

MEMORANDUM

TO: Tisdale Land, LLC
c/o Mr. Paul McGovern
10 Springdale Avenue
Dover, MA 02030

FROM: Mr. Jeffrey S. Dirk, P.E.* , PTOE, FITE
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**Professional Engineer in CT, MA, ME, NH, RI and VA*

DATE: October 10, 2024

RE: 9964

SUBJECT: Transportation Impact Assessment
Proposed Multifamily Residential Development – 81 & 85 Tisdale Drive
Dover, Massachusetts

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 multifamily residential development to be located at 81 and 85 Tisdale Drive in Dover, 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 County Street (Route 109) and at major intersections along this roadway through which Project-related traffic will travel. 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 284 vehicle trips on an average weekday (two-way, 24-hour volume), with 17 vehicle trips expected during the weekday morning peak-hour and 21 vehicle trips expected during the weekday evening peak-hour;
2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over Existing or anticipated future conditions without the Project (No-Build conditions), acknowledging that the Walpole Street approach to Route 109 is currently operating at or over capacity (i.e., level-of-service (LOS) E or F, respectively) independent of the Project;
3. The addition of Project-related traffic to the Route 109/Tisdale Drive intersection resulted in an increase in average motorist delay on the Tisdale Drive approach during the weekday morning peak-hour of 4.9 seconds that caused a change in level of service (LOS) from LOS C to LOS D. That being said, no change in vehicle queuing is predicted to occur over No-Build conditions, with the residual vehicle queuing (up to one (1) vehicle) contained along Tisdale Drive without

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

inhibiting access, or the movement of vehicles, pedestrians or bicyclists along Route 109. All movements along Route 109 approaching Tisdale Drive are predicted to continue to operate at LOS A with negligible vehicle queuing.

4. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections, with all of the intersections found to have motor vehicle crash rates below the MassDOT average crash rates for similar intersections; and
5. Lines of sight at the Tisdale Drive intersection with Route 109 were found to exceed the recommended minimum distances for the intersection to operate in a safe and efficient manner 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 the implementation of the recommendations defined herein.

The following details our assessment of the Project.

PROJECT DESCRIPTION

The Project will entail the construction of a 42-unit multifamily residential development to be located at 81 and 85 Tisdale Drive in Dover, Massachusetts. The Project site encompasses approximately $2.5 \pm$ acres of land that is bound by residential properties and areas of open and wooded space to the north, south and east, and Tisdale Drive to the west. The Project site is currently occupied by two (2) single-family homes (81 and 85 Tisdale Drive) with associated appurtenances and areas of open and wooded space and low-lying wetland areas. The single-family homes and their associated appurtenances will be removed to accommodate the Project. Figure 1 depicts the Project site location in relation to the existing roadway network.

Access to the Project site will be provided by way of two (2) new driveways that will intersect the east side of Tisdale Drive adjacent to the southerly property line and at the approximate center of the frontage along Tisdale Drive. Secondary access for emergency vehicles will be provided by way of an internal drive that will be constructed using Grasscrete® pavers (or similar) and will traverse an alignment from the parking lot and drive aisle to the south of the proposed building entrance, parallel to the east and north sides of the building, and intersect the east side of Tisdale Drive adjacent to the northerly property line. Both ends of the secondary emergency access will be secured by means of a gate.

Off-street parking will be provided for 66 vehicles, or a ratio of 1.57 parking spaces per unit. The Project site is located in the R1 Zoning District where multifamily residential developments are not allowed and, as such, off-street parking requirements are not defined in the Dover Zoning Bylaws for this use. That being said, the proposed parking supply (1.57 parking spaces per unit) is within the range of observed parking demands for a multifamily residential community located in a similar setting documented by the ITE.²

²*Parking Generation*, 5th Edition; Institute of Transportation Engineers; Washington D.C.; January 2019. The observed peak-parking demand ratio for a multifamily (low-rise) residential community was observed to range from 0.58 to 3.16 spaces per residential unit, with an average observed peak parking demand of 1.27 parking spaces per unit and an 85th percentile peak parking demand of 1.59 parking spaces per unit.



Figure 1

Site Location Map

STUDY METHODOLOGY

This study was prepared in consultation with MassDOT and the Town of Dover; 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 guidelines. The analysis conducted in stage two identifies existing or projected future capacity, safety, and access issues, as these areas relate to the transportation infrastructure.

The third stage of the study presents and evaluates measures to address deficiencies in the transportation infrastructure, 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 March 2024. 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 following specific intersections: Route 109 at Walpole Street, Route 109 at Tisdale Drive and Route 109 at Draper Road

The following describes the study area roadway and intersections.

Roadway

County Street (Route 109)

County Street (Route 109) is a two-lane, urban principal arterial roadway that traverses the study area in a general east-west direction and is under Town of Dover jurisdiction. In the vicinity of the Project site, Route 109 provides two 12- to 13-foot-wide travel lanes that are separated by a double-yellow centerline, with 1- to 5-foot-wide marked shoulders. The posted speed limit in the vicinity of the Project site is 40 miles per hour (mph). Sidewalks are not provided within the study area. Illumination is provided intermittently by way of streetlights mounted on wood poles. Land use along Route 109 within the study area consists of the Project site, residential properties and areas of open and wooded space.

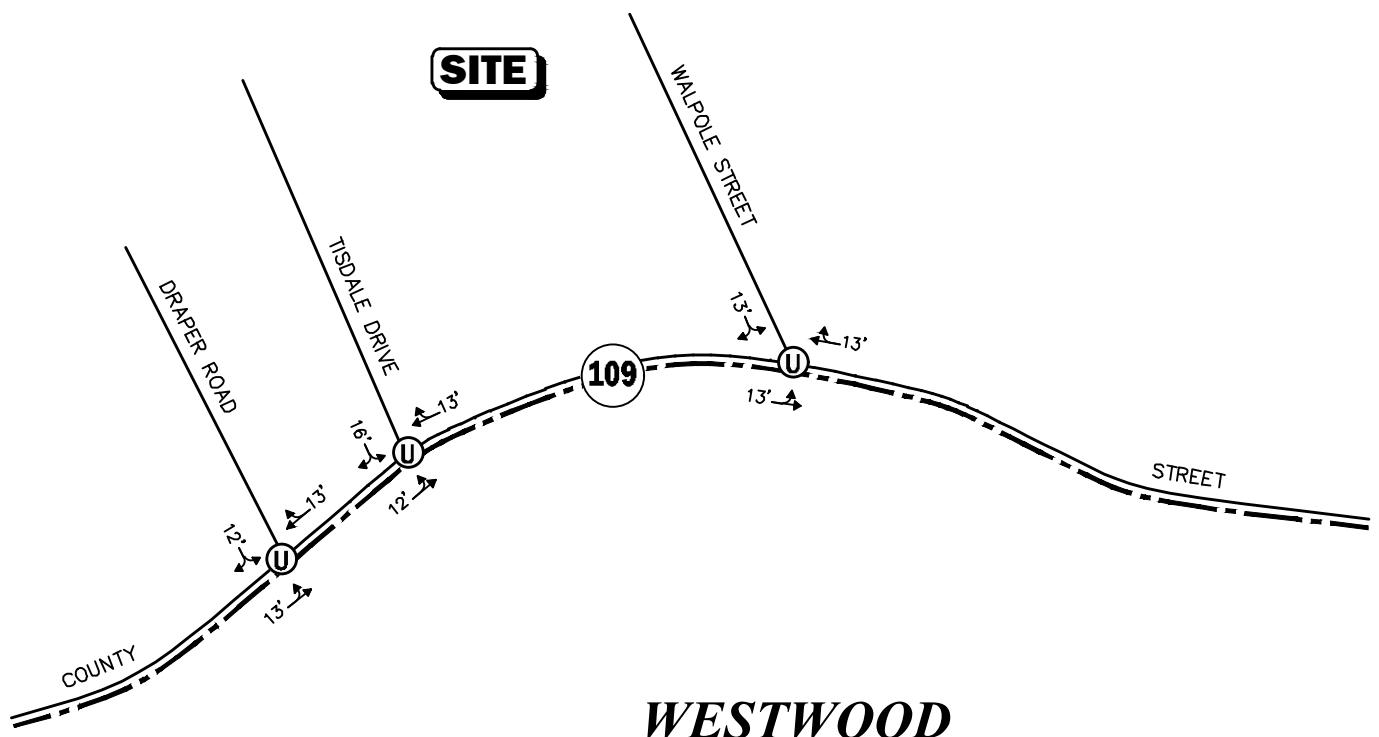
Intersections

Table 1 and Figure 2 summarize existing lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections as observed in March 2024.

Legend:

- U Unsignalized Intersection
- XX' Lane Use and Travel Lane Width

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Figure 2

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

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/ Draper Rd.	S	1 general-purpose travel lane provided on all approaches	Yes; 2- to 3-feet on Rte. 109	No	Yes, shared travelled-way on Rte. 109 ^b
Rte. 109/ Tisdale Dr.	S	1 general-purpose travel lane provided on all approaches	Yes; 1- to 2-feet on Rte. 109	No	Yes, shared travelled-way on Rte. 109
Rte. 109/ Walpole St.	S	1 general-purpose travel lane provided on all approaches	Yes; 2- to 5-feet on Rte. 109 and 1- to 2-feet on Walpole St.	No	Yes, shared travelled-way on Rte. 109

^aS = STOP-sign control.

^bCombined shoulder and travel lane width equal to or exceeding 14 feet.

Existing 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 March 2024. The ATR counts were conducted on Route 109, east of Tisdale Drive, on March 20th through 21st, 2024 (Wednesday through Thursday, inclusive) to record weekday traffic conditions over an extended period, with weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak-period TMCs performed at the study intersections on Wednesday, March 20, 2024. 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.

To evaluate the potential for seasonal fluctuation of traffic volumes within the study area, MassDOT weekday seasonal factors for Urban Group 3 roadways (other principal arterial, the functional classification of Route 109) were reviewed.³ Based on a review of this data, it was determined that traffic volumes for the month of March are approximately 2.0 percent *above* average-month conditions. In order to provide a conservative assessment of traffic-volume conditions within the study area, no adjustment was made to the March traffic volumes as they are representative of *above* average-month conditions.

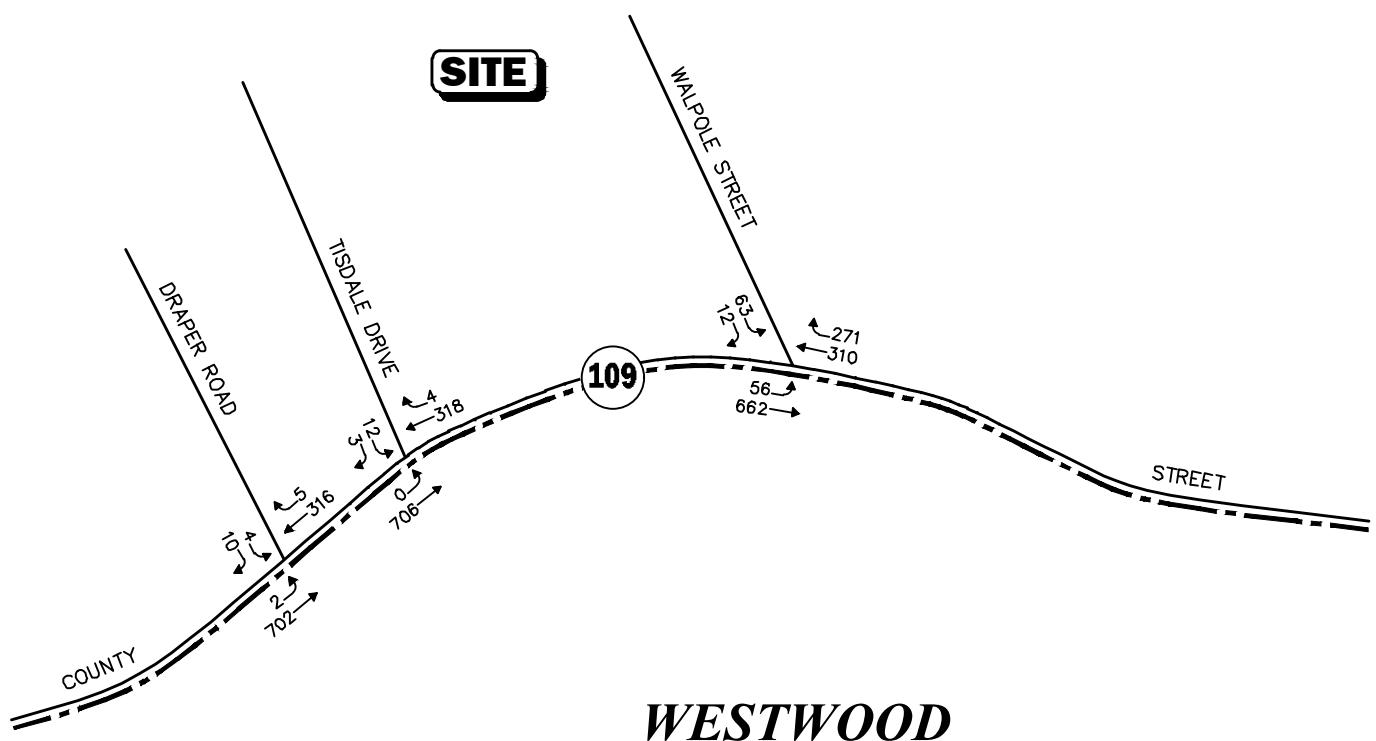
MassDOT does not require pandemic-related adjustment of traffic counts performed after March 2022 except in locations where the predominant land use consists of predominantly office properties.⁴ Given that the predominant land use within the study area is residential, a pandemic-related adjustment was not required.

The 2024 Existing traffic volumes are summarized in Table 2, with the weekday morning and evening peak-hour traffic volumes graphically depicted on Figures 3 and 4. Note that the peak-hour traffic volumes presented in Table 2 were obtained from the TMCs and are reflected in the aforementioned figures.

³MassDOT statewide Traffic Data Collection; 2019 Weekday Seasonal Factors, Group U3.

⁴25% Design Submission Guidelines; MassDOT Highway Division, Traffic and Safety Engineering; Revised May 31, 2022.

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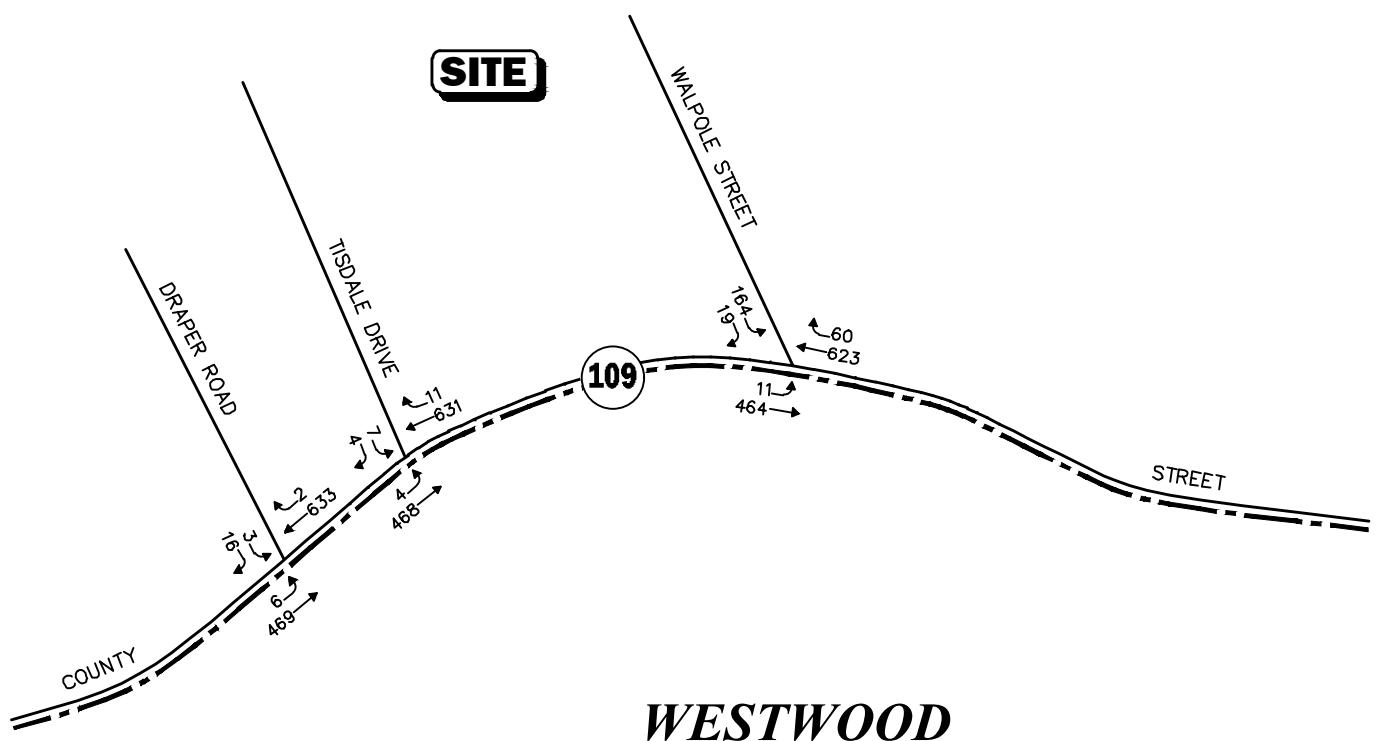


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Figure 3

2024 Existing
Weekday Morning
Peak-Hour Traffic Volumes

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Figure 4

2024 Existing
Weekday Evening
Peak-Hour Traffic Volumes

Table 2
2024 EXISTING TRAFFIC VOLUMES

Location/Peak Hour	AWT ^a	VPH ^b	K Factor ^c	Directional Distribution ^d
<i>Route 109, east of Tisdale Drive:</i>	11,790	--	--	--
Weekday Morning (7:30 – 8:30 AM)	--	1,040	8.8	69.0% EB
Weekday Evening (4:30 – 5:30 PM)	--	1,117	9.5	57.5% WB

^aAverage weekday traffic in vehicles per day.

^bVehicles per hour.

^cPercent of daily traffic occurring during the peak hour.

^dPercent traveling in peak direction.

EB = eastbound; WB = westbound.

As can be seen in Table 2, Route 109 in the vicinity of the Project site was found to accommodate approximately 11,790 vehicles on an average weekday (two-way, 24-hour volume), with approximately 1,040 vehicles per hour (vph) during the weekday morning peak hour and 1,117 vph during the weekday evening peak hour.

Pedestrian and Bicycle Facilities

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in March 2024. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study intersections, as well as the location of existing and planned future bicycle facilities. As detailed on Figure 2, sidewalks and marked crosswalks are not provided within the study area.

Formal bicycle facilities are not provided within the study area; however, Route 109 provides sufficient width (combined travel lane and shoulder) to support bicycle travel in a shared traveled-way configuration (i.e., motor vehicles and bicyclists sharing the roadway).⁵

Public Transportation

Regularly scheduled public transportation services are not currently provided in the vicinity of the Project site or within the study area. The MetroWest Regional Transit Authority (MWRTA) provides on-demand, curb-to-curb transportation services for eligible disabled residents of the Town of Dover in compliance with the Americans with Disabilities Act (ADA). In addition, the Town of Dover Council on Aging (COA) provides rides to local destinations and to Boston through a private partner (JFK Transportation Service). The service operates on weekdays between the hours of 7:00 AM and 5:00 PM.

⁵A 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 the vicinity of the Project site 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)	28	33
85 th Percentile Speed (mph)	30	36
Posted Speed Limit (mph)	40	40

mph = miles per hour.

As can be seen in Table 3, the mean vehicle travel speed along Route 109 in the vicinity of the Project site was found to be 28 mph in the eastbound direction and 33 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 30 mph in the eastbound direction and 36 mph westbound, which is below the posted speed limit in the vicinity of the Project site (40 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 (2017 through 2021, inclusive) 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 is presented in Table 4.

As can be seen in Table 4, the study area intersections were found to have experienced an average of 1.4 or fewer reported motor vehicle crashes per year over the five-year review period and were identified to have motor vehicle crash rates *below* both the MassDOT Statewide and District average crash rates for similar intersections for the MassDOT Highway Division District in which the intersection is located (District 6). The majority of the reported crashes occurred on a weekday, under clear weather conditions, during daylight, and involved collisions with a fixed-object that resulted in personal injury.

A review of the MassDOT statewide High Crash Location List indicates that there are no locations within the study area that are included on MassDOT's Highway Safety Improvement Program (HSIP) listing as a high crash cluster 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 and High Crash Location mapping are provided in the Appendix.

Table 4
MOTOR VEHICLE CRASH DATA SUMMARY^a

	Route 109/ Draper Road	Route 109/ Tisdale Drive	Route 109/ Walpole Street
Traffic Control Type ^b	U	U	U
<i>Year:</i>			
2017	4	0	0
2018	0	2	1
2019	0	0	3
2020	0	1	1
<u>2021</u>	<u>0</u>	<u>0</u>	<u>2</u>
Total	4	3	7
Average	0.80	0.60	1.40
Crash Rate ^c	0.17	0.13	0.26
MassDOT Crash Rate: ^d	0.57/0.61	0.57/0.61	0.57/0.61
Significant? ^e	No	No	No
<i>Type:</i>			
Angle	0	1	0
Head-On	0	0	1
Rear-End	0	1	2
Front-to-Front	0	0	1
Sideswipe	0	0	1
Fixed Object	3	1	2
Pedestrian/Bicycle	0	0	0
<u>Unknown/Other</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total	4	3	7
<i>Conditions:</i>			
Clear	2	2	6
Cloudy	0	0	1
Rain	1	1	0
Snow/Ice	1	0	0
<u>Not Reported/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	4	3	7
<i>Lighting:</i>			
Daylight	1	3	5
Dawn/Dusk	1	0	0
Dark (Road Lit)	2	0	1
<u>Dark (Road Unlit)</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	4	3	7
<i>Day of Week:</i>			
Monday-Friday	2	3	5
Saturday	2	0	0
<u>Sunday</u>	<u>0</u>	<u>0</u>	<u>2</u>
Total	4	3	7
<i>Severity:</i>			
Property Damage Only	2	1	2
Non-fatal Injury	2	2	5
Fatalities	0	0	0
<u>Not Reported</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	4	3	7

^aSource: MassDOT Safety Management/Traffic Operations Unit records, 2017 through 2021.

^bTraffic Control Type: U = unsignalized.

^cCrash rate per million vehicles entering the intersection.

^dStatewide/District crash rate.

^eThe 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).



FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2031, which reflects a seven-year planning horizon consistent with MassDOT guidelines. Independent of the Project, traffic volumes on the roadway network in the year 2031 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2031 No-Build traffic volumes reflect 2031 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 Town of Dover Planning Department and Town of Westwood Planning Division were consulted in order to determine if there are any projects that would have an impact on future traffic volumes at the study intersections. Based on these consultations, the following project was identified for inclusion in this assessment:

- ***Multifamily Residential Development, County Street (Route 109), Dover, Massachusetts.*** This project entails the construction of a 39-unit multifamily residential community to be located at 63 County Street (Route 109). Traffic volumes associated with this project were incorporated into the future condition traffic volumes.

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 (discussion follows).

General Background Traffic Growth

Traffic-volume data compiled by MassDOT from count stations located in Dover were reviewed in order to determine general traffic growth trends in the area. This data indicates that annual traffic volumes have fluctuated over the past several years, with the average growth rate found to be approximately 0.98 percent per year. As such, a slightly higher 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 Dover and MassDOT were contacted in order to determine if there are any planned future roadway improvement projects expected to be completed by 2031 within the study area. Based on these discussions, no roadway improvement projects aside from routine maintenance activities are identified to be planned within the study area at this time.

No-Build Traffic Volumes

The 2031 No-Build condition peak-hour traffic volumes were developed by: i) applying the 1.0 percent per year compounded annual background traffic growth rate to the 2024 Existing peak-hour traffic volumes; and ii) adding the traffic volumes associated with the specific development project by others (Governor's Landing residential development). The resulting 2031 No-Build weekday morning and evening peak-hour traffic volumes are shown on Figures 5 and 6.

Project-Generated Traffic

Design year (2031 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. 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 42-unit multifamily residential development. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the ITE⁶ for a similar land use as that proposed were used. ITE Land Use Code (LUC) 220, *Multifamily Housing (Low-Rise)*, was used to develop the traffic characteristics of the Project, the results of which are summarized in Table 5.

Table 5
TRIP GENERATION SUMMARY

Time Period	Vehicle Trips ^a		
	Entering	Exiting	Total
Average Weekday	142	142	284
Weekday Morning Peak Hour	4	13	17
Weekday Evening Peak Hour	13	8	21

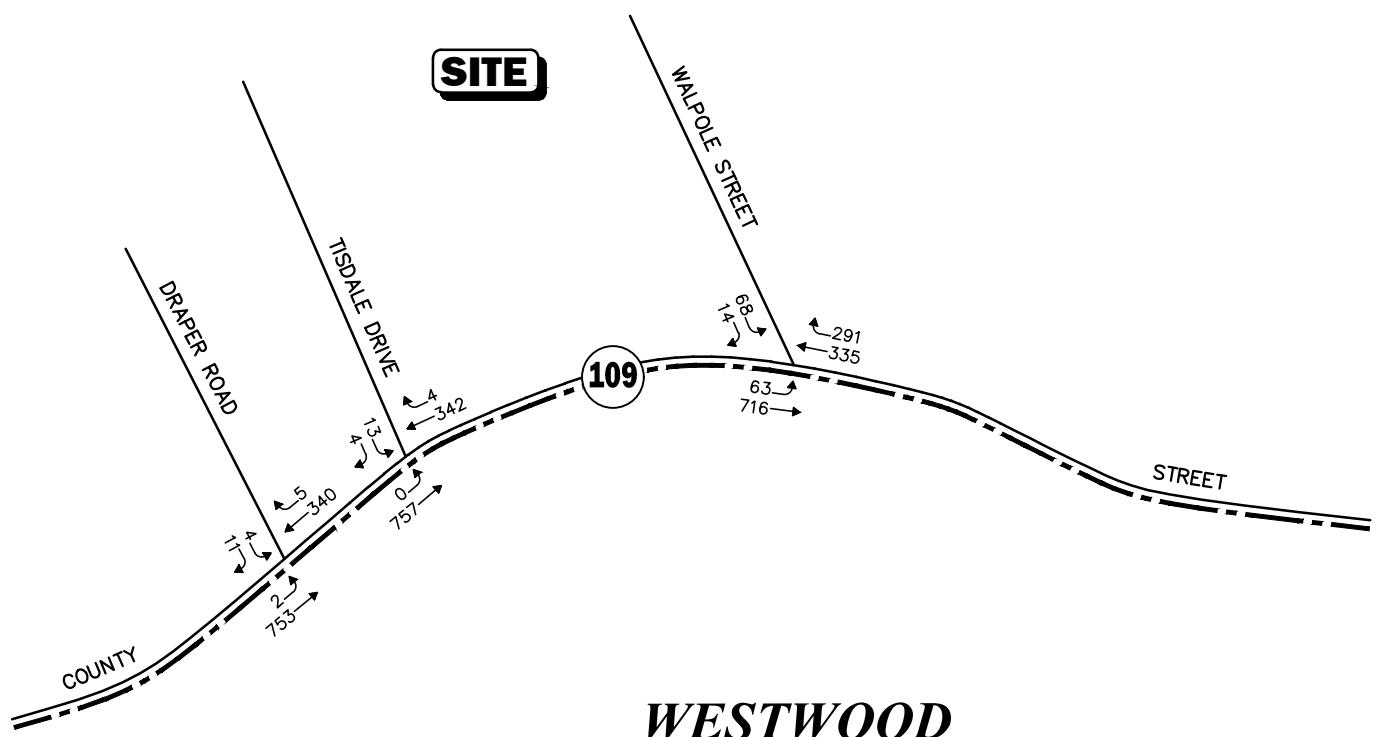
^aBased on ITE LUC 220, *Multifamily Housing (Low-Rise)* (42 units).

Project-Generated Traffic-Volume Summary

As can be seen in Table 5, the Project is expected to generate approximately 284 vehicle trips on an average weekday (two-way, 24-hour volume, or 142 vehicles entering and 142 exiting), with 17 vehicle trips (4 vehicles entering and 13 exiting) expected during the weekday morning peak-hour and 21 vehicle trips (13 vehicles entering and 8 exiting) expected during the weekday evening peak-hour.

⁶Institute of Transportation Engineers, op. cit. 1.

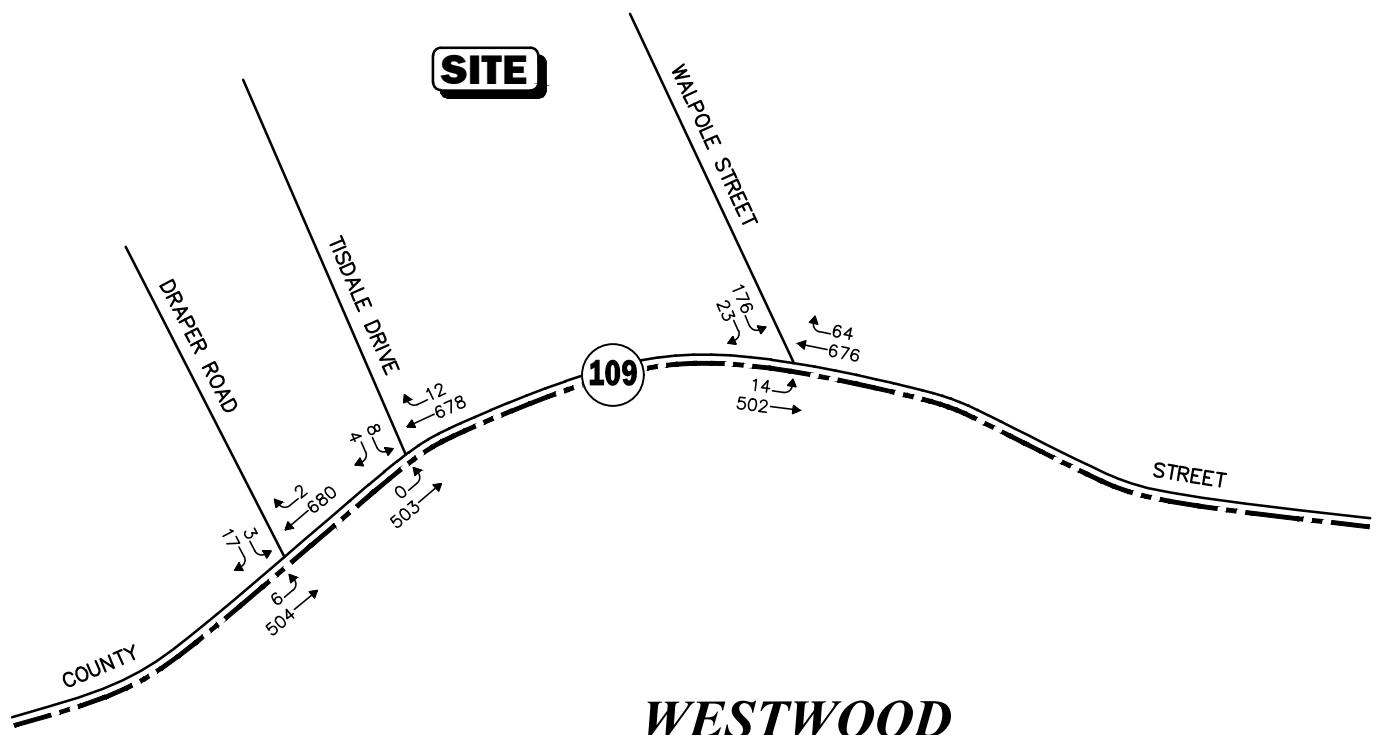
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Figure 5

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Figure 6

2031 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

Trip Distribution and Assignment

The directional distribution of generated trips to and from the Project site was determined based on a review of U.S. Census Journey-to-Work data for the Town of Dover and then refined based on a review of existing traffic patterns within the study area. The general trip distribution for the Project is graphically depicted on Figure 7, with the additional traffic that is expected to be generated by the Project assigned on the study area roadway network as shown on Figures 8 and 9.

Build Traffic Volumes

The 2031 Build condition traffic volumes consist of the 2031 No-Build traffic volumes with the addition of the traffic expected to be generated by the Project. The 2031 Build weekday morning and evening peak-hour traffic volumes are graphically depicted on Figures 10 and 11.

TRAFFIC OPERATIONS ANALYSIS

In order to assess the potential impact of the Project on the roadway network, a detailed traffic operations analysis (motorist delays, vehicle queuing, and level of service) was performed for the study area intersections. Capacity analyses provide an indication of how well transportation 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.

In brief, six levels of service are defined for each type of facility. They are given letter designations ranging from A to F, with LOS A representing the best operating conditions and LOS F representing congested or constrained operations. An LOS of E is representative of a transportation facility that is operating at its design capacity with an LOS of D generally defined as the limit of “acceptable” traffic operations. Since the level of service of a traffic facility is a function of the 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 the year. The Synchro® intersection capacity analysis software, which is based on the analysis methodologies and procedures presented in the *6th Edition Highway Capacity Manual* (HCM)⁷ for unsignalized intersections was used to complete the level-of-service and vehicle queue analyses.

Analysis Results

Level-of-service and vehicle queue analysis were conducted for 2024 Existing, 2031 No-Build, and 2031 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Table 6, with the detailed analysis results attached.

The following is a summary of the level-of-service and vehicle queue analyses for intersections within the study area. For context, we note that an LOS of D or better is generally defined as “acceptable” operating conditions.

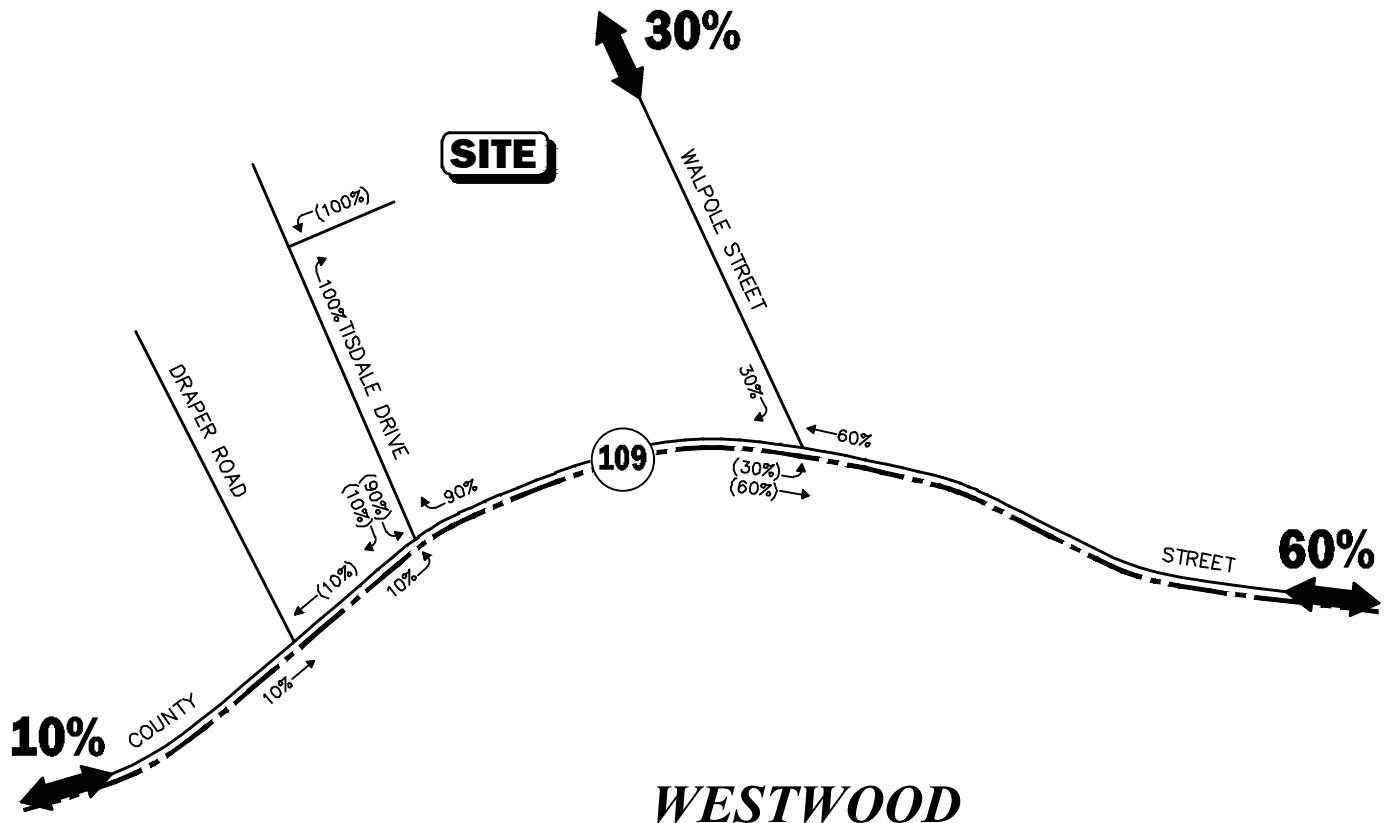
Route 109 at Draper Road

No change in level of service or vehicle queuing is predicted to occur for any movement over No-Build conditions, with all movements continuing to operate at LOS C or better and Project-related impacts generally defined as a predicted increase in average motorist delay of less than 1.0 seconds.

⁷*Highway Capacity Manual*, Transportation Research Board; Washington, DC; 2016.

Legend:

XX Entering Trips
(XX) Exiting Trips

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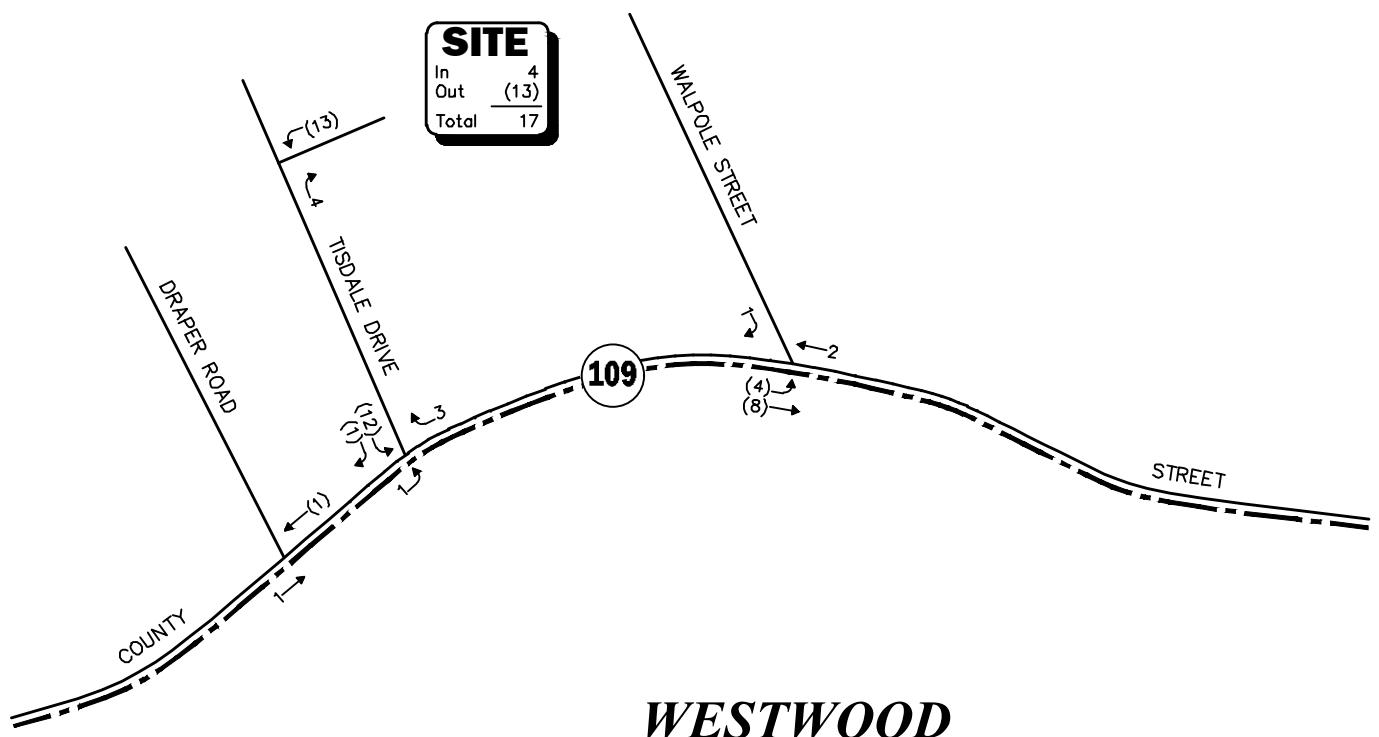
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Figure 7

Trip Distribution Map

Legend:

XX Entering Trips
(XX) Exiting Trips

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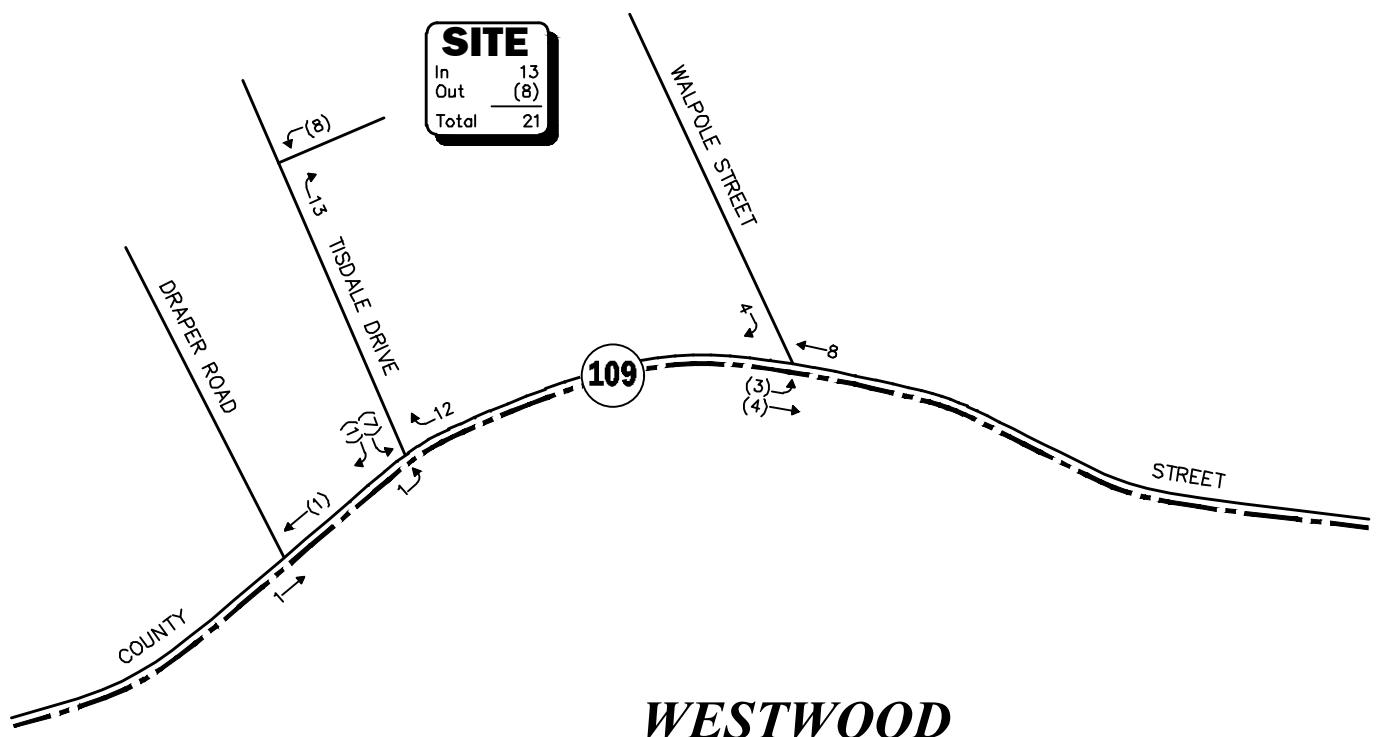
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Figure 8

Project-Generated
Weekday Morning
Peak-Hour Traffic Volumes

Legend:

XX Entering Trips
(XX) Exiting Trips

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Figure 9

Project-Generated
Weekday Evening
Peak-Hour Traffic Volumes

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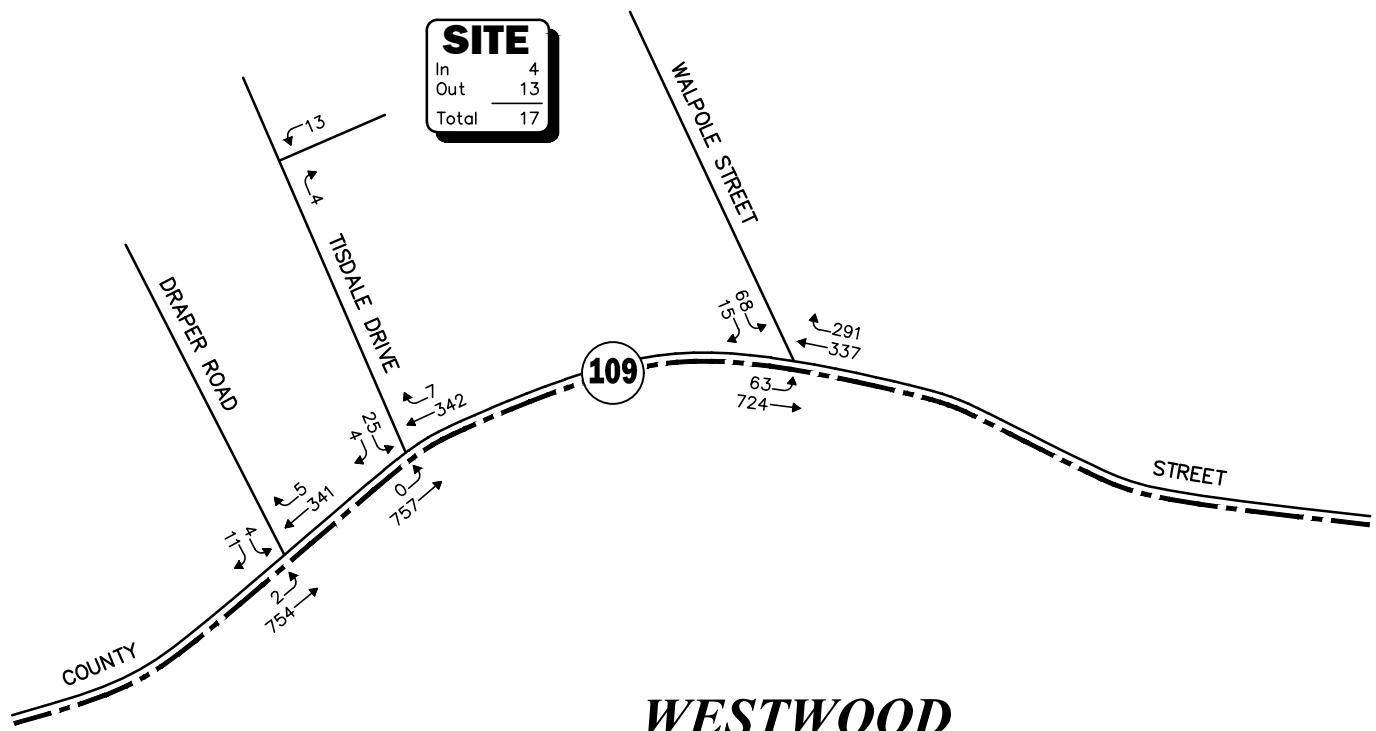


Figure 10

2031 Build
Weekday Morning
Peak-Hour Traffic Volumes



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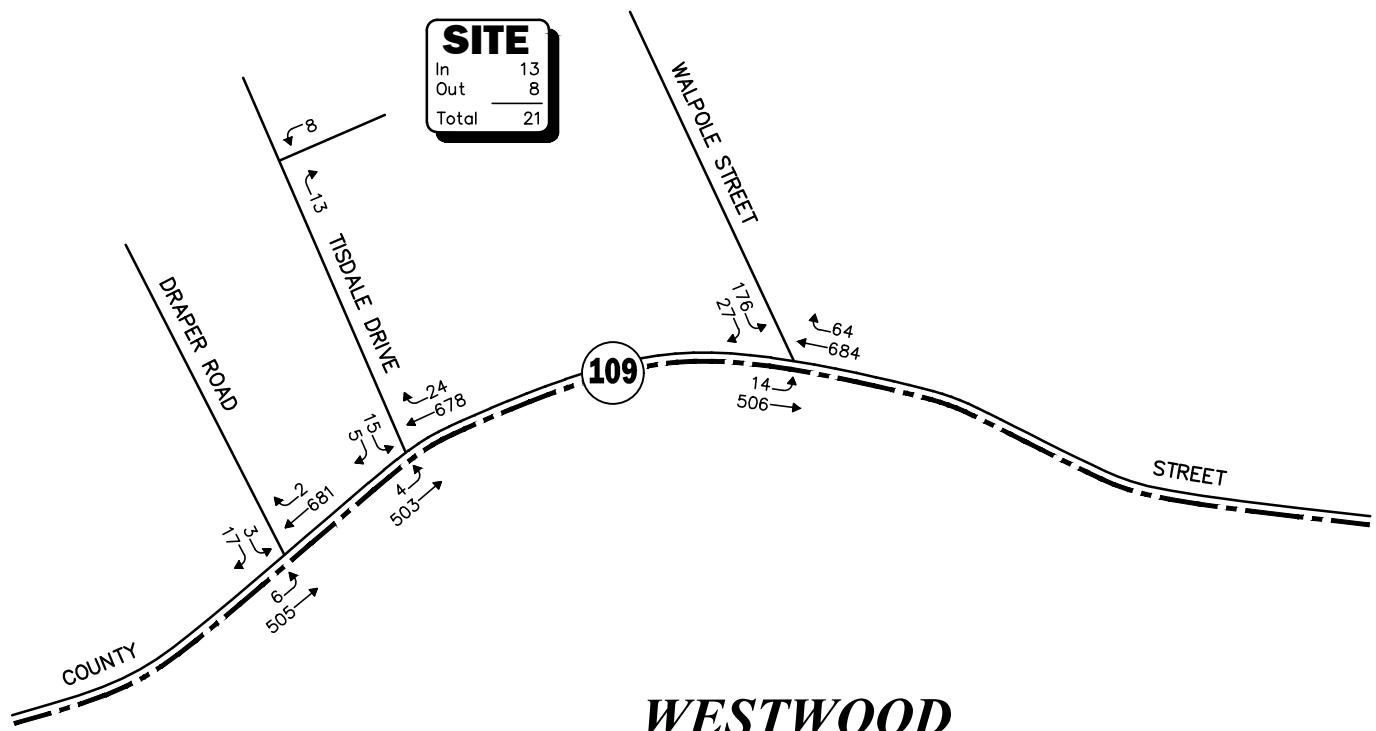


Figure 11

2031 Build
Weekday Evening
Peak-Hour Traffic Volumes



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Route 109 at Tisdale Drive

The addition of Project-related traffic was shown to result in an increase in average motorist delay on the Tisdale Drive approach during the weekday morning peak-hour of 4.9 seconds that caused a change in level-of-service from LOS C to LOS D. No change in vehicle queuing is predicted to occur as a result of the addition of Project-related traffic, with residual vehicle queuing (up to one (1) vehicle) contained along Tisdale Drive without inhibiting access or the movement of vehicles, pedestrians or bicyclists along Route 109. All movements along Route 109 approaching the intersection were shown to continue to operate at LOS A with negligible vehicle queuing.

Route 109 at Walpole Street

No change in level of service is predicted to occur for any movement over No-Build conditions, with Project-related impacts generally defined as a predicted increase in average motorist delay that was shown to result in an increase in vehicle queuing of up to one (1) vehicle. Independent of the Project, the Walpole Street approach is currently operating at or over capacity (i.e., LOS "E" or "F") during the peak hours.

Table 6
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/ Peak Hour/Movement	2024 Existing				2031 No-Build				2031 Build			
	Demand ^a	Delay ^b	LOS ^c	Queue ^d 95 th	Demand	Delay	LOS	Queue 95 th	Demand	Delay	LOS	Queue 95 th
Route 109 at Draper Road												
<i>Weekday Morning:</i>												
Route 109 EB LT/TH	704	0.1	A	0	755	0.1	A	0	756	0.1	A	0
Route 109 WB TH/RT	321	0.0	A	0	345	0.0	A	0	346	0.0	A	0
Draper Road SB LT/RT	14	15.2	C	1	15	15.9	C	1	15	15.9	C	1
<i>Weekday Evening:</i>												
Route 109 EB LT/TH	475	0.2	A	0	510	0.1	A	0	511	0.1	A	0
Route 109 WB TH/RT	635	0.0	A	0	682	0.0	A	0	683	0.0	A	0
Draper Road SB LT/RT	19	17.3	C	1	20	18.6	C	1	20	18.6	C	1
Route 109 at Tisdale Drive												
<i>Weekday Morning:</i>												
Route 109 EB TH/RT	706	0.0	A	0	757	0.0	A	0	757	0.0	A	0
Route 109 WB LT/TH	322	0.0	A	0	346	0.0	A	0	346	0.0	A	0
Tisdale Drive SB LT/RT	15	21.7	C	1	17	23.7	C	1	29	28.6	D	1
<i>Weekday Evening:</i>												
Route 109 EB TH/RT	472	0.1	A	0	503	0.0	A	0	507	0.1	A	0
Route 109 WB LT/TH	642	0.0	A	0	690	0.0	A	0	702	0.0	A	0
Tisdale Drive SB LT/RT	11	22.8	C	1	12	25.8	D	1	20	30.3	D	1
Route 109 at Walpole Street												
<i>Weekday Morning:</i>												
Route 109 EB LT/TH	718	0.7	A	0	779	0.8	A	1	787	0.8	A	1
Route 109 WB TH/RT	581	0.0	A	0	626	0.0	A	0	628	0.0	A	0
Walpole Street SB LT/RT	75	49.8	E	3	82	>50.0	F	4	83	>50.0	F	4
<i>Weekday Evening:</i>												
Route 109 EB LT/TH	475	0.2	A	0	516	0.3	A	0	520	0.3	A	0
Route 109 WB TH/RT	683	0.0	A	0	740	0.0	A	0	748	0.0	A	0
Walpole Street SB LT/RT	183	>50.0	F	9	199	>50.0	F	13	203	>50.0	F	13

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel of service.

^dQueue length in vehicles.

NB = northbound, EB = eastbound; SB = southbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.



SIGHT DISTANCE ASSESSMENT

Sight distance measurements were performed at Tisdale Drive intersection with Route 109 in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)⁸ 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 oncoming vehicle and safely complete a turning or crossing maneuver with oncoming 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 7 presents the measured SSD and ISD at the subject intersection.

Table 7
SIGHT DISTANCE MEASUREMENTS^a

Intersection/Sight Distance Measurement	Feet		
	Required Minimum (SSD)	Desirable (ISD) ^b	Measured
Route 109 at Tisdale Drive			
<i>Stopping Sight Distance:</i>			
Route 109 approaching from the east	305	--	500+
Route 109 approaching from the west	305	--	500+
<i>Intersection Sight Distance:</i>			
Looking to the east from Tisdale Drive	305	385	500+
Looking to the west from Tisdale Drive	305	445	500+

^aRecommended 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 40-mph approach speed on Route 109.

^bValues 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.

As can be seen in Table 7, the available lines of sight to and from Tisdale Drive at its intersection with Route 109 exceed the recommended minimum sight distances to function in a safe (SSD) and efficient (ISD) manner based on a 40 mph approach speed, which is consistent with the posted speed limit in the vicinity of the intersection (40 mph) and is above the measured 85th percentile vehicle travel speed (30/36 mph).

⁸*A Policy on Geometric Design of Highway and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.

SUMMARY

VAI has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed construction of a multifamily residential development to be located at 81 and 85 Tisdale Drive in Dover, 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 Institute of Transportation Engineers (ITE),⁹ the Project is expected to generate approximately 284 vehicle trips on an average weekday (two-way, 24-hour volume), with 17 vehicle trips expected during the weekday morning peak-hour and 21 vehicle trips expected during the weekday evening peak-hour;
2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over Existing or anticipated future conditions without the Project (No-Build conditions), acknowledging that the Walpole Street approach to Route 109 is currently operating at or over capacity (i.e., level-of-service (LOS) E or F, respectively) independent of the Project;
3. The addition of Project-related traffic to the Route 109/Tisdale Drive intersection resulted in an increase in average motorist delay on the Tisdale Drive approach during the weekday morning peak-hour of 4.9 seconds that caused a change in level of service from LOS C to LOS D. That being said, no change in vehicle queuing is predicted to occur over No-Build conditions, with the residual vehicle queuing (up to one (1) vehicle) contained along Tisdale Drive without inhibiting access, or the movement of vehicles, pedestrians or bicyclists along Route 109. All movements along Route 109 approaching Tisdale Drive are predicted to continue to operate at LOS A with negligible vehicle queuing.
4. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections, with all of the intersections found to have motor vehicle crash rates below the MassDOT average crash rates for similar intersections; and
5. Lines of sight at the Tisdale Drive intersection with Route 109 were found to exceed the recommended minimum distances for the intersection to operate in a safe and efficient manner 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 the 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 as a part of this assessment. 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.

⁹*Trip Generation*, 11th Edition; Institute of Transportation Engineers; Washington, DC; 2021.

Project Access

Access to the Project site will be provided by way of two (2) new driveways that will intersect the east side of Tisdale Drive adjacent to the southerly property line and at the approximate center of the frontage along Tisdale Drive. Secondary access for emergency vehicles will be provided by way of an internal drive that will be constructed using Grasscrete® pavers (or similar) and will traverse an alignment from the parking lot and drive aisle to the south of the proposed building entrance, parallel to the east and north sides of the building, and intersect the east side of Tisdale Drive adjacent to the northerly property line. Both ends of the secondary emergency access will be secured by means of a gate. 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 Plan:

- The Project site driveways will be 24 feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle.
- The one-way drive at the front of the building should be 20-feet in width and covey traffic in a one-way counterclockwise direction. “One-Way” and “Do Not Enter” signs should be provided to regulate the one-way circulation pattern.
- Where perpendicular parking is proposed the drive aisle behind the parking will be 24 feet in order to facilitate parking maneuvers.
- Vehicles exiting the Project site will be placed under STOP-sign control with a marked STOP-line provided.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).¹⁰
- Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided at pedestrian crossings within the Project site.
- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of the Project site driveways should be designed and maintained so as not to restrict lines of sight.
- Snow accumulations (windrows) within sight triangle areas should be promptly removed where such accumulations would impede sightlines.

Off-Site

Route 109 at Walpole Street

Independent of the Project, the Walpole Street approach to the Route 109/Walpole Street intersection currently operates at or over capacity during the peak hours. Absent improvement, motorist delays are expected to increase further in the future, again, independent of the Project. The Project will not have a significant impact (increase) on motorist delays or vehicle queuing at the intersection over anticipated future conditions without the Project (No-Build conditions). A review of the MassDOT crash data for the intersection did not indicate an inherent safety deficiency related to the roadway or intersection geometry. As such, improvements do not appear to be necessary to accommodate the relatively minor impact of the Project at the intersection.

¹⁰*Manual on Uniform Traffic Control Devices* (MUTCD); Federal Highway Administration; Washington, D.C.; 2009.

Transportation Demand Management

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

- A transportation coordinator should be assigned for the Project to coordinate the TDM program;
- A “welcome packet” should be provided to residents detailing available transportation options, including those offered by the COA;
- A pick-up/drop-off area has been provided at the front of the building for use by carshare and delivery service providers, as well as Amazon, UPS and FedEx;
- Pedestrian accommodations have been incorporated into the Project site;
- A mail drop will be provided within the building; and
- Bicycle parking will be 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.

Attachment

APPENDIX

PROJECT SITE PLAN
AUTOMATIC TRAFFIC RECORDER COUNT DATA
TURNING MOVEMENT COUNT DATA
SEASONAL ADJUSTMENT DATA
VEHICLE TRAVEL SPEED DATA
MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAP
GENERAL BACKGROUND TRAFFIC GROWTH
BACKGROUND DEVELOPMENT NETWORKS
TRIP-GENERATION CALCULATIONS
TRIP-DISTRIBUTION
CAPACITY ANALYSIS WORKSHEETS

PROJECT SITE PLAN

TISDALE

DRIVE

N/F CONDOMINIUM
COUNTY BK. 9294 - PG. 1

TOP BIT. CURB

WALL N20°28'10"E

WALL N20°50'10"E

8X8X4 TEE

ETW

PL.BK.229 PL.NO.732

R=20.0'

R=12.0'

R=3.0'

R=3.0'

R=3.0'

STOP

30.00'

35.2'

25.0'

25.0'

VGC

VGC

VGC

VGC

VGC

SNOW STORAGE

SNOW STORAGE

SNOW STORAGE

SNOW STORAGE

SNOW STORAGE

30'

30'

30'

30'

24'

24'

24'

24'

14(9x18) Spaces

14(9x18) Spaces

14(9x18) Spaces

14(9x18) Spaces

10(9x18) Spaces

10(9x18) Spaces

10(9x18) Spaces

10(9x18) Spaces

178.25' CALC

178.25' REC

16.57'

16.57'

16.57'

16.57'

63.95'

63.95'

63.95'

63.95'

71.78'

71.78'

71.78'

71.78'

92.53'

92.53'

92.53'

92.53'

1.88 AC

1.88 AC

1.88 AC

1.88 AC

ASSESSING ID: 25-9B

ASSESSING ID: 25-9B

ASSESSING ID: 25-9B

ASSESSING ID: 25-9B

ZONE: R1

ZONE: R1

ZONE: R1

ZONE: R1

GW-2

GW-2

GW-2

GW-2

1.88 AC

1.88 AC

1.88 AC

1.88 AC

104.50'

104.50'

104.50'

104.50'

97.30'

97.30'

97.30'

97.30'

9.8(8x18) Spaces

9.8(8x18) Spaces

9.8(8x18) Spaces

9.8(8x18) Spaces

CHARGING PEDESTAL

CHARGING PEDESTAL

CHARGING PEDESTAL

CHARGING PEDESTAL

EMERGENCY GENERATOR

EMERGENCY GENERATOR

EMERGENCY GENERATOR

EMERGENCY GENERATOR

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PAD ELEV. 281 (WF)

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PAD ELEV. 281 (WF)

PROPOSED ACCESS

PROPOSED ACCESS

PROPOSED ACCESS

PROPOSED ACCESS

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GATE/BARRIER

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GATE/BARRIER

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ACCESS TO BE

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CONTROLLED BY DOVER

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EMERGENCY PERSONNEL ONLY

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AUTOMATIC TRAFFIC RECORDER COUNT DATA

Accurate Counts
978-664-2565

Location : County Street (Route 109)
Location : East of Tisdale Drive
City/State: Dover, MA

Site Code: 99640001

3/20/2024	EB,		Hour Totals		WB,		Hour Totals		Combined Totals		
	Time	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		1	83			13	88				
12:15		3	78			11	97				
12:30		1	95			8	77				
12:45		2	94	7	350	8	95	40	357	47	707
1:00		2	97			4	67				
1:15		3	82			3	87				
1:30		0	70			1	88				
1:45		3	65	8	314	5	71	13	313	21	627
2:00		0	80			3	98				
2:15		2	77			4	92				
2:30		1	68			1	133				
2:45		0	82	3	307	0	97	8	420	11	727
3:00		1	67			2	127				
3:15		6	86			7	108				
3:30		3	106			2	114				
3:45		5	80	15	339	1	124	12	473	27	812
4:00		9	82			4	119				
4:15		14	103			3	115				
4:30		24	103			4	156				
4:45		29	98	76	386	7	160	18	550	94	936
5:00		44	103			4	172				
5:15		59	102			12	148				
5:30		87	86			9	136				
5:45		92	81	282	372	17	111	42	567	324	939
6:00		93	76			21	104				
6:15		117	69			28	100				
6:30		117	50			47	116				
6:45		127	71	454	266	45	87	141	407	595	673
7:00		139	51			56	95				
7:15		153	47			64	76				
7:30		179	48			69	72				
7:45		177	47	648	193	66	63	255	306	903	499
8:00		150	46			80	77				
8:15		124	39			93	91				
8:30		126	40			77	62				
8:45		114	43	514	168	65	56	315	286	829	454
9:00		108	27			54	52				
9:15		86	34			69	42				
9:30		92	28			64	38				
9:45		81	17	367	106	73	32	260	164	627	270
10:00		94	12			62	32				
10:15		91	18			75	32				
10:30		89	10			64	28				
10:45		73	15	347	55	87	16	288	108	635	163
11:00		101	11			85	16				
11:15		82	9			76	21				
11:30		78	2			80	22				
11:45		79	2	340	24	84	11	325	70	665	94
Total		3061	2880			1717	4021			4778	6901
Percent		51.5%	48.5%			29.9%	70.1%			40.9%	59.1%

Accurate Counts
978-664-2565

Location : County Street (Route 109)
Location : East of Tisdale Drive
City/State: Dover, MA

Site Code: 99640001

3/21/2024 Time	EB, Morning		Hour Totals Morning		WB, Morning		Hour Totals Morning		Combined Totals Morning	
	Afternoon		Afternoon		Afternoon		Afternoon		Afternoon	
12:00	0	80			17	87				
12:15	4	90			9	115				
12:30	3	79			5	106				
12:45	0	81	7	330	8	89	39	397	46	727
1:00	4	84			9	81				
1:15	2	102			2	86				
1:30	1	87			2	81				
1:45	3	74	10	347	5	83	18	331	28	678
2:00	0	78			1	86				
2:15	3	85			1	109				
2:30	0	88			1	103				
2:45	2	85	5	336	2	111	5	409	10	745
3:00	5	96			2	103				
3:15	7	90			5	123				
3:30	5	112			1	119				
3:45	7	90	24	388	2	114	10	459	34	847
4:00	4	88			4	118				
4:15	14	112			3	121				
4:30	19	95			10	114				
4:45	24	103	61	398	7	132	24	485	85	883
5:00	29	91			7	158				
5:15	53	100			11	132				
5:30	68	73			14	152				
5:45	81	102	231	366	15	119	47	561	278	927
6:00	103	89			19	115				
6:15	114	76			35	123				
6:30	101	74			41	111				
6:45	133	66	451	305	43	112	138	461	589	766
7:00	139	67			46	79				
7:15	154	58			67	77				
7:30	186	60			64	85				
7:45	196	44	675	229	73	62	250	303	925	532
8:00	141	50			65	81				
8:15	140	42			91	61				
8:30	108	39			76	66				
8:45	109	39	498	170	70	51	302	259	800	429
9:00	117	20			66	48				
9:15	98	25			64	48				
9:30	84	21			59	43				
9:45	91	20	390	86	68	40	257	179	647	265
10:00	80	20			52	42				
10:15	86	19			73	28				
10:30	112	18			67	31				
10:45	95	8	373	65	75	29	267	130	640	195
11:00	83	7			78	25				
11:15	98	10			76	19				
11:30	100	3			97	24				
11:45	88	6	369	26	83	19	334	87	703	113
Total	3094	3046			1691	4061			4785	7107
Percent	50.4%	49.6%			29.4%	70.6%			40.2%	59.8%
Grand Total	6155	5926			3408	8082			9563	14008
Percent	50.9%	49.1%			29.7%	70.3%			40.6%	59.4%

ADT

ADT: 11,786

AADT: 11,786

Accurate Counts
978-664-2565

Location : County Street (Route 109)
Location : East of Tisdale Drive
City/State: Dover, MA

Site Code: 99640001

Time	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Week Average		
	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	
0:00	*	*	*	*	7	40	7	39	*	*	*	*	*	*	*	7	40
1:00	*	*	*	*	8	13	10	18	*	*	*	*	*	*	*	9	16
2:00	*	*	*	*	3	8	5	5	*	*	*	*	*	*	*	4	6
3:00	*	*	*	*	15	12	24	10	*	*	*	*	*	*	*	20	11
4:00	*	*	*	*	76	18	61	24	*	*	*	*	*	*	*	68	21
5:00	*	*	*	*	282	42	231	47	*	*	*	*	*	*	*	256	44
6:00	*	*	*	*	454	141	451	138	*	*	*	*	*	*	*	452	140
7:00	*	*	*	*	648	255	675	250	*	*	*	*	*	*	*	662	252
8:00	*	*	*	*	514	315	498	302	*	*	*	*	*	*	*	506	308
9:00	*	*	*	*	367	260	390	257	*	*	*	*	*	*	*	378	258
10:00	*	*	*	*	347	288	373	267	*	*	*	*	*	*	*	360	278
11:00	*	*	*	*	340	325	369	334	*	*	*	*	*	*	*	354	330
12:00	*	*	*	*	350	357	330	397	*	*	*	*	*	*	*	340	377
13:00	*	*	*	*	314	313	347	331	*	*	*	*	*	*	*	330	322
14:00	*	*	*	*	307	420	336	409	*	*	*	*	*	*	*	322	414
15:00	*	*	*	*	339	473	388	459	*	*	*	*	*	*	*	364	466
16:00	*	*	*	*	386	550	398	485	*	*	*	*	*	*	*	392	518
17:00	*	*	*	*	372	567	366	561	*	*	*	*	*	*	*	369	564
18:00	*	*	*	*	266	407	305	461	*	*	*	*	*	*	*	286	434
19:00	*	*	*	*	193	306	229	303	*	*	*	*	*	*	*	211	304
20:00	*	*	*	*	168	286	170	259	*	*	*	*	*	*	*	169	272
21:00	*	*	*	*	106	164	86	179	*	*	*	*	*	*	*	96	172
22:00	*	*	*	*	55	108	65	130	*	*	*	*	*	*	*	60	119
23:00	*	*	*	*	24	70	26	87	*	*	*	*	*	*	*	25	78
Total	0	0	0	0	5941	5738	6140	5752	0	0	0	0	0	0	0	6040	5744
Day	0	0			11679		11892		0	0	0	0	0	0	0	11784	
AM Peak Volume			7:00	11:00	7:00	11:00										7:00	11:00
			648	325	675	334										662	330
PM Peak Volume			16:00	17:00	16:00	17:00										16:00	17:00
			386	567	398	561										392	564
Comb Total	0	0			11679		11892		0	0	0	0	0	0	0	11784	

TURNING MOVEMENT COUNT DATA

Accurate Counts

978-664-2565

N/S Street : Draper Road
 E/W Street : Route 109
 City/State : Dover, MA
 Weather : Coudy

File Name : 99640001
 Site Code : 99640001
 Start Date : 3/20/2024
 Page No : 1

Groups Printed- Cars - Trucks

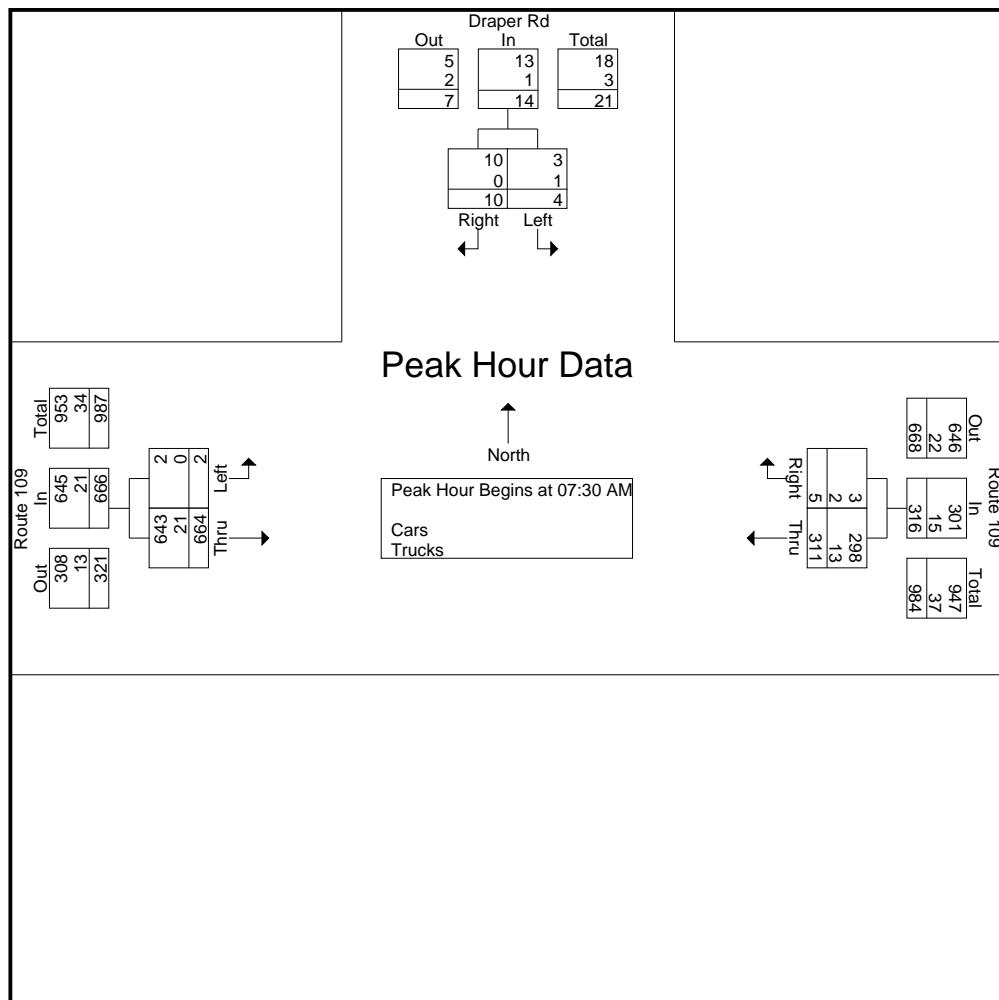
		Draper Rd From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM		0	1	55	0	2	145	203
07:15 AM		0	0	66	0	1	153	220
07:30 AM		1	0	75	1	0	197	274
07:45 AM		1	1	62	1	1	187	253
Total		2	2	258	2	4	682	950
08:00 AM		2	1	84	2	1	155	245
08:15 AM		0	8	90	1	0	125	224
08:30 AM		0	1	77	0	2	137	217
08:45 AM		1	2	73	1	0	120	197
Total		3	12	324	4	3	537	883
Grand Total		5	14	582	6	7	1219	1833
Apprch %		26.3	73.7	99	1	0.6	99.4	
Total %		0.3	0.8	31.8	0.3	0.4	66.5	
Cars		4	14	551	4	6	1177	1756
% Cars		80	100	94.7	66.7	85.7	96.6	95.8
Trucks		1	0	31	2	1	42	77
% Trucks		20	0	5.3	33.3	14.3	3.4	4.2

		Draper Rd From North			Route 109 From East			Route 109 From West			
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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		1	0	1	75	1	76	0	197	197	274
07:45 AM		1	1	2	62	1	63	1	187	188	253
08:00 AM		2	1	3	84	2	86	1	155	156	245
08:15 AM		0	8	8	90	1	91	0	125	125	224
Total Volume		4	10	14	311	5	316	2	664	666	996
% App. Total		28.6	71.4		98.4	1.6		0.3	99.7		
PHF		.500	.313	.438	.864	.625	.868	.500	.843	.845	.909
Cars		3	10	13	298	3	301	2	643	645	959
% Cars		75.0	100	92.9	95.8	60.0	95.3	100	96.8	96.8	96.3
Trucks		1	0	1	13	2	15	0	21	21	37
% Trucks		25.0	0	7.1	4.2	40.0	4.7	0	3.2	3.2	3.7

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 2



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

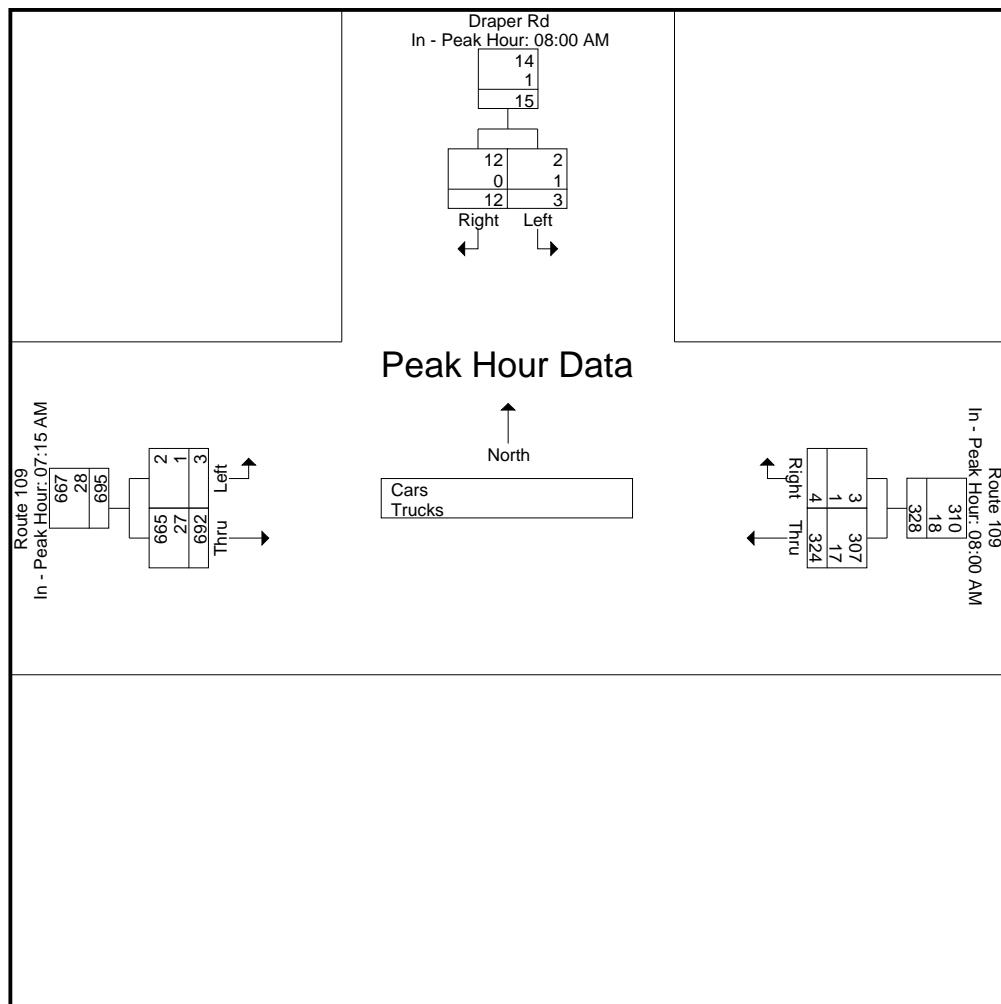
Peak Hour for Each Approach Begins at:

	08:00 AM		08:00 AM		07:15 AM		
+0 mins.	2	1	3	84	2	86	153
+15 mins.	0	8	8	90	1	91	0
+30 mins.	0	1	1	77	0	77	187
+45 mins.	1	2	3	73	1	74	155
Total Volume	3	12	15	324	4	328	692
% App. Total	20	80		98.8	1.2		99.6
PHF	.375	.375	.469	.900	.500	.901	.750
Cars	2	12	14	307	3	310	2
% Cars	66.7	100	93.3	94.8	75	94.5	66.7
Trucks	1	0	1	17	1	18	1
% Trucks	33.3	0	6.7	5.2	25	5.5	33.3
							3.9
							4

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 4

Groups Printed- Cars

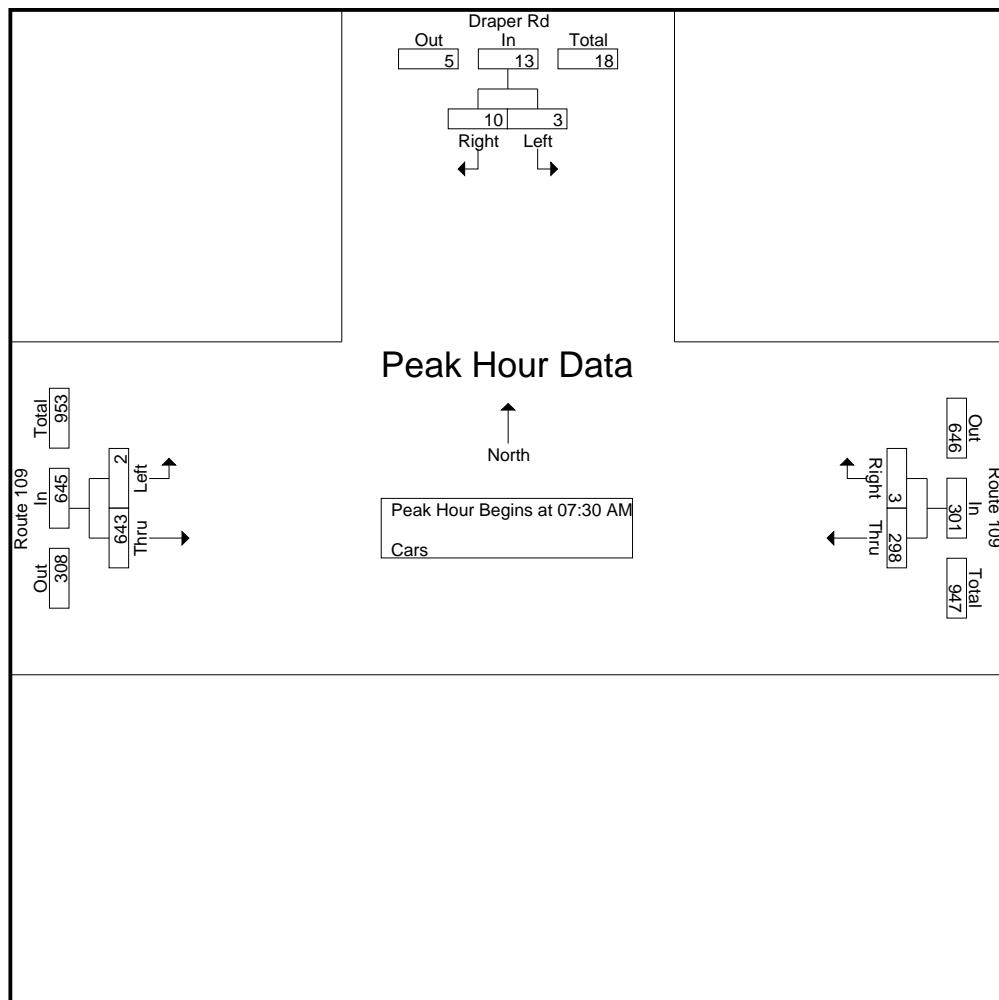
		Draper Rd From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM		0	1	53	0	2	141	197
07:15 AM		0	0	61	0	0	145	206
07:30 AM		1	0	72	1	0	195	269
07:45 AM		1	1	58	0	1	177	238
Total		2	2	244	1	3	658	910
08:00 AM		1	1	81	1	1	148	233
08:15 AM		0	8	87	1	0	123	219
08:30 AM		0	1	73	0	2	132	208
08:45 AM		1	2	66	1	0	116	186
Total		2	12	307	3	3	519	846
Grand Total		4	14	551	4	6	1177	1756
Apprch %		22.2	77.8	99.3	0.7	0.5	99.5	
Total %		0.2	0.8	31.4	0.2	0.3	67	

		Draper Rd From North			Route 109 From East			Route 109 From West			
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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		1	0	1	72	1	73	0	195	195	269
07:45 AM		1	1	2	58	0	58	1	177	178	238
08:00 AM		1	1	2	81	1	82	1	148	149	233
08:15 AM		0	8	8	87	1	88	0	123	123	219
Total Volume		3	10	13	298	3	301	2	643	645	959
% App. Total		23.1	76.9		99	1		0.3	99.7		
PHF		.750	.313	.406	.856	.750	.855	.500	.824	.827	.891

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 5



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

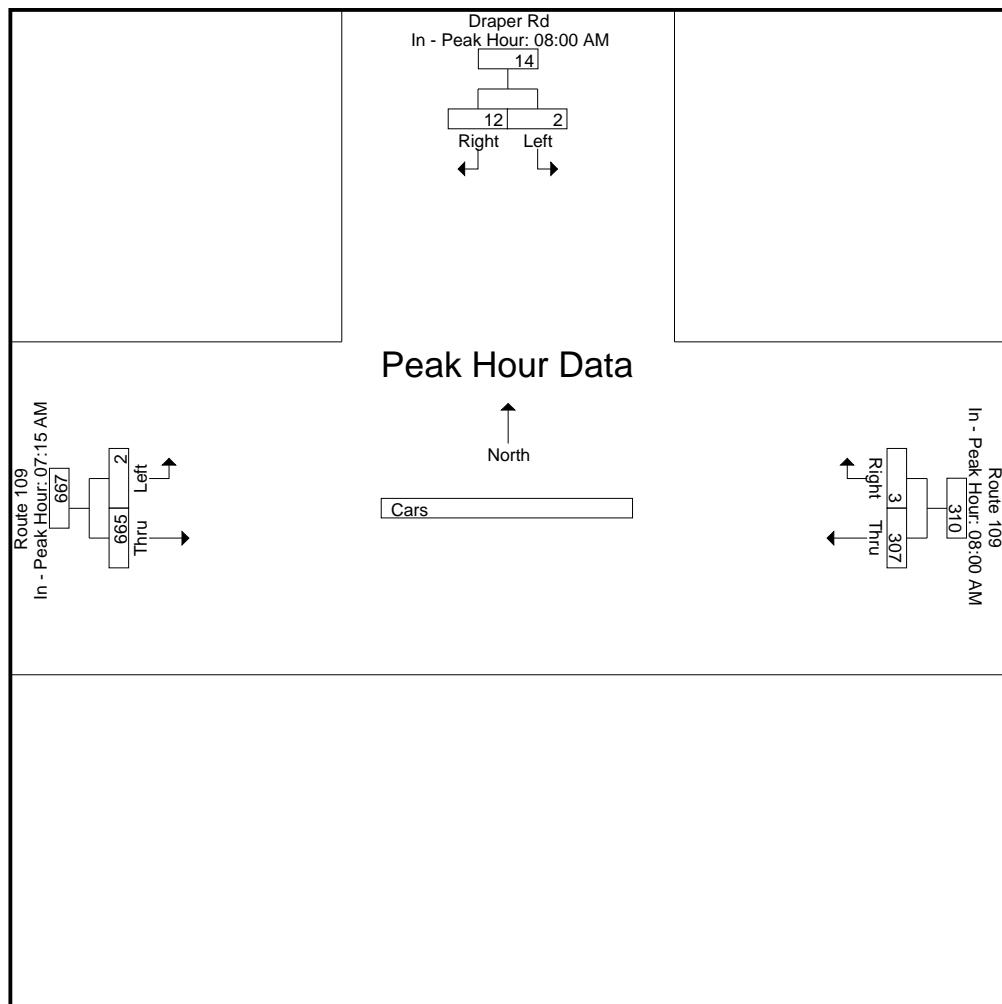
Peak Hour for Each Approach Begins at:

	08:00 AM			08:00 AM			07:15 AM		
+0 mins.	1	1	2	81	1	82	0	145	145
+15 mins.	0	8	8	87	1	88	0	195	195
+30 mins.	0	1	1	73	0	73	1	177	178
+45 mins.	1	2	3	66	1	67	1	148	149
Total Volume	2	12	14	307	3	310	2	665	667
% App. Total	14.3	85.7		99	1		0.3	99.7	
PHF	.500	.375	.438	.882	.750	.881	.500	.853	.855

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
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Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 7

Groups Printed- Trucks

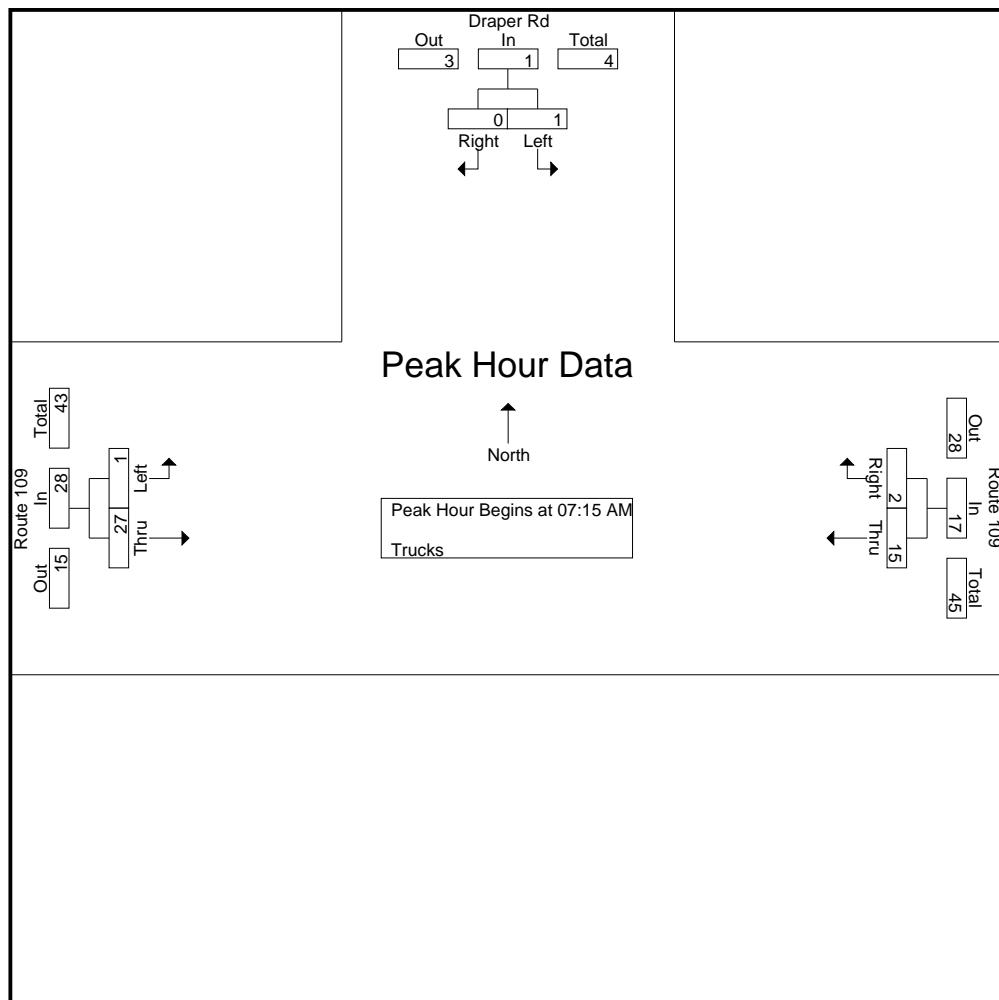
		Draper Rd From North		Route 109 From East		Route 109 From West		Int. Total
Start Time		Left	Right	Thru	Right	Left	Thru	
07:00 AM		0	0	2	0	0	4	6
07:15 AM		0	0	5	0	1	8	14
07:30 AM		0	0	3	0	0	2	5
07:45 AM		0	0	4	1	0	10	15
Total		0	0	14	1	1	24	40
08:00 AM		1	0	3	1	0	7	12
08:15 AM		0	0	3	0	0	2	5
08:30 AM		0	0	4	0	0	5	9
08:45 AM		0	0	7	0	0	4	11
Total		1	0	17	1	0	18	37
Grand Total		1	0	31	2	1	42	77
Apprch %		100	0	93.9	6.1	2.3	97.7	
Total %		1.3	0	40.3	2.6	1.3	54.5	

		Draper Rd From North			Route 109 From East			Route 109 From West			Int. Total	
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:15 AM												
07:15 AM		0	0	0	5	0	5	1	8	9	14	
07:30 AM		0	0	0	3	0	3	0	2	2	5	
07:45 AM		0	0	0	4	1	5	0	10	10	15	
08:00 AM		1	0	1	3	1	4	0	7	7	12	
Total Volume		1	0	1	15	2	17	1	27	28	46	
% App. Total		100	0		88.2	11.8		3.6	96.4			
PHF		.250	.000	.250	.750	.500	.850	.250	.675	.700	.767	

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
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Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

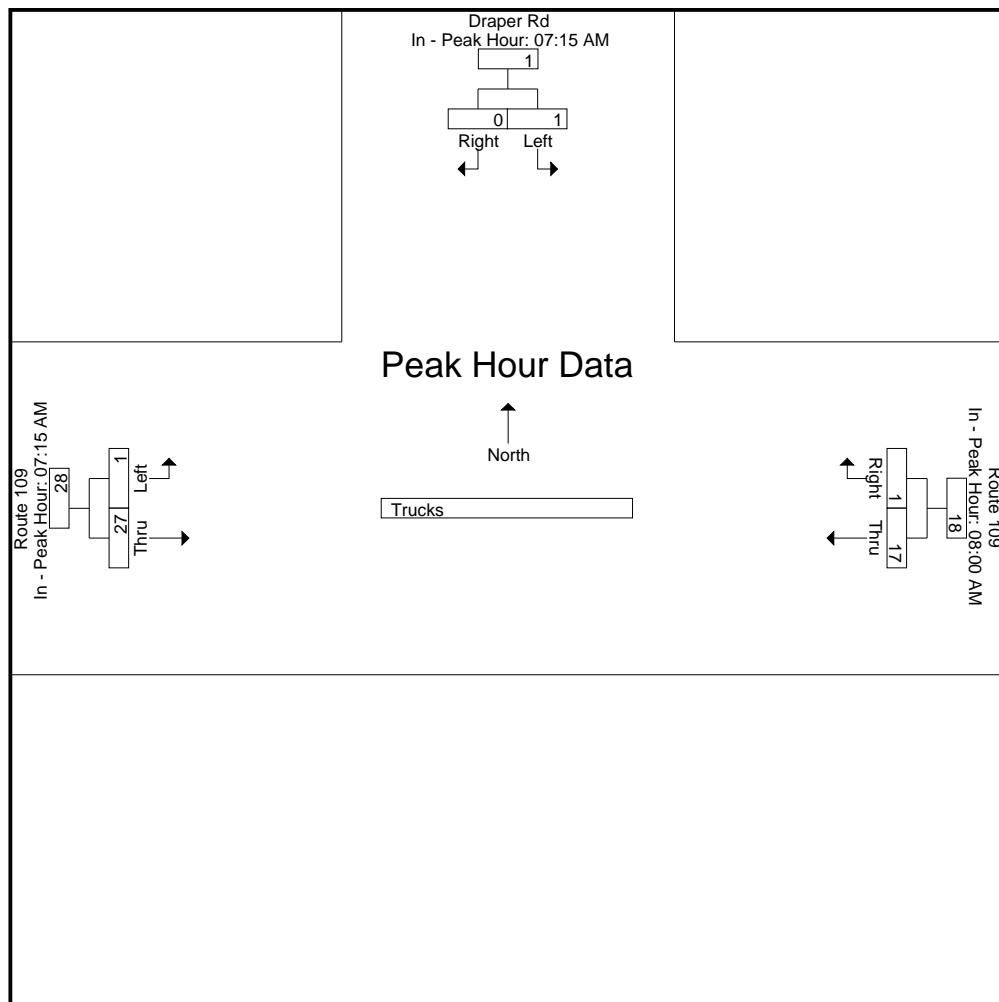
Peak Hour for Each Approach Begins at:

	07:15 AM			08:00 AM			07:15 AM		
+0 mins.	0	0	0	3	1	4	1	8	9
+15 mins.	0	0	0	3	0	3	0	2	2
+30 mins.	0	0	0	4	0	4	0	10	10
+45 mins.	1	0	1	7	0	7	0	7	7
Total Volume	1	0	1	17	1	18	1	27	28
% App. Total	100	0		94.4	5.6		3.6	96.4	
PHF	.250	.000	.250	.607	.250	.643	.250	.675	.700

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 9



Accurate Counts

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 10

Groups Printed- Bikes Peds

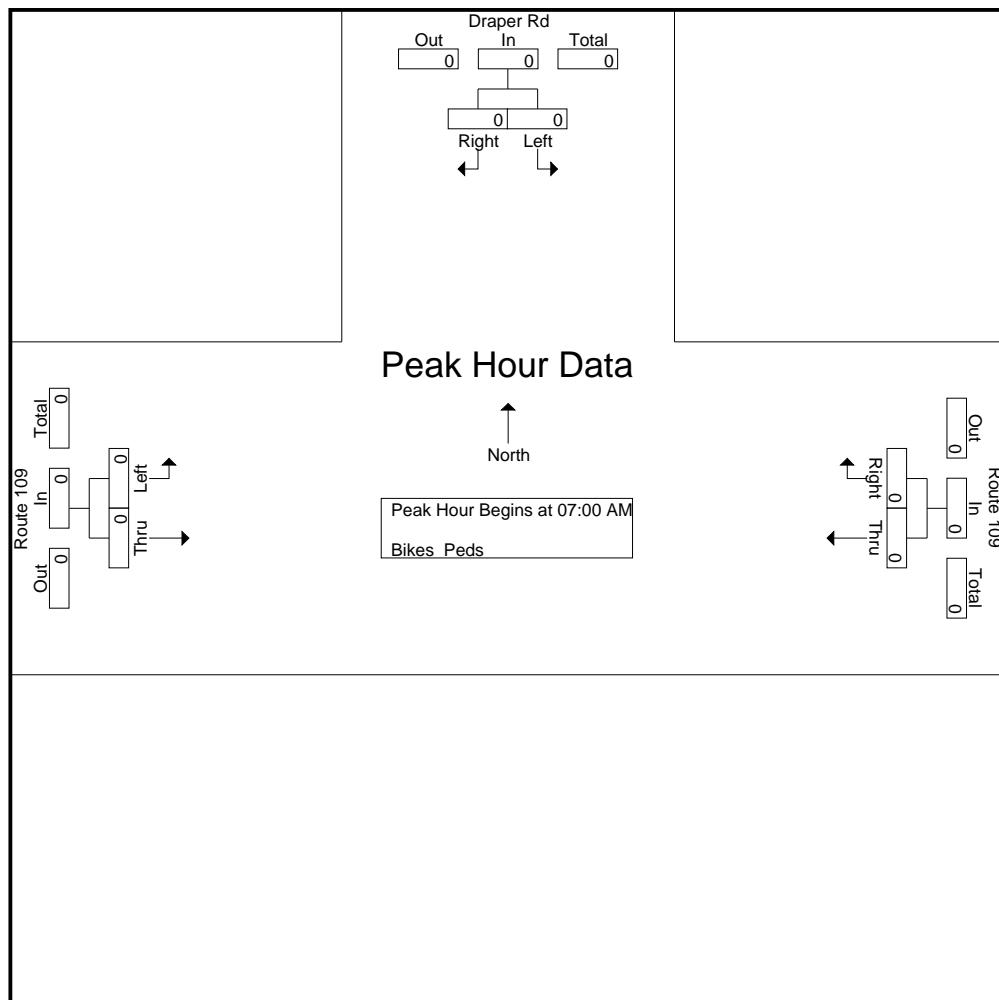
	Draper Rd From North			Route 109 From East			Route 109 From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Excl. Total	Incl. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	1	0	0	0	0	0	0	1	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	0	0	0	1	0	1
08:00 AM	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
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	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
Grand Total	0	0	1	0	0	0	0	0	0	1	0	1
Apprch %	0	0		0	0		0	0				
Total %										100	0	

Accurate Counts

978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
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Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

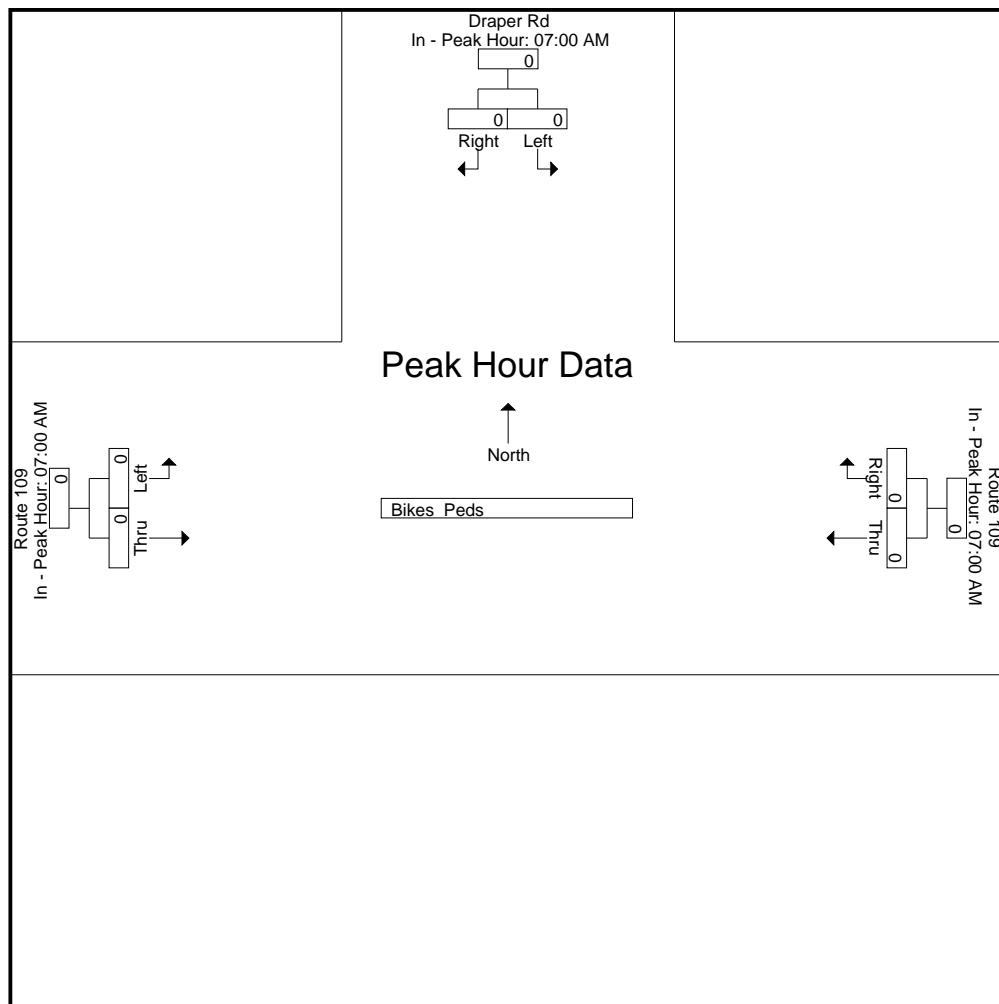
Peak Hour Analysis From 07:00 AM to 08:00 AM

Peak Hour for Each Approach Begins at:

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
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Accurate Counts

978-664-2565

N/S Street : Draper Road
 E/W Street : Route 109
 City/State : Dover, MA
 Weather : Coudy

File Name : 99640001
 Site Code : 99640001
 Start Date : 3/20/2024
 Page No : 1

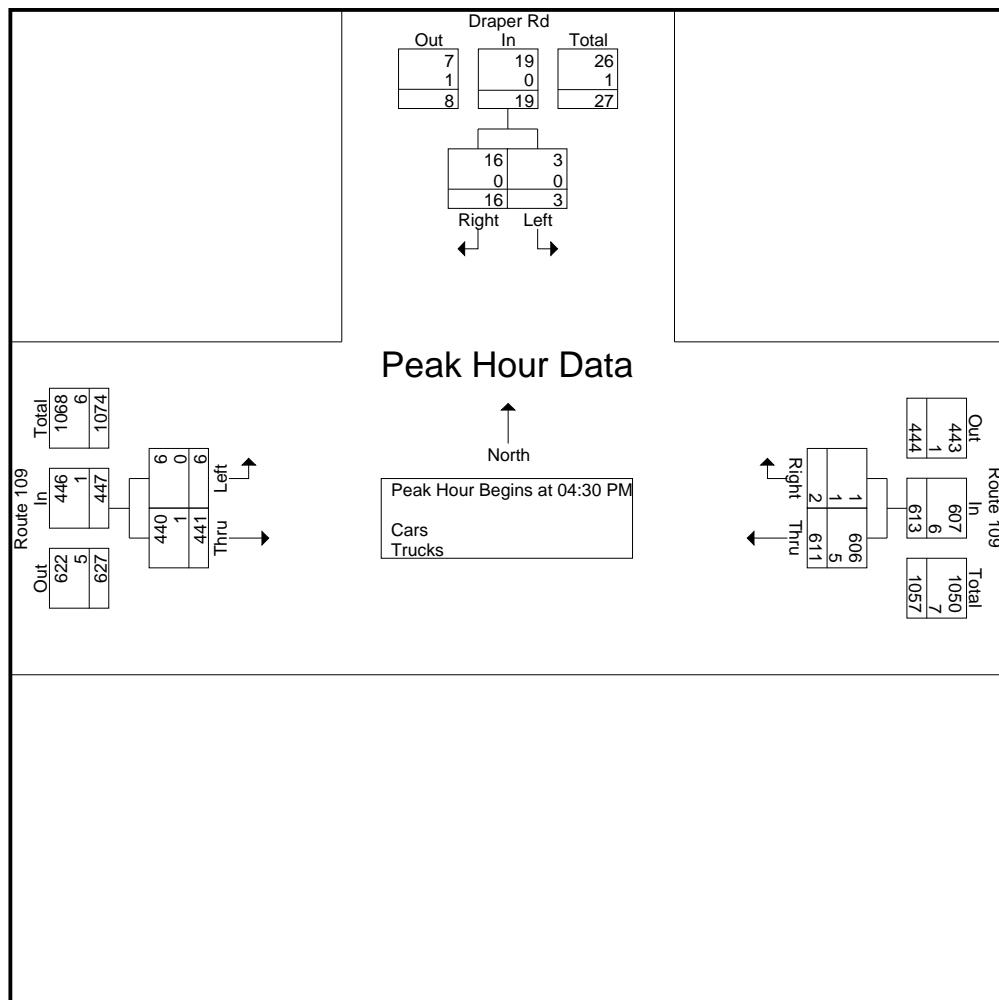
Groups Printed- Cars - Trucks

		Draper Rd From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM		2	2	128	0	0	90	222
04:15 PM		2	0	113	1	1	116	233
04:30 PM		1	5	149	2	2	113	272
04:45 PM		1	4	154	0	3	104	266
Total		6	11	544	3	6	423	993
05:00 PM		0	3	172	0	0	119	294
05:15 PM		1	4	136	0	1	105	247
05:30 PM		1	2	141	1	3	108	256
05:45 PM		0	0	105	2	1	80	188
Total		2	9	554	3	5	412	985
Grand Total		8	20	1098	6	11	835	1978
Apprch %		28.6	71.4	99.5	0.5	1.3	98.7	
Total %		0.4	1	55.5	0.3	0.6	42.2	
Cars		8	20	1087	5	11	830	1961
% Cars		100	100	99	83.3	100	99.4	99.1
Trucks		0	0	11	1	0	5	17
% Trucks		0	0	1	16.7	0	0.6	0.9

		Draper Rd From North			Route 109 From East			Route 109 From West			
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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		1	5	6	149	2	151	2	113	115	272
04:45 PM		1	4	5	154	0	154	3	104	107	266
05:00 PM		0	3	3	172	0	172	0	119	119	294
05:15 PM		1	4	5	136	0	136	1	105	106	247
Total Volume		3	16	19	611	2	613	6	441	447	1079
% App. Total		15.8	84.2		99.7	0.3		1.3	98.7		
PHF		.750	.800	.792	.888	.250	.891	.500	.926	.939	.918
Cars		3	16	19	606	1	607	6	440	446	1072
% Cars		100	100	100	99.2	50.0	99.0	100	99.8	99.8	99.4
Trucks		0	0	0	5	1	6	0	1	1	7
% Trucks		0	0	0	0.8	50.0	1.0	0	0.2	0.2	0.6

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

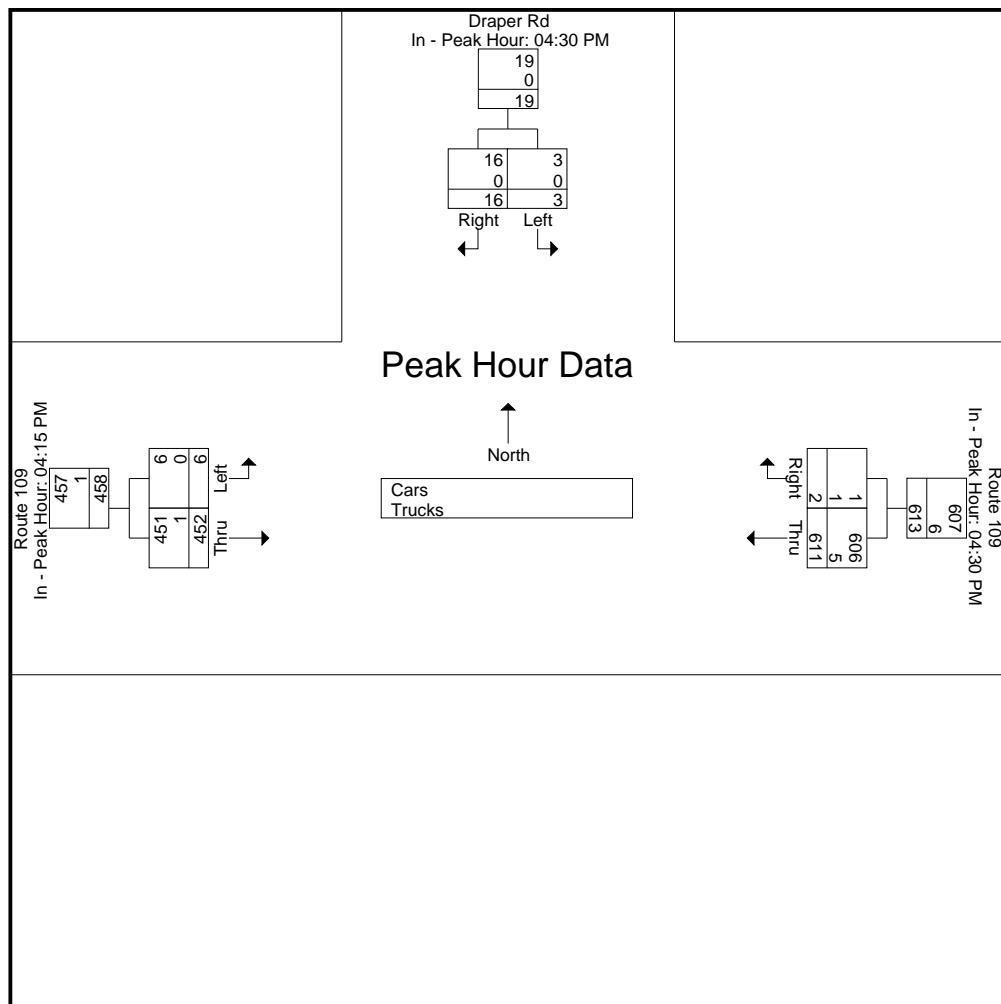
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:15 PM		
+0 mins.	1	5	6	149	2	151	1	116	117
+15 mins.	1	4	5	154	0	154	2	113	115
+30 mins.	0	3	3	172	0	172	3	104	107
+45 mins.	1	4	5	136	0	136	0	119	119
Total Volume	3	16	19	611	2	613	6	452	458
% App. Total	15.8	84.2		99.7	0.3		1.3	98.7	
PHF	.750	.800	.792	.888	.250	.891	.500	.950	.962
Cars	3	16	19	606	1	607	6	451	457
% Cars	100	100	100	99.2	50	99	100	99.8	99.8
Trucks	0	0	0	5	1	6	0	1	1
% Trucks	0	0	0	0.8	50	1	0	0.2	0.2

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 4

Groups Printed- Cars

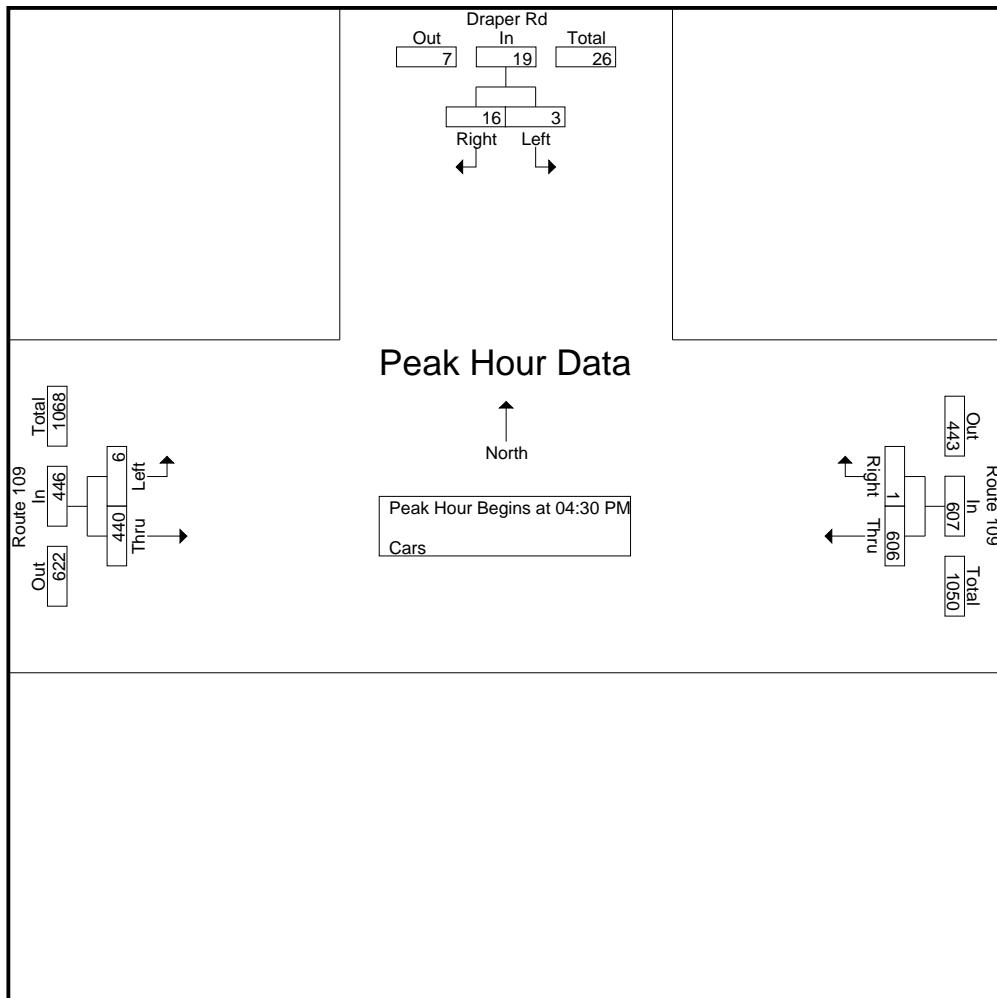
		Draper Rd From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM		2	2	125	0	0	89	218
04:15 PM		2	0	111	1	1	116	231
04:30 PM		1	5	148	1	2	113	270
04:45 PM		1	4	152	0	3	103	263
Total		6	11	536	2	6	421	982
05:00 PM		0	3	171	0	0	119	293
05:15 PM		1	4	135	0	1	105	246
05:30 PM		1	2	140	1	3	108	255
05:45 PM		0	0	105	2	1	77	185
Total		2	9	551	3	5	409	979
Grand Total		8	20	1087	5	11	830	1961
Apprch %		28.6	71.4	99.5	0.5	1.3	98.7	
Total %		0.4	1	55.4	0.3	0.6	42.3	

		Draper Rd From North			Route 109 From East			Route 109 From West			
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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		1	5	6	148	1	149	2	113	115	270
04:45 PM		1	4	5	152	0	152	3	103	106	263
05:00 PM		0	3	3	171	0	171	0	119	119	293
05:15 PM		1	4	5	135	0	135	1	105	106	246
Total Volume		3	16	19	606	1	607	6	440	446	1072
% App. Total		15.8	84.2		99.8	0.2		1.3	98.7		
PHF		.750	.800	.792	.886	.250	.887	.500	.924	.937	.915

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

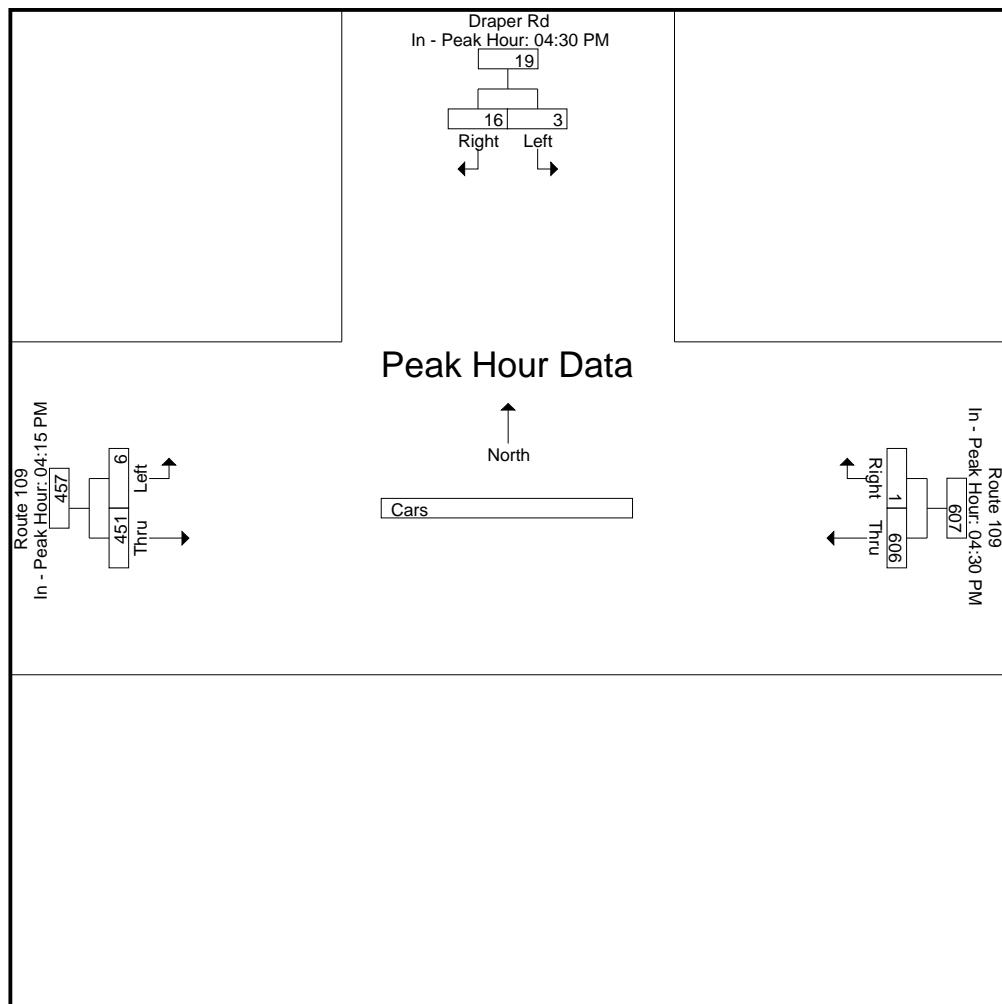
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:15 PM		
+0 mins.	1	5	6	148	1	149	1	116	117
+15 mins.	1	4	5	152	0	152	2	113	115
+30 mins.	0	3	3	171	0	171	3	103	106
+45 mins.	1	4	5	135	0	135	0	119	119
Total Volume	3	16	19	606	1	607	6	451	457
% App. Total	15.8	84.2		99.8	0.2		1.3	98.7	
PHF	.750	.800	.792	.886	.250	.887	.500	.947	.960

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
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Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 7

Groups Printed- Trucks

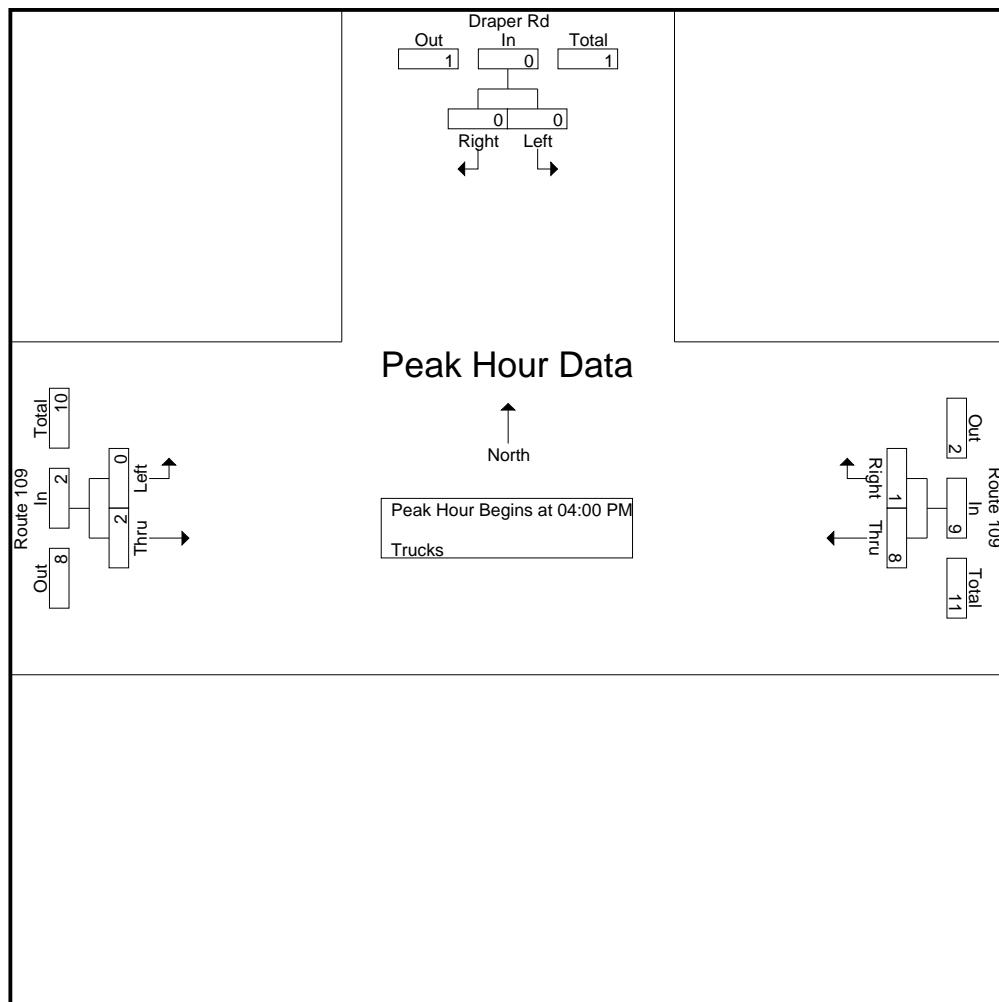
		Draper Rd From North		Route 109 From East		Route 109 From West		Int. Total
Start Time		Left	Right	Thru	Right	Left	Thru	
04:00 PM		0	0	3	0	0	1	4
04:15 PM		0	0	2	0	0	0	2
04:30 PM		0	0	1	1	0	0	2
04:45 PM		0	0	2	0	0	1	3
Total		0	0	8	1	0	2	11
05:00 PM		0	0	1	0	0	0	1
05:15 PM		0	0	1	0	0	0	1
05:30 PM		0	0	1	0	0	0	1
05:45 PM		0	0	0	0	0	3	3
Total		0	0	3	0	0	3	6
Grand Total		0	0	11	1	0	5	17
Apprch %		0	0	91.7	8.3	0	100	
Total %		0	0	64.7	5.9	0	29.4	

		Draper Rd From North			Route 109 From East			Route 109 From West			Int. Total	
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 04:00 PM												
04:00 PM		0	0	0	3	0	3	0	1	1	4	
04:15 PM		0	0	0	2	0	2	0	0	0	2	
04:30 PM		0	0	0	1	1	2	0	0	0	2	
04:45 PM		0	0	0	2	0	2	0	1	1	3	
Total Volume		0	0	0	8	1	9	0	2	2	11	
% App. Total		0	0		88.9	11.1		0	100			
PHF		.000	.000	.000	.667	.250	.750	.000	.500	.500	.688	

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 8



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

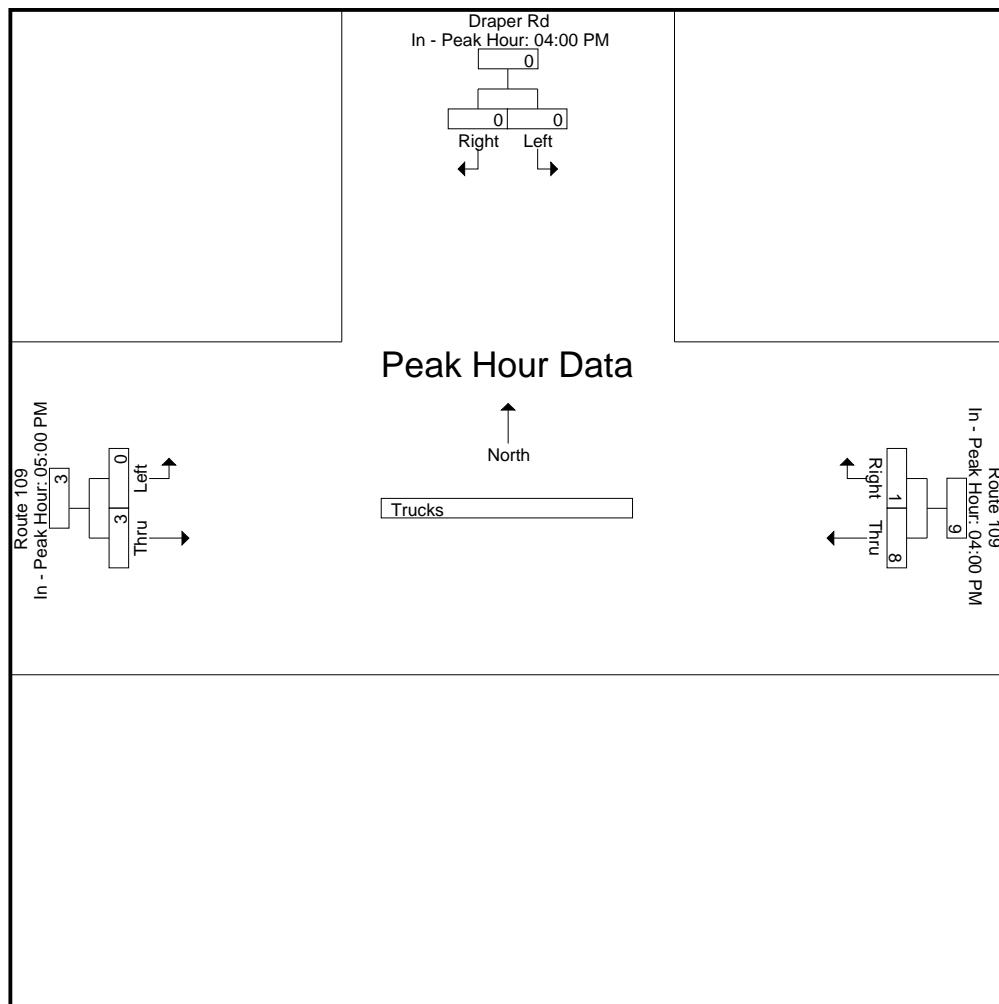
Peak Hour for Each Approach Begins at:

	04:00 PM	04:00 PM	05:00 PM	
+0 mins.	0	0	0	0
+15 mins.	0	0	2	0
+30 mins.	0	0	1	0
+45 mins.	0	0	2	3
Total Volume	0	1	9	3
% App. Total	0	88.9	11.1	100
PHF	.000	.667	.250	.250

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 9



Accurate Counts

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 10

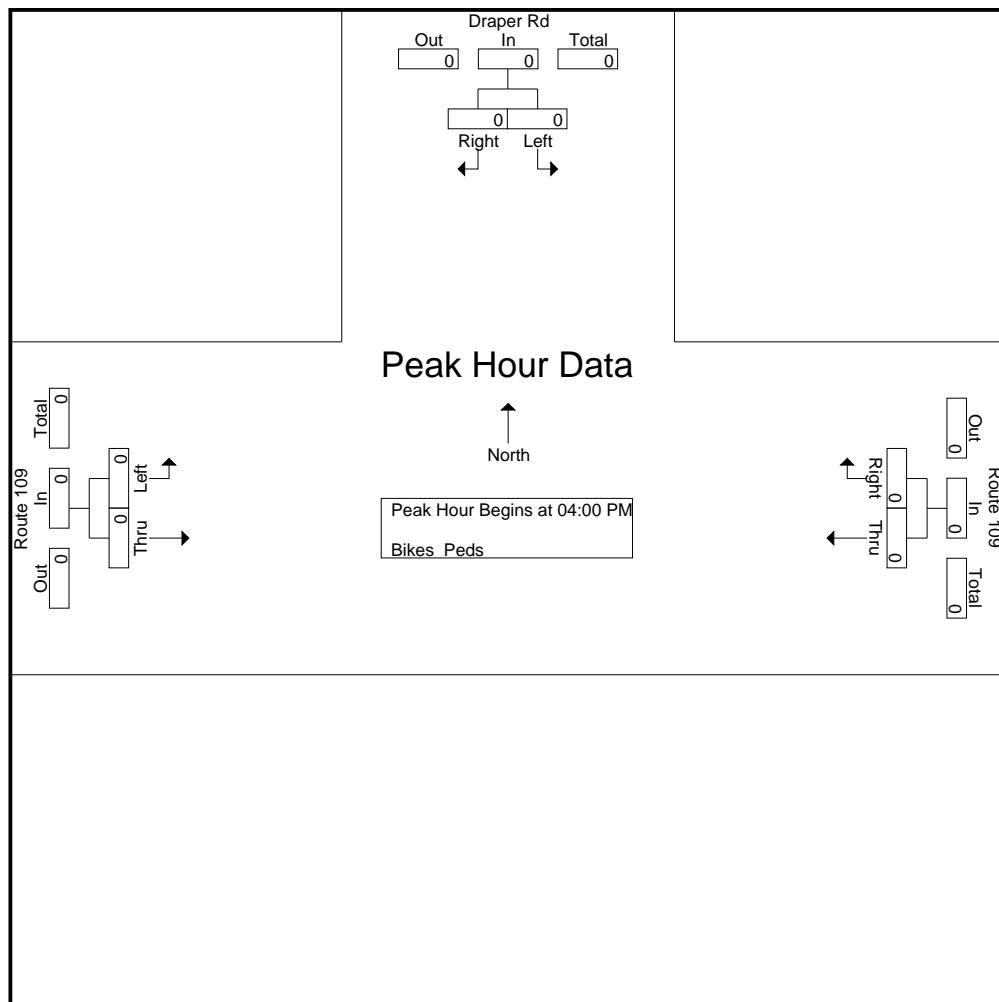
Groups Printed- Bikes Peds

	Draper Rd From North			Route 109 From East			Route 109 From West			Total		
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Excl. Total	Incl. Total	Int. Total
04:00 PM	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
04:30 PM	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
Total	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
05:15 PM	0	0	0	0	0	2	0	0	0	2	0	2
05:30 PM	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
Total	0	0	0	0	0	2	0	0	0	2	0	2
Grand Total	0	0	0	0	0	2	0	0	0	2	0	2
Apprch %	0	0		0	0		0	0				
Total %										100	0	

Accurate Counts

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 11



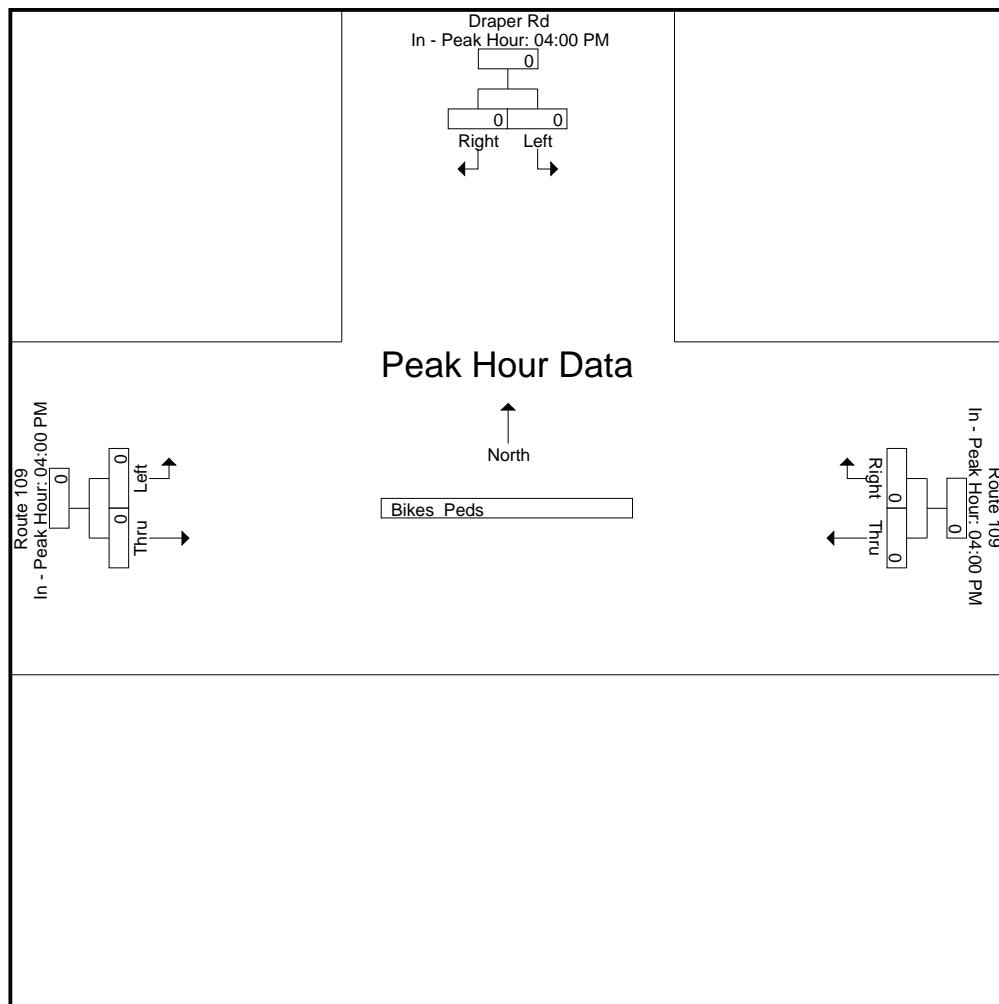
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour Analysis From 04:00 PM to 05:00 PM

Accurate Counts
978-664-2565

N/S Street : Draper Road
E/W Street : Route 109
City/State : Dover, MA
Weather : Coudy

File Name : 99640001
Site Code : 99640001
Start Date : 3/20/2024
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Tisdale Drive
 E/W Street : Route 109
 City/State : Dover, MA
 Weather : Cloudy

File Name : 99640002
 Site Code : 99640002
 Start Date : 3/20/2024
 Page No : 1

Groups Printed- Cars - Trucks

		Tisdale Dr From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM		3	1	54	0	0	147	205
07:15 AM		2	0	68	0	0	156	226
07:30 AM		5	2	72	0	0	202	281
07:45 AM		2	1	64	3	0	189	259
Total		12	4	258	3	0	694	971
08:00 AM		3	0	88	1	0	159	251
08:15 AM		3	3	89	0	0	130	225
08:30 AM		1	0	79	0	0	143	223
08:45 AM		1	1	71	1	0	125	199
Total		8	4	327	2	0	557	898
Grand Total		20	8	585	5	0	1251	1869
Apprch %		71.4	28.6	99.2	0.8	0	100	
Total %		1.1	0.4	31.3	0.3	0	66.9	
Cars		20	8	552	5	0	1211	1796
% Cars		100	100	94.4	100	0	96.8	96.1
Trucks		0	0	33	0	0	40	73
% Trucks		0	0	5.6	0	0	3.2	3.9

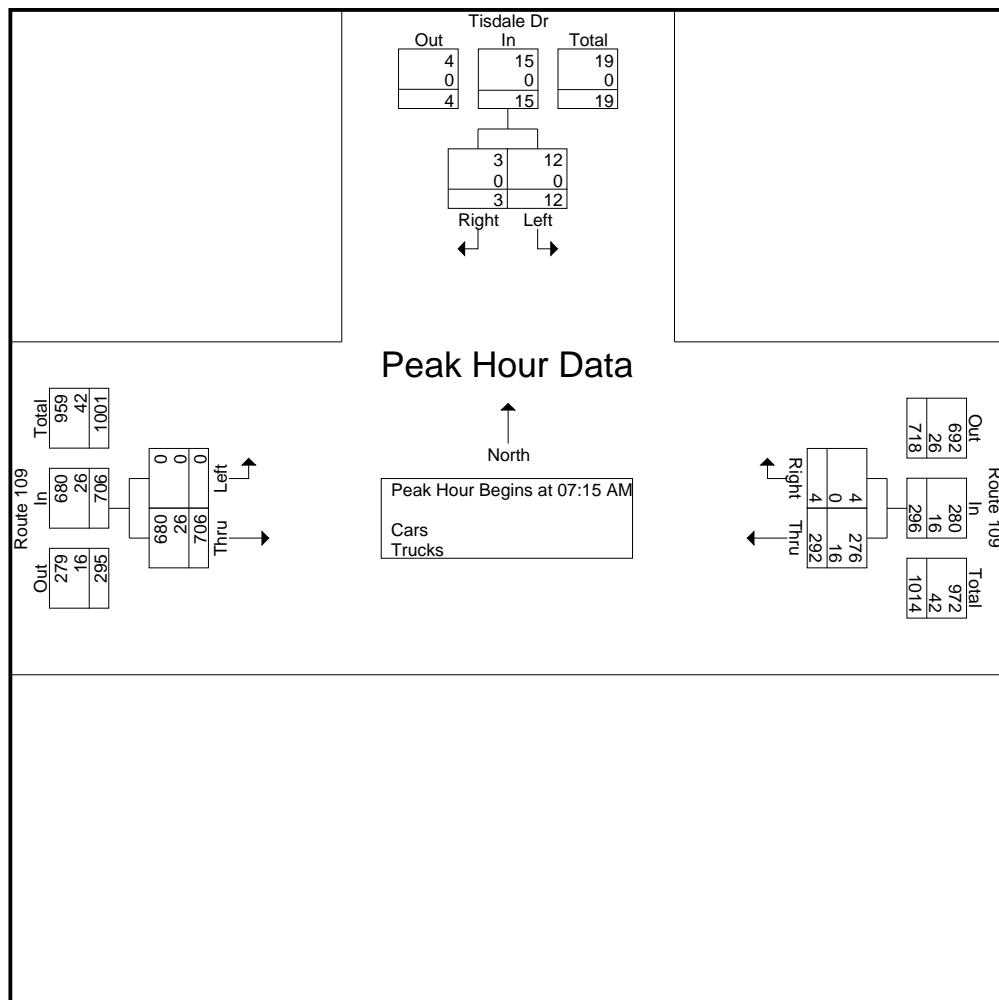
		Tisdale Dr From North			Route 109 From East			Route 109 From West			
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:15 AM											
07:15 AM		2	0	2	68	0	68	0	156	156	226
07:30 AM		5	2	7	72	0	72	0	202	202	281
07:45 AM		2	1	3	64	3	67	0	189	189	259
08:00 AM		3	0	3	88	1	89	0	159	159	251
Total Volume		12	3	15	292	4	296	0	706	706	1017
% App. Total		80	20		98.6	1.4		0	100		
PHF		.600	.375	.536	.830	.333	.831	.000	.874	.874	.905
Cars		12	3	15	276	4	280	0	680	680	975
% Cars		100	100	100	94.5	100	94.6	0	96.3	96.3	95.9
Trucks		0	0	0	16	0	16	0	26	26	42
% Trucks		0	0	0	5.5	0	5.4	0	3.7	3.7	4.1

Accurate Counts

978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 2



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

Peak Hour Analysis From 07:00 AM to 08:00 AM

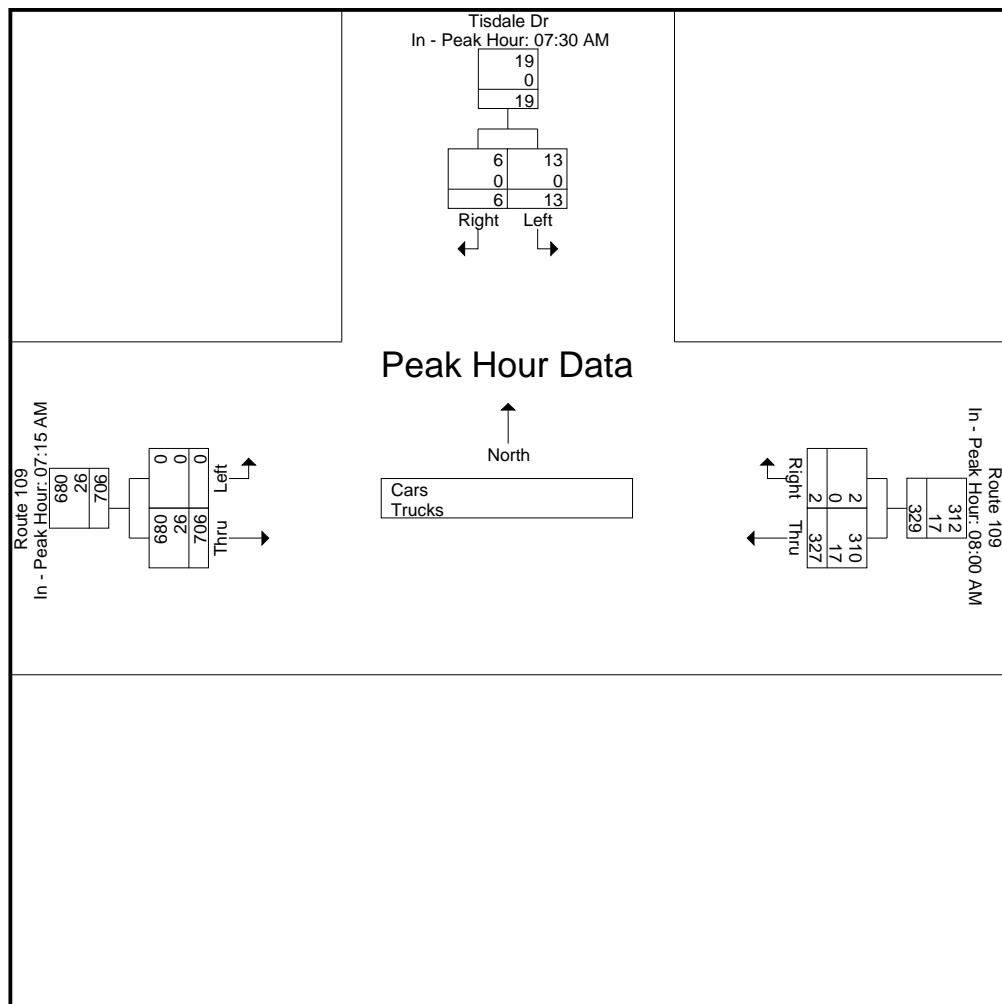
Peak Hour for Each Approach Begins at:

Peak Hour for Each Approach Begins at:				07:30 AM	08:00 AM	07:15 AM	07:30 AM	08:00 AM	07:15 AM	
+0 mins.	5	2	7		88	1	89	0	156	156
+15 mins.	2	1	3		89	0	89	0	202	202
+30 mins.	3	0	3		79	0	79	0	189	189
+45 mins.	3	3	6		71	1	72	0	159	159
Total Volume	13	6	19		327	2	329	0	706	706
% App. Total	68.4	31.6			99.4	0.6		0	100	
PHF	.650	.500	.679		.919	.500	.924	.000	.874	.874
Cars	13	6	19		310	2	312	0	680	680
% Cars	100	100	100		94.8	100	94.8	0	96.3	96.3
Trucks	0	0	0		17	0	17	0	26	26
% Trucks	0	0	0		5.2	0	5.2	0	3.7	3.7

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 4

Groups Printed- Cars

		Tisdale Dr From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM		3	1	51	0	0	143	198
07:15 AM		2	0	63	0	0	148	213
07:30 AM		5	2	70	0	0	200	277
07:45 AM		2	1	58	3	0	179	243
Total		12	4	242	3	0	670	931
08:00 AM		3	0	85	1	0	153	242
08:15 AM		3	3	86	0	0	128	220
08:30 AM		1	0	75	0	0	138	214
08:45 AM		1	1	64	1	0	122	189
Total		8	4	310	2	0	541	865
Grand Total		20	8	552	5	0	1211	1796
Apprch %		71.4	28.6	99.1	0.9	0	100	
Total %		1.1	0.4	30.7	0.3	0	67.4	

**Tisdale Dr
From North**

**Route 109
From East**

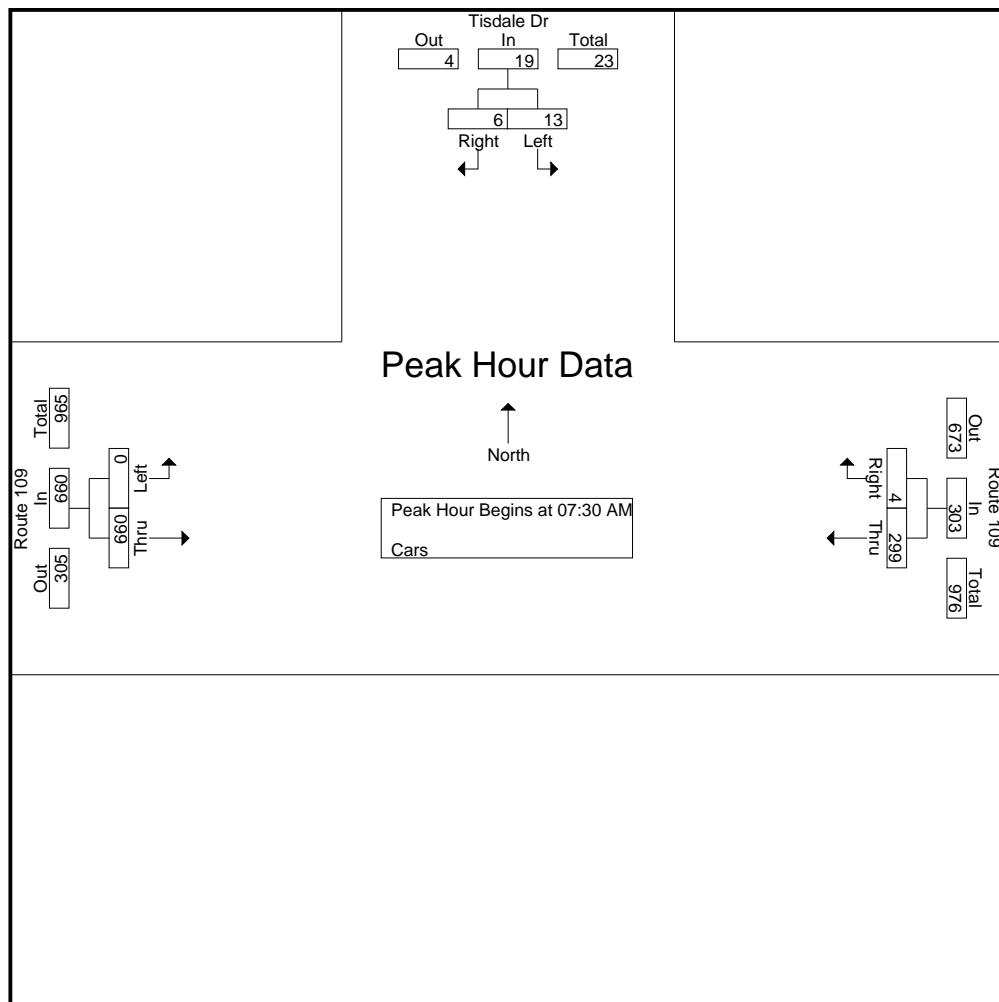
**Route 109
From West**

Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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		5	2	7	70	0	70	0	200	200	277
07:45 AM		2	1	3	58	3	61	0	179	179	243
08:00 AM		3	0	3	85	1	86	0	153	153	242
08:15 AM		3	3	6	86	0	86	0	128	128	220
Total Volume		13	6	19	299	4	303	0	660	660	982
% App. Total		68.4	31.6		98.7	1.3		0	100		
PHF		.650	.500	.679	.869	.333	.881	.000	.825	.825	.886

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
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Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

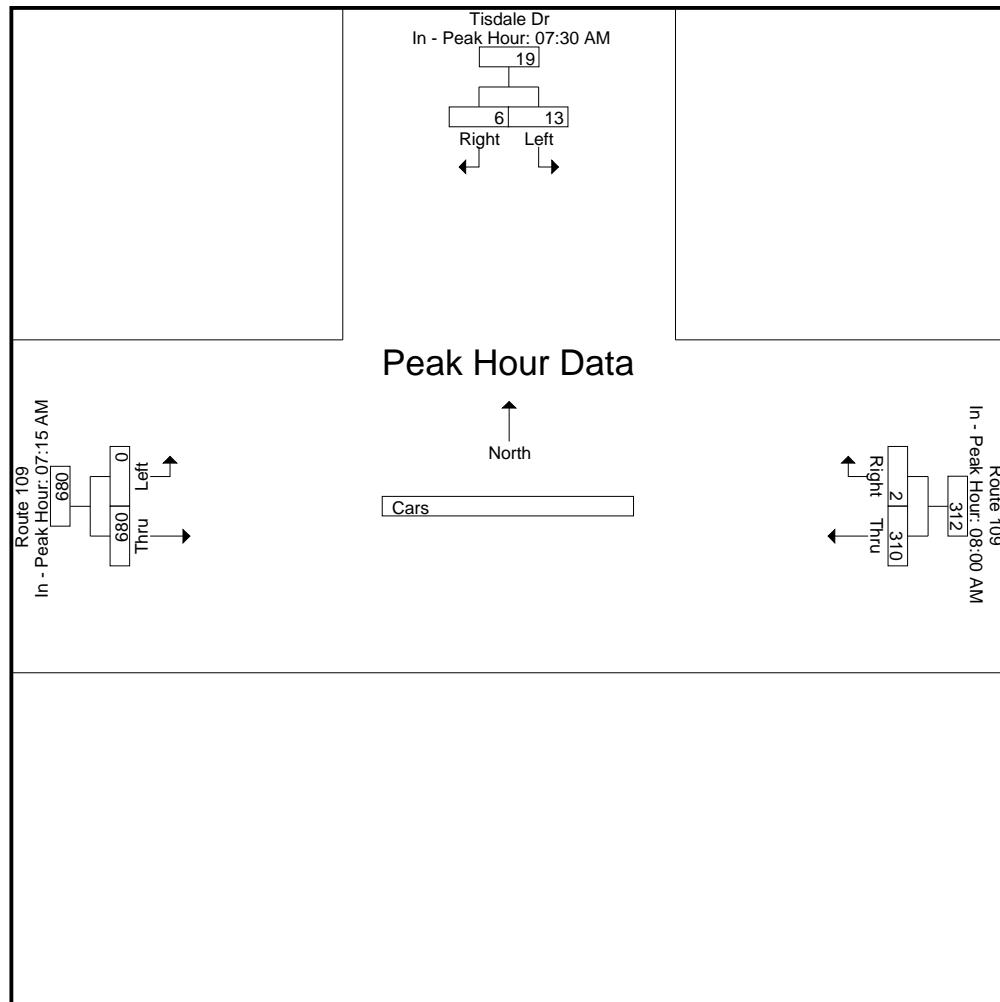
Peak Hour for Each Approach Begins at:

	07:30 AM		08:00 AM		07:15 AM	
+0 mins.	5	2	7	85	1	86
+15 mins.	2	1	3	86	0	86
+30 mins.	3	0	3	75	0	75
+45 mins.	3	3	6	64	1	65
Total Volume	13	6	19	310	2	312
% App. Total	68.4	31.6		99.4	0.6	
PHF	.650	.500	.679	.901	.500	.907
					0.000	.850
						.850

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 6



Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 7

Groups Printed- Trucks

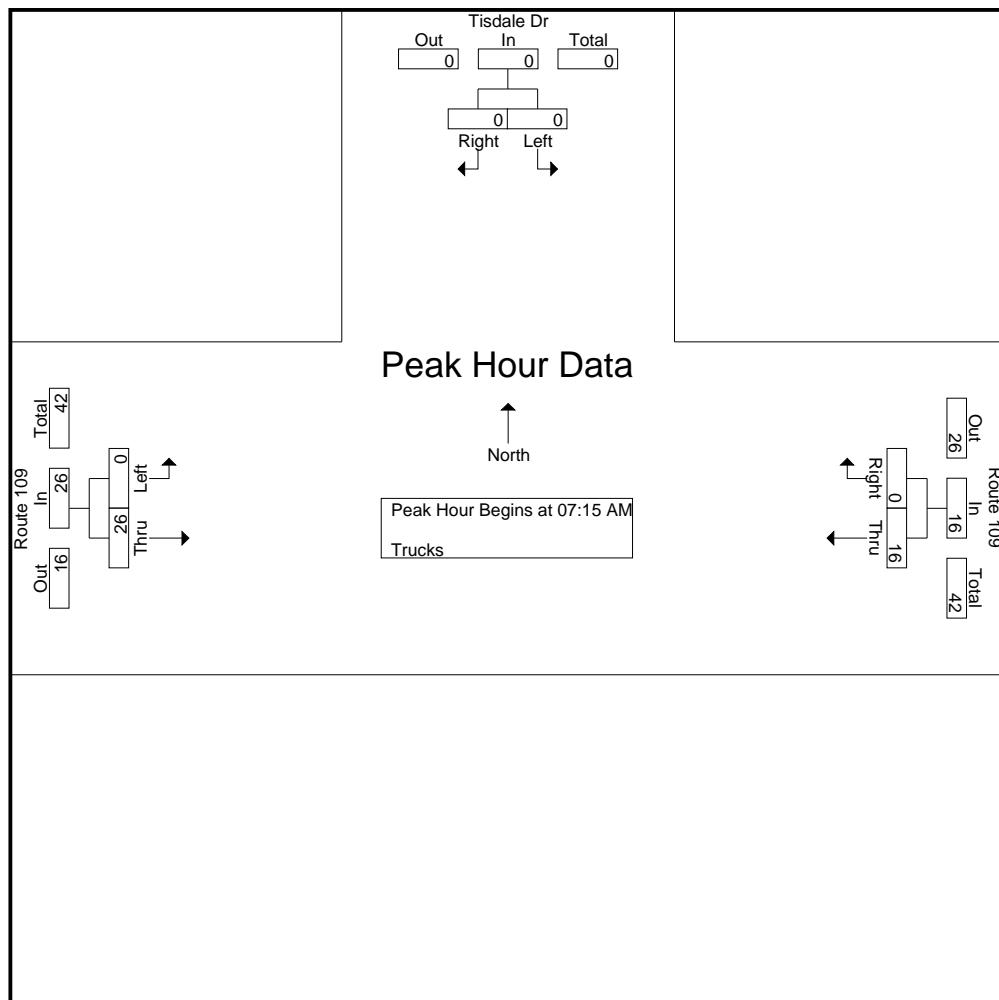
		Tisdale Dr From North		Route 109 From East		Route 109 From West		Int. Total
Start Time		Left	Right	Thru	Right	Left	Thru	
07:00 AM		0	0	3	0	0	4	7
07:15 AM		0	0	5	0	0	8	13
07:30 AM		0	0	2	0	0	2	4
07:45 AM		0	0	6	0	0	10	16
Total		0	0	16	0	0	24	40
08:00 AM		0	0	3	0	0	6	9
08:15 AM		0	0	3	0	0	2	5
08:30 AM		0	0	4	0	0	5	9
08:45 AM		0	0	7	0	0	3	10
Total		0	0	17	0	0	16	33
Grand Total		0	0	33	0	0	40	73
Apprch %		0	0	100	0	0	100	
Total %		0	0	45.2	0	0	54.8	

		Tisdale Dr From North			Route 109 From East			Route 109 From West			Int. Total	
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:15 AM												
07:15 AM		0	0	0	5	0	5	0	8	8	13	
07:30 AM		0	0	0	2	0	2	0	2	2	4	
07:45 AM		0	0	0	6	0	6	0	10	10	16	
08:00 AM		0	0	0	3	0	3	0	6	6	9	
Total Volume		0	0	0	16	0	16	0	26	26	42	
% App. Total		0	0	100	0	0	100	0	100	100		
PHF		.000	.000	.000	.667	.000	.667	.000	.650	.650	.656	

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
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Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

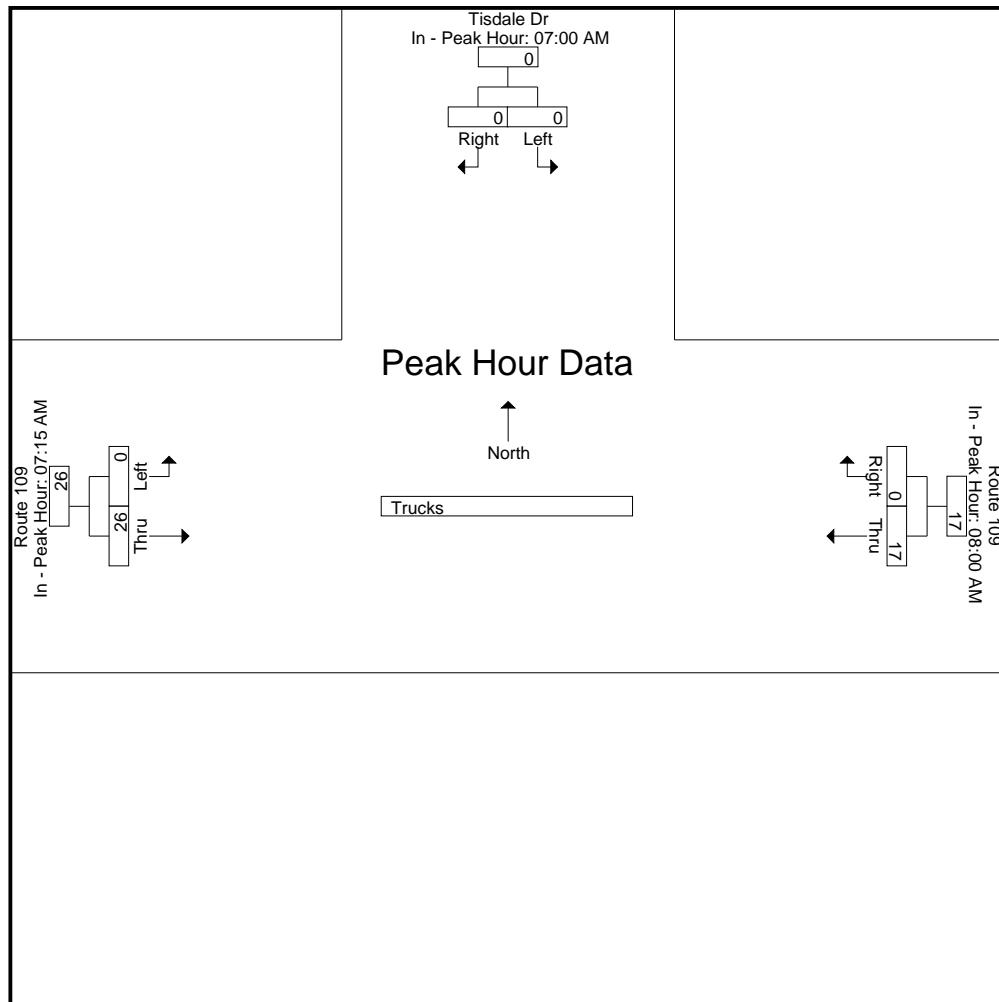
Peak Hour for Each Approach Begins at:

	07:00 AM			08:00 AM			07:15 AM			
+0 mins.	0	0	0	3	0	3	0	8	8	
+15 mins.	0	0	0	3	0	3	0	2	2	
+30 mins.	0	0	0	4	0	4	0	10	10	
+45 mins.	0	0	0	7	0	7	0	6	6	
Total Volume	0	0	0	17	0	17	0	26	26	
% App. Total	0	0	0	100	0	100	0	100	100	
PHF	.000	.000	.000	.607	.000	.607	.000	.650	.650	

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
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Accurate Counts

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

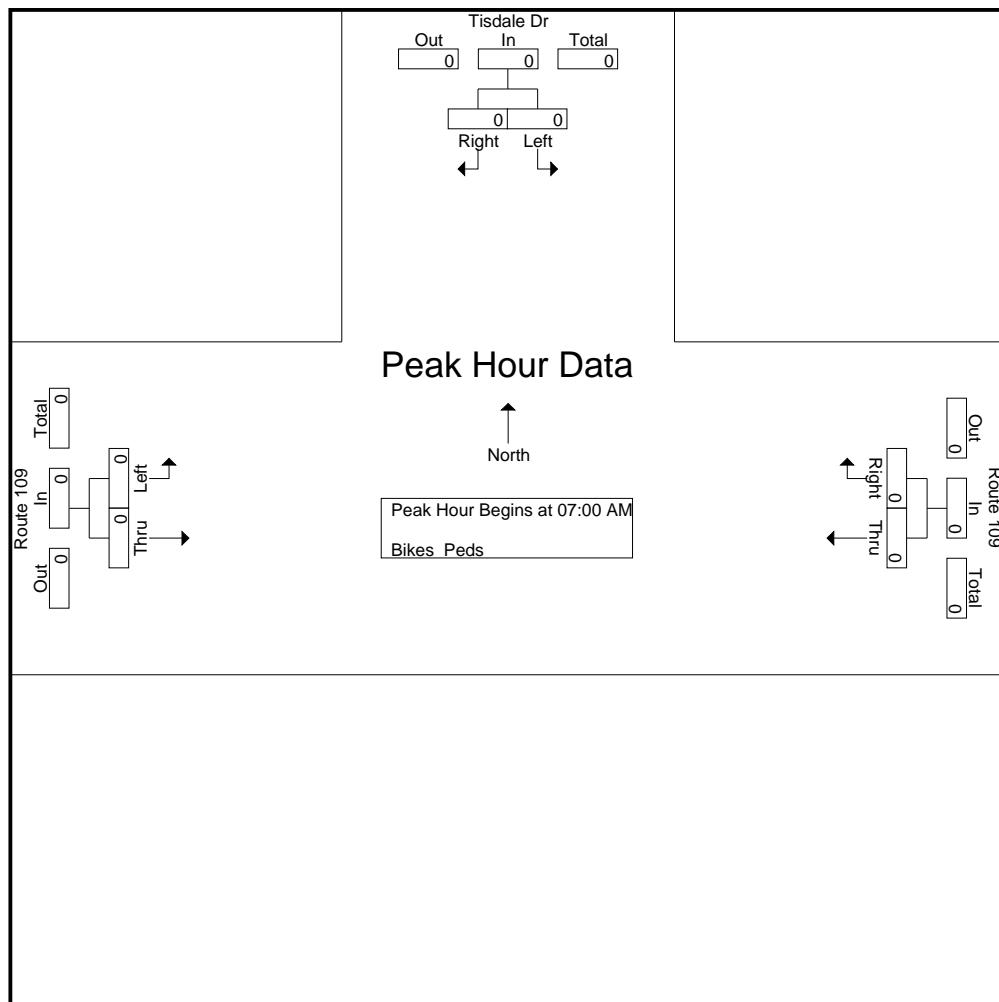
File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 10

Groups Printed- Bikes Peds

	Tisdale Dr From North			Route 109 From East			Route 109 From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Excl. Total	Incl. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	1	0	0	0	0	0	0	1	0	1
07:30 AM	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
Total	0	0	1	0	0	0	0	0	0	1	0	1
08:00 AM	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
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	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
Grand Total	0	0	1	0	0	0	0	0	0	1	0	1
Apprch %	0	0		0	0		0	0				
Total %										100	0	

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 11



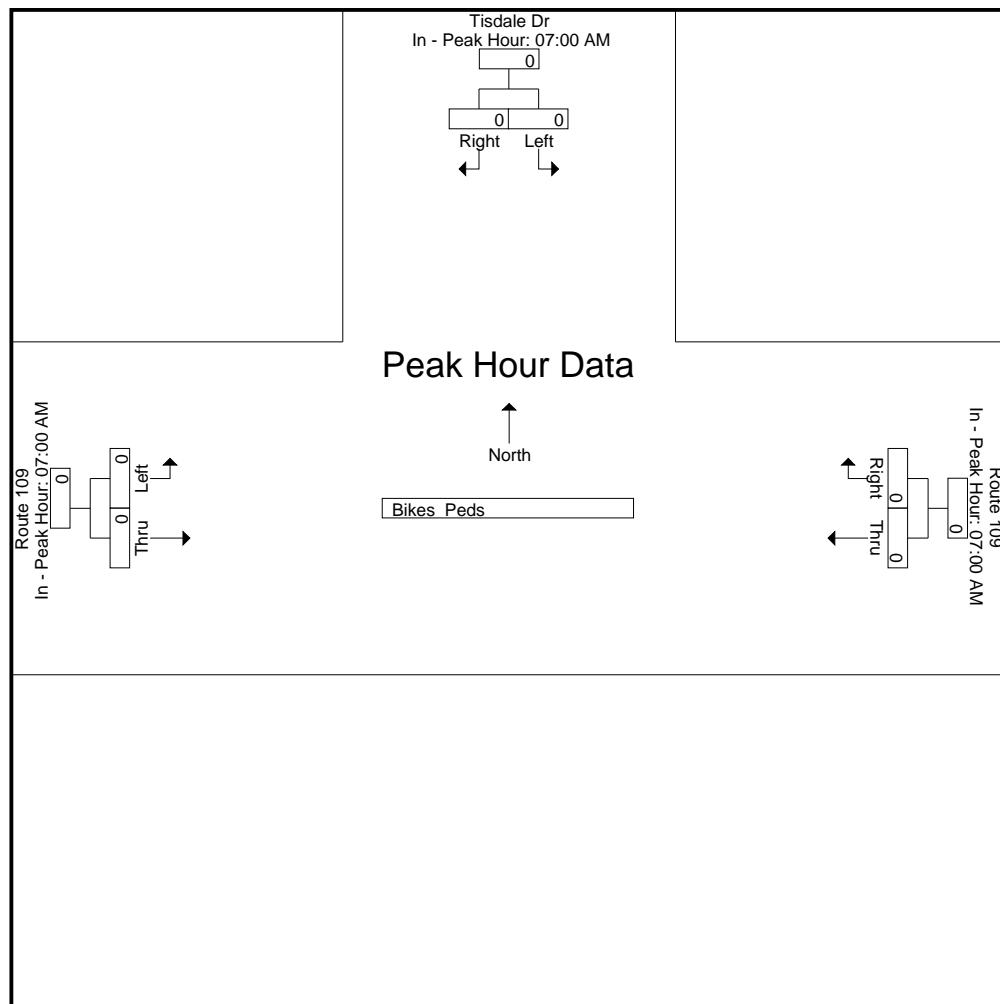
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour Analysis From 07:00 AM to 08:00 AM

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Tisdale Drive
 E/W Street : Route 109
 City/State : Dover, MA
 Weather : Cloudy

File Name : 99640002
 Site Code : 99640002
 Start Date : 3/20/2024
 Page No : 1

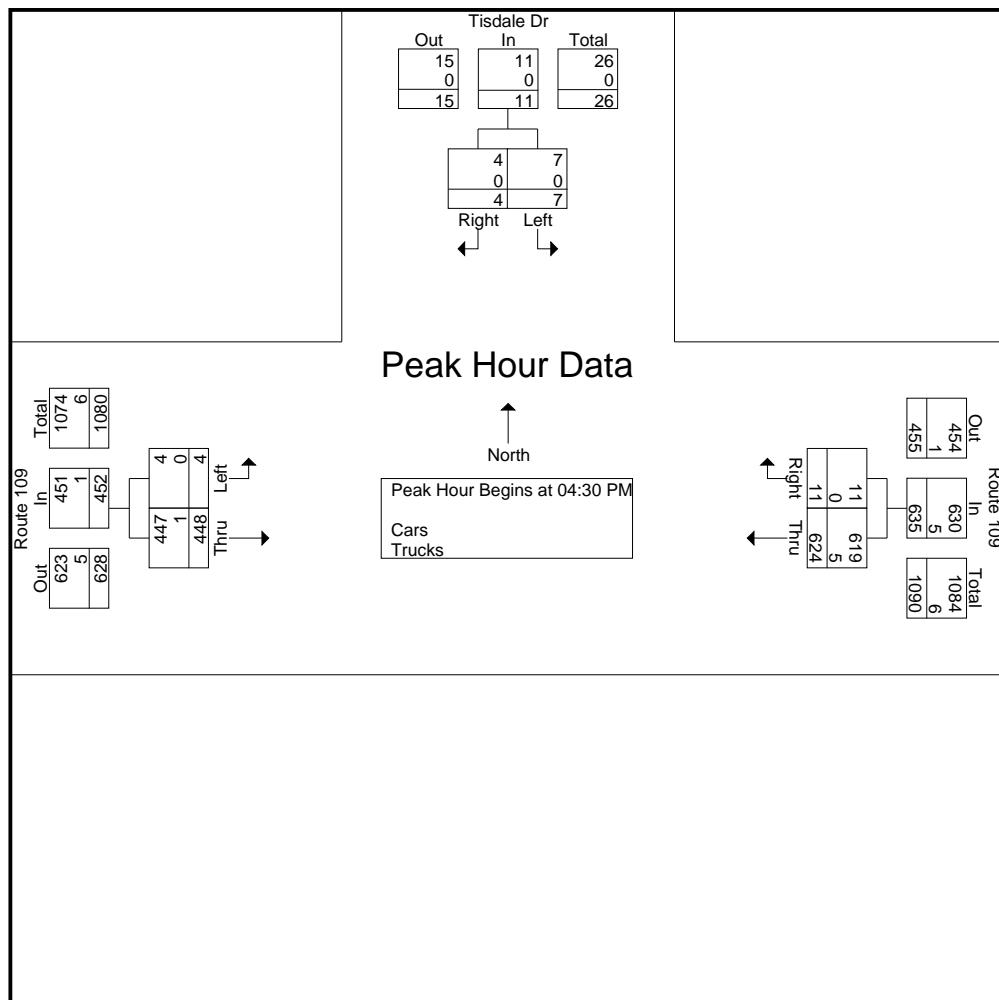
Groups Printed- Cars - Trucks

		Tisdale Dr From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM		4	1	128	2	1	94	230
04:15 PM		2	1	116	2	2	116	239
04:30 PM		4	3	148	4	1	111	271
04:45 PM		2	0	158	1	1	104	266
Total		12	5	550	9	5	425	1006
05:00 PM		0	0	175	3	0	127	305
05:15 PM		1	1	143	3	2	106	256
05:30 PM		0	1	142	4	1	110	258
05:45 PM		3	1	110	3	0	80	197
Total		4	3	570	13	3	423	1016
Grand Total		16	8	1120	22	8	848	2022
Apprch %		66.7	33.3	98.1	1.9	0.9	99.1	
Total %		0.8	0.4	55.4	1.1	0.4	41.9	
Cars		16	8	1109	22	8	843	2006
% Cars		100	100	99	100	100	99.4	99.2
Trucks		0	0	11	0	0	5	16
% Trucks		0	0	1	0	0	0.6	0.8

		Tisdale Dr From North			Route 109 From East			Route 109 From West			
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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		4	3	7	148	4	152	1	111	112	271
04:45 PM		2	0	2	158	1	159	1	104	105	266
05:00 PM		0	0	0	175	3	178	0	127	127	305
05:15 PM		1	1	2	143	3	146	2	106	108	256
Total Volume		7	4	11	624	11	635	4	448	452	1098
% App. Total		63.6	36.4		98.3	1.7		0.9	99.1		
PHF		.438	.333	.393	.891	.688	.892	.500	.882	.890	.900
Cars		7	4	11	619	11	630	4	447	451	1092
% Cars		100	100	100	99.2	100	99.2	100	99.8	99.8	99.5
Trucks		0	0	0	5	0	5	0	1	1	6
% Trucks		0	0	0	0.8	0	0.8	0	0.2	0.2	0.5

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour Analysis From 04:00 AM to 05:00 AM

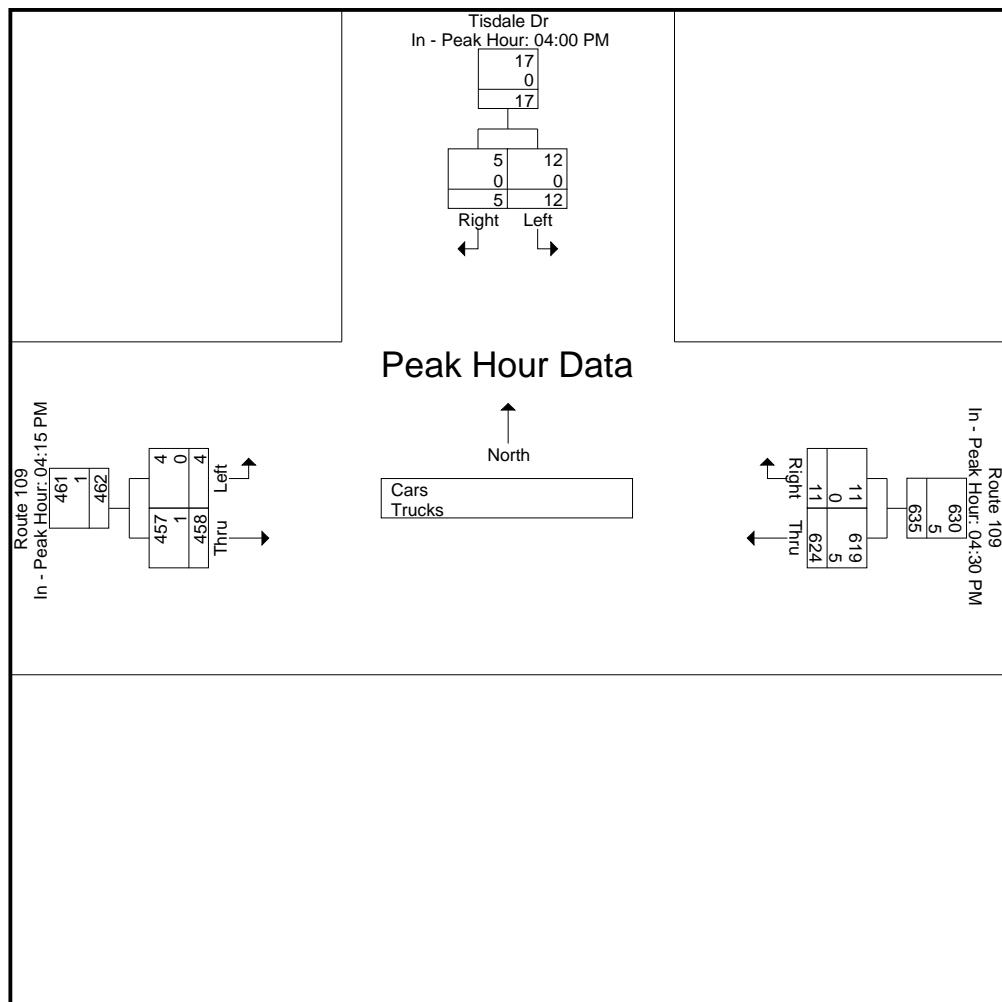
Peak Hour for Each Approach Begins at:

Peak Hour for Each Approach Begins at:	04:00 PM	04:30 PM	04:15 PM						
+0 mins.	4	1	5	148	4	152	2	116	118
+15 mins.	2	1	3	158	1	159	1	111	112
+30 mins.	4	3	7	175	3	178	1	104	105
+45 mins.	2	0	2	143	3	146	0	127	127
Total Volume	12	5	17	624	11	635	4	458	462
% App. Total	70.6	29.4		98.3	1.7		0.9	99.1	
PHF	.750	.417	.607	.891	.688	.892	.500	.902	.909
Cars	12	5	17	619	11	630	4	457	461
% Cars	100	100	100	99.2	100	99.2	100	99.8	99.8
Trucks	0	0	0	5	0	5	0	1	1
% Trucks	0	0	0	0.8	0	0.8	0	0.2	0.2

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 4

Groups Printed- Cars

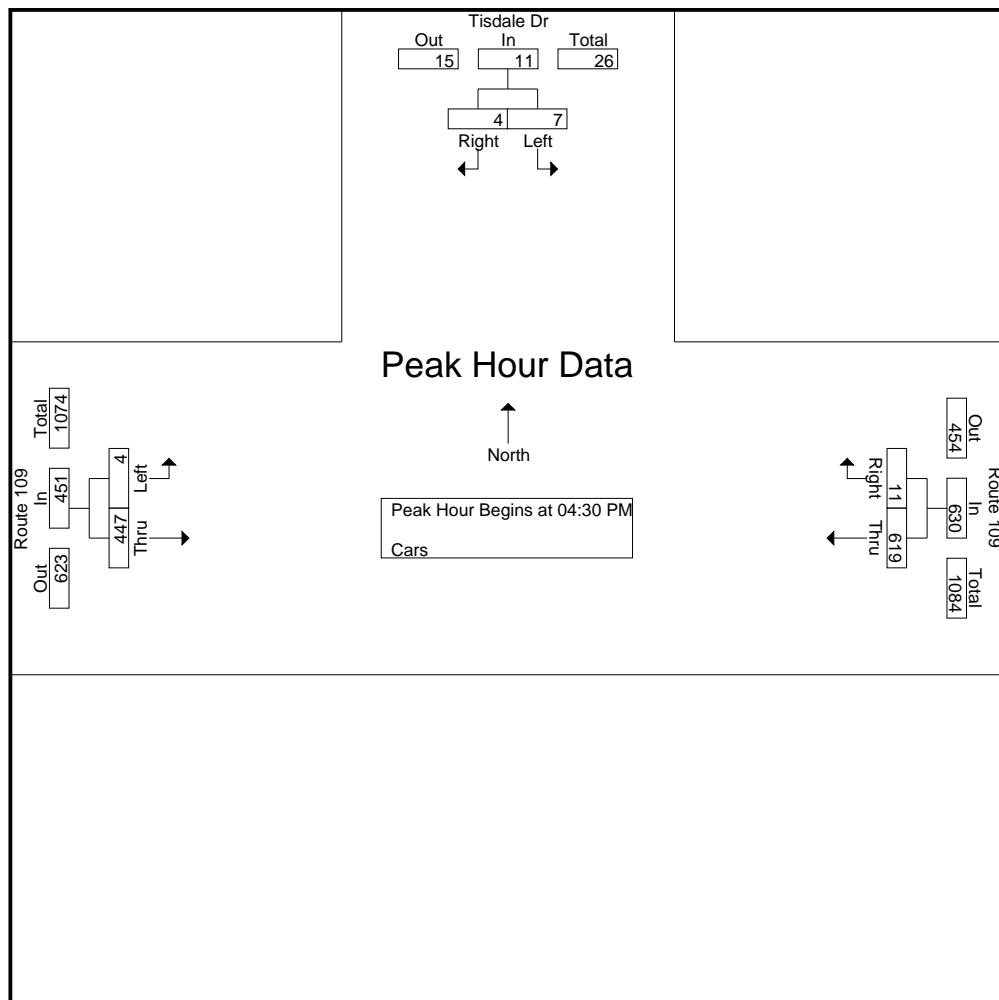
		Tisdale Dr From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM		4	1	125	2	1	93	226
04:15 PM		2	1	114	2	2	116	237
04:30 PM		4	3	146	4	1	111	269
04:45 PM		2	0	156	1	1	103	263
Total		12	5	541	9	5	423	995
05:00 PM		0	0	174	3	0	127	304
05:15 PM		1	1	143	3	2	106	256
05:30 PM		0	1	141	4	1	110	257
05:45 PM		3	1	110	3	0	77	194
Total		4	3	568	13	3	420	1011
Grand Total		16	8	1109	22	8	843	2006
Apprch %		66.7	33.3	98.1	1.9	0.9	99.1	
Total %		0.8	0.4	55.3	1.1	0.4	42	

		Tisdale Dr From North			Route 109 From East			Route 109 From West			
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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		4	3	7	146	4	150	1	111	112	269
04:45 PM		2	0	2	156	1	157	1	103	104	263
05:00 PM		0	0	0	174	3	177	0	127	127	304
05:15 PM		1	1	2	143	3	146	2	106	108	256
Total Volume		7	4	11	619	11	630	4	447	451	1092
% App. Total		63.6	36.4		98.3	1.7		0.9	99.1		
PHF		.438	.333	.393	.889	.688	.890	.500	.880	.888	.898

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 5



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

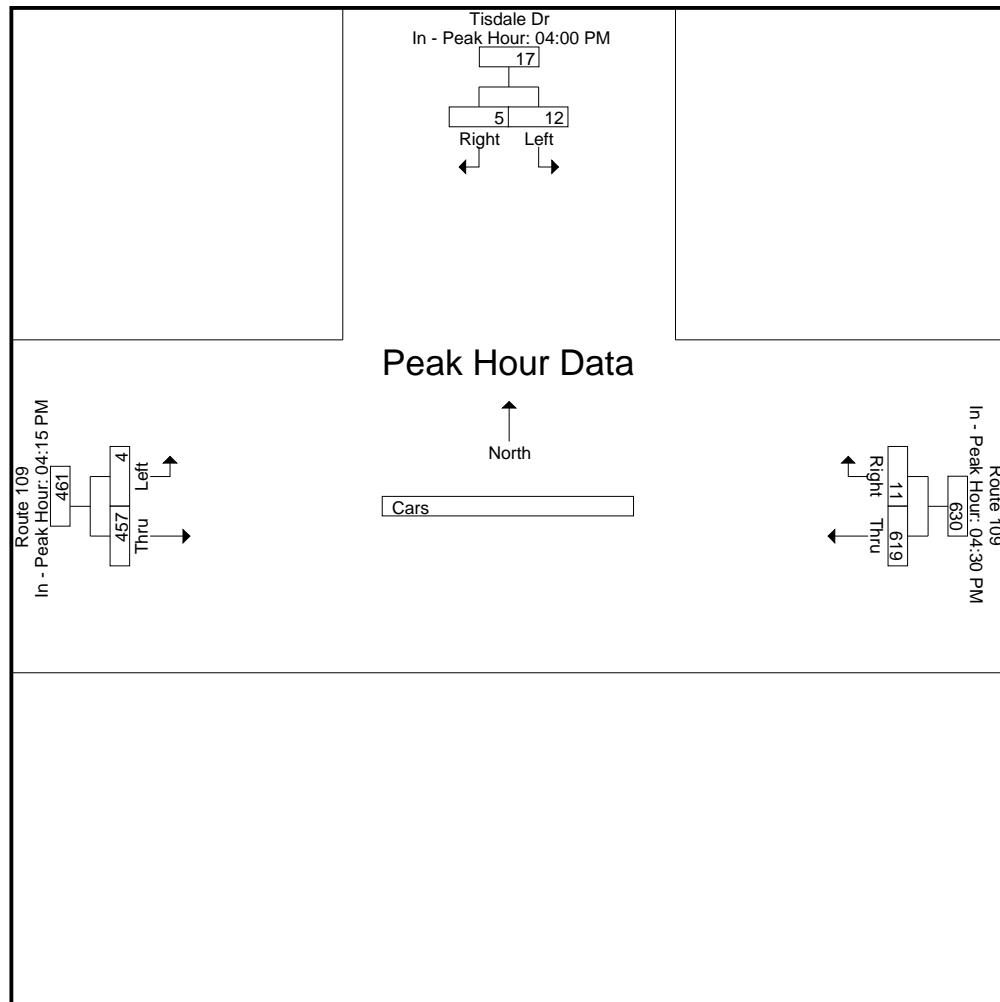
Peak Hour for Each Approach Begins at:

	04:00 PM			04:30 PM			04:15 PM		
+0 mins.	4	1	5	146	4	150	2	116	118
+15 mins.	2	1	3	156	1	157	1	111	112
+30 mins.	4	3	7	174	3	177	1	103	104
+45 mins.	2	0	2	143	3	146	0	127	127
Total Volume	12	5	17	619	11	630	4	457	461
% App. Total	70.6	29.4		98.3	1.7		0.9	99.1	
PHF	.750	.417	.607	.889	.688	.890	.500	.900	.907

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 6



Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 7

Groups Printed- Trucks

		Tisdale Dr From North		Route 109 From East		Route 109 From West		Int. Total
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total	
04:00 PM	0	0	3	0	0	1	4	11
04:15 PM	0	0	2	0	0	0	2	
04:30 PM	0	0	2	0	0	0	2	
04:45 PM	0	0	2	0	0	1	3	
Total	0	0	9	0	0	2	11	
05:00 PM	0	0	1	0	0	0	1	
05:15 PM	0	0	0	0	0	0	0	
05:30 PM	0	0	1	0	0	0	1	
05:45 PM	0	0	0	0	0	3	3	
Total	0	0	2	0	0	3	5	
Grand Total	0	0	11	0	0	5	16	
Apprch %	0	0	100	0	0	100		
Total %	0	0	68.8	0	0	31.2		

**Tisdale Dr
From North**

**Route 109
From East**

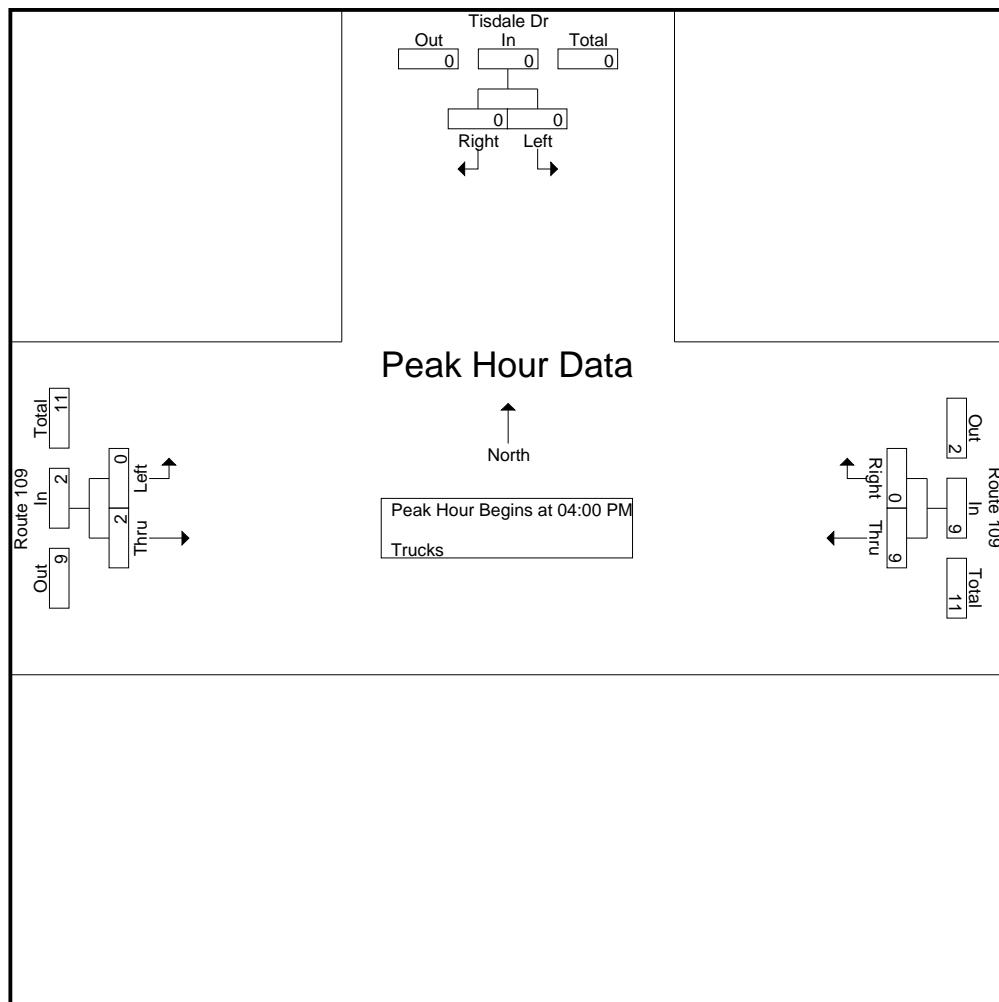
**Route 109
From West**

Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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	3	0	3	0	1	1	4
04:15 PM	0	0	0	2	0	2	0	0	0	2
04:30 PM	0	0	0	2	0	2	0	0	0	2
04:45 PM	0	0	0	2	0	2	0	1	1	3
Total Volume	0	0	0	9	0	9	0	2	2	11
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.750	.000	.750	.000	.500	.500	.688

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 8



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

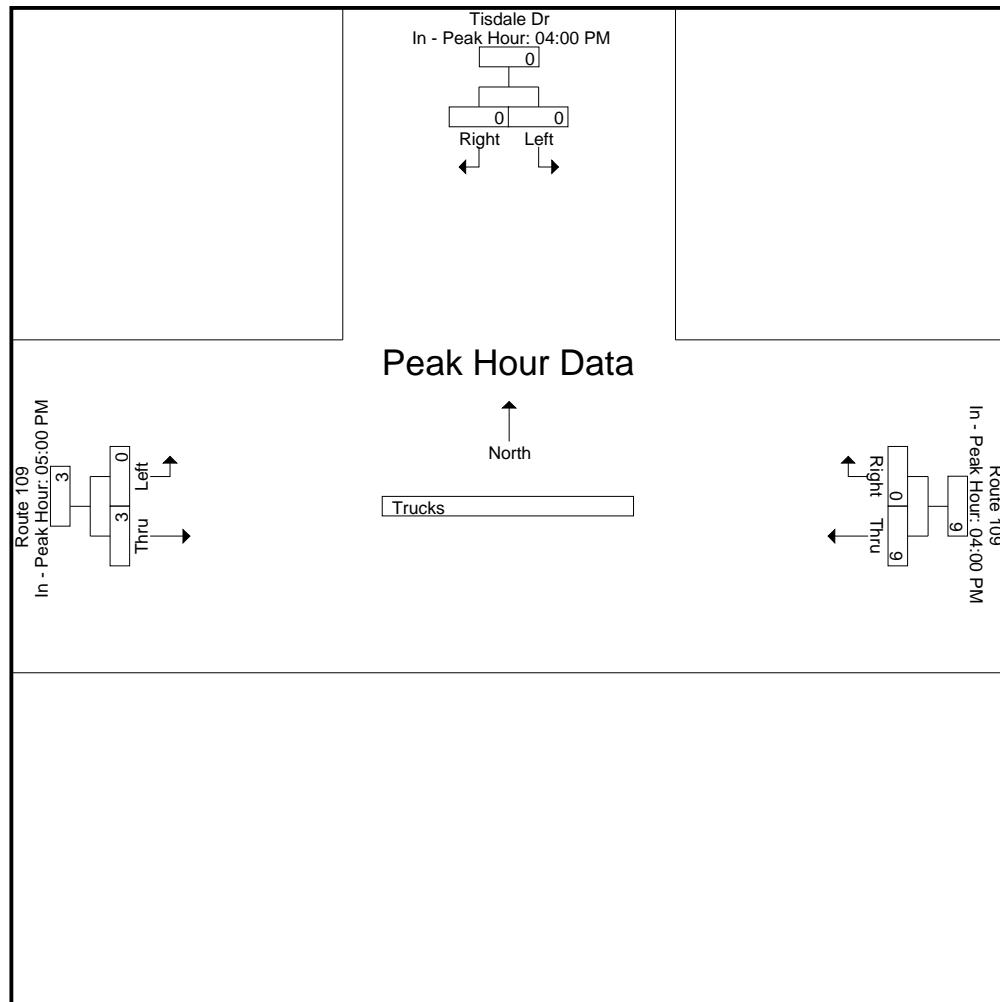
Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			05:00 PM		
+0 mins.	0	0	0	3	0	3	0	0	0
+15 mins.	0	0	0	2	0	2	0	0	0
+30 mins.	0	0	0	2	0	2	0	0	0
+45 mins.	0	0	0	2	0	2	0	3	3
Total Volume	0	0	0	9	0	9	0	3	3
% App. Total	0	0	0	100	0	100	0	100	100
PHF	.000	.000	.000	.750	.000	.750	.000	.250	.250

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 9



Accurate Counts

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

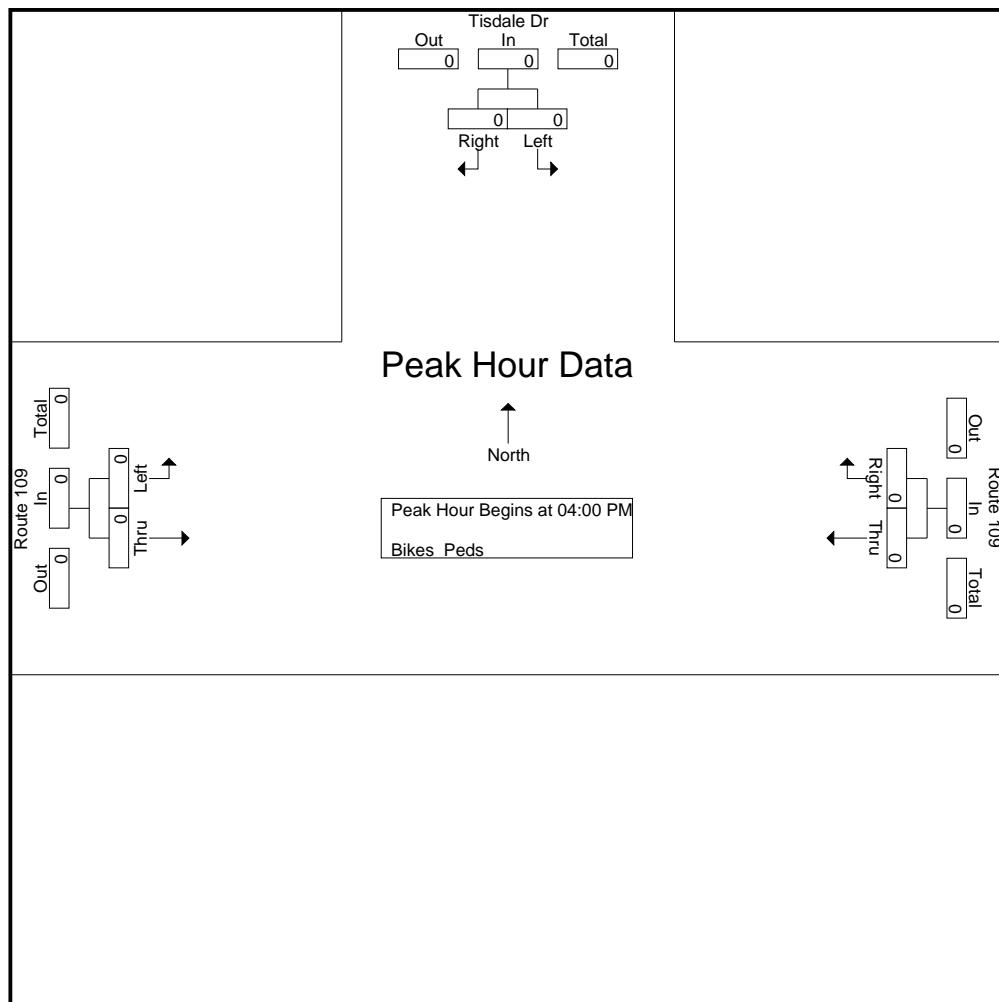
File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 10

Groups Printed- Bikes Peds

	Tisdale Dr From North			Route 109 From East			Route 109 From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Excl. Total	Incl. Total	Int. Total
04:00 PM	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
04:30 PM	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
Total	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
05:15 PM	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
05:45 PM	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
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0				
Total %										0	0	

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 11



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

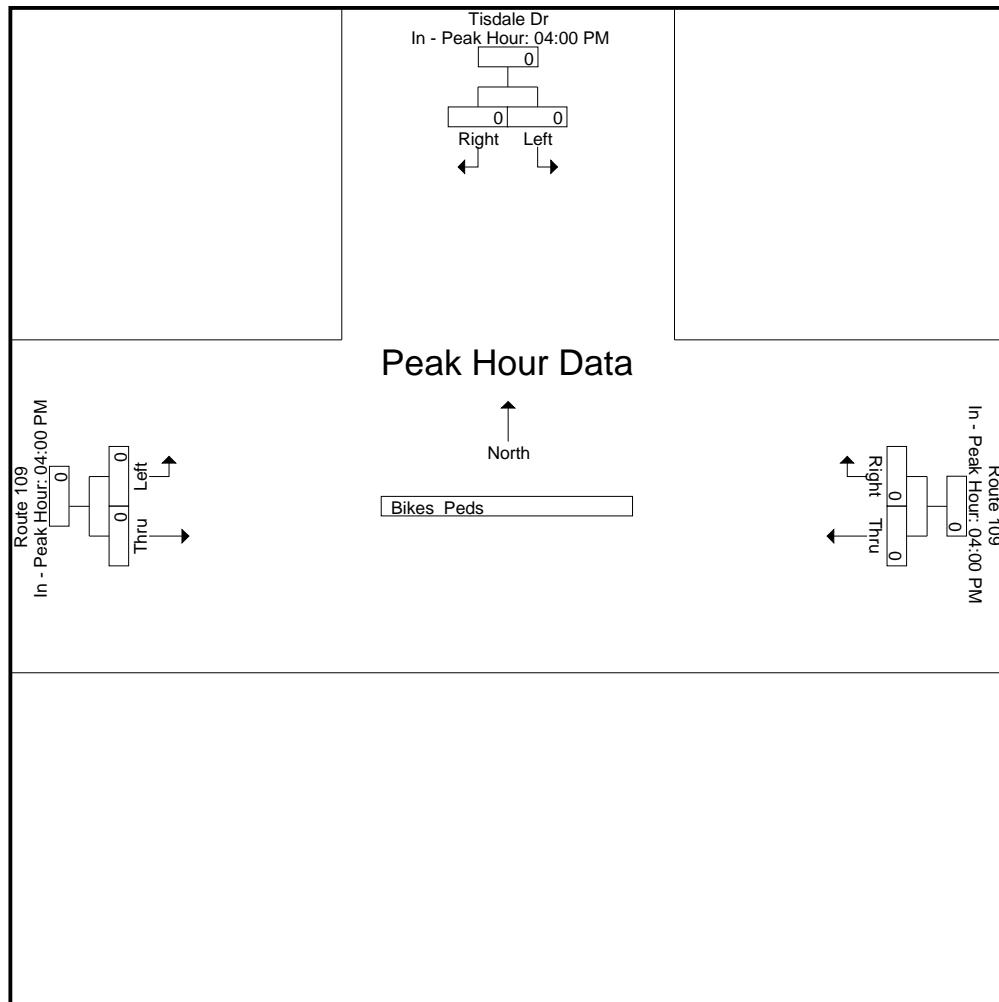
Peak Hour Analysis From 04:00 PM to 05:00 PM

Peak Hour for Each Approach Begins at:

Accurate Counts
978-664-2565

N/S Street : Tisdale Drive
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640002
Site Code : 99640002
Start Date : 3/20/2024
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Walpole Street

E/W Street : Route 109

City/State : Dover, MA

Weather : Cloudy

File Name : 99640003

Site Code : 99640003

Start Date : 3/20/2024

Page No : 1

Groups Printed- Cars - Trucks

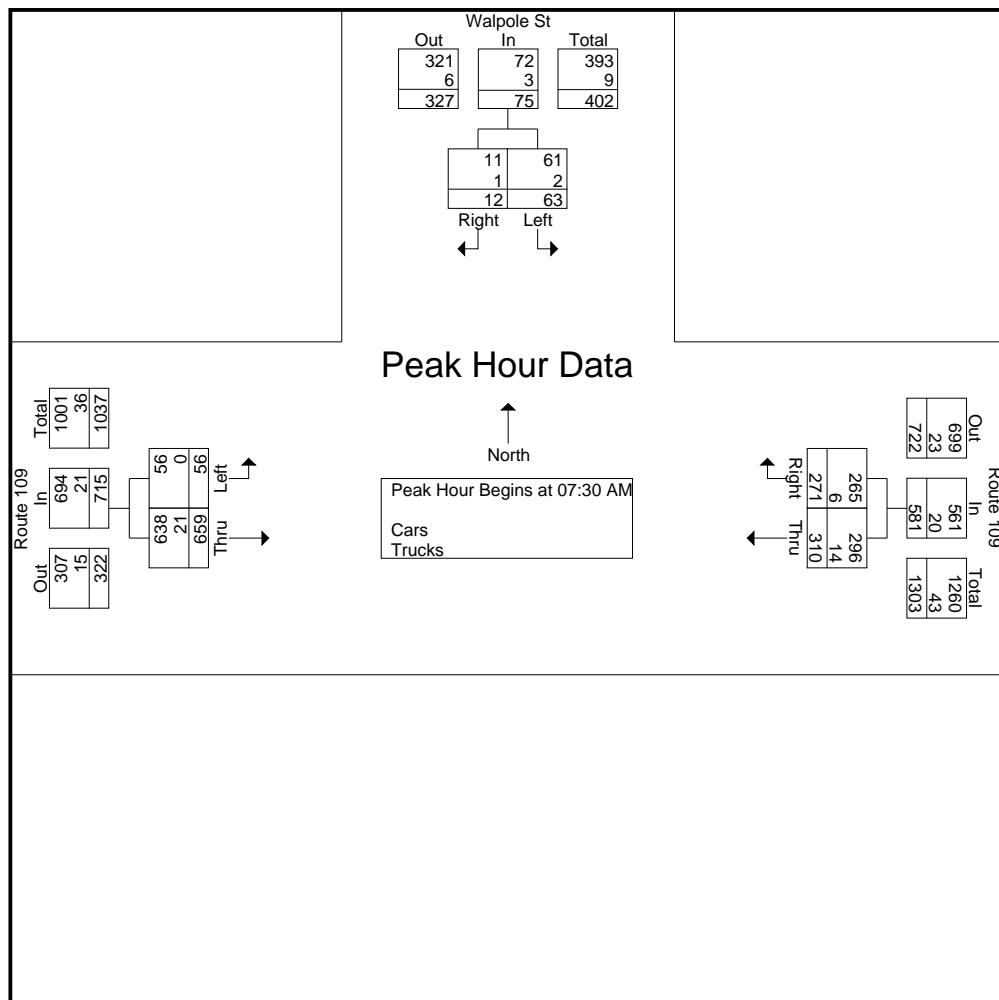
		Walpole St From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM		7	2	53	66	11	139	278
07:15 AM		11	2	67	58	12	151	301
07:30 AM		18	1	73	74	19	190	375
07:45 AM		12	5	61	64	15	179	336
Total		48	10	254	262	57	659	1290
08:00 AM		18	2	90	60	12	165	347
08:15 AM		15	4	86	73	10	125	313
08:30 AM		9	1	77	38	3	140	268
08:45 AM		12	2	75	40	3	122	254
Total		54	9	328	211	28	552	1182
Grand Total		102	19	582	473	85	1211	2472
Apprch %		84.3	15.7	55.2	44.8	6.6	93.4	
Total %		4.1	0.8	23.5	19.1	3.4	49	
Cars		99	17	549	460	85	1168	2378
% Cars		97.1	89.5	94.3	97.3	100	96.4	96.2
Trucks		3	2	33	13	0	43	94
% Trucks		2.9	10.5	5.7	2.7	0	3.6	3.8

		Walpole St From North			Route 109 From East			Route 109 From West			
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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		18	1	19	73	74	147	19	190	209	375
07:45 AM		12	5	17	61	64	125	15	179	194	336
08:00 AM		18	2	20	90	60	150	12	165	177	347
08:15 AM		15	4	19	86	73	159	10	125	135	313
Total Volume		63	12	75	310	271	581	56	659	715	1371
% App. Total		84	16		53.4	46.6		7.8	92.2		
PHF		.875	.600	.938	.861	.916	.914	.737	.867	.855	.914
Cars		61	11	72	296	265	561	56	638	694	1327
% Cars		96.8	91.7	96.0	95.5	97.8	96.6	100	96.8	97.1	96.8
Trucks		2	1	3	14	6	20	0	21	21	44
% Trucks		3.2	8.3	4.0	4.5	2.2	3.4	0	3.2	2.9	3.2

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 2



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

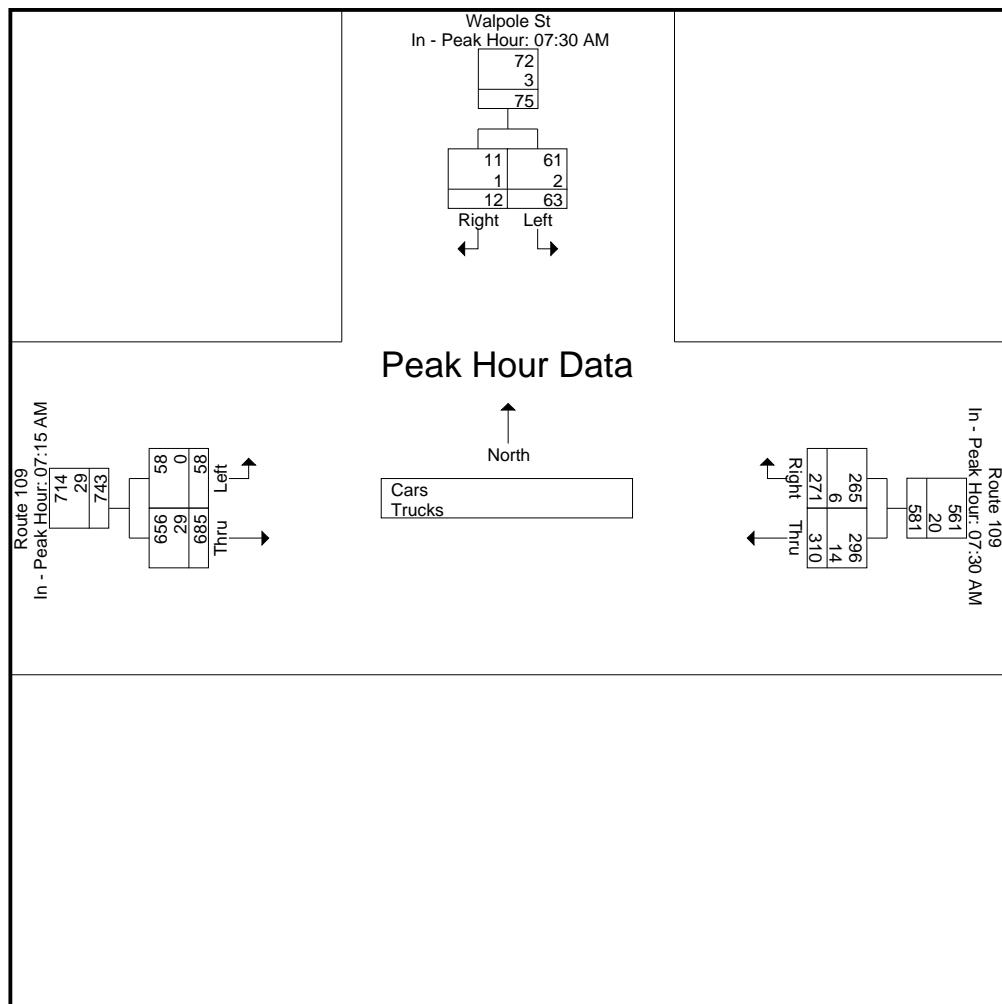
Peak Hour for Each Approach Begins at:

	07:30 AM			07:30 AM			07:15 AM		
+0 mins.	18	1	19	73	74	147	12	151	163
+15 mins.	12	5	17	61	64	125	19	190	209
+30 mins.	18	2	20	90	60	150	15	179	194
+45 mins.	15	4	19	86	73	159	12	165	177
Total Volume	63	12	75	310	271	581	58	685	743
% App. Total	84	16		53.4	46.6		7.8	92.2	
PHF	.875	.600	.938	.861	.916	.914	.763	.901	.889
Cars	61	11	72	296	265	561	58	656	714
% Cars	96.8	91.7	96	95.5	97.8	96.6	100	95.8	96.1
Trucks	2	1	3	14	6	20	0	29	29
% Trucks	3.2	8.3	4	4.5	2.2	3.4	0	4.2	3.9

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Walpole Street

E/W Street : Route 109

City/State : Dover, MA

Weather : Cloudy

File Name : 99640003

Site Code : 99640003

Start Date : 3/20/2024

Page No : 4

Groups Printed- Cars

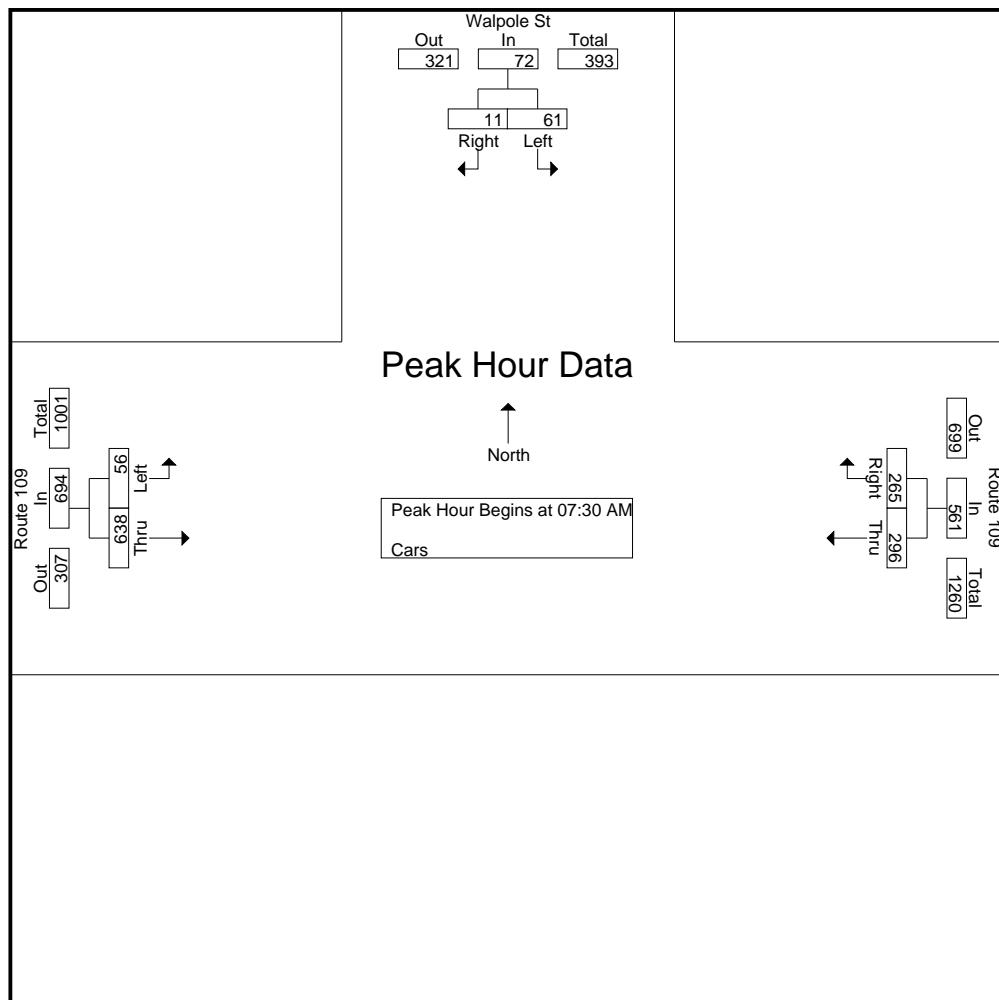
	Walpole St From North		Route 109 From East		Route 109 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM	7	1	51	64	11	135	269
07:15 AM	10	2	61	56	12	141	282
07:30 AM	17	1	71	72	19	187	367
07:45 AM	12	4	56	63	15	170	320
Total	46	8	239	255	57	633	1238
08:00 AM	18	2	87	57	12	158	334
08:15 AM	14	4	82	73	10	123	306
08:30 AM	9	1	73	36	3	136	258
08:45 AM	12	2	68	39	3	118	242
Total	53	9	310	205	28	535	1140
Grand Total	99	17	549	460	85	1168	2378
Apprch %	85.3	14.7	54.4	45.6	6.8	93.2	
Total %	4.2	0.7	23.1	19.3	3.6	49.1	

	Walpole St From North			Route 109 From East			Route 109 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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	17	1	18	71	72	143	19	187	206	367
07:45 AM	12	4	16	56	63	119	15	170	185	320
08:00 AM	18	2	20	87	57	144	12	158	170	334
08:15 AM	14	4	18	82	73	155	10	123	133	306
Total Volume	61	11	72	296	265	561	56	638	694	1327
% App. Total	84.7	15.3		52.8	47.2		8.1	91.9		
PHF	.847	.688	.900	.851	.908	.905	.737	.853	.842	.904

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 5



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

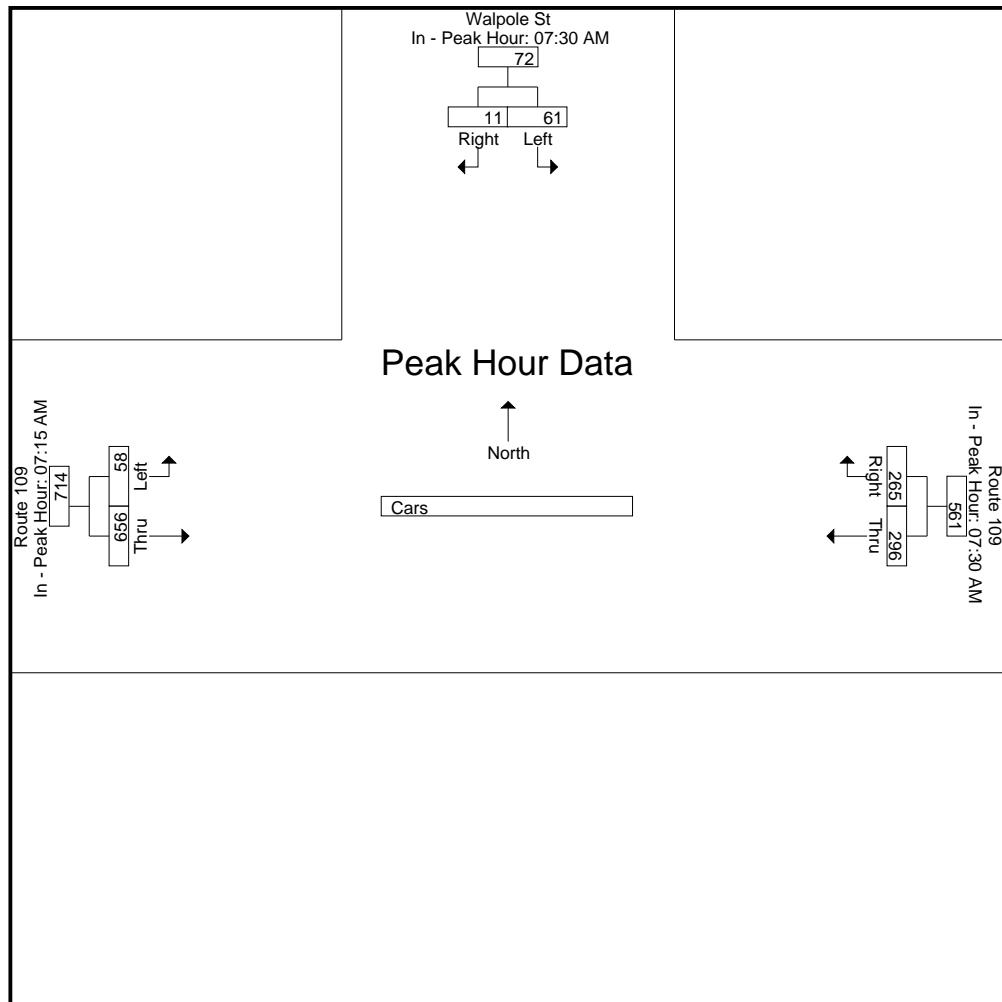
Peak Hour for Each Approach Begins at:

	07:30 AM			07:30 AM			07:15 AM		
+0 mins.	17	1	18	71	72	143	12	141	153
+15 mins.	12	4	16	56	63	119	19	187	206
+30 mins.	18	2	20	87	57	144	15	170	185
+45 mins.	14	4	18	82	73	155	12	158	170
Total Volume	61	11	72	296	265	561	58	656	714
% App. Total	84.7	15.3		52.8	47.2		8.1	91.9	
PHF	.847	.688	.900	.851	.908	.905	.763	.877	.867

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 6



Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 7

Groups Printed- Trucks

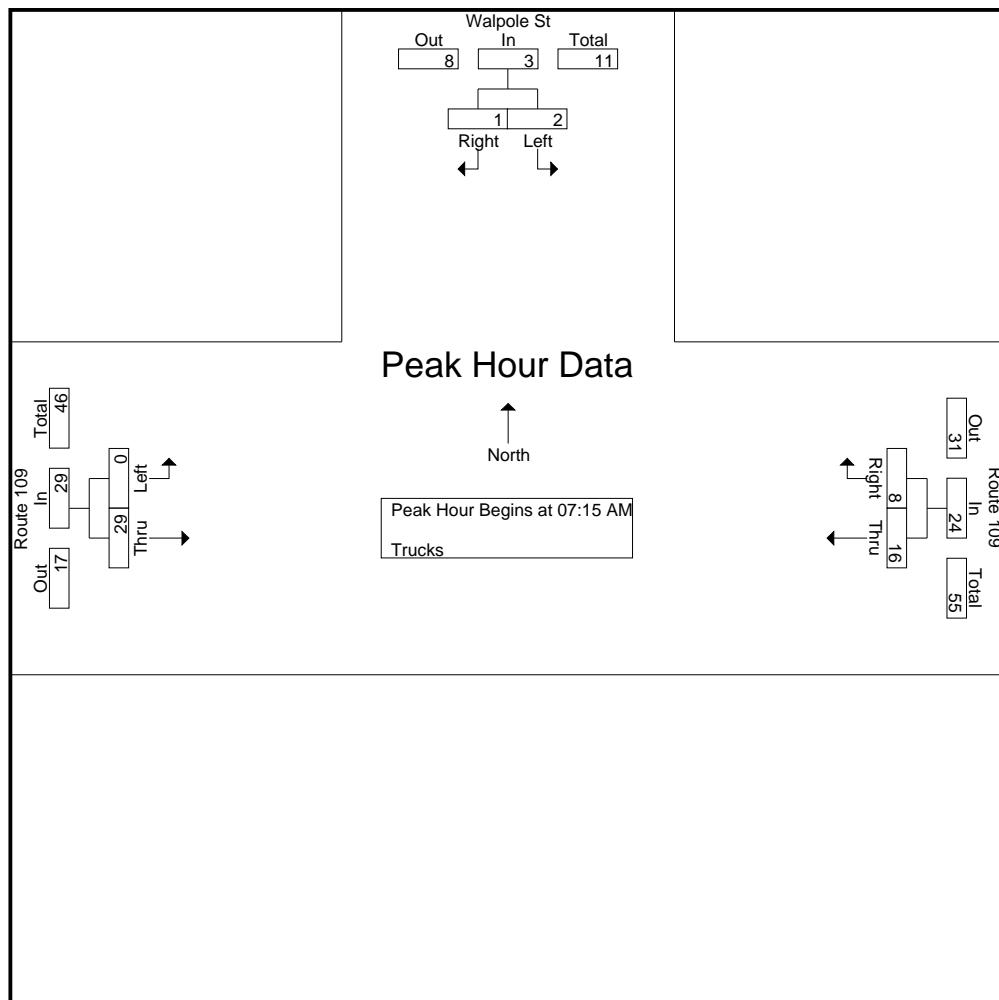
		Walpole St From North		Route 109 From East		Route 109 From West		Int. Total
Start Time		Left	Right	Thru	Right	Left	Thru	
07:00 AM		0	1	2	2	0	4	9
07:15 AM		1	0	6	2	0	10	19
07:30 AM		1	0	2	2	0	3	8
07:45 AM		0	1	5	1	0	9	16
Total		2	2	15	7	0	26	52
08:00 AM		0	0	3	3	0	7	13
08:15 AM		1	0	4	0	0	2	7
08:30 AM		0	0	4	2	0	4	10
08:45 AM		0	0	7	1	0	4	12
Total		1	0	18	6	0	17	42
Grand Total		3	2	33	13	0	43	94
Apprch %		60	40	71.7	28.3	0	100	
Total %		3.2	2.1	35.1	13.8	0	45.7	

		Walpole St From North			Route 109 From East			Route 109 From West			Int. Total	
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:15 AM												
07:15 AM		1	0	1	6	2	8	0	10	10	19	
07:30 AM		1	0	1	2	2	4	0	3	3	8	
07:45 AM		0	1	1	5	1	6	0	9	9	16	
08:00 AM		0	0	0	3	3	6	0	7	7	13	
Total Volume		2	1	3	16	8	24	0	29	29	56	
% App. Total		66.7	33.3		66.7	33.3		0	100			
PHF		.500	.250	.750	.667	.667	.750	.000	.725	.725	.737	

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 8



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

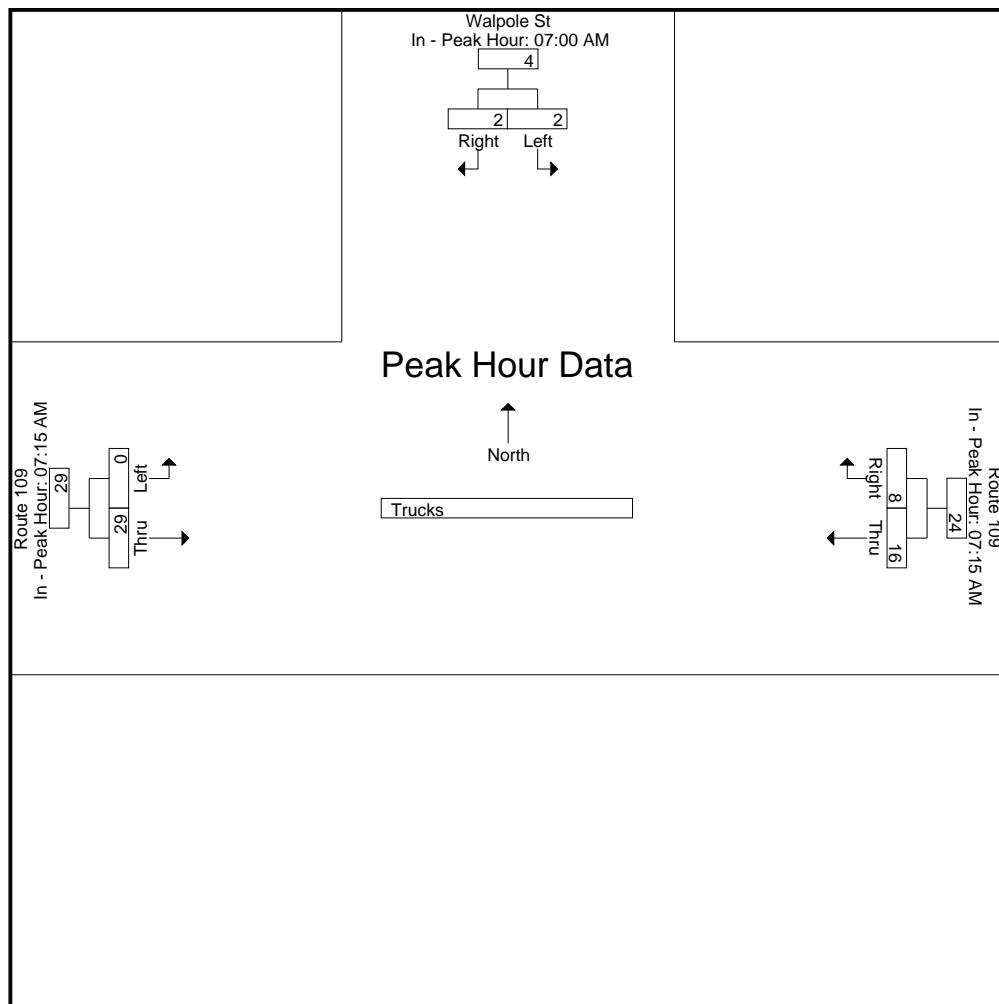
Peak Hour for Each Approach Begins at:

	07:00 AM			07:15 AM			07:15 AM		
+0 mins.	0	1	1	6	2	8	0	10	10
+15 mins.	1	0	1	2	2	4	0	3	3
+30 mins.	1	0	1	5	1	6	0	9	9
+45 mins.	0	1	1	3	3	6	0	7	7
Total Volume	2	2	4	16	8	24	0	29	29
% App. Total	50	50		66.7	33.3		0	100	
PHF	.500	.500	1.000	.667	.667	.750	.000	.725	.725

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 9



Accurate Counts

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

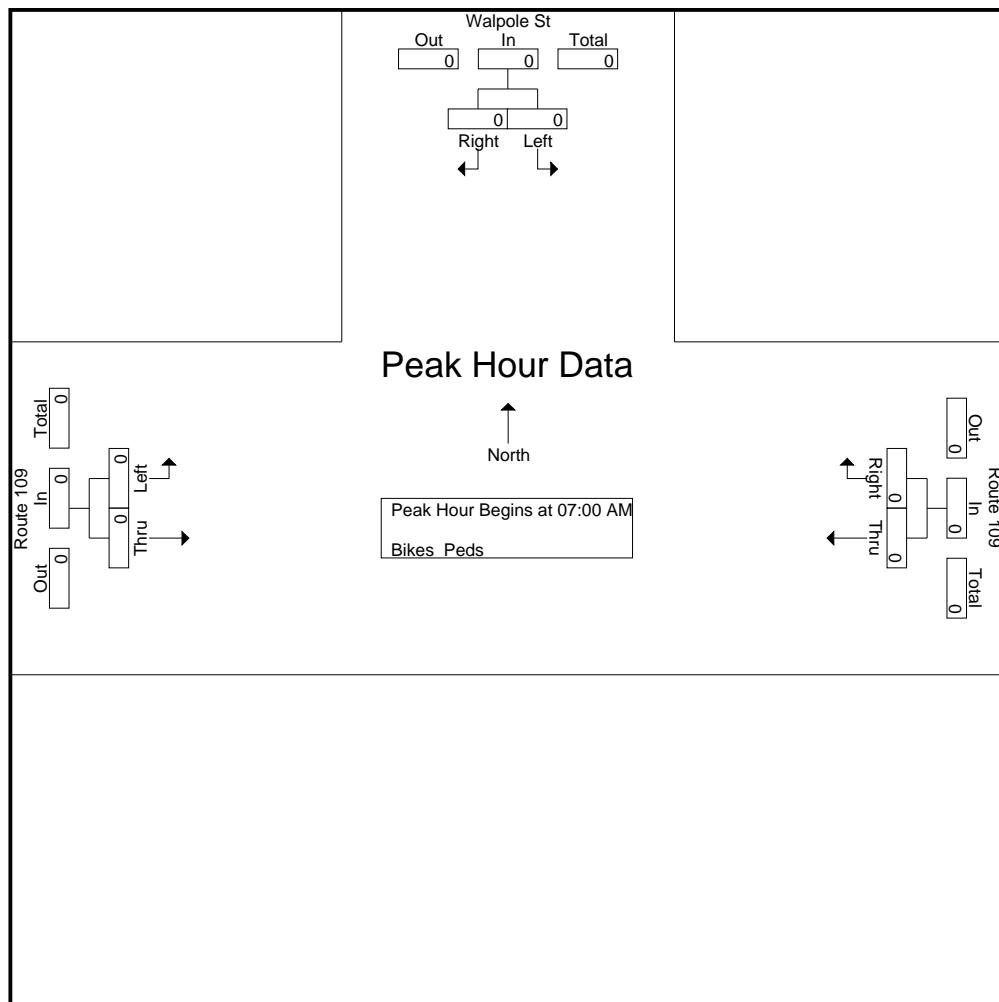
File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 10

Groups Printed- Bikes Peds

	Walpole St From North			Route 109 From East			Route 109 From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Excl. Total	Incl. Total	Int. Total
07:00 AM	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
07:30 AM	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
Total	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
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	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
Grand Total	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	0

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 11



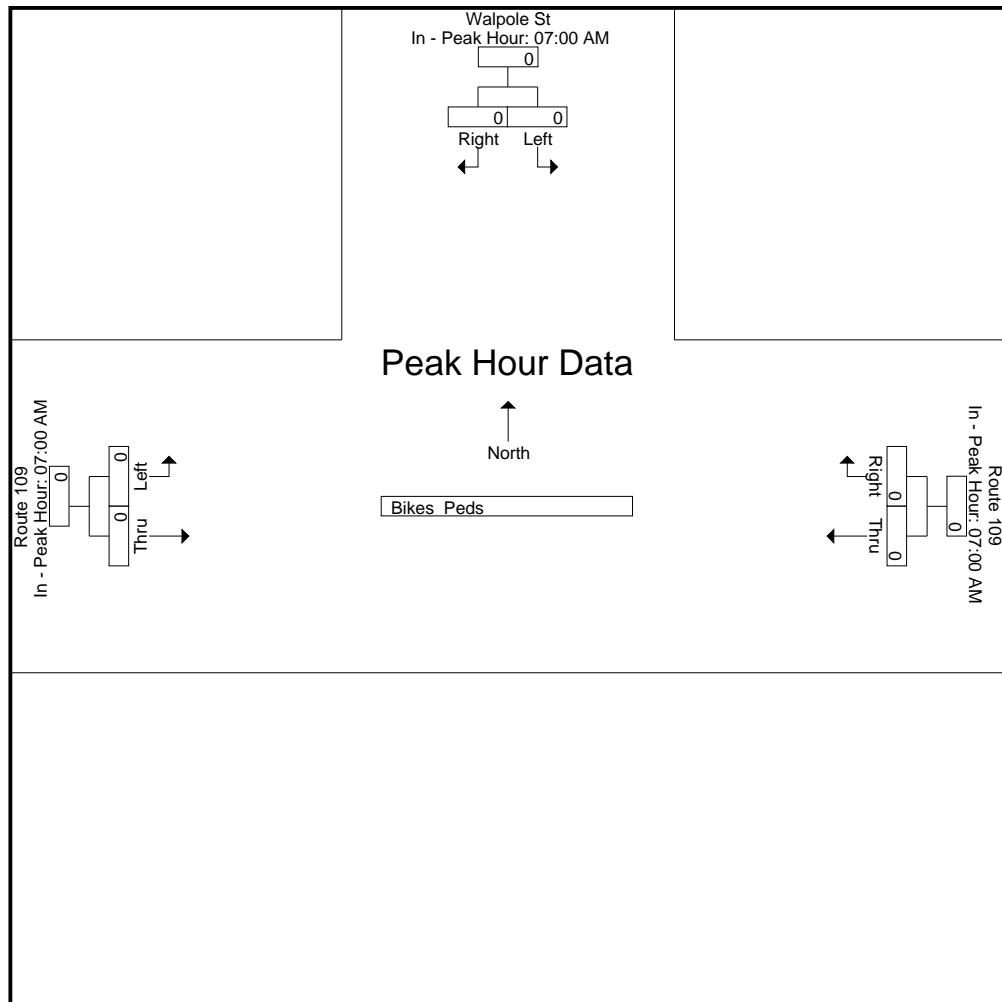
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour Analysis From 07:00 AM to 08:00 AM

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Walpole Street

E/W Street : Route 109

City/State : Dover, MA

Weather : Cloudy

File Name : 99640003

Site Code : 99640003

Start Date : 3/20/2024

Page No : 1

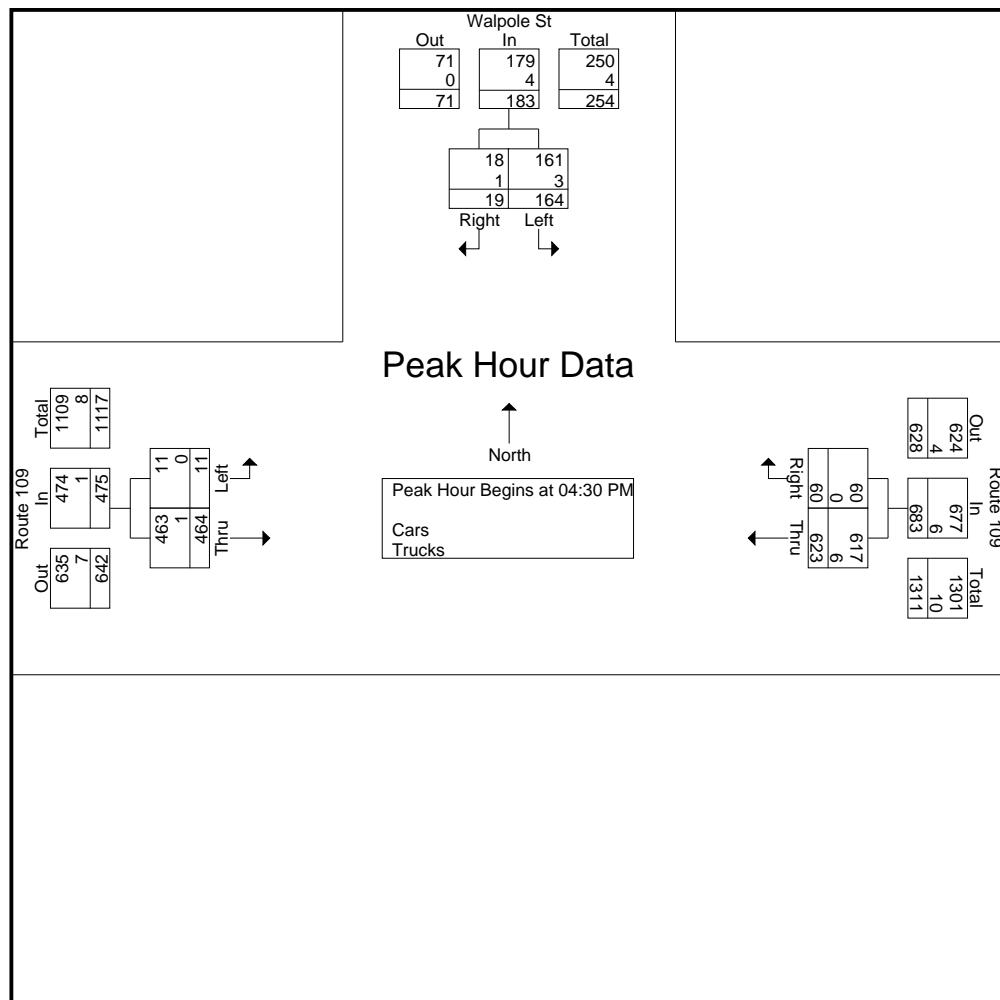
Groups Printed- Cars - Trucks

		Walpole St From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM		32	2	123	9	3	93	262
04:15 PM		41	0	120	9	4	117	291
04:30 PM		35	6	145	12	0	121	319
04:45 PM		38	4	157	19	4	111	333
Total		146	12	545	49	11	442	1205
05:00 PM		37	6	179	16	4	122	364
05:15 PM		54	3	142	13	3	110	325
05:30 PM		28	8	146	9	3	106	300
05:45 PM		26	5	117	16	0	87	251
Total		145	22	584	54	10	425	1240
Grand Total		291	34	1129	103	21	867	2445
Apprch %		89.5	10.5	91.6	8.4	2.4	97.6	
Total %		11.9	1.4	46.2	4.2	0.9	35.5	
Cars		288	33	1117	103	21	862	2424
% Cars		99	97.1	98.9	100	100	99.4	99.1
Trucks		3	1	12	0	0	5	21
% Trucks		1	2.9	1.1	0	0	0.6	0.9

		Walpole St From North			Route 109 From East			Route 109 From West			
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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		35	6	41	145	12	157	0	121	121	319
04:45 PM		38	4	42	157	19	176	4	111	115	333
05:00 PM		37	6	43	179	16	195	4	122	126	364
05:15 PM		54	3	57	142	13	155	3	110	113	325
Total Volume		164	19	183	623	60	683	11	464	475	1341
% App. Total		89.6	10.4		91.2	8.8		2.3	97.7		
PHF		.759	.792	.803	.870	.789	.876	.688	.951	.942	.921
Cars		161	18	179	617	60	677	11	463	474	1330
% Cars		98.2	94.7	97.8	99.0	100	99.1	100	99.8	99.8	99.2
Trucks		3	1	4	6	0	6	0	1	1	11
% Trucks		1.8	5.3	2.2	1.0	0	0.9	0	0.2	0.2	0.8

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

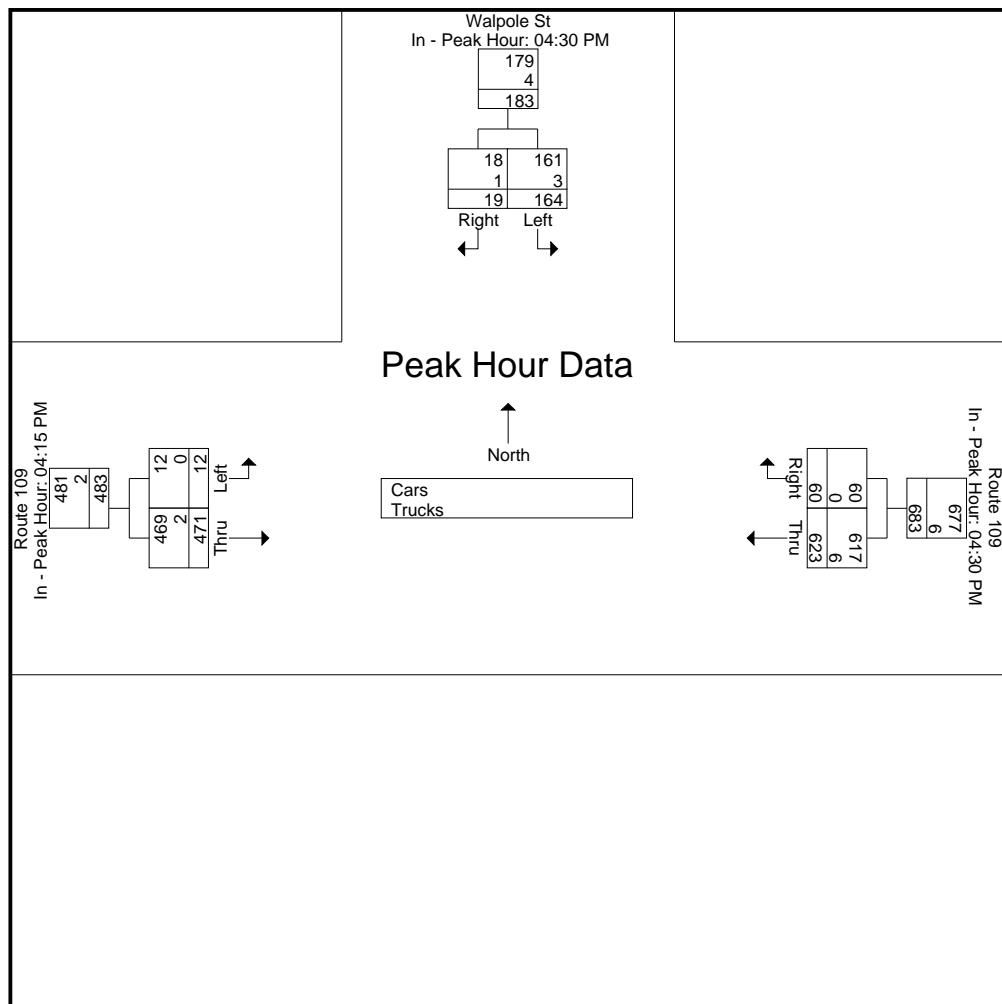
Peak Hour for Each Approach Begins at:

	04:30 PM		04:30 PM		04:30 PM		04:15 PM		04:15 PM	
+0 mins.	35	6	41		145	12	157	4	117	121
+15 mins.	38	4	42		157	19	176	0	121	121
+30 mins.	37	6	43		179	16	195	4	111	115
+45 mins.	54	3	57		142	13	155	4	122	126
Total Volume	164	19	183		623	60	683	12	471	483
% App. Total	89.6	10.4			91.2	8.8		2.5	97.5	
PHF	.759	.792	.803		.870	.789	.876	.750	.965	.958
Cars	161	18	179		617	60	677	12	469	481
% Cars	98.2	94.7	97.8		99	100	99.1	100	99.6	99.6
Trucks	3	1	4		6	0	6	0	2	2
% Trucks	1.8	5.3	2.2		1	0	0.9	0	0.4	0.4

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 4

Groups Printed- Cars

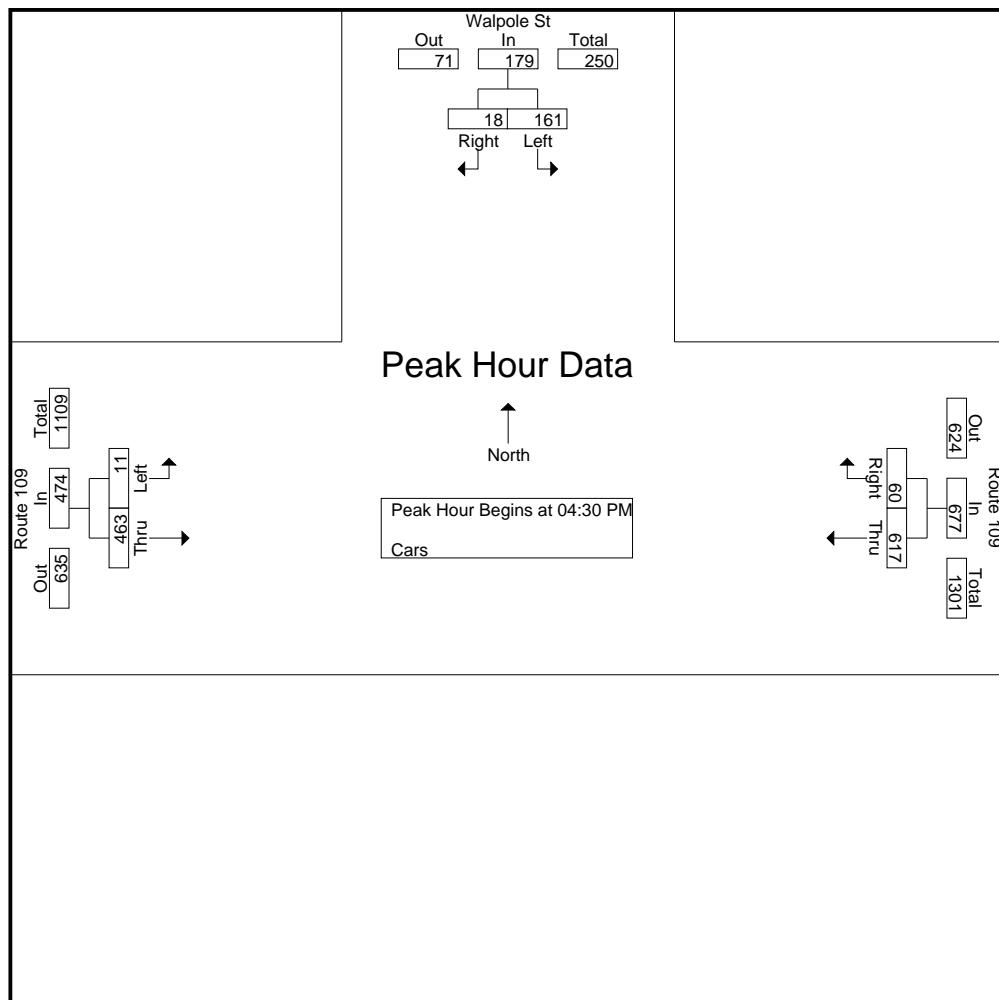
		Walpole St From North		Route 109 From East		Route 109 From West		
Start Time		Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM		32	2	120	9	3	93	259
04:15 PM		41	0	118	9	4	116	288
04:30 PM		33	5	144	12	0	121	315
04:45 PM		37	4	155	19	4	110	329
Total		143	11	537	49	11	440	1191
05:00 PM		37	6	178	16	4	122	363
05:15 PM		54	3	140	13	3	110	323
05:30 PM		28	8	145	9	3	106	299
05:45 PM		26	5	117	16	0	84	248
Total		145	22	580	54	10	422	1233
Grand Total		288	33	1117	103	21	862	2424
Apprch %		89.7	10.3	91.6	8.4	2.4	97.6	
Total %		11.9	1.4	46.1	4.2	0.9	35.6	

		Walpole St From North			Route 109 From East			Route 109 From West			
Start Time		Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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		33	5	38	144	12	156	0	121	121	315
04:45 PM		37	4	41	155	19	174	4	110	114	329
05:00 PM		37	6	43	178	16	194	4	122	126	363
05:15 PM		54	3	57	140	13	153	3	110	113	323
Total Volume		161	18	179	617	60	677	11	463	474	1330
% App. Total		89.9	10.1		91.1	8.9		2.3	97.7		
PHF		.745	.750	.785	.867	.789	.872	.688	.949	.940	.916

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 5



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

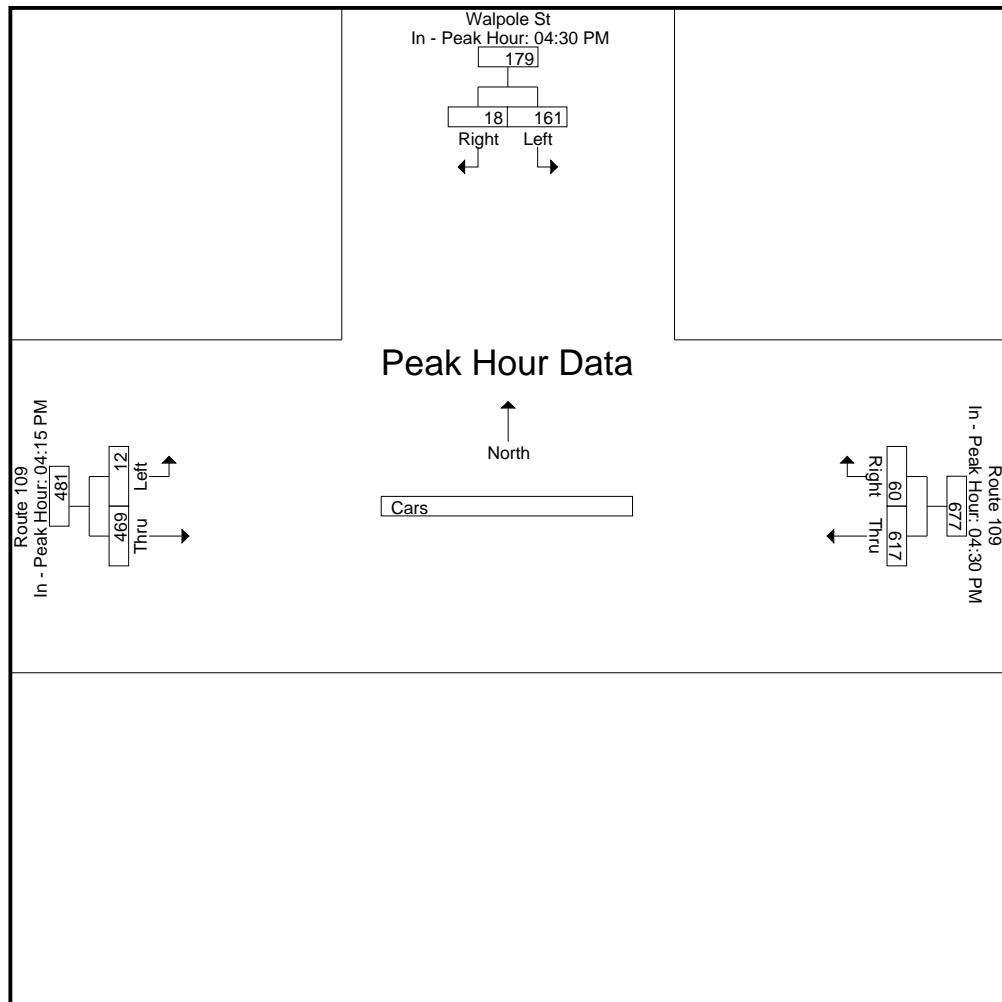
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:15 PM		
+0 mins.	33	5	38	144	12	156	4	116	120
+15 mins.	37	4	41	155	19	174	0	121	121
+30 mins.	37	6	43	178	16	194	4	110	114
+45 mins.	54	3	57	140	13	153	4	122	126
Total Volume	161	18	179	617	60	677	12	469	481
% App. Total	89.9	10.1		91.1	8.9		2.5	97.5	
PHF	.745	.750	.785	.867	.789	.872	.750	.961	.954

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 6



Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 7

Groups Printed- Trucks

		Walpole St From North		Route 109 From East		Route 109 From West		Int. Total
Start Time		Left	Right	Thru	Right	Left	Thru	
04:00 PM		0	0	3	0	0	0	3
04:15 PM		0	0	2	0	0	1	3
04:30 PM		2	1	1	0	0	0	4
04:45 PM		1	0	2	0	0	1	4
Total		3	1	8	0	0	2	14
05:00 PM		0	0	1	0	0	0	1
05:15 PM		0	0	2	0	0	0	2
05:30 PM		0	0	1	0	0	0	1
05:45 PM		0	0	0	0	0	3	3
Total		0	0	4	0	0	3	7
Grand Total		3	1	12	0	0	5	21
Apprch %		75	25	100	0	0	100	
Total %		14.3	4.8	57.1	0	0	23.8	

**Walpole St
From North**

Walpole St From North			Route 109 From East			Route 109 From West				
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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	3	0	3	0	0	0	3
04:15 PM	0	0	0	2	0	2	0	1	1	3
04:30 PM	2	1	3	1	0	1	0	0	0	4
04:45 PM	1	0	1	2	0	2	0	1	1	4
Total Volume	3	1	4	8	0	8	0	2	2	14
% App. Total	75	25		100	0		0	100		
PHF	.375	.250	.333	.667	.000	.667	.000	.500	.500	.875

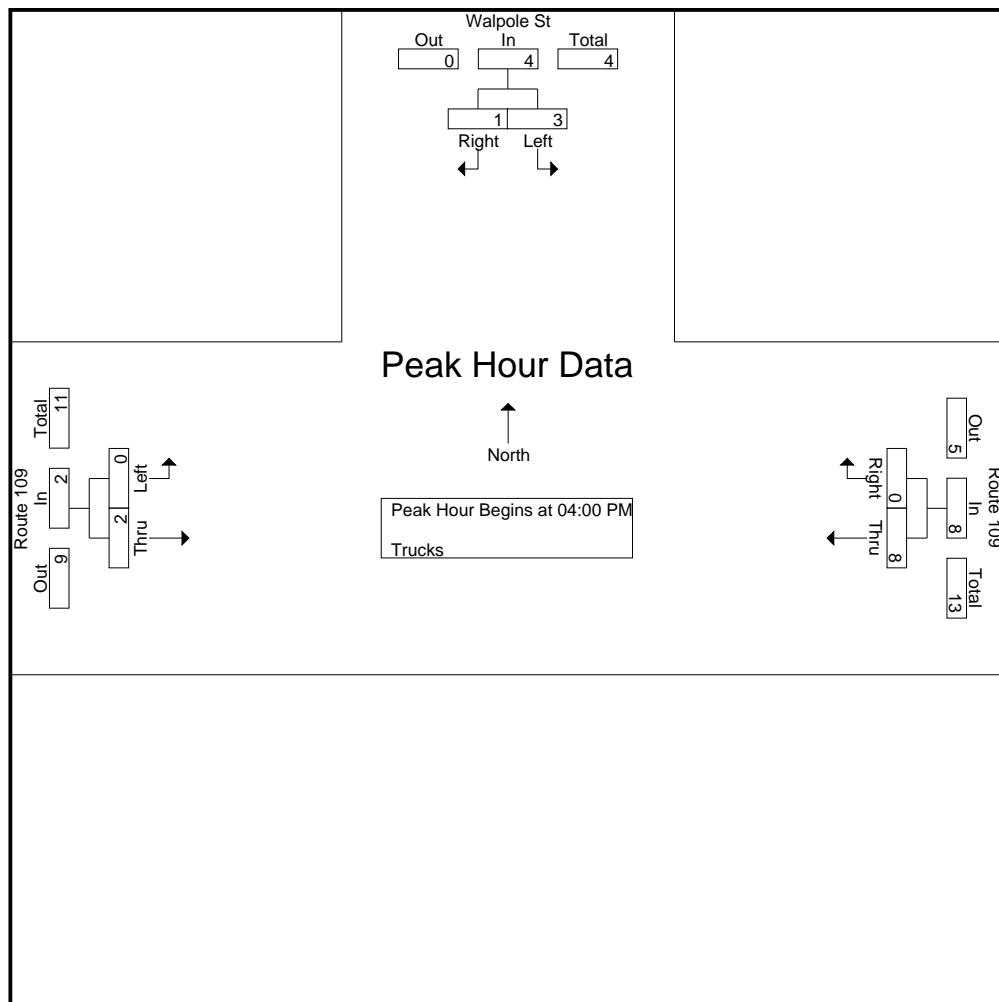
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 8



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

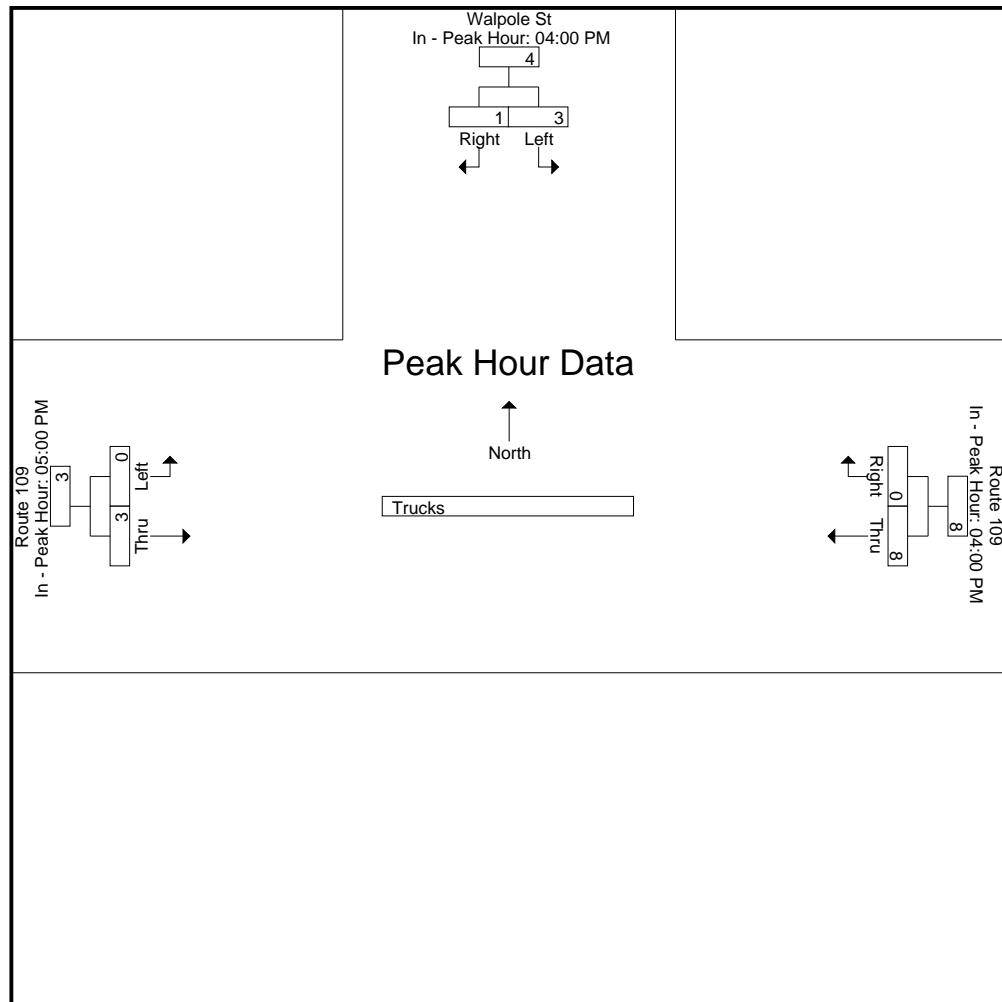
Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			05:00 PM		
+0 mins.	0	0	0	3	0	3	0	0	0
+15 mins.	0	0	0	2	0	2	0	0	0
+30 mins.	2	1	3	1	0	1	0	0	0
+45 mins.	1	0	1	2	0	2	0	3	3
Total Volume	3	1	4	8	0	8	0	3	3
% App. Total	75	25		100	0		0	100	
PHF	.375	.250	.333	.667	.000	.667	.000	.250	.250

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 9



Accurate Counts

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

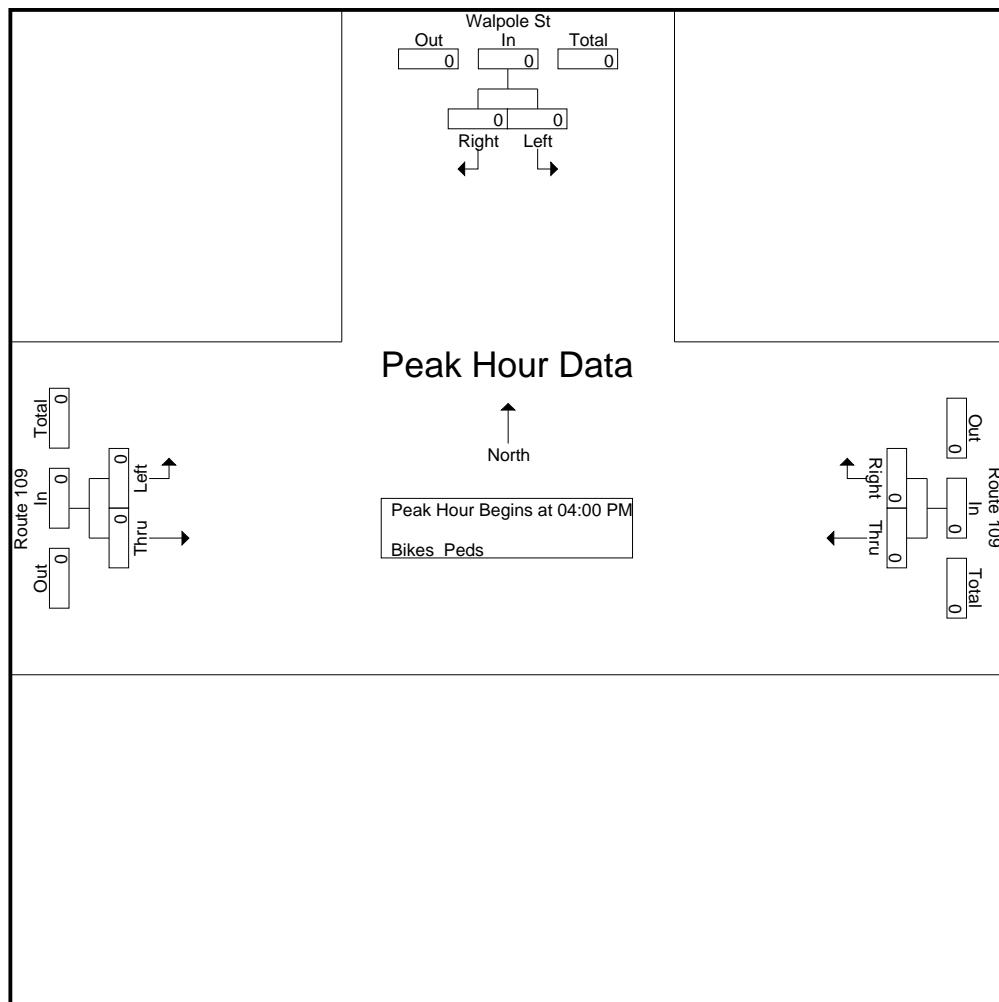
File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 10

Groups Printed- Bikes Peds

	Walpole St From North			Route 109 From East			Route 109 From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Excl. Total	Incl. Total	Int. Total
04:00 PM	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
04:30 PM	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
Total	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
05:15 PM	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
05:45 PM	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
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0				
Total %										0	0	

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 11



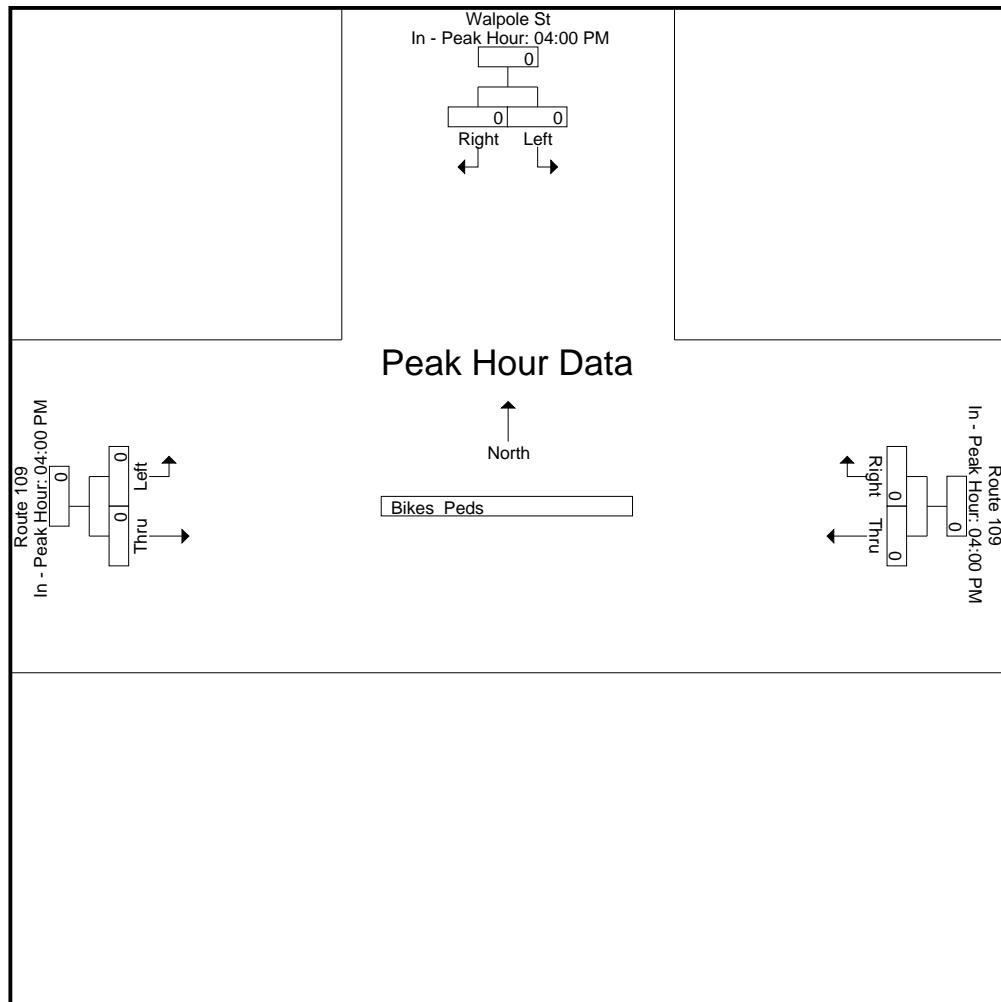
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour Analysis From 04:00 PM to 05:00 PM

Accurate Counts
978-664-2565

N/S Street : Walpole Street
E/W Street : Route 109
City/State : Dover, MA
Weather : Cloudy

File Name : 99640003
Site Code : 99640003
Start Date : 3/20/2024
Page No : 12



SEASONAL ADJUSTMENT DATA

Massachusetts Highway Department
 Statewide Traffic Data Collection
 2019 Weekday Seasonal Factors

Factor Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Axle Factor
R1	1.22	1.14	1.12	1.06	1.00	0.96	0.87	0.85	0.96	0.99	1.04	1.12	0.85
R2	0.95	0.96	0.98	0.97	0.97	0.93	0.97	0.94	0.96	0.90	0.92	0.93	0.96
R3	1.15	1.06	1.07	1.00	0.89	0.88	0.89	0.89	0.95	0.92	1.02	1.01	0.97
R4-R7	1.09	1.09	1.11	1.02	0.96	0.92	0.89	0.89	0.99	0.98	1.09	1.13	0.98
U1-Boston	1.03	1.01	0.98	0.94	0.94	0.92	0.95	0.93	0.94	0.94	0.97	1.04	0.96
U1-Essex	1.09	1.06	1.03	0.99	0.94	0.90	0.88	0.86	0.93	0.94	0.99	1.06	0.93
U1-Southeast	1.06	1.05	1.01	0.97	0.95	0.93	0.93	0.90	0.94	0.94	0.98	1.04	0.98
U1-West	1.19	1.14	1.09	0.95	0.92	0.89	0.89	0.86	0.91	0.95	0.97	1.07	0.84
U1-Worcester	1.02	1.04	0.97	0.94	0.93	0.91	0.95	0.91	0.93	0.92	0.95	1.10	0.88
U2	1.01	1.00	0.94	0.93	0.91	0.89	0.93	0.90	0.90	0.91	0.94	1.02	0.99
U3	1.06	1.03	0.98	0.94	0.93	0.91	0.95	0.91	0.92	0.93	0.97	1.00	0.98
U4-U7	1.01	1.00	0.95	0.92	0.88	0.86	0.92	0.91	0.92	0.94	0.99	1.04	0.99
Rec - East	1.04	1.16	1.12	0.98	0.92	0.88	0.77	0.81	0.94	1.02	1.08	1.12	0.99
Rec - West	1.30	1.23	1.32	1.18	0.95	0.82	0.70	0.69	0.97	0.96	1.16	1.15	0.98

Round off:

0-999 = 10

>1000 = 100

U = Urban

R = Rural

1 - Interstate

2 - Freeway and Expressway

3 - Other Principal Arterial

4 - Minor Arterial

5 - Major Collector

6 - Minor Collector

7 - Local Road and Street

Recreational - East Group - Cape Cod (all towns) including the town of Plymouth south of Route 3A (stations

7014,7079,7080,7090,7091,7092,7093,7094,7095,7096,7097,7108 and 7178), Martha's Vineyard and Nantucket.

Recreational - West Group - Continuous Stations 2 and 189 including stations

1066,1067,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1113,1114,1116,2196,2197 and 2198.

VEHICLE TRAVEL SPEED DATA

Accurate Counts
978-664-2565

Location : County Street (Route 109)
Location : East of Tisdale Drive
City/State: Dover, MA
Direction: EB,

Site Code: 99640001

3/20/2024	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
Time														
12:00 AM	0	1	0	3	2	1	0	0	0	0	0	0	0	7
1:00	0	0	1	2	4	1	0	0	0	0	0	0	0	8
2:00	0	0	2	0	1	0	0	0	0	0	0	0	0	3
3:00	0	1	0	8	5	1	0	0	0	0	0	0	0	15
4:00	0	0	4	35	26	8	2	0	1	0	0	0	0	76
5:00	0	3	12	133	120	14	0	0	0	0	0	0	0	282
6:00	2	6	52	255	113	17	6	3	0	0	0	0	0	454
7:00	7	47	175	314	84	18	3	0	0	0	0	0	0	648
8:00	2	22	105	276	94	9	4	0	2	0	0	0	0	514
9:00	5	8	61	223	45	17	6	2	0	0	0	0	0	367
10:00	0	11	74	193	54	11	3	1	0	0	0	0	0	347
11:00	0	11	81	172	51	19	6	0	0	0	0	0	0	340
12:00 PM	2	14	74	182	58	12	6	2	0	0	0	0	0	350
1:00	2	6	70	170	53	10	1	2	0	0	0	0	0	314
2:00	1	3	67	172	46	16	2	0	0	0	0	0	0	307
3:00	0	17	92	169	44	16	0	1	0	0	0	0	0	339
4:00	3	11	80	223	60	6	3	0	0	0	0	0	0	386
5:00	2	7	69	214	73	7	0	0	0	0	0	0	0	372
6:00	0	5	56	153	51	0	1	0	0	0	0	0	0	266
7:00	0	4	62	96	28	3	0	0	0	0	0	0	0	193
8:00	1	5	60	82	18	2	0	0	0	0	0	0	0	168
9:00	0	5	21	55	24	1	0	0	0	0	0	0	0	106
10:00	0	2	9	25	17	2	0	0	0	0	0	0	0	55
11:00	0	0	4	14	4	2	0	0	0	0	0	0	0	24
Total	27	189	1231	3169	1075	193	43	11	3	0	0	0	0	5941
Percentile Speed			15th	50th	85th	95th								
Mean Speed (Average)			27.9											
10 MPH Pace Speed			21-30											
Number in Pace			4400											
Percent in Pace			74.0%											
Number > 30 MPH			1325											
Percent > 30 MPH			22.3%											

Accurate Counts
978-664-2565

Location : County Street (Route 109)
Location : East of Tisdale Drive
City/State: Dover, MA
Direction: EB,

Site Code: 99640001

3/21/2024 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	6	0	0	0	1	0	0	0	0	0	7
1:00	0	1	2	4	3	0	0	0	0	0	0	0	0	10
2:00	1	0	0	2	2	0	0	0	0	0	0	0	0	5
3:00	0	0	1	5	18	0	0	0	0	0	0	0	0	24
4:00	0	1	2	24	28	5	1	0	0	0	0	0	0	61
5:00	0	1	14	95	106	12	2	1	0	0	0	0	0	231
6:00	0	2	56	271	99	15	8	0	0	0	0	0	0	451
7:00	7	27	192	332	98	17	2	0	0	0	0	0	0	675
8:00	2	7	108	294	69	16	1	1	0	0	0	0	0	498
9:00	13	14	81	205	65	6	6	0	0	0	0	0	0	390
10:00	8	15	120	183	37	8	1	1	0	0	0	0	0	373
11:00	4	14	90	204	44	10	3	0	0	0	0	0	0	369
12:00 PM	3	11	74	176	51	9	5	0	1	0	0	0	0	330
1:00	1	20	79	181	56	8	2	0	0	0	0	0	0	347
2:00	3	16	67	180	61	9	0	0	0	0	0	0	0	336
3:00	1	7	87	212	71	8	2	0	0	0	0	0	0	388
4:00	1	6	72	243	68	6	2	0	0	0	0	0	0	398
5:00	1	5	52	228	71	5	4	0	0	0	0	0	0	366
6:00	2	2	46	189	62	2	2	0	0	0	0	0	0	305
7:00	2	2	42	136	38	7	2	0	0	0	0	0	0	229
8:00	2	6	23	102	36	1	0	0	0	0	0	0	0	170
9:00	0	0	28	37	20	1	0	0	0	0	0	0	0	86
10:00	0	3	9	37	15	1	0	0	0	0	0	0	0	65
11:00	0	1	3	16	5	1	0	0	0	0	0	0	0	26
Total	51	161	1248	3362	1123	147	43	4	1	0	0	0	0	6140

Percentile Speed
15th 23
50th 26
85th 30
95th 33

Mean Speed (Average) 27.9
10 MPH Pace Speed 21-30
Number in Pace 4545
Percent in Pace 75.0%

Number > 30 MPH 1318
Percent > 30 MPH 21.5%

Grand Total	78	350	2479	6531	2198	340	86	15	4	0	0	0	0	12081
Percentile Speed	15th 23	50th 26	85th 30	95th 33										
Mean Speed (Average)	27.9													
10 MPH Pace Speed	21-30													
Number in Pace	8991													
Percent in Pace	75.0%													
Number > 30 MPH	2643													
Percent > 30 MPH	21.9%													

Accurate Counts
978-664-2565

Location : County Street (Route 109)
Location : East of Tisdale Drive
City/State: Dover, MA
Direction: WB,

Site Code: 99640001

3/20/2024	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
Time														
12:00 AM	0	0	0	4	19	7	7	3	0	0	0	0	0	40
1:00	0	0	0	3	4	6	0	0	0	0	0	0	0	13
2:00	0	0	0	1	2	4	0	1	0	0	0	0	0	8
3:00	0	2	1	3	2	2	2	0	0	0	0	0	0	12
4:00	0	0	0	3	3	9	2	0	1	0	0	0	0	18
5:00	0	1	3	6	16	8	5	3	0	0	0	0	0	42
6:00	1	3	3	27	53	35	10	8	1	0	0	0	0	141
7:00	2	6	15	53	90	69	15	4	1	0	0	0	0	255
8:00	0	12	27	71	128	58	13	4	2	0	0	0	0	315
9:00	1	6	12	73	95	53	16	2	1	1	0	0	0	260
10:00	1	5	32	69	107	55	13	4	1	1	0	0	0	288
11:00	1	6	14	93	127	57	20	6	1	0	0	0	0	325
12:00 PM	4	9	20	62	155	88	18	1	0	0	0	0	0	357
1:00	2	3	23	88	99	72	23	3	0	0	0	0	0	313
2:00	1	6	33	114	153	86	23	3	1	0	0	0	0	420
3:00	1	8	24	103	205	96	30	5	1	0	0	0	0	473
4:00	0	7	27	113	254	106	31	11	0	0	0	0	1	550
5:00	3	10	37	105	227	135	42	7	1	0	0	0	0	567
6:00	1	2	25	99	168	92	19	1	0	0	0	0	0	407
7:00	0	3	36	136	87	35	9	0	0	0	0	0	0	306
8:00	1	5	25	116	86	43	9	1	0	0	0	0	0	286
9:00	1	2	19	48	56	28	9	1	0	0	0	0	0	164
10:00	0	2	4	20	51	17	12	1	1	0	0	0	0	108
11:00	0	0	1	15	31	19	3	0	1	0	0	0	0	70
Total	20	98	381	1425	2218	1180	331	69	13	2	0	0	1	5738
	Percentile Speed			15th	50th	85th	95th							
	Mean Speed (Average)			32.6										
	10 MPH Pace Speed			26-35										
	Number in Pace			3643										
	Percent in Pace			63.0%										
	Number > 30 MPH			3814										
	Percent > 30 MPH			66.5%										

Accurate Counts
978-664-2565

Location : County Street (Route 109)
Location : East of Tisdale Drive
City/State: Dover, MA
Direction: WB,

Site Code: 99640001

3/21/2024	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
Time														
12:00 AM	0	0	0	4	20	13	2	0	0	0	0	0	0	39
1:00	0	0	0	1	10	4	2	1	0	0	0	0	0	18
2:00	0	0	1	2	1	0	0	0	1	0	0	0	0	5
3:00	0	1	0	2	5	0	2	0	0	0	0	0	0	10
4:00	1	0	1	4	5	6	4	3	0	0	0	0	0	24
5:00	0	1	1	8	20	15	1	1	0	0	0	0	0	47
6:00	1	4	9	27	52	31	12	2	0	0	0	0	0	138
7:00	2	6	13	64	75	68	16	6	0	0	0	0	0	250
8:00	2	7	19	64	125	56	24	3	2	0	0	0	0	302
9:00	4	8	28	80	86	41	7	1	2	0	0	0	0	257
10:00	1	8	26	69	94	55	12	1	1	0	0	0	0	267
11:00	4	6	23	96	131	55	16	3	0	0	0	0	0	334
12:00 PM	2	10	40	123	123	83	14	2	0	0	0	0	0	397
1:00	2	4	18	83	121	84	10	8	1	0	0	0	0	331
2:00	3	5	23	91	151	101	27	6	2	0	0	0	0	409
3:00	2	11	38	92	171	123	21	0	1	0	0	0	0	459
4:00	2	2	28	120	203	96	30	2	1	1	0	0	0	485
5:00	1	4	17	137	230	133	33	6	0	0	0	0	0	561
6:00	1	5	11	98	186	130	25	4	1	0	0	0	0	461
7:00	3	7	16	64	129	65	15	3	0	1	0	0	0	303
8:00	1	2	15	59	98	63	16	5	0	0	0	0	0	259
9:00	0	3	10	40	75	37	12	2	0	0	0	0	0	179
10:00	0	1	4	26	45	42	11	1	0	0	0	0	0	130
11:00	0	0	4	19	31	24	5	3	1	0	0	0	0	87
Total	32	95	345	1373	2187	1325	317	63	13	2	0	0	0	5752
	Percentile Speed			15th	50th	85th	95th							
	Mean Speed (Average)			32.8										
	10 MPH Pace Speed			27-36										
	Number in Pace			3442										
	Percent in Pace			62.0%										
	Number > 30 MPH			3907										
	Percent > 30 MPH			67.9%										
Grand Total	52	193	726	2798	4405	2505	648	132	26	4	0	0	1	11490
	Percentile Speed			15th	50th	85th	95th							
	Mean Speed (Average)			32.7										
	10 MPH Pace Speed			26-35										
	Number in Pace			7153										
	Percent in Pace			63.0%										
	Number > 30 MPH			7721										
	Percent > 30 MPH			67.2%										

Accurate Counts
978-664-2565

Location : County Street (Route 109)
Location : East of Tisdale Drive
City/State: Dover, MA
Direction: Combined

Site Code: 99640001

3/20/2024	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	1	0	7	21	8	7	3	0	0	0	0	0	47
1:00	0	0	1	5	8	7	0	0	0	0	0	0	0	21
2:00	0	0	2	1	3	4	0	1	0	0	0	0	0	11
3:00	0	3	1	11	7	3	2	0	0	0	0	0	0	27
4:00	0	0	4	38	29	17	4	0	2	0	0	0	0	94
5:00	0	4	15	139	136	22	5	3	0	0	0	0	0	324
6:00	3	9	55	282	166	52	16	11	1	0	0	0	0	595
7:00	9	53	190	367	174	87	18	4	1	0	0	0	0	903
8:00	2	34	132	347	222	67	17	4	4	0	0	0	0	829
9:00	6	14	73	296	140	70	22	4	1	1	0	0	0	627
10:00	1	16	106	262	161	66	16	5	1	1	0	0	0	635
11:00	1	17	95	265	178	76	26	6	1	0	0	0	0	665
12:00 PM	6	23	94	244	213	100	24	3	0	0	0	0	0	707
1:00	4	9	93	258	152	82	24	5	0	0	0	0	0	627
2:00	2	9	100	286	199	102	25	3	1	0	0	0	0	727
3:00	1	25	116	272	249	112	30	6	1	0	0	0	0	812
4:00	3	18	107	336	314	112	34	11	0	0	0	0	1	936
5:00	5	17	106	319	300	142	42	7	1	0	0	0	0	939
6:00	1	7	81	252	219	92	20	1	0	0	0	0	0	673
7:00	0	7	98	232	115	38	9	0	0	0	0	0	0	499
8:00	2	10	85	198	104	45	9	1	0	0	0	0	0	454
9:00	1	7	40	103	80	29	9	1	0	0	0	0	0	270
10:00	0	4	13	45	68	19	12	1	1	0	0	0	0	163
11:00	0	0	5	29	35	21	3	0	1	0	0	0	0	94
Total	47	287	1612	4594	3293	1373	374	80	16	2	0	0	1	11679
Percentile Speed			15th	50th	85th	95th								
Mean Speed (Average)			30.2											
10 MPH Pace Speed			26-35											
Number in Pace			7887											
Percent in Pace			68.0%											
Number > 30 MPH			5139											
Percent > 30 MPH			44.0%											

Accurate Counts
978-664-2565

Location : County Street (Route 109)
Location : East of Tisdale Drive
City/State: Dover, MA
Direction: Combined

Site Code: 99640001

3/21/2024	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	10	20	13	2	1	0	0	0	0	0	46
1:00	0	1	2	5	13	4	2	1	0	0	0	0	0	28
2:00	1	0	1	4	3	0	0	0	1	0	0	0	0	10
3:00	0	1	1	7	23	0	2	0	0	0	0	0	0	34
4:00	1	1	3	28	33	11	5	3	0	0	0	0	0	85
5:00	0	2	15	103	126	27	3	2	0	0	0	0	0	278
6:00	1	6	65	298	151	46	20	2	0	0	0	0	0	589
7:00	9	33	205	396	173	85	18	6	0	0	0	0	0	925
8:00	4	14	127	358	194	72	25	4	2	0	0	0	0	800
9:00	17	22	109	285	151	47	13	1	2	0	0	0	0	647
10:00	9	23	146	252	131	63	13	2	1	0	0	0	0	640
11:00	8	20	113	300	175	65	19	3	0	0	0	0	0	703
12:00 PM	5	21	114	299	174	92	19	2	1	0	0	0	0	727
1:00	3	24	97	264	177	92	12	8	1	0	0	0	0	678
2:00	6	21	90	271	212	110	27	6	2	0	0	0	0	745
3:00	3	18	125	304	242	131	23	0	1	0	0	0	0	847
4:00	3	8	100	363	271	102	32	2	1	1	0	0	0	883
5:00	2	9	69	365	301	138	37	6	0	0	0	0	0	927
6:00	3	7	57	287	248	132	27	4	1	0	0	0	0	766
7:00	5	9	58	200	167	72	17	3	0	1	0	0	0	532
8:00	3	8	38	161	134	64	16	5	0	0	0	0	0	429
9:00	0	3	38	77	95	38	12	2	0	0	0	0	0	265
10:00	0	4	13	63	60	43	11	1	0	0	0	0	0	195
11:00	0	1	7	35	36	25	5	3	1	0	0	0	0	113
Total	83	256	1593	4735	3310	1472	360	67	14	2	0	0	0	11892
	Percentile Speed		15th	50th	85th	95th								
	Mean Speed (Average)		30.2											
	10 MPH Pace Speed		26-35											
	Number in Pace		7851											
	Percent in Pace		68.0%											
	Number > 30 MPH		5225											
	Percent > 30 MPH		43.9%											
Grand Total	130	543	3205	9329	6603	2845	734	147	30	4	0	0	1	23571
	Percentile Speed		15th	50th	85th	95th								
	Mean Speed (Average)		30.2											
	10 MPH Pace Speed		26-35											
	Number in Pace		15861											
	Percent in Pace		68.0%											
	Number > 30 MPH		10364											
	Percent > 30 MPH		44.0%											

MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAP

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Dover COUNT DATE : _____ Mar-24

DISTRICT : 6 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Route 109

MINOR STREET(S) : Draper Road

**INTERSECTION
DIAGRAM
(Label Approaches)**



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	WB	EB	SB			
PEAK HOURLY VOLUMES (AM/PM) :	635	475	19			1,129

"K" FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

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

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

Comments : Below Statewide and District Crash Rates

Project Title & Date: Tisdale Drive

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Dover COUNT DATE : _____ Mar-24

DISTRICT : 6 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Route 109

MINOR STREET(S) : Tisdale Drive

**INTERSECTION
DIAGRAM
(Label Approaches)**



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	WB	EB	SB			
PEAK HOURLY VOLUMES (AM) :	642	472	11			1,125

"K" FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

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

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

Comments : Below Statewide and District Crash Rates

Project Title & Date: Tisdale Drive

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Dover COUNT DATE : _____ Mar-24

DISTRICT : 6 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Route 109

MINOR STREET(S) : Walpole Street

**INTERSECTION
DIAGRAM
(Label Approaches)**



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	WB	EB	SB			
PEAK HOURLY VOLUMES (AM) :	683	475	183			1,341

"K" FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

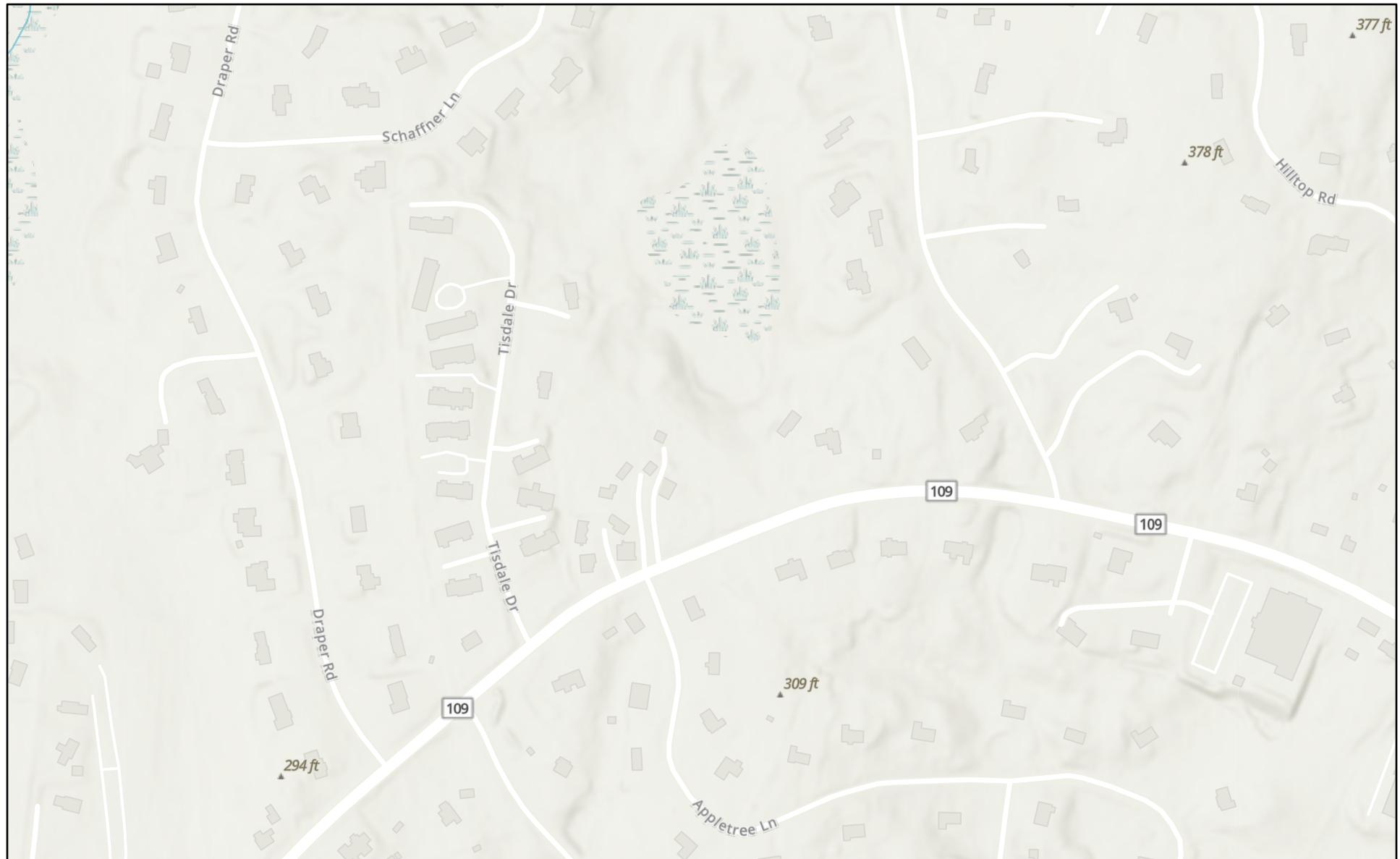
TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES PER YEAR (A) :

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

Comments : Below Statewide and District Crash Rates

Project Title & Date: Tisdale Drive

HSIP Mapping



7/9/2024

1:6,019
0 0.04 0.07 0.15 mi
0 0.05 0.1 0.2 km

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA,

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	Average Annual
Dedham	Yankee division Highway	Ramp-RT 95 NB to RT 109 EB		123,000					152,504	164,399	163,906	168,245	169,254	2.69%
Medfield	Spring Street	Main Street(Rte 109)	13,990	12,600	12,798	12,139	11,652	12,293	12,428	13,486	13,634	13,825	12,732	-0.78%
Norwood	Morse Street	South of Morse St	35,815	36,800	38,488	38,813	38,851	40,055	40,976	30,125	30,637	30,729	30,606	-1.12%
Westwood	North Street	Walpole T.L	8,300	8,250	8,476	8,114	8,151	8,404	8,018	8,515	8,660	8,821	8,786	0.62%
Medfield	Main Street	East of brook st	16,300	16,357	16,623	15,570	15,498	16,350	15,723	15,927	16,102	16,259	16,324	0.06%
Norwood	Walpole Street	Norwood T.L	11,817	11,699			10,771	11,105	11,681		13,677	13,531	12,979	3.23%
Walpole	Main Street	South of North st									20,688	20,750	20,667	-0.05%
Walpole	North Street	West of Route 1A									5,532	5,549	5,527	-0.04%
Walpole	Main Street	North of North st									18,995	19,052	18,976	-0.05%
Walpole	Main Street	North of Stop and Shop Driveway									18,855	18,912	18,836	-0.05%
Walpole	Main Street	Gould Street									20,391	20,452	20,370	-0.05%
Walpole	Main Street	North of Burrill st									15,917	15,965	15,901	-0.05%
														0.37%

BACKGROUND DEVELOPMENT NETWORKS

DOVER

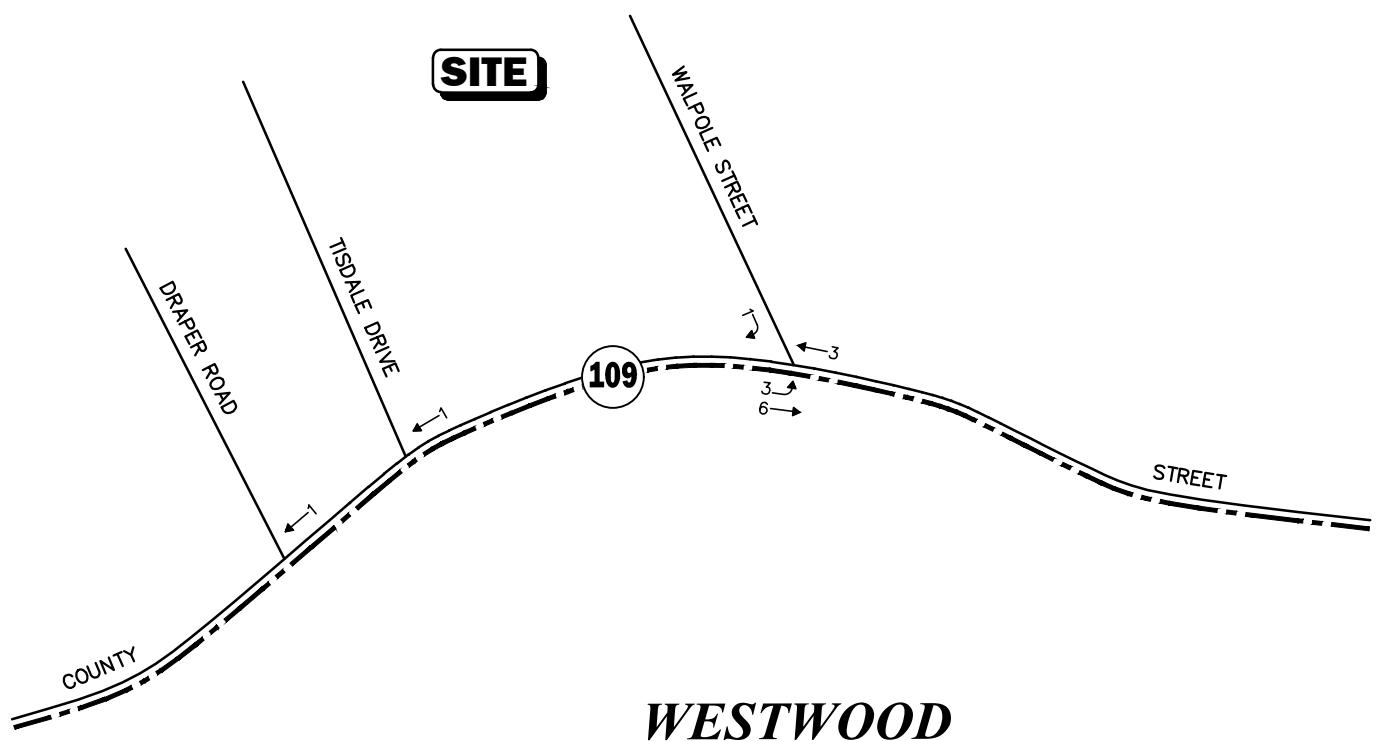


Figure A-1



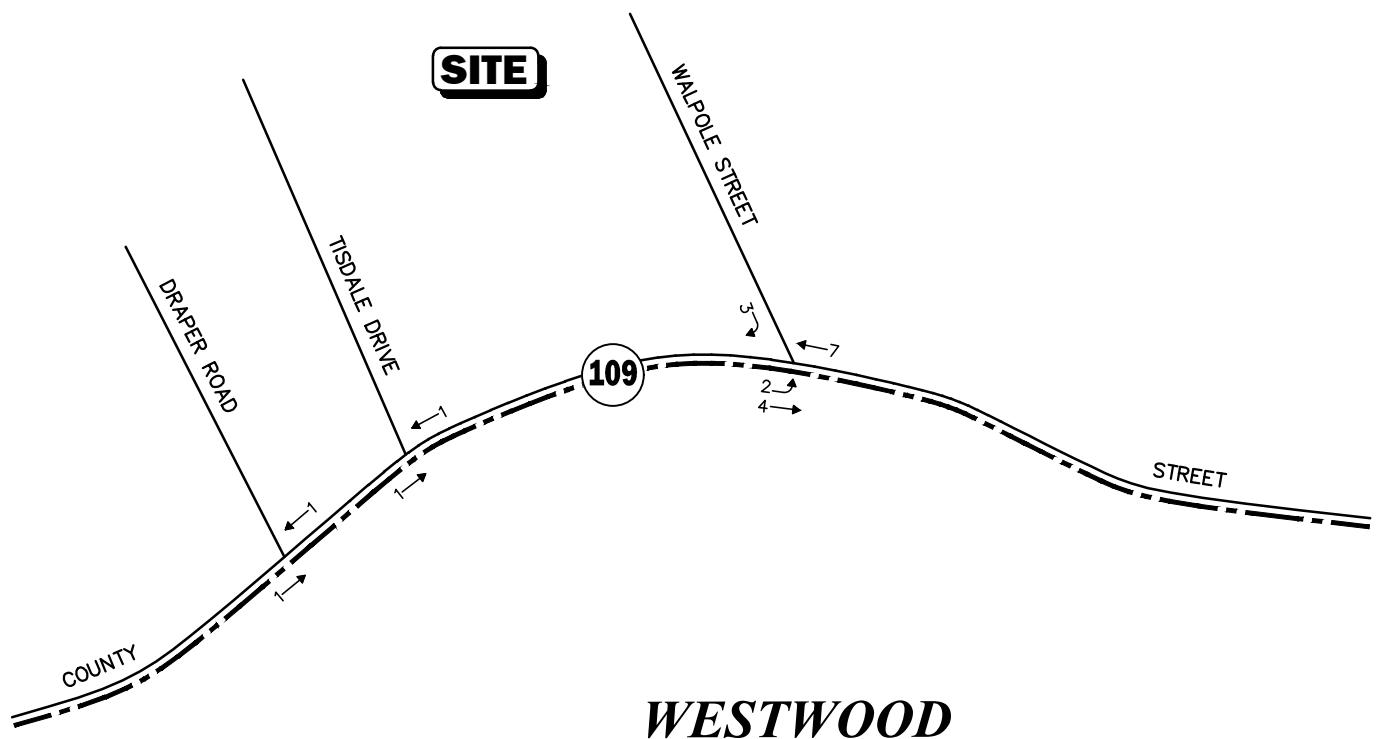
Not To Scale



Vanasse &
Associates inc

Red Robin Pastures
Weekday Morning
Peak-Hour Traffic Volumes

DOVER



Not To Scale

Figure A-2



Vanasse &
Associates inc

Red Robin Pastures
Weekday Evening
Peak-Hour Traffic Volumes

TRIP-GENERATION CALCULATIONS

 Graph Look Up

ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Query Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 220 

LAND USE GROUP: (200-299) Residential

LAND USE : 220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

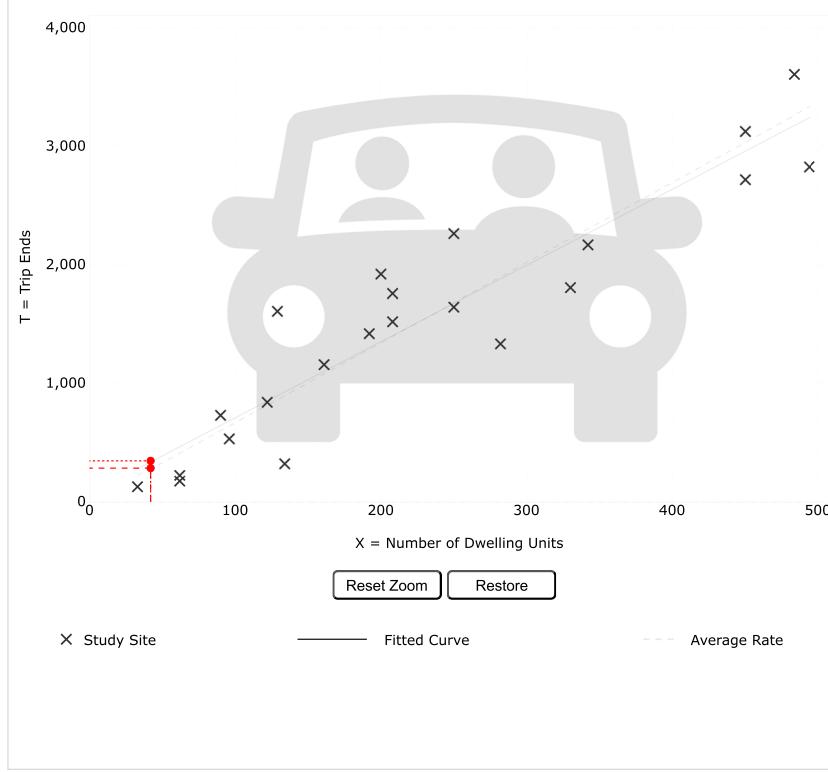
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 42

Data Plot and Equation



DATA STATISTICS

Land Use: Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) [Click for Description and Data Plots](#)

Independent Variable: Dwelling Units

Time Period: Weekday

Setting/Location: General Urban/Suburban

Trip Type: Vehicle

Number of Studies: 22

Avg. Num. of Dwelling Units: 229

Average Rate: 6.74

Range of Rates: 2.46 - 12.50

Standard Deviation: 1.79

Fitted Curve Equation: $T = 6.41(X) + 75.31$

R²:
0.86

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 283 (Total), 142 (Entry), 141 (Exit)
Fitted Curve: 345 (Total), 172 (Entry), 173 (Exit)

Add-ons to do more

Try OTISS Pro

 Graph Look Up

ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Query

Filter

DATA SOURCE:

Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:

220



LAND USE GROUP:

(200-299) Residential

LAND USE :

220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY:

Not Close to Rail Transit

SETTING/LOCATION:

General Urban/Suburban

INDEPENDENT VARIABLE (IV):

Dwelling Units

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:

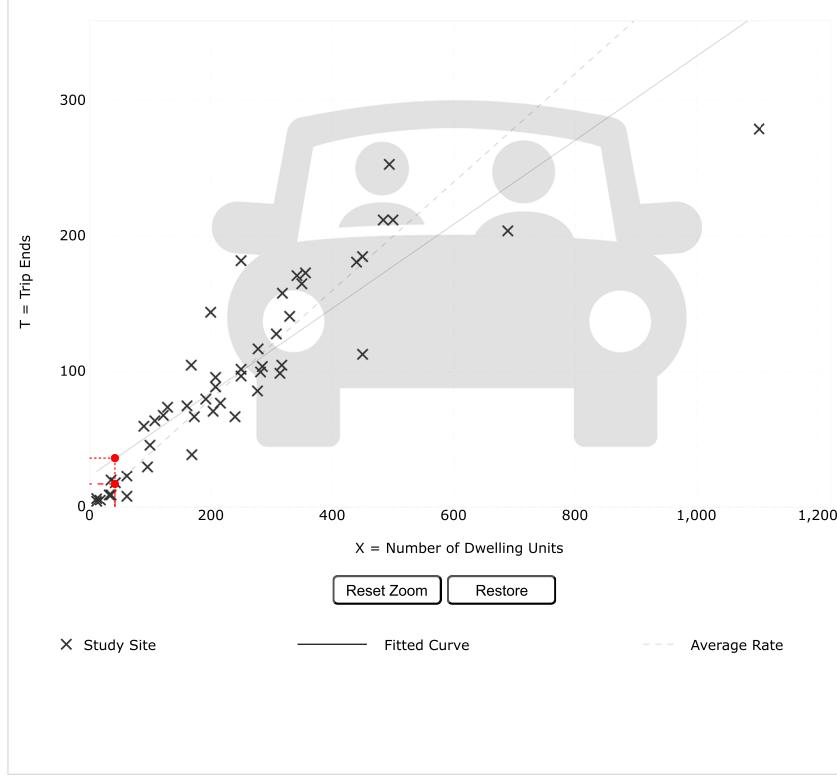
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

42

Calculate

Data Plot and Equation



DATA STATISTICS

Land Use:

Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) [Click for Description and Data Plots](#)Independent Variable:
Dwelling UnitsTime Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.Setting/Location:
General Urban/SuburbanTrip Type:
VehicleNumber of Studies:
49Avg. Num. of Dwelling Units:
249Average Rate:
0.40Range of Rates:
0.13 - 0.73Standard Deviation:
0.12Fitted Curve Equation:
 $T = 0.31(X) + 22.85$ R^2 :
0.79Directional Distribution:
24% entering, 76% exitingCalculated Trip Ends:
Average Rate: 17 (Total), 4 (Entry), 13 (Exit)
Fitted Curve: 36 (Total), 9 (Entry), 27 (Exit)

Add-ons to do more

Try OTISS Pro

 Graph Look Up

ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Query

Filter

DATA SOURCE:

Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:

220



LAND USE GROUP:

(200-299) Residential

LAND USE :

220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY:

Not Close to Rail Transit

SETTING/LOCATION:

General Urban/Suburban

INDEPENDENT VARIABLE (IV):

Dwelling Units

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:

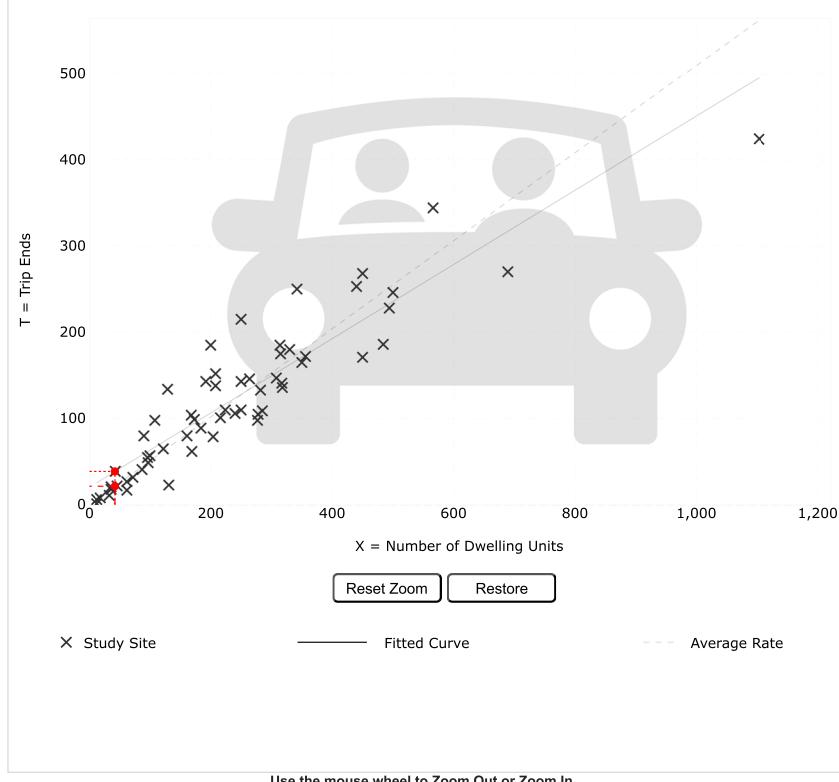
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

42

Calculate

Data Plot and Equation



DATA STATISTICS

Land Use:

Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) [Click for Description and Data Plots](#)Independent Variable:
Dwelling UnitsTime Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.Setting/Location:
General Urban/SuburbanTrip Type:
VehicleNumber of Studies:
59Avg. Num. of Dwelling Units:
241Average Rate:
0.51Range of Rates:
0.08 - 1.04Standard Deviation:
0.15Fitted Curve Equation:
 $T = 0.43(X) + 20.55$ R^2 :
0.84Directional Distribution:
63% entering, 37% exitingCalculated Trip Ends:
Average Rate: 21 (Total), 13 (Entry), 8 (Exit)
Fitted Curve: 39 (Total), 24 (Entry), 15 (Exit)

Add-ons to do more

Try OTISS Pro

TRIP-DISTRIBUTION

Proposed Multifamily Residential Development

Dover, MA

Residence	Workplace	Number	Draper Road	Walpole Street	Route 109 (East)	Route 109 (West)	
Dover town	Boston city	619	0	10%	62	90%	557
Dover town	Dover town	445	0	100%	445	0	0
Dover town	Wellesley town	139	0	50%	70	50%	70
Dover town	Newton city	110	0	10%	11	90%	99
Dover town	Watertown Town c	99	0	10%	10	90%	89
Dover town	Dedham town	87	0	0	0	100%	87
Dover town	Needham town	81	0	50%	41	50%	41
Dover town	Waltham city	80	0	10%	8	90%	72
Dover town	Natick town	67	0	25%	17	0	75%
Dover town	Norwood town	65	0	0	0	100%	65
Dover town	Quincy city	62	0	0	0	100%	62
Dover town	Weymouth Town c	51	0	0	0	100%	51
Dover town	Cambridge city	49	0	10%	5	90%	44
Dover town	Burlington town	44	0	10%	4	90%	40
Dover town	Brookline town	42	0	50%	21	50%	21
Dover town	Framingham town	41	0	0	0	100%	41
Dover town	Westwood town	36	0	0	0	100%	36
Dover town	Lexington town	34	0	10%	3	90%	31
Dover town	Medfield town	31	0	0	0	100%	31
Dover town	Sudbury town	30	0	20%	6	20%	6
Dover town	Walpole town	29	0	0	0	50%	15
Dover town	Brockton city	25	0	0	0	100%	25
Dover town	Marlborough city	21	0	0	0	100%	21
Dover town	Holliston town	20	0	0	0	0	100%
Dover town	Franklin Town city	19	0	0	0	10%	2
Dover town	Canton town	16	0	0	0	100%	16
		2,342	0	702	1,427	213	
				0.0%	30.0%	60.9%	9.1%
		<u>SAY</u>		0%	30%	60%	10%

CAPACITY ANALYSIS WORKSHEETS

2024 Existing
2031 No-Build
2031 Build

2024 Existing

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	702	316	5	4	10
Future Vol, veh/h	2	702	316	5	4	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	87	87	44	44
Heavy Vehicles, %	0	3	4	40	25	0
Mvmt Flow	2	826	363	6	9	23
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	369	0	-	0	1197	366
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	831	-
Critical Hdwy	4.1	-	-	-	6.65	6.2
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.2	-	-	-	3.725	3.3
Pot Cap-1 Maneuver	1201	-	-	-	185	684
Stage 1	-	-	-	-	654	-
Stage 2	-	-	-	-	391	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1201	-	-	-	184	684
Mov Cap-2 Maneuver	-	-	-	-	184	-
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	391	-
Approach	EB	WB	SB			
HCM Control Delay, s/v	0.02	0	15.19			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	5	-	-	-	385	
HCM Lane V/C Ratio	0.002	-	-	-	0.083	
HCM Control Delay (s/veh)	8	0	-	-	15.2	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.3	

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Vol, veh/h	0	706	318	4	12	3
Future Vol, veh/h	0	706	318	4	12	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	83	83	54	54
Heavy Vehicles, %	0	3	5	0	0	0
Mvmt Flow	0	802	383	5	22	6
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	388	0	-	0	1188	386
Stage 1	-	-	-	-	386	-
Stage 2	-	-	-	-	802	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1182	-	-	-	210	667
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	445	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1182	-	-	-	210	667
Mov Cap-2 Maneuver	-	-	-	-	210	-
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	445	-
Approach	EB	WB	SB			
HCM Control Delay, s/v	0	0	21.7			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1182	-	-	-	243	
HCM Lane V/C Ratio	-	-	-	-	0.114	
HCM Control Delay (s/veh)	0	-	-	-	21.7	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.4	

Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	56	662	310	271	63	12
Future Vol, veh/h	56	662	310	271	63	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	91	91	94	94
Heavy Vehicles, %	0	3	5	2	3	8
Mvmt Flow	65	770	341	298	67	13
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	638	0	-	0	1390	490
Stage 1	-	-	-	-	490	-
Stage 2	-	-	-	-	900	-
Critical Hdwy	4.1	-	-	-	6.43	6.28
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.2	-	-	-	3.527	3.372
Pot Cap-1 Maneuver	955	-	-	-	156	567
Stage 1	-	-	-	-	614	-
Stage 2	-	-	-	-	395	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	955	-	-	-	138	567
Mov Cap-2 Maneuver	-	-	-	-	138	-
Stage 1	-	-	-	-	541	-
Stage 2	-	-	-	-	395	-
Approach	EB	WB	SB			
HCM Control Delay, s/v	0.71	0	49.76			
HCM LOS			E			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	140	-	-	-	157	
HCM Lane V/C Ratio	0.068	-	-	-	0.51	
HCM Control Delay (s/veh)	9	0	-	-	49.8	
HCM Lane LOS	A	A	-	-	E	
HCM 95th %tile Q(veh)	0.2	-	-	-	2.5	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	469	633	2	3	16
Future Vol, veh/h	6	469	633	2	3	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	87	87	44	44
Heavy Vehicles, %	0	3	4	40	25	0
Mvmt Flow	7	552	728	2	7	36
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	730	0	-	0	1295	729
Stage 1	-	-	-	-	729	-
Stage 2	-	-	-	-	566	-
Critical Hdwy	4.1	-	-	-	6.65	6.2
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.2	-	-	-	3.725	3.3
Pot Cap-1 Maneuver	883	-	-	-	160	426
Stage 1	-	-	-	-	438	-
Stage 2	-	-	-	-	525	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	883	-	-	-	159	426
Mov Cap-2 Maneuver	-	-	-	-	159	-
Stage 1	-	-	-	-	433	-
Stage 2	-	-	-	-	525	-
Approach	EB	WB	SB			
HCM Control Delay, s/v	0.12	0	17.26			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	23	-	-	-	337	
HCM Lane V/C Ratio	0.008	-	-	-	0.128	
HCM Control Delay (s/veh)	9.1	0	-	-	17.3	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.4	

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	468	631	11	7	4
Future Vol, veh/h	4	468	631	11	7	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	83	83	54	54
Heavy Vehicles, %	0	3	5	0	0	0
Mvmt Flow	5	532	760	13	13	7
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	773	0	-	0	1308	767
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	541	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	851	-	-	-	178	405
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	588	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	851	-	-	-	176	405
Mov Cap-2 Maneuver	-	-	-	-	176	-
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	588	-
Approach	EB	WB	SB			
HCM Control Delay, s/v	0.08	0	22.85			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	15	-	-	-	222	
HCM Lane V/C Ratio	0.005	-	-	-	0.092	
HCM Control Delay (s/veh)	9.3	0	-	-	22.8	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.3	

Intersection						
Int Delay, s/veh	16.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	464	623	60	164	19
Future Vol, veh/h	11	464	623	60	164	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	91	91	94	94
Heavy Vehicles, %	0	3	5	2	3	8
Mvmt Flow	13	540	685	66	174	20
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	751	0	-	0	1283	718
Stage 1	-	-	-	-	718	-
Stage 2	-	-	-	-	565	-
Critical Hdwy	4.1	-	-	-	6.43	6.28
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.2	-	-	-	3.527	3.372
Pot Cap-1 Maneuver	868	-	-	-	181	419
Stage 1	-	-	-	-	481	-
Stage 2	-	-	-	-	567	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	868	-	-	-	178	419
Mov Cap-2 Maneuver	-	-	-	-	178	-
Stage 1	-	-	-	-	471	-
Stage 2	-	-	-	-	567	-
Approach	EB	WB	SB			
HCM Control Delay, s/v	0.21	0	125.27			
HCM LOS			F			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	42	-	-	-	189	
HCM Lane V/C Ratio	0.015	-	-	-	1.031	
HCM Control Delay (s/veh)	9.2	0	-	-	125.3	
HCM Lane LOS	A	A	-	-	F	
HCM 95th %tile Q(veh)	0	-	-	-	8.9	

2031 No-Build

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	753	340	5	4	11
Future Vol, veh/h	2	753	340	5	4	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	87	87	44	44
Heavy Vehicles, %	0	3	4	40	25	0
Mvmt Flow	2	886	391	6	9	25

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	397	0	-
Stage 1	-	-	394
Stage 2	-	-	891
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	5.65
Critical Hdwy Stg 2	-	-	5.65
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1173	-	-
Stage 1	-	-	634
Stage 2	-	-	366
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1173	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	632
Stage 2	-	-	366

Approach	EB	WB	SB
HCM Control Delay, s/v	0.02	0	15.94
HCM LOS		C	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	5	-	-	-	363
HCM Lane V/C Ratio	0.002	-	-	-	0.094
HCM Control Delay (s/veh)	8.1	0	-	-	15.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	757	342	4	13	4
Future Vol, veh/h	0	757	342	4	13	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	83	83	54	54
Heavy Vehicles, %	0	3	5	0	0	0
Mvmt Flow	0	860	412	5	24	7

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	417	0	-
Stage 1	-	-	414
Stage 2	-	-	860
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1153	-	186
Stage 1	-	-	671
Stage 2	-	-	418
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1153	-	186
Mov Cap-2 Maneuver	-	-	186
Stage 1	-	-	671
Stage 2	-	-	418

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	23.74
HCM LOS		C	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1153	-	-	-	223
HCM Lane V/C Ratio	-	-	-	-	0.141
HCM Control Delay (s/veh)	0	-	-	-	23.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection						
Int Delay, s/veh	4.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	63	716	335	291	68	14
Future Vol, veh/h	63	716	335	291	68	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	91	91	94	94
Heavy Vehicles, %	0	3	5	2	3	8
Mvmt Flow	73	833	368	320	72	15
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	688	0	-	0	1507	528
Stage 1	-	-	-	-	528	-
Stage 2	-	-	-	-	979	-
Critical Hdwy	4.1	-	-	-	6.43	6.28
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.2	-	-	-	3.527	3.372
Pot Cap-1 Maneuver	916	-	-	-	132	539
Stage 1	-	-	-	-	590	-
Stage 2	-	-	-	-	363	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	916	-	-	-	113	539
Mov Cap-2 Maneuver	-	-	-	-	113	-
Stage 1	-	-	-	-	502	-
Stage 2	-	-	-	-	363	-
Approach	EB	WB	SB			
HCM Control Delay, s/v	0.75	0	76.05			
HCM LOS			F			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	146	-	-	-	130	
HCM Lane V/C Ratio	0.08	-	-	-	0.67	
HCM Control Delay (s/veh)	9.3	0	-	-	76	
HCM Lane LOS	A	A	-	-	F	
HCM 95th %tile Q(veh)	0.3	-	-	-	3.6	

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	504	680	2	3	17
Future Vol, veh/h	6	504	680	2	3	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	87	87	44	44
Heavy Vehicles, %	0	3	4	40	25	0
Mvmt Flow	7	593	782	2	7	39

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	784	0	-
Stage 1	-	-	783
Stage 2	-	-	607
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	5.65
Critical Hdwy Stg 2	-	-	5.65
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	843	-	-
Stage 1	-	-	413
Stage 2	-	-	502
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	843	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	408
Stage 2	-	-	502

Approach	EB	WB	SB
HCM Control Delay, s/v	0.11	0	18.6
HCM LOS		C	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	21	-	-	-	310
HCM Lane V/C Ratio	0.008	-	-	-	0.147
HCM Control Delay (s/veh)	9.3	0	-	-	18.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	503	678	12	8	4
Future Vol, veh/h	0	503	678	12	8	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	83	83	54	54
Heavy Vehicles, %	0	3	5	0	0	0
Mvmt Flow	0	572	817	14	15	7

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	831	0	-
Stage 1	-	-	824
Stage 2	-	-	572
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	810	-	157
Stage 1	-	-	434
Stage 2	-	-	569
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	810	-	157
Mov Cap-2 Maneuver	-	-	157
Stage 1	-	-	434
Stage 2	-	-	569

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	25.82
HCM LOS			D
<hr/>			
Minor Lane/Major Mvmt	EBL	EBT	WBT WBR SBLn1

Capacity (veh/h)	810	-	-	-	195
HCM Lane V/C Ratio	-	-	-	-	0.114
HCM Control Delay (s/veh)	0	-	-	-	25.8
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection

Int Delay, s/veh 30

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	502	676	64	176	23
Future Vol, veh/h	14	502	676	64	176	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	91	91	94	94
Heavy Vehicles, %	0	3	5	2	3	8
Mvmt Flow	16	584	743	70	187	24

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	813	0	-
Stage 1	-	-	778
Stage 2	-	-	616
Critical Hdwy	4.1	-	6.43 6.28
Critical Hdwy Stg 1	-	-	5.43
Critical Hdwy Stg 2	-	-	5.43
Follow-up Hdwy	2.2	-	3.527 3.372
Pot Cap-1 Maneuver	822	-	~ 155 387
Stage 1	-	-	451
Stage 2	-	-	537
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	822	-	~ 151 387
Mov Cap-2 Maneuver	-	-	~ 151
Stage 1	-	-	438
Stage 2	-	-	537

Approach	EB	WB	SB
HCM Control Delay, s/v	0.26	0	229.69
HCM LOS		F	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	49	-	-	-	162
HCM Lane V/C Ratio	0.02	-	-	-	1.307
HCM Control Delay (s/veh)	9.5	0	-	-	229.7
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	12.5

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

2031 Build

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	754	341	5	4	11
Future Vol, veh/h	2	754	341	5	4	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	87	87	44	44
Heavy Vehicles, %	0	3	4	40	25	0
Mvmt Flow	2	887	392	6	9	25

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	398	0	-
Stage 1	-	-	395
Stage 2	-	-	892
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	5.65
Critical Hdwy Stg 2	-	-	5.65
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1172	-	-
Stage 1	-	-	634
Stage 2	-	-	365
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1172	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	631
Stage 2	-	-	365

Approach	EB	WB	SB
HCM Control Delay, s/v	0.02	0	15.97
HCM LOS		C	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	5	-	-	-	362
HCM Lane V/C Ratio	0.002	-	-	-	0.094
HCM Control Delay (s/veh)	8.1	0	-	-	16
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	757	342	7	25	4
Future Vol, veh/h	0	757	342	7	25	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	83	83	54	54
Heavy Vehicles, %	0	3	5	0	0	0
Mvmt Flow	0	860	412	8	46	7

Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	420	0	-	0	1276	416
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	860	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1149	-	-	-	186	641
Stage 1	-	-	-	-	670	-
Stage 2	-	-	-	-	418	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1149	-	-	-	186	641
Mov Cap-2 Maneuver	-	-	-	-	186	-
Stage 1	-	-	-	-	670	-
Stage 2	-	-	-	-	418	-

Approach	EB	WB	SB			
HCM Control Delay, s/v	0	0	28.56			
HCM LOS			D			

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1149	-	-	-	206	
HCM Lane V/C Ratio	-	-	-	-	0.261	
HCM Control Delay (s/veh)	0	-	-	-	28.6	
HCM Lane LOS	A	-	-	-	D	
HCM 95th %tile Q(veh)	0	-	-	-	1	

Intersection						
Int Delay, s/veh	4.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	63	724	337	291	68	15
Future Vol, veh/h	63	724	337	291	68	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	91	91	94	94
Heavy Vehicles, %	0	3	5	2	3	8
Mvmt Flow	73	842	370	320	72	16
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	690	0	-	0	1519	530
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	988	-
Critical Hdwy	4.1	-	-	-	6.43	6.28
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.2	-	-	-	3.527	3.372
Pot Cap-1 Maneuver	914	-	-	-	130	537
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	359	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	914	-	-	-	111	537
Mov Cap-2 Maneuver	-	-	-	-	111	-
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	359	-
Approach	EB	WB	SB			
HCM Control Delay, s/v	0.74	0	78.51			
HCM LOS			F			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	144	-	-	-	129	
HCM Lane V/C Ratio	0.08	-	-	-	0.684	
HCM Control Delay (s/veh)	9.3	0	-	-	78.5	
HCM Lane LOS	A	A	-	-	F	
HCM 95th %tile Q(veh)	0.3	-	-	-	3.7	

Intersection

Int Delay, s/veh 0.6

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations		↔	↑	↔	↑	↔
Traffic Vol, veh/h	6	505	681	2	3	17
Future Vol, veh/h	6	505	681	2	3	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	87	87	44	44
Heavy Vehicles, %	0	3	4	40	25	0
Mvmt Flow	7	594	783	2	7	39

Major/Minor Major1 Major2 Minor2

Conflicting Flow All	785	0	-	0	1392	784
Stage 1	-	-	-	-	784	-
Stage 2	-	-	-	-	608	-
Critical Hdwy	4.1	-	-	-	6.65	6.2
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.2	-	-	-	3.725	3.3
Pot Cap-1 Maneuver	843	-	-	-	139	396
Stage 1	-	-	-	-	412	-
Stage 2	-	-	-	-	501	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	843	-	-	-	138	396
Mov Cap-2 Maneuver	-	-	-	-	138	-
Stage 1	-	-	-	-	407	-
Stage 2	-	-	-	-	501	-

Approach EB WB SB

HCM Control Delay, s/v 0.11 0 18.64

HCM LOS C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	21	-	-	-	309
HCM Lane V/C Ratio	0.008	-	-	-	0.147
HCM Control Delay (s/veh)	9.3	0	-	-	18.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection

Int Delay, s/veh 0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	503	678	24	15	5
Future Vol, veh/h	4	503	678	24	15	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	83	83	54	54
Heavy Vehicles, %	0	3	5	0	0	0
Mvmt Flow	5	572	817	29	28	9

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	846	0	-
Stage 1	-	-	831
Stage 2	-	-	581
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	800	-	154
Stage 1	-	-	431
Stage 2	-	-	563
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	800	-	152
Mov Cap-2 Maneuver	-	-	152
Stage 1	-	-	427
Stage 2	-	-	563

Approach	EB	WB	SB
HCM Control Delay, s/v	0.08	0	30.32
HCM LOS		D	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	14	-	-	-	179
HCM Lane V/C Ratio	0.006	-	-	-	0.207
HCM Control Delay (s/veh)	9.5	0	-	-	30.3
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.8

Intersection

Int Delay, s/veh 32.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
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Lane Configurations						
Traffic Vol, veh/h	14	506	684	64	176	27
Future Vol, veh/h	14	506	684	64	176	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	91	91	94	94
Heavy Vehicles, %	0	3	5	2	3	8
Mvmt Flow	16	588	752	70	187	29

Major/Minor	Major1	Major2	Minor2
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Conflicting Flow All	822	0	-	0	1408	787
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	621	-
Critical Hdwy	4.1	-	-	-	6.43	6.28
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.2	-	-	-	3.527	3.372
Pot Cap-1 Maneuver	816	-	-	-	~ 152	382
Stage 1	-	-	-	-	447	-
Stage 2	-	-	-	-	534	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	816	-	-	-	~ 148	382
Mov Cap-2 Maneuver	-	-	-	-	~ 148	-
Stage 1	-	-	-	-	434	-
Stage 2	-	-	-	-	534	-

Approach	EB	WB	SB
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HCM Control Delay, s/v	0.26	0	243.97
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HCM LOS	F
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Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	48	-	-	-	161
HCM Lane V/C Ratio	0.02	-	-	-	1.343
HCM Control Delay (s/veh)	9.5	0	-	-	244
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	13.1

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon