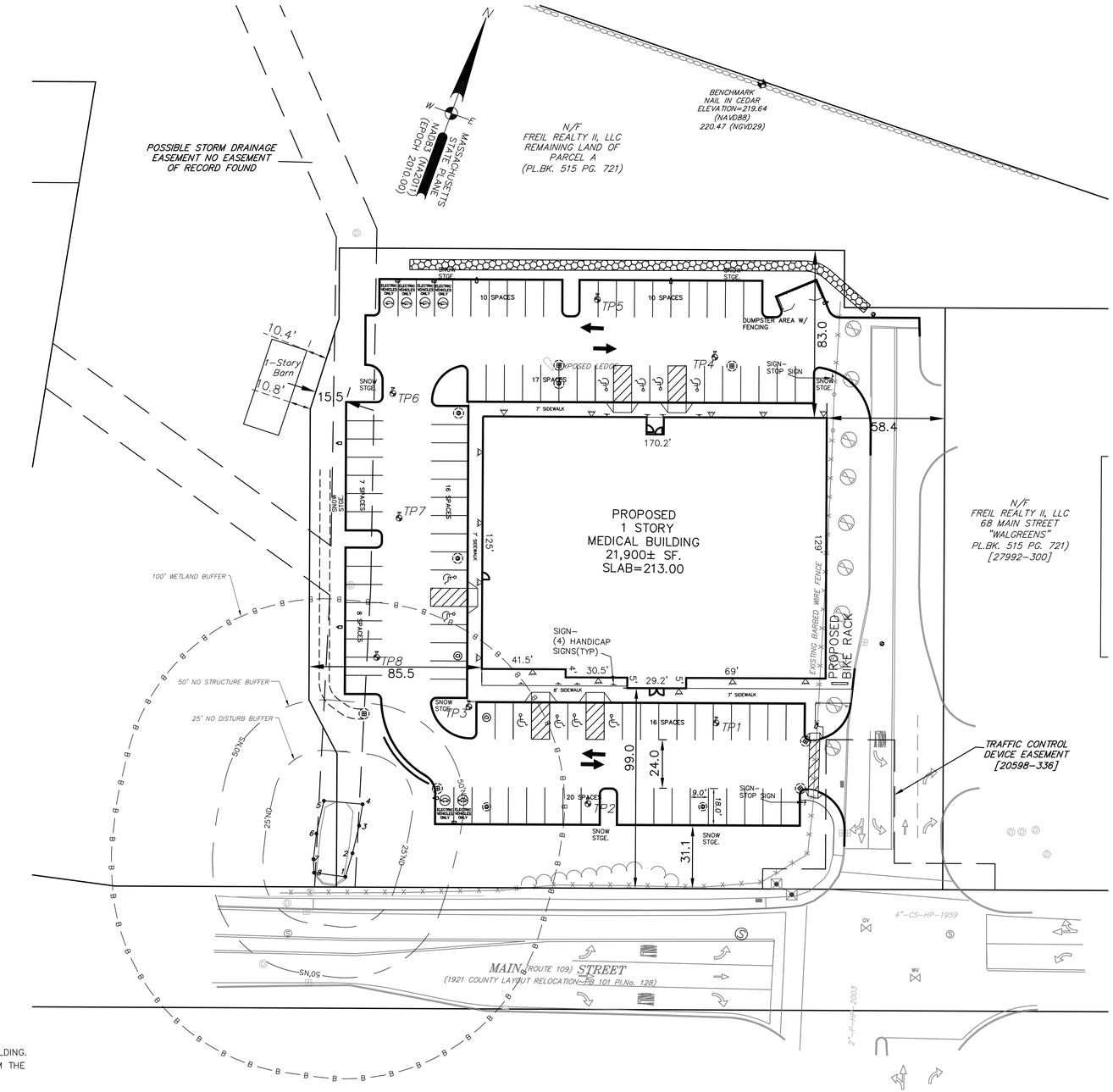
MEDICAL OFFICE OR CLINIC:
1 SPACE PER 300 SF. = 67 SPACES REQUIRED
PARKING SPACES PROVIDED = 109 SPACES

TYPICAL PARKING SPACE: 18' X 9'

A SPECIAL PERMIT WILL BE REQUIRED BY THE PLANNING BOARD FOR PARKING LOCATED WITHIN THE FRONT YARD SETBACK.

SECTION 7. GENERAL REGULATIONS

7.1.1. OFF STREET PARKING AND LOADING
K.(4) SPECIAL PARKING TYPES AND STANDARDS;
FRONTAGE PARKING– BY SPECIAL PERMIT, BY THE BOARD TO ALLOW A LIMITED AMOUNT OF OFFSTREET SURFACE PARKING TO BE PLACED BETWEEN A PUBLIC STREET AND THE STREET FACING FACADE OF A PRIMARY BUILDING. WHERE THIS IS PERMITTED BY THE BOARD, THE PARKING AREA WILL BE SETBACK A MINIMUM OF TWENTY FEET FROM THE STREET LINE AND STREETSCAPE TREATMENT.



F4516

APPROVED DATE:

MEDWAY PLANNING BOARD

BEING A MAJORITY

LEGAL NOTES

UTILITIES ARE PLOTTED AS A COMPILATION OF RECORD DOCUMENTS, MARKINGS AND OTHER OBSERVED EVIDENCE TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES AND SHOULD BE CONSIDERED APPROXIMATE. LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. ADDITIONAL UTILITIES, NOT EVIDENCED BY RECORD DOCUMENTS OR OBSERVED PHYSICAL EVIDENCE, MAY EXIST. CONTRACTORS (IN ACCORDANCE WITH MASS.G.L. CHAPTER 82 SECTION 40 AS AMENDED) MUST CONTACT ALL UTILITY COMPANIES BEFORE EXCAVATING AND DRILLING AND CALL DIGSAFE AT 1(888)DIG–SAFE[72233].

CONSTRUCTION ON THIS LAND IS SUBJECT TO ANY EASEMENTS, RIGHTS–OF–WAY, RESTRICTIONS, RESERVATIONS, OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY AN EXAMINATION OF THE TITLE.

OWNER

FREIL REALTY II, LLC
DEED BOOK 27992 PAGE 300
PLAN BK. 515, PG 721 OF 2003
A.M. 41 LOT 8

APPLICANT

LOBISSER COMPANIES
1 CHARLESVIEW ROAD
HOPEDALE, MA 01747

SITE PLAN
86 HOLLISTON STREET
MEDWAY
MASSACHUSETTS

LAYOUT PLAN

FEBRUARY 7, 2022

DATE	REVISION DESCRIPTION

GRAPHIC SCALE: 1"=30'

0 10 20 30 40 50 75 FEET
0 5 10 15 20 25 METERS

Guerriere & Halnon, Inc.
ENGINEERING & LAND SURVEYING
55 WEST CENTRAL ST. PH. (508) 528–3221
FRANKLIN, MA 02038 FX. (508) 528–7921
www.gandhengineering.com

SHEET 5 OF 13 | JOB NO. F4516

AUTOMATIC TRAFFIC RECORDER COUNT DATA

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA

2/17/2022	EB,		Hour Totals		WB,		Hour Totals		Combined Totals	
Time	Morning	Afternoon	Morning	Afternon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	2	121			6	98				
12:15	1	130			3	105				
12:30	2	108			7	108				
12:45	2	154	7	513	6	103	22	414	29	927
1:00	1	110			2	81				
1:15	4	108			4	113				
1:30	0	130			1	101				
1:45	2	95	7	443	3	89	10	384	17	827
2:00	1	120			3	83				
2:15	4	109			1	103				
2:30	1	125			1	111				
2:45	0	129	6	483	2	97	7	394	13	877
3:00	1	106			10	103				
3:15	0	156			0	104				
3:30	6	123			0	115				
3:45	5	135	12	520	4	95	14	417	26	937
4:00	5	139			4	100				
4:15	12	119			2	102				
4:30	17	119			3	106				
4:45	34	123	68	500	9	88	18	396	86	896
5:00	28	124			6	94				
5:15	38	125			22	91				
5:30	65	118			13	101				
5:45	80	109	211	476	28	106	69	392	280	868
6:00	105	109			37	99				
6:15	126	90			42	105				
6:30	147	86			51	99				
6:45	142	78	520	363	67	81	197	384	717	747
7:00	133	82			68	90				
7:15	168	52			72	63				
7:30	149	60			75	79				
7:45	150	57	600	251	92	63	307	295	907	546
8:00	141	36			74	45				
8:15	133	57			97	53				
8:30	141	37			74	51				
8:45	138	34	553	164	88	40	333	189	886	353
9:00	108	35			97	41				
9:15	109	18			79	33				
9:30	111	15			79	33				
9:45	124	23	452	91	94	19	349	126	801	217
10:00	120	21			83	17				
10:15	102	21			80	16				
10:30	105	12			83	20				
10:45	121	15	448	69	89	21	335	74	783	143
11:00	99	7			97	12				
11:15	112	5			95	10				
11:30	136	7			86	7				
11:45	115	6	462	25	83	8	361	37	823	62
Total	3346	3898			2022	3502			5368	7400
Percent	46.2%	53.8%			36.6%	63.4%			42.0%	58.0%

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA

2/18/2022	EB,		Hour Totals		WB,		Hour Totals		Combined Totals	
Time	Morning	Afternoon	Morning	Afternon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	3	115			11	104				
12:15	5	127			9	94				
12:30	7	121			4	112				
12:45	1	111	16	474	10	103	34	413	50	887
1:00	1	127			3	111				
1:15	5	103			5	100				
1:30	5	129			2	102				
1:45	2	138	13	497	0	93	10	406	23	903
2:00	0	112			3	97				
2:15	2	112			3	117				
2:30	2	135			0	110				
2:45	1	139	5	498	1	118	7	442	12	940
3:00	0	130			13	106				
3:15	1	151			1	106				
3:30	3	143			3	95				
3:45	3	127	7	551	0	114	17	421	24	972
4:00	3	122			1	89				
4:15	11	128			1	111				
4:30	9	99			6	98				
4:45	33	118	56	467	3	94	11	392	67	859
5:00	29	121			7	106				
5:15	38	117			18	135				
5:30	54	122			13	115				
5:45	70	113	191	473	20	115	58	471	249	944
6:00	86	107			34	112				
6:15	128	104			37	122				
6:30	128	86			50	118				
6:45	144	77	486	374	61	101	182	453	668	827
7:00	148	86			55	101				
7:15	128	75			68	115				
7:30	134	52			79	63				
7:45	150	58	560	271	84	60	286	339	846	610
8:00	132	44			72	73				
8:15	143	54			85	47				
8:30	138	49			68	58				
8:45	139	43	552	190	75	32	300	210	852	400
9:00	117	32			82	49				
9:15	129	27			74	34				
9:30	110	19			87	33				
9:45	117	29	473	107	78	25	321	141	794	248
10:00	106	19			88	30				
10:15	98	33			81	30				
10:30	80	17			88	19				
10:45	100	20	384	89	97	17	354	96	738	185
11:00	120	14			101	17				
11:15	111	10			99	6				
11:30	129	13			101	16				
11:45	140	15	500	52	95	12	396	51	896	103
Total	3243	4043			1976	3835			5219	7878
Percent	44.5%	55.5%			34.0%	66.0%			39.8%	60.2%

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA

2/19/2022	EB,		Hour Totals		WB,		Hour Totals		Combined Totals	
Time	Morning	Afternoon	Morning	Afternon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	5	136			15	92				
12:15	7	115			11	108				
12:30	2	133			13	97				
12:45	7	121	21	505	5	94	44	391	65	896
1:00	6	119			7	110				
1:15	3	144			3	85				
1:30	3	132			3	103				
1:45	0	145	12	540	3	110	16	408	28	948
2:00	2	132			2	96				
2:15	5	136			3	111				
2:30	4	116			0	102				
2:45	1	128	12	512	1	121	6	430	18	942
3:00	0	105			2	106				
3:15	2	115			0	93				
3:30	2	117			2	116				
3:45	2	103	6	440	0	103	4	418	10	858
4:00	5	111			4	98				
4:15	7	105			0	93				
4:30	5	106			2	91				
4:45	10	109	27	431	4	92	10	374	37	805
5:00	10	87			4	99				
5:15	16	75			8	68				
5:30	18	98			11	89				
5:45	24	83	68	343	11	73	34	329	102	672
6:00	30	81			11	97				
6:15	21	63			21	78				
6:30	46	69			28	67				
6:45	41	65	138	278	19	61	79	303	217	581
7:00	52	46			29	60				
7:15	65	55			27	58				
7:30	57	60			46	50				
7:45	84	49	258	210	59	40	161	208	419	418
8:00	82	34			55	37				
8:15	77	33			68	36				
8:30	93	28			71	39				
8:45	109	37	361	132	72	27	266	139	627	271
9:00	95	42			87	27				
9:15	110	39			108	32				
9:30	99	20			75	29				
9:45	131	26	435	127	112	18	382	106	817	233
10:00	119	16			101	23				
10:15	118	25			109	19				
10:30	119	22			126	13				
10:45	144	19	500	82	101	19	437	74	937	156
11:00	112	12			125	16				
11:15	143	13			96	8				
11:30	147	11			102	21				
11:45	134	15	536	51	108	9	431	54	967	105
Total	2374	3651			1870	3234			4244	6885
Percent	39.4%	60.6%			36.6%	63.4%			38.1%	61.9%
Grand Total	8963	11592			5868	10571			14831	22163
Percent	43.6%	56.4%			35.7%	64.3%			40.1%	59.9%
ADT		ADT: 12,331		AADT: 12,331						

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA

2/14/2022	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Week Average	
Time	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,
12:00 AM	*	*	*	*	*	*	7	22	16	34	21	44	*	*	15	33
1:00	*	*	*	*	*	*	7	10	13	10	12	16	*	*	11	12
2:00	*	*	*	*	*	*	6	7	5	7	12	6	*	*	8	7
3:00	*	*	*	*	*	*	12	14	7	17	6	4	*	*	8	12
4:00	*	*	*	*	*	*	68	18	56	11	27	10	*	*	50	13
5:00	*	*	*	*	*	*	211	69	191	58	68	34	*	*	157	54
6:00	*	*	*	*	*	*	520	197	486	182	138	79	*	*	381	153
7:00	*	*	*	*	*	*	600	307	560	286	258	161	*	*	473	251
8:00	*	*	*	*	*	*	553	333	552	300	361	266	*	*	489	300
9:00	*	*	*	*	*	*	452	349	473	321	435	382	*	*	453	351
10:00	*	*	*	*	*	*	448	335	384	354	500	437	*	*	444	375
11:00	*	*	*	*	*	*	462	361	500	396	536	431	*	*	499	396
12:00 PM	*	*	*	*	*	*	513	414	474	413	505	391	*	*	497	406
1:00	*	*	*	*	*	*	443	384	497	406	540	408	*	*	493	399
2:00	*	*	*	*	*	*	483	394	498	442	512	430	*	*	498	422
3:00	*	*	*	*	*	*	520	417	551	421	440	418	*	*	504	419
4:00	*	*	*	*	*	*	500	396	467	392	431	374	*	*	466	387
5:00	*	*	*	*	*	*	476	392	473	471	343	329	*	*	431	397
6:00	*	*	*	*	*	*	363	384	374	453	278	303	*	*	338	380
7:00	*	*	*	*	*	*	251	295	271	339	210	208	*	*	244	281
8:00	*	*	*	*	*	*	164	189	190	210	132	139	*	*	162	179
9:00	*	*	*	*	*	*	91	126	107	141	127	106	*	*	108	124
10:00	*	*	*	*	*	*	69	74	89	96	82	74	*	*	80	81
11:00	*	*	*	*	*	*	25	37	52	51	51	54	*	*	43	47
Total	0	0	0	0	0	0	7244	5524	7286	5811	6025	5104	0	0	6852	5479
Day	0		0		0		12768		13097		11129		0		12331	
AM Peak							7:00	11:00	7:00	11:00	11:00	10:00			11:00	11:00
Volume							600	361	560	396	536	437			499	396
PM Peak							3:00	3:00	3:00	5:00	1:00	2:00			3:00	2:00
Volume							520	417	551	471	540	430			504	422
Comb Total	0		0		0		12768		13097		11129		0		12331	
ADT	ADT: 12,331		AADT: 12,331													

MANUAL TURNING MOVEMENT COUNT DATA

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 1

Groups Printed- Cars - Trucks

	Holliston St From North			Route 109 From East			Holliston St From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	17	31	20	6	51	8	30	25	4	16	119	45	372
07:15 AM	21	70	24	5	73	14	49	46	12	27	135	65	541
07:30 AM	13	34	27	7	61	13	54	53	14	22	119	25	442
07:45 AM	15	27	24	2	85	7	44	39	7	27	128	34	439
Total	66	162	95	20	270	42	177	163	37	92	501	169	1794
08:00 AM	23	32	25	3	73	10	33	48	2	32	120	26	427
08:15 AM	15	21	23	2	89	13	34	53	1	27	116	30	424
08:30 AM	25	18	30	2	83	10	28	31	4	28	109	23	391
08:45 AM	30	37	42	3	69	21	30	21	4	27	107	27	418
Total	93	108	120	10	314	54	125	153	11	114	452	106	1660
Grand Total	159	270	215	30	584	96	302	316	48	206	953	275	3454
Apprch %	24.7	41.9	33.4	4.2	82.3	13.5	45.3	47.4	7.2	14.4	66.5	19.2	
Total %	4.6	7.8	6.2	0.9	16.9	2.8	8.7	9.1	1.4	6	27.6	8	
Cars	148	259	212	29	570	93	297	305	46	203	922	265	3349
% Cars	93.1	95.9	98.6	96.7	97.6	96.9	98.3	96.5	95.8	98.5	96.7	96.4	97
Trucks	11	11	3	1	14	3	5	11	2	3	31	10	105
% Trucks	6.9	4.1	1.4	3.3	2.4	3.1	1.7	3.5	4.2	1.5	3.3	3.6	3

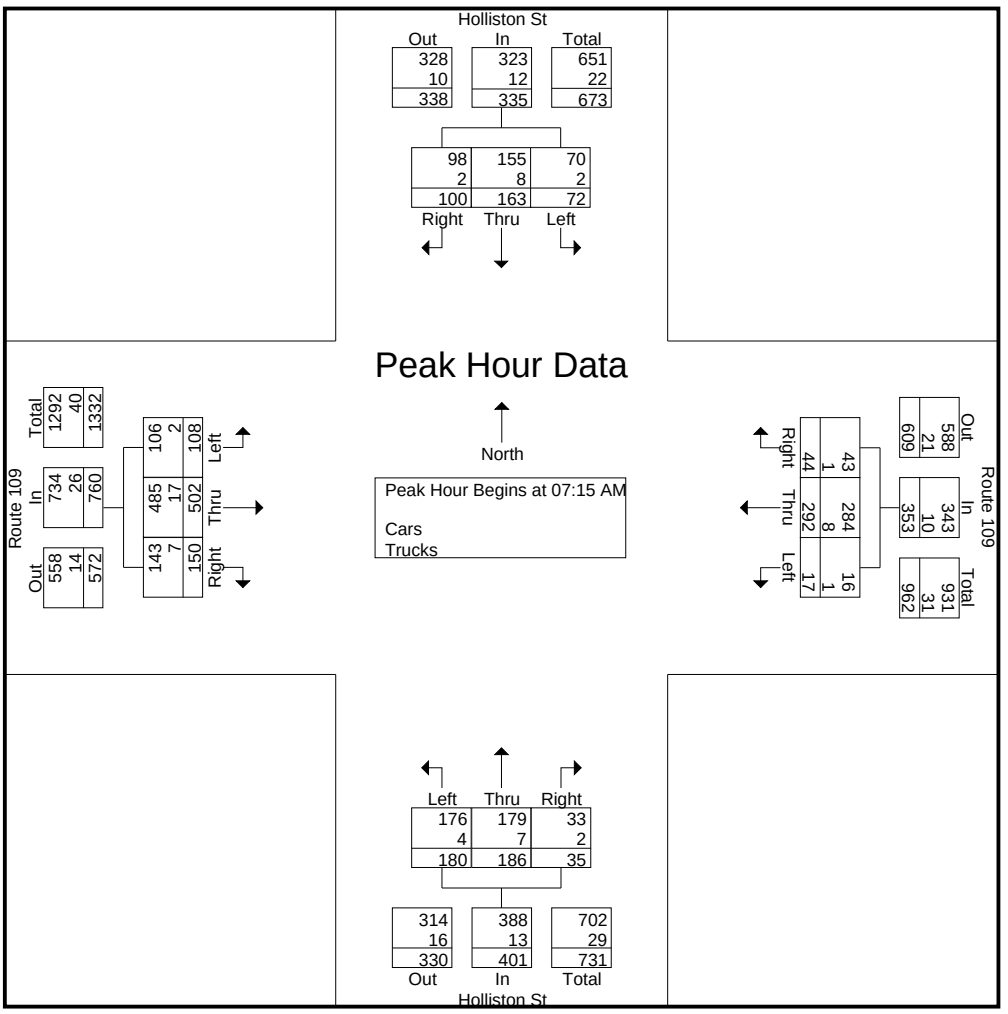
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	21	**70**	24	**115**	5	73	**14**	92	49	46	12	107	27	**135**	**65**	**227**	**541**
07:30 AM	13	34	**27**	74	**7**	61	13	81	**54**	**53**	**14**	**121**	22	119	25	166	442
07:45 AM	15	27	24	66	2	**85**	7	**94**	44	39	7	90	27	128	34	189	439
08:00 AM	**23**	32	25	80	3	73	10	86	33	48	2	83	**32**	120	26	178	427
Total Volume	72	163	100	335	17	292	44	353	180	186	35	401	108	502	150	760	1849
% App. Total	21.5	48.7	29.9		4.8	82.7	12.5		44.9	46.4	8.7		14.2	66.1	19.7		
PHF	.783	.582	.926	.728	.607	.859	.786	.939	.833	.877	.625	.829	.844	.930	.577	.837	.854
Cars	70	155	98	323	16	284	43	343	176	179	33	388	106	485	143	734	1788
% Cars	97.2	95.1	98.0	96.4	94.1	97.3	97.7	97.2	97.8	96.2	94.3	96.8	98.1	96.6	95.3	96.6	96.7
Trucks	2	8	2	12	1	8	1	10	4	7	2	13	2	17	7	26	61
% Trucks	2.8	4.9	2.0	3.6	5.9	2.7	2.3	2.8	2.2	3.8	5.7	3.2	1.9	3.4	4.7	3.4	3.3

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 2



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

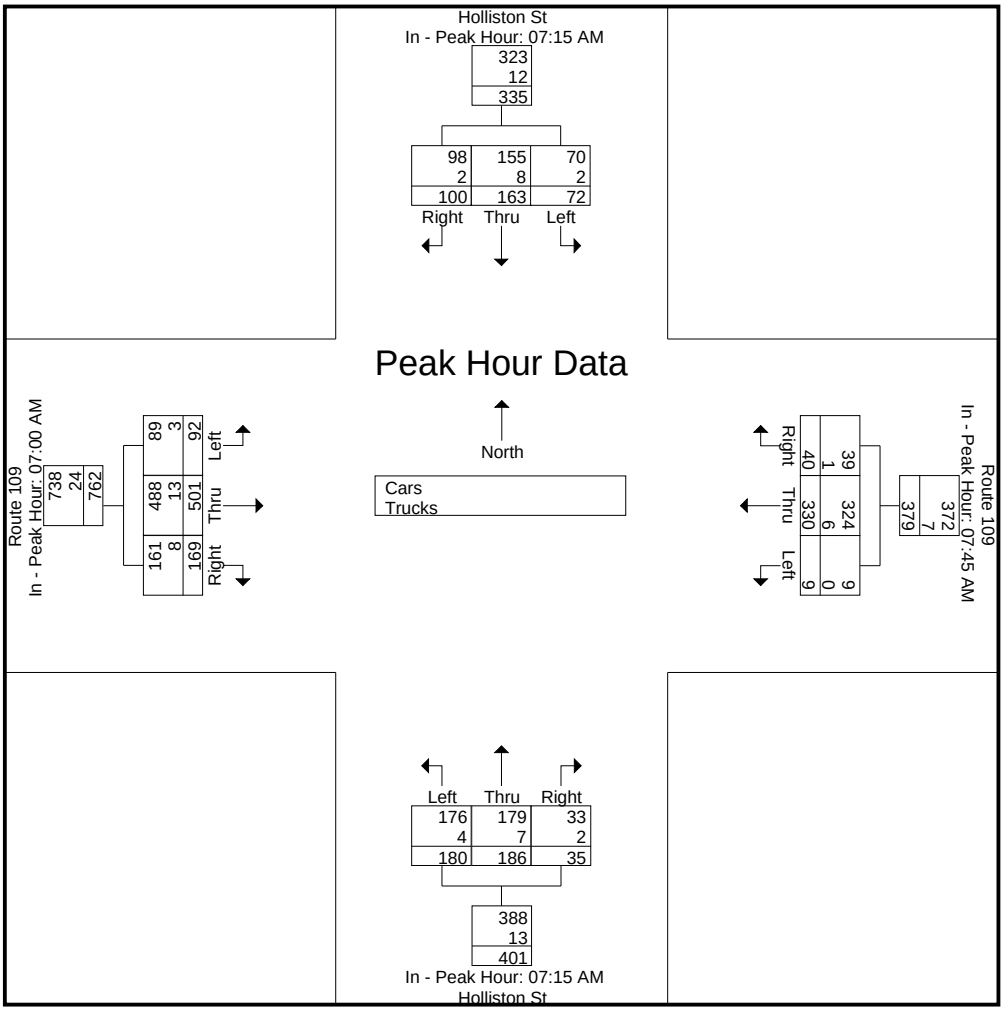
	07:15 AM				07:45 AM				07:15 AM				07:00 AM			
+0 mins.	21	**70**	24	**115**	2	85	7	94	49	46	12	107	16	119	45	180
+15 mins.	13	34	**27**	74	**3**	73	10	86	**54**	**53**	**14**	**121**	**27**	**135**	**65**	**227**
+30 mins.	15	27	24	66	2	**89**	**13**	**104**	44	39	7	90	22	119	25	166
+45 mins.	**23**	32	25	80	2	83	10	95	33	48	2	83	27	128	34	189
Total Volume	72	163	100	335	9	330	40	379	180	186	35	401	92	501	169	762
% App. Total	21.5	48.7	29.9		2.4	87.1	10.6		44.9	46.4	8.7		12.1	65.7	22.2	
PHF	.783	.582	.926	.728	.750	.927	.769	.911	.833	.877	.625	.829	.852	.928	.650	.839
Cars	70	155	98	323	9	324	39	372	176	179	33	388	89	488	161	738
% Cars	97.2	95.1	98	96.4	100	98.2	97.5	98.2	97.8	96.2	94.3	96.8	96.7	97.4	95.3	96.9
Trucks	2	8	2	12	0	6	1	7	4	7	2	13	3	13	8	24
% Trucks	2.8	4.9	2	3.6	0	1.8	2.5	1.8	2.2	3.8	5.7	3.2	3.3	2.6	4.7	3.1

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 4

Groups Printed- Cars

	Holliston St From North			Route 109 From East			Holliston St From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	17	31	20	6	50	8	29	24	4	15	116	42	362
07:15 AM	21	65	24	4	72	14	46	43	12	27	132	61	521
07:30 AM	13	33	26	7	60	12	53	51	13	20	117	25	430
07:45 AM	15	26	23	2	80	7	44	39	7	27	123	33	426
Total	66	155	93	19	262	41	172	157	36	89	488	161	1739
08:00 AM	21	31	25	3	72	10	33	46	1	32	113	24	411
08:15 AM	15	19	22	2	89	12	34	52	1	27	114	30	417
08:30 AM	18	17	30	2	83	10	28	29	4	28	105	23	377
08:45 AM	28	37	42	3	64	20	30	21	4	27	102	27	405
Total	82	104	119	10	308	52	125	148	10	114	434	104	1610
Grand Total	148	259	212	29	570	93	297	305	46	203	922	265	3349
Apprch %	23.9	41.8	34.2	4.2	82.4	13.4	45.8	47.1	7.1	14.6	66.3	19.1	
Total %	4.4	7.7	6.3	0.9	17	2.8	8.9	9.1	1.4	6.1	27.5	7.9	

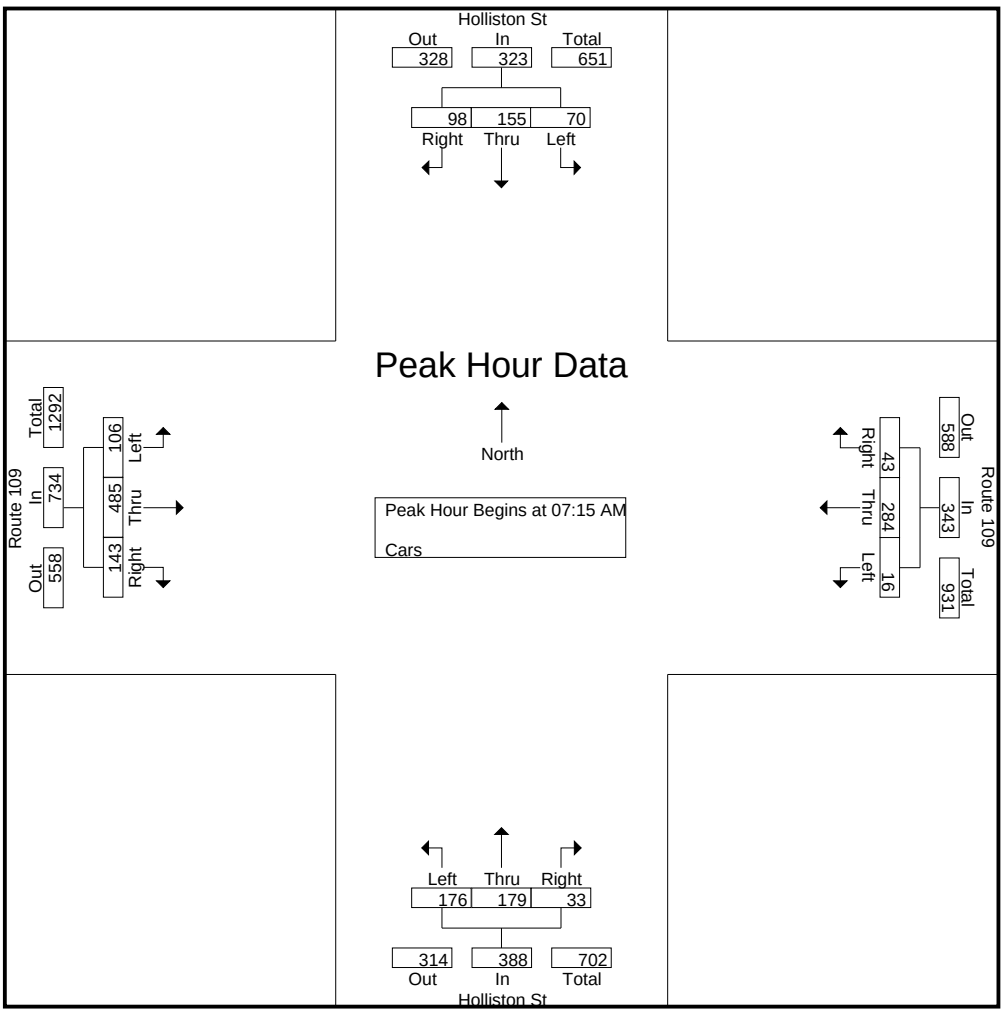
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**21**	**65**	24	**110**	4	72	**14**	**90**	46	43	12	101	27	**132**	**61**	**220**	**521**
07:30 AM	13	33	**26**	72	**7**	60	12	79	**53**	**51**	**13**	**117**	20	117	25	162	430
07:45 AM	15	26	23	64	2	**80**	7	89	44	39	7	90	27	123	33	183	426
08:00 AM	21	31	25	77	3	72	10	85	33	46	1	80	**32**	113	24	169	411
Total Volume	70	155	98	323	16	284	43	343	176	179	33	388	106	485	143	734	1788
% App. Total	21.7	48	30.3		4.7	82.8	12.5		45.4	46.1	8.5		14.4	66.1	19.5		
PHF	.833	.596	.942	.734	.571	.888	.768	.953	.830	.877	.635	.829	.828	.919	.586	.834	.858

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 5



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

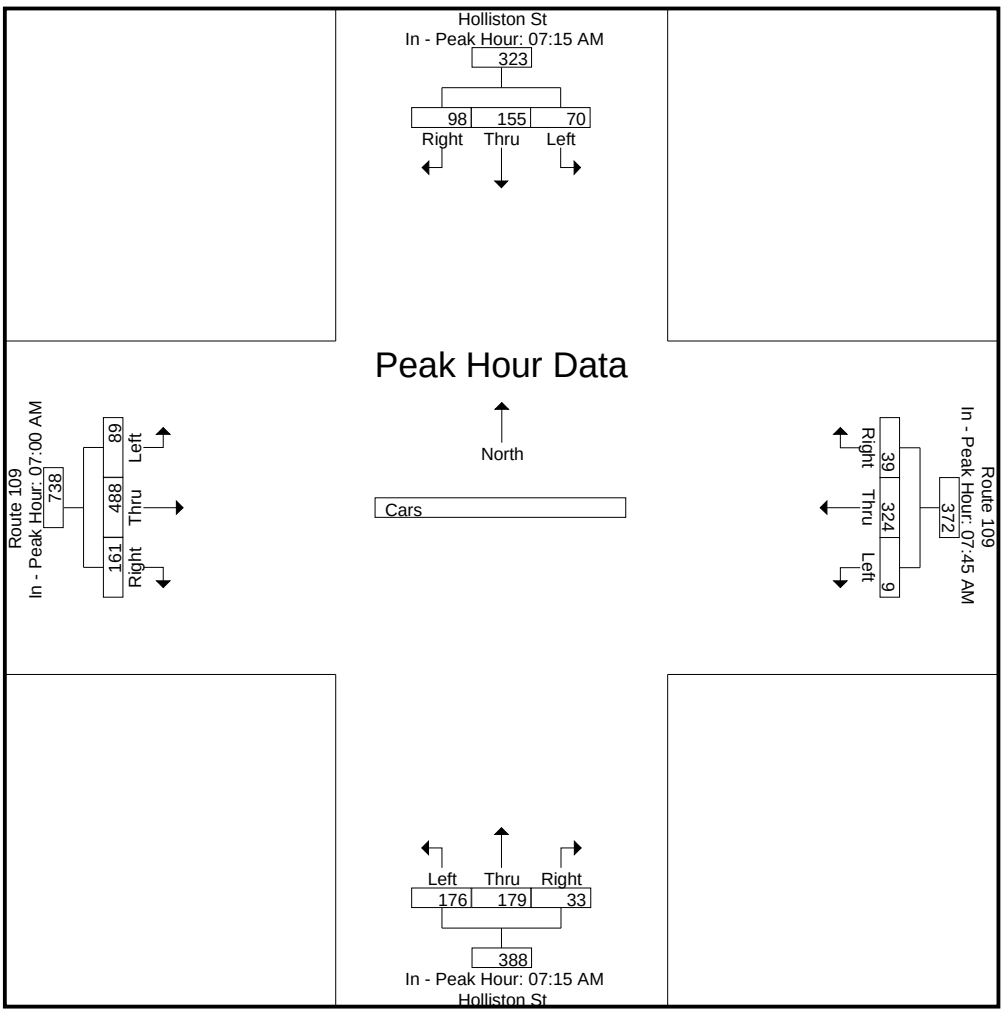
	07:15 AM				07:45 AM				07:15 AM				07:00 AM			
+0 mins.	**21**	**65**	24	**110**	2	80	7	89	46	43	12	101	15	116	42	173
+15 mins.	13	33	**26**	72	**3**	72	10	85	**53**	**51**	**13**	**117**	**27**	**132**	**61**	**220**
+30 mins.	15	26	23	64	2	**89**	**12**	**103**	44	39	7	90	20	117	25	162
+45 mins.	21	31	25	77	2	83	10	95	33	46	1	80	27	123	33	183
Total Volume	70	155	98	323	9	324	39	372	176	179	33	388	89	488	161	738
% App. Total	21.7	48	30.3		2.4	87.1	10.5		45.4	46.1	8.5		12.1	66.1	21.8	
PHF	.833	.596	.942	.734	.750	.910	.813	.903	.830	.877	.635	.829	.824	.924	.660	.839

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022

Groups Printed- Trucks

	Holliston St From North			Route 109 From East			Holliston St From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	1	0	1	1	0	1	3	3	10
07:15 AM	0	5	0	1	1	0	3	3	0	0	3	4	20
07:30 AM	0	1	1	0	1	1	1	2	1	2	2	0	12
07:45 AM	0	1	1	0	5	0	0	0	0	0	5	1	13
Total	0	7	2	1	8	1	5	6	1	3	13	8	55
08:00 AM	2	1	0	0	1	0	0	2	1	0	7	2	16
08:15 AM	0	2	1	0	0	1	0	1	0	0	2	0	7
08:30 AM	7	1	0	0	0	0	0	2	0	0	4	0	14
08:45 AM	2	0	0	0	5	1	0	0	0	0	5	0	13
Total	11	4	1	0	6	2	0	5	1	0	18	2	50
Grand Total	11	11	3	1	14	3	5	11	2	3	31	10	105
Apprch %	44	44	12	5.6	77.8	16.7	27.8	61.1	11.1	6.8	70.5	22.7	
Total %	10.5	10.5	2.9	1	13.3	2.9	4.8	10.5	1.9	2.9	29.5	9.5	

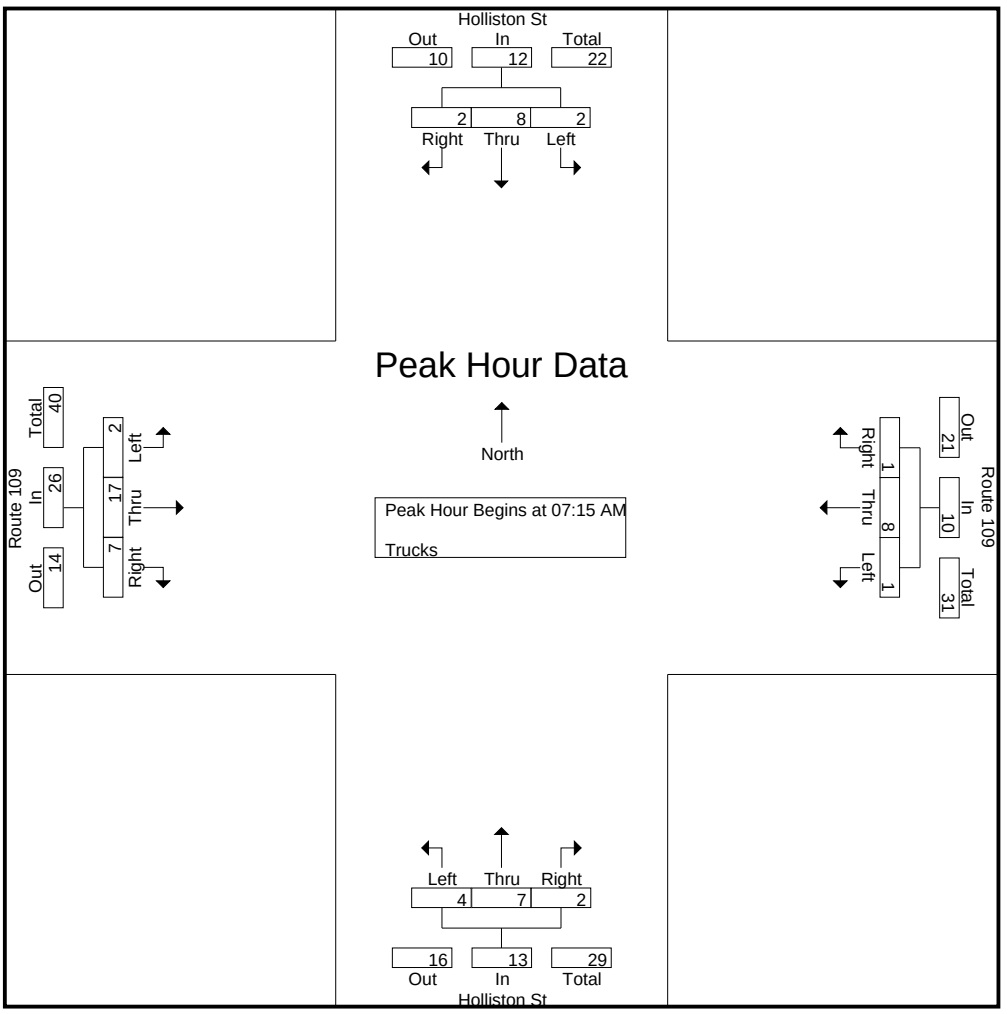
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	**5**	0	**5**	**1**	1	0	2	**3**	**3**	0	**6**	0	3	**4**	7	**20**
07:30 AM	0	1	**1**	2	0	1	**1**	2	1	2	**1**	4	**2**	2	0	4	12
07:45 AM	0	1	1	2	0	**5**	0	**5**	0	0	0	0	0	5	1	6	13
08:00 AM	**2**	1	0	3	0	1	0	1	0	2	1	3	0	**7**	2	**9**	16
Total Volume	2	8	2	12	1	8	1	10	4	7	2	13	2	17	7	26	61
% App. Total	16.7	66.7	16.7		10	80	10		30.8	53.8	15.4		7.7	65.4	26.9		
PHF	.250	.400	.500	.600	.250	.400	.250	.500	.333	.583	.500	.542	.250	.607	.438	.722	.763

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 8



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

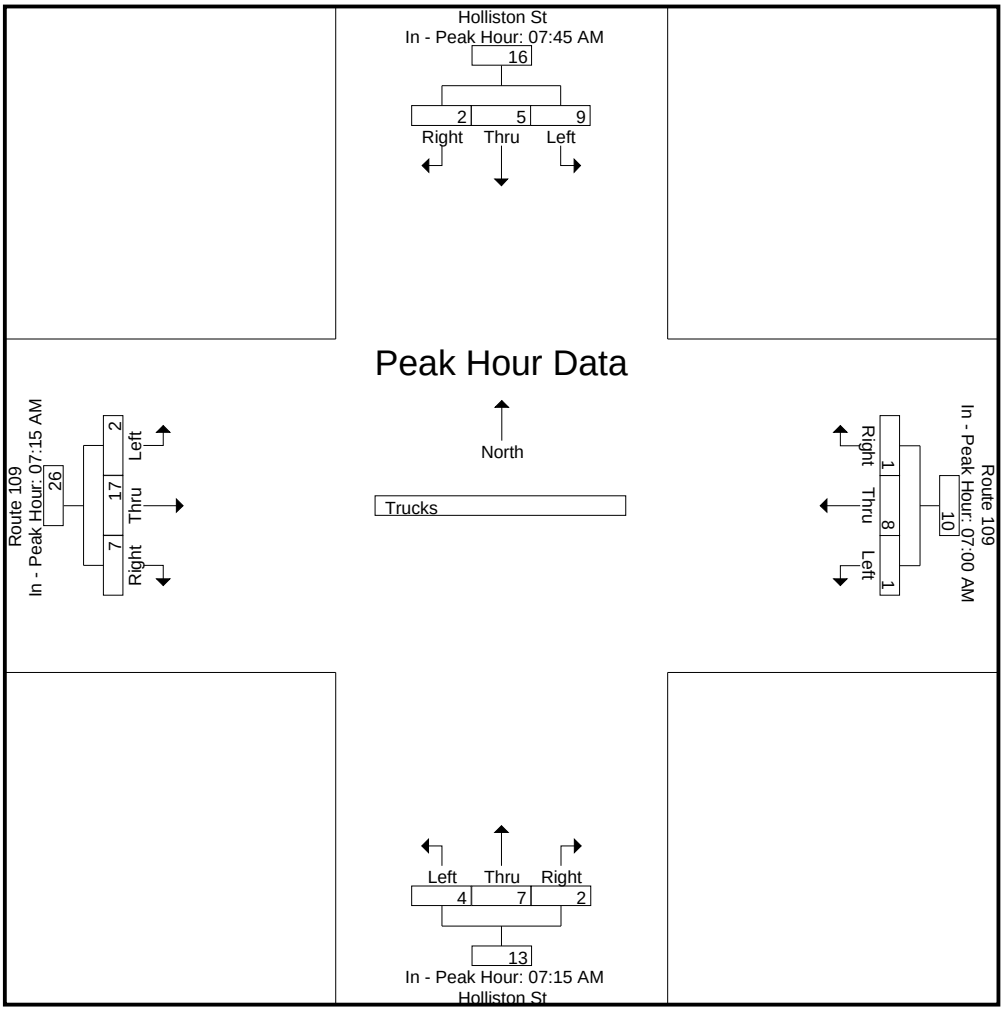
	07:45 AM				07:00 AM				07:15 AM				07:15 AM			
+0 mins.	0	1	**1**	2	0	1	0	1	**3**	**3**	0	**6**	0	3	**4**	7
+15 mins.	2	1	0	3	**1**	1	0	2	1	2	**1**	4	**2**	2	0	4
+30 mins.	0	**2**	1	3	0	1	**1**	2	0	0	0	0	0	5	1	6
+45 mins.	**7**	1	0	**8**	0	**5**	0	**5**	0	2	1	3	0	**7**	2	**9**
Total Volume	9	5	2	16	1	8	1	10	4	7	2	13	2	17	7	26
% App. Total	56.2	31.2	12.5		10	80	10		30.8	53.8	15.4		7.7	65.4	26.9	
PHF	.321	.625	.500	.500	.250	.400	.250	.500	.333	.583	.500	.542	.250	.607	.438	.722

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022

Groups Printed- Bikes Peds

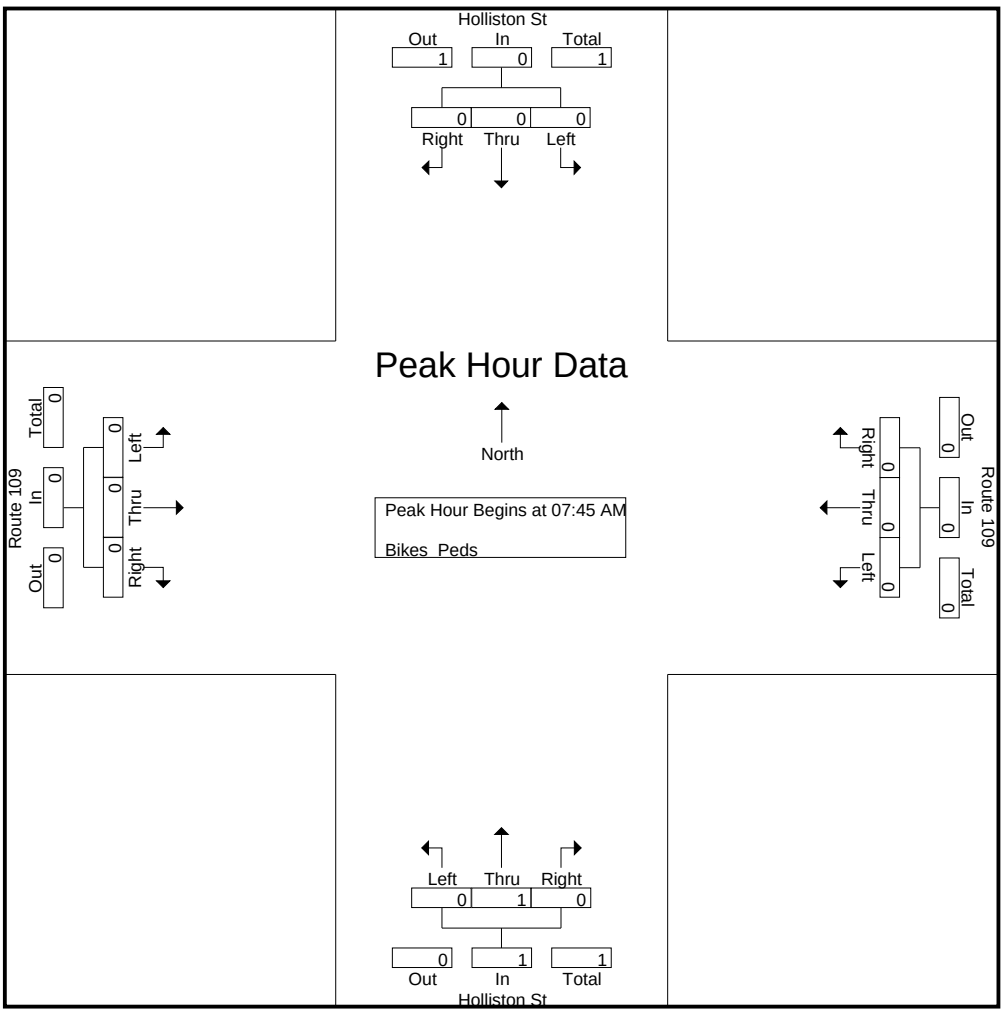
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Grand Total	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2
Apprch %	0	0	0		0	0	0		0	100	0		0	0	0				
Total %	0	0	0		0	0	0		0	100	0		0	0	0		50	50	

	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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 07:45 AM																	
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	**1**
Total Volume	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
% App. Total	0	0	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.250

Accurate Counts
978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 11



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

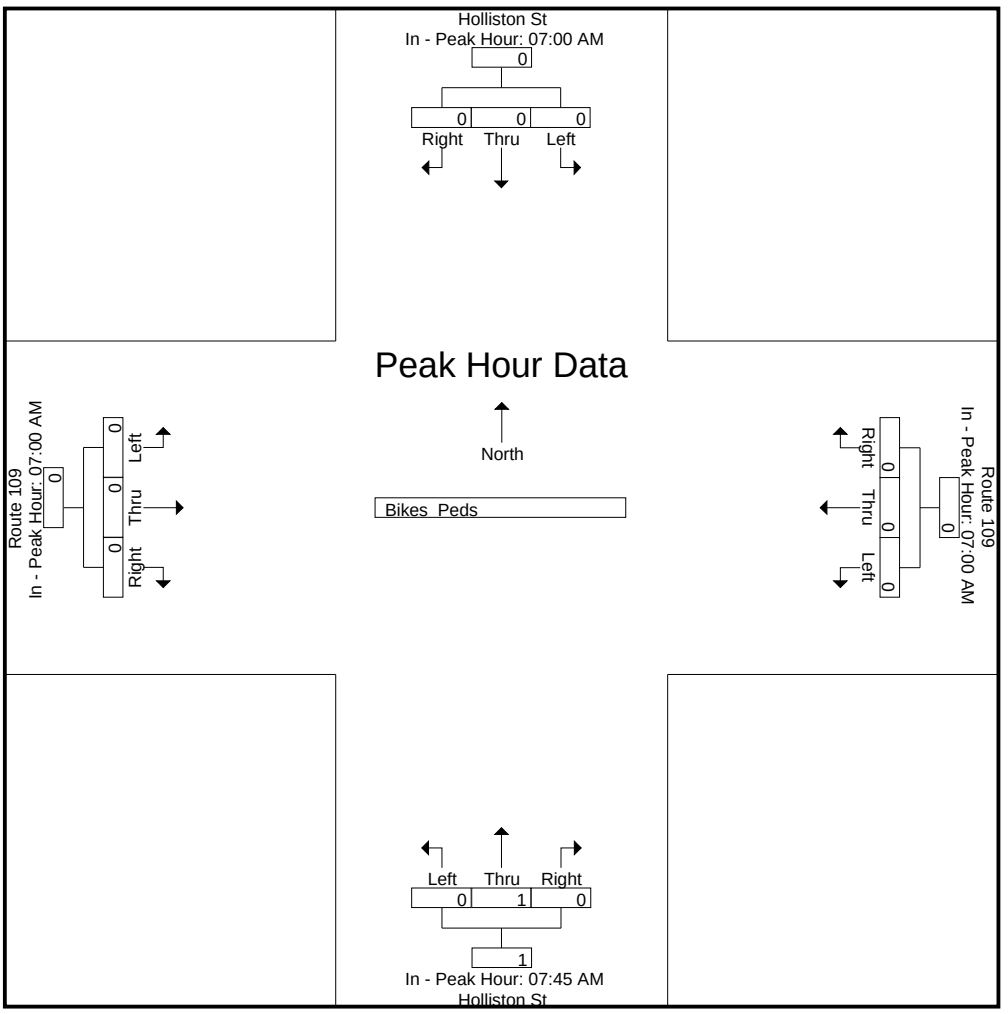
	07:00 AM				07:00 AM				07:45 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
% App. Total	0	0	0		0	0	0		0	100	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 1

Groups Printed- Cars - Trucks

	Holliston St From North			Route 109 From East			Holliston St From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	27	40	43	6	118	20	49	40	5	24	105	49	526
04:15 PM	25	31	32	7	119	9	49	28	4	31	96	42	473
04:30 PM	24	36	44	5	122	13	40	34	5	26	85	48	482
04:45 PM	25	54	43	5	114	12	39	33	9	22	95	55	506
Total	101	161	162	23	473	54	177	135	23	103	381	194	1987
05:00 PM	26	35	46	5	121	16	40	64	7	35	94	37	526
05:15 PM	24	34	51	7	99	14	42	34	5	21	92	46	469
05:30 PM	22	30	29	3	120	23	46	40	7	24	87	37	468
05:45 PM	13	31	18	3	113	20	35	23	3	19	93	40	411
Total	85	130	144	18	453	73	163	161	22	99	366	160	1874
Grand Total	186	291	306	41	926	127	340	296	45	202	747	354	3861
Apprch %	23.8	37.2	39.1	3.7	84.6	11.6	49.9	43.5	6.6	15.5	57.3	27.2	
Total %	4.8	7.5	7.9	1.1	24	3.3	8.8	7.7	1.2	5.2	19.3	9.2	
Cars	184	288	306	40	917	127	339	295	45	202	740	354	3837
% Cars	98.9	99	100	97.6	99	100	99.7	99.7	100	100	99.1	100	99.4
Trucks	2	3	0	1	9	0	1	1	0	0	7	0	24
% Trucks	1.1	1	0	2.4	1	0	0.3	0.3	0	0	0.9	0	0.6

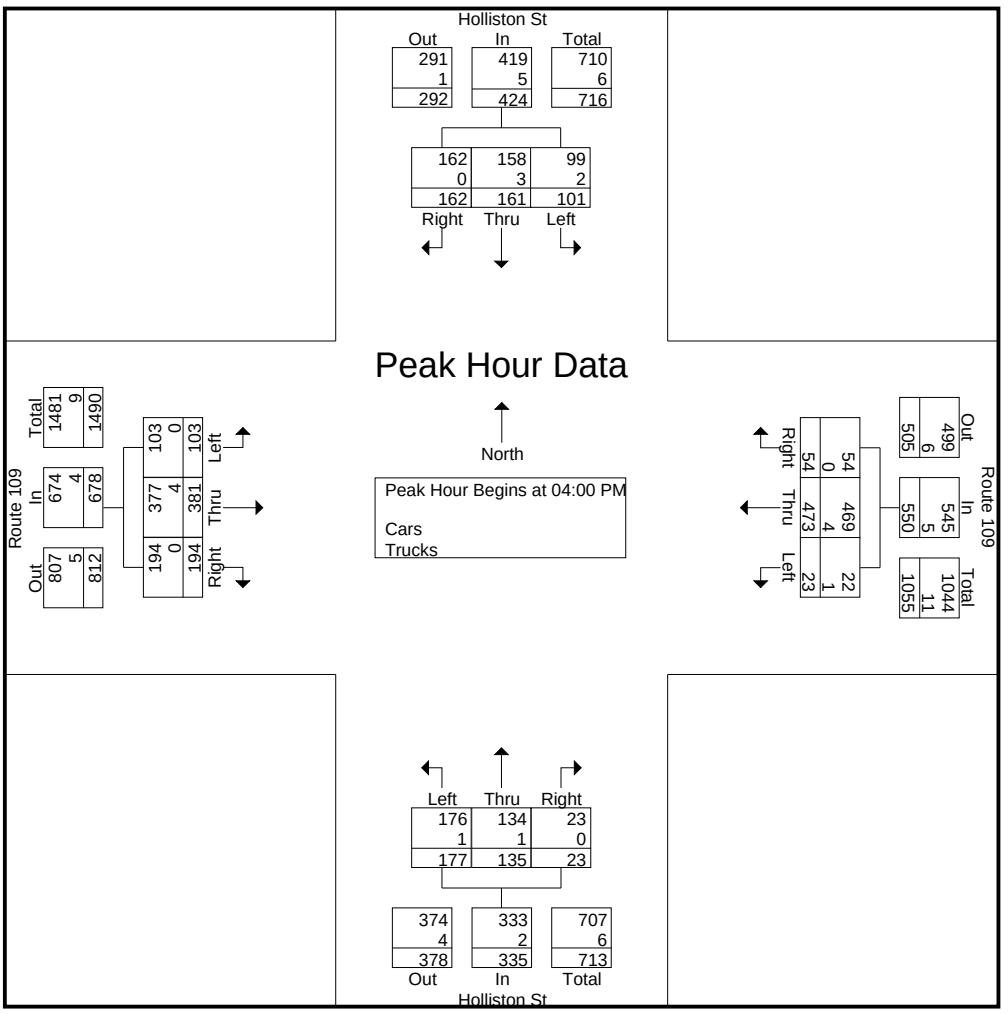
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	**27**	40	43	110	6	118	**20**	**144**	**49**	**40**	5	**94**	24	**105**	49	**178**	**526**
04:15 PM	25	31	32	88	**7**	119	9	135	49	28	4	81	**31**	96	42	169	473
04:30 PM	24	36	**44**	104	5	**122**	13	140	40	34	5	79	26	85	48	159	482
04:45 PM	25	**54**	43	**122**	5	114	12	131	39	33	**9**	81	22	95	**55**	172	506
Total Volume	101	161	162	424	23	473	54	550	177	135	23	335	103	381	194	678	1987
% App. Total	23.8	38	38.2		4.2	86	9.8		52.8	40.3	6.9		15.2	56.2	28.6		
PHF	.935	.745	.920	.869	.821	.969	.675	.955	.903	.844	.639	.891	.831	.907	.882	.952	.944
Cars	99	158	162	419	22	469	54	545	176	134	23	333	103	377	194	674	1971
% Cars	98.0	98.1	100	98.8	95.7	99.2	100	99.1	99.4	99.3	100	99.4	100	99.0	100	99.4	99.2
Trucks	2	3	0	5	1	4	0	5	1	1	0	2	0	4	0	4	16
% Trucks	2.0	1.9	0	1.2	4.3	0.8	0	0.9	0.6	0.7	0	0.6	0	1.0	0	0.6	0.8

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

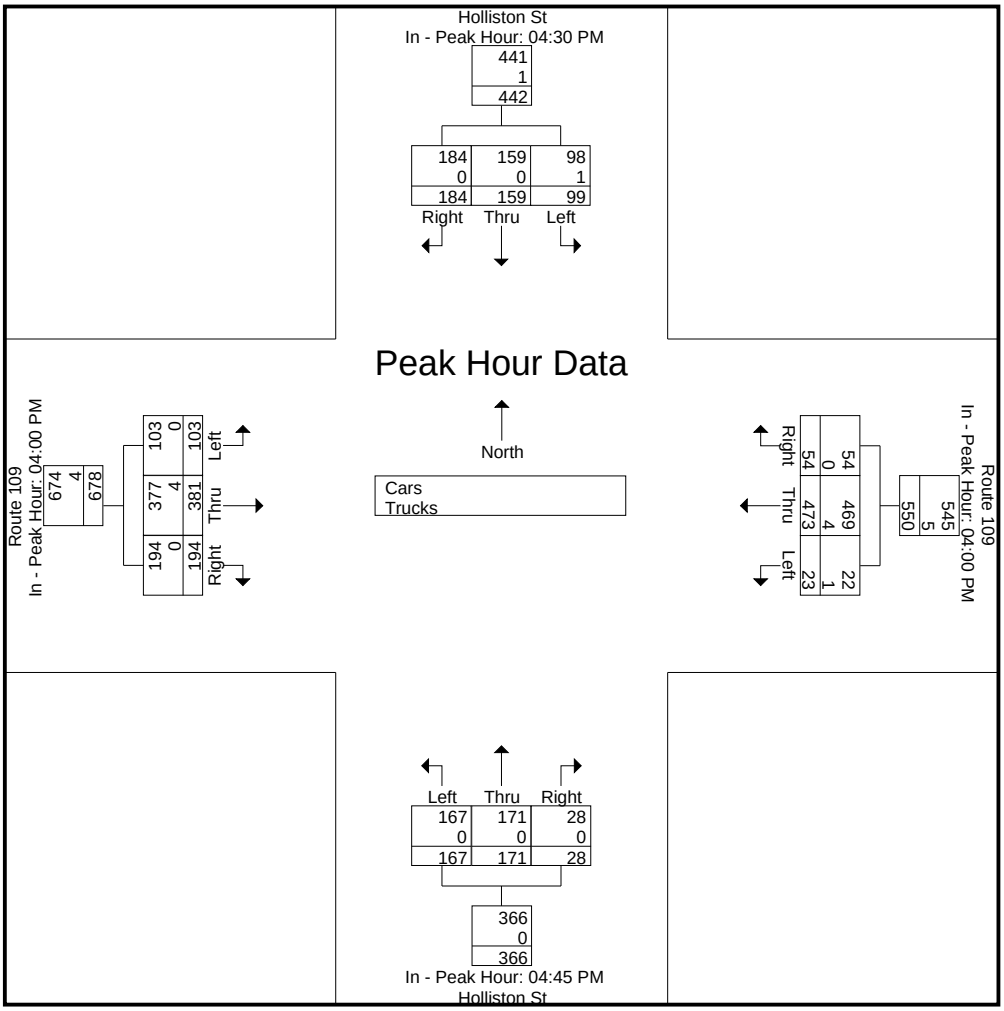
	04:30 PM				04:00 PM				04:45 PM				04:00 PM			
+0 mins.	24	36	44	104	6	118	**20**	**144**	39	33	**9**	81	24	**105**	49	**178**
+15 mins.	25	**54**	43	**122**	**7**	119	9	135	40	**64**	7	**111**	**31**	96	42	169
+30 mins.	**26**	35	46	107	5	**122**	13	140	42	34	5	81	26	85	48	159
+45 mins.	24	34	**51**	109	5	114	12	131	**46**	40	7	93	22	95	**55**	172
Total Volume	99	159	184	442	23	473	54	550	167	171	28	366	103	381	194	678
% App. Total	22.4	36	41.6		4.2	86	9.8		45.6	46.7	7.7		15.2	56.2	28.6	
PHF	.952	.736	.902	.906	.821	.969	.675	.955	.908	.668	.778	.824	.831	.907	.882	.952
Cars	98	159	184	441	22	469	54	545	167	171	28	366	103	377	194	674
% Cars	99	100	100	99.8	95.7	99.2	100	99.1	100	100	100	100	100	99	100	99.4
Trucks	1	0	0	1	1	4	0	5	0	0	0	0	0	4	0	4
% Trucks	1	0	0	0.2	4.3	0.8	0	0.9	0	0	0	0	0	1	0	0.6

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 4

Groups Printed- Cars

	Holliston St From North			Route 109 From East			Holliston St From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	27	38	43	6	118	20	48	40	5	24	103	49	521
04:15 PM	24	30	32	6	115	9	49	28	4	31	94	42	464
04:30 PM	24	36	44	5	122	13	40	33	5	26	85	48	481
04:45 PM	24	54	43	5	114	12	39	33	9	22	95	55	505
Total	99	158	162	22	469	54	176	134	23	103	377	194	1971
05:00 PM	26	35	46	5	117	16	40	64	7	35	94	37	522
05:15 PM	24	34	51	7	98	14	42	34	5	21	91	46	467
05:30 PM	22	30	29	3	120	23	46	40	7	24	86	37	467
05:45 PM	13	31	18	3	113	20	35	23	3	19	92	40	410
Total	85	130	144	18	448	73	163	161	22	99	363	160	1866
Grand Total	184	288	306	40	917	127	339	295	45	202	740	354	3837
Apprch %	23.7	37	39.3	3.7	84.6	11.7	49.9	43.4	6.6	15.6	57.1	27.3	
Total %	4.8	7.5	8	1	23.9	3.3	8.8	7.7	1.2	5.3	19.3	9.2	

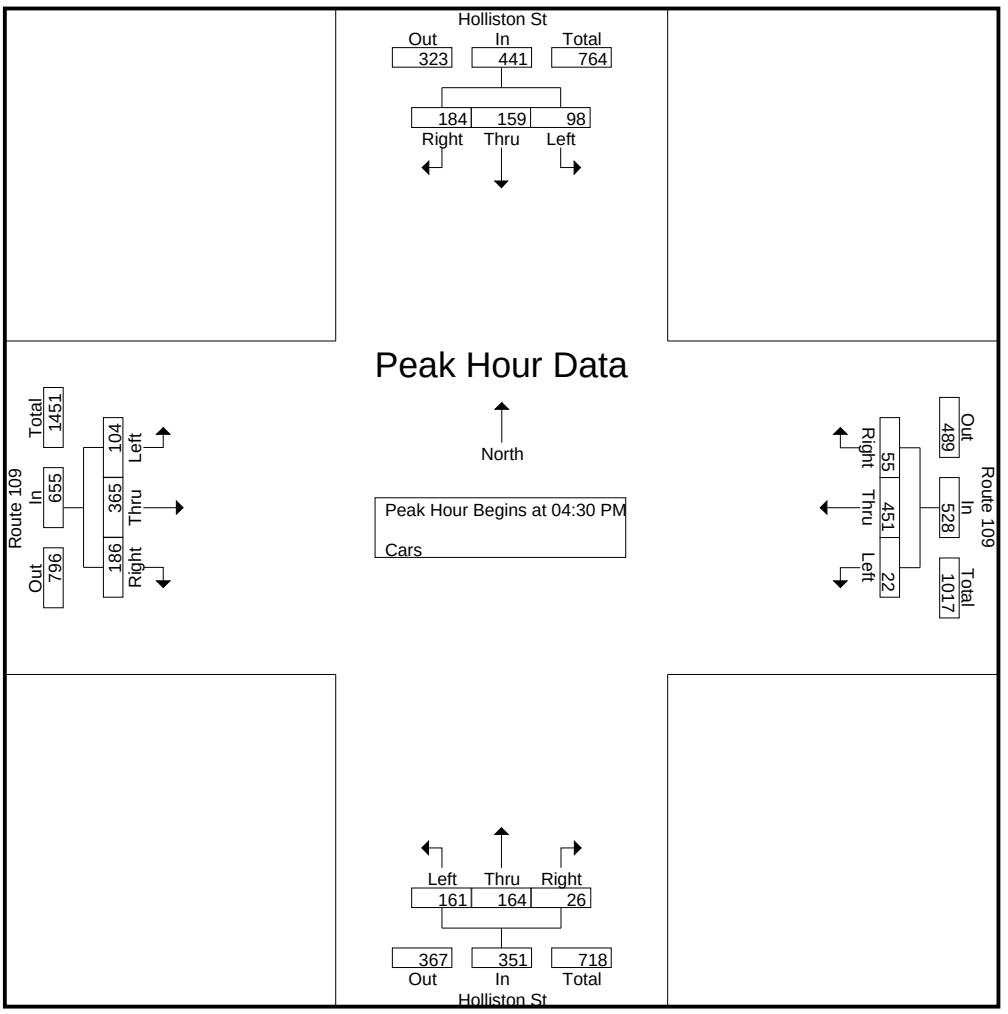
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	24	36	44	104	5	**122**	13	**140**	40	33	5	78	26	85	48	159	481
04:45 PM	24	**54**	43	**121**	5	114	12	131	39	33	**9**	81	22	**95**	**55**	**172**	505
05:00 PM	**26**	35	46	107	5	117	**16**	138	40	**64**	7	**111**	**35**	94	37	166	**522**
05:15 PM	24	34	**51**	109	**7**	98	14	119	**42**	34	5	81	21	91	46	158	467
Total Volume	98	159	184	441	22	451	55	528	161	164	26	351	104	365	186	655	1975
% App. Total	22.2	36.1	41.7		4.2	85.4	10.4		45.9	46.7	7.4		15.9	55.7	28.4		
PHF	.942	.736	.902	.911	.786	.924	.859	.943	.958	.641	.722	.791	.743	.961	.845	.952	.946

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 5



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

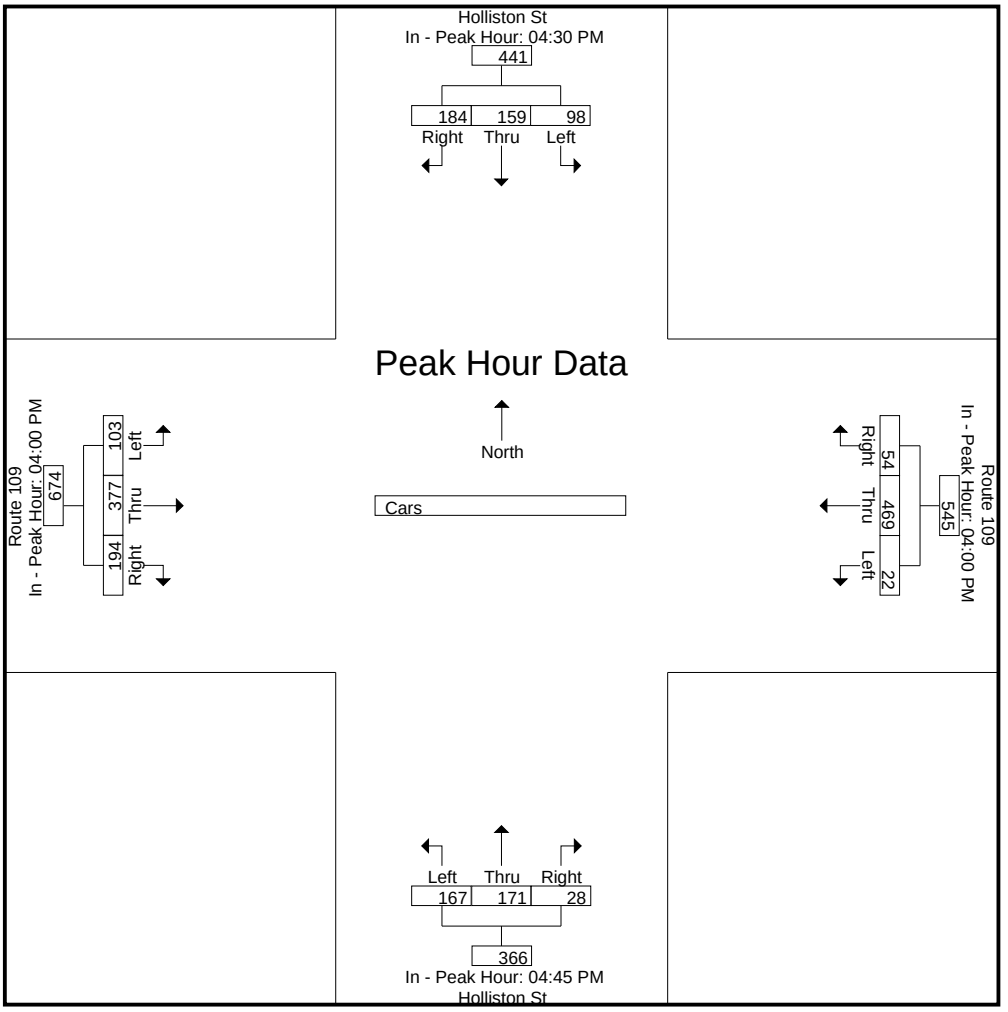
	04:30 PM				04:00 PM				04:45 PM				04:00 PM			
+0 mins.	24	36	44	104	**6**	118	**20**	**144**	39	33	**9**	81	24	**103**	49	**176**
+15 mins.	24	**54**	43	**121**	6	115	9	130	40	**64**	7	**111**	**31**	94	42	167
+30 mins.	**26**	35	46	107	5	**122**	13	140	42	34	5	81	26	85	48	159
+45 mins.	24	34	**51**	109	5	114	12	131	**46**	40	7	93	22	95	**55**	172
Total Volume	98	159	184	441	22	469	54	545	167	171	28	366	103	377	194	674
% App. Total	22.2	36.1	41.7		4	86.1	9.9		45.6	46.7	7.7		15.3	55.9	28.8	
PHF	.942	.736	.902	.911	.917	.961	.675	.946	.908	.668	.778	.824	.831	.915	.882	.957

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022

Groups Printed- Trucks

	Holliston St From North			Route 109 From East			Holliston St From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	2	0	0	0	0	1	0	0	0	2	0	5
04:15 PM	1	1	0	1	4	0	0	0	0	0	2	0	9
04:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
04:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	2	3	0	1	4	0	1	1	0	0	4	0	16
05:00 PM	0	0	0	0	4	0	0	0	0	0	0	0	4
05:15 PM	0	0	0	0	1	0	0	0	0	0	1	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	5	0	0	0	0	0	3	0	8
Grand Total	2	3	0	1	9	0	1	1	0	0	7	0	24
Apprch %	40	60	0	10	90	0	50	50	0	0	100	0	
Total %	8.3	12.5	0	4.2	37.5	0	4.2	4.2	0	0	29.2	0	

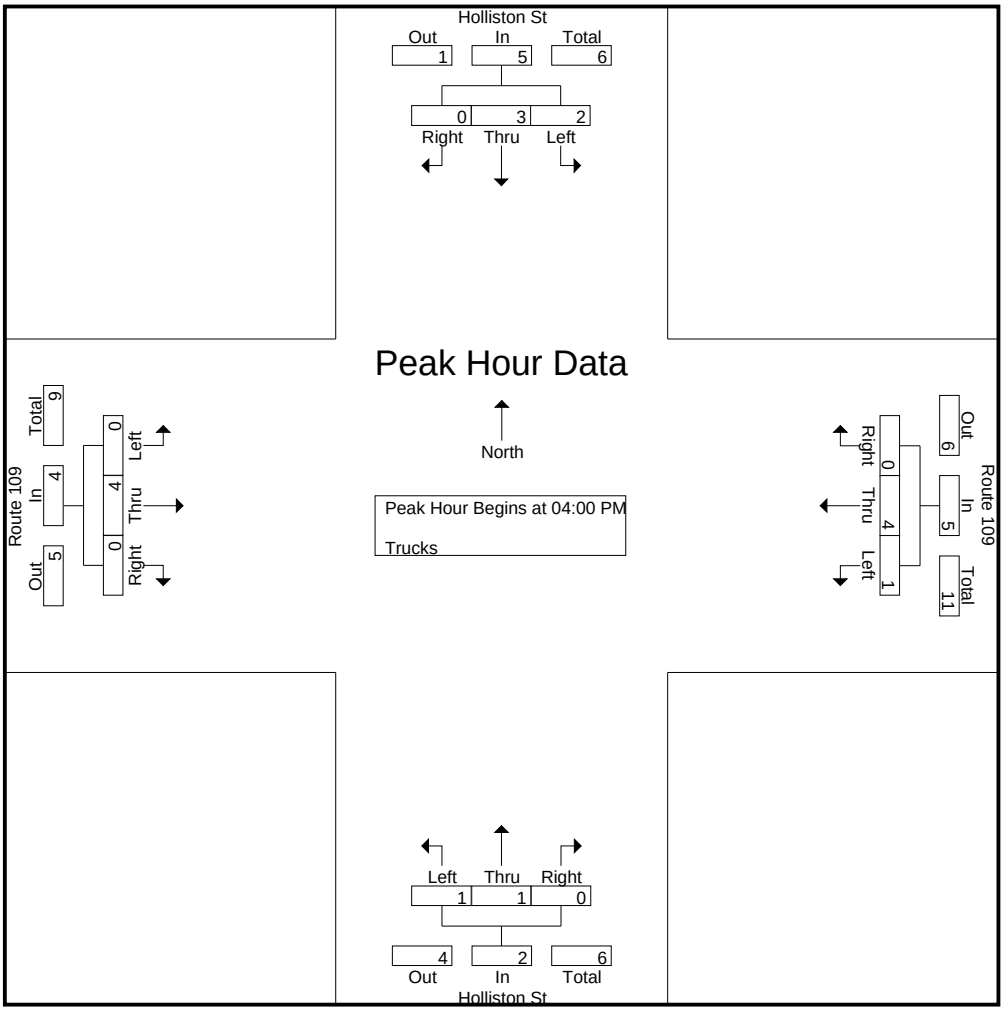
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	**2**	0	**2**	0	0	0	0	**1**	0	0	**1**	0	**2**	0	**2**	5
04:15 PM	**1**	1	0	2	**1**	**4**	0	**5**	0	0	0	0	0	2	0	2	**9**
04:30 PM	0	0	0	0	0	0	0	0	0	**1**	0	1	0	0	0	0	1
04:45 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	2	3	0	5	1	4	0	5	1	1	0	2	0	4	0	4	16
% App. Total	40	60	0		20	80	0		50	50	0		0	100	0		
PHF	.500	.375	.000	.625	.250	.250	.000	.250	.250	.250	.000	.500	.000	.500	.000	.500	.444

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 8



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

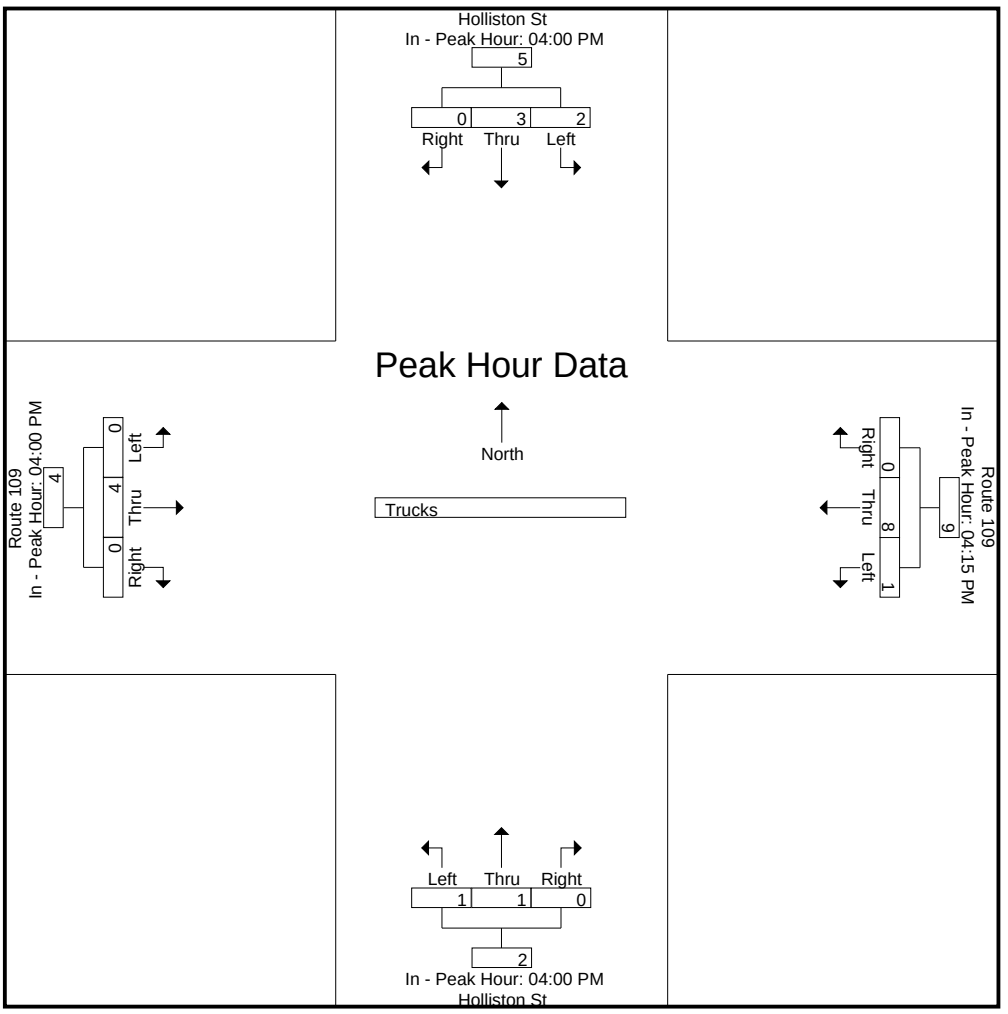
	04:00 PM				04:15 PM				04:00 PM				04:00 PM			
+0 mins.	0	**2**	0	**2**	**1**	**4**	0	**5**	**1**	0	0	**1**	0	**2**	0	**2**
+15 mins.	**1**	1	0	2	0	0	0	0	0	0	0	0	0	2	0	2
+30 mins.	0	0	0	0	0	0	0	0	0	**1**	0	1	0	0	0	0
+45 mins.	1	0	0	1	0	4	0	4	0	0	0	0	0	0	0	0
Total Volume	2	3	0	5	1	8	0	9	1	1	0	2	0	4	0	4
% App. Total	40	60	0		11.1	88.9	0		50	50	0		0	100	0	
PHF	.500	.375	.000	.625	.250	.500	.000	.450	.250	.250	.000	.500	.000	.500	.000	.500

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022

Groups Printed- Bikes Peds

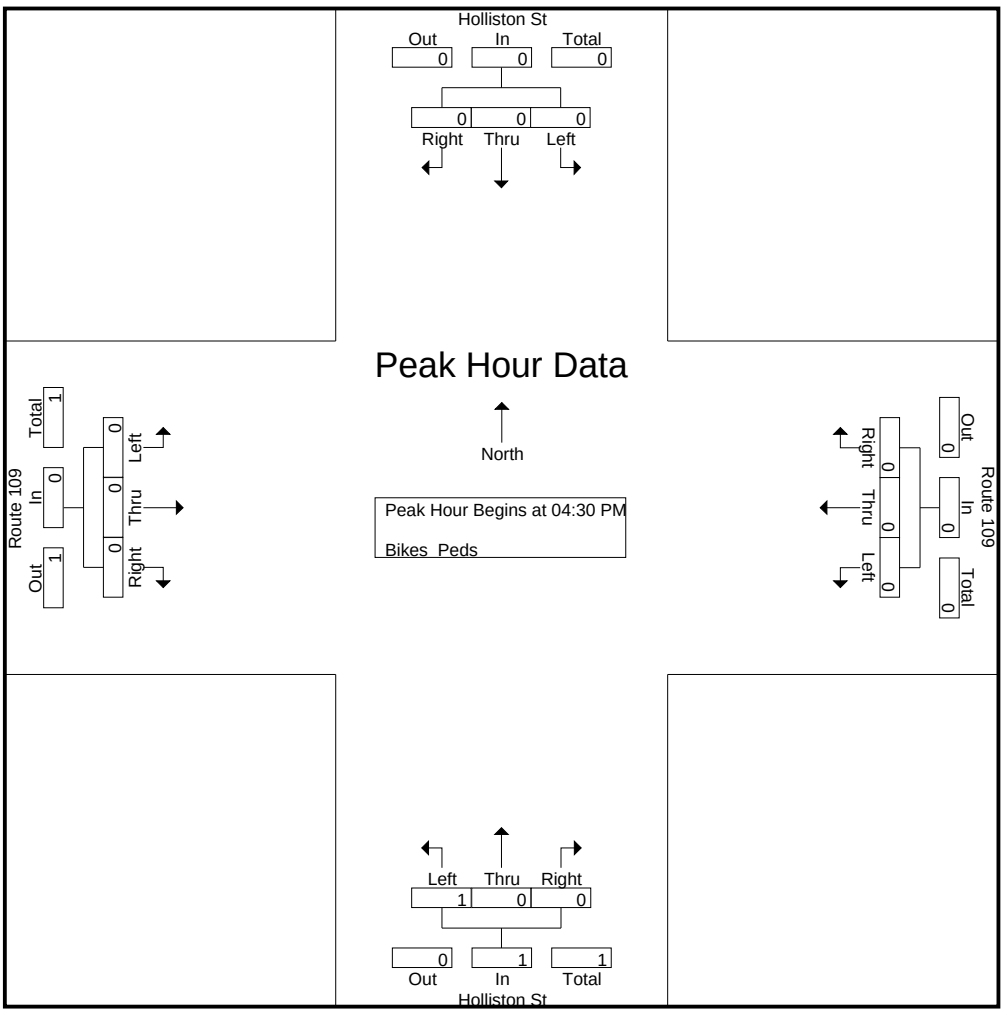
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	2	1	3
Grand Total	0	0	0	0	0	0	0	2	1	0	0	2	0	0	0	0	4	1	5
Apprch %	0	0	0		0	0	0		100	0	0		0	0	0				
Total %	0	0	0		0	0	0		100	0	0		0	0	0		80	20	

	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0	**1**
Total Volume	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
% App. Total	0	0	0		0	0	0		100	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.250

Accurate Counts
978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 11



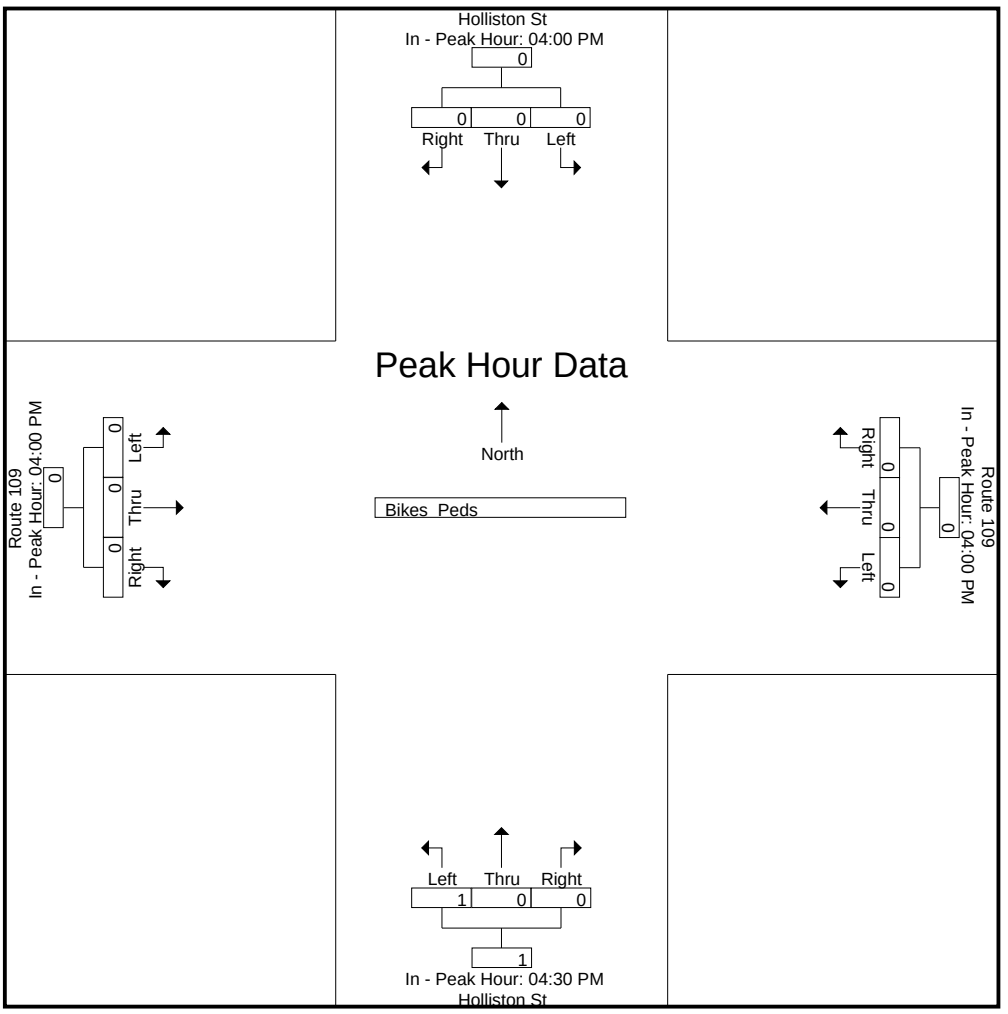
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:30 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
% App. Total	0	0	0		0	0	0		100	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000

Accurate Counts
978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420001
Site Code : 92420001
Start Date : 2/17/2022
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 1

Groups Printed- Cars - Trucks

	Holliston St From North			Route 109 From East			Holliston St From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
11:00 AM	22	30	37	15	109	22	53	30	5	26	87	51	487
11:15 AM	22	28	41	6	118	21	58	21	10	23	111	50	509
11:30 AM	23	38	26	5	103	18	49	38	11	26	109	52	498
11:45 AM	13	22	35	6	120	24	50	26	4	34	119	57	510
Total	80	118	139	32	450	85	210	115	30	109	426	210	2004
12:00 PM	26	25	35	6	110	11	40	27	5	29	106	37	457
12:15 PM	32	21	25	4	117	28	43	35	8	31	77	46	467
12:30 PM	25	21	23	2	116	18	35	24	3	28	107	46	448
12:45 PM	21	32	30	5	96	22	42	24	5	27	94	66	464
Total	104	99	113	17	439	79	160	110	21	115	384	195	1836
01:00 PM	14	21	28	5	124	15	47	27	2	20	104	42	449
01:15 PM	20	22	27	4	99	16	33	21	9	28	122	40	441
01:30 PM	31	19	26	3	100	22	33	24	3	28	87	39	415
01:45 PM	23	22	24	10	123	17	31	27	8	34	110	48	477
Total	88	84	105	22	446	70	144	99	22	110	423	169	1782
Grand Total	272	301	357	71	1335	234	514	324	73	334	1233	574	5622
Apprch %	29.2	32.4	38.4	4.3	81.4	14.3	56.4	35.6	8	15.6	57.6	26.8	
Total %	4.8	5.4	6.4	1.3	23.7	4.2	9.1	5.8	1.3	5.9	21.9	10.2	
Cars	272	301	357	71	1332	234	514	323	73	334	1229	574	5614
% Cars	100	100	100	100	99.8	100	100	99.7	100	100	99.7	100	99.9
Trucks	0	0	0	0	3	0	0	1	0	0	4	0	8
% Trucks	0	0	0	0	0.2	0	0	0.3	0	0	0.3	0	0.1

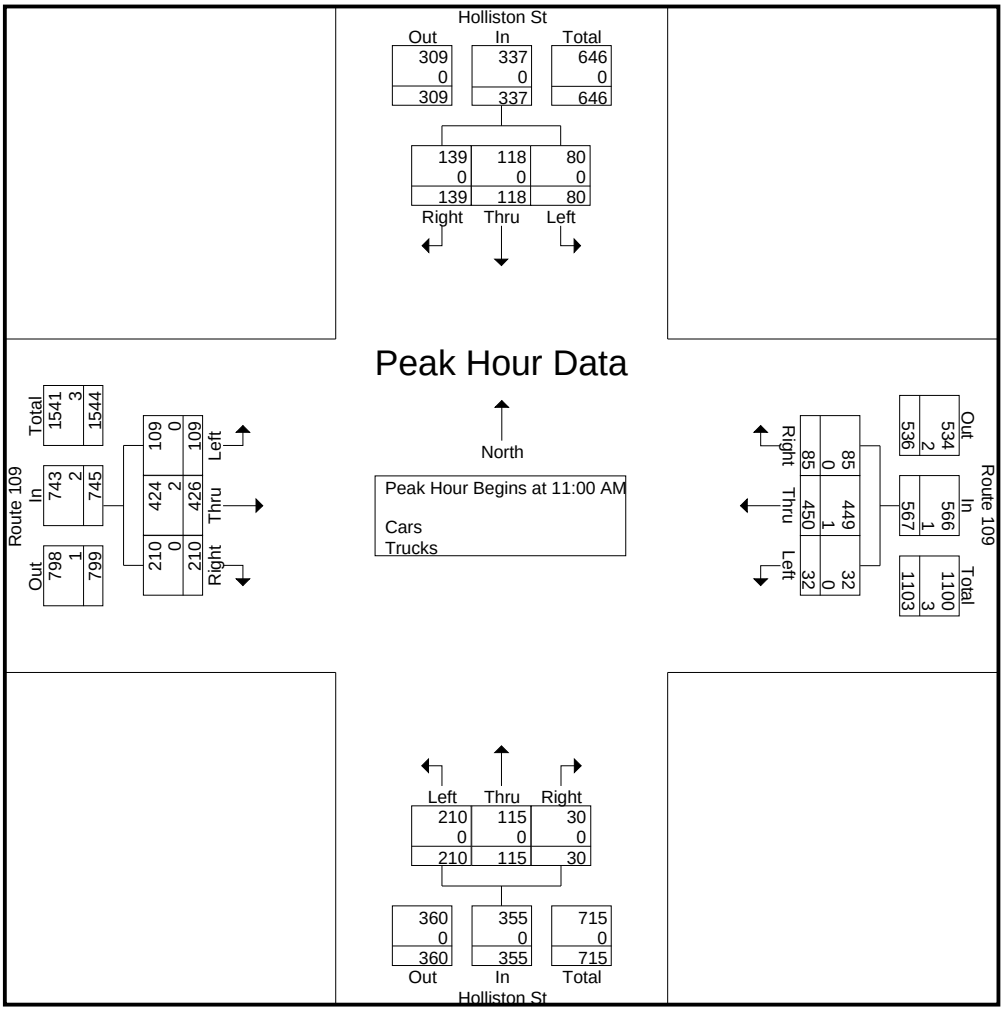
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	22	30	37	89	**15**	109	22	146	53	30	5	88	26	87	51	164	487
11:15 AM	22	28	**41**	**91**	6	118	21	145	**58**	21	10	89	23	111	50	184	509
11:30 AM	**23**	**38**	26	87	5	103	18	126	49	**38**	**11**	**98**	26	109	52	187	498
11:45 AM	13	22	35	70	6	**120**	**24**	**150**	50	26	4	80	**34**	**119**	**57**	**210**	**510**
Total Volume	80	118	139	337	32	450	85	567	210	115	30	355	109	426	210	745	2004
% App. Total	23.7	35	41.2		5.6	79.4	15		59.2	32.4	8.5		14.6	57.2	28.2		
PHF	.870	.776	.848	.926	.533	.938	.885	.945	.905	.757	.682	.906	.801	.895	.921	.887	.982
Cars	80	118	139	337	32	449	85	566	210	115	30	355	109	424	210	743	2001
% Cars	100	100	100	100	100	99.8	100	99.8	100	100	100	100	100	99.5	100	99.7	99.9
Trucks	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	3
% Trucks	0	0	0	0	0	0.2	0	0.2	0	0	0	0	0	0.5	0	0.3	0.1

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 2



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

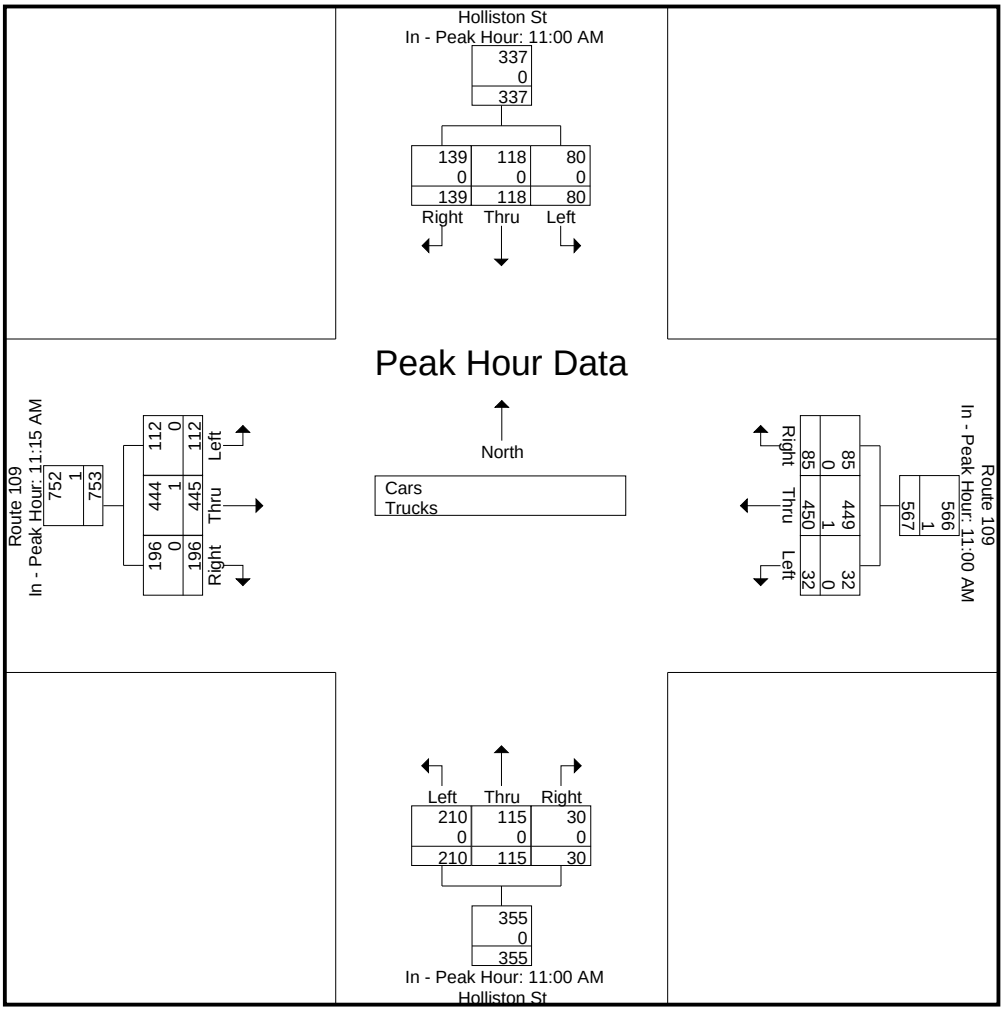
	11:00 AM				11:00 AM				11:00 AM				11:15 AM			
+0 mins.	22	30	37	89	**15**	109	22	146	53	30	5	88	23	111	50	184
+15 mins.	22	28	**41**	**91**	6	118	21	145	**58**	21	10	89	26	109	52	187
+30 mins.	**23**	**38**	26	87	5	103	18	126	49	**38**	**11**	**98**	**34**	**119**	**57**	**210**
+45 mins.	13	22	35	70	6	**120**	**24**	**150**	50	26	4	80	29	106	37	172
Total Volume	80	118	139	337	32	450	85	567	210	115	30	355	112	445	196	753
% App. Total	23.7	35	41.2		5.6	79.4	15		59.2	32.4	8.5		14.9	59.1	26	
PHF	.870	.776	.848	.926	.533	.938	.885	.945	.905	.757	.682	.906	.824	.935	.860	.896
Cars	80	118	139	337	32	449	85	566	210	115	30	355	112	444	196	752
% Cars	100	100	100	100	100	99.8	100	99.8	100	100	100	100	100	99.8	100	99.9
Trucks	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1
% Trucks	0	0	0	0	0	0.2	0	0.2	0	0	0	0	0	0.2	0	0.1

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 4

Groups Printed- Cars

	Holliston St From North			Route 109 From East			Holliston St From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
11:00 AM	22	30	37	15	109	22	53	30	5	26	86	51	486
11:15 AM	22	28	41	6	118	21	58	21	10	23	111	50	509
11:30 AM	23	38	26	5	103	18	49	38	11	26	109	52	498
11:45 AM	13	22	35	6	119	24	50	26	4	34	118	57	508
Total	80	118	139	32	449	85	210	115	30	109	424	210	2001
12:00 PM	26	25	35	6	109	11	40	27	5	29	106	37	456
12:15 PM	32	21	25	4	117	28	43	35	8	31	76	46	466
12:30 PM	25	21	23	2	115	18	35	24	3	28	107	46	447
12:45 PM	21	32	30	5	96	22	42	24	5	27	94	66	464
Total	104	99	113	17	437	79	160	110	21	115	383	195	1833
01:00 PM	14	21	28	5	124	15	47	27	2	20	103	42	448
01:15 PM	20	22	27	4	99	16	33	20	9	28	122	40	440
01:30 PM	31	19	26	3	100	22	33	24	3	28	87	39	415
01:45 PM	23	22	24	10	123	17	31	27	8	34	110	48	477
Total	88	84	105	22	446	70	144	98	22	110	422	169	1780
Grand Total	272	301	357	71	1332	234	514	323	73	334	1229	574	5614
Apprch %	29.2	32.4	38.4	4.3	81.4	14.3	56.5	35.5	8	15.6	57.5	26.9	
Total %	4.8	5.4	6.4	1.3	23.7	4.2	9.2	5.8	1.3	5.9	21.9	10.2	

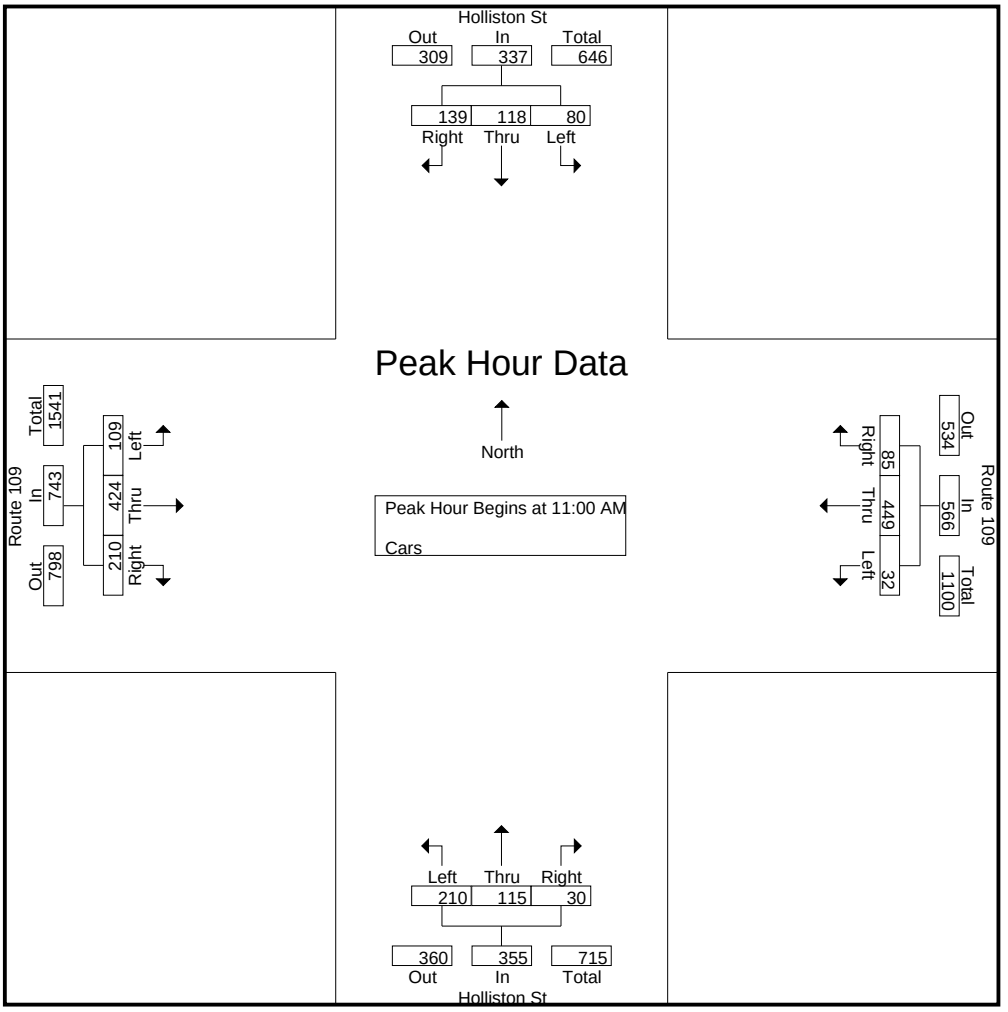
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	22	30	37	89	**15**	109	22	146	53	30	5	88	26	86	51	163	486
11:15 AM	22	28	**41**	**91**	6	118	21	145	**58**	21	10	89	23	111	50	184	**509**
11:30 AM	**23**	**38**	26	87	5	103	18	126	49	**38**	**11**	**98**	26	109	52	187	498
11:45 AM	13	22	35	70	6	**119**	**24**	**149**	50	26	4	80	**34**	**118**	**57**	**209**	508
Total Volume	80	118	139	337	32	449	85	566	210	115	30	355	109	424	210	743	2001
% App. Total	23.7	35	41.2		5.7	79.3	15		59.2	32.4	8.5		14.7	57.1	28.3		
PHF	.870	.776	.848	.926	.533	.943	.885	.950	.905	.757	.682	.906	.801	.898	.921	.889	.983

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 5



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

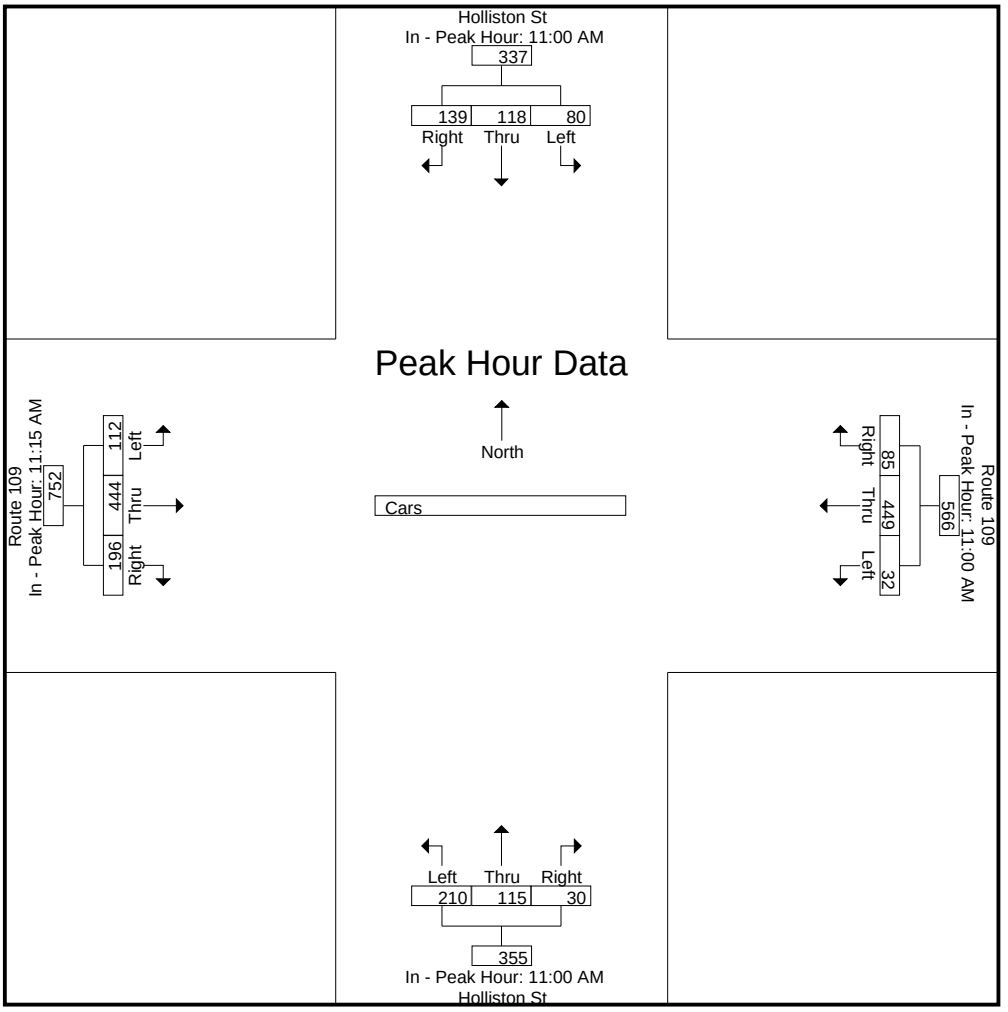
	11:00 AM				11:00 AM				11:00 AM				11:15 AM			
+0 mins.	22	30	37	89	**15**	109	22	146	53	30	5	88	23	111	50	184
+15 mins.	22	28	**41**	**91**	6	118	21	145	**58**	21	10	89	26	109	52	187
+30 mins.	**23**	**38**	26	87	5	103	18	126	49	**38**	**11**	**98**	**34**	**118**	**57**	**209**
+45 mins.	13	22	35	70	6	**119**	**24**	**149**	50	26	4	80	29	106	37	172
Total Volume	80	118	139	337	32	449	85	566	210	115	30	355	112	444	196	752
% App. Total	23.7	35	41.2		5.7	79.3	15		59.2	32.4	8.5		14.9	59	26.1	
PHF	.870	.776	.848	.926	.533	.943	.885	.950	.905	.757	.682	.906	.824	.941	.860	.900

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 7

Groups Printed- Trucks

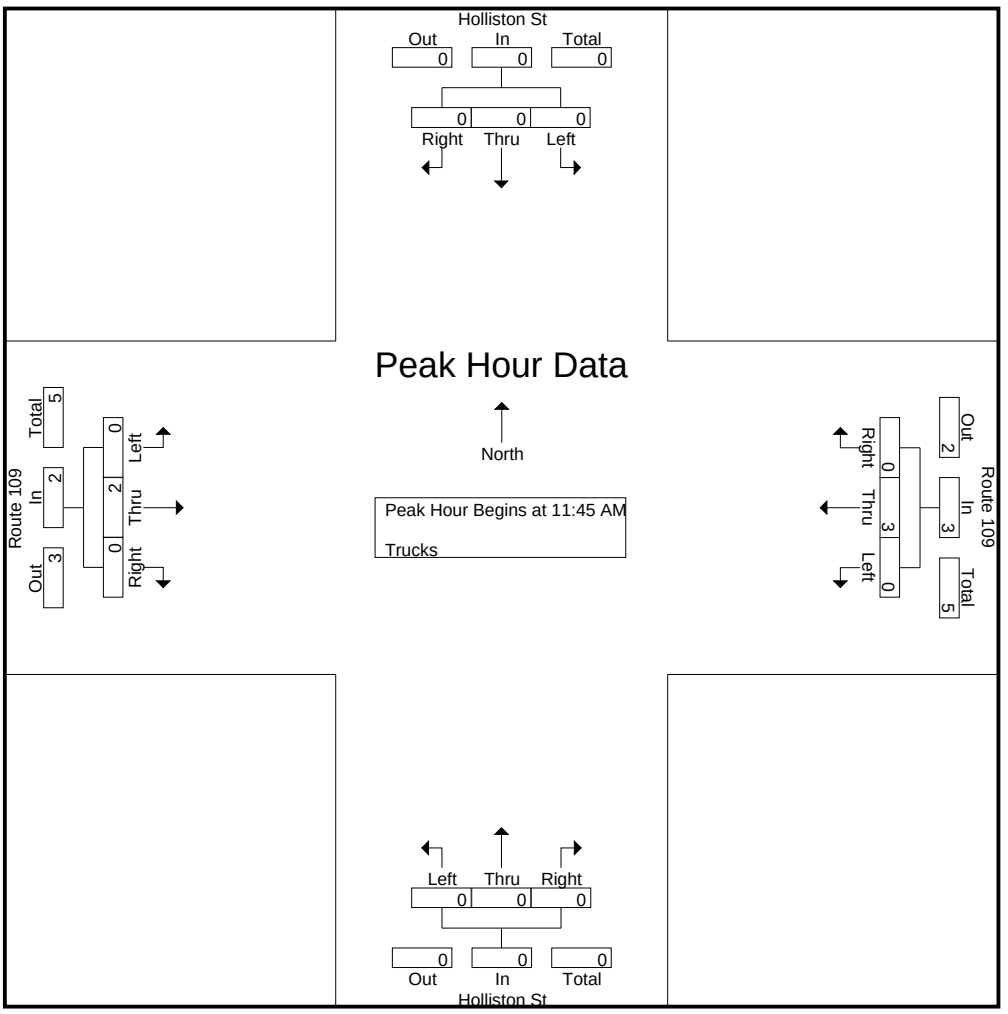
	Holliston St From North			Route 109 From East			Holliston St From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
11:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	1	0	0	0	0	0	1	0	2
Total	0	0	0	0	1	0	0	0	0	0	2	0	3
12:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
12:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	2	0	0	0	0	0	1	0	3
01:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
01:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	1	0	2
Grand Total	0	0	0	0	3	0	0	1	0	0	4	0	8
Apprch %	0	0	0	0	100	0	0	100	0	0	100	0	
Total %	0	0	0	0	37.5	0	0	12.5	0	0	50	0	

	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	**1**	0	**1**	**2**
12:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
12:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	3	0	3	0	0	0	0	0	2	0	2	5
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.750	.000	.750	.000	.000	.000	.000	.000	.500	.000	.500	.625

Accurate Counts
978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 8



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

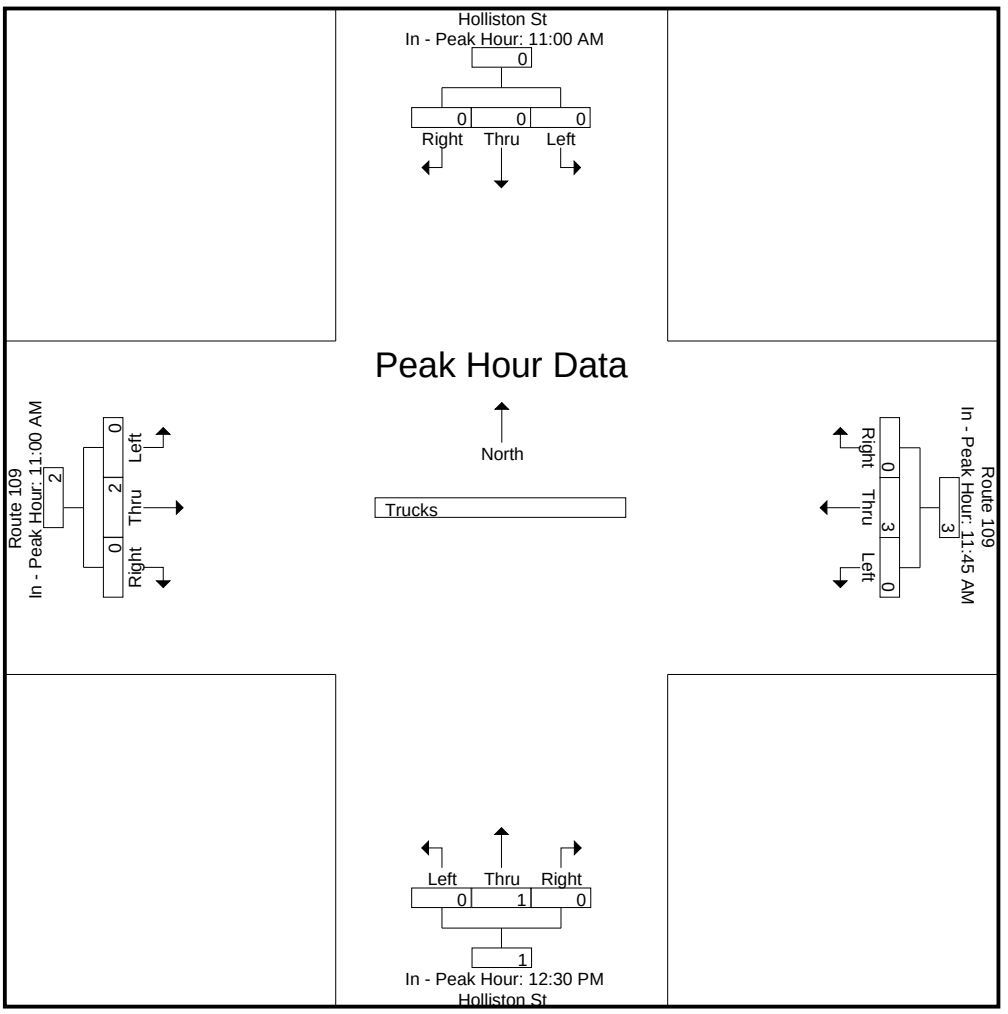
	11:00 AM				11:45 AM				12:30 PM				11:00 AM			
+0 mins.	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	**1**	0	**1**
+15 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	1	0	1	0	**1**	0	**1**	0	1	0	1
Total Volume	0	0	0	0	0	3	0	3	0	1	0	1	0	2	0	2
% App. Total	0	0	0		0	100	0		0	100	0		0	100	0	
PHF	.000	.000	.000	.000	.000	.750	.000	.750	.000	.250	.000	.250	.000	.500	.000	.500

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022

Groups Printed- Bikes Peds

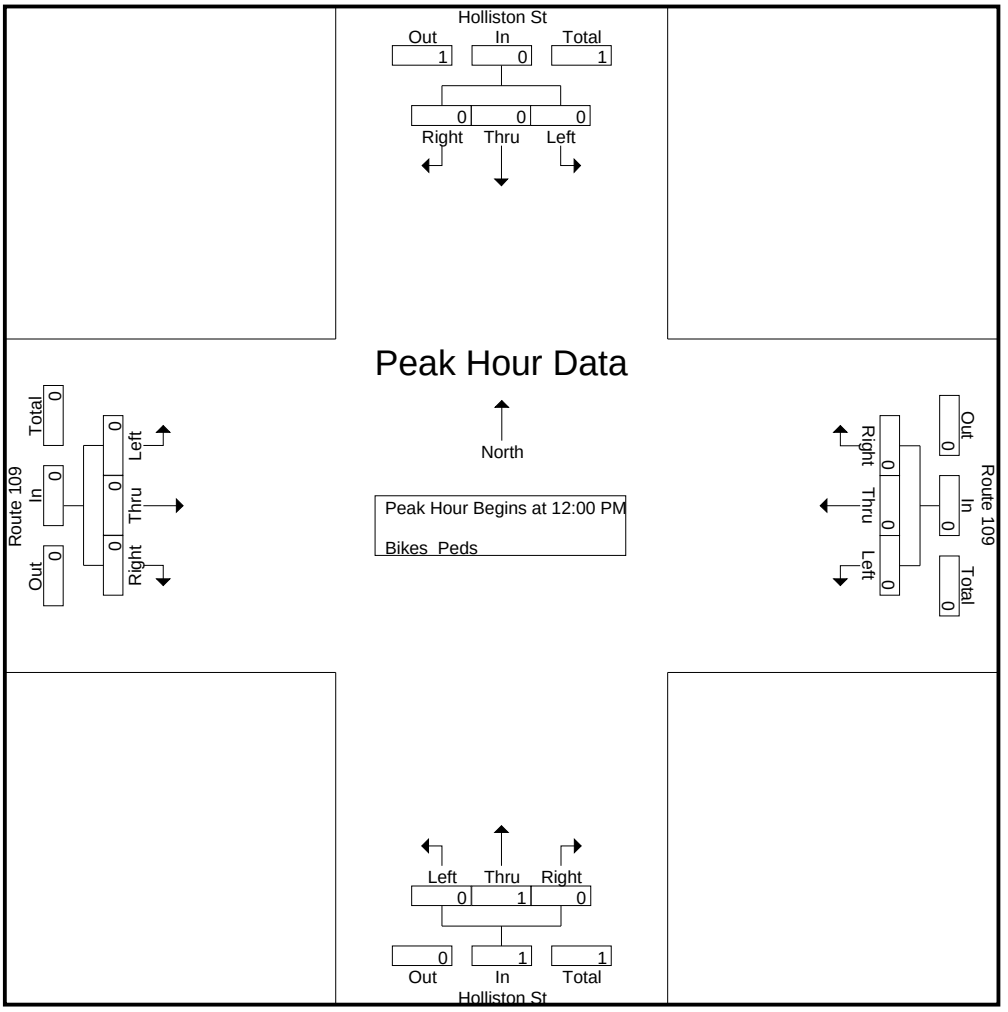
	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	3	0	3
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	4	0	4
12:00 PM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	3	0	3
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	2	1	3
Total	0	0	0	2	0	0	0	0	0	1	0	2	0	0	0	2	6	1	7
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Grand Total	0	0	0	3	0	0	0	2	0	1	0	4	0	0	0	2	11	1	12
Apprch %	0	0	0		0	0	0		0	100	0		0	0	0				
Total %	0	0	0		0	0	0		0	100	0		0	0	0		91.7	8.3	

	Holliston St From North				Route 109 From East				Holliston St From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	**1**
Total Volume	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
% App. Total	0	0	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.250

Accurate Counts
978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 11



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

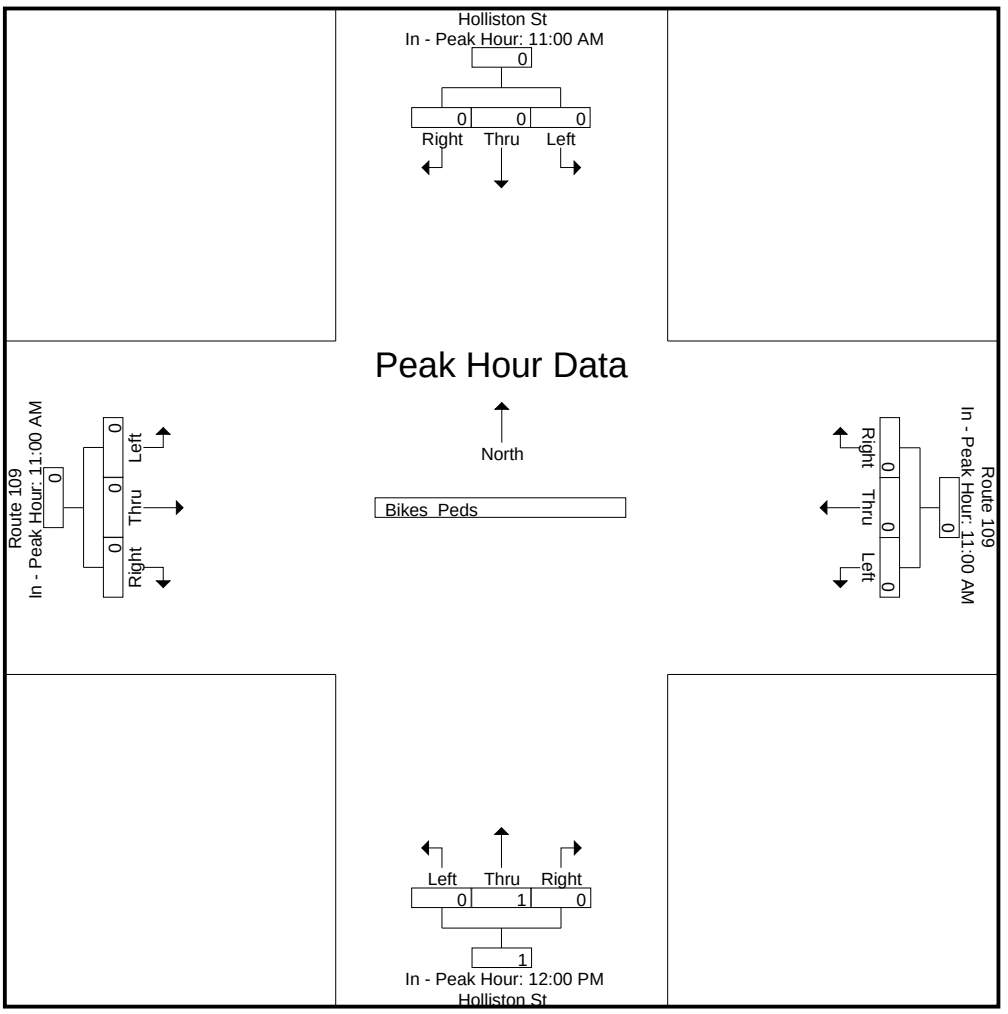
	11:00 AM				11:00 AM				12:00 PM				11:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
% App. Total	0	0	0		0	0	0		0	100	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Holliston Street
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S1
Site Code : 92420001
Start Date : 2/19/2022
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 1

Groups Printed- Cars - Trucks

	Walgreens From North			Route 109 From East			Medway Commons From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	1	0	0	5	57	0	13	0	7	0	132	11	226
07:15 AM	0	0	0	11	66	0	16	0	13	0	133	28	267
07:30 AM	0	0	0	5	66	0	15	0	21	0	148	8	263
07:45 AM	0	0	0	6	86	0	12	0	14	0	135	12	265
Total	1	0	0	27	275	0	56	0	55	0	548	59	1021
08:00 AM	0	1	0	12	69	0	9	0	14	0	121	19	245
08:15 AM	0	0	1	5	100	1	12	0	12	1	119	24	275
08:30 AM	1	0	0	10	65	1	22	0	7	2	111	22	241
08:45 AM	0	0	0	10	82	0	17	0	14	2	119	24	268
Total	1	1	1	37	316	2	60	0	47	5	470	89	1029
Grand Total	2	1	1	64	591	2	116	0	102	5	1018	148	2050
Apprch %	50	25	25	9.7	90	0.3	53.2	0	46.8	0.4	86.9	12.6	
Total %	0.1	0	0	3.1	28.8	0.1	5.7	0	5	0.2	49.7	7.2	
Cars	2	1	1	62	573	2	113	0	98	5	977	143	1977
% Cars	100	100	100	96.9	97	100	97.4	0	96.1	100	96	96.6	96.4
Trucks	0	0	0	2	18	0	3	0	4	0	41	5	73
% Trucks	0	0	0	3.1	3	0	2.6	0	3.9	0	4	3.4	3.6

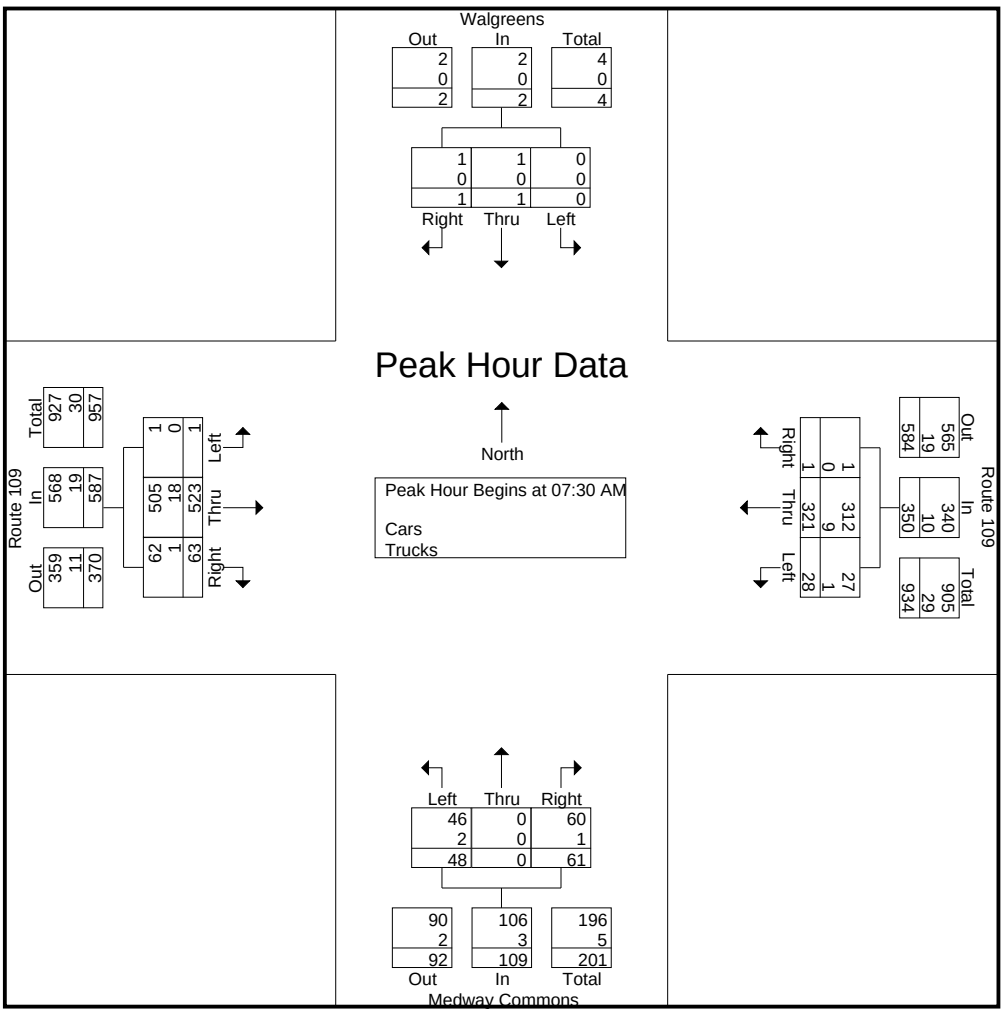
	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	5	66	0	71	**15**	0	**21**	**36**	0	**148**	8	**156**	263
07:45 AM	0	0	0	0	6	86	0	92	12	0	14	26	0	135	12	147	265
08:00 AM	0	**1**	0	**1**	**12**	69	0	81	9	0	14	23	0	121	19	140	245
08:15 AM	0	0	**1**	1	5	**100**	**1**	**106**	12	0	12	24	**1**	119	**24**	144	**275**
Total Volume	0	1	1	2	28	321	1	350	48	0	61	109	1	523	63	587	1048
% App. Total	0	50	50		8	91.7	0.3		44	0	56		0.2	89.1	10.7		
PHF	.000	.250	.250	.500	.583	.803	.250	.825	.800	.000	.726	.757	.250	.883	.656	.941	.953
Cars	0	1	1	2	27	312	1	340	46	0	60	106	1	505	62	568	1016
% Cars	0	100	100	100	96.4	97.2	100	97.1	95.8	0	98.4	97.2	100	96.6	98.4	96.8	96.9
Trucks	0	0	0	0	1	9	0	10	2	0	1	3	0	18	1	19	32
% Trucks	0	0	0	0	3.6	2.8	0	2.9	4.2	0	1.6	2.8	0	3.4	1.6	3.2	3.1

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 2



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

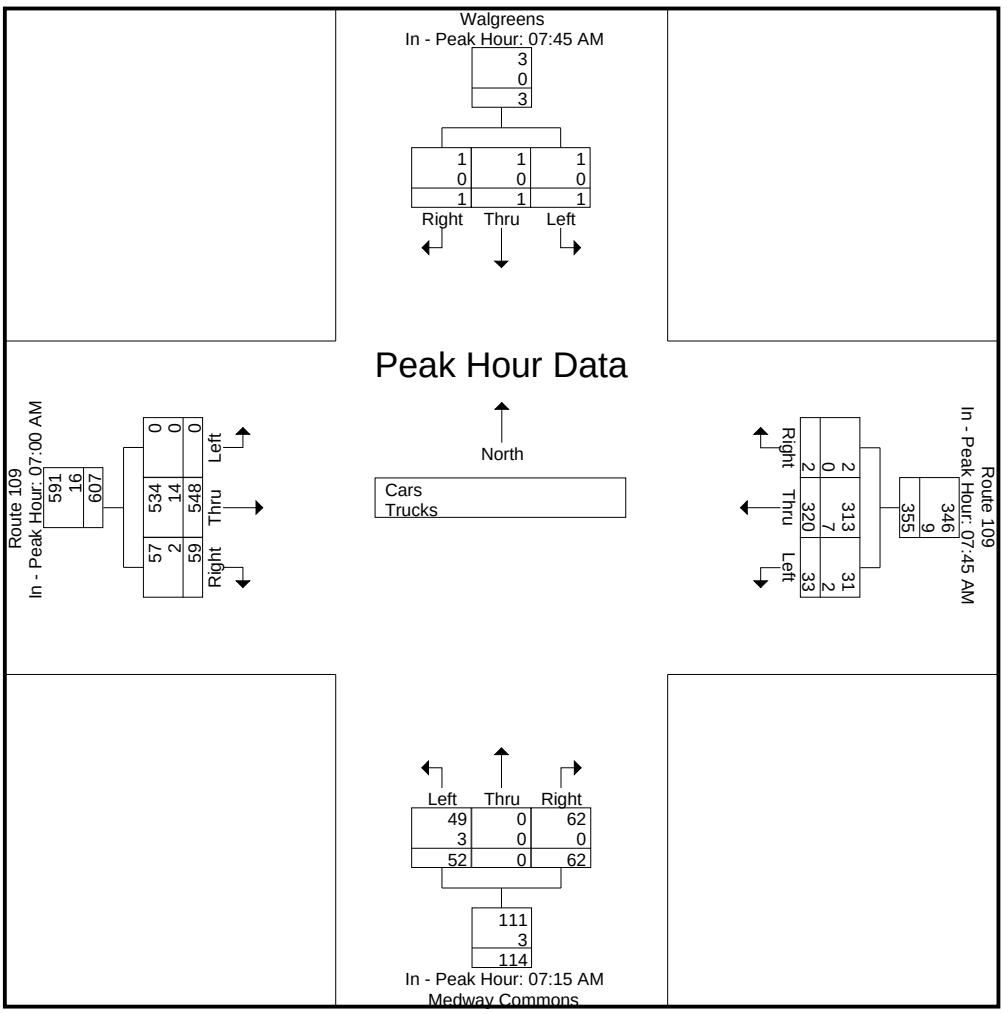
	07:45 AM				07:45 AM				07:15 AM				07:00 AM			
+0 mins.	0	0	0	0	6	86	0	92	**16**	0	13	29	0	132	11	143
+15 mins.	0	**1**	0	**1**	**12**	69	0	81	15	0	**21**	**36**	0	133	**28**	**161**
+30 mins.	0	0	**1**	1	5	**100**	**1**	**106**	12	0	14	26	0	**148**	8	156
+45 mins.	**1**	0	0	1	10	65	1	76	9	0	14	23	0	135	12	147
Total Volume	1	1	1	3	33	320	2	355	52	0	62	114	0	548	59	607
% App. Total	33.3	33.3	33.3		9.3	90.1	0.6		45.6	0	54.4		0	90.3	9.7	
PHF	.250	.250	.250	.750	.688	.800	.500	.837	.813	.000	.738	.792	.000	.926	.527	.943
Cars	1	1	1	3	31	313	2	346	49	0	62	111	0	534	57	591
% Cars	100	100	100	100	93.9	97.8	100	97.5	94.2	0	100	97.4	0	97.4	96.6	97.4
Trucks	0	0	0	0	2	7	0	9	3	0	0	3	0	14	2	16
% Trucks	0	0	0	0	6.1	2.2	0	2.5	5.8	0	0	2.6	0	2.6	3.4	2.6

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022

Groups Printed- Cars

	Walgreens From North			Route 109 From East			Medway Commons From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	1	0	0	5	56	0	13	0	6	0	129	11	221
07:15 AM	0	0	0	11	64	0	15	0	13	0	129	26	258
07:30 AM	0	0	0	5	64	0	14	0	21	0	146	8	258
07:45 AM	0	0	0	5	82	0	11	0	14	0	130	12	254
Total	1	0	0	26	266	0	53	0	54	0	534	57	991
08:00 AM	0	1	0	12	68	0	9	0	14	0	114	18	236
08:15 AM	0	0	1	5	98	1	12	0	11	1	115	24	268
08:30 AM	1	0	0	9	65	1	22	0	7	2	102	21	230
08:45 AM	0	0	0	10	76	0	17	0	12	2	112	23	252
Total	1	1	1	36	307	2	60	0	44	5	443	86	986
Grand Total	2	1	1	62	573	2	113	0	98	5	977	143	1977
Apprch %	50	25	25	9.7	90	0.3	53.6	0	46.4	0.4	86.8	12.7	
Total %	0.1	0.1	0.1	3.1	29	0.1	5.7	0	5	0.3	49.4	7.2	

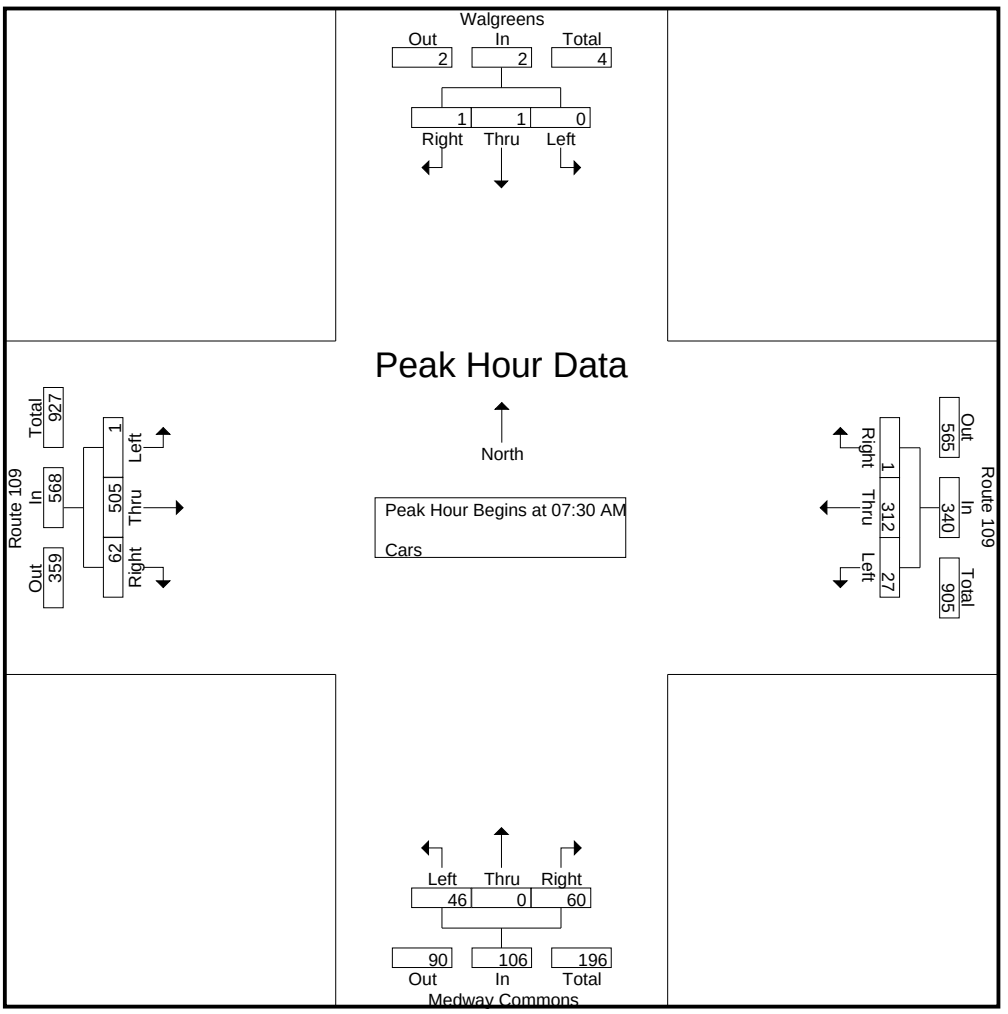
	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	5	64	0	69	**14**	0	**21**	**35**	0	**146**	8	**154**	258
07:45 AM	0	0	0	0	5	82	0	87	11	0	14	25	0	130	12	142	254
08:00 AM	0	**1**	0	**1**	**12**	68	0	80	9	0	14	23	0	114	18	132	236
08:15 AM	0	0	**1**	1	5	**98**	**1**	**104**	12	0	11	23	**1**	115	**24**	140	**268**
Total Volume	0	1	1	2	27	312	1	340	46	0	60	106	1	505	62	568	1016
% App. Total	0	50	50		7.9	91.8	0.3		43.4	0	56.6		0.2	88.9	10.9		
PHF	.000	.250	.250	.500	.563	.796	.250	.817	.821	.000	.714	.757	.250	.865	.646	.922	.948

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 5



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

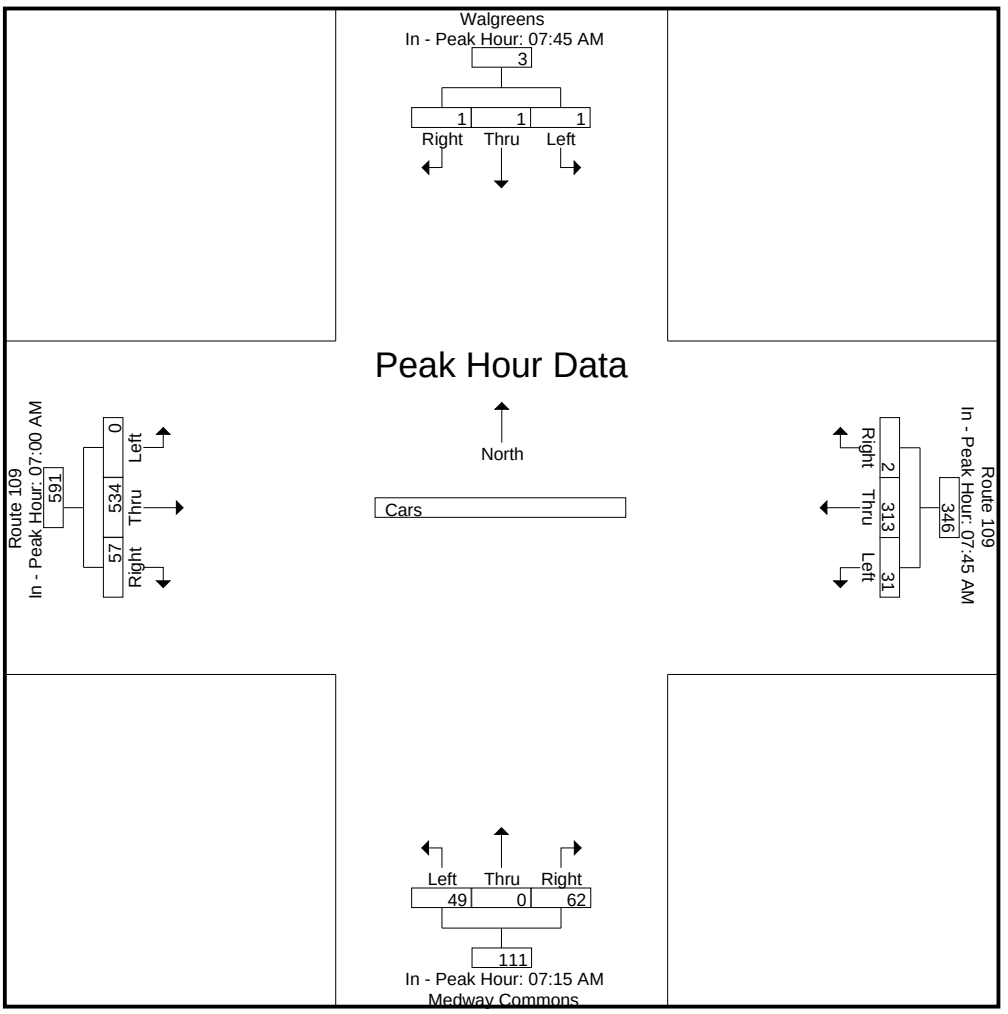
	07:45 AM				07:45 AM				07:15 AM				07:00 AM			
+0 mins.	0	0	0	0	5	82	0	87	**15**	0	13	28	0	129	11	140
+15 mins.	0	**1**	0	**1**	**12**	68	0	80	14	0	**21**	**35**	0	129	**26**	**155**
+30 mins.	0	0	**1**	1	5	**98**	**1**	**104**	11	0	14	25	0	**146**	8	154
+45 mins.	**1**	0	0	1	9	65	1	75	9	0	14	23	0	130	12	142
Total Volume	1	1	1	3	31	313	2	346	49	0	62	111	0	534	57	591
% App. Total	33.3	33.3	33.3		9	90.5	0.6		44.1	0	55.9		0	90.4	9.6	
PHF	.250	.250	.250	.750	.646	.798	.500	.832	.817	.000	.738	.793	.000	.914	.548	.953

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022

Groups Printed- Trucks

	Walgreens From North			Route 109 From East			Medway Commons From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	1	0	0	0	1	0	3	0	5
07:15 AM	0	0	0	0	2	0	1	0	0	0	4	2	9
07:30 AM	0	0	0	0	2	0	1	0	0	0	2	0	5
07:45 AM	0	0	0	1	4	0	1	0	0	0	5	0	11
Total	0	0	0	1	9	0	3	0	1	0	14	2	30
08:00 AM	0	0	0	0	1	0	0	0	0	0	7	1	9
08:15 AM	0	0	0	0	2	0	0	0	1	0	4	0	7
08:30 AM	0	0	0	1	0	0	0	0	0	0	9	1	11
08:45 AM	0	0	0	0	6	0	0	0	2	0	7	1	16
Total	0	0	0	1	9	0	0	0	3	0	27	3	43
Grand Total	0	0	0	2	18	0	3	0	4	0	41	5	73
Apprch %	0	0	0	10	90	0	42.9	0	57.1	0	89.1	10.9	
Total %	0	0	0	2.7	24.7	0	4.1	0	5.5	0	56.2	6.8	

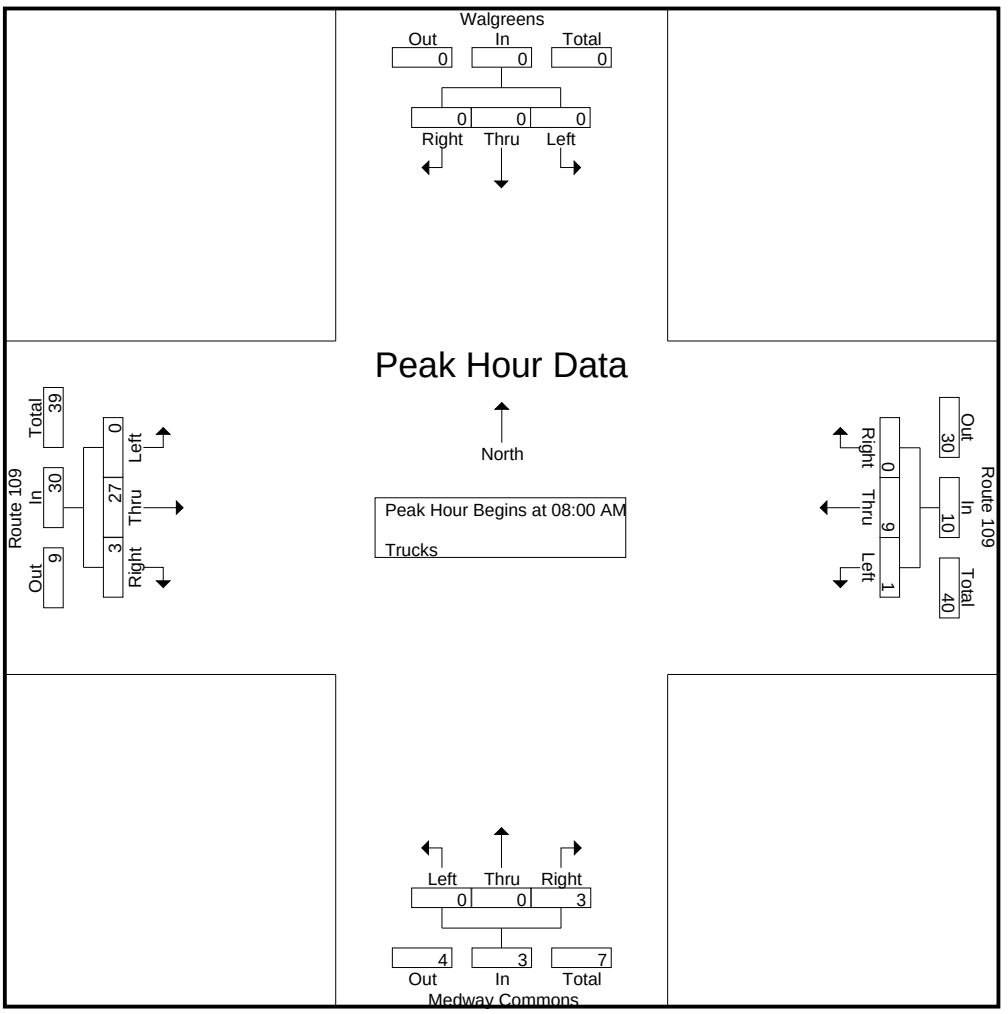
	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	7	**1**	8	9
08:15 AM	0	0	0	0	0	2	0	2	0	0	1	1	0	4	0	4	7
08:30 AM	0	0	0	0	**1**	0	0	1	0	0	0	0	0	**9**	1	**10**	11
08:45 AM	0	0	0	0	0	**6**	0	**6**	0	0	**2**	**2**	0	7	1	8	**16**
Total Volume	0	0	0	0	1	9	0	10	0	0	3	3	0	27	3	30	43
% App. Total	0	0	0		10	90	0		0	0	100		0	90	10		
PHF	.000	.000	.000	.000	.250	.375	.000	.417	.000	.000	.375	.375	.000	.750	.750	.750	.672

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 8



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

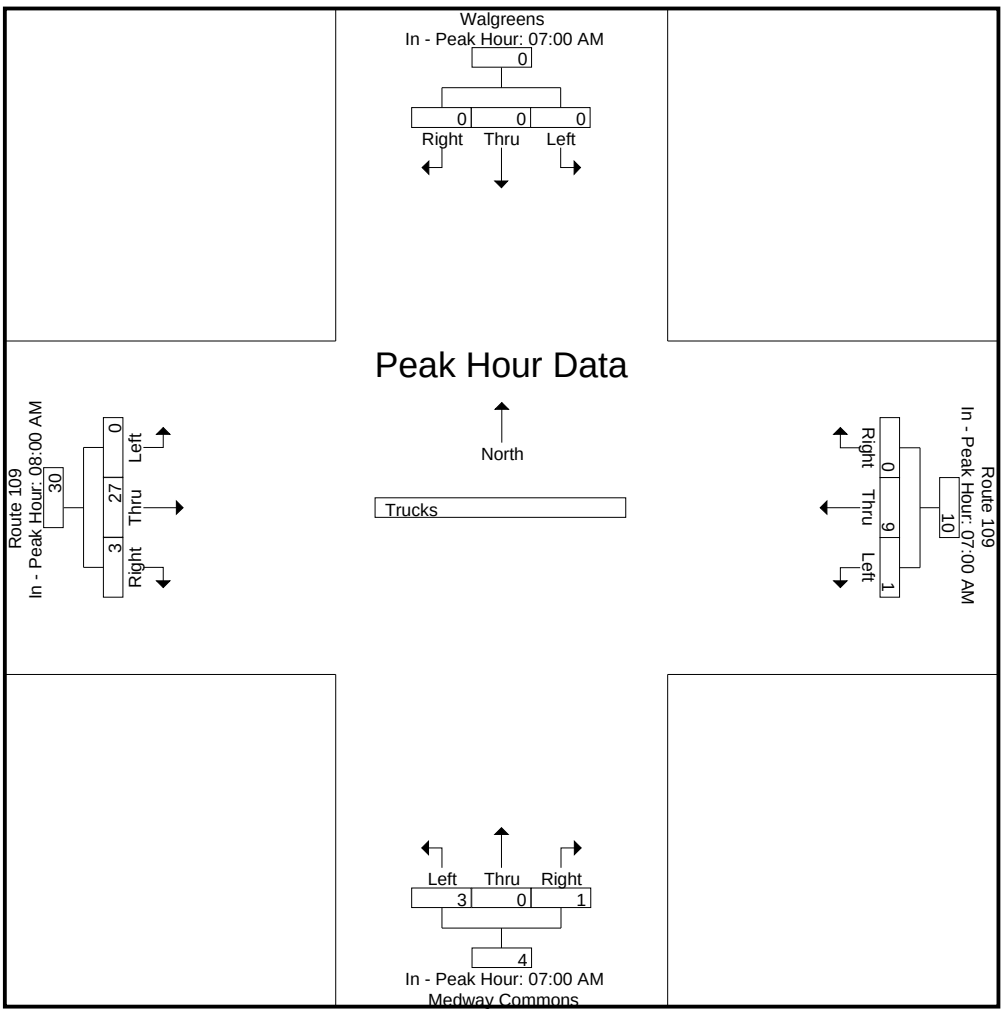
	07:00 AM				07:00 AM				07:00 AM				08:00 AM			
+0 mins.	0	0	0	0	0	1	0	1	0	0	**1**	**1**	0	7	**1**	8
+15 mins.	0	0	0	0	0	2	0	2	**1**	0	0	1	0	4	0	4
+30 mins.	0	0	0	0	0	2	0	2	1	0	0	1	0	**9**	1	**10**
+45 mins.	0	0	0	0	**1**	**4**	0	**5**	1	0	0	1	0	7	1	8
Total Volume	0	0	0	0	1	9	0	10	3	0	1	4	0	27	3	30
% App. Total	0	0	0		10	90	0		75	0	25		0	90	10	
PHF	.000	.000	.000	.000	.250	.563	.000	.500	.750	.000	.250	1.000	.000	.750	.750	.750

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022

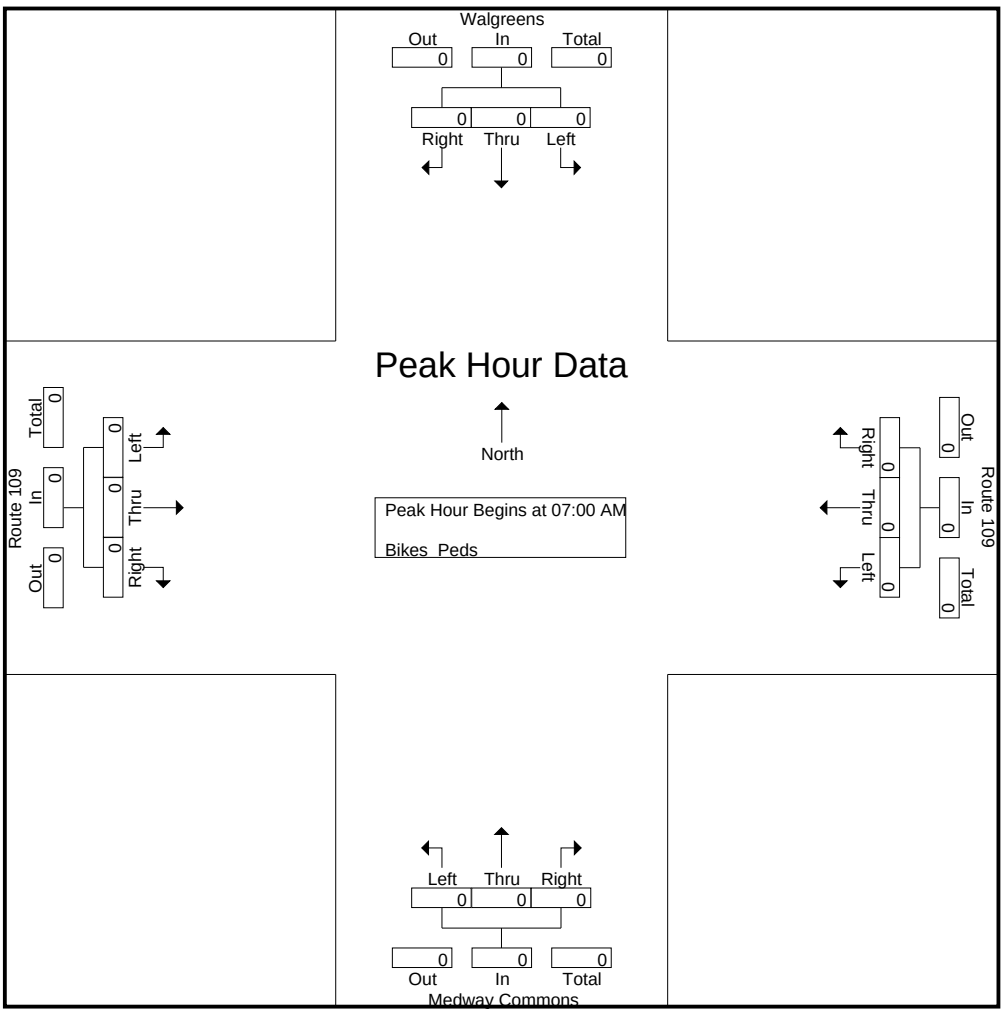
Groups Printed- Bikes Peds

	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Grand Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 11



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

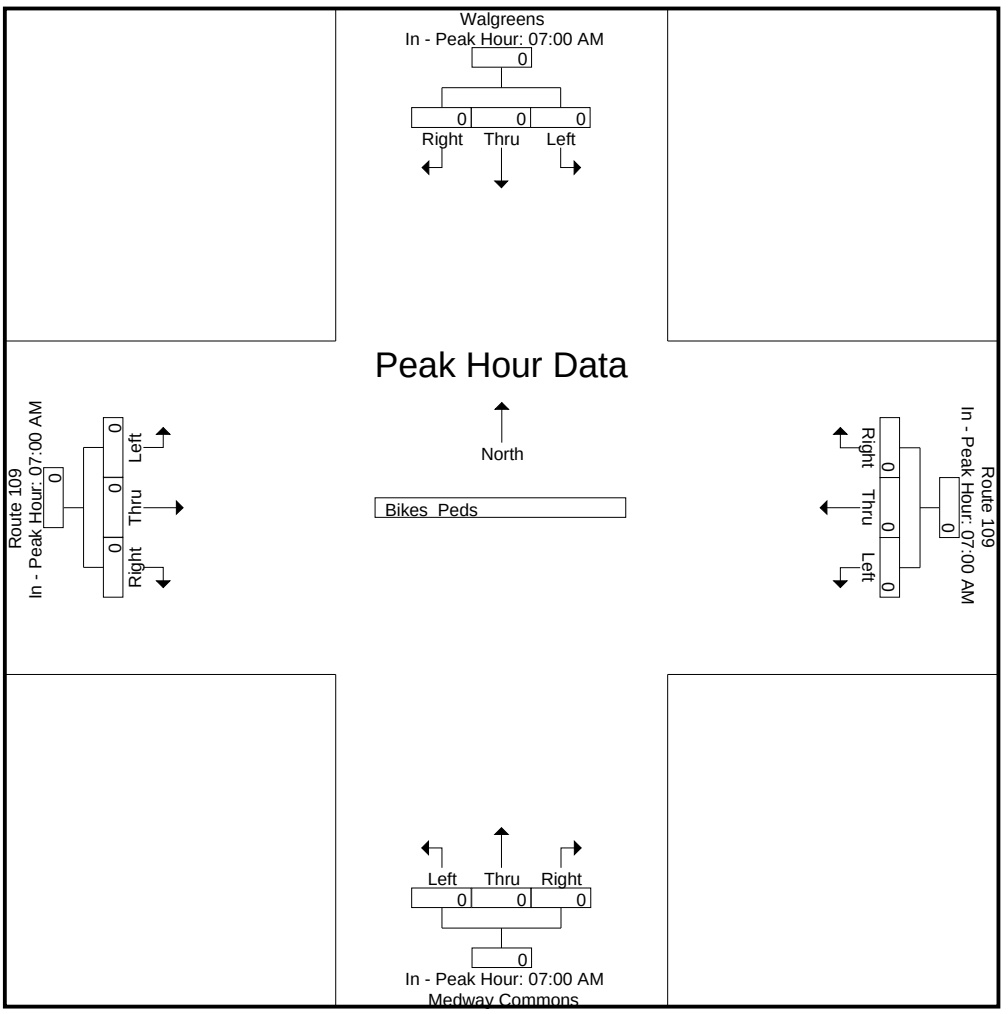
	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022

Groups Printed- Cars - Trucks

	Walgreens From North			Route 109 From East			Medway Commons From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	3	1	9	31	111	5	18	0	13	8	88	40	327
04:15 PM	4	1	7	29	113	3	20	2	19	7	98	30	333
04:30 PM	3	0	4	22	128	2	16	0	19	3	86	29	312
04:45 PM	4	3	6	22	106	3	15	5	14	6	87	33	304
Total	14	5	26	104	458	13	69	7	65	24	359	132	1276
05:00 PM	1	1	4	13	112	1	22	1	13	10	81	34	293
05:15 PM	4	3	5	33	94	4	14	4	23	2	94	31	311
05:30 PM	3	5	3	22	118	6	19	0	20	1	87	29	313
05:45 PM	1	2	4	20	102	3	29	1	23	7	77	23	292
Total	9	11	16	88	426	14	84	6	79	20	339	117	1209
Grand Total	23	16	42	192	884	27	153	13	144	44	698	249	2485
Apprch %	28.4	19.8	51.9	17.4	80.1	2.4	49.4	4.2	46.5	4.4	70.4	25.1	
Total %	0.9	0.6	1.7	7.7	35.6	1.1	6.2	0.5	5.8	1.8	28.1	10	
Cars	23	16	42	189	877	27	152	13	143	44	690	249	2465
% Cars	100	100	100	98.4	99.2	100	99.3	100	99.3	100	98.9	100	99.2
Trucks	0	0	0	3	7	0	1	0	1	0	8	0	20
% Trucks	0	0	0	1.6	0.8	0	0.7	0	0.7	0	1.1	0	0.8

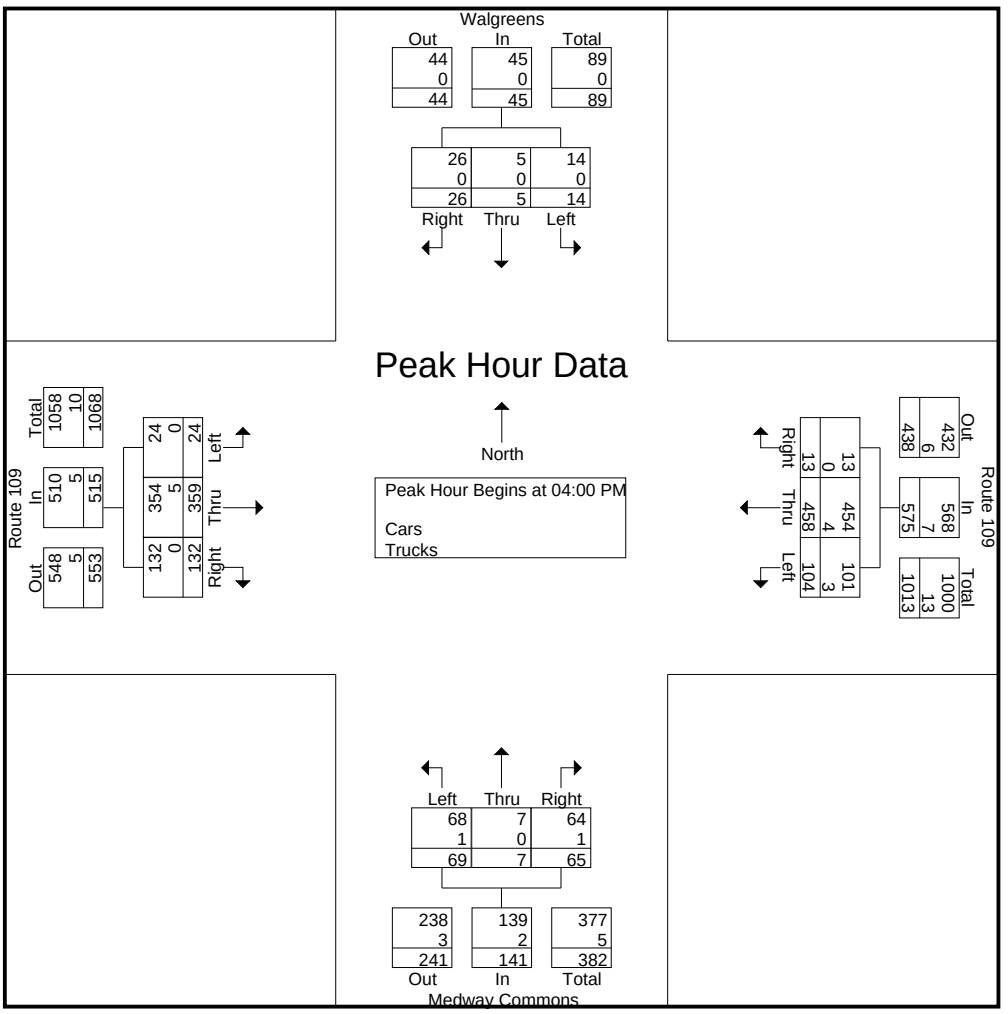
	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	3	1	**9**	**13**	**31**	111	**5**	147	18	0	13	31	**8**	88	**40**	**136**	327
04:15 PM	**4**	1	7	12	29	113	3	145	**20**	2	**19**	**41**	7	**98**	30	135	**333**
04:30 PM	3	0	4	7	22	**128**	2	**152**	16	0	19	35	3	86	29	118	312
04:45 PM	4	**3**	6	13	22	106	3	131	15	**5**	14	34	6	87	33	126	304
Total Volume	14	5	26	45	104	458	13	575	69	7	65	141	24	359	132	515	1276
% App. Total	31.1	11.1	57.8		18.1	79.7	2.3		48.9	5	46.1		4.7	69.7	25.6		
PHF	.875	.417	.722	.865	.839	.895	.650	.946	.863	.350	.855	.860	.750	.916	.825	.947	.958
Cars	14	5	26	45	101	454	13	568	68	7	64	139	24	354	132	510	1262
% Cars	100	100	100	100	97.1	99.1	100	98.8	98.6	100	98.5	98.6	100	98.6	100	99.0	98.9
Trucks	0	0	0	0	3	4	0	7	1	0	1	2	0	5	0	5	14
% Trucks	0	0	0	0	2.9	0.9	0	1.2	1.4	0	1.5	1.4	0	1.4	0	1.0	1.1

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

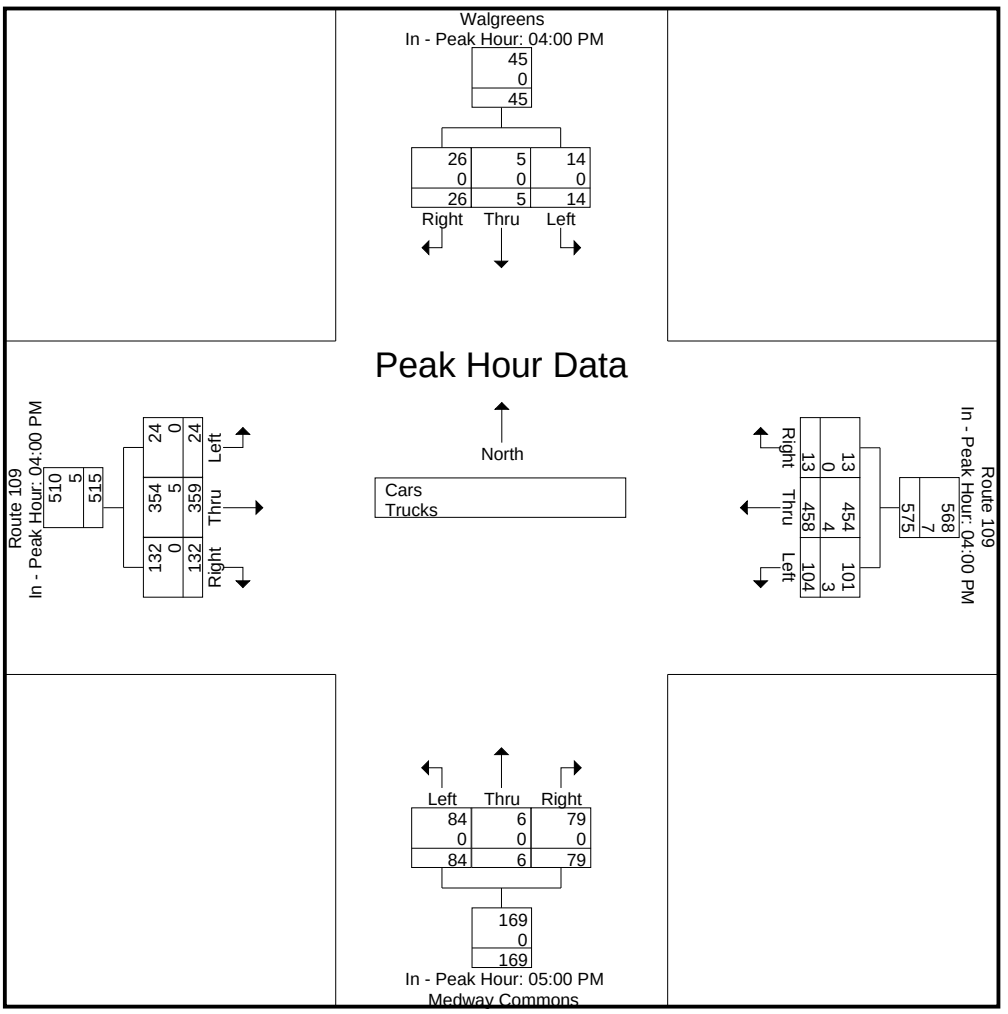
	04:00 PM				04:00 PM				05:00 PM				04:00 PM			
+0 mins.	3	1	**9**	**13**	**31**	111	**5**	147	22	1	13	36	**8**	88	**40**	**136**
+15 mins.	**4**	1	7	12	29	113	3	145	14	**4**	**23**	41	7	**98**	30	135
+30 mins.	3	0	4	7	22	**128**	2	**152**	19	0	20	39	3	86	29	118
+45 mins.	4	**3**	6	13	22	106	3	131	**29**	1	23	**53**	6	87	33	126
Total Volume	14	5	26	45	104	458	13	575	84	6	79	169	24	359	132	515
% App. Total	31.1	11.1	57.8		18.1	79.7	2.3		49.7	3.6	46.7		4.7	69.7	25.6	
PHF	.875	.417	.722	.865	.839	.895	.650	.946	.724	.375	.859	.797	.750	.916	.825	.947
Cars	14	5	26	45	101	454	13	568	84	6	79	169	24	354	132	510
% Cars	100	100	100	100	97.1	99.1	100	98.8	100	100	100	100	100	98.6	100	99
Trucks	0	0	0	0	3	4	0	7	0	0	0	0	0	5	0	5
% Trucks	0	0	0	0	2.9	0.9	0	1.2	0	0	0	0	0	1.4	0	1

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022

Groups Printed- Cars

	Walgreens From North			Route 109 From East			Medway Commons From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	3	1	9	29	111	5	17	0	13	8	86	40	322
04:15 PM	4	1	7	29	110	3	20	2	19	7	96	30	328
04:30 PM	3	0	4	21	128	2	16	0	19	3	86	29	311
04:45 PM	4	3	6	22	105	3	15	5	13	6	86	33	301
Total	14	5	26	101	454	13	68	7	64	24	354	132	1262
05:00 PM	1	1	4	13	110	1	22	1	13	10	81	34	291
05:15 PM	4	3	5	33	93	4	14	4	23	2	93	31	309
05:30 PM	3	5	3	22	118	6	19	0	20	1	86	29	312
05:45 PM	1	2	4	20	102	3	29	1	23	7	76	23	291
Total	9	11	16	88	423	14	84	6	79	20	336	117	1203
Grand Total	23	16	42	189	877	27	152	13	143	44	690	249	2465
Apprch %	28.4	19.8	51.9	17.3	80.2	2.5	49.4	4.2	46.4	4.5	70.2	25.3	
Total %	0.9	0.6	1.7	7.7	35.6	1.1	6.2	0.5	5.8	1.8	28	10.1	

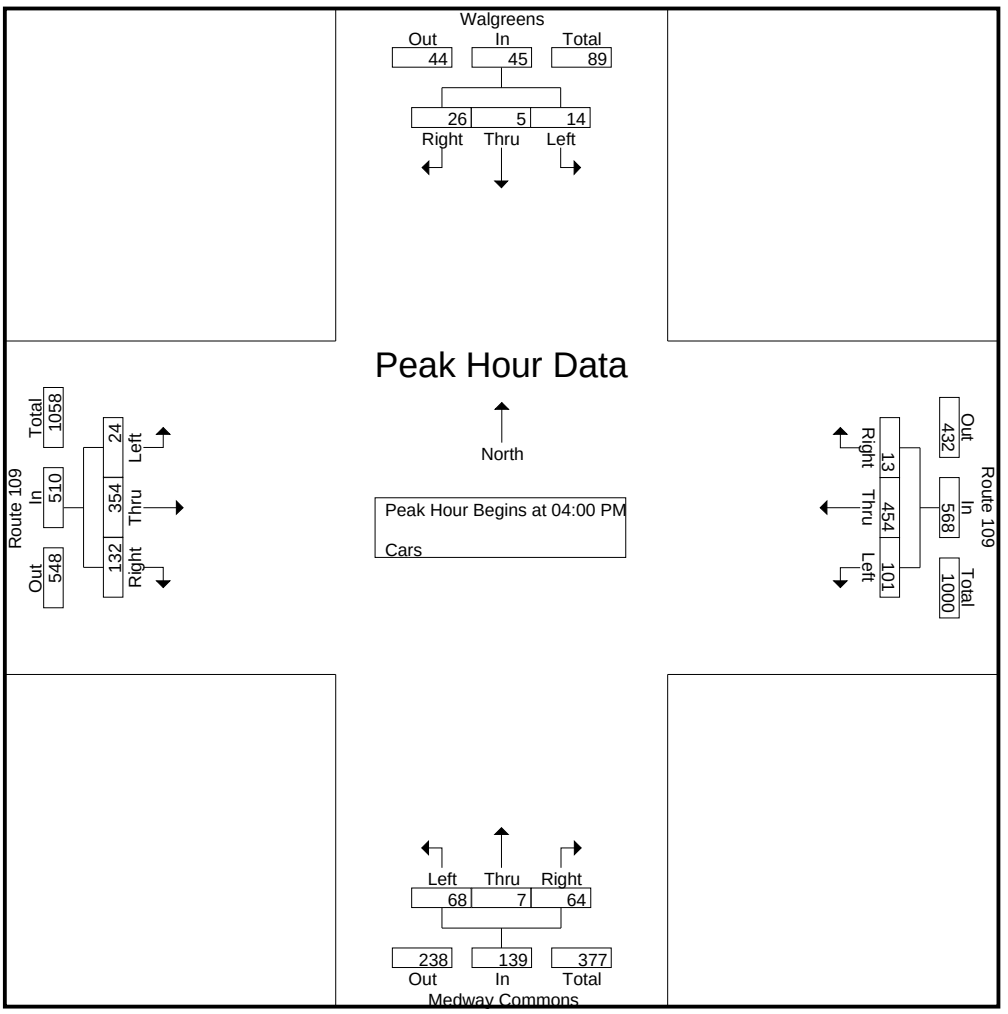
	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	3	1	**9**	**13**	**29**	111	**5**	145	17	0	13	30	**8**	86	**40**	**134**	322
04:15 PM	**4**	1	7	12	29	110	3	142	**20**	2	**19**	**41**	7	**96**	30	133	**328**
04:30 PM	3	0	4	7	21	**128**	2	**151**	16	0	19	35	3	86	29	118	311
04:45 PM	4	**3**	6	13	22	105	3	130	15	**5**	13	33	6	86	33	125	301
Total Volume	14	5	26	45	101	454	13	568	68	7	64	139	24	354	132	510	1262
% App. Total	31.1	11.1	57.8		17.8	79.9	2.3		48.9	5	46		4.7	69.4	25.9		
PHF	.875	.417	.722	.865	.871	.887	.650	.940	.850	.350	.842	.848	.750	.922	.825	.951	.962

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 5



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

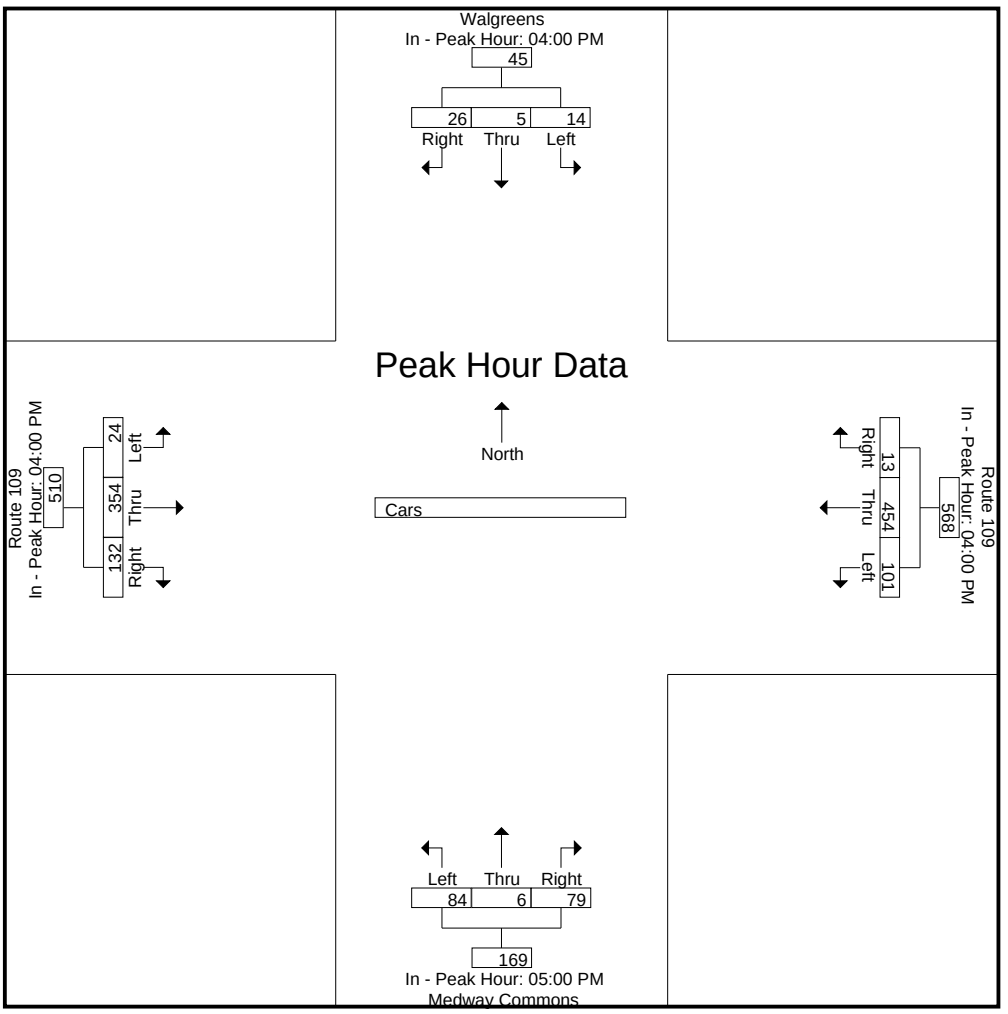
	04:00 PM				04:00 PM				05:00 PM				04:00 PM			
+0 mins.	3	1	**9**	**13**	**29**	111	**5**	145	22	1	13	36	**8**	86	**40**	**134**
+15 mins.	**4**	1	7	12	29	110	3	142	14	**4**	**23**	41	7	**96**	30	133
+30 mins.	3	0	4	7	21	**128**	2	**151**	19	0	20	39	3	86	29	118
+45 mins.	4	**3**	6	13	22	105	3	130	**29**	1	23	**53**	6	86	33	125
Total Volume	14	5	26	45	101	454	13	568	84	6	79	169	24	354	132	510
% App. Total	31.1	11.1	57.8		17.8	79.9	2.3		49.7	3.6	46.7		4.7	69.4	25.9	
PHF	.875	.417	.722	.865	.871	.887	.650	.940	.724	.375	.859	.797	.750	.922	.825	.951

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022

Groups Printed- Trucks

	Walgreens From North			Route 109 From East			Medway Commons From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	0	2	0	0	1	0	0	0	2	0	5
04:15 PM	0	0	0	0	3	0	0	0	0	0	2	0	5
04:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	1	0	0	0	1	0	1	0	3
Total	0	0	0	3	4	0	1	0	1	0	5	0	14
05:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
05:15 PM	0	0	0	0	1	0	0	0	0	0	1	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	3	0	0	0	0	0	3	0	6
Grand Total	0	0	0	3	7	0	1	0	1	0	8	0	20
Apprch %	0	0	0	30	70	0	50	0	50	0	100	0	
Total %	0	0	0	15	35	0	5	0	5	0	40	0	

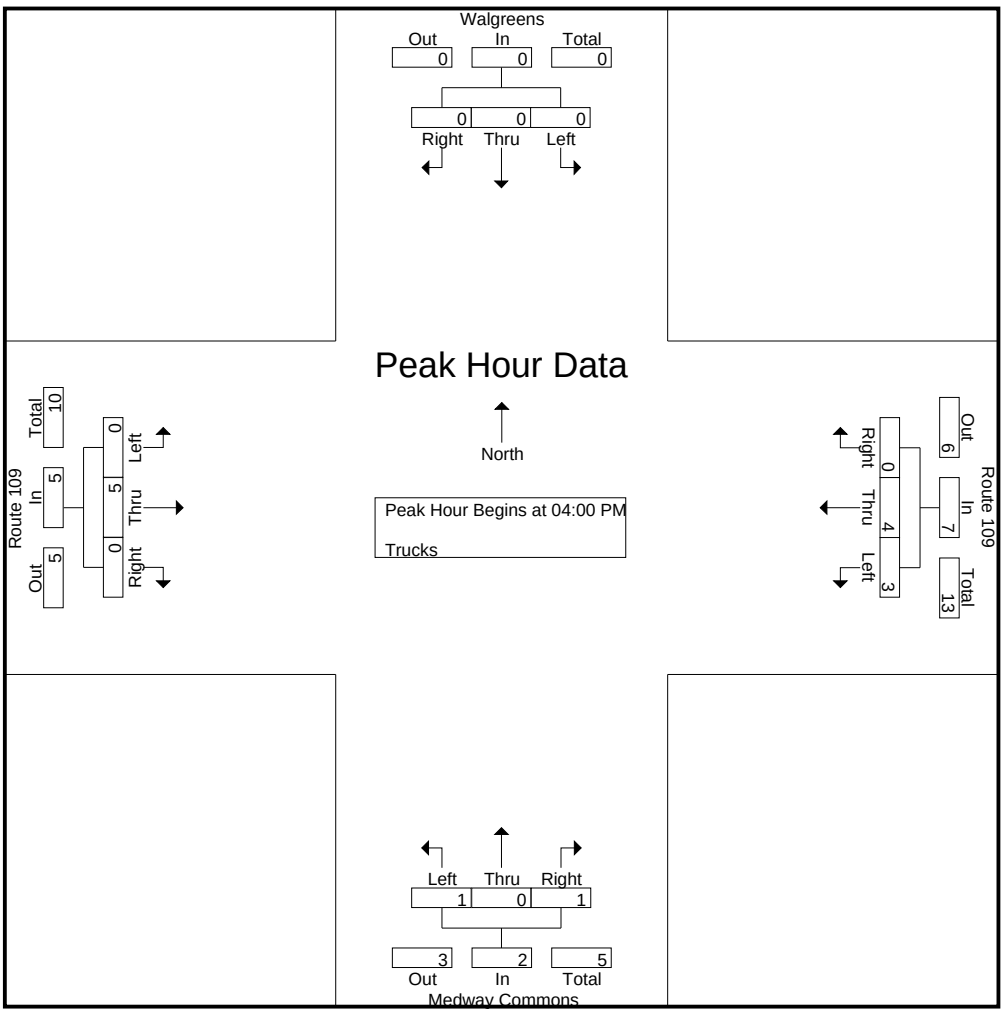
	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	**2**	0	0	2	**1**	0	0	**1**	0	**2**	0	**2**	**5**
04:15 PM	0	0	0	0	0	**3**	0	**3**	0	0	0	0	0	2	0	2	5
04:30 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	1	0	1	0	0	**1**	1	0	1	0	1	3
Total Volume	0	0	0	0	3	4	0	7	1	0	1	2	0	5	0	5	14
% App. Total	0	0	0		42.9	57.1	0		50	0	50		0	100	0		
PHF	.000	.000	.000	.000	.375	.333	.000	.583	.250	.000	.250	.500	.000	.625	.000	.625	.700

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 8



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

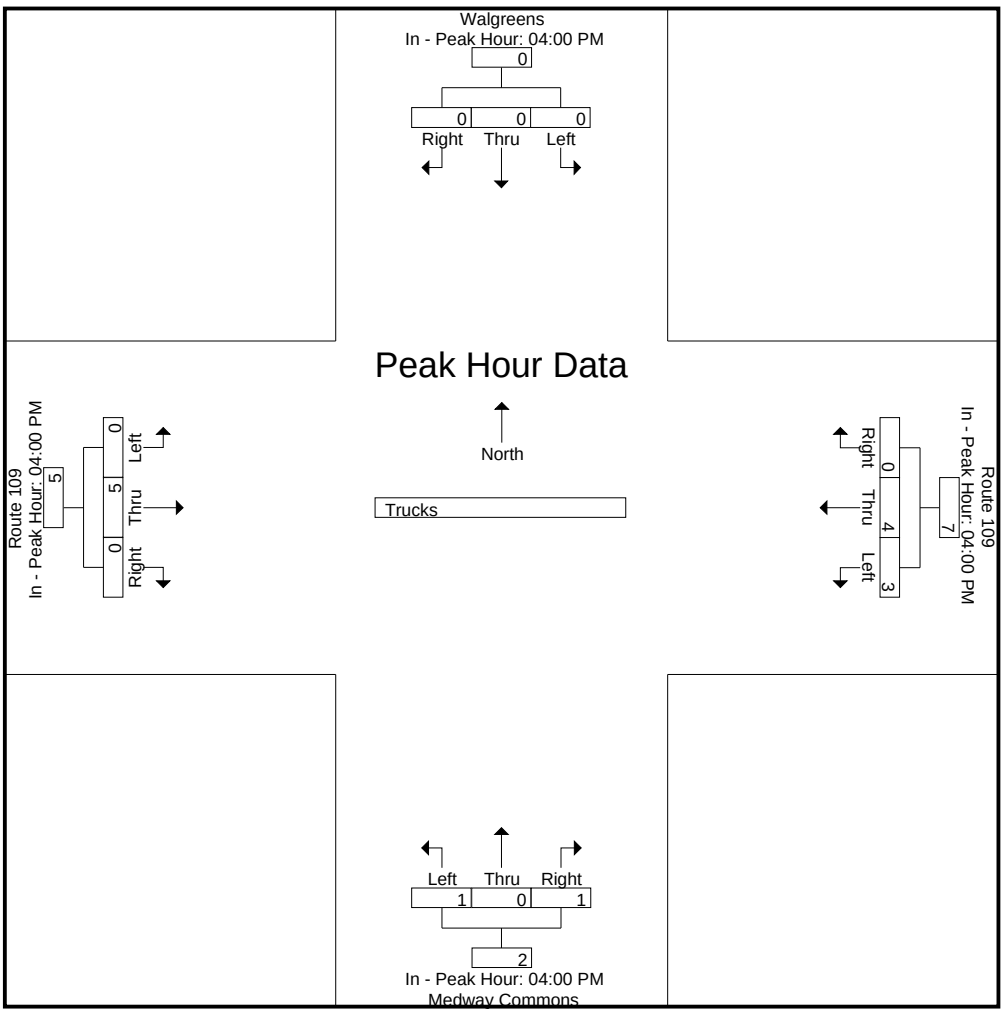
	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	**2**	0	0	2	**1**	0	0	**1**	0	**2**	0	**2**
+15 mins.	0	0	0	0	0	**3**	0	**3**	0	0	0	0	0	2	0	2
+30 mins.	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	1	0	1	0	0	**1**	1	0	1	0	1
Total Volume	0	0	0	0	3	4	0	7	1	0	1	2	0	5	0	5
% App. Total	0	0	0		42.9	57.1	0		50	0	50		0	100	0	
PHF	.000	.000	.000	.000	.375	.333	.000	.583	.250	.000	.250	.500	.000	.625	.000	.625

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022

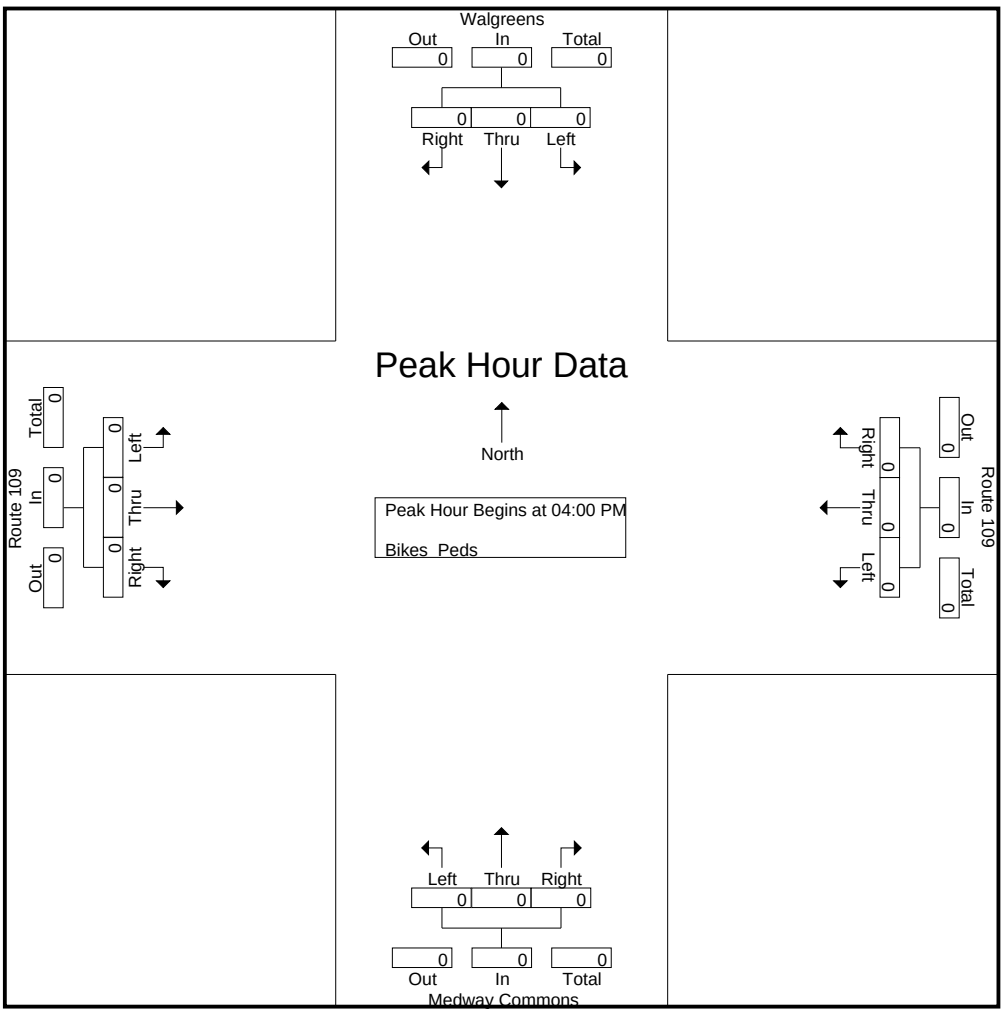
Groups Printed- Bikes Peds

	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 11



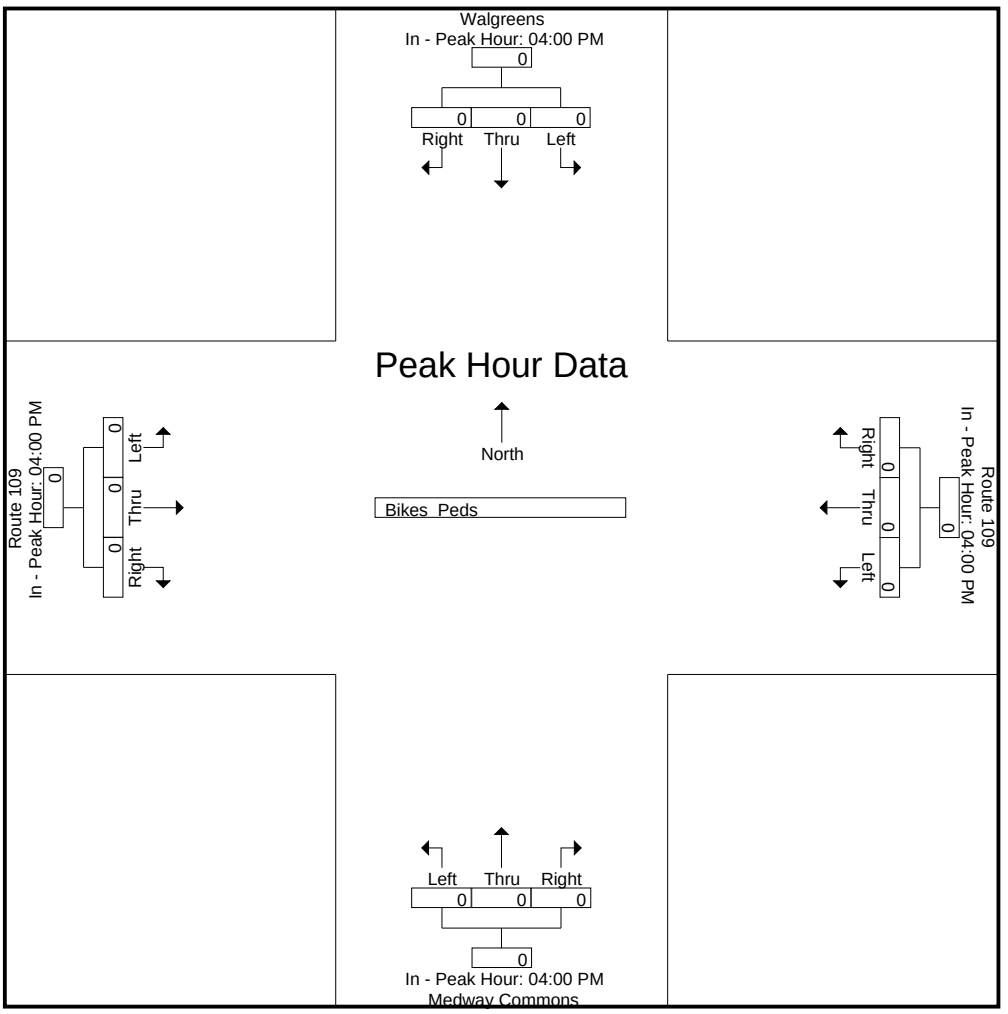
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts
978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 92420002
Site Code : 92420002
Start Date : 2/17/2022
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022
Page No : 1

Groups Printed- Cars - Trucks

	Walgreens From North			Route 109 From East			Medway Commons From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
11:00 AM	2	2	6	29	123	6	27	3	21	6	80	34	339
11:15 AM	4	3	11	20	101	7	25	3	19	9	85	41	328
11:30 AM	2	5	6	20	102	3	27	2	34	8	105	39	353
11:45 AM	1	3	5	17	102	3	41	3	35	1	100	36	347
Total	9	13	28	86	428	19	120	11	109	24	370	150	1367
12:00 PM	3	0	10	21	96	5	32	1	22	5	101	31	327
12:15 PM	4	3	5	17	97	1	38	2	23	4	74	37	305
12:30 PM	0	3	4	16	92	3	33	2	25	4	93	38	313
12:45 PM	1	1	8	13	82	2	32	1	20	6	93	23	282
Total	8	7	27	67	367	11	135	6	90	19	361	129	1227
01:00 PM	2	1	4	11	117	4	25	0	18	4	95	25	306
01:15 PM	0	5	7	22	80	3	26	3	27	8	97	36	314
01:30 PM	3	3	3	18	108	1	24	1	19	2	87	45	314
01:45 PM	2	1	5	19	106	2	32	1	27	6	97	42	340
Total	7	10	19	70	411	10	107	5	91	20	376	148	1274
Grand Total	24	30	74	223	1206	40	362	22	290	63	1107	427	3868
Apprch %	18.8	23.4	57.8	15.2	82.1	2.7	53.7	3.3	43	3.9	69.3	26.7	
Total %	0.6	0.8	1.9	5.8	31.2	1	9.4	0.6	7.5	1.6	28.6	11	
Cars	24	30	74	223	1205	40	361	22	290	63	1105	427	3864
% Cars	100	100	100	100	99.9	100	99.7	100	100	100	99.8	100	99.9
Trucks	0	0	0	0	1	0	1	0	0	0	2	0	4
% Trucks	0	0	0	0	0.1	0	0.3	0	0	0	0.2	0	0.1

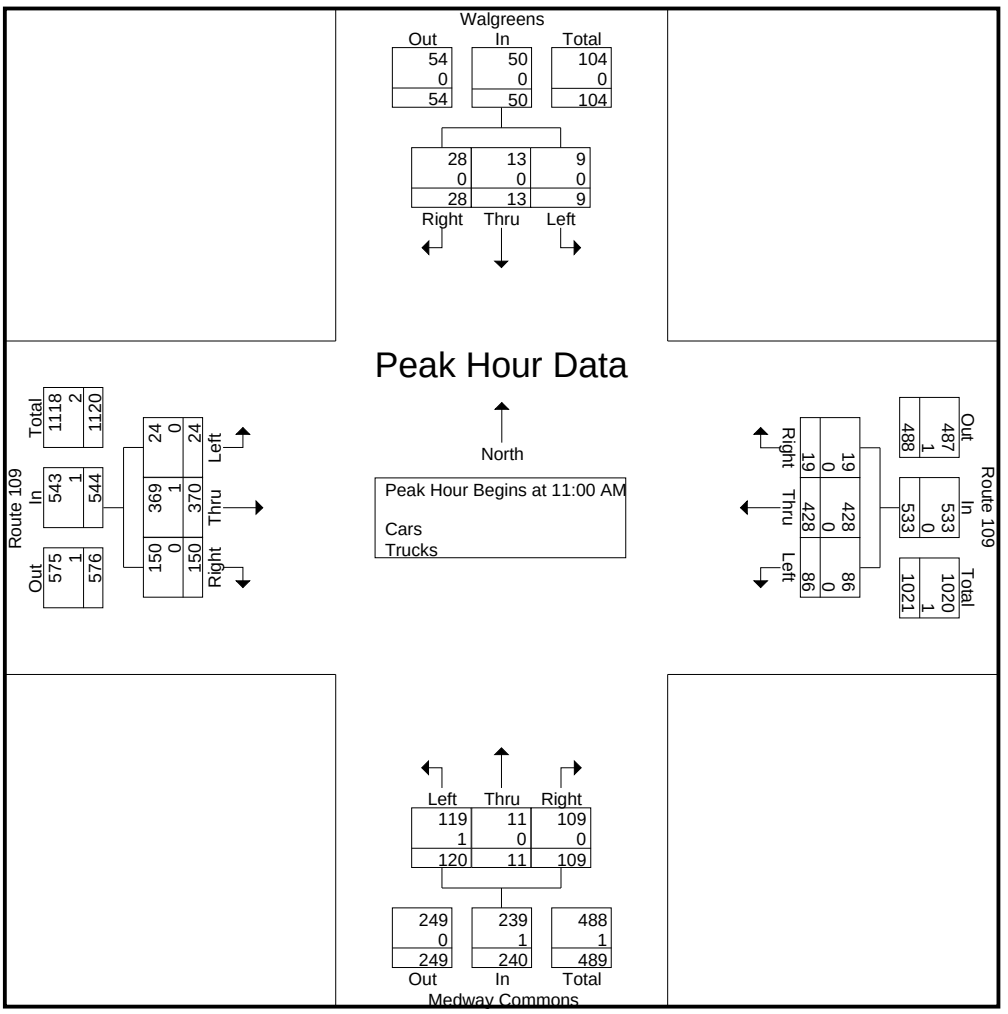
	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	2	2	6	10	**29**	**123**	6	**158**	27	**3**	21	51	6	80	34	120	339
11:15 AM	**4**	3	**11**	**18**	20	101	**7**	128	25	3	19	47	**9**	85	**41**	135	328
11:30 AM	2	**5**	6	13	20	102	3	125	27	2	34	63	8	**105**	39	**152**	**353**
11:45 AM	1	3	5	9	17	102	3	122	**41**	3	**35**	**79**	1	100	36	137	347
Total Volume	9	13	28	50	86	428	19	533	120	11	109	240	24	370	150	544	1367
% App. Total	18	26	56		16.1	80.3	3.6		50	4.6	45.4		4.4	68	27.6		
PHF	.563	.650	.636	.694	.741	.870	.679	.843	.732	.917	.779	.759	.667	.881	.915	.895	.968
Cars	9	13	28	50	86	428	19	533	119	11	109	239	24	369	150	543	1365
% Cars	100	100	100	100	100	100	100	100	99.2	100	100	99.6	100	99.7	100	99.8	99.9
Trucks	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	2
% Trucks	0	0	0	0	0	0	0	0	0.8	0	0	0.4	0	0.3	0	0.2	0.1

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022
Page No : 2



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

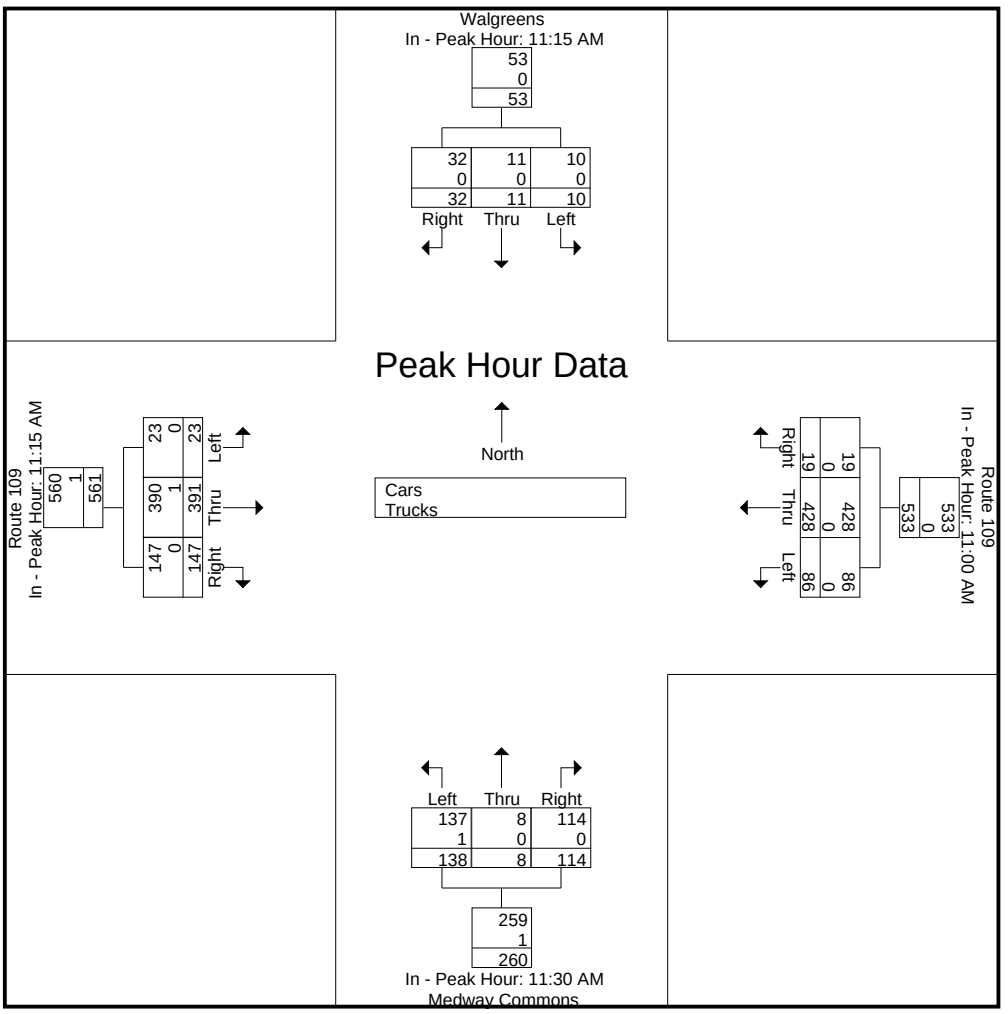
	11:15 AM				11:00 AM				11:30 AM				11:15 AM			
+0 mins.	**4**	3	**11**	**18**	**29**	**123**	6	**158**	27	2	34	63	**9**	85	**41**	135
+15 mins.	2	**5**	6	13	20	101	**7**	128	**41**	**3**	**35**	**79**	8	**105**	39	**152**
+30 mins.	1	3	5	9	20	102	3	125	32	1	22	55	1	100	36	137
+45 mins.	3	0	10	13	17	102	3	122	38	2	23	63	5	101	31	137
Total Volume	10	11	32	53	86	428	19	533	138	8	114	260	23	391	147	561
% App. Total	18.9	20.8	60.4		16.1	80.3	3.6		53.1	3.1	43.8		4.1	69.7	26.2	
PHF	.625	.550	.727	.736	.741	.870	.679	.843	.841	.667	.814	.823	.639	.931	.896	.923
Cars	10	11	32	53	86	428	19	533	137	8	114	259	23	390	147	560
% Cars	100	100	100	100	100	100	100	100	99.3	100	100	99.6	100	99.7	100	99.8
Trucks	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1
% Trucks	0	0	0	0	0	0	0	0	0.7	0	0	0.4	0	0.3	0	0.2

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022
Page No : 4

Groups Printed- Cars

	Walgreens From North			Route 109 From East			Medway Commons From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
11:00 AM	2	2	6	29	123	6	27	3	21	6	80	34	339
11:15 AM	4	3	11	20	101	7	25	3	19	9	85	41	328
11:30 AM	2	5	6	20	102	3	27	2	34	8	105	39	353
11:45 AM	1	3	5	17	102	3	40	3	35	1	99	36	345
Total	9	13	28	86	428	19	119	11	109	24	369	150	1365
12:00 PM	3	0	10	21	96	5	32	1	22	5	101	31	327
12:15 PM	4	3	5	17	97	1	38	2	23	4	74	37	305
12:30 PM	0	3	4	16	91	3	33	2	25	4	93	38	312
12:45 PM	1	1	8	13	82	2	32	1	20	6	93	23	282
Total	8	7	27	67	366	11	135	6	90	19	361	129	1226
01:00 PM	2	1	4	11	117	4	25	0	18	4	94	25	305
01:15 PM	0	5	7	22	80	3	26	3	27	8	97	36	314
01:30 PM	3	3	3	18	108	1	24	1	19	2	87	45	314
01:45 PM	2	1	5	19	106	2	32	1	27	6	97	42	340
Total	7	10	19	70	411	10	107	5	91	20	375	148	1273
Grand Total	24	30	74	223	1205	40	361	22	290	63	1105	427	3864
Apprch %	18.8	23.4	57.8	15.2	82.1	2.7	53.6	3.3	43.1	3.9	69.3	26.8	
Total %	0.6	0.8	1.9	5.8	31.2	1	9.3	0.6	7.5	1.6	28.6	11.1	

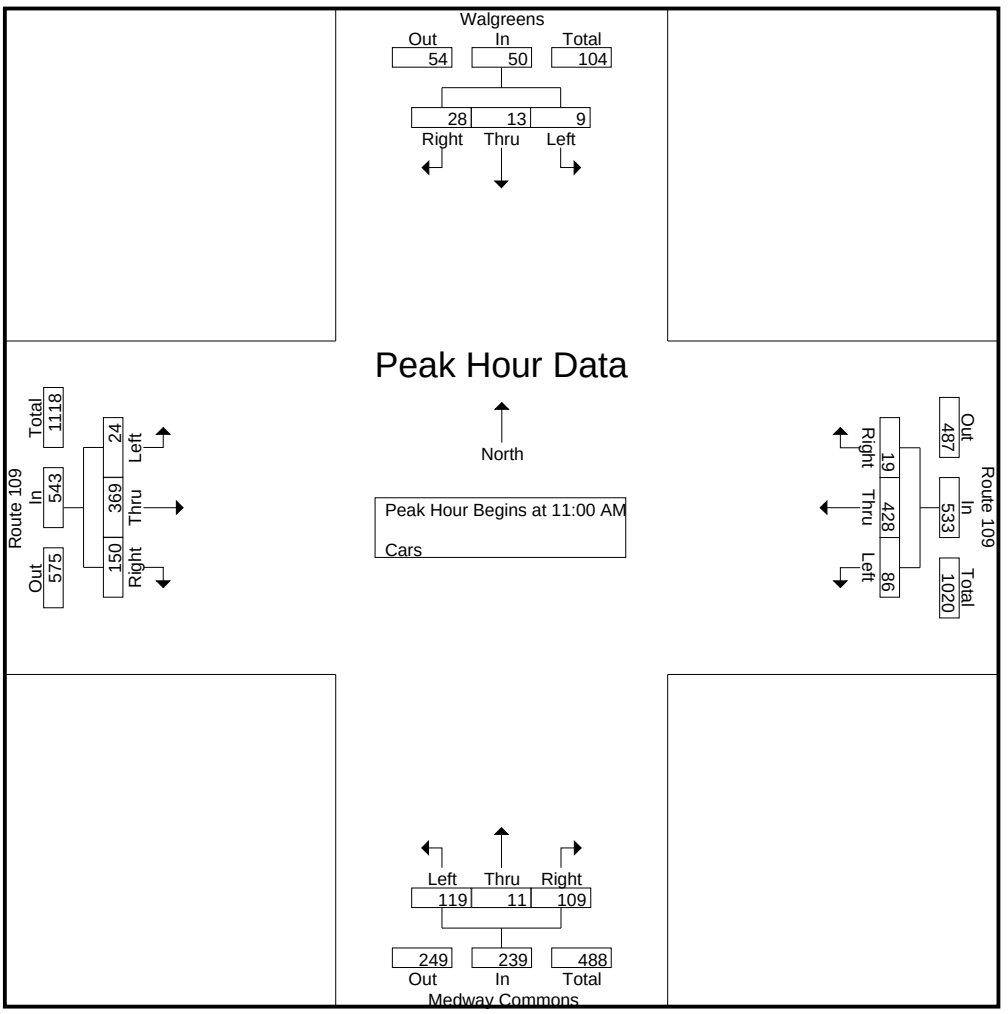
	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	2	2	6	10	**29**	**123**	6	**158**	27	**3**	21	51	6	80	34	120	339
11:15 AM	**4**	3	**11**	**18**	20	101	**7**	128	25	3	19	47	**9**	85	**41**	135	328
11:30 AM	2	**5**	6	13	20	102	3	125	27	2	34	63	8	**105**	39	**152**	**353**
11:45 AM	1	3	5	9	17	102	3	122	**40**	3	**35**	**78**	1	99	36	136	345
Total Volume	9	13	28	50	86	428	19	533	119	11	109	239	24	369	150	543	1365
% App. Total	18	26	56		16.1	80.3	3.6		49.8	4.6	45.6		4.4	68	27.6		
PHF	.563	.650	.636	.694	.741	.870	.679	.843	.744	.917	.779	.766	.667	.879	.915	.893	.967

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022
Page No : 5



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

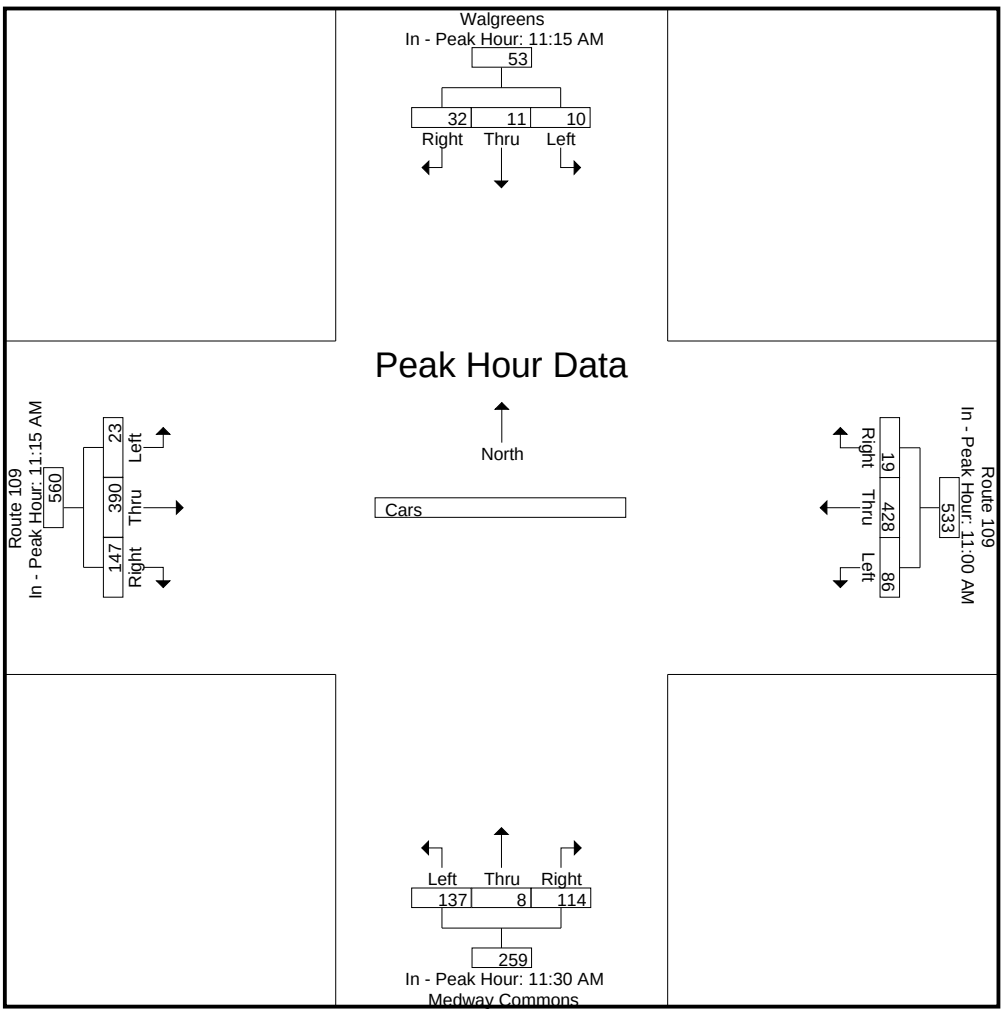
	11:15 AM				11:00 AM				11:30 AM				11:15 AM			
+0 mins.	**4**	3	**11**	**18**	**29**	**123**	6	**158**	27	2	34	63	**9**	85	**41**	135
+15 mins.	2	**5**	6	13	20	101	**7**	128	**40**	**3**	**35**	**78**	8	**105**	39	**152**
+30 mins.	1	3	5	9	20	102	3	125	32	1	22	55	1	99	36	136
+45 mins.	3	0	10	13	17	102	3	122	38	2	23	63	5	101	31	137
Total Volume	10	11	32	53	86	428	19	533	137	8	114	259	23	390	147	560
% App. Total	18.9	20.8	60.4		16.1	80.3	3.6		52.9	3.1	44		4.1	69.6	26.2	
PHF	.625	.550	.727	.736	.741	.870	.679	.843	.856	.667	.814	.830	.639	.929	.896	.921

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022

Groups Printed- Trucks

	Walgreens From North			Route 109 From East			Medway Commons From South			Route 109 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	1	0	0	0	1	0	2
Total	0	0	0	0	0	0	1	0	0	0	1	0	2
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	0	0	0	0	0	1
01:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	1	0	1
Grand Total	0	0	0	0	1	0	1	0	0	0	2	0	4
Apprch %	0	0	0	0	100	0	100	0	0	0	100	0	
Total %	0	0	0	0	25	0	25	0	0	0	50	0	

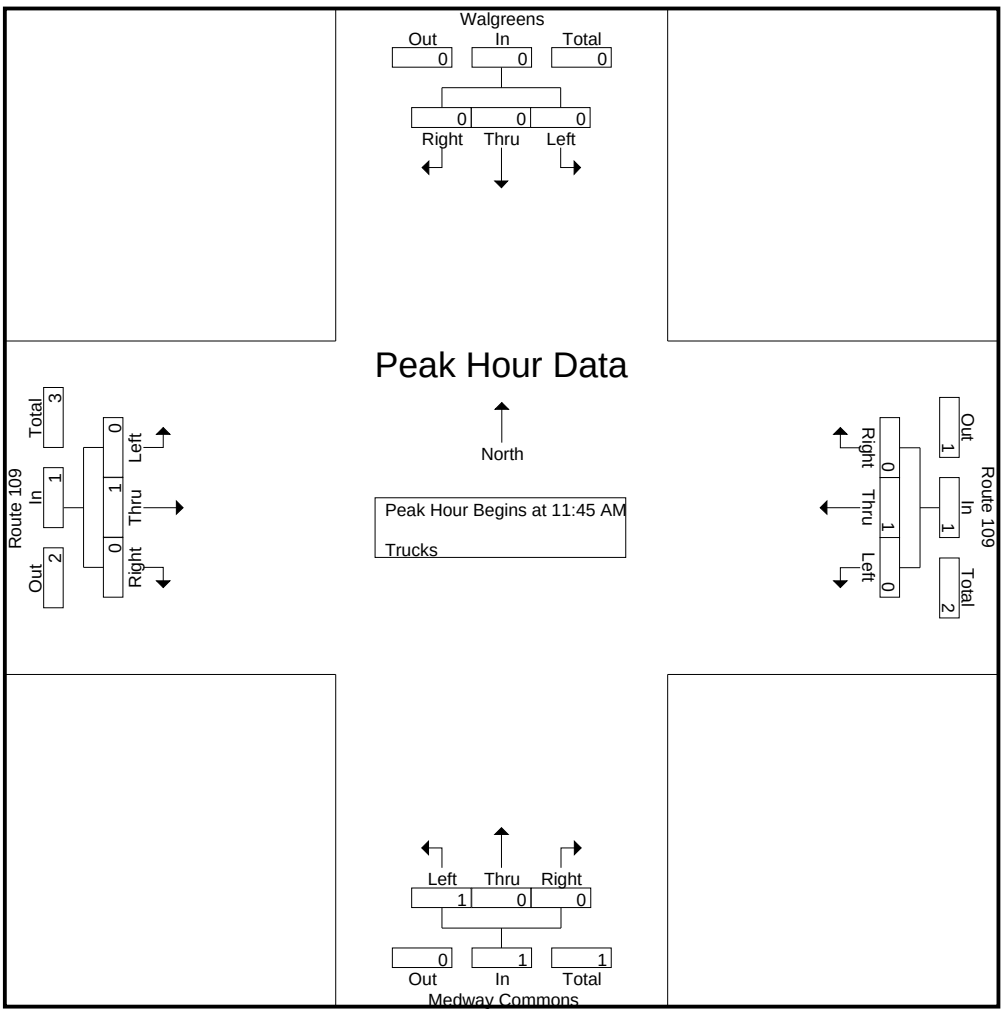
	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	**1**	0	**1**	**2**
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	1	3
% App. Total	0	0	0		0	100	0		100	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.250	.000	.000	.250	.000	.250	.000	.250	.375

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022
Page No : 8



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

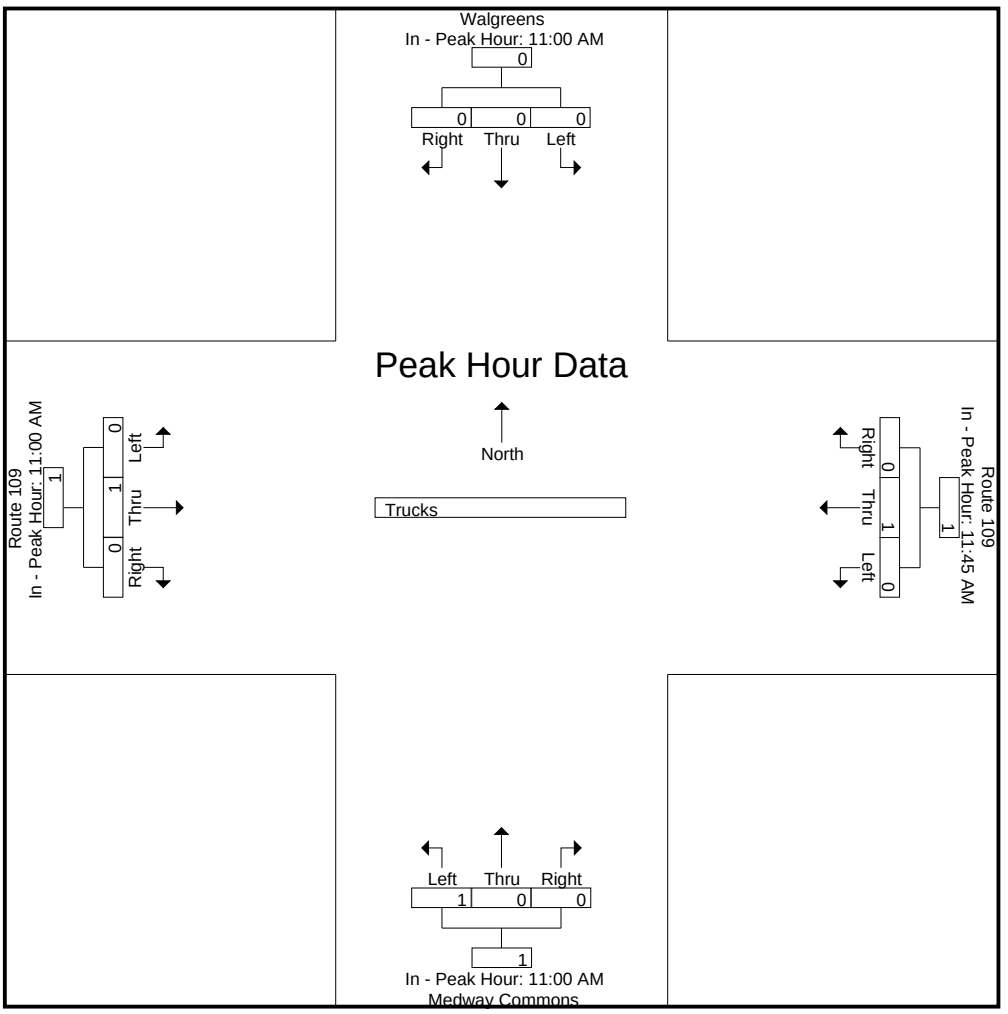
	11:00 AM				11:45 AM				11:00 AM				11:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	**1**	0	**1**	**1**	0	0	**1**	0	**1**	0	**1**
Total Volume	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	1
% App. Total	0	0	0		0	100	0		100	0	0		0	100	0	
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.250	.000	.000	.250	.000	.250	.000	.250

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022

Groups Printed- Bikes Peds

	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
12:00 PM	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	2
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	2	1	3
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Grand Total	0	0	0	4	0	0	0	0	1	0	0	0	0	0	0	0	4	1	5
Apprch %	0	0	0		0	0	0		100	0	0		0	0	0				
Total %	0	0	0		0	0	0		100	0	0		0	0	0		80	20	

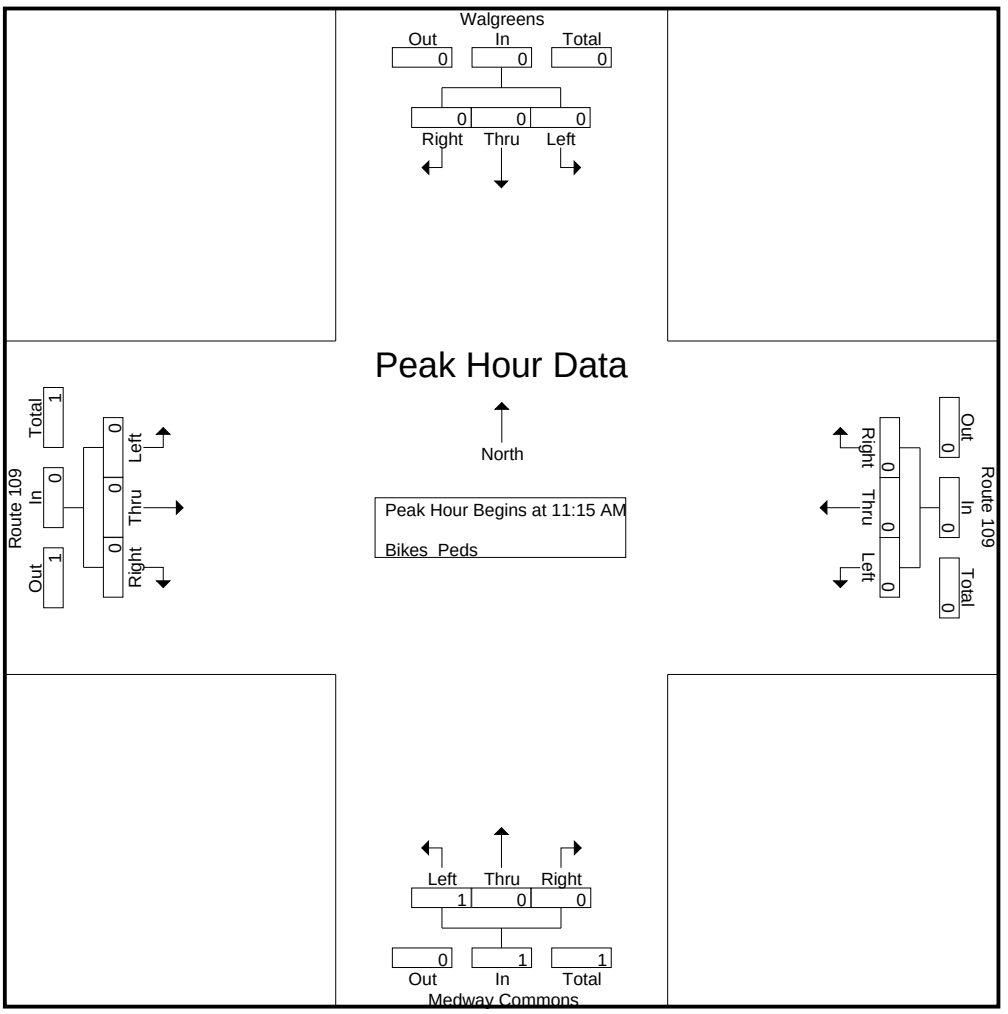
	Walgreens From North				Route 109 From East				Medway Commons From South				Route 109 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0	**1**
Total Volume	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
% App. Total	0	0	0		0	0	0		100	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.250

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022
Page No : 11



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

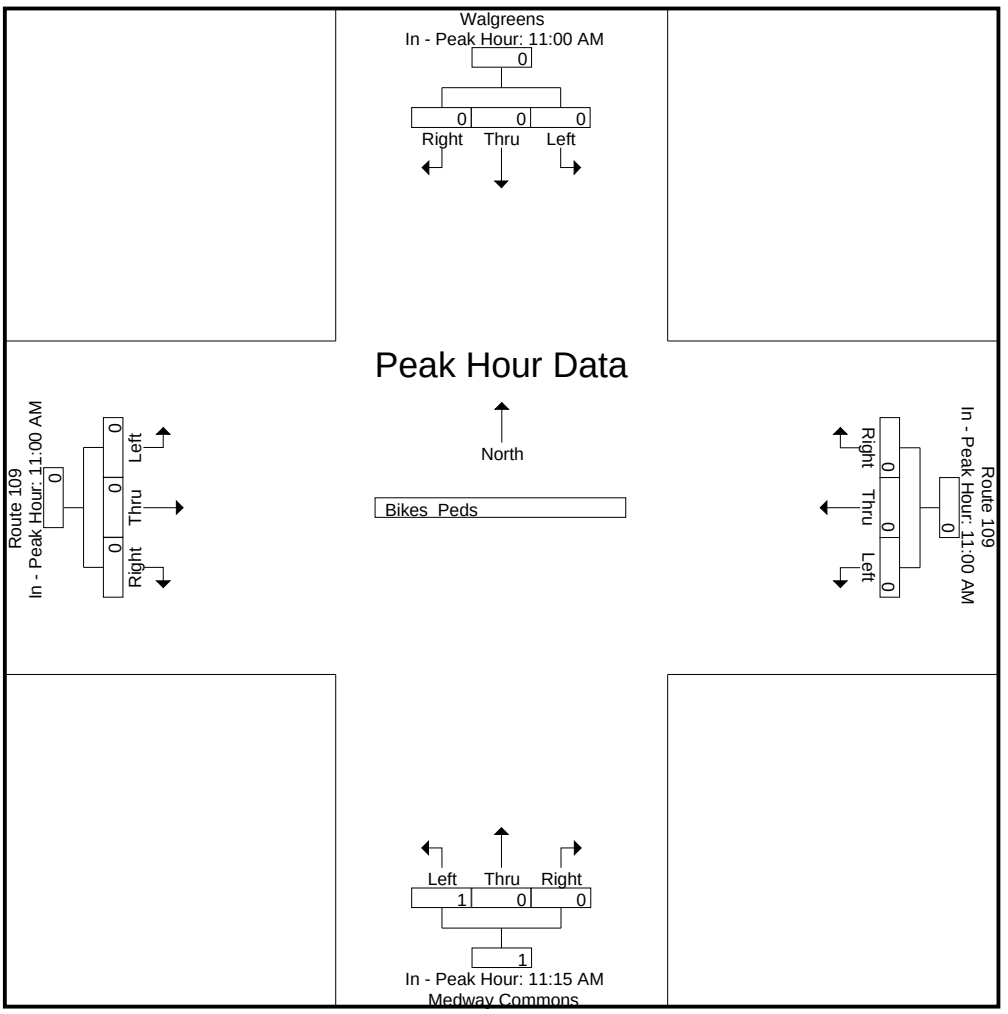
	11:00 AM				11:00 AM				11:15 AM				11:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
% App. Total	0	0	0		0	0	0		100	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Walgreens / Medway Commons
E/W Street : Route 109
City/State : Medway, MA
Weather : Cloudy

File Name : 924200S2
Site Code : 92420002
Start Date : 2/19/2022
Page No : 12



SEASONAL ADJUSTMENT DATA

Massachusetts Highway Department

3180: Monthly Hourly Volume for February 2019

Location ID:	**3180**	**Seasonal Factor Group:**	**U1-Boston**
County:	**Norfolk**	**Daily Factor Group:**	
Functional Class	**1**	**Axle Factor Group:**	**U1-Boston**
Location:	**INTERSTATE 495**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	516	347	311	387	817	2575	5282	7295	6673	4738	4088	4341	4680	5004	6310	7847	7485	7917	5209	3226	2401	1795	1524	1140	91908	Accepted
2	686	423	369	294	378	951	1744	2419	3359	3715	4358	4837	5177	5153	5069	5157	5109	4497	3670	2537	2002	1741	1396	858	65899	Accepted
3	482	319	207	162	169	353	691	1117	1661	2347	3214	3947	4138	4251	4034	4079	3942	3308	1783	872	822	647	1736	1623	45904	Accepted
4																										
5	343	260	245	368	754	2547	5867	8301	7208	5300	4104	3808	4101	4348	5412	6661	7603	7860	5192	2908	2009	1342	933	655	88129	Accepted
6	330	244	219	344	731	2583	5755	8339	7001	5179	3846	4030	4240	4280	5352	7133	8119	7835	4870	2816	1869	1385	929	607	88036	Accepted
7	339	234	253	352	734	2492	5225	8008	7074	5158	3887	3802	4030	4307	5491	7019	7736	7655	4971	2884	2049	1576	1017	708	87001	Accepted
8	433	279	272	358	689	2373	5153	7346	6424	4924	4193	4472	4768	5258	6125	8021	8194	7844	5359	3212	2233	1771	1345	869	91915	Accepted
9	545	384	282	246	389	819	1697	2294	2863	3618	4375	5068	5302	5175	5175	5292	5121	4553	3844	2678	2038	1779	1345	1035	65917	Accepted
10	579	367	210	160	168	393	901	1239	1686	2669	3681	4524	4973	5109	5078	5249	5038	4242	3331	2554	1728	1224	768	476	56347	Accepted
11	263	200	186	318	729	2652	5680	8361	7146	5124	3949	3937	4019	4336	5144	6640	7547	7997	4917	2707	1863	1324	875	609	86523	Accepted
12	306	274	272	362	746	2642	5545	7901	6296	4314	3670	4035	5399	5213	4786	4416	3675	2252	1372	678	610	463	422	325	65974	Accepted
13	265	245	215	298	587	2108	4532	7071	6581	4562	3544	3619	3779	3829	4947	6558	7530	7573	4779	2835	1947	1519	977	719	80619	Accepted
14	375	281	256	377	715	2542	5705	8248	7254	5345	4141	4051	4363	4673	5739	7399	8218	8274	5379	3079	2003	1456	1085	754	91712	Accepted
15	458	300	259	359	704	2395	5351	7413	6289	4890	4348	4561	5071	5791	6750	8495	8777	7994	5425	3546	2262	1755	1393	905	95491	Accepted
16	635	377	291	261	340	778	1531	2204	3023	3903	4776	5395	5576	5434	5446	5491	5374	4781	3857	2664	2071	1668	1470	1066	68412	Accepted
17	539	319	235	171	160	410	797	1180	1822	2780	3922	4689	4984	5141	5054	5071	4943	4433	3616	2564	1946	1482	978	585	57821	Accepted
18	313	279	209	286	442	1077	2275	3763	3618	2999	3088	3548	3829	4102	4466	5017	5356	5191	3241	2203	1645	1172	805	560	59484	Accepted
19	315	236	250	355	735	2669	5545	6832	6240	5118	4366	4450	4662	4765	5740	6881	7669	7971	5052	2782	1942	1450	996	626	87647	Accepted
20	360	263	303	389	813	2663	5515	7693	6870	4943	4283	4427	4558	4807	5735	7118	8074	7823	5019	2668	1851	1279	904	572	88930	Accepted
21	419	275	274	316	621	1885	3941	6425	5960	4424	4018	4235	4270	4512	5591	6797	7509	7730	5139	3057	2232	1589	1127	741	83087	Accepted
22	432	311	268	359	688	2410	4722	6580	6223	5207	4736	5059	5240	5845	6804	7954	8139	7673	5282	3426	2317	1720	1345	974	93714	Accepted
23	594	384	346	244	346	775	1525	2379	2961	3796	4782	5039	5579	5411	5591	5622	5380	4953	3951	2853	2248	1937	1572	994	69262	Accepted
24	661	352	251	171	162	369	663	1053	1560	2420	3334	4308	4875	4738	4689	4833	4319	3708	3041	2201	1663	1151	752	515	51789	Accepted
25	271	193	195	315	728	2628	4553	7552	6860	4873	3892	3829	3889	3989	4904	6391	7363	7307	4502	2578	1754	1195	821	570	81152	Accepted
26	338	277	264	334	711	2628	6071	8576	7095	5312	4136	4074	4220	4341	5352	6911	7892	7884	5266	2892	2036	1478	1047	732	89867	Accepted
27	369	276	268	323	710	2769	5951	7272	7349	5288	4061	4181	4297	4362	5682	7141	8213	8020	5006	2671	1866	1274	820	761	88930	Accepted
28	594	308	292	391	669	1798	4288	6040	6006	5143	4141	3813	3947	3982	5126	6526	7172	7449	4950	2936	2230	1617	1059	802	81279	Accepted
																								February Average	**77880**	
																								2019 AADT	**87592**	
																								Seasonal Adjustment	**1.125**	

COVID-19 ADJUSTMENT DATA

Covid Adjustments for Route 109 at the Medway Commons driveway and the Project site driveway

October 2, 2018 Turning Movement Counts

$Weekday\ Morning\ Peak\ Hour\ Volume = 988$
$Weekday\ Evening\ Peak\ Hour\ Volume = 1{,}243$

Growth Rate (2018-2019): 0.4% [MassDOT Yearly Growth Rates]
Growth Rate (2019-2020): 0.0% [MassDOT Guidance on Traffic Count Data]
Growth Rate (2020-2021): 1.0% [Assumed]
Growth Rate (2021-2022): 1.0% [Assumed]
$Total\ Growth\ Adjustment$: $(1.004) \times (1.000) \times (1.010) \times (1.010) = 1.024$

Seasonal Adjustment: 0.93 [MassDOT 2019 Weekday Seasonal Factors – Group U3]

$Weekday\ Morning = 988 \times (1.024) \times (0.93) = 941$
$Weekday\ Evening = 1{,}243 \times (1.024) \times (0.93) = 1{,}184$

February 17, 2022 Turning Movement Counts

$Weekday\ Morning\ Peak\ Hour\ Volume = 1{,}048$
$Weekday\ Evening\ Peak\ Hour\ Volume = 1{,}276$

Seasonal Adjustment: 1.03 [MassDOT 2019 Weekday Seasonal Factors – Group U3]

$Weekday\ Morning = 1{,}048 \times (1.03) = 1{,}079$
$Weekday\ Evening = 1{,}276 \times (1.03) = 1{,}314$

Covid Adjustments

$$Weekday\ Morning = \frac{941}{1{,}079} = 0.872$$
$$Weekday\ Evening = \frac{1{,}184}{1{,}314} = 0.901$$

VEHICLE TRAVEL SPEED DATA

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA
Direction: EB,

2/17/2022 Time	0 - 3 MPH	> 3 - 6 MPH	> 6 - 9 MPH	> 9 - 12 MPH	> 12 - 15 MPH	> 15 - 18 MPH	> 18 - 21 MPH	> 21 - 24 MPH	> 24 - 27 MPH	> 27 - 30 MPH	> 30 - 33 MPH	> 33 - 36 MPH	> 36 - 39 MPH	> 39 MPH	Total
12:00 AM	0	0	0	0	0	0	0	0	1	2	2	1	1	0	7
1:00	0	0	0	0	0	0	0	0	0	2	1	2	1	1	7
2:00	0	0	0	0	0	0	0	0	1	2	2	1	0	0	6
3:00	0	0	0	0	0	0	0	0	0	5	4	2	0	1	12
4:00	0	0	0	0	0	0	0	2	8	20	9	17	8	4	68
5:00	0	0	0	1	0	0	1	5	32	33	63	44	23	9	211
6:00	0	0	2	6	10	4	10	29	70	179	167	30	12	1	520
7:00	0	0	11	5	12	9	23	48	82	189	164	44	12	1	600
8:00	0	0	5	8	15	4	25	36	110	198	97	33	18	4	553
9:00	0	0	4	2	7	5	17	29	76	138	130	30	11	3	452
10:00	0	0	1	1	16	9	26	31	142	120	67	27	6	2	448
11:00	0	0	3	3	7	4	37	55	92	135	91	26	9	0	462
12:00 PM	0	0	5	4	2	22	31	52	111	165	87	21	10	3	513
1:00	0	0	0	2	3	5	13	45	124	137	85	14	6	9	443
2:00	0	0	6	7	13	11	44	36	125	150	65	15	8	3	483
3:00	0	0	5	6	13	12	26	28	124	126	137	29	14	0	520
4:00	0	0	9	13	16	14	21	54	104	145	83	26	13	2	500
5:00	0	0	3	5	11	15	22	61	113	123	84	24	12	3	476
6:00	0	0	0	0	3	1	3	30	111	73	89	36	16	1	363
7:00	0	0	0	1	0	3	4	21	49	83	52	23	8	7	251
8:00	0	0	0	0	0	1	5	16	23	46	45	15	12	1	164
9:00	0	0	0	0	0	0	0	1	13	17	31	16	8	5	91
10:00	0	0	0	0	0	0	0	0	4	15	22	18	5	5	69
11:00	0	0	0	0	0	0	0	0	1	7	6	7	2	2	25
Total	0	0	54	64	128	119	308	579	1516	2110	1583	501	215	67	7244

Percentile	15th	50th	85th	95th
Speed	24	29	32	35

Mean Speed (Average)	28.7
10 MPH Pace Speed	24-33
Number in Pace	5379
Percent in Pace	74.3%
Number > 30 MPH	2366
Percent > 30 MPH	32.7%

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA
Direction: EB,

2/18/2022 Time	0 - 3 MPH	> 3 - 6 MPH	> 6 - 9 MPH	> 9 - 12 MPH	> 12 - 15 MPH	> 15 - 18 MPH	> 18 - 21 MPH	> 21 - 24 MPH	> 24 - 27 MPH	> 27 - 30 MPH	> 30 - 33 MPH	> 33 - 36 MPH	> 36 - 39 MPH	> 39 MPH	Total
12:00 AM	0	0	0	0	0	0	0	1	1	1	4	2	3	4	16
1:00	0	0	0	0	0	0	0	2	0	4	2	2	2	1	13
2:00	0	0	0	0	0	0	0	0	0	3	1	0	0	1	5
3:00	0	0	0	0	0	0	0	1	1	1	1	1	2	0	7
4:00	0	0	0	0	0	0	0	0	10	5	18	10	8	5	56
5:00	0	0	0	1	0	0	2	2	19	54	63	23	17	10	191
6:00	0	0	10	5	14	8	10	34	82	151	113	47	12	0	486
7:00	0	0	2	8	4	16	9	22	105	159	168	52	13	2	560
8:00	0	0	17	10	19	18	55	78	146	111	64	21	10	3	552
9:00	0	0	0	7	6	14	11	42	144	127	84	33	4	1	473
10:00	0	0	5	2	15	10	21	46	68	110	67	26	12	2	384
11:00	0	0	7	7	11	3	12	99	110	123	97	20	11	0	500
12:00 PM	0	0	6	6	21	11	22	57	102	146	79	13	6	5	474
1:00	0	0	12	2	5	12	21	48	123	147	97	18	9	3	497
2:00	0	0	8	4	10	13	24	56	139	143	60	30	9	2	498
3:00	0	0	11	7	6	5	24	60	131	170	99	26	6	6	551
4:00	0	0	3	2	8	4	8	21	108	144	119	33	14	3	467
5:00	0	0	7	3	12	5	16	28	142	127	85	31	16	1	473
6:00	0	0	0	0	10	11	13	16	86	124	66	33	15	0	374
7:00	0	0	0	0	7	1	5	7	76	87	44	27	11	6	271
8:00	0	0	0	0	1	2	0	7	34	45	59	23	16	3	190
9:00	0	0	0	0	0	0	0	3	7	40	32	15	5	5	107
10:00	0	0	0	0	0	0	0	2	4	19	35	20	5	4	89
11:00	0	0	0	0	0	0	0	4	2	7	17	11	8	3	52
Total	0	0	88	64	149	133	253	636	1640	2048	1474	517	214	70	7286
			Percentile	15th	50th	85th	95th								
			Speed	23	28	32	35								
		Mean Speed (Average)		28.5											
		10 MPH Pace Speed		23-32											
		Number in Pace		5346											
		Percent in Pace		73.4%											
		Number > 30 MPH		2275											
		Percent > 30 MPH		31.2%											

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA
Direction: EB,

2/19/2022 Time	0 - 3 MPH	> 3 - 6 MPH	> 6 - 9 MPH	> 9 - 12 MPH	> 12 - 15 MPH	> 15 - 18 MPH	> 18 - 21 MPH	> 21 - 24 MPH	> 24 - 27 MPH	> 27 - 30 MPH	> 30 - 33 MPH	> 33 - 36 MPH	> 36 - 39 MPH	> 39 MPH	Total
12:00 AM	0	0	0	0	0	0	0	0	4	5	6	5	1	0	21
1:00	0	0	0	0	0	0	0	0	3	1	4	3	1	0	12
2:00	0	0	0	0	0	0	0	1	0	4	1	1	2	3	12
3:00	0	0	0	0	0	0	0	0	0	4	2	0	0	0	6
4:00	0	0	0	0	0	0	0	0	1	7	5	4	4	6	27
5:00	0	0	0	0	0	0	0	0	1	10	18	16	8	15	68
6:00	0	0	0	0	0	0	1	2	13	31	49	25	8	9	138
7:00	0	0	0	0	3	3	0	3	21	59	84	47	28	10	258
8:00	0	0	1	7	2	6	3	13	56	126	78	51	17	1	361
9:00	0	0	2	1	4	9	12	18	114	135	89	30	20	1	435
10:00	0	0	2	4	4	9	17	50	103	182	93	25	9	2	500
11:00	0	0	5	1	3	7	35	64	134	193	61	26	6	1	536
12:00 PM	0	0	5	6	12	10	28	81	126	102	91	34	8	2	505
1:00	0	0	5	2	12	9	38	65	102	154	114	23	14	2	540
2:00	0	0	2	8	1	13	21	56	132	162	80	31	5	1	512
3:00	0	0	5	6	3	8	20	65	81	139	72	29	9	3	440
4:00	0	0	0	1	4	3	5	34	131	137	87	16	9	4	431
5:00	0	0	0	2	11	18	52	50	100	60	34	11	5	0	343
6:00	0	0	1	8	3	14	17	39	73	62	39	13	8	1	278
7:00	0	0	0	0	0	0	4	23	26	51	68	28	8	2	210
8:00	0	0	0	0	0	0	0	2	22	33	46	19	8	2	132
9:00	0	0	0	0	1	0	0	0	4	22	65	24	7	4	127
10:00	0	0	0	0	0	0	0	2	9	20	22	15	8	6	82
11:00	0	0	0	0	0	0	0	1	2	5	23	12	7	1	51
Total	0	0	28	46	63	109	253	569	1258	1704	1231	488	200	76	6025
			Percentile	15th	50th	85th	95th								
			Speed	23	29	32	35								
		Mean Speed (Average)		29.3											
		10 MPH Pace Speed		23-32											
		Number in Pace		4361											
		Percent in Pace		72.4%											
		Number > 30 MPH		1995											
		Percent > 30 MPH		33.1%											
Grand Total	0	0	170	174	340	361	814	1784	4414	5862	4288	1506	629	213	20555
Stats			Percentile	15th	50th	85th	95th								
			Speed	23	28	32	35								
		Mean Speed (Average)		28.8											
		10 MPH Pace Speed		23-32											
		Number in Pace		15075											
		Percent in Pace		73.3%											
		Number > 30 MPH		6636											
		Percent > 30 MPH		32.3%											

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA
Direction: WB,

2/17/2022 Time	0 - 3 MPH	> 3 - 6 MPH	> 6 - 9 MPH	> 9 - 12 MPH	> 12 - 15 MPH	> 15 - 18 MPH	> 18 - 21 MPH	> 21 - 24 MPH	> 24 - 27 MPH	> 27 - 30 MPH	> 30 - 33 MPH	> 33 - 36 MPH	> 36 - 39 MPH	> 39 MPH	Total
12:00 AM	0	0	0	0	1	2	1	2	4	5	3	3	1	0	22
1:00	0	0	0	0	0	0	1	0	1	1	5	1	1	0	10
2:00	0	0	0	0	0	0	1	0	3	0	0	1	2	0	7
3:00	0	0	1	0	0	0	1	2	4	2	0	1	3	0	14
4:00	0	0	0	0	0	1	3	1	3	5	2	1	1	1	18
5:00	0	0	0	1	1	1	7	5	11	11	15	9	4	4	69
6:00	0	0	4	7	7	14	18	31	39	26	21	15	8	7	197
7:00	0	0	16	14	22	24	38	40	53	45	31	13	9	2	307
8:00	0	0	19	20	36	31	54	45	60	31	20	10	6	1	333
9:00	0	0	20	28	36	29	53	34	53	46	24	19	5	2	349
10:00	0	0	27	24	38	47	55	44	50	25	18	3	4	0	335
11:00	0	0	31	29	33	29	75	64	49	31	14	4	1	1	361
12:00 PM	0	0	43	40	54	59	63	71	56	21	6	1	0	0	414
1:00	0	0	35	38	56	37	82	48	49	23	11	4	1	0	384
2:00	0	0	37	38	55	49	71	64	41	30	5	2	2	0	394
3:00	0	0	56	48	54	49	88	74	32	9	5	2	0	0	417
4:00	0	0	50	47	59	64	90	63	22	1	0	0	0	0	396
5:00	0	0	50	49	59	67	84	46	25	8	2	2	0	0	392
6:00	0	0	24	25	28	38	78	89	62	20	13	5	2	0	384
7:00	0	0	11	13	21	26	56	50	43	39	19	11	6	0	295
8:00	0	0	5	7	9	15	18	32	31	33	29	5	5	0	189
9:00	0	0	0	1	1	4	17	22	26	18	21	9	6	1	126
10:00	0	0	0	0	0	2	12	10	13	13	12	10	2	0	74
11:00	0	0	0	0	0	0	0	7	10	9	5	3	2	1	37
Total	0	0	429	429	570	588	966	844	740	452	281	134	71	20	5524

Percentile	15th	50th	85th	95th
Speed	12	20	28	32

Mean Speed (Average)	20.6
10 MPH Pace Speed	17-26
Number in Pace	2741
Percent in Pace	49.6%
Number > 30 MPH	506
Percent > 30 MPH	9.2%

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA
Direction: WB,

2/18/2022 Time	0 - 3 MPH	> 3 - 6 MPH	> 6 - 9 MPH	> 9 - 12 MPH	> 12 - 15 MPH	> 15 - 18 MPH	> 18 - 21 MPH	> 21 - 24 MPH	> 24 - 27 MPH	> 27 - 30 MPH	> 30 - 33 MPH	> 33 - 36 MPH	> 36 - 39 MPH	> 39 MPH	Total
12:00 AM	0	0	0	0	1	0	1	3	7	10	4	5	3	0	34
1:00	0	0	0	0	0	1	1	0	2	3	1	0	2	0	10
2:00	0	0	0	0	0	0	0	1	0	2	2	1	1	0	7
3:00	0	0	0	0	0	0	0	4	5	1	2	2	3	0	17
4:00	0	0	0	0	0	0	0	1	2	3	1	1	3	0	11
5:00	0	0	0	0	0	3	5	6	7	10	12	8	4	3	58
6:00	0	0	3	3	3	8	21	24	47	25	27	10	10	1	182
7:00	0	0	14	17	21	31	36	38	56	28	33	11	1	0	286
8:00	0	0	24	21	34	27	58	40	47	26	16	4	3	0	300
9:00	0	0	13	21	31	24	40	56	68	33	16	11	3	5	321
10:00	0	0	32	23	47	35	50	47	59	34	20	5	2	0	354
11:00	0	0	24	32	45	47	68	62	52	32	20	7	5	2	396
12:00 PM	0	0	33	35	54	58	56	68	61	36	8	2	2	0	413
1:00	0	0	40	33	46	48	64	54	76	30	9	4	2	0	406
2:00	0	0	41	23	45	43	99	88	47	32	17	2	1	4	442
3:00	0	0	62	51	50	50	89	73	41	3	1	0	0	1	421
4:00	0	0	49	53	58	63	86	53	26	4	0	0	0	0	392
5:00	0	0	53	45	57	57	100	98	50	11	0	0	0	0	471
6:00	0	0	35	29	40	61	92	68	60	36	21	9	2	0	453
7:00	0	0	19	20	34	34	45	60	53	37	26	5	5	1	339
8:00	0	0	4	3	14	5	26	44	39	29	35	5	6	0	210
9:00	0	0	1	2	3	4	12	24	29	27	26	8	3	2	141
10:00	0	0	0	0	1	2	7	17	19	17	18	13	2	0	96
11:00	0	0	0	0	1	0	6	6	12	11	6	4	5	0	51
Total	0	0	447	411	585	601	962	935	865	480	321	117	68	19	5811
			Percentile	15th	50th	85th	95th								
			Speed	12	20	28	32								

Mean Speed (Average)	20.8
10 MPH Pace Speed	17-26
Number in Pace	2954
Percent in Pace	50.8%
Number > 30 MPH	525
Percent > 30 MPH	9.0%

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA
Direction: WB,

2/19/2022 Time	0 - 3 MPH	> 3 - 6 MPH	> 6 - 9 MPH	> 9 - 12 MPH	> 12 - 15 MPH	> 15 - 18 MPH	> 18 - 21 MPH	> 21 - 24 MPH	> 24 - 27 MPH	> 27 - 30 MPH	> 30 - 33 MPH	> 33 - 36 MPH	> 36 - 39 MPH	> 39 MPH	Total
12:00 AM	0	0	0	0	0	2	7	10	6	5	8	4	2	0	44
1:00	0	0	0	0	0	0	0	0	6	2	3	0	4	1	16
2:00	0	0	0	0	0	0	0	1	1	0	1	1	0	2	6
3:00	0	0	0	0	0	0	0	0	0	3	0	0	0	1	4
4:00	0	0	0	0	0	1	1	0	1	4	0	1	1	1	10
5:00	0	0	0	0	2	3	2	3	7	8	4	3	1	1	34
6:00	0	0	0	0	1	1	12	13	14	13	15	5	3	2	79
7:00	0	0	5	5	12	13	16	22	25	22	18	9	9	5	161
8:00	0	0	14	15	17	14	33	42	45	38	34	10	2	2	266
9:00	0	0	16	20	27	23	64	65	91	42	20	8	2	4	382
10:00	0	0	41	27	53	41	75	95	64	22	7	7	4	1	437
11:00	0	0	49	35	44	47	90	84	58	14	4	5	1	0	431
12:00 PM	0	0	45	31	45	39	81	72	56	11	6	4	1	0	391
1:00	0	0	51	45	41	36	67	71	52	32	11	2	0	0	408
2:00	0	0	28	10	35	40	68	82	86	51	16	8	6	0	430
3:00	0	0	33	33	48	43	81	75	59	24	14	5	3	0	418
4:00	0	0	12	18	35	28	52	69	66	51	26	12	4	1	374
5:00	0	0	19	22	44	38	73	57	42	26	3	2	1	2	329
6:00	0	0	19	32	25	31	43	57	41	36	17	1	1	0	303
7:00	0	0	8	4	14	19	37	45	30	29	14	4	3	1	208
8:00	0	0	1	1	4	3	14	23	26	31	19	14	2	1	139
9:00	0	0	0	1	3	5	9	10	24	28	12	9	4	1	106
10:00	0	0	0	0	1	2	6	15	16	18	6	5	3	2	74
11:00	0	0	0	0	2	2	3	6	14	6	8	7	3	3	54
Total	0	0	341	299	453	431	834	917	830	516	266	126	60	31	5104
			Percentile	15th	50th	85th	95th								
			Speed	13	21	28	32								
		Mean Speed (Average)		21.8											
		10 MPH Pace Speed		18-27											
		Number in Pace		2750											
		Percent in Pace		53.9%											
		Number > 30 MPH		483											
		Percent > 30 MPH		9.5%											
Grand Total	0	0	1217	1139	1608	1620	2762	2696	2435	1448	868	377	199	70	16439
Stats			Percentile	15th	50th	85th	95th								
			Speed	12	20	28	32								
		Mean Speed (Average)		21.1											
		10 MPH Pace Speed		17-26											
		Number in Pace		8406											
		Percent in Pace		51.1%											
		Number > 30 MPH		1514											
		Percent > 30 MPH		9.2%											

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA
Direction: Combined

2/17/2022 Time	0 - 3 MPH	> 3 - 6 MPH	> 6 - 9 MPH	> 9 - 12 MPH	> 12 - 15 MPH	> 15 - 18 MPH	> 18 - 21 MPH	> 21 - 24 MPH	> 24 - 27 MPH	> 27 - 30 MPH	> 30 - 33 MPH	> 33 - 36 MPH	> 36 - 39 MPH	> 39 MPH	Total
12:00 AM	0	0	0	0	1	2	1	2	5	7	5	4	2	0	29
1:00	0	0	0	0	0	0	1	0	1	3	6	3	2	1	17
2:00	0	0	0	0	0	0	1	0	4	2	2	2	2	0	13
3:00	0	0	1	0	0	0	1	2	4	7	4	3	3	1	26
4:00	0	0	0	0	0	1	3	3	11	25	11	18	9	5	86
5:00	0	0	0	2	1	1	8	10	43	44	78	53	27	13	280
6:00	0	0	6	13	17	18	28	60	109	205	188	45	20	8	717
7:00	0	0	27	19	34	33	61	88	135	234	195	57	21	3	907
8:00	0	0	24	28	51	35	79	81	170	229	117	43	24	5	886
9:00	0	0	24	30	43	34	70	63	129	184	154	49	16	5	801
10:00	0	0	28	25	54	56	81	75	192	145	85	30	10	2	783
11:00	0	0	34	32	40	33	112	119	141	166	105	30	10	1	823
12:00 PM	0	0	48	44	56	81	94	123	167	186	93	22	10	3	927
1:00	0	0	35	40	59	42	95	93	173	160	96	18	7	9	827
2:00	0	0	43	45	68	60	115	100	166	180	70	17	10	3	877
3:00	0	0	61	54	67	61	114	102	156	135	142	31	14	0	937
4:00	0	0	59	60	75	78	111	117	126	146	83	26	13	2	896
5:00	0	0	53	54	70	82	106	107	138	131	86	26	12	3	868
6:00	0	0	24	25	31	39	81	119	173	93	102	41	18	1	747
7:00	0	0	11	14	21	29	60	71	92	122	71	34	14	7	546
8:00	0	0	5	7	9	16	23	48	54	79	74	20	17	1	353
9:00	0	0	0	1	1	4	17	23	39	35	52	25	14	6	217
10:00	0	0	0	0	0	2	12	10	17	28	34	28	7	5	143
11:00	0	0	0	0	0	0	0	7	11	16	11	10	4	3	62
Total	0	0	483	493	698	707	1274	1423	2256	2562	1864	635	286	87	12768

Percentile	15th	50th	85th	95th
Speed	16	25	32	34

Mean Speed (Average)	25.2
10 MPH Pace Speed	23-32
Number in Pace	7142
Percent in Pace	55.9%
Number > 30 MPH	2872
Percent > 30 MPH	22.5%

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA
Direction: Combined

2/18/2022 Time	0 - 3 MPH	> 3 - 6 MPH	> 6 - 9 MPH	> 9 - 12 MPH	> 12 - 15 MPH	> 15 - 18 MPH	> 18 - 21 MPH	> 21 - 24 MPH	> 24 - 27 MPH	> 27 - 30 MPH	> 30 - 33 MPH	> 33 - 36 MPH	> 36 - 39 MPH	> 39 MPH	Total
12:00 AM	0	0	0	0	1	0	1	4	8	11	8	7	6	4	50
1:00	0	0	0	0	0	1	1	2	2	7	3	2	4	1	23
2:00	0	0	0	0	0	0	0	1	0	5	3	1	1	1	12
3:00	0	0	0	0	0	0	0	5	6	2	3	3	5	0	24
4:00	0	0	0	0	0	0	0	1	12	8	19	11	11	5	67
5:00	0	0	0	1	0	3	7	8	26	64	75	31	21	13	249
6:00	0	0	13	8	17	16	31	58	129	176	140	57	22	1	668
7:00	0	0	16	25	25	47	45	60	161	187	201	63	14	2	846
8:00	0	0	41	31	53	45	113	118	193	137	80	25	13	3	852
9:00	0	0	13	28	37	38	51	98	212	160	100	44	7	6	794
10:00	0	0	37	25	62	45	71	93	127	144	87	31	14	2	738
11:00	0	0	31	39	56	50	80	161	162	155	117	27	16	2	896
12:00 PM	0	0	39	41	75	69	78	125	163	182	87	15	8	5	887
1:00	0	0	52	35	51	60	85	102	199	177	106	22	11	3	903
2:00	0	0	49	27	55	56	123	144	186	175	77	32	10	6	940
3:00	0	0	73	58	56	55	113	133	172	173	100	26	6	7	972
4:00	0	0	52	55	66	67	94	74	134	148	119	33	14	3	859
5:00	0	0	60	48	69	62	116	126	192	138	85	31	16	1	944
6:00	0	0	35	29	50	72	105	84	146	160	87	42	17	0	827
7:00	0	0	19	20	41	35	50	67	129	124	70	32	16	7	610
8:00	0	0	4	3	15	7	26	51	73	74	94	28	22	3	400
9:00	0	0	1	2	3	4	12	27	36	67	58	23	8	7	248
10:00	0	0	0	0	1	2	7	19	23	36	53	33	7	4	185
11:00	0	0	0	0	1	0	6	10	14	18	23	15	13	3	103
Total	0	0	535	475	734	734	1215	1571	2505	2528	1795	634	282	89	13097

Percentile	15th	50th	85th	95th
Speed	16	25	31	34

Mean Speed (Average)	25.1
10 MPH Pace Speed	23-32
Number in Pace	7344
Percent in Pace	56.1%
Number > 30 MPH	2800
Percent > 30 MPH	21.4%

Location : Route 109 92420001
Location : West of Walgreen's Driveway
City/State: Medway, MA
Direction: Combined

2/19/2022 Time	0 - 3 MPH	> 3 - 6 MPH	> 6 - 9 MPH	> 9 - 12 MPH	> 12 - 15 MPH	> 15 - 18 MPH	> 18 - 21 MPH	> 21 - 24 MPH	> 24 - 27 MPH	> 27 - 30 MPH	> 30 - 33 MPH	> 33 - 36 MPH	> 36 - 39 MPH	> 39 MPH	Total
12:00 AM	0	0	0	0	0	2	7	10	10	10	14	9	3	0	65
1:00	0	0	0	0	0	0	0	0	9	3	7	3	5	1	28
2:00	0	0	0	0	0	0	0	2	1	4	2	2	2	5	18
3:00	0	0	0	0	0	0	0	0	0	7	2	0	0	1	10
4:00	0	0	0	0	0	1	1	0	2	11	5	5	5	7	37
5:00	0	0	0	0	2	3	2	3	8	18	22	19	9	16	102
6:00	0	0	0	0	1	1	13	15	27	44	64	30	11	11	217
7:00	0	0	5	5	15	16	16	25	46	81	102	56	37	15	419
8:00	0	0	15	22	19	20	36	55	101	164	112	61	19	3	627
9:00	0	0	18	21	31	32	76	83	205	177	109	38	22	5	817
10:00	0	0	43	31	57	50	92	145	167	204	100	32	13	3	937
11:00	0	0	54	36	47	54	125	148	192	207	65	31	7	1	967
12:00 PM	0	0	50	37	57	49	109	153	182	113	97	38	9	2	896
1:00	0	0	56	47	53	45	105	136	154	186	125	25	14	2	948
2:00	0	0	30	18	36	53	89	138	218	213	96	39	11	1	942
3:00	0	0	38	39	51	51	101	140	140	163	86	34	12	3	858
4:00	0	0	12	19	39	31	57	103	197	188	113	28	13	5	805
5:00	0	0	19	24	55	56	125	107	142	86	37	13	6	2	672
6:00	0	0	20	40	28	45	60	96	114	98	56	14	9	1	581
7:00	0	0	8	4	14	19	41	68	56	80	82	32	11	3	418
8:00	0	0	1	1	4	3	14	25	48	64	65	33	10	3	271
9:00	0	0	0	1	4	5	9	10	28	50	77	33	11	5	233
10:00	0	0	0	0	1	2	6	17	25	38	28	20	11	8	156
11:00	0	0	0	0	2	2	3	7	16	11	31	19	10	4	105
Total	0	0	369	345	516	540	1087	1486	2088	2220	1497	614	260	107	11129
			Percentile	15th	50th	85th	95th								
			Speed	17	25	31	35								
			Mean Speed (Average)	25.9											
			10 MPH Pace Speed	23-32											
			Number in Pace	6300											
			Percent in Pace	56.6%											
			Number > 30 MPH	2478											
			Percent > 30 MPH	22.3%											
Grand Total	0	0	1387	1313	1948	1981	3576	4480	6849	7310	5156	1883	828	283	36994
Stats			Percentile	15th	50th	85th	95th								
			Speed	16	25	31	34								
			Mean Speed (Average)	25.4											
			10 MPH Pace Speed	23-32											
			Number in Pace	20786											
			Percent in Pace	56.2%											
			Number > 30 MPH	8150											
			Percent > 30 MPH	22.0%											

MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAPPING

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Medway | COUNT DATE : Feb-22

DISTRICT : 3 | UNSIGNALIZED : | SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Route 109

MINOR STREET(S) : Holliston Street

INTERSECTION DIAGRAM (Label Approaches)

↑ *North*

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (PM) :	378	479	771	622		**2,250**

" K " FACTOR : **0.090** | INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **25,000**

TOTAL # OF CRASHES : 36 | # OF YEARS : 5 | AVERAGE # OF CRASHES PER YEAR (**A**) : **7.20**

CRASH RATE CALCULATION : **0.79**

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

Comments : Above Statewide (0.78) but Below District (0.89) Crash Rates

Project Title & Date: Proposed Medical Office Building

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Medway | COUNT DATE : Feb-22

DISTRICT : 3 | UNSIGNALIZED : | SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Route 109

MINOR STREET(S) : Project site drvieway

Medway Commons driveway

INTERSECTION DIAGRAM (Label Approaches)

↑ *North*

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (PM) :	159	51	580	647		**1,437**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **15,967**

TOTAL # OF CRASHES : 25 | # OF YEARS : 5 | AVERAGE # OF CRASHES PER YEAR (**A**) : **5.00**

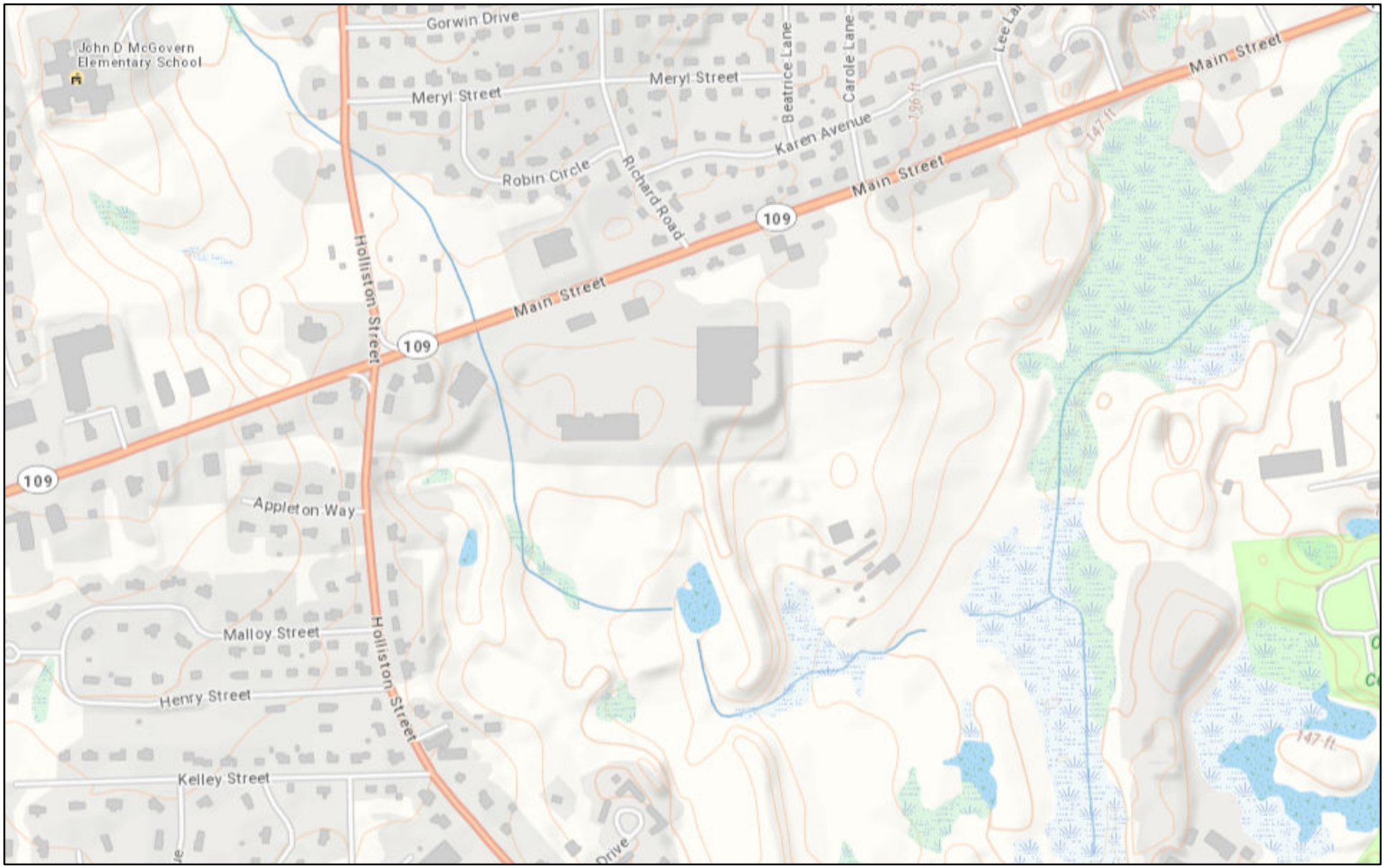
CRASH RATE CALCULATION : 0.86

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

Comments : Above Statewide (0.78) but Below District (0.89) Crash Rates

Project Title & Date: Proposed Medical Office Building

MassDOT Top Crash Locations



3/23/2022, 1:00:21 PM

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

MassGIS

MassDOT

MassGIS |

ROAD SAFETY AUDIT

Route 109 (Main Street) at Holliston Street

Town of Medway

January 2014

Prepared for:
Massachusetts Department of Transportation

Moving Massachusetts Forward. massDOT

Prepared by:
Howard/Stein-Hudson Associates
38 Chauncy Street
Boston, MA 02111

Table 2. Summary of Potential Safety Enhancements

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Party
Access Management	In order to reduce the occurrence of courtesy crashes, consider restricting left turns from commercial driveways located close to the intersection, including left turns from Energy Gas, Hang Tai, The Little Store, and the adjacent real estate office on Holliston Street.	High	Short-term	Low	Town of Medway
	To help prevent courtesy crashes, work with the owners of Hang Tai and adjacent property owners to arrange a shared parking agreement that would allow Hang Tai to remove the perpendicular parking spaces along Route 109 eastbound and formalize a driveway to the parking lot.	High	Mid-term	Medium	Town of Medway/ Property Owners
	Work with the owner of Energy Gas to formalize its driveways along Route 109 eastbound and Holliston Street northbound to reduce the occurrence of courtesy crashes and improve efficiency at the intersection.	Medium	Mid-term	Medium	Town of Medway/ Property Owners
	To discourage cut-through traffic, work with the owners of Energy Gas, Hang Tai, and other businesses to implement strategies to discourage cut-through traffic from Holliston Street northbound to Route 109 westbound, including restricting the Hang Tai driveway along Route 109 eastbound to entrance-only; installation of speed humps along the cut-through route, and/or narrowing the curb cut on Holliston Street.	Medium	Mid-term	Medium	Town of Medway/ Property Owners
	As part of long-term planning efforts, require access management improvements, including formalization of driveways and driveway consolidation as part of site plan approval for future development.	High	Long-term	High	Town of Medway/ Property Owners

Table 2. Summary of Potential Safety Enhancements (continued)

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Party
Traffic Signal	Analyze the benefits to traffic operations created by switching to protected-permissive left turns at the intersection compared to the safety benefits of protected-only left-turns. If protected-permissive left turns are implemented, consider the use of a flashing yellow arrow during the permissive phase to alert motorists that left turns are permitted, but motorists must yield to oncoming traffic. Turning radii of larger vehicles should be checked to ensure no conflicts in the vehicles' travel path.	Low	Short-term	Medium	Town of Medway
	Evaluate the existing minimum green times at the intersection, and reduce if appropriate to increase efficiency at the intersection.	Low	Short-term	Low	Town of Medway
	Evaluate the condition of the existing loop detectors. If necessary, repair, or replace loop detectors to improve operations at the intersection. Consider the benefits of using video detection at the intersection.	Low	Short-term	Low	Town of Medway
	Consider extending longitudinal pavement markings along the Holliston Street southbound approach to the intersection to guide motorists into the intended travel lanes and reduce confusion at the intersection. Supplement with lane use signage and diagrammatic pavement markings.	Medium	Short-term	Medium	Town of Medway
	As part of long-term safety improvements, realign the Holliston Street southbound signal so that it is more visible to approaching vehicles, and so that the signal heads are aligned in the center of their corresponding lanes, especially left-turn signals.	Medium	Long-term	High	Town of Medway

Table 2. Summary of Potential Safety Enhancements (continued)

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Party
Signage	Improve guide signage at the intersection. Include names of adjacent towns (Holliston, Millis, etc.). Guide signage for Route 109 westbound should include "To I-495".	Low	Mid-term	Medium	Town of Medway
	Consider the use of a dedicated signal indication so that northbound vehicles see a red arrow instead of a red ball.	Low	Mid-term	Medium	Town of Medway
	Place "Right Turn on Red After Stop" signage in a location visible from the stop bar on the Route 109 westbound channelized right-turn lane. Consider placing "Right Turn on Red" signage adjacent to the right-side signal or on the signal post for added visibility.	Low	Short-term	Low	Town of Medway
	Place a yield line at the yield sign in the Route 109 eastbound channelized right-turn lane.	Low	Short-term	Low	Town of Medway
	Remove the "Do Not Pass" signage and any other unnecessary or distracting signage from the vicinity of the intersection.	Low	Short-term	Low	Town of Medway
	Provide street name signage at all approaches to the intersection.	Low	Short-term	Low	Town of Medway
Pedestrian and Bicycle Accommodations	Provide sidewalks where sidewalks are currently not provided on Route 109 and Holliston Street, where feasible within the project limits, to improve pedestrian safety. Provide crosswalks and pedestrian signals at the intersection to connect the existing sidewalks to the new ones.	High	Mid-term	Medium	Town of Medway
	To discourage pedestrians from crossing at an unsafe location, remove the pedestrian push button on the southeast corner of the intersection facing Holliston Street, unless a crossing across the south leg will be provided as part of future safety improvements.	Medium	Mid-term	Medium	Town of Medway

Table 2. Summary of Potential Safety Enhancements (continued)

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Party
Pedestrian and Bicycle Accommodations	Evaluate the safety benefits of upgrading existing signal indications to include pedestrian countdown timers.	Medium	Mid-term	Medium	Town of Medway
	As part of future design considerations, consider providing bicycle accommodations along Route 109 and Holliston Street where feasible.	Medium	Mid-term	Medium	Town of Medway
	As part of future design considerations, provide bicycle detection at the intersection of Route 109/Holliston Street.	Low	Mid-term	Medium	Town of Medway

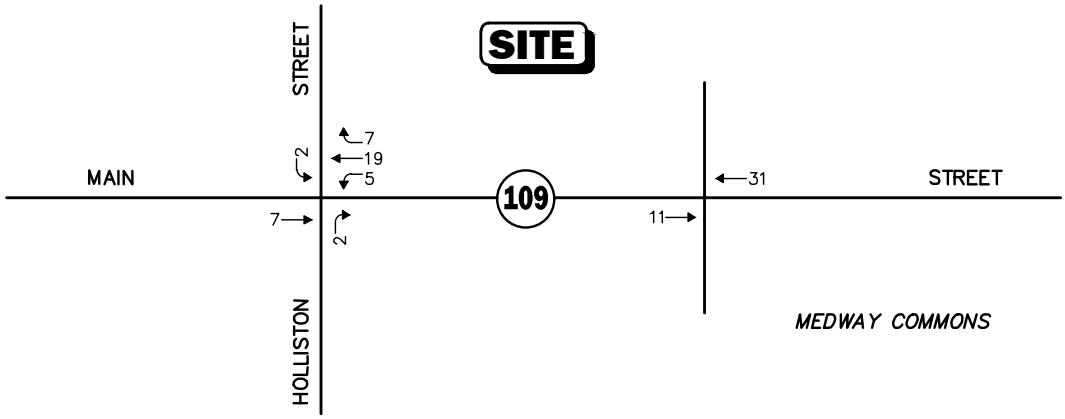
GENERAL BACKGROUND TRAFFIC GROWTH

General Background Traffic Growth - Daily Traffic Volumes

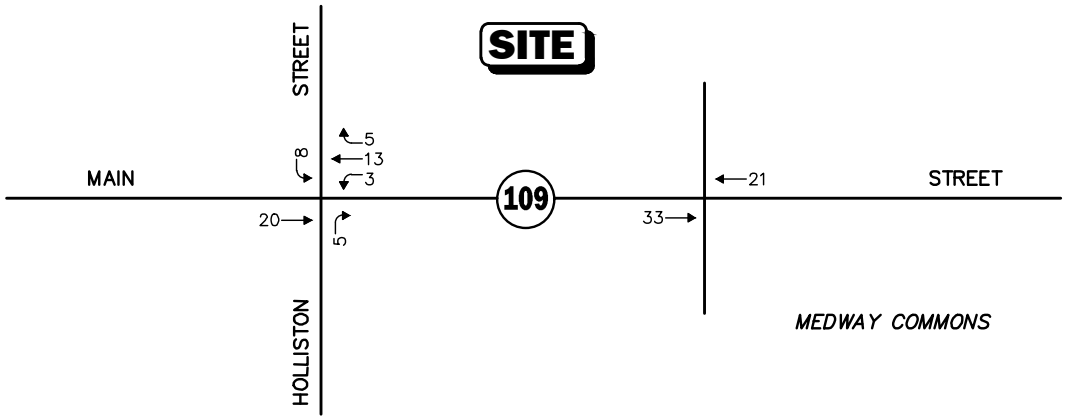
CITY/TOWN	ROUTE/STREET	LOCATION	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Annual Growth Rate
Medway	Main Street	at the Millis Town Line	14,500	14,551	14,736	13,426	13,526	14,270	14,939	15,133	15,299	14,067	14,123	**0.10%**
Medway	Summer Street	South of Milford Street	9,563	9,668	9,776	9,934	10,014	8,576	8,670	8,783	8,210	8,325	8,358	**-1.81%**
														-0.86%

BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS

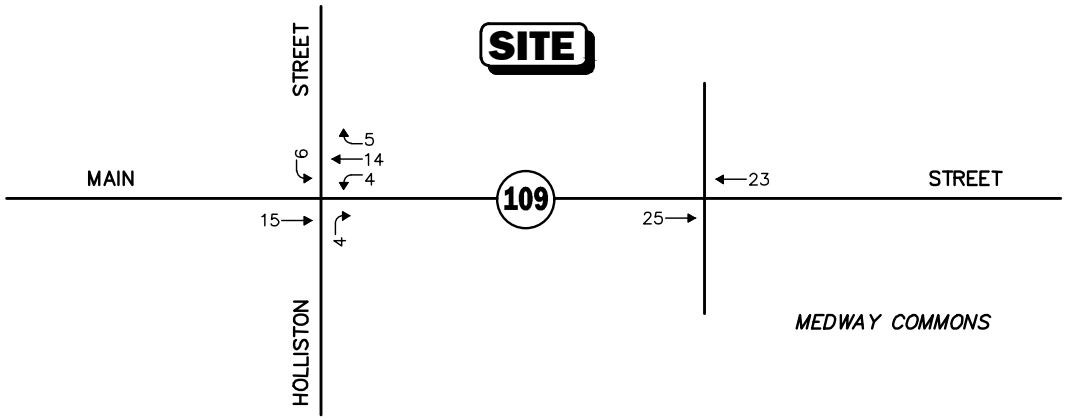
WEEKDAY MORNING PEAK HOUR (7:15 to 8:15 AM)



WEEKDAY EVENING PEAK HOUR (4:00 to 5:00 PM)



SATURDAY MIDDAY PEAK HOUR (11:00 AM to 12:00 PM)



N

Not To Scale

Figure A-1

Proposed Residential Development
39 Main Street
Peak-Hour Traffic Volumes

Vanasse & Associates inc

TRIP-GENERATION CALCULATIONS

Medical-Dental Office Building - Stand-Alone
(720)

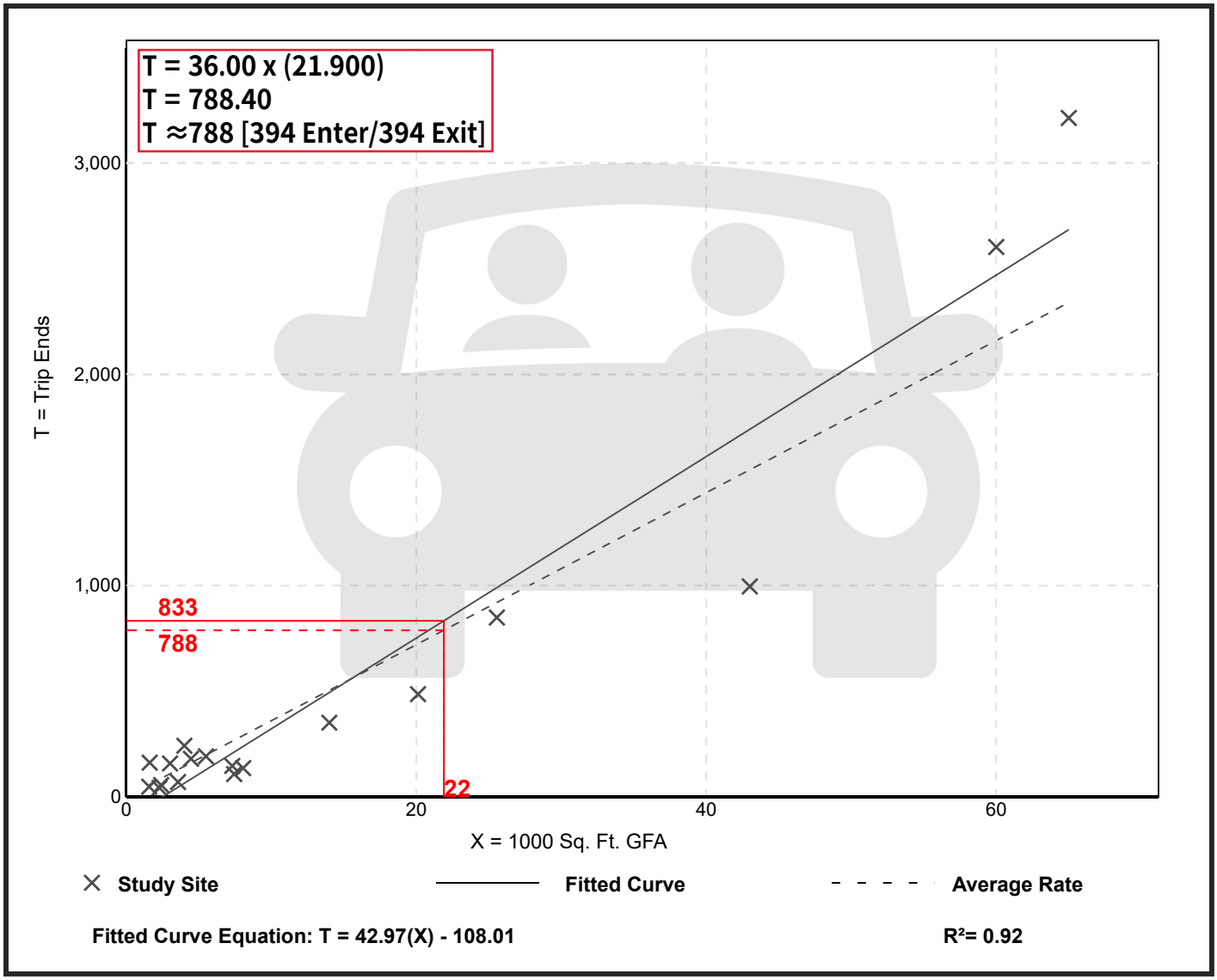
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 18
Avg. 1000 Sq. Ft. GFA: 15
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
36.00	14.52 - 100.75	13.38

Data Plot and Equation



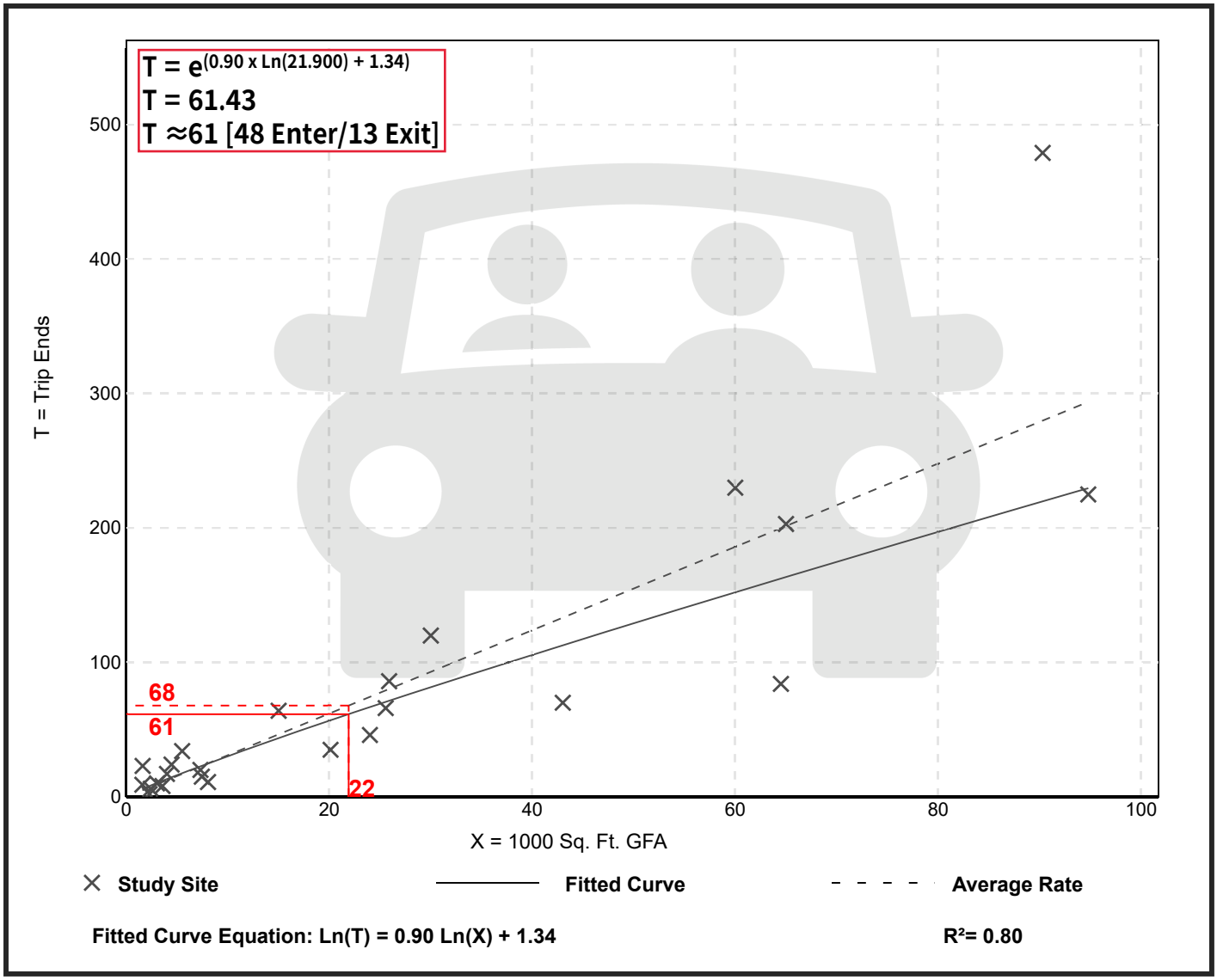
Medical-Dental Office Building - Stand-Alone
(720)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	24
Avg. 1000 Sq. Ft. GFA:	25
Directional Distribution:	79% entering, 21% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.10	0.87 - 14.30	1.49

Data Plot and Equation



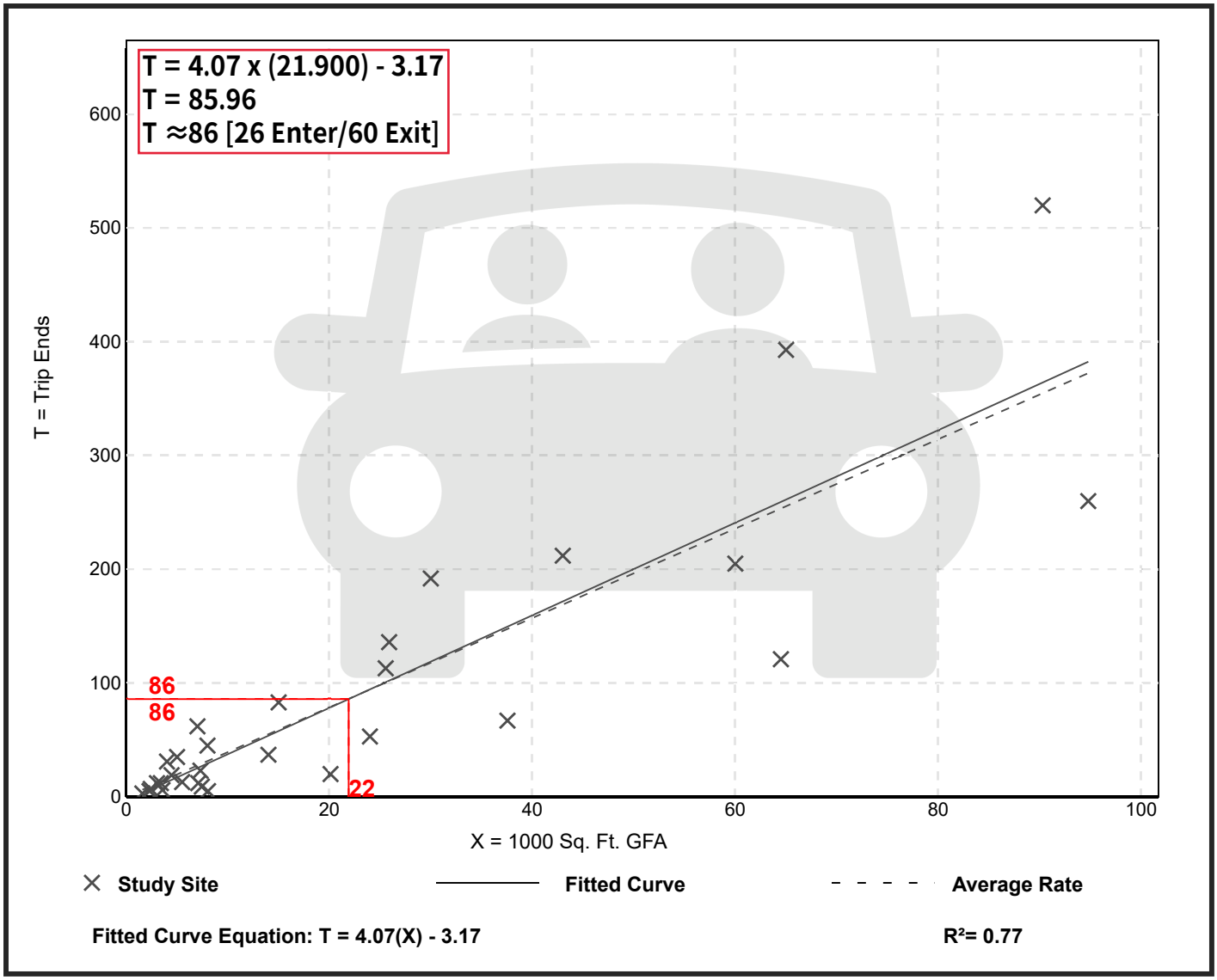
Medical-Dental Office Building - Stand-Alone
(720)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	30
Avg. 1000 Sq. Ft. GFA:	23
Directional Distribution:	30% entering, 70% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.93	0.62 - 8.86	1.86

Data Plot and Equation



Medical-Dental Office Building - Stand-Alone
(720)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Saturday**

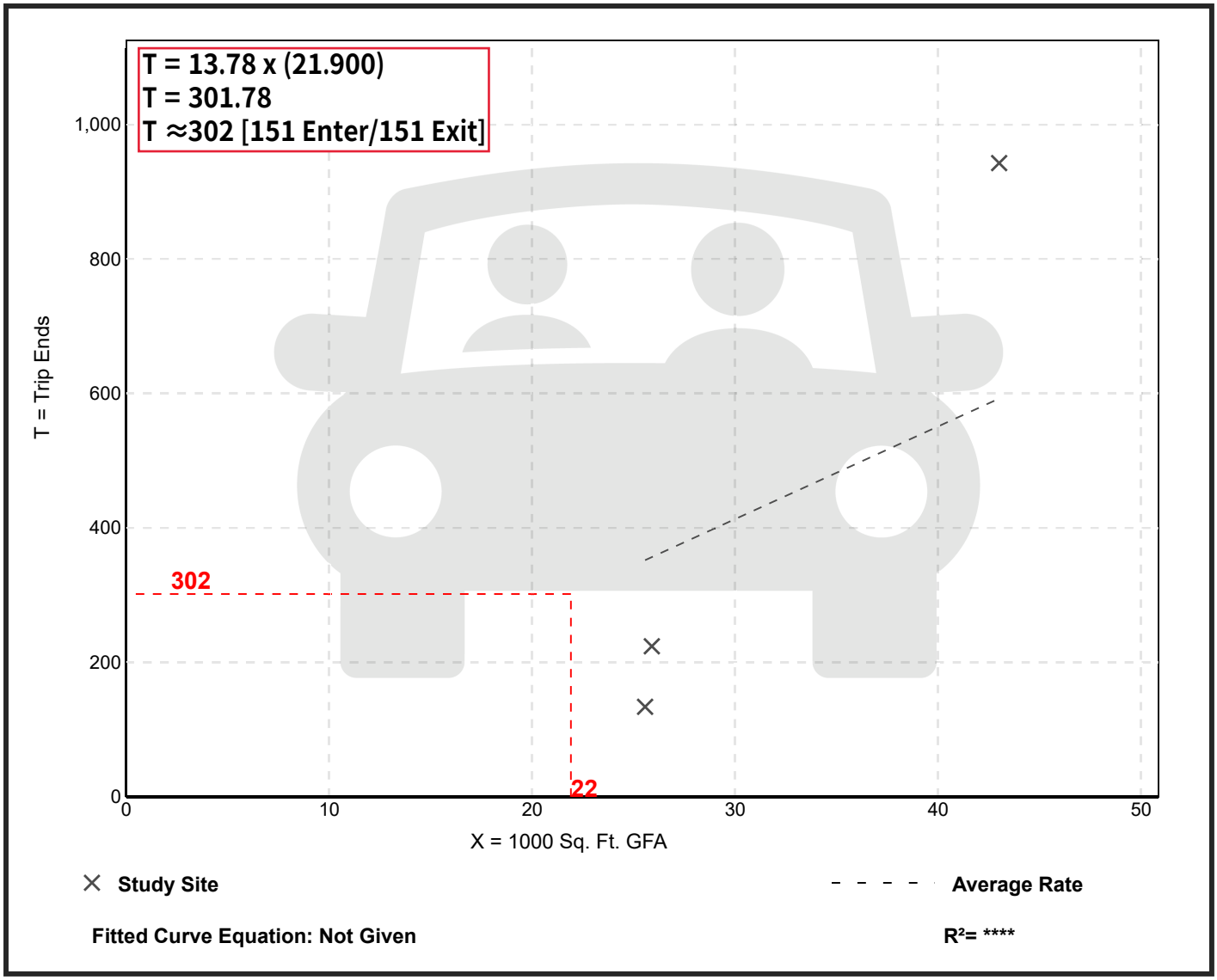
Setting/Location: **General Urban/Suburban**
Number of Studies: 3
Avg. 1000 Sq. Ft. GFA: 31
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
13.78	5.24 - 21.93	9.26

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ****

Medical-Dental Office Building - Stand-Alone
(720)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Saturday, Peak Hour of Generator**

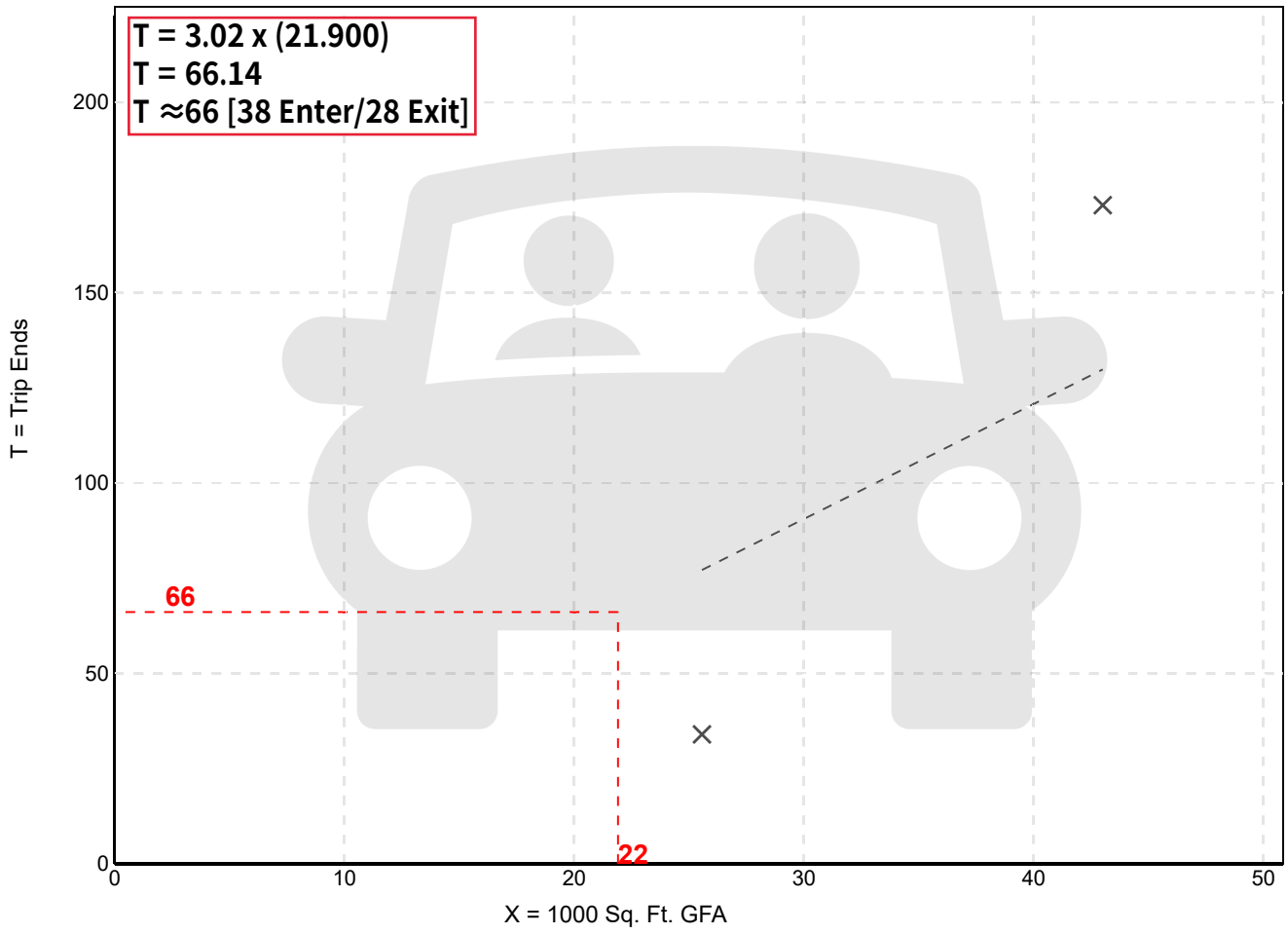
Setting/Location: **General Urban/Suburban**
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 34
Directional Distribution: 57% entering, 43% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.02	1.33 - 4.02	*

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= **

SIGHT DISTANCE CALCULATIONS

Sight Distance Calculations

Equations:
$ISD = 1.47 \times V \times t$

Variables:
$V = 35\ mph$
$t = 8.0\ s$

Intersection Sight Distance: looking to the southeast (turning left from stop):

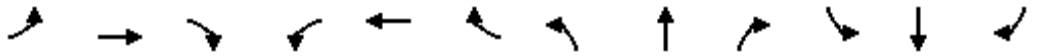
$ISD = 1.47 \times 40 \times 8.0 = 411.6 \approx \mathbf{415}$

CAPACITY ANALYSIS WORKSHEETS

Route 109 at Holliston Street
Route 109 at the Project site driveway and the Medway Commons Driveway

Route 114 at Holliston Street

2022 Existing Weekday Morning Peak Hour Traffic Volumes
1: Holliston Street & Route 109



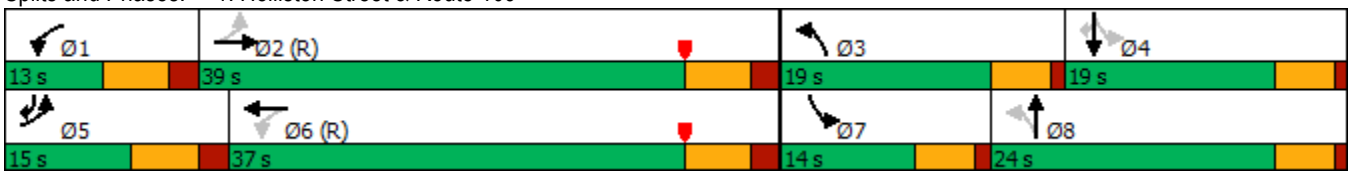
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	565	169	20	344	52	202	209	39	81	183	112
Future Volume (vph)	122	565	169	20	344	52	202	209	39	81	183	112
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.976				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1652	1845	1538	1589	1783	1478	1652	1778	0	1636	1749	1531
Flt Permitted	0.333			0.152			0.242			0.450		
Satd. Flow (perm)	579	1845	1538	254	1783	1478	421	1778	0	775	1749	1531
Satd. Flow (RTOR)			242			242		10				153
Adj. Flow (vph)	145	673	201	21	366	55	243	252	47	111	251	153
Lane Group Flow (vph)	145	673	201	21	366	55	243	299	0	111	251	153
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.5	16.5		12.5	16.5		11.0	11.0		11.0	11.0	12.5
Total Split (s)	15.0	39.0		13.0	37.0		19.0	24.0		14.0	19.0	15.0
Total Split (%)	16.7%	43.3%		14.4%	41.1%		21.1%	26.7%		15.6%	21.1%	16.7%
Maximum Green (s)	8.5	32.5		6.5	30.5		14.0	19.0		9.0	14.0	8.5
Yellow Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	2.0
Lost Time Adjust (s)	-2.5	-2.5		-2.5	-2.5		-1.0	-1.0		-1.0	-1.0	-2.5
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	None
v/c Ratio	0.33	0.75	0.13	0.08	0.54	0.04	0.70	0.68		0.37	0.86	0.25
Control Delay	12.9	28.1	0.2	10.1	26.0	0.0	32.9	39.9		23.3	64.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.9	28.1	0.2	10.1	26.0	0.0	32.9	39.9		23.3	64.8	4.9
Queue Length 50th (ft)	40	265	0	6	174	0	99	154		41	140	0
Queue Length 95th (ft)	66	#518	0	14	124	0	146	222		62	#189	21
Internal Link Dist (ft)		220			570			220			220	
Turn Bay Length (ft)	200		200	105		115	150			85		100
Base Capacity (vph)	440	897	1538	256	681	1478	359	441		311	295	613
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.33	0.75	0.13	0.08	0.54	0.04	0.68	0.68		0.36	0.85	0.25

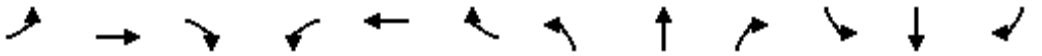
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection
Natural Cycle: 90

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Holliston Street & Route 109





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	565	169	20	344	52	202	209	39	81	183	112
Future Volume (vph)	122	565	169	20	344	52	202	209	39	81	183	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	11	10	10	12	12	10	11	11
Total Lost time (s)	4.0	4.0	1.5	4.0	4.0	1.5	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1652	1845	1538	1589	1783	1478	1652	1778		1636	1749	1531
Flt Permitted	0.33	1.00	1.00	0.15	1.00	1.00	0.24	1.00		0.45	1.00	1.00
Satd. Flow (perm)	580	1845	1538	254	1783	1478	420	1778		774	1749	1531
Peak-hour factor, PHF	0.84	0.84	0.84	0.94	0.94	0.94	0.83	0.83	0.83	0.73	0.73	0.73
Adj. Flow (vph)	145	673	201	21	366	55	243	252	47	111	251	153
RTOR Reduction (vph)	0	0	0	0	0	0	0	8	0	0	0	105
Lane Group Flow (vph)	145	673	201	21	366	55	243	291	0	111	251	48
Heavy Vehicles (%)	2%	3%	5%	6%	3%	2%	2%	4%	6%	3%	5%	2%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Actuated Green, G (s)	44.5	36.4	90.0	33.5	30.9	90.0	33.0	21.0		22.0	15.0	23.1
Effective Green, g (s)	48.0	38.9	90.0	38.5	33.4	90.0	34.0	22.0		24.0	16.0	28.1
Actuated g/C Ratio	0.53	0.43	1.00	0.43	0.37	1.00	0.38	0.24		0.27	0.18	0.31
Clearance Time (s)	6.5	6.5		6.5	6.5		5.0	5.0		5.0	5.0	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	435	797	1538	184	661	1478	350	434		283	310	478
v/s Ratio Prot	c0.04	c0.36		0.01	0.21		c0.11	0.16		0.03	c0.14	0.01
v/s Ratio Perm	0.14		0.13	0.04		0.04	0.15			0.07		0.02
v/c Ratio	0.33	0.84	0.13	0.11	0.55	0.04	0.69	0.67		0.39	0.81	0.10
Uniform Delay, d1	12.1	22.8	0.0	17.5	22.4	0.0	21.5	30.7		26.0	35.5	22.0
Progression Factor	1.00	1.00	1.00	0.92	1.01	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	10.6	0.2	0.3	3.2	0.0	5.9	4.1		0.9	14.4	0.1
Delay (s)	12.6	33.5	0.2	16.3	25.9	0.0	27.3	34.8		26.9	49.9	22.1
Level of Service	B	C	A	B	C	A	C	C		C	D	C
Approach Delay (s)		23.9			22.2			31.5			36.7	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2022 Existing Weekday Evening Peak Hour Traffic Volumes
1: Holliston Street & Route 109

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	437	218	26	535	61	199	152	27	116	181	182
Future Volume (vph)	116	437	218	26	535	61	199	152	27	116	181	182
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.978				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1685	1881	1615	1620	1818	1507	1668	1843	0	1652	1801	1561
Flt Permitted	0.209			0.391			0.339			0.479		
Satd. Flow (perm)	371	1881	1615	667	1818	1507	595	1843	0	833	1801	1561
Satd. Flow (RTOR)			242			242		9				203
Adj. Flow (vph)	122	460	229	27	557	64	224	171	30	133	208	209
Lane Group Flow (vph)	122	460	229	27	557	64	224	201	0	133	208	209
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.5	16.5		12.5	16.5		11.0	11.0		11.0	11.0	12.5
Total Split (s)	13.0	43.0		13.0	43.0		14.0	20.0		14.0	20.0	13.0
Total Split (%)	14.4%	47.8%		14.4%	47.8%		15.6%	22.2%		15.6%	22.2%	14.4%
Maximum Green (s)	6.5	36.5		6.5	36.5		9.0	15.0		9.0	15.0	6.5
Yellow Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	2.0
Lost Time Adjust (s)	-2.5	-2.5		-2.5	-2.5		-1.0	-1.0		-1.0	-1.0	-2.5
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	None
v/c Ratio	0.36	0.47	0.14	0.06	0.72	0.04	0.69	0.59		0.42	0.71	0.34
Control Delay	12.2	17.6	0.2	7.7	24.8	0.0	37.1	39.9		26.0	49.5	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.2	17.6	0.2	7.7	24.8	0.0	37.1	39.9		26.0	49.5	5.4
Queue Length 50th (ft)	32	148	0	7	284	0	92	99		51	111	2
Queue Length 95th (ft)	54	286	0	m14	211	0	#165	171		95	178	45
Internal Link Dist (ft)		220			570			220			220	
Turn Bay Length (ft)	200		200	105		115	150			85		100
Base Capacity (vph)	341	972	1615	448	804	1507	323	350		324	320	623
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.36	0.47	0.14	0.06	0.69	0.04	0.69	0.57		0.41	0.65	0.34

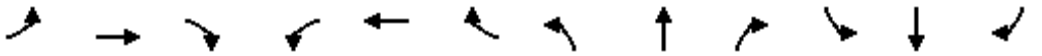
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection
Natural Cycle: 65

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

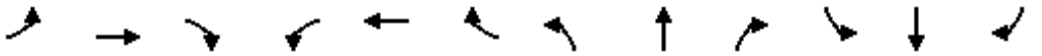
Splits and Phases: 1: Holliston Street & Route 109



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	437	218	26	535	61	199	152	27	116	181	182
Future Volume (vph)	116	437	218	26	535	61	199	152	27	116	181	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	11	10	10	12	12	10	11	11
Total Lost time (s)	4.0	4.0	1.5	4.0	4.0	1.5	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1685	1881	1615	1620	1818	1507	1668	1842		1652	1801	1561
Flt Permitted	0.21	1.00	1.00	0.39	1.00	1.00	0.34	1.00		0.48	1.00	1.00
Satd. Flow (perm)	371	1881	1615	667	1818	1507	595	1842		833	1801	1561
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.89	0.89	0.89	0.87	0.87	0.87
Adj. Flow (vph)	122	460	229	27	557	64	224	171	30	133	208	209
RTOR Reduction (vph)	0	0	0	0	0	0	0	7	0	0	0	146
Lane Group Flow (vph)	122	460	229	27	557	64	224	194	0	133	208	63
Heavy Vehicles (%)	0%	1%	0%	4%	1%	0%	1%	1%	0%	2%	2%	0%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Actuated Green, G (s)	46.7	40.1	90.0	38.7	36.1	90.0	26.0	15.4		22.6	13.7	20.3
Effective Green, g (s)	51.7	42.6	90.0	43.7	38.6	90.0	28.0	16.4		24.6	14.7	25.3
Actuated g/C Ratio	0.57	0.47	1.00	0.49	0.43	1.00	0.31	0.18		0.27	0.16	0.28
Clearance Time (s)	6.5	6.5		6.5	6.5		5.0	5.0		5.0	5.0	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	345	890	1615	377	779	1507	323	335		317	294	438
v/s Ratio Prot	c0.04	0.24		0.00	c0.31		c0.09	0.11		0.05	0.12	0.01
v/s Ratio Perm	0.17		c0.14	0.03		0.04	c0.13			0.07		0.03
v/c Ratio	0.35	0.52	0.14	0.07	0.72	0.04	0.69	0.58		0.42	0.71	0.14
Uniform Delay, d1	12.3	16.5	0.0	12.5	21.2	0.0	25.1	33.6		25.9	35.6	24.2
Progression Factor	1.00	1.00	1.00	0.85	0.89	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	2.1	0.2	0.1	5.3	0.0	6.3	2.4		0.9	7.6	0.2
Delay (s)	12.9	18.7	0.2	10.7	24.0	0.0	31.4	36.1		26.8	43.2	24.4
Level of Service	B	B	A	B	C	A	C	D		C	D	C
Approach Delay (s)		12.6			21.1			33.6			32.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

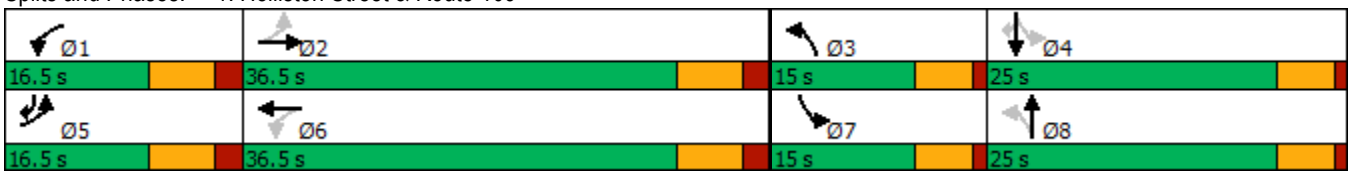


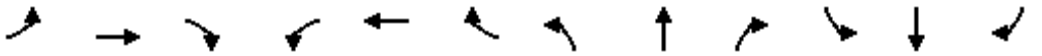
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	486	236	36	515	98	236	129	35	91	133	156
Future Volume (vph)	123	486	236	36	515	98	236	129	35	91	133	156
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.968				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1685	1881	1615	1685	1837	1507	1685	1839	0	1685	1837	1561
Flt Permitted	0.167			0.294			0.475			0.615		
Satd. Flow (perm)	296	1881	1615	521	1837	1507	842	1839	0	1091	1837	1561
Satd. Flow (RTOR)			235			235		13				167
Adj. Flow (vph)	138	546	265	38	548	104	259	142	38	98	143	168
Lane Group Flow (vph)	138	546	265	38	548	104	259	180	0	98	143	168
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.5	16.5		12.5	16.5		11.0	11.0		11.0	11.0	12.5
Total Split (s)	16.5	36.5		16.5	36.5		15.0	25.0		15.0	25.0	16.5
Total Split (%)	17.7%	39.2%		17.7%	39.2%		16.1%	26.9%		16.1%	26.9%	17.7%
Maximum Green (s)	10.0	30.0		10.0	30.0		10.0	20.0		10.0	20.0	10.0
Yellow Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	2.0
Lost Time Adjust (s)	-2.5	-2.5		-2.5	-2.5		-1.0	-1.0		-1.0	-1.0	-2.5
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
v/c Ratio	0.39	0.63	0.16	0.10	0.82	0.07	0.68	0.44		0.26	0.48	0.25
Control Delay	12.9	23.7	0.2	10.1	36.5	0.1	32.3	32.6		21.5	37.3	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.9	23.7	0.2	10.1	36.5	0.1	32.3	32.6		21.5	37.3	4.2
Queue Length 50th (ft)	31	228	0	8	246	0	106	82		36	70	0
Queue Length 95th (ft)	68	396	0	25	#470	0	176	148		71	126	39
Internal Link Dist (ft)		220			570			220			220	
Turn Bay Length (ft)	200		200	105		115	150			85		100
Base Capacity (vph)	377	867	1615	450	742	1507	383	497		408	479	680
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.37	0.63	0.16	0.08	0.74	0.07	0.68	0.36		0.24	0.30	0.25

Intersection Summary
Cycle Length: 93
Actuated Cycle Length: 81.6
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Holliston Street & Route 109





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	486	236	36	515	98	236	129	35	91	133	156
Future Volume (vph)	123	486	236	36	515	98	236	129	35	91	133	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	11	10	10	12	12	10	11	11
Total Lost time (s)	4.0	4.0	1.5	4.0	4.0	1.5	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1685	1881	1615	1685	1837	1507	1685	1840		1685	1837	1561
Flt Permitted	0.17	1.00	1.00	0.29	1.00	1.00	0.47	1.00		0.61	1.00	1.00
Satd. Flow (perm)	297	1881	1615	521	1837	1507	842	1840		1090	1837	1561
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.91	0.91	0.91	0.93	0.93	0.93
Adj. Flow (vph)	138	546	265	38	548	104	259	142	38	98	143	168
RTOR Reduction (vph)	0	0	0	0	0	0	0	10	0	0	0	113
Lane Group Flow (vph)	138	546	265	38	548	104	259	170	0	98	143	55
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Actuated Green, G (s)	44.1	35.1	85.5	33.9	30.0	85.5	26.4	16.5		20.6	13.6	22.6
Effective Green, g (s)	48.0	37.6	85.5	38.9	32.5	85.5	28.4	17.5		22.6	14.6	27.6
Actuated g/C Ratio	0.56	0.44	1.00	0.45	0.38	1.00	0.33	0.20		0.26	0.17	0.32
Clearance Time (s)	6.5	6.5		6.5	6.5		5.0	5.0		5.0	5.0	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	353	827	1615	324	698	1507	387	376		343	313	503
v/s Ratio Prot	c0.05	c0.29		0.01	c0.30		c0.09	0.09		0.03	0.08	0.01
v/s Ratio Perm	0.17		0.16	0.04		0.07	c0.14			0.05		0.02
v/c Ratio	0.39	0.66	0.16	0.12	0.79	0.07	0.67	0.45		0.29	0.46	0.11
Uniform Delay, d1	12.7	18.9	0.0	13.8	23.4	0.0	22.7	29.8		24.6	31.9	20.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.7	2.0	0.2	0.2	5.8	0.1	4.4	0.9		0.5	1.1	0.1
Delay (s)	13.5	20.9	0.2	14.0	29.2	0.1	27.1	30.7		25.0	32.9	20.4
Level of Service	B	C	A	B	C	A	C	C		C	C	C
Approach Delay (s)		14.0			24.0			28.5			25.9	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	85.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2029 No Build Weekday Morning Peak Hour Traffic Volumes
1: Holliston Street & Route 109

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	613	181	26	388	63	217	224	44	89	196	120
Future Volume (vph)	131	613	181	26	388	63	217	224	44	89	196	120
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.975				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1652	1845	1538	1589	1783	1478	1652	1776	0	1636	1749	1531
Flt Permitted	0.289			0.119			0.208			0.332		
Satd. Flow (perm)	502	1845	1538	199	1783	1478	362	1776	0	572	1749	1531
Satd. Flow (RTOR)			242			242		10				164
Adj. Flow (vph)	156	730	215	28	413	67	261	270	53	122	268	164
Lane Group Flow (vph)	156	730	215	28	413	67	261	323	0	122	268	164
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.5	16.5		12.5	16.5		11.0	11.0		11.0	11.0	12.5
Total Split (s)	15.0	39.0		13.0	37.0		19.0	24.0		14.0	19.0	15.0
Total Split (%)	16.7%	43.3%		14.4%	41.1%		21.1%	26.7%		15.6%	21.1%	16.7%
Maximum Green (s)	8.5	32.5		6.5	30.5		14.0	19.0		9.0	14.0	8.5
Yellow Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	2.0
Lost Time Adjust (s)	-2.5	-2.5		-2.5	-2.5		-1.0	-1.0		-1.0	-1.0	-2.5
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	None
v/c Ratio	0.39	0.83	0.14	0.12	0.62	0.05	0.77	0.80		0.46	0.91	0.27
Control Delay	13.8	32.6	0.2	10.1	25.8	0.1	37.4	48.1		25.4	72.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	13.8	32.6	0.2	10.1	25.8	0.1	37.4	48.1		25.4	72.0	4.9
Queue Length 50th (ft)	43	302	0	8	201	0	108	170		46	152	0
Queue Length 95th (ft)	70	#586	0	16	146	0	#160	#261		67	#208	21
Internal Link Dist (ft)		220			570			220			220	
Turn Bay Length (ft)	200		200	105		115	150			85		100
Base Capacity (vph)	406	884	1538	233	667	1478	350	406		278	296	623
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.38	0.83	0.14	0.12	0.62	0.05	0.75	0.80		0.44	0.91	0.26

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

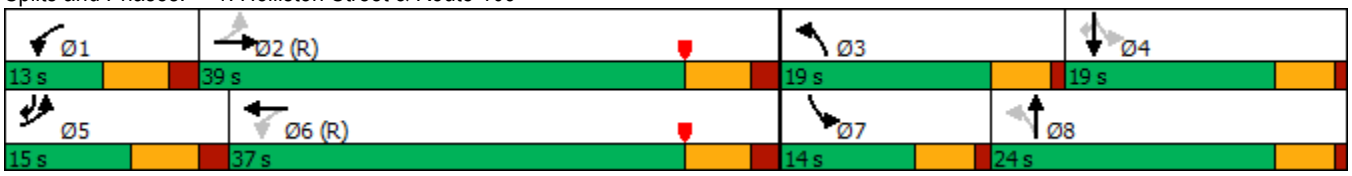
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection

Natural Cycle: 90

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

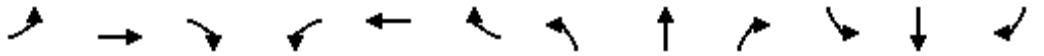
Splits and Phases: 1: Holliston Street & Route 109



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	613	181	26	388	63	217	224	44	89	196	120
Future Volume (vph)	131	613	181	26	388	63	217	224	44	89	196	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	11	10	10	12	12	10	11	11
Total Lost time (s)	4.0	4.0	1.5	4.0	4.0	1.5	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1652	1845	1538	1589	1783	1478	1652	1776		1636	1749	1531
Flt Permitted	0.29	1.00	1.00	0.12	1.00	1.00	0.21	1.00		0.33	1.00	1.00
Satd. Flow (perm)	502	1845	1538	199	1783	1478	362	1776		572	1749	1531
Peak-hour factor, PHF	0.84	0.84	0.84	0.94	0.94	0.94	0.83	0.83	0.83	0.73	0.73	0.73
Adj. Flow (vph)	156	730	215	28	413	67	261	270	53	122	268	164
RTOR Reduction (vph)	0	0	0	0	0	0	0	8	0	0	0	114
Lane Group Flow (vph)	156	730	215	28	413	67	261	315	0	122	268	50
Heavy Vehicles (%)	2%	3%	5%	6%	3%	2%	2%	4%	6%	3%	5%	2%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Actuated Green, G (s)	45.0	36.8	90.0	33.8	31.2	90.0	32.6	19.2		22.6	14.2	22.4
Effective Green, g (s)	48.4	39.3	90.0	38.8	33.7	90.0	33.6	20.2		24.6	15.2	27.4
Actuated g/C Ratio	0.54	0.44	1.00	0.43	0.37	1.00	0.37	0.22		0.27	0.17	0.30
Clearance Time (s)	6.5	6.5		6.5	6.5		5.0	5.0		5.0	5.0	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	406	805	1538	164	667	1478	341	398		267	295	466
v/s Ratio Prot	c0.05	c0.40		0.01	0.23		c0.12	c0.18		0.05	0.15	0.01
v/s Ratio Perm	0.16		0.14	0.06		0.05	0.16			0.08		0.02
v/c Ratio	0.38	0.91	0.14	0.17	0.62	0.05	0.77	0.79		0.46	0.91	0.11
Uniform Delay, d1	12.5	23.6	0.0	18.4	22.9	0.0	22.2	32.9		25.9	36.7	22.5
Progression Factor	1.00	1.00	1.00	0.87	0.91	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	15.8	0.2	0.5	4.1	0.1	9.8	10.3		1.2	29.6	0.1
Delay (s)	13.1	39.4	0.2	16.5	24.9	0.1	32.1	43.3		27.2	66.3	22.6
Level of Service	B	D	A	B	C	A	C	D		C	E	C
Approach Delay (s)		28.1			21.2			38.2			44.8	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	489	234	31	587	70	213	163	34	132	194	195
Future Volume (vph)	124	489	234	31	587	70	213	163	34	132	194	195
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.974				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1685	1881	1615	1620	1818	1507	1668	1835	0	1652	1801	1561
Flt Permitted	0.167			0.316			0.313			0.427		
Satd. Flow (perm)	296	1881	1615	539	1818	1507	550	1835	0	742	1801	1561
Satd. Flow (RTOR)			242			242		10				171
Adj. Flow (vph)	131	515	246	32	611	73	239	183	38	152	223	224
Lane Group Flow (vph)	131	515	246	32	611	73	239	221	0	152	223	224
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.5	16.5		12.5	16.5		11.0	11.0		11.0	11.0	12.5
Total Split (s)	13.0	43.0		13.0	43.0		14.0	20.0		14.0	20.0	13.0
Total Split (%)	14.4%	47.8%		14.4%	47.8%		15.6%	22.2%		15.6%	22.2%	14.4%
Maximum Green (s)	6.5	36.5		6.5	36.5		9.0	15.0		9.0	15.0	6.5
Yellow Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	2.0
Lost Time Adjust (s)	-2.5	-2.5		-2.5	-2.5		-1.0	-1.0		-1.0	-1.0	-2.5
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	None
v/c Ratio	0.43	0.56	0.15	0.08	0.79	0.05	0.76	0.64		0.50	0.75	0.37
Control Delay	13.8	20.9	0.2	7.8	27.4	0.1	42.5	42.0		28.2	51.8	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	13.8	20.9	0.2	7.8	27.4	0.1	42.5	42.0		28.2	51.8	8.5
Queue Length 50th (ft)	32	223	0	6	309	0	103	113		62	120	21
Queue Length 95th (ft)	58	330	0	m15	192	0	#195	#188		108	#202	69
Internal Link Dist (ft)		220			570			220			220	
Turn Bay Length (ft)	200		200	105		115	150			85		100
Base Capacity (vph)	303	916	1615	391	797	1507	314	348		311	320	605
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.43	0.56	0.15	0.08	0.77	0.05	0.76	0.64		0.49	0.70	0.37

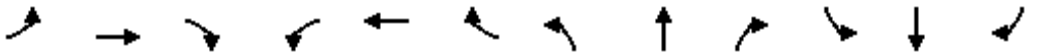
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection
Natural Cycle: 75

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

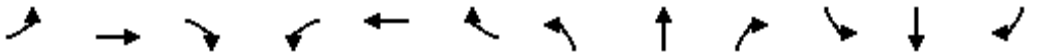
Splits and Phases: 1: Holliston Street & Route 109



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	489	234	31	587	70	213	163	34	132	194	195
Future Volume (vph)	124	489	234	31	587	70	213	163	34	132	194	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	11	10	10	12	12	10	11	11
Total Lost time (s)	4.0	4.0	1.5	4.0	4.0	1.5	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1685	1881	1615	1620	1818	1507	1668	1836		1652	1801	1561
Flt Permitted	0.17	1.00	1.00	0.32	1.00	1.00	0.31	1.00		0.43	1.00	1.00
Satd. Flow (perm)	296	1881	1615	539	1818	1507	550	1836		742	1801	1561
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.89	0.89	0.89	0.87	0.87	0.87
Adj. Flow (vph)	131	515	246	32	611	73	239	183	38	152	223	224
RTOR Reduction (vph)	0	0	0	0	0	0	0	8	0	0	0	122
Lane Group Flow (vph)	131	515	246	32	611	73	239	213	0	152	223	102
Heavy Vehicles (%)	0%	1%	0%	4%	1%	0%	1%	1%	0%	2%	2%	0%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Actuated Green, G (s)	45.3	38.7	90.0	39.7	35.9	90.0	26.1	15.6		22.9	14.0	20.6
Effective Green, g (s)	50.3	41.2	90.0	44.7	38.4	90.0	28.1	16.6		24.9	15.0	25.6
Actuated g/C Ratio	0.56	0.46	1.00	0.50	0.43	1.00	0.31	0.18		0.28	0.17	0.28
Clearance Time (s)	6.5	6.5		6.5	6.5		5.0	5.0		5.0	5.0	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	305	861	1615	343	775	1507	314	338		305	300	444
v/s Ratio Prot	c0.04	0.27		0.01	c0.34		c0.10	0.12		0.05	0.12	0.02
v/s Ratio Perm	0.20		c0.15	0.04		0.05	c0.14			0.08		0.04
v/c Ratio	0.43	0.60	0.15	0.09	0.79	0.05	0.76	0.63		0.50	0.74	0.23
Uniform Delay, d1	13.8	18.2	0.0	12.6	22.3	0.0	25.3	33.9		26.1	35.7	24.6
Progression Factor	1.00	1.00	1.00	0.86	0.85	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	3.1	0.2	0.1	7.4	0.1	10.4	3.7		1.3	9.6	0.3
Delay (s)	14.8	21.3	0.2	10.9	26.5	0.1	35.7	37.5		27.4	45.2	24.9
Level of Service	B	C	A	B	C	A	D	D		C	D	C
Approach Delay (s)		14.5			23.1			36.6			33.1	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

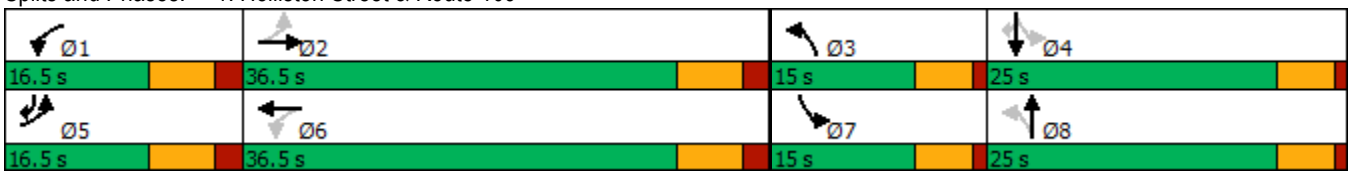


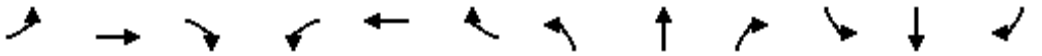
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	536	253	43	566	110	253	138	42	104	143	167
Future Volume (vph)	132	536	253	43	566	110	253	138	42	104	143	167
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.965				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1685	1881	1615	1685	1837	1507	1685	1834	0	1685	1837	1561
Flt Permitted	0.127			0.237			0.455			0.556		
Satd. Flow (perm)	225	1881	1615	420	1837	1507	807	1834	0	986	1837	1561
Satd. Flow (RTOR)			235			235		15				138
Adj. Flow (vph)	148	602	284	46	602	117	278	152	46	112	154	180
Lane Group Flow (vph)	148	602	284	46	602	117	278	198	0	112	154	180
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.5	16.5		12.5	16.5		11.0	11.0		11.0	11.0	12.5
Total Split (s)	16.5	36.5		16.5	36.5		15.0	25.0		15.0	25.0	16.5
Total Split (%)	17.7%	39.2%		17.7%	39.2%		16.1%	26.9%		16.1%	26.9%	17.7%
Maximum Green (s)	10.0	30.0		10.0	30.0		10.0	20.0		10.0	20.0	10.0
Yellow Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	2.0
Lost Time Adjust (s)	-2.5	-2.5		-2.5	-2.5		-1.0	-1.0		-1.0	-1.0	-2.5
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
v/c Ratio	0.46	0.69	0.18	0.14	0.88	0.08	0.75	0.49		0.31	0.50	0.28
Control Delay	16.1	26.4	0.2	10.8	42.4	0.1	37.2	33.5		22.1	37.8	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	16.1	26.4	0.2	10.8	42.4	0.1	37.2	33.5		22.1	37.8	6.9
Queue Length 50th (ft)	35	273	0	10	294	0	117	92		42	76	15
Queue Length 95th (ft)	84	#510	0	29	#553	0	#206	161		79	135	56
Internal Link Dist (ft)		220			570			220			220	
Turn Bay Length (ft)	200		200	105		115	150			85		100
Base Capacity (vph)	340	874	1615	407	710	1507	370	482		386	458	657
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.44	0.69	0.18	0.11	0.85	0.08	0.75	0.41		0.29	0.34	0.27

Intersection Summary
Cycle Length: 93
Actuated Cycle Length: 84.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Holliston Street & Route 109

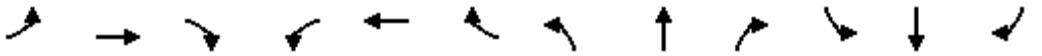




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	536	253	43	566	110	253	138	42	104	143	167
Future Volume (vph)	132	536	253	43	566	110	253	138	42	104	143	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	11	10	10	12	12	10	11	11
Total Lost time (s)	4.0	4.0	1.5	4.0	4.0	1.5	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1685	1881	1615	1685	1837	1507	1685	1834		1685	1837	1561
Flt Permitted	0.13	1.00	1.00	0.24	1.00	1.00	0.46	1.00		0.56	1.00	1.00
Satd. Flow (perm)	225	1881	1615	421	1837	1507	807	1834		986	1837	1561
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.91	0.91	0.91	0.93	0.93	0.93
Adj. Flow (vph)	148	602	284	46	602	117	278	152	46	112	154	180
RTOR Reduction (vph)	0	0	0	0	0	0	0	12	0	0	0	94
Lane Group Flow (vph)	148	602	284	46	602	117	278	186	0	112	154	86
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Actuated Green, G (s)	45.9	36.8	88.4	35.9	31.8	88.4	27.3	17.2		21.7	14.4	23.5
Effective Green, g (s)	49.9	39.3	88.4	40.9	34.3	88.4	29.3	18.2		23.7	15.4	28.5
Actuated g/C Ratio	0.56	0.44	1.00	0.46	0.39	1.00	0.33	0.21		0.27	0.17	0.32
Clearance Time (s)	6.5	6.5		6.5	6.5		5.0	5.0		5.0	5.0	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	318	836	1615	289	712	1507	377	377		329	320	503
v/s Ratio Prot	c0.06	c0.32		0.01	c0.33		c0.09	0.10		0.03	0.08	0.02
v/s Ratio Perm	0.20		0.18	0.06		0.08	c0.15			0.06		0.03
v/c Ratio	0.47	0.72	0.18	0.16	0.85	0.08	0.74	0.49		0.34	0.48	0.17
Uniform Delay, d1	14.4	20.1	0.0	14.6	24.6	0.0	24.1	31.0		25.4	32.9	21.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	3.1	0.2	0.3	9.1	0.1	7.3	1.0		0.6	1.1	0.2
Delay (s)	15.4	23.1	0.2	14.9	33.7	0.1	31.5	32.0		26.0	34.0	21.6
Level of Service	B	C	A	B	C	A	C	C		C	C	C
Approach Delay (s)		15.7			27.5			31.7			27.0	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	88.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	632	181	29	393	65	217	224	53	97	196	120
Future Volume (vph)	131	632	181	29	393	65	217	224	53	97	196	120
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.971				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1652	1845	1538	1589	1783	1478	1652	1767	0	1636	1749	1531
Flt Permitted	0.283			0.119			0.207			0.299		
Satd. Flow (perm)	492	1845	1538	199	1783	1478	360	1767	0	515	1749	1531
Satd. Flow (RTOR)			242			242		12				164
Adj. Flow (vph)	156	752	215	31	418	69	261	270	64	133	268	164
Lane Group Flow (vph)	156	752	215	31	418	69	261	334	0	133	268	164
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.5	16.5		12.5	16.5		11.0	11.0		11.0	11.0	12.5
Total Split (s)	15.0	39.0		13.0	37.0		19.0	24.0		14.0	19.0	15.0
Total Split (%)	16.7%	43.3%		14.4%	41.1%		21.1%	26.7%		15.6%	21.1%	16.7%
Maximum Green (s)	8.5	32.5		6.5	30.5		14.0	19.0		9.0	14.0	8.5
Yellow Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	2.0
Lost Time Adjust (s)	-2.5	-2.5		-2.5	-2.5		-1.0	-1.0		-1.0	-1.0	-2.5
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	None
v/c Ratio	0.39	0.90	0.14	0.14	0.63	0.05	0.77	0.83		0.51	0.91	0.27
Control Delay	14.0	41.9	0.2	10.2	24.3	0.1	37.4	51.1		27.1	72.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	14.0	41.9	0.2	10.2	24.3	0.1	37.4	51.1		27.1	72.0	4.9
Queue Length 50th (ft)	43	~468	0	5	204	0	108	176		50	152	0
Queue Length 95th (ft)	70	#612	0	18	154	0	#161	#275		72	#208	21
Internal Link Dist (ft)		220			570			220			220	
Turn Bay Length (ft)	200		200	105		115	150			85		100
Base Capacity (vph)	400	832	1538	233	667	1478	350	403		268	296	623
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.39	0.90	0.14	0.13	0.63	0.05	0.75	0.83		0.50	0.91	0.26

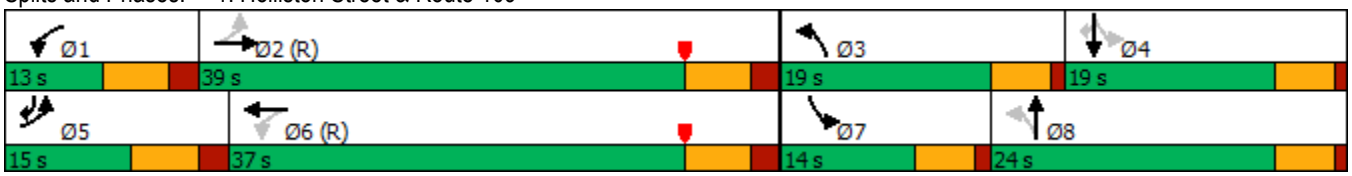
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection
Natural Cycle: 90

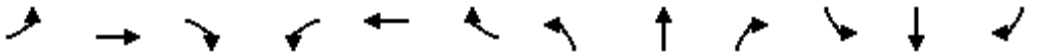
Control Type: Actuated-Coordinated

~ 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: 1: Holliston Street & Route 109





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	632	181	29	393	65	217	224	53	97	196	120
Future Volume (vph)	131	632	181	29	393	65	217	224	53	97	196	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	11	10	10	12	12	10	11	11
Total Lost time (s)	4.0	4.0	1.5	4.0	4.0	1.5	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1652	1845	1538	1589	1783	1478	1652	1768		1636	1749	1531
Flt Permitted	0.28	1.00	1.00	0.12	1.00	1.00	0.21	1.00		0.30	1.00	1.00
Satd. Flow (perm)	492	1845	1538	199	1783	1478	360	1768		515	1749	1531
Peak-hour factor, PHF	0.84	0.84	0.84	0.94	0.94	0.94	0.83	0.83	0.83	0.73	0.73	0.73
Adj. Flow (vph)	156	752	215	31	418	69	261	270	64	133	268	164
RTOR Reduction (vph)	0	0	0	0	0	0	0	9	0	0	0	114
Lane Group Flow (vph)	156	752	215	31	418	69	261	325	0	133	268	50
Heavy Vehicles (%)	2%	3%	5%	6%	3%	2%	2%	4%	6%	3%	5%	2%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Actuated Green, G (s)	43.6	35.4	90.0	35.0	31.1	90.0	32.5	19.1		22.9	14.3	22.5
Effective Green, g (s)	48.3	37.9	90.0	40.0	33.6	90.0	33.7	20.1		24.9	15.3	27.5
Actuated g/C Ratio	0.54	0.42	1.00	0.44	0.37	1.00	0.37	0.22		0.28	0.17	0.31
Clearance Time (s)	6.5	6.5		6.5	6.5		5.0	5.0		5.0	5.0	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	401	776	1538	187	665	1478	341	394		262	297	467
v/s Ratio Prot	c0.05	c0.41		0.01	0.23		c0.12	c0.18		0.05	0.15	0.01
v/s Ratio Perm	0.16		0.14	0.06		0.05	0.16			0.09		0.02
v/c Ratio	0.39	0.97	0.14	0.17	0.63	0.05	0.77	0.82		0.51	0.90	0.11
Uniform Delay, d1	12.6	25.5	0.0	19.0	23.1	0.0	22.2	33.3		26.0	36.6	22.4
Progression Factor	1.00	1.00	1.00	0.87	0.84	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	25.6	0.2	0.4	4.3	0.1	9.8	13.1		1.5	28.5	0.1
Delay (s)	13.3	51.1	0.2	16.8	23.6	0.1	32.0	46.3		27.5	65.1	22.5
Level of Service	B	D	A	B	C	A	C	D		C	E	C
Approach Delay (s)		36.1			20.1			40.0			43.9	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	499	234	42	610	80	213	163	39	136	194	195
Future Volume (vph)	124	499	234	42	610	80	213	163	39	136	194	195
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.971				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1685	1881	1615	1620	1818	1507	1668	1830	0	1652	1801	1561
Flt Permitted	0.153			0.310			0.323			0.388		
Satd. Flow (perm)	271	1881	1615	529	1818	1507	567	1830	0	675	1801	1561
Satd. Flow (RTOR)			242			242		12				162
Adj. Flow (vph)	131	525	246	44	635	83	239	183	44	156	223	224
Lane Group Flow (vph)	131	525	246	44	635	83	239	227	0	156	223	224
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.5	16.5		12.5	16.5		11.0	11.0		11.0	11.0	12.5
Total Split (s)	13.0	43.0		13.0	43.0		14.0	20.0		14.0	20.0	13.0
Total Split (%)	14.4%	47.8%		14.4%	47.8%		15.6%	22.2%		15.6%	22.2%	14.4%
Maximum Green (s)	6.5	36.5		6.5	36.5		9.0	15.0		9.0	15.0	6.5
Yellow Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	2.0
Lost Time Adjust (s)	-2.5	-2.5		-2.5	-2.5		-1.0	-1.0		-1.0	-1.0	-2.5
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	None
v/c Ratio	0.45	0.57	0.15	0.11	0.81	0.06	0.79	0.68		0.53	0.75	0.37
Control Delay	14.1	20.8	0.2	8.4	28.3	0.1	45.1	44.0		29.6	51.8	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	14.1	20.8	0.2	8.4	28.3	0.1	45.1	44.0		29.6	51.8	9.3
Queue Length 50th (ft)	32	228	0	6	322	0	105	115		65	120	25
Queue Length 95th (ft)	58	339	0	m22	#245	0	#192	#197		110	#202	73
Internal Link Dist (ft)		220			570			220			220	
Turn Bay Length (ft)	200		200	105		115	150			85		100
Base Capacity (vph)	293	925	1615	391	797	1507	304	339		298	320	599
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.45	0.57	0.15	0.11	0.80	0.06	0.79	0.67		0.52	0.70	0.37

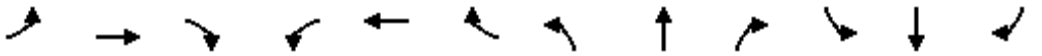
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection
Natural Cycle: 80

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Holliston Street & Route 109



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	499	234	42	610	80	213	163	39	136	194	195
Future Volume (vph)	124	499	234	42	610	80	213	163	39	136	194	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	11	10	10	12	12	10	11	11
Total Lost time (s)	4.0	4.0	1.5	4.0	4.0	1.5	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1685	1881	1615	1620	1818	1507	1668	1830		1652	1801	1561
Flt Permitted	0.15	1.00	1.00	0.31	1.00	1.00	0.32	1.00		0.39	1.00	1.00
Satd. Flow (perm)	272	1881	1615	528	1818	1507	567	1830		675	1801	1561
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.89	0.89	0.89	0.87	0.87	0.87
Adj. Flow (vph)	131	525	246	44	635	83	239	183	44	156	223	224
RTOR Reduction (vph)	0	0	0	0	0	0	0	10	0	0	0	116
Lane Group Flow (vph)	131	525	246	44	635	83	239	217	0	156	223	108
Heavy Vehicles (%)	0%	1%	0%	4%	1%	0%	1%	1%	0%	2%	2%	0%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Actuated Green, G (s)	45.7	39.1	90.0	40.3	36.4	90.0	25.1	15.1		22.9	14.0	20.6
Effective Green, g (s)	50.7	41.6	90.0	45.3	38.9	90.0	27.1	16.1		24.9	15.0	25.6
Actuated g/C Ratio	0.56	0.46	1.00	0.50	0.43	1.00	0.30	0.18		0.28	0.17	0.28
Clearance Time (s)	6.5	6.5		6.5	6.5		5.0	5.0		5.0	5.0	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	296	869	1615	343	785	1507	305	327		294	300	444
v/s Ratio Prot	c0.04	0.28		0.01	c0.35		c0.10	0.12		0.06	0.12	0.02
v/s Ratio Perm	0.20		c0.15	0.06		0.06	c0.14			0.09		0.04
v/c Ratio	0.44	0.60	0.15	0.13	0.81	0.06	0.78	0.66		0.53	0.74	0.24
Uniform Delay, d1	14.0	18.1	0.0	12.4	22.3	0.0	26.1	34.4		26.2	35.7	24.8
Progression Factor	1.00	1.00	1.00	0.92	0.86	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	3.1	0.2	0.2	8.1	0.1	12.4	5.0		1.8	9.6	0.3
Delay (s)	15.1	21.2	0.2	11.6	27.2	0.1	38.4	39.4		28.0	45.2	25.0
Level of Service	B	C	A	B	C	A	D	D		C	D	C
Approach Delay (s)		14.6			23.4			38.9			33.3	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

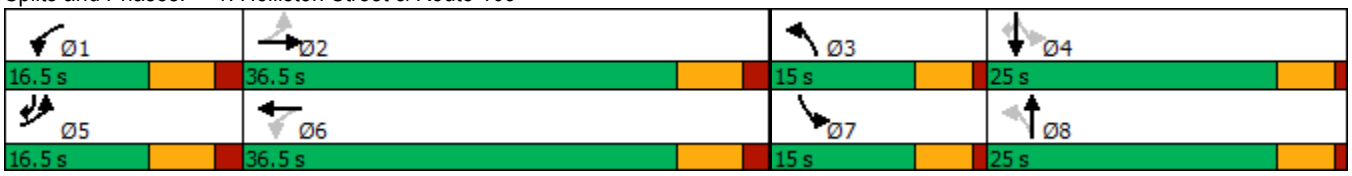
2029 Build Saturday Midday Peak Hour Traffic Volumes
1: Holliston Street & Route 109

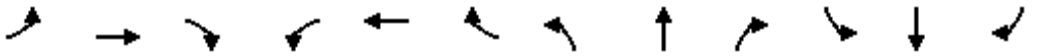
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	551	253	48	577	115	253	138	49	110	143	167
Future Volume (vph)	132	551	253	48	577	115	253	138	49	110	143	167
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.961				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1685	1881	1615	1685	1837	1507	1685	1826	0	1685	1837	1561
Flt Permitted	0.118			0.219			0.459			0.531		
Satd. Flow (perm)	209	1881	1615	388	1837	1507	814	1826	0	942	1837	1561
Satd. Flow (RTOR)			235			235		18				135
Adj. Flow (vph)	148	619	284	51	614	122	278	152	54	118	154	180
Lane Group Flow (vph)	148	619	284	51	614	122	278	206	0	118	154	180
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.5	16.5		12.5	16.5		11.0	11.0		11.0	11.0	12.5
Total Split (s)	16.5	36.5		16.5	36.5		15.0	25.0		15.0	25.0	16.5
Total Split (%)	17.7%	39.2%		17.7%	39.2%		16.1%	26.9%		16.1%	26.9%	17.7%
Maximum Green (s)	10.0	30.0		10.0	30.0		10.0	20.0		10.0	20.0	10.0
Yellow Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	2.0
Lost Time Adjust (s)	-2.5	-2.5		-2.5	-2.5		-1.0	-1.0		-1.0	-1.0	-2.5
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
v/c Ratio	0.47	0.71	0.18	0.15	0.89	0.08	0.75	0.51		0.33	0.49	0.28
Control Delay	17.2	27.4	0.2	11.1	43.9	0.1	37.2	33.6		22.4	37.7	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	17.2	27.4	0.2	11.1	43.9	0.1	37.2	33.6		22.4	37.7	7.1
Queue Length 50th (ft)	36	289	0	12	306	0	117	95		45	76	16
Queue Length 95th (ft)	89	#537	0	32	#569	0	#204	166		83	135	57
Internal Link Dist (ft)		220			570			220			220	
Turn Bay Length (ft)	200		200	105		115	150			85		100
Base Capacity (vph)	332	874	1615	394	705	1507	370	479		379	455	655
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.45	0.71	0.18	0.13	0.87	0.08	0.75	0.43		0.31	0.34	0.27

Intersection Summary
Cycle Length: 93
Actuated Cycle Length: 85.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Holliston Street & Route 109



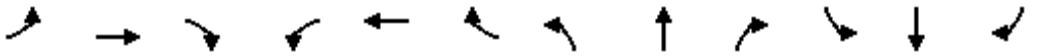


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	551	253	48	577	115	253	138	49	110	143	167
Future Volume (vph)	132	551	253	48	577	115	253	138	49	110	143	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	11	10	10	12	12	10	11	11
Total Lost time (s)	4.0	4.0	1.5	4.0	4.0	1.5	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1685	1881	1615	1685	1837	1507	1685	1825		1685	1837	1561
Flt Permitted	0.12	1.00	1.00	0.22	1.00	1.00	0.46	1.00		0.53	1.00	1.00
Satd. Flow (perm)	210	1881	1615	389	1837	1507	813	1825		941	1837	1561
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.91	0.91	0.91	0.93	0.93	0.93
Adj. Flow (vph)	148	619	284	51	614	122	278	152	54	118	154	180
RTOR Reduction (vph)	0	0	0	0	0	0	0	14	0	0	0	91
Lane Group Flow (vph)	148	619	284	51	614	122	278	192	0	118	154	89
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		Free	6		Free	8			4		4
Actuated Green, G (s)	46.2	37.1	89.0	36.4	32.2	89.0	27.4	17.3		22.0	14.6	23.7
Effective Green, g (s)	50.3	39.6	89.0	41.4	34.7	89.0	29.4	18.3		24.0	15.6	28.7
Actuated g/C Ratio	0.57	0.44	1.00	0.47	0.39	1.00	0.33	0.21		0.27	0.18	0.32
Clearance Time (s)	6.5	6.5		6.5	6.5		5.0	5.0		5.0	5.0	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	310	836	1615	278	716	1507	377	375		323	321	503
v/s Ratio Prot	c0.06	c0.33		0.01	c0.33		c0.09	0.11		0.03	0.08	0.02
v/s Ratio Perm	0.21		0.18	0.07		0.08	c0.15			0.06		0.03
v/c Ratio	0.48	0.74	0.18	0.18	0.86	0.08	0.74	0.51		0.37	0.48	0.18
Uniform Delay, d1	14.7	20.4	0.0	14.9	24.9	0.0	24.4	31.4		25.6	33.0	21.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	3.6	0.2	0.3	10.0	0.1	7.3	1.2		0.7	1.1	0.2
Delay (s)	15.9	24.0	0.2	15.2	34.8	0.1	31.8	32.6		26.3	34.2	21.8
Level of Service	B	C	A	B	C	A	C	C		C	C	C
Approach Delay (s)		16.4			28.2			32.1			27.2	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Route 114 at the Project site driveway and the Medway Commons Driveway



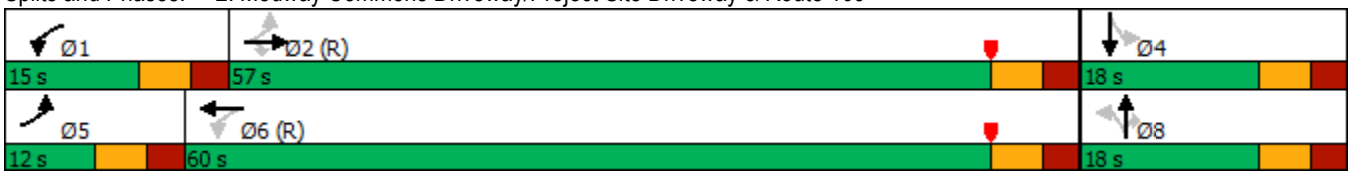
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	613	71	32	361	1	54	0	69	0	1	1
Future Volume (vph)	1	613	71	32	361	1	54	0	69	0	1	1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850						0.850		0.925	
Flt Protected	0.950			0.950				0.950				
Satd. Flow (prot)	1745	1845	1583	1851	1968	0	0	1736	1583	1900	1758	0
Flt Permitted	0.495			0.320				0.755				
Satd. Flow (perm)	909	1845	1583	624	1968	0	0	1379	1583	1900	1758	0
Satd. Flow (RTOR)			109						109		2	
Adj. Flow (vph)	1	652	76	39	435	1	71	0	91	0	2	2
Lane Group Flow (vph)	1	652	76	39	436	0	0	71	91	0	4	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	12.0	16.0	16.0	12.0	16.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	12.0	57.0	57.0	15.0	60.0		18.0	18.0	18.0	18.0	18.0	
Total Split (%)	13.3%	63.3%	63.3%	16.7%	66.7%		20.0%	20.0%	20.0%	20.0%	20.0%	
Maximum Green (s)	6.0	51.0	51.0	9.0	54.0		12.0	12.0	12.0	12.0	12.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None	None	None	None	
v/c Ratio	0.00	0.48	0.06	0.06	0.28			0.39	0.30		0.02	
Control Delay	4.0	8.4	1.5	3.1	5.1			40.8	7.6		26.0	
Queue Delay	0.0	0.1	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	4.0	8.4	1.5	3.1	5.1			40.8	7.6		26.0	
Queue Length 50th (ft)	0	124	0	4	54			38	0		1	
Queue Length 95th (ft)	m0	142	m1	11	157			62	17		5	
Internal Link Dist (ft)		570			220			220			219	
Turn Bay Length (ft)	100		100	230								
Base Capacity (vph)	779	1349	1186	650	1557			221	345		284	
Starvation Cap Reductn	0	59	0	0	0			0	0		0	
Spillback Cap Reductn	0	0	0	0	0			0	0		0	
Storage Cap Reductn	0	0	0	0	0			0	0		0	
Reduced v/c Ratio	0.00	0.51	0.06	0.06	0.28			0.32	0.26		0.01	

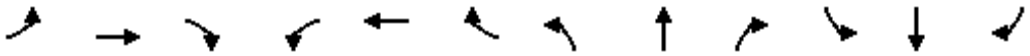
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 55

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Medway Commons Driveway/Project Site Driveway & Route 109

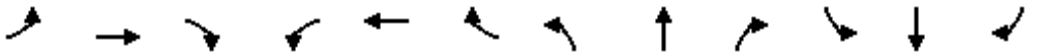




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	613	71	32	361	1	54	0	69	0	1	1
Future Volume (vph)	1	613	71	32	361	1	54	0	69	0	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	14	14	14	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1745	1845	1583	1851	1967			1736	1583		1758	
Flt Permitted	0.50	1.00	1.00	0.32	1.00			0.76	1.00		1.00	
Satd. Flow (perm)	909	1845	1583	624	1967			1380	1583		1758	
Peak-hour factor, PHF	0.94	0.94	0.94	0.83	0.83	0.83	0.76	0.76	0.76	0.50	0.50	0.50
Adj. Flow (vph)	1	652	76	39	435	1	71	0	91	0	2	2
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	80	0	2	0
Lane Group Flow (vph)	1	652	52	39	436	0	0	71	11	0	2	0
Heavy Vehicles (%)	0%	3%	2%	4%	3%	0%	4%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	60.6	59.4	59.4	65.8	62.0			8.8	8.8		8.8	
Effective Green, g (s)	64.6	61.4	61.4	69.8	64.0			10.8	10.8		10.8	
Actuated g/C Ratio	0.72	0.68	0.68	0.78	0.71			0.12	0.12		0.12	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	682	1258	1079	563	1398			165	189		210	
v/s Ratio Prot	0.00	c0.35		c0.00	0.22						0.00	
v/s Ratio Perm	0.00		0.03	0.05				c0.05	0.01			
v/c Ratio	0.00	0.52	0.05	0.07	0.31			0.43	0.06		0.01	
Uniform Delay, d1	3.6	7.0	4.7	3.6	4.8			36.7	35.1		34.9	
Progression Factor	1.35	0.90	1.90	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	1.1	0.1	0.1	0.6			1.8	0.1		0.0	
Delay (s)	4.9	7.4	9.0	3.7	5.4			38.5	35.2		34.9	
Level of Service	A	A	A	A	A			D	D		C	
Approach Delay (s)		7.6			5.3			36.7			34.9	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



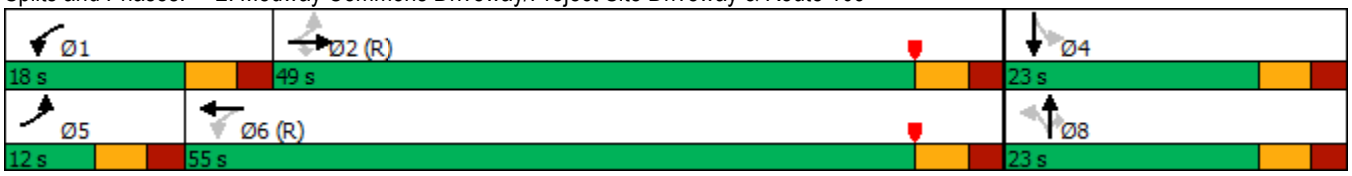
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	404	149	117	515	15	78	8	73	16	6	29
Future Volume (vph)	27	404	149	117	515	15	78	8	73	16	6	29
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996				0.850		0.876	
Flt Protected	0.950			0.950				0.956		0.950		
Satd. Flow (prot)	1745	1881	1615	1869	1999	0	0	1800	1583	1805	1664	0
Flt Permitted	0.414			0.420				0.716		0.669		
Satd. Flow (perm)	760	1881	1615	826	1999	0	0	1348	1583	1271	1664	0
Satd. Flow (RTOR)			148		3				109		34	
Adj. Flow (vph)	28	425	157	123	542	16	91	9	85	19	7	34
Lane Group Flow (vph)	28	425	157	123	558	0	0	100	85	19	41	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	12.0	16.0	16.0	12.0	16.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	12.0	49.0	49.0	18.0	55.0		23.0	23.0	23.0	23.0	23.0	
Total Split (%)	13.3%	54.4%	54.4%	20.0%	61.1%		25.6%	25.6%	25.6%	25.6%	25.6%	
Maximum Green (s)	6.0	43.0	43.0	12.0	49.0		17.0	17.0	17.0	17.0	17.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None	None	None	None	
v/c Ratio	0.05	0.37	0.15	0.17	0.40			0.48	0.25	0.10	0.14	
Control Delay	3.1	8.5	1.6	4.0	8.5			41.5	5.8	31.6	14.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	3.1	8.5	1.6	4.0	8.5			41.5	5.8	31.6	14.0	
Queue Length 50th (ft)	2	91	0	15	85			53	0	9	3	
Queue Length 95th (ft)	m7	132	8	35	265			91	22	26	28	
Internal Link Dist (ft)		570			220			220			219	
Turn Bay Length (ft)	100		100	230						60		
Base Capacity (vph)	621	1147	1042	787	1406			284	420	268	378	
Starvation Cap Reductn	0	0	0	0	0			0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0			0	0	0	0	
Storage Cap Reductn	0	0	0	0	0			0	0	0	0	
Reduced v/c Ratio	0.05	0.37	0.15	0.16	0.40			0.35	0.20	0.07	0.11	

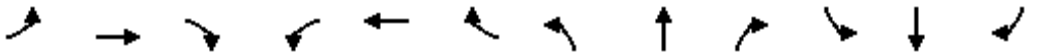
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 45

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Medway Commons Driveway/Project Site Driveway & Route 109

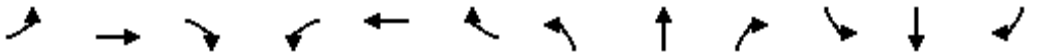




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	404	149	117	515	15	78	8	73	16	6	29
Future Volume (vph)	27	404	149	117	515	15	78	8	73	16	6	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	14	14	14	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1745	1881	1615	1869	1999			1801	1583	1805	1664	
Flt Permitted	0.41	1.00	1.00	0.42	1.00			0.72	1.00	0.67	1.00	
Satd. Flow (perm)	760	1881	1615	826	1999			1347	1583	1270	1664	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	28	425	157	123	542	16	91	9	85	19	7	34
RTOR Reduction (vph)	0	0	58	0	1	0	0	0	72	0	29	0
Lane Group Flow (vph)	28	425	99	123	557	0	0	100	13	19	12	0
Heavy Vehicles (%)	0%	1%	0%	3%	1%	0%	1%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	55.4	52.9	52.9	64.8	57.6			11.9	11.9	11.9	11.9	
Effective Green, g (s)	59.4	54.9	54.9	68.1	59.6			13.9	13.9	13.9	13.9	
Actuated g/C Ratio	0.66	0.61	0.61	0.76	0.66			0.15	0.15	0.15	0.15	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	550	1147	985	731	1323			208	244	196	256	
v/s Ratio Prot	0.00	0.23		c0.02	c0.28						0.01	
v/s Ratio Perm	0.03		0.06	0.11				c0.07	0.01	0.01		
v/c Ratio	0.05	0.37	0.10	0.17	0.42			0.48	0.05	0.10	0.05	
Uniform Delay, d1	5.4	8.8	7.3	3.6	7.1			34.8	32.4	32.7	32.4	
Progression Factor	0.79	0.76	0.62	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.8	0.2	0.1	1.0			1.7	0.1	0.2	0.1	
Delay (s)	4.3	7.6	4.7	3.7	8.1			36.5	32.5	32.9	32.5	
Level of Service	A	A	A	A	A			D	C	C	C	
Approach Delay (s)		6.7			7.3			34.7			32.6	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

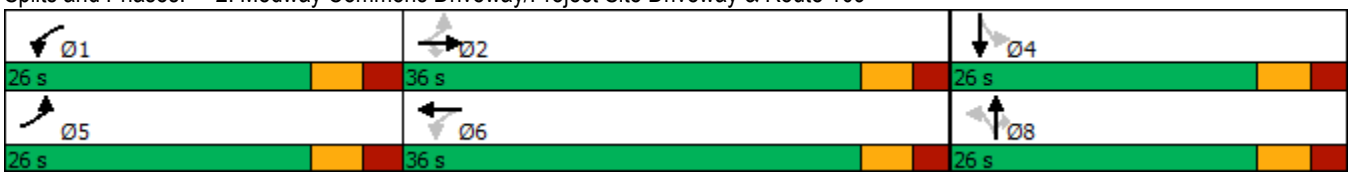
c Critical Lane Group

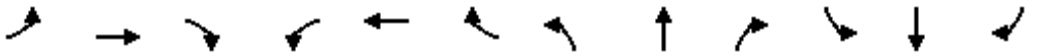


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	416	169	97	482	21	135	12	123	10	15	32
Future Volume (vph)	27	416	169	97	482	21	135	12	123	10	15	32
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.994				0.850		0.899	
Flt Protected	0.950			0.950				0.956		0.950		
Satd. Flow (prot)	1745	1900	1615	1925	2015	0	0	1800	1615	1805	1708	0
Flt Permitted	0.291			0.300				0.695		0.576		
Satd. Flow (perm)	534	1900	1615	608	2015	0	0	1308	1615	1094	1708	0
Satd. Flow (RTOR)			131		3				162		46	
Adj. Flow (vph)	30	462	188	115	574	25	178	16	162	14	22	46
Lane Group Flow (vph)	30	462	188	115	599	0	0	194	162	14	68	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	12.0	16.0	16.0	12.0	16.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	26.0	36.0	36.0	26.0	36.0		26.0	26.0	26.0	26.0	26.0	
Total Split (%)	29.5%	40.9%	40.9%	29.5%	40.9%		29.5%	29.5%	29.5%	29.5%	29.5%	
Maximum Green (s)	20.0	30.0	30.0	20.0	30.0		20.0	20.0	20.0	20.0	20.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min		None	None	None	None	None	
v/c Ratio	0.07	0.60	0.26	0.21	0.59			0.53	0.28	0.05	0.13	
Control Delay	6.3	19.5	6.3	6.8	15.3			27.2	5.6	19.8	10.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	6.3	19.5	6.3	6.8	15.3			27.2	5.6	19.8	10.4	
Queue Length 50th (ft)	4	137	13	16	112			62	0	4	6	
Queue Length 95th (ft)	15	258	54	37	294			114	25	14	23	
Internal Link Dist (ft)		570			220			220			219	
Turn Bay Length (ft)	100		100	230						60		
Base Capacity (vph)	823	1125	1010	913	1240			532	754	445	723	
Starvation Cap Reductn	0	0	0	0	0			0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0			0	0	0	0	
Storage Cap Reductn	0	0	0	0	0			0	0	0	0	
Reduced v/c Ratio	0.04	0.41	0.19	0.13	0.48			0.36	0.21	0.03	0.09	

Intersection Summary
Cycle Length: 88
Actuated Cycle Length: 59.6
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Medway Commons Driveway/Project Site Driveway & Route 109

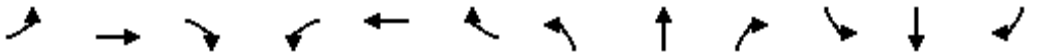




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	416	169	97	482	21	135	12	123	10	15	32
Future Volume (vph)	27	416	169	97	482	21	135	12	123	10	15	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	14	14	14	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1745	1900	1615	1925	2014			1800	1615	1805	1707	
Flt Permitted	0.29	1.00	1.00	0.30	1.00			0.69	1.00	0.58	1.00	
Satd. Flow (perm)	535	1900	1615	608	2014			1308	1615	1095	1707	
Peak-hour factor, PHF	0.90	0.90	0.90	0.84	0.84	0.84	0.76	0.76	0.76	0.69	0.69	0.69
Adj. Flow (vph)	30	462	188	115	574	25	178	16	162	14	22	46
RTOR Reduction (vph)	0	0	76	0	2	0	0	0	119	0	34	0
Lane Group Flow (vph)	30	462	112	115	597	0	0	194	43	14	34	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	26.5	24.4	24.4	33.3	27.8			14.5	14.5	14.5	14.5	
Effective Green, g (s)	30.5	26.4	26.4	37.3	29.8			16.5	16.5	16.5	16.5	
Actuated g/C Ratio	0.49	0.42	0.42	0.60	0.48			0.26	0.26	0.26	0.26	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	341	803	683	521	961			345	427	289	451	
v/s Ratio Prot	0.01	0.24		c0.03	c0.30						0.02	
v/s Ratio Perm	0.04		0.07	0.11				c0.15	0.03	0.01		
v/c Ratio	0.09	0.58	0.16	0.22	0.62			0.56	0.10	0.05	0.08	
Uniform Delay, d1	8.9	13.7	11.2	6.6	12.1			19.8	17.3	17.1	17.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.0	0.1	0.2	1.3			2.1	0.1	0.1	0.1	
Delay (s)	9.1	14.7	11.3	6.8	13.4			21.9	17.4	17.2	17.3	
Level of Service	A	B	B	A	B			C	B	B	B	
Approach Delay (s)		13.5			12.3			19.9			17.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	62.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



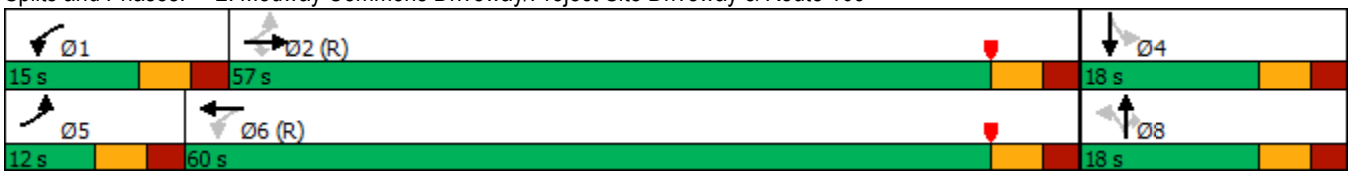
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	674	71	32	422	1	54	0	69	0	1	1
Future Volume (vph)	1	674	71	32	422	1	54	0	69	0	1	1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850						0.850		0.925	
Flt Protected	0.950			0.950				0.950				
Satd. Flow (prot)	1745	1845	1583	1851	1968	0	0	1736	1583	1900	1758	0
Flt Permitted	0.449			0.287				0.755				
Satd. Flow (perm)	825	1845	1583	559	1968	0	0	1379	1583	1900	1758	0
Satd. Flow (RTOR)			109						109		2	
Adj. Flow (vph)	1	717	76	39	508	1	71	0	91	0	2	2
Lane Group Flow (vph)	1	717	76	39	509	0	0	71	91	0	4	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	12.0	16.0	16.0	12.0	16.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	12.0	57.0	57.0	15.0	60.0		18.0	18.0	18.0	18.0	18.0	
Total Split (%)	13.3%	63.3%	63.3%	16.7%	66.7%		20.0%	20.0%	20.0%	20.0%	20.0%	
Maximum Green (s)	6.0	51.0	51.0	9.0	54.0		12.0	12.0	12.0	12.0	12.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None	None	None	None	
v/c Ratio	0.00	0.53	0.06	0.07	0.33			0.40	0.30		0.02	
Control Delay	3.0	7.3	0.8	2.9	5.2			41.9	7.9		27.0	
Queue Delay	0.0	0.1	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	3.0	7.3	0.8	2.9	5.2			41.9	7.9		27.0	
Queue Length 50th (ft)	0	121	1	4	67			38	0		1	
Queue Length 95th (ft)	m0	m104	m0	10	178			64	17		5	
Internal Link Dist (ft)		570			220			220			219	
Turn Bay Length (ft)	100		100	230								
Base Capacity (vph)	725	1356	1192	608	1557			216	340		277	
Starvation Cap Reductn	0	60	0	0	0			0	0		0	
Spillback Cap Reductn	0	0	0	0	0			0	0		0	
Storage Cap Reductn	0	0	0	0	0			0	0		0	
Reduced v/c Ratio	0.00	0.55	0.06	0.06	0.33			0.33	0.27		0.01	

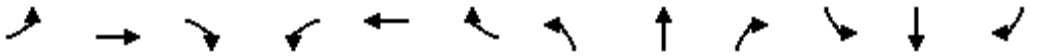
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Medway Commons Driveway/Project Site Driveway & Route 109



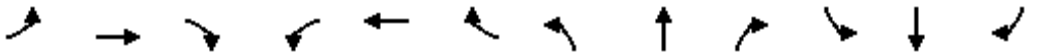


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	674	71	32	422	1	54	0	69	0	1	1
Future Volume (vph)	1	674	71	32	422	1	54	0	69	0	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	14	14	14	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1745	1845	1583	1851	1967			1736	1583		1758	
Flt Permitted	0.45	1.00	1.00	0.29	1.00			0.76	1.00		1.00	
Satd. Flow (perm)	825	1845	1583	559	1967			1380	1583		1758	
Peak-hour factor, PHF	0.94	0.94	0.94	0.83	0.83	0.83	0.76	0.76	0.76	0.50	0.50	0.50
Adj. Flow (vph)	1	717	76	39	508	1	71	0	91	0	2	2
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	80	0	2	0
Lane Group Flow (vph)	1	717	52	39	509	0	0	71	11	0	2	0
Heavy Vehicles (%)	0%	3%	2%	4%	3%	0%	4%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	60.9	59.7	59.7	66.1	62.3			8.5	8.5		8.5	
Effective Green, g (s)	64.9	61.7	61.7	70.1	64.3			10.5	10.5		10.5	
Actuated g/C Ratio	0.72	0.69	0.69	0.78	0.71			0.12	0.12		0.12	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	627	1264	1085	518	1405			161	184		205	
v/s Ratio Prot	0.00	c0.39		c0.00	0.26						0.00	
v/s Ratio Perm	0.00		0.03	0.05				c0.05	0.01			
v/c Ratio	0.00	0.57	0.05	0.08	0.36			0.44	0.06		0.01	
Uniform Delay, d1	3.6	7.3	4.6	4.0	5.0			37.0	35.4		35.2	
Progression Factor	1.08	0.75	1.01	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	1.1	0.1	0.1	0.7			1.9	0.1		0.0	
Delay (s)	3.8	6.6	4.7	4.1	5.7			38.9	35.5		35.2	
Level of Service	A	A	A	A	A			D	D		D	
Approach Delay (s)		6.4			5.6			37.0			35.2	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

2029 No Build Weekday Evening Peak Hour Traffic Volumes
2: Medway Commons Driveway/Project Site Driveway & Route 109



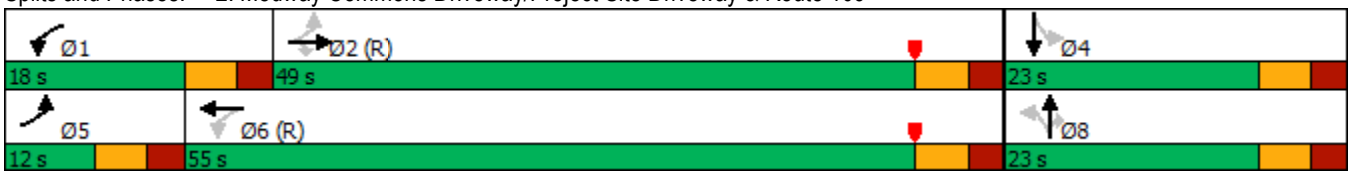
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	479	149	117	581	15	78	8	73	16	6	29
Future Volume (vph)	27	479	149	117	581	15	78	8	73	16	6	29
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996				0.850		0.876	
Flt Protected	0.950			0.950				0.956		0.950		
Satd. Flow (prot)	1745	1881	1615	1869	1999	0	0	1800	1583	1805	1664	0
Flt Permitted	0.368			0.368				0.716		0.669		
Satd. Flow (perm)	676	1881	1615	724	1999	0	0	1348	1583	1271	1664	0
Satd. Flow (RTOR)			125		2				109		34	
Adj. Flow (vph)	28	504	157	123	612	16	91	9	85	19	7	34
Lane Group Flow (vph)	28	504	157	123	628	0	0	100	85	19	41	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	12.0	16.0	16.0	12.0	16.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	12.0	49.0	49.0	18.0	55.0		23.0	23.0	23.0	23.0	23.0	
Total Split (%)	13.3%	54.4%	54.4%	20.0%	61.1%		25.6%	25.6%	25.6%	25.6%	25.6%	
Maximum Green (s)	6.0	43.0	43.0	12.0	49.0		17.0	17.0	17.0	17.0	17.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None	None	None	None	
v/c Ratio	0.05	0.44	0.15	0.19	0.45			0.48	0.25	0.10	0.14	
Control Delay	3.0	8.5	1.9	4.1	9.1			41.5	5.8	31.6	14.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	3.0	8.5	1.9	4.1	9.1			41.5	5.8	31.6	14.0	
Queue Length 50th (ft)	3	111	0	15	101			53	0	9	3	
Queue Length 95th (ft)	m7	133	m17	35	312			91	22	26	28	
Internal Link Dist (ft)		570			220			220			219	
Turn Bay Length (ft)	100		100	230						60		
Base Capacity (vph)	570	1147	1033	725	1406			284	420	268	378	
Starvation Cap Reductn	0	0	0	0	0			0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0			0	0	0	0	
Storage Cap Reductn	0	0	0	0	0			0	0	0	0	
Reduced v/c Ratio	0.05	0.44	0.15	0.17	0.45			0.35	0.20	0.07	0.11	

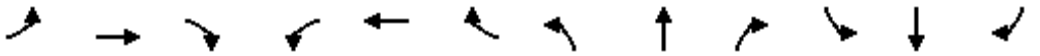
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 55

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Medway Commons Driveway/Project Site Driveway & Route 109

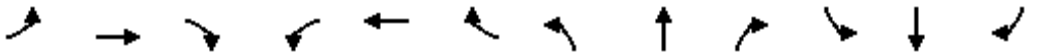




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	479	149	117	581	15	78	8	73	16	6	29
Future Volume (vph)	27	479	149	117	581	15	78	8	73	16	6	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	14	14	14	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1745	1881	1615	1869	1999			1801	1583	1805	1664	
Flt Permitted	0.37	1.00	1.00	0.37	1.00			0.72	1.00	0.67	1.00	
Satd. Flow (perm)	675	1881	1615	723	1999			1347	1583	1270	1664	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	28	504	157	123	612	16	91	9	85	19	7	34
RTOR Reduction (vph)	0	0	49	0	1	0	0	0	72	0	29	0
Lane Group Flow (vph)	28	504	108	123	627	0	0	100	13	19	12	0
Heavy Vehicles (%)	0%	1%	0%	3%	1%	0%	1%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	55.4	52.9	52.9	64.8	57.6			11.9	11.9	11.9	11.9	
Effective Green, g (s)	59.4	54.9	54.9	68.1	59.6			13.9	13.9	13.9	13.9	
Actuated g/C Ratio	0.66	0.61	0.61	0.76	0.66			0.15	0.15	0.15	0.15	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	499	1147	985	664	1323			208	244	196	256	
v/s Ratio Prot	0.00	0.27		c0.02	c0.31						0.01	
v/s Ratio Perm	0.03		0.07	0.12				c0.07	0.01	0.01		
v/c Ratio	0.06	0.44	0.11	0.19	0.47			0.48	0.05	0.10	0.05	
Uniform Delay, d1	5.6	9.4	7.3	4.0	7.5			34.8	32.4	32.7	32.4	
Progression Factor	0.76	0.70	0.56	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.0	0.2	0.1	1.2			1.7	0.1	0.2	0.1	
Delay (s)	4.3	7.6	4.3	4.2	8.7			36.5	32.5	32.9	32.5	
Level of Service	A	A	A	A	A			D	C	C	C	
Approach Delay (s)		6.7			8.0			34.7			32.6	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

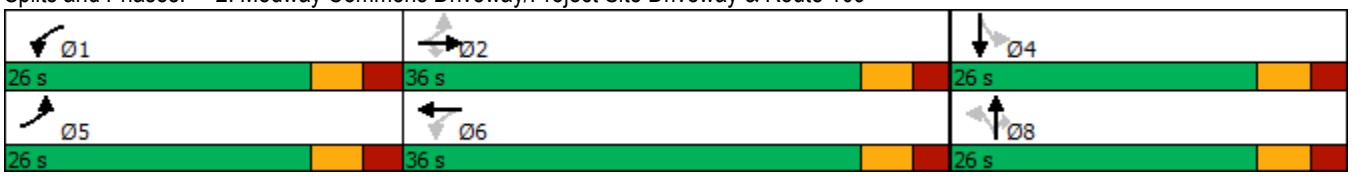
c Critical Lane Group

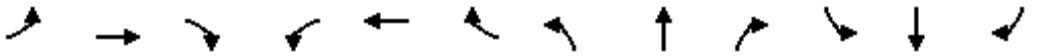


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	486	169	97	552	21	135	12	123	10	15	32
Future Volume (vph)	27	486	169	97	552	21	135	12	123	10	15	32
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995				0.850		0.899	
Flt Protected	0.950			0.950				0.956		0.950		
Satd. Flow (prot)	1745	1900	1615	1925	2017	0	0	1800	1615	1805	1708	0
Flt Permitted	0.231			0.252				0.695		0.563		
Satd. Flow (perm)	424	1900	1615	511	2017	0	0	1308	1615	1070	1708	0
Satd. Flow (RTOR)			112		2				162		46	
Adj. Flow (vph)	30	540	188	115	657	25	178	16	162	14	22	46
Lane Group Flow (vph)	30	540	188	115	682	0	0	194	162	14	68	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	12.0	16.0	16.0	12.0	16.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	26.0	36.0	36.0	26.0	36.0		26.0	26.0	26.0	26.0	26.0	
Total Split (%)	29.5%	40.9%	40.9%	29.5%	40.9%		29.5%	29.5%	29.5%	29.5%	29.5%	
Maximum Green (s)	20.0	30.0	30.0	20.0	30.0		20.0	20.0	20.0	20.0	20.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min		None	None	None	None	None	
v/c Ratio	0.07	0.66	0.25	0.22	0.64			0.55	0.29	0.05	0.14	
Control Delay	6.3	20.6	7.2	6.8	16.4			28.9	5.7	20.4	10.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	6.3	20.6	7.2	6.8	16.4			28.9	5.7	20.4	10.6	
Queue Length 50th (ft)	4	171	18	17	139			69	0	4	7	
Queue Length 95th (ft)	15	315	61	37	352			114	25	14	23	
Internal Link Dist (ft)		570			220			220			219	
Turn Bay Length (ft)	100		100	230						60		
Base Capacity (vph)	756	1042	936	844	1205			493	709	403	672	
Starvation Cap Reductn	0	0	0	0	0			0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0			0	0	0	0	
Storage Cap Reductn	0	0	0	0	0			0	0	0	0	
Reduced v/c Ratio	0.04	0.52	0.20	0.14	0.57			0.39	0.23	0.03	0.10	

Intersection Summary
Cycle Length: 88
Actuated Cycle Length: 62.6
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Medway Commons Driveway/Project Site Driveway & Route 109

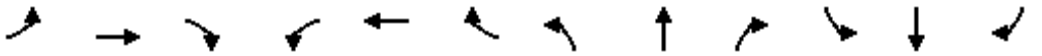




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	486	169	97	552	21	135	12	123	10	15	32
Future Volume (vph)	27	486	169	97	552	21	135	12	123	10	15	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	14	14	14	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1745	1900	1615	1925	2016			1800	1615	1805	1707	
Flt Permitted	0.23	1.00	1.00	0.25	1.00			0.69	1.00	0.56	1.00	
Satd. Flow (perm)	424	1900	1615	510	2016			1308	1615	1069	1707	
Peak-hour factor, PHF	0.90	0.90	0.90	0.84	0.84	0.84	0.76	0.76	0.76	0.69	0.69	0.69
Adj. Flow (vph)	30	540	188	115	657	25	178	16	162	14	22	46
RTOR Reduction (vph)	0	0	62	0	1	0	0	0	121	0	34	0
Lane Group Flow (vph)	30	540	126	115	681	0	0	194	41	14	34	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	29.6	27.4	27.4	36.4	30.8			14.7	14.7	14.7	14.7	
Effective Green, g (s)	33.6	29.4	29.4	40.4	32.8			16.7	16.7	16.7	16.7	
Actuated g/C Ratio	0.51	0.45	0.45	0.61	0.50			0.25	0.25	0.25	0.25	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	301	850	722	477	1006			332	410	271	433	
v/s Ratio Prot	0.01	0.28		c0.03	c0.34						0.02	
v/s Ratio Perm	0.04		0.08	0.12				c0.15	0.03	0.01		
v/c Ratio	0.10	0.64	0.17	0.24	0.68			0.58	0.10	0.05	0.08	
Uniform Delay, d1	9.3	14.0	10.9	7.1	12.4			21.5	18.8	18.5	18.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.6	0.1	0.3	1.8			2.6	0.1	0.1	0.1	
Delay (s)	9.4	15.6	11.0	7.4	14.3			24.1	18.9	18.6	18.7	
Level of Service	A	B	B	A	B			C	B	B	B	
Approach Delay (s)		14.2			13.3			21.7			18.7	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



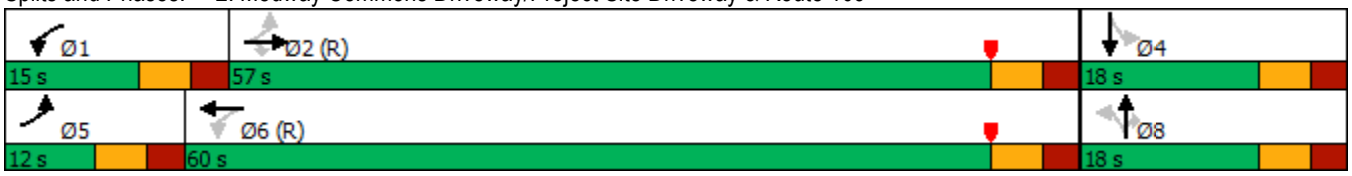
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	674	71	32	422	13	54	0	69	3	1	11
Future Volume (vph)	37	674	71	32	422	13	54	0	69	3	1	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995				0.850		0.862	
Flt Protected	0.950			0.950				0.950		0.950		
Satd. Flow (prot)	1745	1845	1583	1851	1960	0	0	1736	1583	1805	1638	0
Flt Permitted	0.414			0.298				0.742		0.711		
Satd. Flow (perm)	760	1845	1583	581	1960	0	0	1356	1583	1351	1638	0
Satd. Flow (RTOR)			109		3				109		22	
Adj. Flow (vph)	39	717	76	39	508	16	71	0	91	6	2	22
Lane Group Flow (vph)	39	717	76	39	524	0	0	71	91	6	24	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	12.0	16.0	16.0	12.0	16.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	12.0	57.0	57.0	15.0	60.0		18.0	18.0	18.0	18.0	18.0	
Total Split (%)	13.3%	63.3%	63.3%	16.7%	66.7%		20.0%	20.0%	20.0%	20.0%	20.0%	
Maximum Green (s)	6.0	51.0	51.0	9.0	54.0		12.0	12.0	12.0	12.0	12.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None	None	None	None	
v/c Ratio	0.06	0.53	0.06	0.07	0.36			0.40	0.30	0.03	0.10	
Control Delay	3.3	9.0	1.1	3.0	7.6			42.2	7.9	33.0	15.8	
Queue Delay	0.0	0.1	0.0	0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	3.3	9.1	1.1	3.0	7.6			42.2	7.9	33.0	15.8	
Queue Length 50th (ft)	8	263	4	4	128			38	0	3	1	
Queue Length 95th (ft)	m3	m104	m0	10	184			64	17	8	8	
Internal Link Dist (ft)		570			220			220			219	
Turn Bay Length (ft)	100		100	230						60		
Base Capacity (vph)	680	1356	1192	620	1446			212	340	211	275	
Starvation Cap Reductn	0	70	0	0	0			0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0			0	0	0	0	
Storage Cap Reductn	0	0	0	0	0			0	0	0	0	
Reduced v/c Ratio	0.06	0.56	0.06	0.06	0.36			0.33	0.27	0.03	0.09	

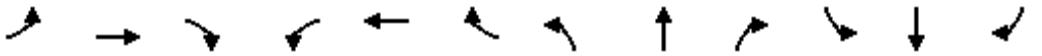
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Medway Commons Driveway/Project Site Driveway & Route 109

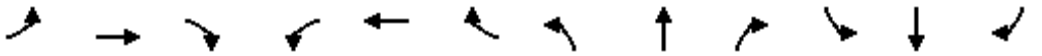




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	674	71	32	422	13	54	0	69	3	1	11
Future Volume (vph)	37	674	71	32	422	13	54	0	69	3	1	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	14	14	14	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1745	1845	1583	1851	1960			1736	1583	1805	1639	
Flt Permitted	0.41	1.00	1.00	0.30	1.00			0.74	1.00	0.71	1.00	
Satd. Flow (perm)	760	1845	1583	581	1960			1355	1583	1350	1639	
Peak-hour factor, PHF	0.94	0.94	0.94	0.83	0.83	0.83	0.76	0.76	0.76	0.50	0.50	0.50
Adj. Flow (vph)	39	717	76	39	508	16	71	0	91	6	2	22
RTOR Reduction (vph)	0	0	24	0	1	0	0	0	80	0	19	0
Lane Group Flow (vph)	39	717	52	39	523	0	0	71	11	6	5	0
Heavy Vehicles (%)	0%	3%	2%	4%	3%	0%	4%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	63.3	59.7	59.7	63.7	59.9			8.5	8.5	8.5	8.5	
Effective Green, g (s)	67.3	61.7	61.7	67.7	61.9			10.5	10.5	10.5	10.5	
Actuated g/C Ratio	0.75	0.69	0.69	0.75	0.69			0.12	0.12	0.12	0.12	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	629	1264	1085	518	1348			158	184	157	191	
v/s Ratio Prot	0.00	c0.39		c0.00	0.27						0.00	
v/s Ratio Perm	0.04		0.03	0.05				c0.05	0.01	0.00		
v/c Ratio	0.06	0.57	0.05	0.08	0.39			0.45	0.06	0.04	0.02	
Uniform Delay, d1	3.2	7.3	4.6	4.1	6.0			37.1	35.4	35.3	35.2	
Progression Factor	1.15	0.97	1.52	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.9	0.0	0.1	0.8			2.0	0.1	0.1	0.1	
Delay (s)	3.8	8.0	7.1	4.2	6.8			39.1	35.5	35.4	35.3	
Level of Service	A	A	A	A	A			D	D	D	D	
Approach Delay (s)		7.7			6.6			37.1			35.3	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



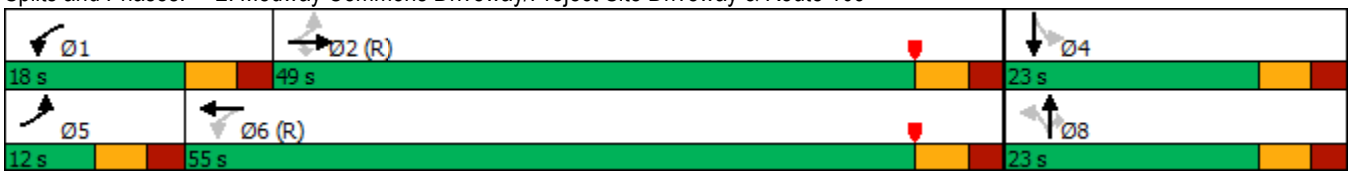
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	479	149	117	581	22	78	8	73	32	6	73
Future Volume (vph)	46	479	149	117	581	22	78	8	73	32	6	73
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995				0.850		0.861	
Flt Protected	0.950			0.950				0.956		0.950		
Satd. Flow (prot)	1745	1881	1615	1869	1997	0	0	1800	1583	1805	1636	0
Flt Permitted	0.343			0.371				0.676		0.670		
Satd. Flow (perm)	630	1881	1615	730	1997	0	0	1273	1583	1273	1636	0
Satd. Flow (RTOR)			125		3				109		85	
Adj. Flow (vph)	48	504	157	123	612	23	91	9	85	37	7	85
Lane Group Flow (vph)	48	504	157	123	635	0	0	100	85	37	92	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	12.0	16.0	16.0	12.0	16.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	12.0	49.0	49.0	18.0	55.0		23.0	23.0	23.0	23.0	23.0	
Total Split (%)	13.3%	54.4%	54.4%	20.0%	61.1%		25.6%	25.6%	25.6%	25.6%	25.6%	
Maximum Green (s)	6.0	43.0	43.0	12.0	49.0		17.0	17.0	17.0	17.0	17.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None	None	None	None	
v/c Ratio	0.09	0.44	0.15	0.19	0.48			0.50	0.25	0.18	0.28	
Control Delay	3.3	8.8	2.0	4.3	10.8			42.1	5.6	33.0	10.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	3.3	8.8	2.0	4.3	10.8			42.1	5.6	33.0	10.6	
Queue Length 50th (ft)	5	116	0	15	183			53	0	18	3	
Queue Length 95th (ft)	m11	134	m18	36	327			91	22	41	38	
Internal Link Dist (ft)		570			220			220			219	
Turn Bay Length (ft)	100		100	230						60		
Base Capacity (vph)	543	1139	1027	726	1345			270	422	270	414	
Starvation Cap Reductn	0	0	0	0	0			0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0			0	0	0	0	
Storage Cap Reductn	0	0	0	0	0			0	0	0	0	
Reduced v/c Ratio	0.09	0.44	0.15	0.17	0.47			0.37	0.20	0.14	0.22	

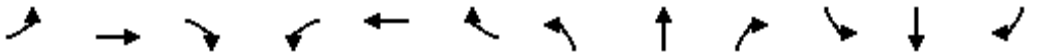
Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 55

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Medway Commons Driveway/Project Site Driveway & Route 109

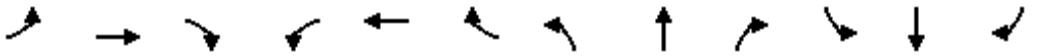




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	479	149	117	581	22	78	8	73	32	6	73
Future Volume (vph)	46	479	149	117	581	22	78	8	73	32	6	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	14	14	14	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1745	1881	1615	1869	1996			1801	1583	1805	1637	
Flt Permitted	0.34	1.00	1.00	0.37	1.00			0.68	1.00	0.67	1.00	
Satd. Flow (perm)	631	1881	1615	730	1996			1273	1583	1273	1637	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	48	504	157	123	612	23	91	9	85	37	7	85
RTOR Reduction (vph)	0	0	49	0	1	0	0	0	72	0	72	0
Lane Group Flow (vph)	48	504	108	123	634	0	0	100	13	37	20	0
Heavy Vehicles (%)	0%	1%	0%	3%	1%	0%	1%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	56.6	52.6	52.6	63.0	55.8			12.2	12.2	12.2	12.2	
Effective Green, g (s)	60.6	54.6	54.6	67.0	57.8			14.2	14.2	14.2	14.2	
Actuated g/C Ratio	0.67	0.61	0.61	0.74	0.64			0.16	0.16	0.16	0.16	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	499	1141	979	659	1281			200	249	200	258	
v/s Ratio Prot	0.01	0.27		c0.02	c0.32						0.01	
v/s Ratio Perm	0.06		0.07	0.12				c0.08	0.01	0.03		
v/c Ratio	0.10	0.44	0.11	0.19	0.49			0.50	0.05	0.18	0.08	
Uniform Delay, d1	5.6	9.5	7.5	4.2	8.4			34.7	32.2	32.9	32.3	
Progression Factor	0.78	0.71	0.58	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.0	0.2	0.1	1.4			2.0	0.1	0.4	0.1	
Delay (s)	4.4	7.8	4.5	4.4	9.8			36.6	32.3	33.3	32.5	
Level of Service	A	A	A	A	A			D	C	C	C	
Approach Delay (s)		6.8			8.9			34.6			32.7	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

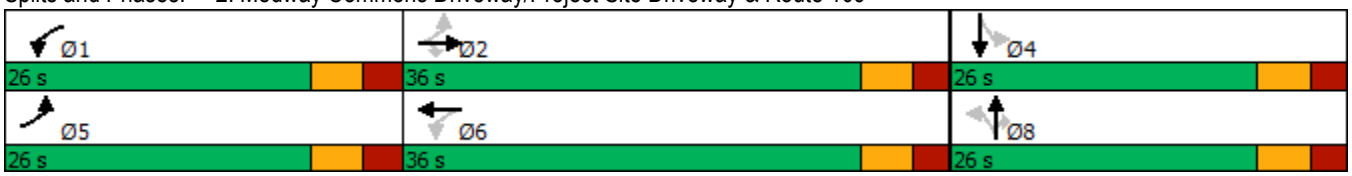
c Critical Lane Group

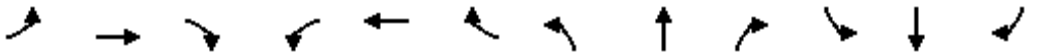


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	486	169	97	552	31	135	12	123	17	15	53
Future Volume (vph)	55	486	169	97	552	31	135	12	123	17	15	53
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992				0.850		0.883	
Flt Protected	0.950			0.950				0.956		0.950		
Satd. Flow (prot)	1745	1900	1615	1925	2010	0	0	1800	1615	1805	1678	0
Flt Permitted	0.186			0.263				0.674		0.563		
Satd. Flow (perm)	342	1900	1615	533	2010	0	0	1269	1615	1070	1678	0
Satd. Flow (RTOR)			112		4				162		77	
Adj. Flow (vph)	61	540	188	115	657	37	178	16	162	25	22	77
Lane Group Flow (vph)	61	540	188	115	694	0	0	194	162	25	99	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	12.0	16.0	16.0	12.0	16.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	26.0	36.0	36.0	26.0	36.0		26.0	26.0	26.0	26.0	26.0	
Total Split (%)	29.5%	40.9%	40.9%	29.5%	40.9%		29.5%	29.5%	29.5%	29.5%	29.5%	
Maximum Green (s)	20.0	30.0	30.0	20.0	30.0		20.0	20.0	20.0	20.0	20.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min		None	None	None	None	None	
v/c Ratio	0.16	0.64	0.24	0.22	0.70			0.57	0.30	0.09	0.20	
Control Delay	6.9	20.3	7.2	6.9	20.1			30.2	5.7	21.1	9.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	6.9	20.3	7.2	6.9	20.1			30.2	5.7	21.1	9.0	
Queue Length 50th (ft)	9	174	18	17	238			74	0	8	7	
Queue Length 95th (ft)	24	315	61	37	371			115	25	20	24	
Internal Link Dist (ft)		570			220			220			219	
Turn Bay Length (ft)	100		100	230						60		
Base Capacity (vph)	718	1008	909	829	1101			463	692	390	661	
Starvation Cap Reductn	0	0	0	0	0			0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0			0	0	0	0	
Storage Cap Reductn	0	0	0	0	0			0	0	0	0	
Reduced v/c Ratio	0.08	0.54	0.21	0.14	0.63			0.42	0.23	0.06	0.15	

Intersection Summary
Cycle Length: 88
Actuated Cycle Length: 64
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Medway Commons Driveway/Project Site Driveway & Route 109





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	486	169	97	552	31	135	12	123	17	15	53
Future Volume (vph)	55	486	169	97	552	31	135	12	123	17	15	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	14	14	14	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1745	1900	1615	1925	2010			1800	1615	1805	1678	
Flt Permitted	0.19	1.00	1.00	0.26	1.00			0.67	1.00	0.56	1.00	
Satd. Flow (perm)	342	1900	1615	533	2010			1268	1615	1070	1678	
Peak-hour factor, PHF	0.90	0.90	0.90	0.84	0.84	0.84	0.76	0.76	0.76	0.69	0.69	0.69
Adj. Flow (vph)	61	540	188	115	657	37	178	16	162	25	22	77
RTOR Reduction (vph)	0	0	62	0	2	0	0	0	120	0	57	0
Lane Group Flow (vph)	61	540	126	115	692	0	0	194	42	25	42	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	31.3	27.6	27.6	35.1	29.5			15.0	15.0	15.0	15.0	
Effective Green, g (s)	35.3	29.6	29.6	39.1	31.5			17.0	17.0	17.0	17.0	
Actuated g/C Ratio	0.53	0.45	0.45	0.59	0.48			0.26	0.26	0.26	0.26	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	303	849	722	474	956			325	414	274	430	
v/s Ratio Prot	0.02	0.28		c0.03	c0.34						0.02	
v/s Ratio Perm	0.09		0.08	0.12				c0.15	0.03	0.02		
v/c Ratio	0.20	0.64	0.17	0.24	0.72			0.60	0.10	0.09	0.10	
Uniform Delay, d1	9.5	14.1	11.0	7.5	13.9			21.6	18.8	18.7	18.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.6	0.1	0.3	2.7			2.9	0.1	0.1	0.1	
Delay (s)	9.9	15.7	11.1	7.8	16.6			24.5	18.9	18.9	18.8	
Level of Service	A	B	B	A	B			C	B	B	B	
Approach Delay (s)		14.2			15.4			22.0			18.9	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	66.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group