Transportation Impact Assessment

Proposed Andover Town Yard Redevelopment
Former Andover Town Yard
Andover, Massachusetts

Prepared for:

Andover Town Yard LLC
North Andover, Massachusetts

November 2023

Prepared by:

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EXECUTIVE SUMMARY

DESCRIPTION OF PROJECT

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) to identify traffic impacts associated with a proposed Andover Town Yard Redevelopment to be located at the former Andover Town Yard off of Pearson Street in Andover, Massachusetts (the "Project"). The purpose of this TIA is to review existing and future traffic conditions in the vicinity of the site, determine the traffic impact of the proposed Project at key intersections expected to experience increased traffic levels from the Project, and review the need for improvements to mitigate the Project's traffic impact.

PROPOSED PROJECT

The site is bounded by residential properties and the Haverhill Line railroad to the north, commercial properties to the south, residential properties to the east, and Haverhill Line railroad to the west. Currently, the site contains a commercial building and several residential buildings. The site has one curb cut onto Pearson Street and becomes Buxton Court. The Project entails razing the existing buildings and constructing two new buildings, one of which will consist of 164+1 multifamily units and a 2,500 square foot (sf) gym, and the other building will be composed of a 1,700sf office, 2,160sf community center, and a 800sf coffee shop. The site will provide 255 parking spaces. The +1 multifamily unit represents a single family house that is include in the site area. This house will remain so it will not generate any new traffic volumes due to the Project.

EXISTING CONDITIONS

A comprehensive field inventory was conducted to collect existing roadway geometrics, traffic volumes, operating characteristics, speed limits, and sight distances, as well as land use information. Traffic volumes were collected in September 2023 at the intersections expected to receive the traffic impact from the Project. These are listed below:

- North Main Street (Route 28) at Railroad Street
- Route 28 at Lewis Street
- Route 28 at Pearson Street
- Pearson Street at the site driveway/Depot Pizza parking lot

- Pearson Street at Essex Street and Railroad Street/Dundee Park Drive
- Essex Street at School Street
- Essex Street at Ridge Street and Brook Street
- School Street at Lupine Road and Ridge Street

FUTURE CONDITIONS

Traffic volumes within the study area were projected to 2030, which reflects a seven-year planning horizon consistent with State traffic study guidelines. These conditions incorporate traffic growth due to general background traffic increases as well as development projects currently being proposed/permitted or under construction and expected to generate traffic in the future. This condition is referred to as the No-Build condition.

PROJECT-GENERATED TRAFFIC

The Project is expected to generate 526 vehicle trips on an average weekday (two-way, 24-hour volume), with 54 vehicle trips (23 entering and 31 exiting) expected during the weekday morning peak hour and 46 vehicle trips (26 entering and 20 exiting) expected during the weekday evening peak hour.

Project-related traffic-volume increases external to the study area relative to 2030 No-Build conditions are anticipated to range from 1 to 18 vehicles or 0.5 to 2.3 percent during the peak periods.

TRAFFIC OPERATIONS ANALYSIS

In future conditions, operations are generally preserved with minor increases in delays and vehicle queue lengths on the various approaches.

RECOMMENDATIONS

Access to the Project site will be provided via one driveway onto Pearson Street and from the Buxton Court roadway. As a curb cut on Pearson Street exists and the Buxton Court entrance exists, the Project will not increase the number of access points. The following recommendations are offered with respect to the design and operation of the Project site access:

- Access should be placed under STOP-sign (*Manual on Uniform Traffic Control Devices* (MUTCD)[1] R1-1) control, with a painted STOP-bar included.

- All signs and other pavement markings to be installed within the Project site shall conform to the applicable standards of the current MUTCD.

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

- Signs and landscaping adjacent to the Project site driveway should be designed and maintained so as not to restrict lines of sight. Snow windrows within sight triangle areas of the Project site driveway should be promptly removed where such accumulations would impede sightlines.

CONCLUSIONS

As documented in this study, Project-related traffic increases result in minor delay increases at signalized intersections; however, there is minimal change in vehicle queuing so it is unlikely that Project-related traffic increases will be noticeable. Further, Project-related traffic increases will not result in significant increases on overall traffic volumes or traffic delays within the study area. The site driveways will provide safe access to and from the development. In general, Project-related traffic can be adequately accommodated within the existing infrastructure with minimal impact on the traffic operations within the study area.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) in order to identify the traffic impacts associated with the proposed Andover Town Yard Redevelopment to be located at the former Andover Town Yard off of Pearson Street in Andover, Massachusetts. This report identifies and analyzes existing and future traffic conditions both with and without the Project and reviews access requirements, potential off-site improvements, and safety considerations.

STUDY METHODOLOGY

This study was prepared in accordance with the State guidelines for TIAs 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 geometry, observations of traffic flow, and collection of peak-period traffic 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 these analyses consistent with State guidelines for the preparation of TIAs. The traffic analysis conducted in stage two identifies projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any are necessary, based on the results from stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in August and September 2023. The field investigation consisted of an inventory of existing roadway geometrics; traffic volumes; and operating characteristics; as well as posted speed limits, sight distance, and land use information within the study area. The study area for the Project contains the major roadway which provides access to the Project, as well as the intersections which are expected to accommodate the majority of Project-related traffic. The study area is listed below and graphically depicted on Figure 1.

- North Main Street (Route 28) at Railroad Street
- Route 28 at Lewis Street
- Route 28 at Pearson Street
- Pearson Street at the site driveway/Depot Pizza parking lot
- Pearson Street at Essex Street and Railroad Street/Dundee Park Drive
- Essex Street at School Street
- Essex Street at Ridge Street and Brook Street
- School Street at Lupine Road and Ridge Street

The following describes the study area roadway which provides access/egress to the Project.

GEOMETRY

Roadway

Pearson Street

Pearson Street is classified as a local roadway under Town jurisdiction. Pearson Street runs in a general east-to-west alignment throughout the study area. Pearson Street provides one general-purpose travel lane in each direction separated by a double-yellow centerline in the past, the roadway had just been repaved at the time of field inventory, with exclusive turn lanes provided at some intersections. The land uses along Pearson Street throughout the study area generally consist of commercial and residential uses.

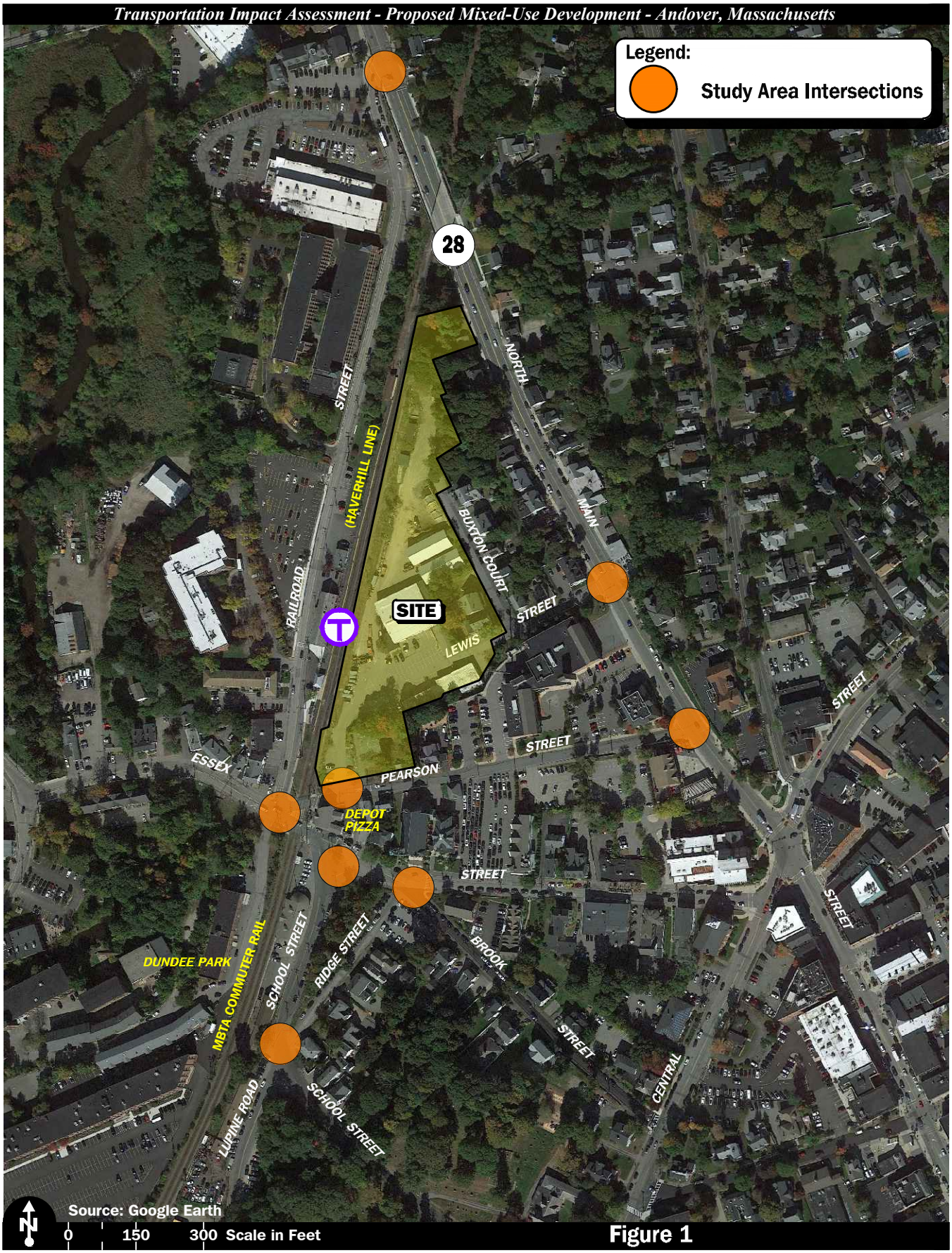

Figure 1

Site Location and Study Area Map

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Intersections

Figure 2 summarizes existing lane use, travel lane widths, and sidewalk and crosswalk locations at the study area intersections.

EXISTING TRAFFIC VOLUMES

In order to establish base traffic-volume demands and flow patterns within the study area, manual turning movement counts (TMCs) were completed in September 2023. The TMCs were conducted during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods. Bicycles and pedestrians were also counted.

Traffic-Volume Adjustments

In order to develop 2023 Existing traffic-volume conditions, Massachusetts Department of Transportation (MassDOT) weekday seasonal factors for Urban Groups 4-7 (major and minor collectors and local roads and streets, the functional classifications of the majority of the study area roadways) were reviewed.[2] Based on a review of this data, it was determined that traffic volumes for the month of September are *above* average-month conditions. As such, the traffic volumes were not adjusted in order to be representative of average-month conditions.

MassDOT no longer requires pandemic-related adjustment of traffic counts performed after March 2022 except in locations where the predominant land use consists of offices or similar uses.[3] Given that the predominant land use within the study area is residential, no further adjustment (beyond the seasonal adjustment) is necessary.

As can be seen in Table 1, Pearson Street is estimated to carry approximately 1,211 vehicles per day (vpd) with 110 vehicles per hour (vph) during the weekday morning peak hour and 109 vph during the weekday evening peak hour. During the weekday morning peak hour, 66 percent of the traffic is traveling eastbound and during the weekday evening peak hour, 51 percent of the traffic is traveling eastbound. The existing weekday morning and evening peak-hour traffic volumes for the study area intersections are graphically depicted on Figure 3 and Figure 4, respectively.

Table 1
2023 EXISTING ROADWAY TRAFFIC-VOLUME SUMMARY

	Weekday	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Location	Daily Volume (vpd)[a]	Volume (vph)[b]	Percent of Daily Traffic[c]	Predominant Flow	Volume (vph)	Percent of Daily Traffic	Predominant Flow
Pearson Street, east of Essex Street	1,211	110	9.1	65.5% EB	109	9.0	51.4% EB

Note: Includes seasonal correction factors applied to TMCs that were conducted in September 2023.
[a]Two-way daily traffic expressed in vehicles per day, estimated.
[b]Two-way peak-hour volume expressed in vehicles per hour.
[c]The percent of daily traffic that occurs during the peak hour.
EB = eastbound.

[2]MassDOT statewide Traffic Data Collection; 2019 Weekday Seasonal Factors, Groups U4-7.

[3]*25% Design Submission Guidelines*; MassDOT Highway Division, Traffic and Safety Engineering; Revised May 31, 2022.

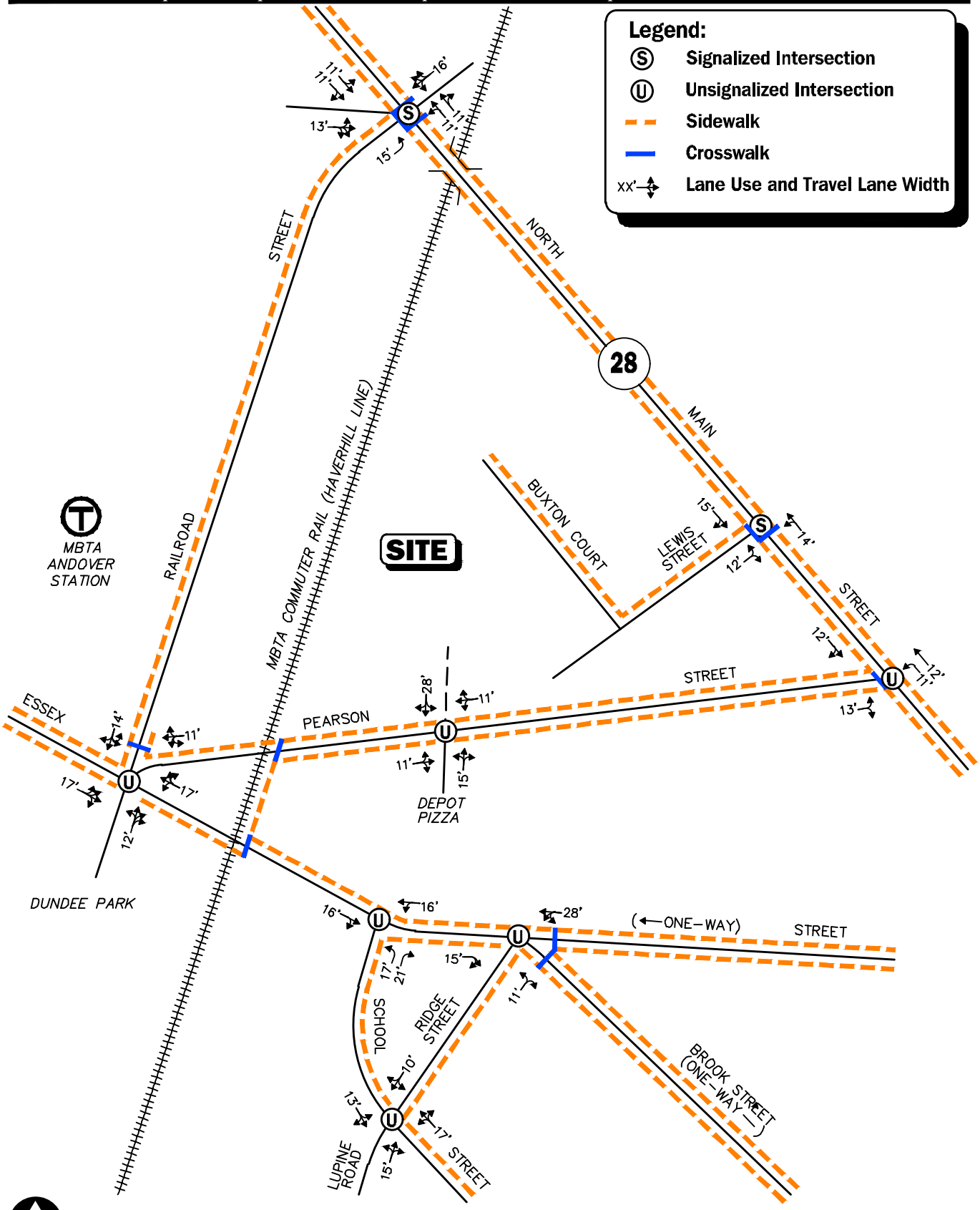

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Figure 2

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

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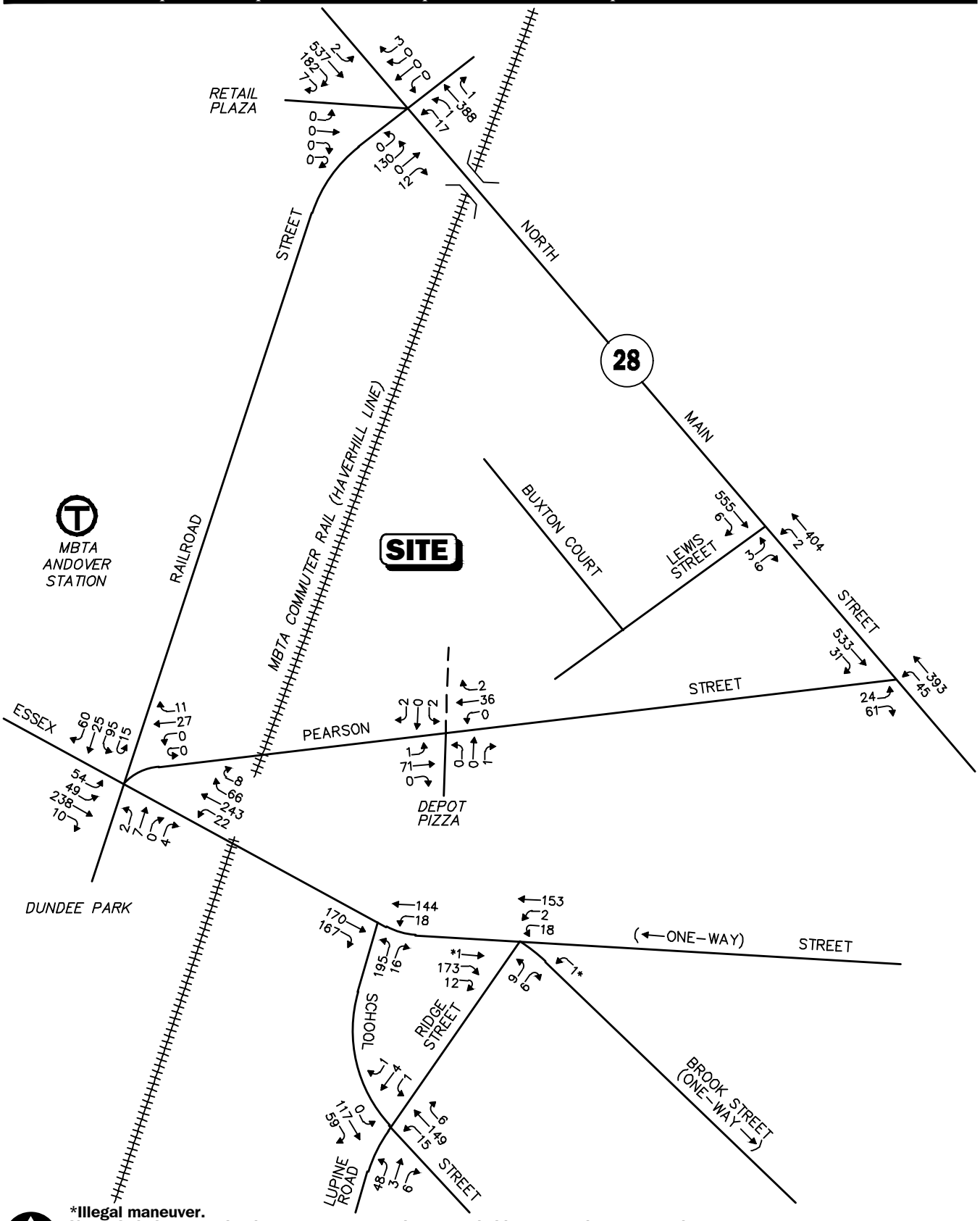

*Illegal maneuver.
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 3

2023 Existing Weekday Morning Peak-Hour Traffic Volumes

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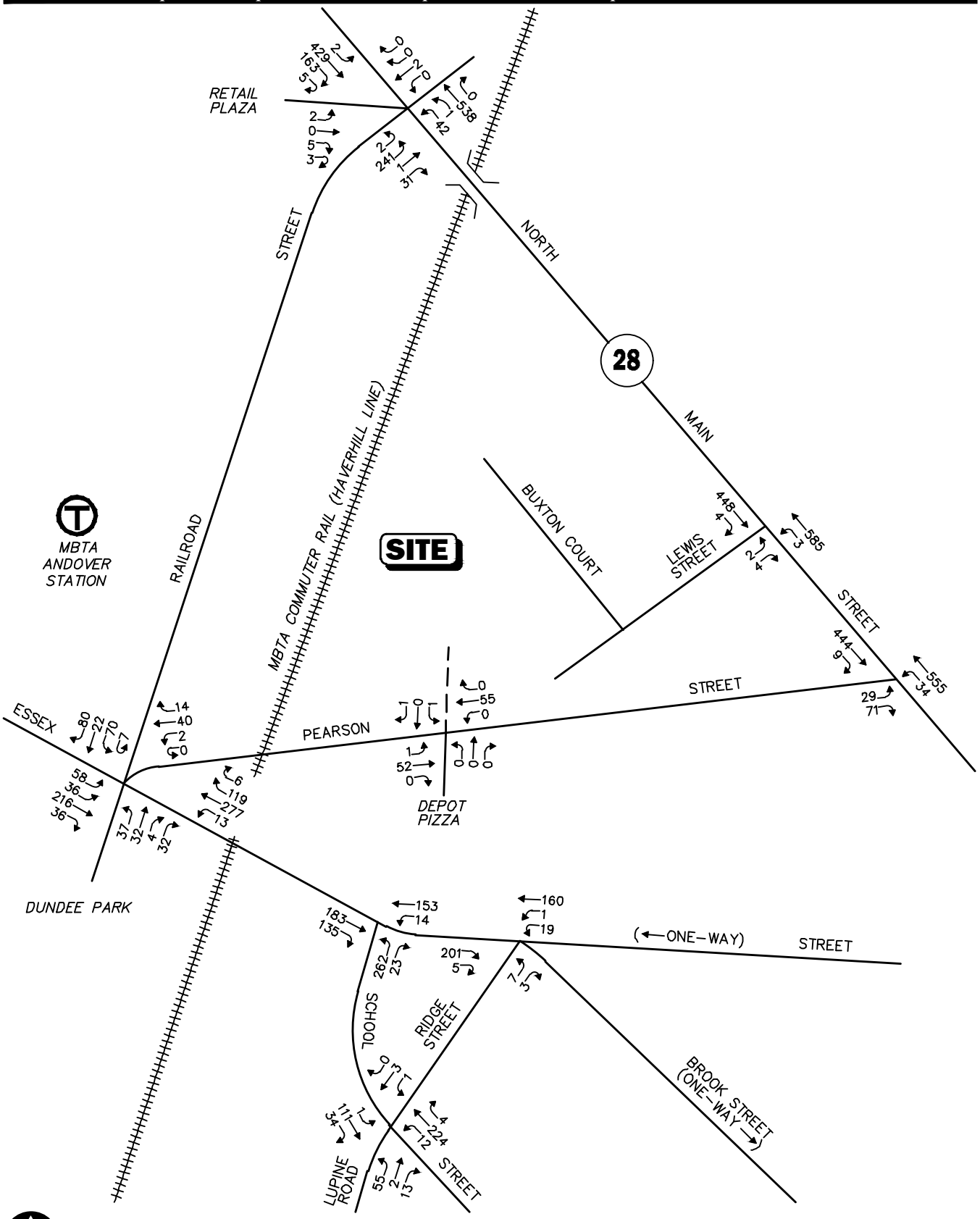

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 4

2023 Existing
Weekday Evening
Peak-Hour Traffic Volumes

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PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in August and September 2023. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study area roadways and at the study area intersections, as well as the location of bicycle facilities. Sidewalks are provided along both sides of Route 28, Pearson Street, Brook Street, Essex Street except between School Street and Pearson Street where it is along the north side from School Street to the railroad track and along the south side from the railroad tracks to Pearson Street, on the west side of Railroad Street, on the east side of School Street, on the east side of Ridge Street, on the east side of Buxton Court, and the north side of Lewis Street. Crosswalks are provided across the Route 28 and Railroad Street approaches of the intersection of Route 28 at Railroad Street, across the Railroad Street leg of the intersection of Essex Street at Pearson Street and Railroad Street/Dundee Park Drive, across the Brook Street leg and the Essex Street east leg of the intersection of Essex Street at Brook Street and Ridge Street, across the Lewis Street leg and the Route 28 south leg of the intersection of Route 28 at Lewis Street, and across the Pearson Street leg of the intersection of Route 28 at Pearson Street. In addition, there are crosswalks on Pearson Street and Essex Street just east of the MBTA railroad tracks.

PUBLIC TRANSPORTATION

Public transportation services are provided within the study area by the Massachusetts Bay Transportation Authority (MBTA) and the Merrimack Valley Regional Transit Authority (MVRTA). The MBTA provides commuter rail service to North Station in Boston on the Haverhill Line by way of Andover Station, which is located at 26 Railroad Street, approximately 0.1 miles (a 2-minute walk) to the west of the Project site. In addition, the MVRTA provides fixed-route services with a bus stop at the MBTA Andover Station. Table 2 summarizes the characteristics of these services. Schedule and fare information for the fixed-route service is provided in the Appendix.

Table 2
PUBLIC TRANSPORTATION SERVICES

Transit Agency	Service	Stop Closest to Site	Distance from Site	Weekday		Weekend	
				Hours of Operation	Headway (minutes)	Hours of Operation	Headway (minutes)
MBTA	Haverhill Line	Andover MBTA Station	~500 feet west	4:58 AM – 12:31 AM	45-138	5:51 AM – 12:21 AM	120-195
MVRTA	Bus Route 21: Andover Shuttle	Andover MBTA Station	~300 feet west	8:19 AM – 6:23 PM	70	--	--
MVRTA	Bus Route 2: Andover via South Broadway	Andover MBTA Station	~300 feet west	5:48 AM – 9:21 PM	30-60	7:18 AM – 6:21 PM	60

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Safety Management/Traffic Operations Unit for the most recent five-year period available (2016 through 2020) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized in Table 3 by intersection, type, weather condition, lighting condition, pavement condition, and severity.

As can be seen in Table 3, the study area intersections experience 13 crashes or less or 2.6 crashes or less per year. The majority of the crashes were angled collisions (36 out of 63), occurred on dry payment (41 out of 63), during daylight (44 out of 63), in clear weather (35 out of 63), and caused property damage only (54 out of 63). No fatalities were reported over the five-year period reviewed. The crash rates for the intersections were observed to be lower than the MassDOT District 4 crash rates for a majority of the study area's unsignalized and signalized intersections. However, the intersections of Pearson Street at the site driveway and Depot Pizza parking lot, Essex Street at School Street, and Essex Street at Brook Street and Ridge Street were higher than the MassDOT District 4 crash rate for unsignalized intersections. These intersections were observed to have at most 10 accidents over the 5 years.

Table 3
MOTOR VEHICLE CRASH DATA SUMMARY

Scenario	Rte 28 at Railroad St	Rte 28 at Lewis St	Rte 28 at Pearson St	Pearson St at Site Dwy and Depot Pizza Prkg Lot	Pearson St at Essex St and Railroad St/ Dundee Park Dr	Essex St at School St	Essex St at Brook St/ Ridge St	School St at Ridge St/ Lupine Rd
Year:								
2016	0	3	5	0	2	2	4	0
2017	2	4	3	1	2	3	5	0
2018	0	1	3	1	1	0	1	0
2019	1	3	2	0	6	5	0	0
2020	1	0	0	0	0	0	0	1
Total	4	12	13	2	11	10	10	1
Average[a]	0.8	2.4	2.6	0.4	2.2	2.0	2.0	0.2
Crash Rate[b]	0.13	0.57	0.56	0.86	0.49	0.64	1.25	0.12
Significant[c]	No	No	No	Yes	No	Yes	Yes	No
Type:								
Angle	0	5	8	1	7	6	8	1
Rear-End	1	2	5	0	2	1	1	0
Head-On	0	0	0	0	0	0	0	0
Sideswipe	1	4	0	0	0	2	0	0
Fixed Object	2	1	0	1	2	1	1	0
Pedestrian	0	0	0	0	0	0	0	0
Bicyclist	0	0	0	0	0	0	0	0
Unknown/Other	0	0	0	0	0	0	0	0
Total	4	12	13	2	11	10	10	1
Weather Conditions:								
Clear	2	7	12	0	5	3	5	1
Cloudy/Rain	1	4	1	1	2	7	4	0
Snow/Ice	1	1	0	1	4	0	1	0
Fog	0	0	0	0	0	0	0	0
Unknown/Other	0	0	0	0	0	0	0	0
Total	4	12	13	2	11	10	10	1
Lighting Conditions:								
Daylight	2	12	12	2	4	3	8	1
Dawn/Dusk	0	0	0	0	0	1	0	0
Dark (lit)	2	0	0	0	5	5	2	0
Dark (unlit)	0	0	1	0	1	0	0	0
Unknown/Other	0	0	0	0	1	1	0	0
Total	4	12	13	2	11	10	10	1
Pavement Conditions :								
Dry	3	7	13	0	6	4	7	1
Wet	0	4	0	1	2	6	3	0
Snow/Ice	1	1	0	1	3	0	0	0
Unknown/Other	0	0	0	0	0	0	0	0
Total	4	12	13	2	11	10	10	1
Severity:								
Property Damage Only	4	10	9	2	10	9	9	1
Personal Injury	0	2	4	0	1	1	1	0
Fatality	0	0	0	0	0	0	0	0
Unknown/Other	0	0	0	0	0	0	0	0
Total	4	12	13	2	11	10	10	1

[a]Average number of crashes over a five-year period.
[b]Crash rate per million entering vehicles (mev).
[c]Significant if crash rate > 0.73 for signalized intersections or > 0.57 for unsignalized intersections (MassDOT District 4 rates).
Source: MassDOT Crash Data, 2016 through 2020.

FUTURE CONDITIONS

To determine the impact of site-generated traffic volumes on the roadway network under future conditions, existing traffic volumes in the study area were projected to the year 2030. Traffic volumes on the roadway network at that time, in the absence of the Project (that is, the No-Build condition), would include existing traffic, new traffic due to general background traffic growth, and traffic related to specific development by others expected to be completed by 2030. Inclusion of these factors resulted in the development of 2030 No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop the 2030 Build traffic-volume conditions.

FUTURE TRAFFIC GROWTH

Traffic growth on area roadways is a function of the expected land development impacting the study area. Several methods are used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all existing 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.

In addition, we identified the location and type of planned development affecting the study area, estimated the traffic to be generated by that development, and assigned it to the area roadway network. This produces a more realistic estimate of growth for local traffic. However, the drawback of this procedure is that the potential growth in population and development external to the study area would not be accounted for in the traffic projections.

To provide a conservative analysis framework, both procedures were used in this TIA.

General Background Growth

Traffic-volume data compiled by MassDOT from permanent count stations and historic traffic counts in the area were reviewed in order to determine general background traffic growth trends. Based on a review of this data and other area traffic studies, it was determined that the traffic volumes are increasing in the area by approximately 0.92 percent per year on average. Therefore, a 1.0 percent per year compounded annual background traffic growth rate was used to account for future traffic growth including presently unforeseen development within the study area.

Specific Development by Others

The Town of Andover was contacted in order to determine if there are any planned or approved development projects that are expected to influence future traffic volumes within the study area. Based on these discussions, the following projects were identified for possible inclusion in this assessment:

305 North Main Redevelopment. This project entails redeveloping the interior of an existing commercial building into a multi-family residential development. This development is north of our Project site. The 1.0 percent general background growth rate was assumed to account for the new trips generated by this project.

Draper Block – 27 Main Street. This project entails construction of a 47,518 square foot (sf) development that is north of the Project site. Based on a special permit document for this project, trips were generated for this project. Accordingly, trips from the 27 Main Street development were included in the future condition analysis.

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.

Planned Roadway Improvements

The Town of Andover and MassDOT were contacted in order to determine if there are any planned roadway improvement projects expected to be completed within the study area in the seven-year planning horizon. Based on these discussions, the following roadway improvement project was identified:

- ***Essex Street Corridor – MassWorks Grant.*** This project is being undertaken by MassWorks and entails the removal of the Pearson Street approach from the Essex Street at Pearson Street/Railroad Street/Dundee Park Drive intersection and pedestrian and bicycle improvements along the length of Essex Street and Brook Street to include the following:

  - Essex Street and Brook Street will be reconstructed to provide one-way and two-way bike lanes. At certain locations, there will be on-street parking provided along one or both sides of the roadway.

  - A marked crosswalk will be provided for crossing the approach of School Street for the intersection of Essex Street at School Street.

  - At the Depot Pizza location along Pearson Street is where Pearson Street will be turned into a small roundabout and cut back from the five-way intersection with Essex Street.

No other roadway improvement projects aside from routine maintenance activities were identified to be planned within the study area at this time.

No-Build Traffic Volumes

The 2030 No-Build peak-hour traffic-volume networks were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2023 Existing peak-hour traffic volumes and incorporating traffic projections from the development projects listed above. The

resulting 2030 No-Build weekday morning and evening peak-hour traffic-volume networks are shown on Figure 5 and Figure 6, respectively.

PROJECT-GENERATED TRAFFIC

The Project entails constructing several buildings consisting of 164+1 multifamily residential units, a gym, office space, and a coffee shop with a drive-through window. In order to develop the traffic characteristics of the proposed Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)[4] for Land Use Code (LUC) 221 *Multifamily Housing (Mid-Rise)*, LUC 492 *Health/Fitness Club*, LUC 712 *Small Office Building*, LUC 495 *Recreation Community Center*, and LUC 937 *Coffee/Donut Shop with Drive-Through Window* were used.

These many land uses within the same site can cause some trips generated to be with the site. The impact to study area intersections would be based only on the external trips that leave and enter outside the site. The base trip-generation calculations obtained using the ITE data were converted to external trips assuming an internal trip capture of 10 percent.

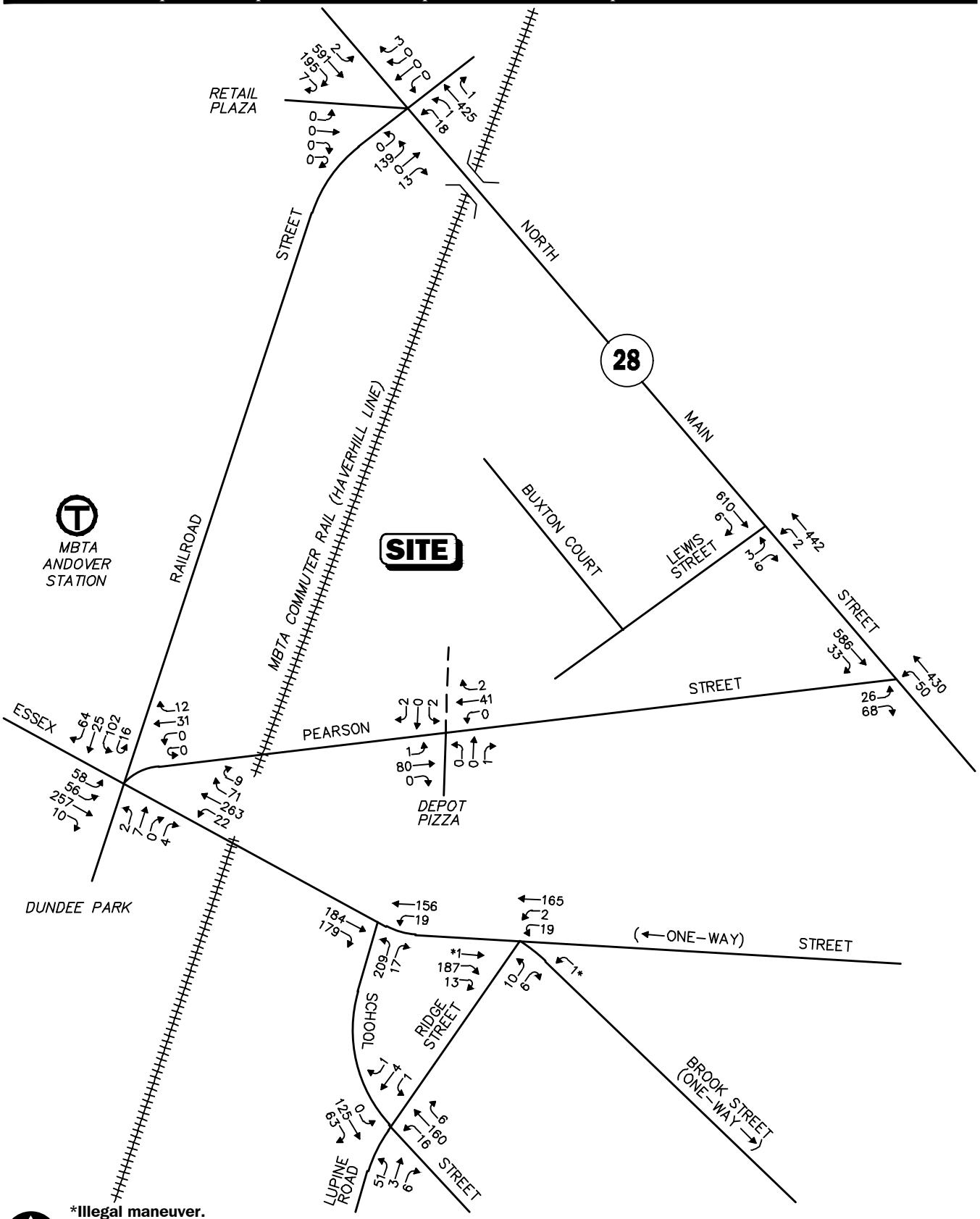
The external trips generated by the Project site were converted to person trips using the vehicle occupancy ratio (VOR) for Census Tract 2542 and were then disseminated to the available modes of transportation. The automobile person trips were then converted back to vehicle trips by dividing by the VOR. Table 4 shows the percentage of available transportation modes for each of the noted land uses. Table 5 shows the resulting calculations for the Project using the above methodology.

Table 4
MODE SPLIT BY LAND USE

Land Use	SOV+HOV Trips	Transit Trips	Walk Trips	Other Trips
Multifamily Residential	41%	25%	13%	21%
Gym	40%	0%	30%	30%
Office Space	33%	33%	34%	0%
Community Center	100%	0%	0%	0%
Coffee Shop	40%	0%	30%	30%

Full calculations and tables of the trip-generation internal capture and the trip-generation by mode split can be found in the Appendix.

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



*Illegal maneuver.
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 5

2030 No-Build Weekday Morning Peak-Hour Traffic Volumes

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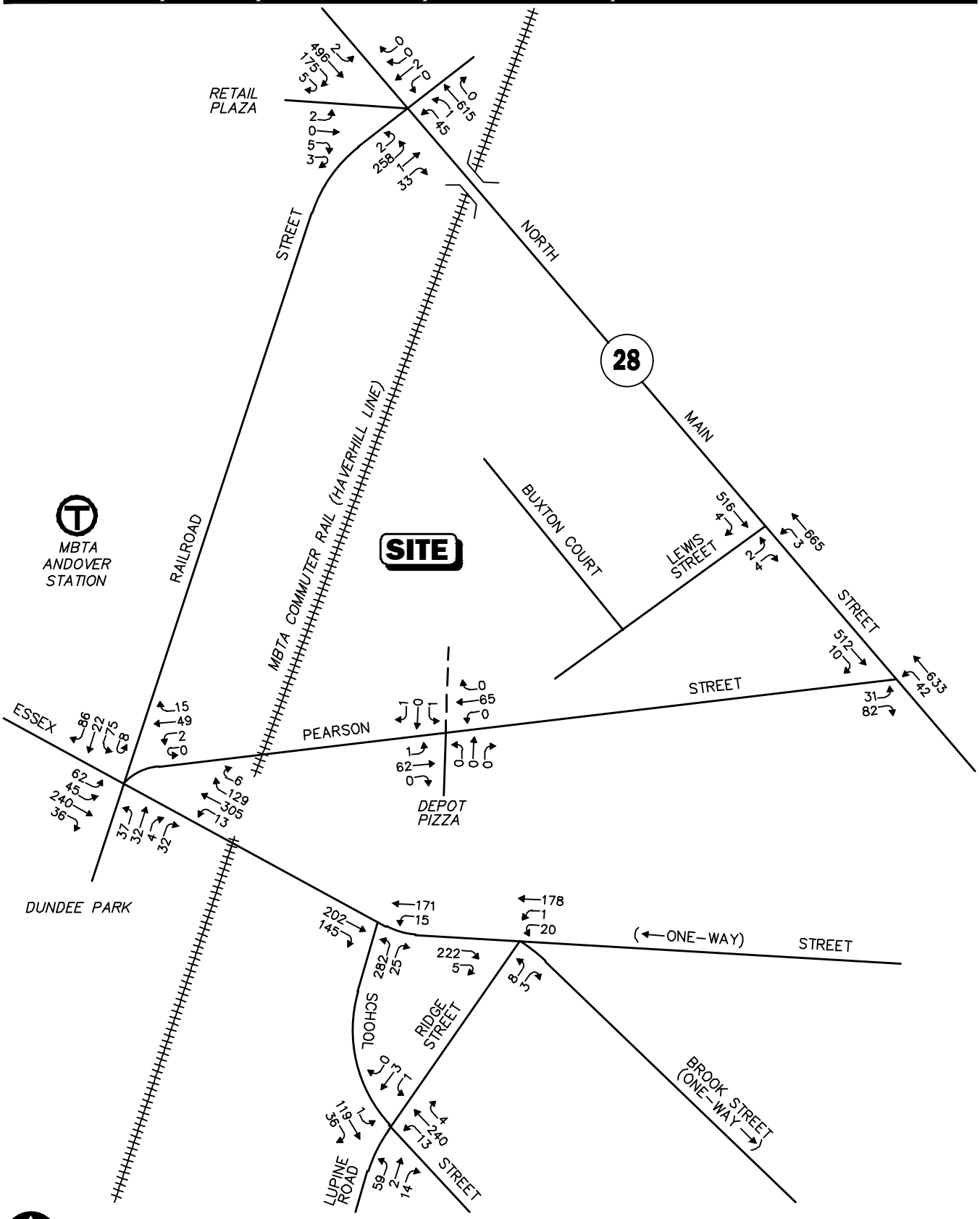

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 6

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2030 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

Table 5
PROPOSED SITE TRIP-GENERATION SUMMARY

Time Period/ Directional Distribution	Multi-Family Residential Units (A) Vehicle Trips	Gym (B) Vehicle Trips	Office Space (C) Vehicle Trips	Recreational Community Center (D) Vehicle Trips	Coffee Shop with Drive-Thru (E) Vehicle Trips	Total (F=A+B+C+D+E) Vehicle Trips
Weekday Daily	276	24	8	64	154	526
Weekday Morning Peak Hour:						
Entering	5	1	1	3	13	23
Exiting	17	1	0	1	12	31
Total	22	2	1	4	25	54
Weekday Evening Peak Hour:						
Entering	15	2	0	3	6	26
Exiting	9	1	1	3	6	20
Total	24	3	1	6	12	46

As can be seen in Table 5, the Project is expected to generate 526 vehicle trips on an average weekday (two-way, 24-hour volume), with 54 vehicle trips (23 entering and 31 exiting) expected during the weekday morning peak hour and 46 vehicle trips (26 entering and 20 exiting) expected during the weekday evening peak hour.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated trips to and from the Project was determined based on a combination of a review of existing travel patterns at the study area intersections and census data. The trip distribution for the Project is summarized in Table 6 and graphically depicted on Figure 7. The weekday morning and evening peak-hour traffic volumes expected to be generated by the Project were assigned on the study area roadway network as shown on Figure 8 and Figure 9, respectively.

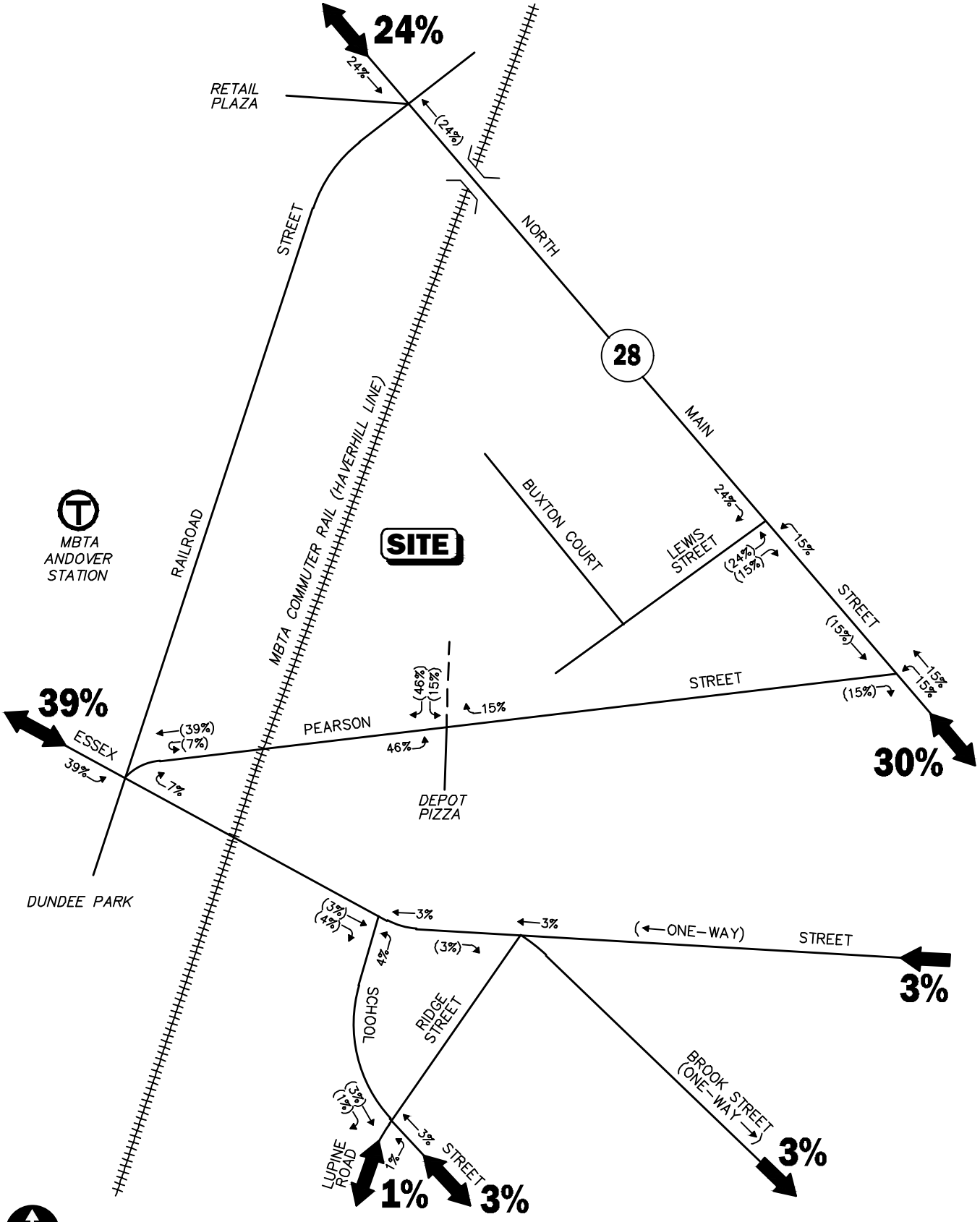

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Figure 7

Trip Distribution Map

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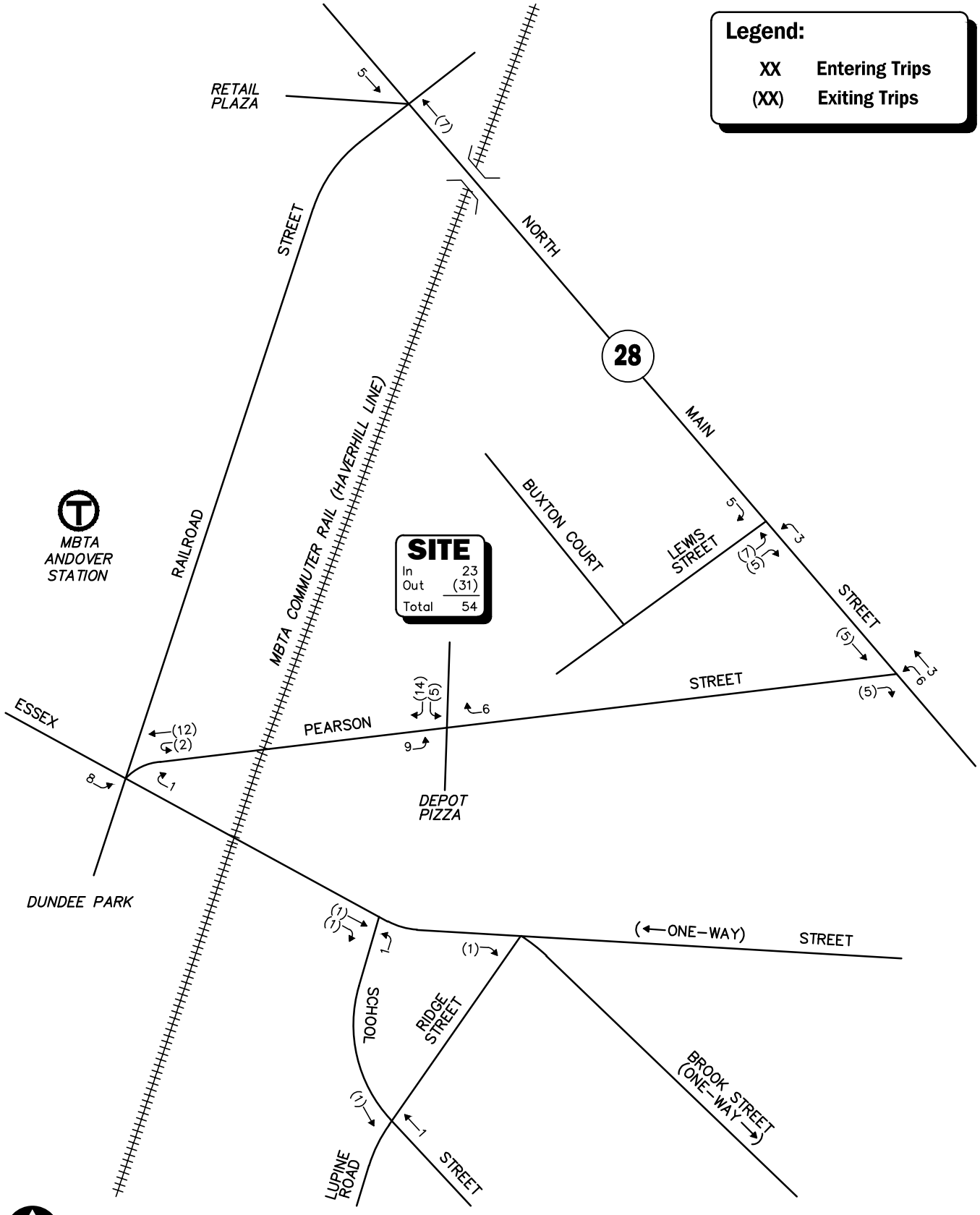

Not To Scale

Figure 8

Site-Generated Weekday Morning Peak-Hour Traffic Volumes

Vanasse & Associates inc

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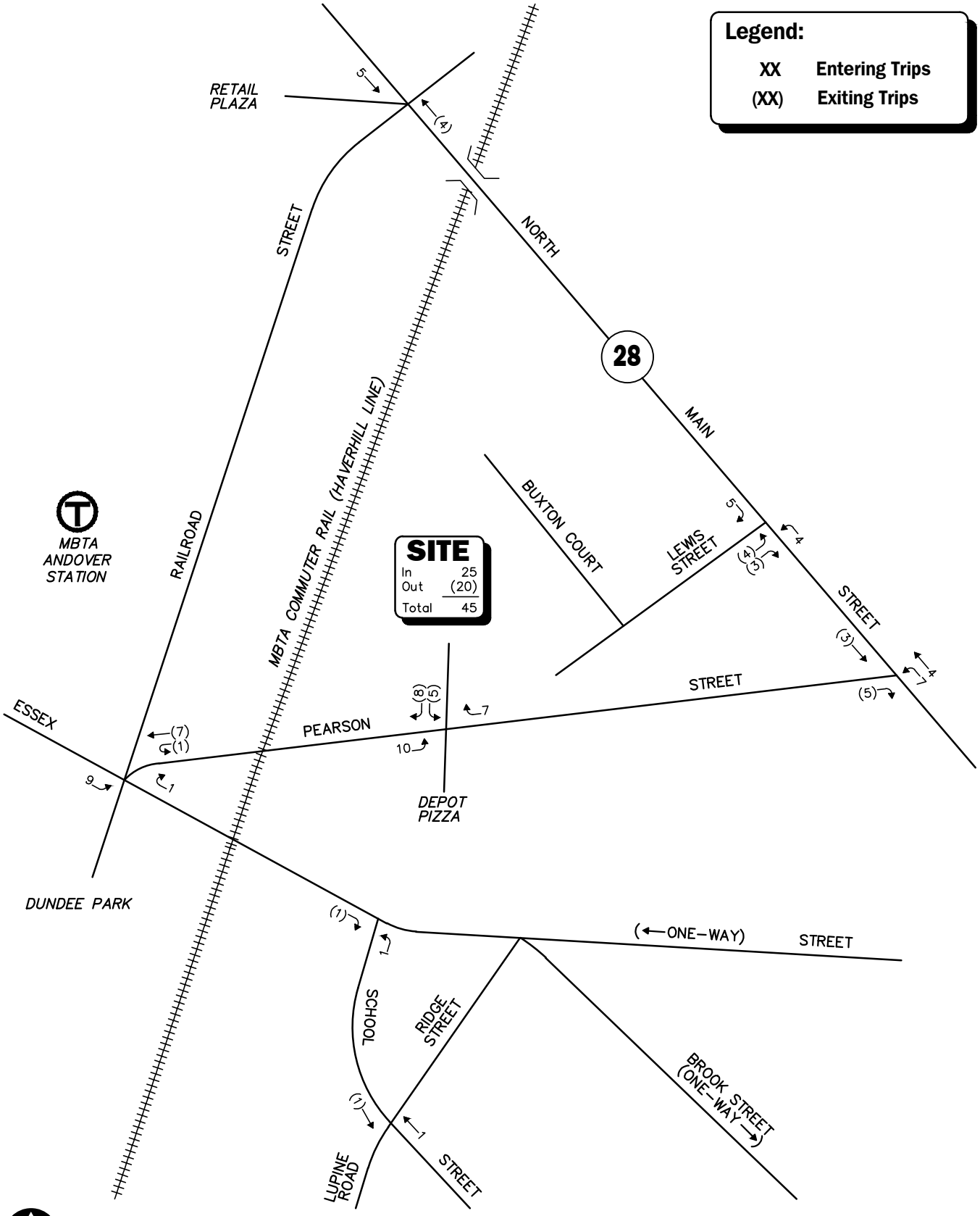


Not To Scale

Figure 9

Site-Generated Weekday Evening Peak-Hour Traffic Volumes

Vanasse & Associates inc

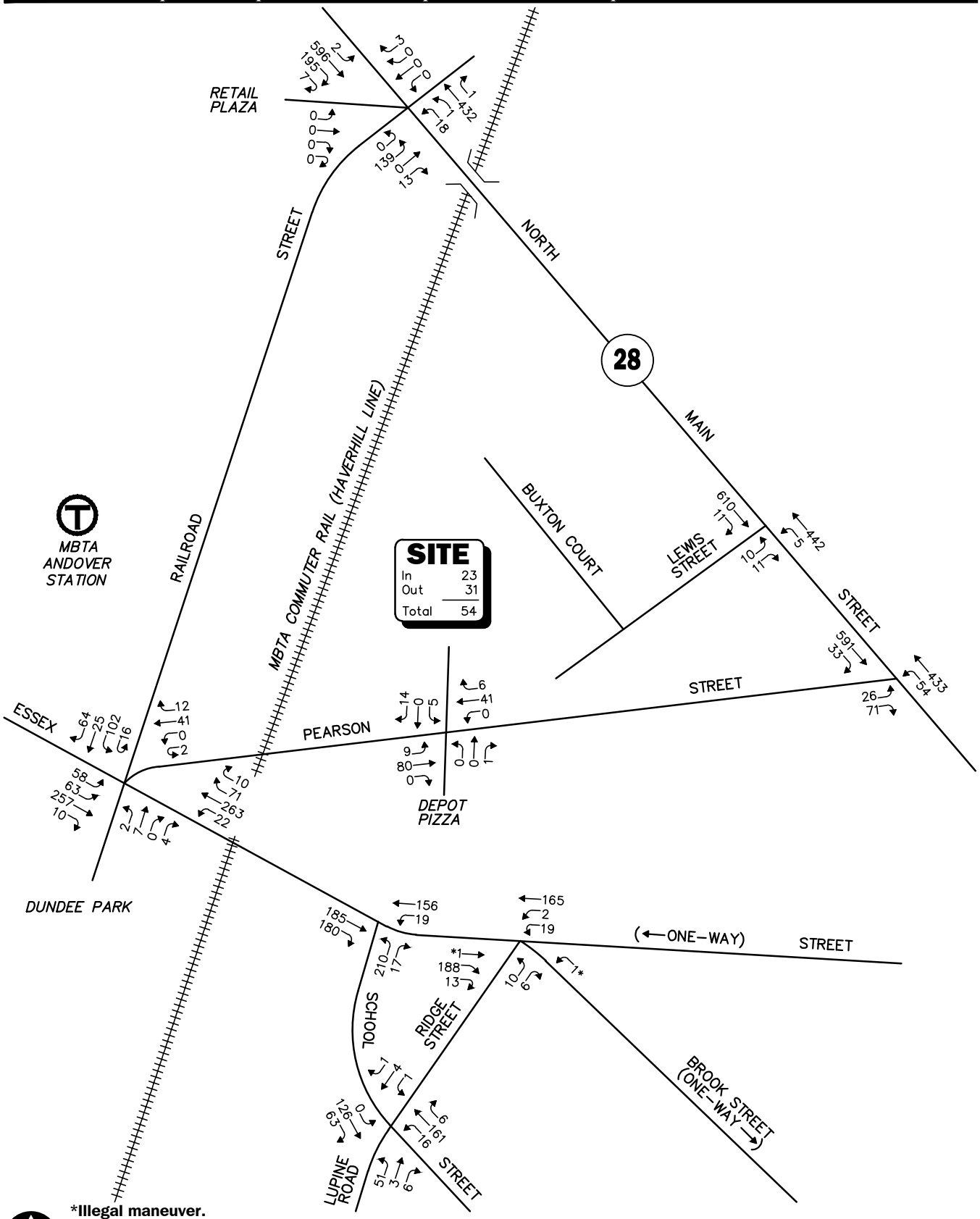
Table 6
TRIP-DISTRIBUTION SUMMARY

Roadway	Direction (To/From)	Percent (To/From)
Route 28	North	24/24
Route 28	South	30/30
Lupine Road	South	1/1
Essex Street	East	0/3
Brook Street	East	3/0
School Street	East	3/3
Essex Street	West	39/39
TOTAL		100/100

FUTURE TRAFFIC VOLUMES – BUILD CONDITION

The 2030 Build condition networks consist of the 2030 No-Build traffic volumes with the anticipated Project-generated traffic added to them. The 2030 Build weekday morning and evening peak-hour traffic-volume networks are graphically depicted on Figure 10 and Figure 11, respectively.

A summary of peak-hour projected traffic-volume increases external to the study area that is the subject of this assessment is shown in Table 7. These volumes are based on the expected increases from the Project.



*Illegal maneuver.
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 10

2030 Build
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc

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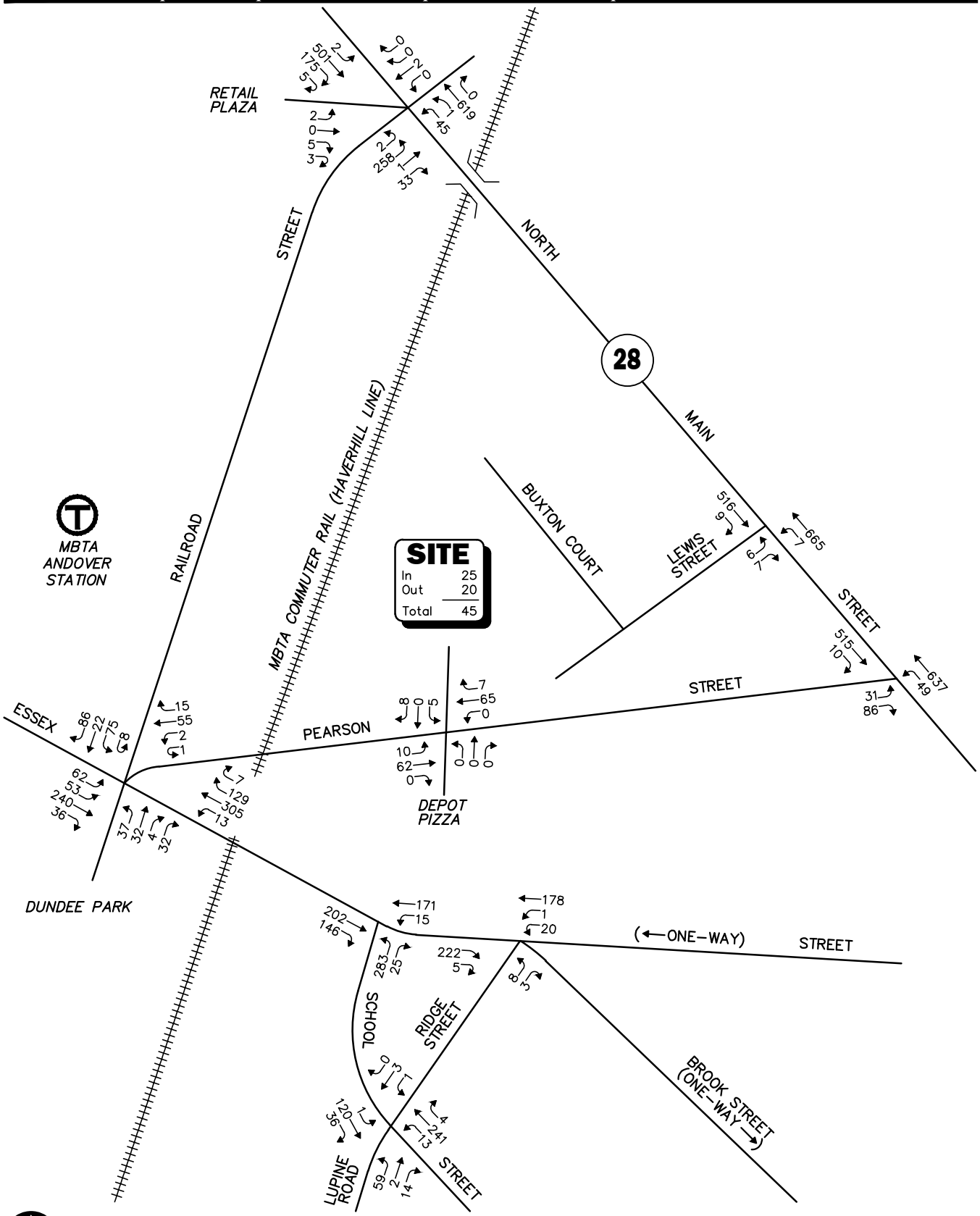


Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 11

Vanasse & Associates inc

2030 Build
Weekday Evening
Peak-Hour Traffic Volumes

Table 7
PEAK-HOUR TRAFFIC-VOLUME INCREASES

Location/Peak Hour	2030 No-Build	2030 Build	Traffic-Volume Increase Over No-Build	Percent Increase Over No-Build
Route 28, north of Railroad Street:				
Weekday Morning	1,362	1,374	12	0.9
Weekday Evening	1,553	1,562	9	0.6
Route 28, south of Pearson Street:				
Weekday Morning	1,134	1,149	15	1.3
Weekday Evening	1,269	1,287	18	1.4
Lupine Road, south of School Street:				
Weekday Morning	143	143	0	0.0
Weekday Evening	127	127	0	0.0
Brook Street, east of Ridge Street:				
Weekday Morning	212	213	1	0.5
Weekday Evening	245	245	0	0.0
School Street, east of Ridge Street:				
Weekday Morning	314	316	2	0.6
Weekday Evening	391	393	2	0.5
Essex Street, east of Ridge Street:				
Weekday Morning	186	186	0	0.0
Weekday Evening	199	199	0	0.0
Essex Street, west of Railroad Street:				
Weekday Morning	741	758	17	2.3
Weekday Evening	860	874	14	1.6

As shown in Table 6, Project-related traffic-volume increases external to the study area relative to 2030 No-Build conditions are anticipated to range from 1 to 18 vehicles or 0.5 to 2.3 percent during the peak periods.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the proposed site driveway intersection with Pearson Street in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)[5] recommendations. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance recommended to be provided 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 is the sight distance recommended to be provided by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. ***In accordance with AASHTO standards, if the measured ISD is at least equal to the recommended SSD value for the appropriate design speed, the intersection can operate in a safe manner.*** Table 8 presents the measured SSD and ISD at the subject intersection.

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

Table 8
SIGHT DISTANCE MEASUREMENTS[a]

Intersection/Sight Distance Measurement	Recommended Distances (Feet) Townwide Speed Limit 25 mph on Pearson Street	Field Measured Distances (Feet)
Pearson Street at Site Driveway		
Stopping Sight Distance:		
Pearson Street approaching from the east	155	436[c]
Pearson Street approaching from the west	155	241
Intersection Sight Distance:[b]		
Left turn from Site Driveway (looking east)	280	300[c]
Left turn from Site Driveway (looking west)	280	111[d]

[a]Recommended values obtained from *A Policy on Geometric Design of Highways and Streets,* 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018.
[b]Values shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.
[c]Distance if parked cars near the site driveway were removed.
[d]Distance if hedge west of the site driveway were cut.

As can be seen in Table 8, the sight distance at the intersection of the site driveway with Pearson Street was found to exceed the recommended values for SSD based on a speed of 25 mph. The site driveway did not meet the recommended value for ISD (looking west) for the 85th percentile vehicle travel speed of 25 mph due to a wall west of Railroad Street. However, the Essex Street Corridor Improvement Project may terminate Pearson Street prior to Railroad Street which will eliminate vehicles traveling to or from the west of the site driveway. Therefore, the site driveway will provide safe and efficient access.

TRAFFIC OPERATIONS ANALYSIS

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

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.[6] The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

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

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

[6]The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual 6th Edition;* Transportation Research Board; Washington, DC; 2016.

Signalized Intersections

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

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

Levels of service for signalized intersections were calculated using the Percentile Delay Method implemented as a part of the Synchro™ 10 software as required by MassDOT. The Percentile Delay Method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on "percentile" delay. Level-of-service designations are based on the criterion of percentile delay per vehicle and are a measure of: i) driver discomfort; ii) motorist frustration; and iii) fuel consumption; and include a uniform delay based on percentile volumes using a Poisson arrival pattern, an initial queue move-up time, and a queue interaction delay that accounts for delays resulting from queues extending from adjacent intersections. Table 9 summarizes the relationship between level-of-service and percentile delay and uses the same numerical delay thresholds as the 2010 *Highway Capacity Manual (*HCM*)*[7] method. The tabulated percentile delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table 9
LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS[a]

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

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

[7]*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

Unsignalized Intersections

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

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with control delays resulting.

The levels of service of unsignalized intersections are determined by the application of a procedure described in the 2000 *Highway Capacity Manual (2000 HCM).* Use of the *2000 HCM* is appropriate since some intersections within the study area are under YIELD-control and later versions of the HCM do not accommodate this type of intersection control.

Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the *2000 Highway Capacity Manual*. Table 10 summarizes the relationship between level of service and average control delay.

Table 10
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[a]

Level of Service	Average Control Delay (Seconds Per Vehicle)
A	≤ 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	>50.0

[a]Source: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000; page 17-2.

SIDRA

The unsignalized capacity analysis for the approaches at the intersection of Essex Street at Pearson Street and Railroad Street and Dundee Park Drive is based on the procedures described in the Traffic Signalized and Unsignalized Intersection Design and Research Aid (SIDRA) Intersection.[8] The main features of the SIDRA Intersection method for unsignalized capacity estimation are the dependence of gap acceptance parameters on roadway geometry, entry lane flows, and the designation of traffic control on approach lanes.

The SIDRA analytical model calculates several components of delay. One of these, the average total delay component, produces level-of-service results based on the concepts described in the HCM. The delay ranges that define levels of service for roundabouts are shown in Table 11.

Table 11
LEVEL-OF-SERVICE CRITERIA FOR SIDRA: UNSIGNALIZED INTERSECTIONS[a]

Level-Of-Service by Volume-to-Capacity Ratio		Control Delay Per Vehicle (Seconds)
v/c ≤ 1.0	v/c > 1.0	
A	F	≤10.0
B	F	10.1 to 15.0
C	F	15.1 to 25.0
D	F	25.1 to 35.0
E	F	35.1 to 50.0
F	F	>50.0

[a]Source: *SIDRA Intersection 9.0 User Guide;* Akcelik & Associates Pty Ltd; Greythorn, Victoria 3104, Australia; October 2020.

[8]Traffic Signalized and Unsignalized Intersection Design and Research Aid, SIDRA Intersection 9.0 User Guide; Akcelik & Associates Pty Ltd; Greythorn, Victoria 3104, Australia; October 2020.

ANALYSIS RESULTS

Level-of-service analyses were conducted for 2023 Existing, 2030 No-Build, and 2030 Build conditions for the study area intersections. The results of the intersection capacity analysis within the study area are described below, with a tabular summary provided in Table 12 and Table 13.

Signalized Intersections

Route 28 at Railroad Street, Private Driveway, and Retail Plaza

Under 2023 Existing and 2030 No-Build conditions, this intersection operates at an overall LOS A during the weekday morning peak hour and at an overall LOS C during the weekday evening peak hour. No changes to level of service occur under 2030 Build conditions due to the addition of Project traffic. There is no change to vehicle queue lengths with the addition of Project traffic.

Route 28 at Lewis Street

Under 2023 Existing and 2030 No-Build conditions, this intersection operates at an overall LOS A during the weekday morning and evening peak hours. No changes to level of service occur under 2030 Build conditions due to the addition of Project traffic. The vehicle queue lengths increase by less than 1 vehicle with the addition of Project traffic.

Table 12
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Signalized Intersection/ Peak Hour/Movement	2023 Existing				2030 No-Build				2030 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] Avg/95th	V/C	Delay	LOS	Queue Avg/95th	V/C	Delay	LOS	Queue Avg/95th
Route 28 at Railroad Street/Private Driveway/Retail Plaza												
Weekday Morning:												
Railroad Street EB LT/TH/RT/HRT	0.49	16.2	B	1/3	0.52	17.6	B	1/3	0.52	17.6	B	1/3
Private Dwy WB HLT/LT/TH/RT	0.01	0.0	A	0/0	0.01	0.0	A	0/0	0.01	0.0	A	0/0
Route 28 NB HLT/LT/TH/RT	0.25	7.6	A	1/5	0.27	7.9	A	1/6	0.28	7.9	A	1/6
Route 28 SB LT/TH/RT/HRT	0.38	8.6	A	2/10	0.42	9.1	A	2/12	0.42	9.2	A	2/12
Retail Plaza SEB HLT/LT/RT/HRT	0.00	0.0	A	0/0	0.00	0.0	A	0/0	0.00	0.0	A	0/0
Overall	--	**8.9**	**A**	--	--	**9.5**	**A**	--	--	**9.5**	**A**	--
Weekday Evening:												
Railroad Street EB LT/TH/RT/HRT	0.76	54.4	D	8/17	0.82	58.3	E	8/19	0.82	58.3	E	8/19
Private Dwy WB HLT/LT/TH/RT	0.06	54.5	D	1/1	0.06	54.5	D	1/1	0.06	54.5	D	1/1
Route 28 NB HLT/LT/TH/RT	0.50	20.6	C	5/10	0.48	21.7	C	6/12	0.48	21.8	C	6/12
Route 28 SB LT/TH/RT/HRT	0.50	20.6	C	6/11	0.48	21.4	C	7/13	0.48	21.5	C	7/13
Retail Plaza SEB HLT/LT/RT/HRT	0.09	0.8	A	0/0	0.09	0.8	A	0/0	0.09	0.8	A	0/0
Overall	--	**26.9**	**C**	--	--	**28.2**	**C**	--	--	**28.2**	**C**	--
Route 28 at Lewis Street												
Weekday Morning:												
Lewis Street EB LT/RT	0.06	18.2	B	1/1	0.06	18.2	B	1/1	0.14	18.2	B	1/1
Route 28 NB LT/TH	0.29	3.8	A	0/7	0.32	4.0	A	0/7	0.34	5.5	A	0/8
Route 28 SB TH/RT	0.34	4.1	A	0/10	0.38	4.4	A	0/11	0.41	6.0	A	0/12
Overall	--	**4.1**	**A**	--	--	**4.4**	**A**	--	--	**6.0**	**A**	--
Weekday Evening:												
Lewis Street EB LT/RT	0.06	18.3	B	1/1	0.06	18.3	B	1/1	0.13	18.4	B	1/1
Route 28 NB LT/TH	0.35	4.2	A	0/10	0.40	4.6	A	0/13	0.43	6.5	A	0/13
Route 28 SB TH/RT	0.27	3.6	A	0/8	0.31	3.9	A	0/9	0.34	5.3	A	0/10
Overall	--	**4.1**	**A**	--	--	**4.4**	**A**	--	--	**6.2**	**A**	--

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

Unsignalized Intersection

Route 28 at Pearson Street

Under 2023 Existing conditions, the critical movement at this intersection operates at LOS C during the weekday morning and weekday evening peak hours. Under 2030 No-Build conditions, the critical movement at this intersection operates at LOS D during the weekday morning and weekday evening peak hours. No changes to level of service occur under 2030 Build conditions due to the addition of Project traffic. Critical movement delay increases by less than 2 seconds and the queue length remains unchanged under 2030 Build conditions compared to 2030 No-Build conditions.

Pearson Street at Project Site Driveway and Depot Pizza

Under 2023 Existing and 2030 No-Build conditions, the critical movements at this intersection operate at LOS A during the weekday morning and evening peak hours. No changes to level of service occur under 2030 Build conditions due to the addition of Project traffic. Critical movement delay increases by less than 1 second and the queue length remains unchanged under 2030 Build conditions compared to 2030 No-Build conditions.

Essex Street at Pearson Street and Railroad Street and Dundee Park Drive

Under 2023 Existing conditions, the critical movements at this intersection operate at LOS D or better during the weekday morning peak hour and operate at LOS E or better during the weekday evening peak hour. Under 2023 Existing conditions, the critical movements at this intersection operate at LOS E or better during the weekday morning peak hour and operate at LOS F or better during the weekday evening peak hour. No changes to level of service occur under 2030 Build conditions during the weekday evening peak hour; however, during the weekday morning peak hour the level of service degraded from LOS E or better to LOS F or better due to the addition of Project traffic. Critical movement delay increases by less than 8 seconds and the queue length increases by less than 1 vehicle under 2030 Build conditions compared to 2030 No-Build conditions.

Essex Street at School Street

Under 2023 Existing and 2030 No-Build conditions, the critical movements at this intersection operate at LOS C during the weekday morning and evening peak hours. No changes to level of service occur under 2030 Build conditions due to the addition of Project traffic. Critical movement delay increases by less than 1 second and the queue length remains unchanged under 2030 Build conditions compared to 2030 No-Build conditions.

Essex Street at Ridge Street and Brook Street

Under 2023 Existing and 2030 No-Build conditions, the critical movements at this intersection operate at LOS B during the weekday morning and evening peak hours. No changes to level of service occur under 2030 Build conditions due to the addition of Project traffic. Critical movement delay increases by less than 1 second and the queue length remains unchanged under 2030 Build conditions compared to 2030 No-Build conditions.

School Street at Ridge Street and Lupine Road

Under 2023 Existing and 2030 No-Build conditions, the critical movements at this intersection operate at LOS B during the weekday morning and evening peak hours. No changes to level of service occur under 2030 Build conditions due to the addition of Project traffic. Critical movement delay increases by less than 1 second and the queue length remains unchanged under 2030 Build conditions compared to 2030 No-Build conditions.

Table 13
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Unsignalized Intersection/ Critical Movement/Peak Hour	2023 Existing				2030 No-Build				2030 Build			
	Demand[a]	Delay[b]	LOS[c]	Queue[d]	Demand	Delay	LOS	Queue	Demand	Delay	LOS	Queue
Route 28 at Pearson Street												
Weekday Morning:												
Pearson Street EB LT/RT	85	23.5	C	2	94	31.5	D	3	97	33.5	D	3
Weekday Evening:												
Pearson Street EB LT/RT	100	20.3	C	2	113	28.7	D	3	117	30.4	D	3
Pearson Street at the Project Site Dwy/Depot Pizza												
Weekday Morning:												
Depot Pizza NB LT/TH/RT	1	8.7	A	0	1	8.8	A	0	1	8.8	A	0
Project Site Dwy SB LT/TH/RT	4	9.0	A	1	4	9.0	A	1	18	9.0	A	1
Weekday Evening:												
Depot Pizza NB LT/TH/RT	0	0.0	A	0	0	0.0	A	0	0	0.0	A	0
Project Site Dwy SB LT/TH/RT	2	9.1	A	1	2	9.2	A	1	13	9.5	A	1
Essex Street at Pearson Street/Railroad Street/ Dundee Park Drive												
Weekday Morning:												
Dundee Park Drive NB LT/TH/RT/HRT	24	18.2	C	1	24	19.9	C	1	24	20.4	C	1
Essex Street WB LT/TH/RT/HRT	506	5.0	A	2	545	5.3	A	2	546	5.4	A	2
Pearson Street SWB HLT/LT/RT/HRT	52	6.3	A	1	59	6.7	A	1	75	6.9	A	1
Railroad Street SB HLT/LT/TH/RT	210	34.3	D	5	223	48.0	E	7	223	>50.0	F	8
Essex Street EB HLT/LT/TH/RT	468	4.8	A	2	508	5.2	A	2	517	5.4	A	3
Weekday Evening:												
Dundee Park Drive NB LT/TH/RT/HRT	194	48.6	E	6	194	>50.0	F	8	194	>50.0	F	9
Essex Street WB LT/TH/RT/HRT	619	6.7	A	4	676	7.3	A	4	678	7.4	A	4
Pearson Street SWB HLT/LT/RT/HRT	77	7.1	A	1	90	7.9	A	1	100	8.1	A	1
Railroad Street SB HLT/LT/TH/RT	192	36.3	E	5	205	>50.0	F	7	205	>50.0	F	8
Essex Street EB HLT/LT/TH/RT	461	5.2	A	2	511	5.9	A	3	521	6.2	A	3
Essex Street at School Street												
Weekday Morning:												
School Street NB LT/RT	211	19.5	C	3	226	23.1	C	4	227	23.3	C	4
Weekday Evening:												
School Street NB LT/RT	285	18.1	C	3	307	21.8	C	4	308	21.9	C	4

See notes at end of table.

Table 13 (Continued)
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Unsignalized Intersection/ Critical Movement/Peak Hour	2023 Existing				2030 No-Build				2030 Build			
	Demand[a]	Delay[b]	LOS[c]	Queue[d]	Demand	Delay	LOS	Queue	Demand	Delay	LOS	Queue
Essex Street at Ridge Street/Brook Street												
Weekday Morning:												
Ridge Street NB LT/RT	15	10.5	B	1	16	10.8	B	1	16	10.8	B	1
Weekday Evening:												
Ridge Street NB LT/RT	10	10.5	B	1	11	10.8	B	1	11	10.8	B	1
School Street at Ridge Street/Lupine Road												
Weekday Morning:												
Lupine Road NB LT/TH/RT	57	12.8	B	1	60	13.4	B	1	60	13.4	B	1
Ridge Street SB LT/TH/RT	6	12.1	B	1	6	12.4	B	1	6	12.4	B	1
Weekday Evening:												
Lupine Road NB LT/TH/RT	70	13.2	B	1	75	13.8	B	1	75	13.8	B	1
Ridge Street SB LT/TH/RT	4	12.9	B	1	4	13.3	B	1	4	13.3	B	1

[a]Demand in vehicles per hour.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]95th percentile queue length (veh).
NB = northbound; SB = southbound; EB = eastbound; WB = westbound; SWB = southwestbound; HLT = hard left-turning movements; LT = left-turning movements; TH = through movements; HRT = hard right-turning movements; RT = right-turning movements.

Alternative Build Analysis

As previously stated in the roadway improvements section of this report, the Essex Street Corridor MassWorks Grant Improvement Project will remove the Pearson Street approach to this intersection. As such, an Alternative Analysis was conducted assuming Pearson Street ends and does not connect through to the Essex Street intersection. In order to do this, traffic volumes were redistributed throughout the study area. The 2030 No-Build Alternative Analysis and 2030 Build Alternative Analysis results are summarized in Table 14. As can be seen in Table 14, with the movements from Railroad Street and Dundee Park Drive during the weekday morning and evening peak hours under 2030 No-Build and Build with alternative conditions, all movements at the intersection are predicted to continue to operate at LOS F or better with the alterations. Traffic-volume network diagrams are provided in the Appendix demonstrating the traffic redistribution.

Table 14
ALTERNATIVE UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Unsignalized Intersection/	2030 No-Build				2030 No-Build Alternative				2030 Build				2030 Build Alternative			
Critical Movement/Peak Hour	Demand[a]	Delay[b]	LOS[c]	Queue[d]	Demand	Delay	LOS	Queue	Demand	Delay	LOS	Queue	Demand	Delay	LOS	Queue
Essex Street at Pearson Street/Railroad Street/ Dundee Park Drive																
Weekday Morning:																
Dundee Park Drive NB LT/TH/RT/HRT	24	19.9	C	1	24	19.7	C	1	24	20.4	C	1	24	20.2	C	1
Essex Street WB LT/TH/RT/HRT	545	5.3	A	2	572	3.1	A	1	546	5.4	A	2	590	3.2	A	1
Pearson Street SWB HLT/LT/RT/HRT	59	6.7	A	1	--	--	--	--	75	6.9	A	1	--	--	--	--
Railroad Street SB HLT/LT/TH/RT	223	48.0	E	7	240	>50.0	F	10	223	>50.0	F	8	240	>50.0	F	10
Essex Street EB HLT/LT/TH/RT	508	5.2	A	2	508	3.8	A	1	517	5.4	A	3	517	3.8	A	1
Weekday Evening:																
Dundee Park Drive NB LT/TH/RT/HRT	194	>50.0	F	8	194	>50.0	F	7	194	>50.0	F	9	194	>50.0	F	8
Essex Street WB LT/TH/RT/HRT	676	7.3	A	4	731	3.6	A	1	678	7.4	A	4	742	2.6	A	1
Pearson Street SWB HLT/LT/RT/HRT	90	7.9	A	1	--	--	A	--	100	8.1	A	1	--	--	--	--
Railroad Street SB HLT/LT/TH/RT	205	>50.0	F	7	216	>50.0	F	10	205	>50.0	F	8	216	>50.0	F	10
Essex Street EB HLT/LT/TH/RT	511	5.9	A	3	511	4.5	A	2	521	6.2	A	3	521	4.6	A	2

[a]Demand in vehicles per hour.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]95th percentile queue length (veh).
NB = northbound; SB = southbound; EB = eastbound; WB = westbound; SWB = southwestbound; HLT = hard left-turning movements; LT = left-turning movements; TH = through movements; HRT = hard right-turning movements; RT = right-turning movements.

Traffic Signal Warrants

The *Manual on Uniform Traffic Control Devices* (MUTCD)[9] establishes nine warrants or criteria to evaluate a location for the installation or retention of a traffic signal. At least one of the nine warrants should be satisfied in order to justify the installation or retention of a traffic signal; however, satisfaction of a warrant in and of itself does not justify traffic signal control. An engineering evaluation of the location in question should indicate that the establishment of traffic signal control will improve the overall safety and/or operation of the intersection. Table 15 identifies the nine traffic signal warrants that were reviewed for this analysis.

Table 15
TRAFFIC SIGNAL WARRANTS

Warrant No.	Description
1	Eight-Hour Vehicular Volume
2	Four-Hour Vehicular Volume
3	Peak Hour
4	Pedestrian Volume
5	School Crossing
6	Coordinated Signal System
7	Crash Experience
8	Roadway Network
9	Intersection near a Grade Crossing

Accordingly, a Traffic Signal Warrants Analysis (TSWA) was conducted, which reviewed each of the traffic signal warrants listed in Table 15 for the intersection of Essex Street at Railroad Street and Dundee Park Drive under the following conditions:

- Design Speed: 25 mph
- Traffic Volumes: 2023 Existing and 2030 Build average-month conditions[10]

Table 16 summarizes the results of the TSWA for the subject intersections, with the detailed TSWA worksheets and supporting materials attached.

[9]Ibid 1.
[10]Traffic volumes at the intersections were adjusted downward to average-month conditions.

Table 16
TRAFFIC SIGNAL WARRANTS ANALYSIS –
ESSEX STREET AT RAILROAD STREET AND DUNDEE PARK DRIVE

Warrant No.	Description	2023 Existing Satisfied?	2030 Build Satisfied?
1	Eight-Hour Vehicular Volume	No	No
2	Four-Hour Vehicular Volume	No	No
3	Peak Hour	No	No
4	Pedestrian Volume	No	No
5	School Crossing	No	No
6	Coordinated Signal System	No	No
7	Crash Experience	No	No
8	Roadway Network	No	No
9	Intersection Near a Grade Crossing	No	No

As can be seen in Table 16, the intersection of Essex Street at Railroad Street and Dundee Park Drive was not found to satisfy any of the traffic signal warrants under 2023 Existing or 2030 Build conditions.

RECOMMENDATIONS AND CONCLUSIONS

VAI has prepared this TIA in order to evaluate potential traffic impacts associated with the proposed Andover Town Yard Redevelopment in Andover, Massachusetts. This study was prepared in accordance with MassDOT Guidelines for *Transportation Impact Assessment (TIA);* and was conducted pursuant to the standards of the traffic engineering and transportation planning professions for the preparation of such reports. Based on the results of this study, the following can be concluded:

- Several of the study area intersection crash rates were observed to be higher than the MassDOT District 4 crash rates for unsignalized intersections.

- The Project is expected to generate 500 vehicle trips on an average weekday (two-way, 24-hour volume), with 54 vehicle trips (23 entering and 31 exiting) expected during the weekday morning peak hour and 45 vehicle trips (25 entering and 20 exiting) expected during the weekday morning peak hour.

- The sight distance at the intersection of the site driveway with Pearson Street was found to exceed the recommended values for SSD and ISD looking east of the site driveway based on a speed of 25 mph. However, due to the Essex Corridor Improvement Project, there are not expected to be any vehicle movements looking west.

- The analysis has indicated that the Project will generally result in minimal impact on motorist delays and vehicle queue lengths at the study intersection.

RECOMMENDATIONS

A transportation improvement program has been developed that is designed to provide safe and efficient access to the Project and address any deficiencies identified at the study area locations. The following improvements have been recommended as a part of this evaluation:

Project Access

Access to the Project site will be provided via one driveway onto Pearson Street and from the Buxton Court roadway. As a curb cut on Pearson Street exists and the Buxton Court entrance exists, the Project will not increase the number of access points. The following recommendations are offered with respect to the design and operation of the Project site access:

- Access should be placed under STOP-sign (MUTCD R1-1) control, with a painted STOP-bar included.
- All signs and other pavement markings to be installed within the Project site shall conform to the applicable standards of the current MUTCD.
- Signs and landscaping adjacent to the Project site driveway should be designed and maintained so as not to restrict lines of sight.
- Snow windrows within sight triangle areas of the Project site driveway should be promptly removed where such accumulations would impede sightlines.

CONCLUSIONS

As documented in this study, Project-related traffic increases result in minor delay increases at signalized intersections; however, there is minimal change in vehicle queuing so it is unlikely that Project-related traffic increases will be noticeable. Further, Project-related traffic increases will not result in significant increases on overall traffic volumes or traffic delays within the study area. The site driveways will provide safe access to and from the development. In general, Project-related traffic can be adequately accommodated within the existing infrastructure with minimal impact on the traffic operations within the study area.

APPENDIX

TRAFFIC COUNT DATA
SEASONAL ADJUSTMENT DATA
PUBLIC TRANSPORTATION SCHEDULES
MASSDOT CRASH RATE WORKSHEETS
GROWTH RATE DATA
MODE SPLIT DATA
TRIP GENERATION DATA
JOURNEY TO WORK
CAPACITY ANALYSIS
TRAFFIC SIGNAL WARRANT ANALYSIS REPORTS

TRAFFIC COUNT DATA

Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
Page No : 1

Groups Printed- Cars - Trucks

	North Main St From North				Driveway From East				North Main St From South				Railroad St From West				Plaza From Northwest				
Start Time	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Int. Total
07:00 AM	0	151	20	0	0	0	0	0	0	0	56	0	0	18	0	1	0	0	0	0	246
07:15 AM	0	145	27	0	1	0	0	0	0	0	54	0	0	14	0	0	0	0	0	0	241
07:30 AM	0	132	46	0	0	0	0	0	3	0	77	0	0	23	1	4	0	0	0	0	286
07:45 AM	0	159	39	0	0	0	0	1	4	0	75	0	0	19	0	0	0	0	0	1	298
Total	0	587	132	0	1	0	0	1	7	0	262	0	0	74	1	5	0	0	0	1	1071
08:00 AM	1	151	55	0	0	0	0	2	2	0	84	1	0	36	0	1	0	0	0	0	333
08:15 AM	0	141	51	1	0	0	0	0	4	0	82	0	0	27	0	4	0	0	0	0	310
08:30 AM	1	131	43	6	0	0	0	1	4	1	99	0	0	33	0	4	0	0	0	0	323
08:45 AM	0	114	33	0	0	0	0	0	7	0	123	0	0	34	0	3	0	0	0	0	314
Total	2	537	182	7	0	0	0	3	17	1	388	1	0	130	0	12	0	0	0	0	1280
Grand Total	2	1124	314	7	1	0	0	4	24	1	650	1	0	204	1	17	0	0	0	1	2351
Apprch %	0.1	77.7	21.7	0.5	20	0	0	80	3.6	0.1	96.2	0.1	0	91.9	0.5	7.7	0	0	0	100	
Total %	0.1	47.8	13.4	0.3	0	0	0	0.2	1	0	27.6	0	0	8.7	0	0.7	0	0	0	0	
Cars	2	1108	311	7	1	0	0	4	24	1	635	1	0	194	1	17	0	0	0	1	2307
% Cars	100	98.6	99	100	100	0	0	100	100	100	97.7	100	0	95.1	100	100	0	0	0	100	98.1
Trucks	0	16	3	0	0	0	0	0	0	0	15	0	0	10	0	0	0	0	0	0	44
% Trucks	0	1.4	1	0	0	0	0	0	0	0	2.3	0	0	4.9	0	0	0	0	0	0	1.9

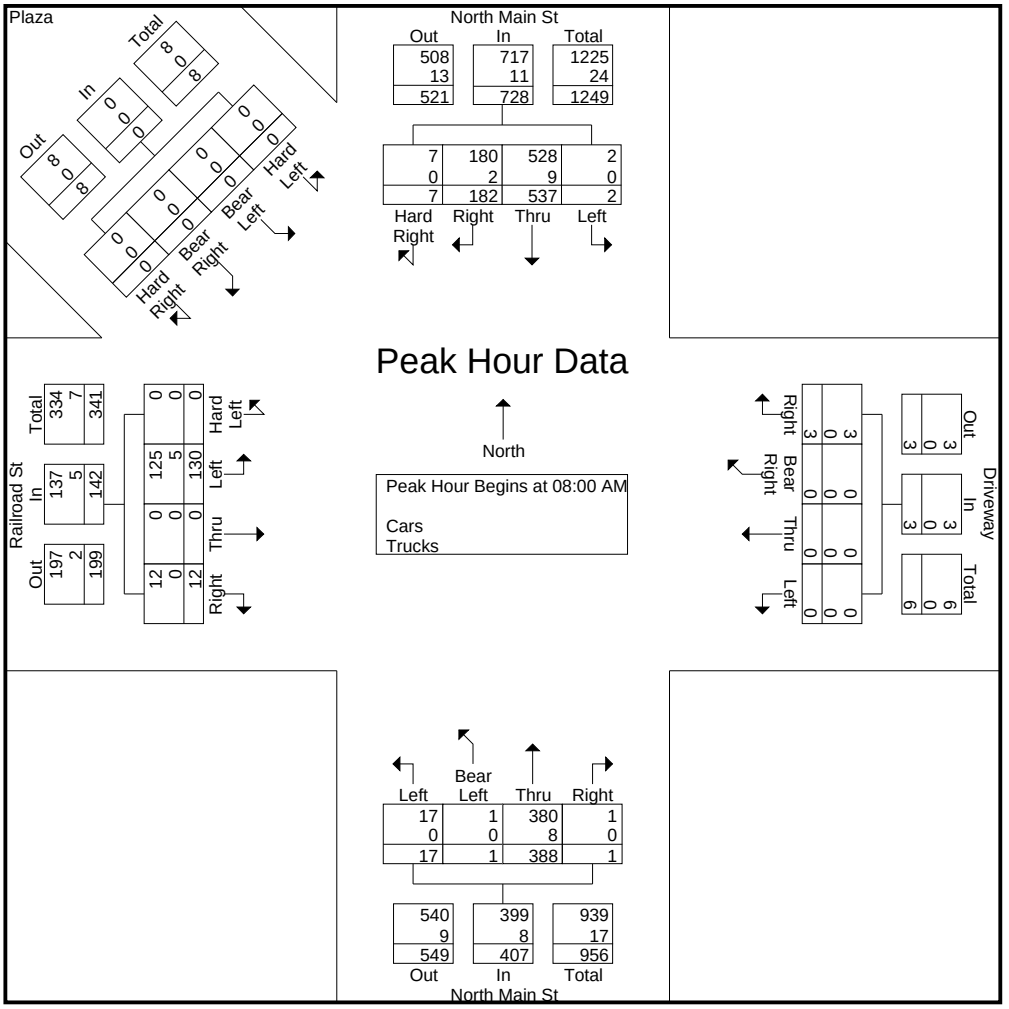
	North Main St From North					Driveway From East					North Main St From South					Railroad St From West					Plaza From Northwest					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 08:00 AM																										
08:00 AM	**1**	**151**	**55**	0	**207**	0	0	0	**2**	**2**	2	0	84	**1**	87	0	**36**	0	1	**37**	0	0	0	0	0	**333**
08:15 AM	0	141	51	1	193	0	0	0	0	0	4	0	82	0	86	0	27	0	**4**	31	0	0	0	0	0	310
08:30 AM	1	131	43	**6**	181	0	0	0	1	1	4	**1**	99	0	104	0	33	0	4	37	0	0	0	0	0	323
08:45 AM	0	114	33	0	147	0	0	0	0	0	**7**	0	**123**	0	**130**	0	34	0	3	37	0	0	0	0	0	314
Total Volume	2	537	182	7	728	0	0	0	3	3	17	1	388	1	407	0	130	0	12	142	0	0	0	0	0	1280
% App. Total	0.3	73.8	25	1		0	0	0	100		4.2	0.2	95.3	0.2		0	91.5	0	8.5		0	0	0	0		
PHF	.500	.889	.827	.292	.879	.000	.000	.000	.375	.375	.607	.250	.789	.250	.783	.000	.903	.000	.750	.959	.000	.000	.000	.000	.000	.961
Cars	2	528	180	7	717	0	0	0	3	3	17	1	380	1	399	0	125	0	12	137	0	0	0	0	0	1256
% Cars	100	98.3	98.9	100	98.5	0	0	0	100	100	100	100	97.9	100	98.0	0	96.2	0	100	96.5	0	0	0	0	0	98.1
Trucks	0	9	2	0	11	0	0	0	0	0	0	0	8	0	8	0	5	0	0	5	0	0	0	0	0	24
% Trucks	0	1.7	1.1	0	1.5	0	0	0	0	0	0	0	2.1	0	2.0	0	3.8	0	0	3.5	0	0	0	0	0	1.9

Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
Page No : 2



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

Peak Hour for Each Approach Begins at:

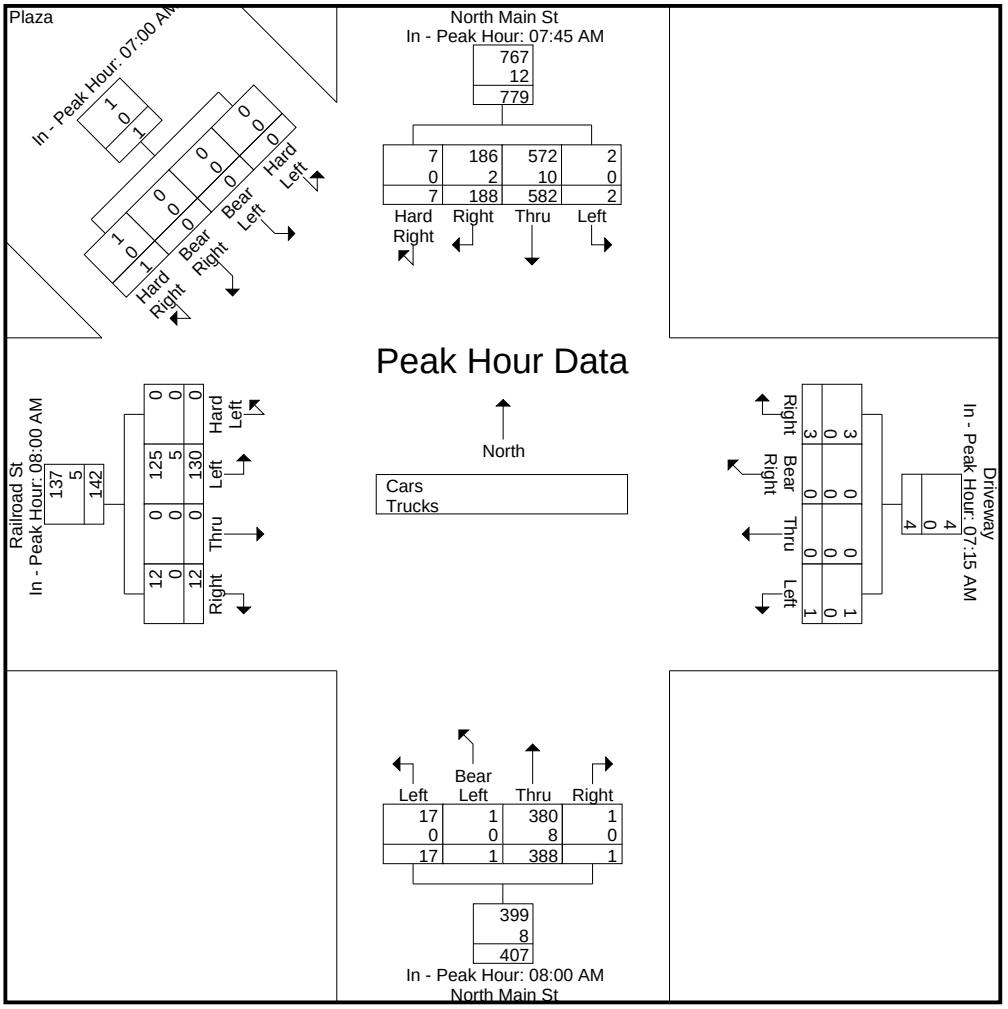
	07:45 AM					07:15 AM					08:00 AM					08:00 AM					07:00 AM				
+0 mins.	0	**159**	39	0	198	**1**	0	0	0	1	2	0	84	**1**	87	0	**36**	0	1	**37**	0	0	0	0	0
+15 mins.	**1**	151	**55**	0	**207**	0	0	0	0	0	4	0	82	0	86	0	27	0	**4**	31	0	0	0	0	0
+30 mins.	0	141	51	1	193	0	0	0	1	1	4	**1**	99	0	104	0	33	0	4	37	0	0	0	0	0
+45 mins.	1	131	43	**6**	181	0	0	0	**2**	**2**	**7**	0	**123**	0	**130**	0	34	0	3	37	0	0	0	**1**	**1**
Total Volume	2	582	188	7	779	1	0	0	3	4	17	1	388	1	407	0	130	0	12	142	0	0	0	1	1
% App. Total	0.3	74.7	24.1	0.9		25	0	0	75		4.2	0.2	95.3	0.2		0	91.5	0	8.5		0	0	0	100	
PHF	.500	.915	.855	.292	.941	.250	.000	.000	.375	.500	.607	.250	.789	.250	.783	.000	.903	.000	.750	.959	.000	.000	.000	.250	.250
Cars	2	572	186	7	767	1	0	0	3	4	17	1	380	1	399	0	125	0	12	137	0	0	0	1	1
% Cars	100	98.3	98.9	100	98.5	100	0	0	100	100	100	100	97.9	100	98	0	96.2	0	100	96.5	0	0	0	100	100
Trucks	0	10	2	0	12	0	0	0	0	0	0	0	8	0	8	0	5	0	0	5	0	0	0	0	0
% Trucks	0	1.7	1.1	0	1.5	0	0	0	0	0	0	0	2.1	0	2	0	3.8	0	0	3.5	0	0	0	0	0

Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
Page No : 4

Groups Printed- Cars

	North Main St From North				Driveway From East				North Main St From South				Railroad St From West				Plaza From Northwest				
Start Time	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Int. Total
07:00 AM	0	149	19	0	0	0	0	0	0	0	54	0	0	16	0	1	0	0	0	0	239
07:15 AM	0	142	27	0	1	0	0	0	0	0	52	0	0	13	0	0	0	0	0	0	235
07:30 AM	0	132	46	0	0	0	0	0	3	0	74	0	0	21	1	4	0	0	0	0	281
07:45 AM	0	157	39	0	0	0	0	1	4	0	75	0	0	19	0	0	0	0	0	1	296
Total	0	580	131	0	1	0	0	1	7	0	255	0	0	69	1	5	0	0	0	1	1051
08:00 AM	1	148	55	0	0	0	0	2	2	0	82	1	0	35	0	1	0	0	0	0	327
08:15 AM	0	137	50	1	0	0	0	0	4	0	81	0	0	25	0	4	0	0	0	0	302
08:30 AM	1	130	42	6	0	0	0	1	4	1	97	0	0	32	0	4	0	0	0	0	318
08:45 AM	0	113	33	0	0	0	0	0	7	0	120	0	0	33	0	3	0	0	0	0	309
Total	2	528	180	7	0	0	0	3	17	1	380	1	0	125	0	12	0	0	0	0	1256
Grand Total	2	1108	311	7	1	0	0	4	24	1	635	1	0	194	1	17	0	0	0	1	2307
Apprch %	0.1	77.6	21.8	0.5	20	0	0	80	3.6	0.2	96.1	0.2	0	91.5	0.5	8	0	0	0	100	
Total %	0.1	48	13.5	0.3	0	0	0	0.2	1	0	27.5	0	0	8.4	0	0.7	0	0	0	0	

	North Main St From North					Driveway From East					North Main St From South					Railroad St From West					Plaza From Northwest					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 08:00 AM																										
08:00 AM	**1**	**148**	**55**	0	**204**	0	0	0	**2**	**2**	2	0	82	**1**	85	0	**35**	0	1	**36**	0	0	0	0	0	**327**
08:15 AM	0	137	50	1	188	0	0	0	0	0	4	0	81	0	85	0	25	0	**4**	29	0	0	0	0	0	302
08:30 AM	1	130	42	**6**	179	0	0	0	1	1	4	**1**	97	0	102	0	32	0	4	36	0	0	0	0	0	318
08:45 AM	0	113	33	0	146	0	0	0	0	0	**7**	0	**120**	0	**127**	0	33	0	3	36	0	0	0	0	0	309
Total Volume	2	528	180	7	717	0	0	0	3	3	17	1	380	1	399	0	125	0	12	137	0	0	0	0	0	1256
% App. Total	0.3	73.6	25.1	1		0	0	0	100		4.3	0.3	95.2	0.3		0	91.2	0	8.8		0	0	0	0		
PHF	.500	.892	.818	.292	.879	.000	.000	.000	.375	.375	.607	.250	.792	.250	.785	.000	.893	.000	.750	.951	.000	.000	.000	.000	.000	.960

Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
Page No : 7

Groups Printed- Trucks

	North Main St From North				Driveway From East				North Main St From South				Railroad St From West				Plaza From Northwest				
Start Time	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Int. Total
07:00 AM	0	2	1	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	7
07:15 AM	0	3	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	6
07:30 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	2	0	0	0	0	0	0	5
07:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	7	1	0	0	0	0	0	0	0	7	0	0	5	0	0	0	0	0	0	20
08:00 AM	0	3	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	6
08:15 AM	0	4	1	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	8
08:30 AM	0	1	1	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	5
08:45 AM	0	1	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	5
Total	0	9	2	0	0	0	0	0	0	0	8	0	0	5	0	0	0	0	0	0	24
Grand Total	0	16	3	0	0	0	0	0	0	0	15	0	0	10	0	0	0	0	0	0	44
Apprch %	0	84.2	15.8	0	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	0	
Total %	0	36.4	6.8	0	0	0	0	0	0	0	34.1	0	0	22.7	0	0	0	0	0	0	

	North Main St From North					Driveway From East					North Main St From South					Railroad St From West					Plaza From Northwest					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 08:00 AM																										
08:00 AM	0	3	0	0	3	0	0	0	0	0	0	0	2	0	2	0	1	0	0	1	0	0	0	0	0	6
08:15 AM	0	**4**	**1**	0	**5**	0	0	0	0	0	0	0	1	0	1	0	**2**	0	0	**2**	0	0	0	0	0	**8**
08:30 AM	0	1	1	0	2	0	0	0	0	0	0	0	2	0	2	0	1	0	0	1	0	0	0	0	0	5
08:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	**3**	0	**3**	0	1	0	0	1	0	0	0	0	0	5
Total Volume	0	9	2	0	11	0	0	0	0	0	0	0	8	0	8	0	5	0	0	5	0	0	0	0	0	24
% App. Total	0	81.8	18.2	0		0	0	0	0		0	0	100	0		0	100	0	0		0	0	0	0		
PHF	.000	.563	.500	.000	.550	.000	.000	.000	.000	.000	.000	.000	.667	.000	.667	.000	.625	.000	.000	.625	.000	.000	.000	.000	.000	.750

Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023

Groups Printed- Bikes Peds

	North Main St From North					Driveway From East					North Main St From South					Railroad St From West					Plaza From Northwest							
Start Time	Left	Thru	Right	Hard Right	Peds	Left	Thru	Bear Right	Right	Peds	Left	Bear Left	Thru	Right	Peds	Hard Left	Left	Thru	Right	Peds	Hard Left	Bear Left	Bear Right	Hard Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	3	0	3
07:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	1	4
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
07:45 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	4	0	4
Total	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	5	11	1	12
08:00 AM	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	5	0	5
08:15 AM	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	4
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	3	0	3
Total	0	0	0	0	2	0	0	0	0	2	0	0	0	0	1	0	0	0	0	3	0	0	0	0	6	14	0	14
Grand Total	0	0	1	0	4	0	0	0	0	2	0	0	0	0	1	0	0	0	0	7	0	0	0	0	11	25	1	26
Apprch %	0	0	100	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0				
Total %	0	0	100	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		96.2	3.8	

	North Main St From North					Driveway From East					North Main St From South					Railroad St From West					Plaza From Northwest					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 07:00 AM																										
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% App. Total	0	0	100	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
Page No : 1

Groups Printed- Cars - Trucks

	North Main St From North				Driveway From East				North Main St From South				Railroad St From West				Plaza From Northwest				
Start Time	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Int. Total
04:00 PM	0	106	48	0	0	0	0	0	8	0	130	0	1	62	0	3	0	0	1	1	360
04:15 PM	0	113	41	0	0	0	0	0	13	0	145	0	2	76	0	6	1	0	1	0	398
04:30 PM	0	85	34	0	0	0	0	0	7	0	129	0	0	58	0	8	2	0	0	2	325
04:45 PM	0	95	36	3	0	0	0	0	12	0	129	0	0	49	0	11	0	0	2	2	339
Total	0	399	159	3	0	0	0	0	40	0	533	0	3	245	0	28	3	0	4	5	1422
05:00 PM	0	122	46	0	0	0	0	0	3	0	132	0	2	68	1	6	2	0	2	1	385
05:15 PM	2	100	44	0	0	2	0	0	12	1	139	0	0	57	0	7	0	0	0	0	364
05:30 PM	0	112	37	2	0	0	0	0	15	0	138	0	0	67	0	7	0	0	1	0	379
05:45 PM	0	95	33	0	1	0	0	0	8	0	129	0	0	48	1	2	1	0	0	0	318
Total	2	429	160	2	1	2	0	0	38	1	538	0	2	240	2	22	3	0	3	1	1446
Grand Total	2	828	319	5	1	2	0	0	78	1	1071	0	5	485	2	50	6	0	7	6	2868
Apprch %	0.2	71.8	27.6	0.4	33.3	66.7	0	0	6.8	0.1	93.1	0	0.9	89.5	0.4	9.2	31.6	0	36.8	31.6	
Total %	0.1	28.9	11.1	0.2	0	0.1	0	0	2.7	0	37.3	0	0.2	16.9	0.1	1.7	0.2	0	0.2	0.2	
Cars	2	818	315	5	1	2	0	0	78	1	1059	0	5	479	2	50	6	0	7	6	2836
% Cars	100	98.8	98.7	100	100	100	0	0	100	100	98.9	0	100	98.8	100	100	100	0	100	100	98.9
Trucks	0	10	4	0	0	0	0	0	0	0	12	0	0	6	0	0	0	0	0	0	32
% Trucks	0	1.2	1.3	0	0	0	0	0	0	0	1.1	0	0	1.2	0	0	0	0	0	0	1.1

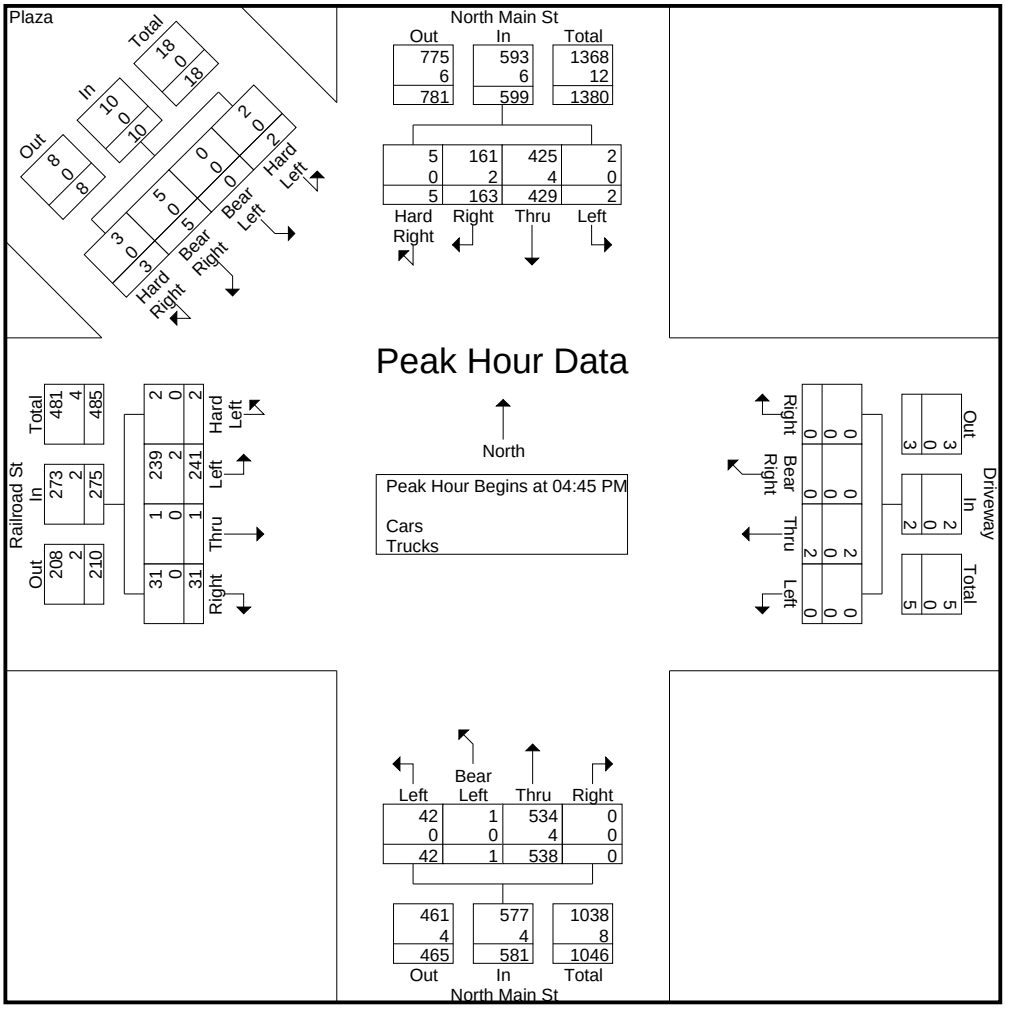
	North Main St From North					Driveway From East					North Main St From South					Railroad St From West					Plaza From Northwest					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:45 PM																										
04:45 PM	0	95	36	**3**	134	0	0	0	0	0	12	0	129	0	141	0	49	0	**11**	60	0	0	**2**	**2**	4	339
05:00 PM	0	**122**	**46**	0	**168**	0	0	0	0	0	3	0	132	0	135	**2**	**68**	**1**	6	**77**	**2**	0	2	1	**5**	**385**
05:15 PM	**2**	100	44	0	146	0	**2**	0	0	**2**	12	**1**	**139**	0	152	0	57	0	7	64	0	0	0	0	0	364
05:30 PM	0	112	37	2	151	0	0	0	0	0	**15**	0	138	0	**153**	0	67	0	7	74	0	0	1	0	1	379
Total Volume	2	429	163	5	599	0	2	0	0	2	42	1	538	0	581	2	241	1	31	275	2	0	5	3	10	1467
% App. Total	0.3	71.6	27.2	0.8		0	100	0	0		7.2	0.2	92.6	0		0.7	87.6	0.4	11.3		20	0	50	30		
PHF	.250	.879	.886	.417	.891	.000	.250	.000	.000	.250	.700	.250	.968	.000	.949	.250	.886	.250	.705	.893	.250	.000	.625	.375	.500	.953
Cars	2	425	161	5	593	0	2	0	0	2	42	1	534	0	577	2	239	1	31	273	2	0	5	3	10	1455
% Cars	100	99.1	98.8	100	99.0	0	100	0	0	100	100	100	99.3	0	99.3	100	99.2	100	100	99.3	100	0	100	100	100	99.2
Trucks	0	4	2	0	6	0	0	0	0	0	0	0	4	0	4	0	2	0	0	2	0	0	0	0	0	12
% Trucks	0	0.9	1.2	0	1.0	0	0	0	0	0	0	0	0.7	0	0.7	0	0.8	0	0	0.7	0	0	0	0	0	0.8

Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
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:

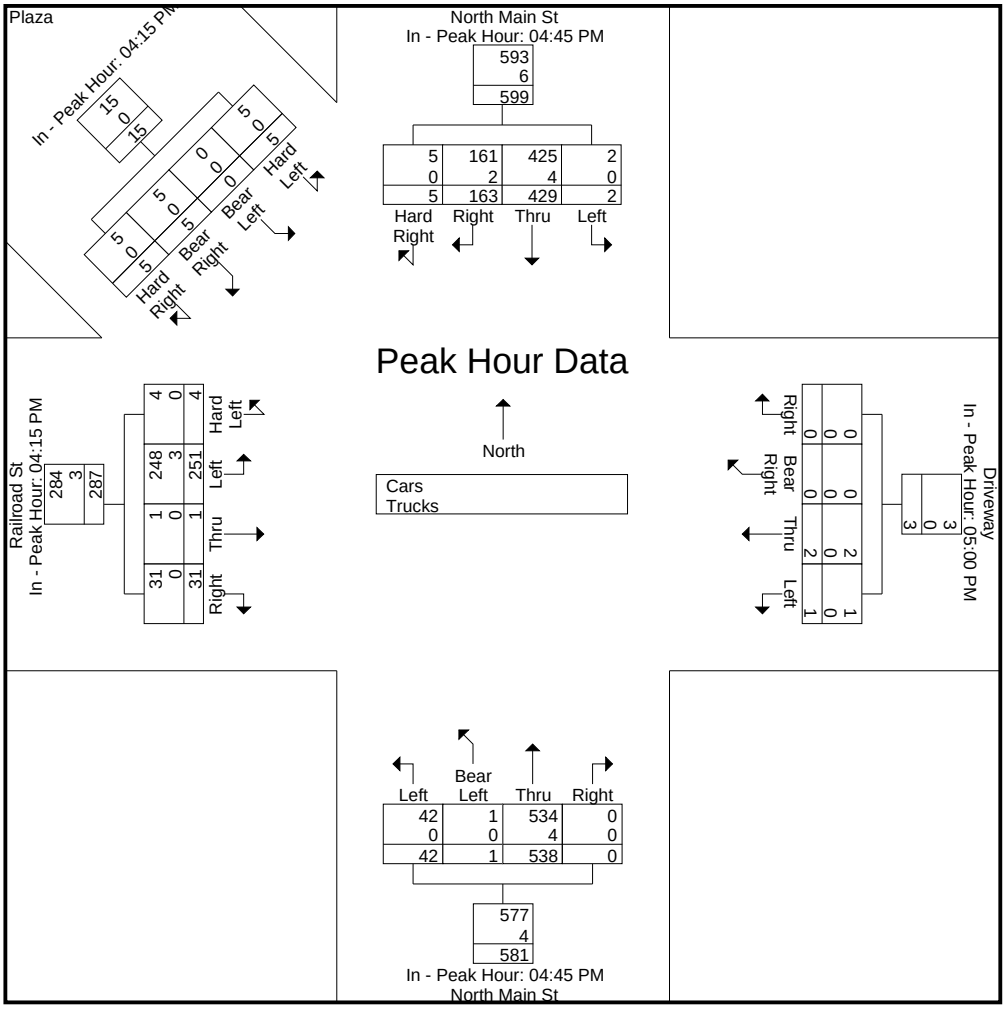
	04:45 PM					05:00 PM					04:45 PM					04:15 PM					04:15 PM				
+0 mins.	0	95	36	**3**	134	0	0	0	0	0	12	0	129	0	141	**2**	**76**	0	6	**84**	1	0	1	0	2
+15 mins.	0	**122**	**46**	0	**168**	0	**2**	0	0	**2**	3	0	132	0	135	0	58	0	8	66	**2**	0	0	**2**	4
+30 mins.	**2**	100	44	0	146	0	0	0	0	0	12	**1**	**139**	0	152	0	49	0	**11**	60	0	0	**2**	2	4
+45 mins.	0	112	37	2	151	**1**	0	0	0	1	**15**	0	138	0	**153**	2	68	**1**	6	77	2	0	2	1	**5**
Total Volume	2	429	163	5	599	1	2	0	0	3	42	1	538	0	581	4	251	1	31	287	5	0	5	5	15
% App. Total	0.3	71.6	27.2	0.8		33.3	66.7	0	0		7.2	0.2	92.6	0		1.4	87.5	0.3	10.8		33.3	0	33.3	33.3	
PHF	.250	.879	.886	.417	.891	.250	.250	.000	.000	.375	.700	.250	.968	.000	.949	.500	.826	.250	.705	.854	.625	.000	.625	.625	.750
Cars	2	425	161	5	593	1	2	0	0	3	42	1	534	0	577	4	248	1	31	284	5	0	5	5	15
% Cars	100	99.1	98.8	100	99	100	100	0	0	100	100	100	99.3	0	99.3	100	98.8	100	100	99	100	0	100	100	100
Trucks	0	4	2	0	6	0	0	0	0	0	0	0	4	0	4	0	3	0	0	3	0	0	0	0	0
% Trucks	0	0.9	1.2	0	1	0	0	0	0	0	0	0	0.7	0	0.7	0	1.2	0	0	1	0	0	0	0	0

Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
Page No : 4

Groups Printed- Cars

	North Main St From North				Driveway From East				North Main St From South				Railroad St From West				Plaza From Northwest				
Start Time	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Int. Total
04:00 PM	0	106	46	0	0	0	0	0	8	0	128	0	1	61	0	3	0	0	1	1	355
04:15 PM	0	111	41	0	0	0	0	0	13	0	141	0	2	76	0	6	1	0	1	0	392
04:30 PM	0	82	34	0	0	0	0	0	7	0	128	0	0	56	0	8	2	0	0	2	319
04:45 PM	0	93	36	3	0	0	0	0	12	0	128	0	0	49	0	11	0	0	2	2	336
Total	0	392	157	3	0	0	0	0	40	0	525	0	3	242	0	28	3	0	4	5	1402
05:00 PM	0	122	45	0	0	0	0	0	3	0	131	0	2	67	1	6	2	0	2	1	382
05:15 PM	2	99	43	0	0	2	0	0	12	1	138	0	0	57	0	7	0	0	0	0	361
05:30 PM	0	111	37	2	0	0	0	0	15	0	137	0	0	66	0	7	0	0	1	0	376
05:45 PM	0	94	33	0	1	0	0	0	8	0	128	0	0	47	1	2	1	0	0	0	315
Total	2	426	158	2	1	2	0	0	38	1	534	0	2	237	2	22	3	0	3	1	1434
Grand Total	2	818	315	5	1	2	0	0	78	1	1059	0	5	479	2	50	6	0	7	6	2836
Apprch %	0.2	71.8	27.6	0.4	33.3	66.7	0	0	6.9	0.1	93.1	0	0.9	89.4	0.4	9.3	31.6	0	36.8	31.6	
Total %	0.1	28.8	11.1	0.2	0	0.1	0	0	2.8	0	37.3	0	0.2	16.9	0.1	1.8	0.2	0	0.2	0.2	

	North Main St From North					Driveway From East					North Main St From South					Railroad St From West					Plaza From Northwest					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:45 PM																										
04:45 PM	0	93	36	**3**	132	0	0	0	0	0	12	0	128	0	140	0	49	0	**11**	60	0	0	**2**	**2**	4	336
05:00 PM	0	**122**	**45**	0	**167**	0	0	0	0	0	3	0	131	0	134	**2**	**67**	**1**	6	**76**	**2**	0	2	1	**5**	**382**
05:15 PM	**2**	99	43	0	144	0	**2**	0	0	**2**	12	**1**	**138**	0	151	0	57	0	7	64	0	0	0	0	0	361
05:30 PM	0	111	37	2	150	0	0	0	0	0	**15**	0	137	0	**152**	0	66	0	7	73	0	0	1	0	1	376
Total Volume	2	425	161	5	593	0	2	0	0	2	42	1	534	0	577	2	239	1	31	273	2	0	5	3	10	1455
% App. Total	0.3	71.7	27.2	0.8		0	100	0	0		7.3	0.2	92.5	0		0.7	87.5	0.4	11.4		20	0	50	30		
PHF	.250	.871	.894	.417	.888	.000	.250	.000	.000	.250	.700	.250	.967	.000	.949	.250	.892	.250	.705	.898	.250	.000	.625	.375	.500	.952

Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
Page No : 7

Groups Printed- Trucks

	North Main St From North				Driveway From East				North Main St From South				Railroad St From West				Plaza From Northwest				
Start Time	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Int. Total
04:00 PM	0	0	2	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	5
04:15 PM	0	2	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	6
04:30 PM	0	3	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	6
04:45 PM	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
Total	0	7	2	0	0	0	0	0	0	0	8	0	0	3	0	0	0	0	0	0	20
05:00 PM	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3
05:15 PM	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
05:30 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3
05:45 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3
Total	0	3	2	0	0	0	0	0	0	0	4	0	0	3	0	0	0	0	0	0	12
Grand Total	0	10	4	0	0	0	0	0	0	0	12	0	0	6	0	0	0	0	0	0	32
Apprch %	0	71.4	28.6	0	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	0	
Total %	0	31.2	12.5	0	0	0	0	0	0	0	37.5	0	0	18.8	0	0	0	0	0	0	

	North Main St From North					Driveway From East					North Main St From South					Railroad St From West					Plaza From Northwest					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:00 PM																										
04:00 PM	0	0	**2**	0	2	0	0	0	0	0	0	0	2	0	2	0	1	0	0	1	0	0	0	0	0	5
04:15 PM	0	2	0	0	2	0	0	0	0	0	0	0	**4**	0	**4**	0	0	0	0	0	0	0	0	0	0	**6**
04:30 PM	0	**3**	0	0	**3**	0	0	0	0	0	0	0	1	0	1	0	**2**	0	0	**2**	0	0	0	0	0	6
04:45 PM	0	2	0	0	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	3
Total Volume	0	7	2	0	9	0	0	0	0	0	0	0	8	0	8	0	3	0	0	3	0	0	0	0	0	20
% App. Total	0	77.8	22.2	0		0	0	0	0		0	0	100	0		0	100	0	0		0	0	0	0		
PHF	.000	.583	.250	.000	.750	.000	.000	.000	.000	.000	.000	.000	.500	.000	.500	.000	.375	.000	.000	.375	.000	.000	.000	.000	.000	.833

Accurate Counts

978-664-2565

N/S Street : North Main Street
E/W Street : Driveway / Railroad Street
City/State : Andover, MA
Weather : Clear

File Name : 89750001
Site Code : 89750001
Start Date : 9/20/2023
Page No : 10

Groups Printed- Bikes Peds

	North Main St From North					Driveway From East					North Main St From South					Railroad St From West					Plaza From Northwest							
Start Time	Left	Thru	Right	Hard Right	Peds	Left	Thru	Bear Right	Right	Peds	Left	Bear Left	Thru	Right	Peds	Hard Left	Left	Thru	Right	Peds	Hard Left	Bear Left	Bear Right	Hard Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5	11	0	11
04:15 PM	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	10	0	10
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	4	6	0	6
Total	0	0	0	0	8	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	15	27	0	27
05:00 PM	0	0	0	0	3	0	0	0	0	1	1	0	0	0	2	0	1	0	0	1	0	0	0	0	4	11	2	13
05:15 PM	0	0	0	0	3	0	0	0	0	3	0	0	0	0	3	0	0	0	1	0	0	0	0	0	2	11	1	12
05:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	0	5
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	7	0	0	0	0	4	1	0	0	0	5	0	1	0	1	1	0	0	0	0	10	27	3	30
Grand Total	0	0	0	0	15	0	0	0	0	5	1	0	0	0	5	0	1	0	1	4	0	0	0	0	25	54	3	57
Apprch %	0	0	0	0		0	0	0	0		100	0	0	0		0	50	0	50		0	0	0	0				
Total %	0	0	0	0		0	0	0	0		33.3	0	0	0		0	33.3	0	33.3		0	0	0	0		94.7	5.3	

	North Main St From North					Driveway From East					North Main St From South					Railroad St From West					Plaza From Northwest					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:30 PM																										
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	**1**	0	**1**	0	0	**1**	0	0	0	0	0	**2**
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	1	0	0	0	0	0	1
Total Volume	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	1	2	0	0	0	0	0	3
% App. Total	0	0	0	0		0	0	0	0		100	0	0	0		0	50	0	50		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.000	.250	.000	.250	.000	.250	.500	.000	.000	.000	.000	.000	.375

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023

Groups Printed- Cars - Trucks

	Route 28 From North		Route 28 From South		Lewis St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
07:00 AM	155	0	0	56	0	1	212
07:15 AM	145	0	1	58	1	2	207
07:30 AM	129	0	1	76	1	2	209
07:45 AM	150	2	1	73	1	2	229
Total	579	2	3	263	3	7	857
08:00 AM	159	1	0	89	0	2	251
08:15 AM	139	0	0	80	1	0	220
08:30 AM	141	2	2	104	2	1	252
08:45 AM	116	3	0	131	0	3	253
Total	555	6	2	404	3	6	976
Grand Total	1134	8	5	667	6	13	1833
Apprch %	99.3	0.7	0.7	99.3	31.6	68.4	
Total %	61.9	0.4	0.3	36.4	0.3	0.7	
Cars	1118	8	5	653	6	13	1803
% Cars	98.6	100	100	97.9	100	100	98.4
Trucks	16	0	0	14	0	0	30
% Trucks	1.4	0	0	2.1	0	0	1.6

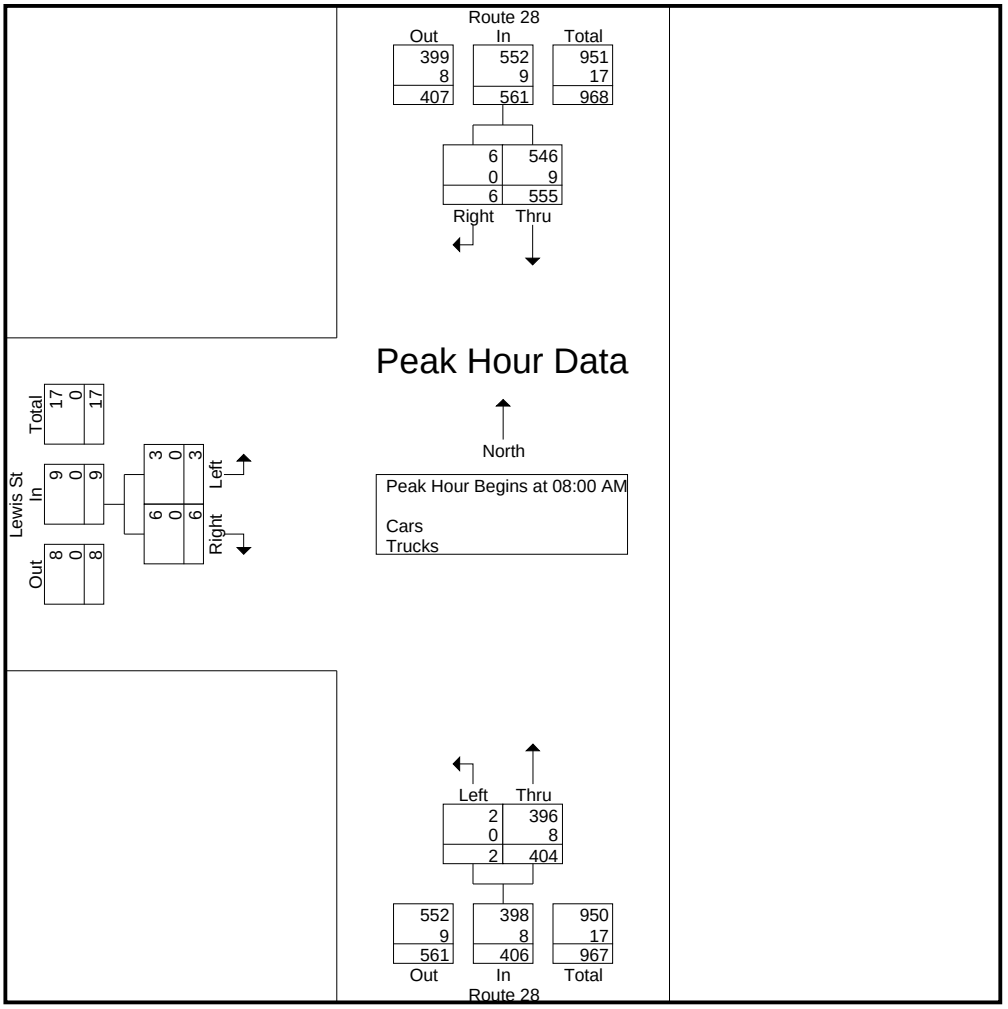
	Route 28 From North			Route 28 From South			Lewis St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**159**	1	**160**	0	89	89	0	2	2	251
08:15 AM	139	0	139	0	80	80	1	0	1	220
08:30 AM	141	2	143	**2**	104	106	**2**	1	**3**	252
08:45 AM	116	**3**	119	0	**131**	**131**	0	**3**	3	**253**
Total Volume	555	6	561	2	404	406	3	6	9	976
% App. Total	98.9	1.1		0.5	99.5		33.3	66.7		
PHF	.873	.500	.877	.250	.771	.775	.375	.500	.750	.964
Cars	546	6	552	2	396	398	3	6	9	959
% Cars	98.4	100	98.4	100	98.0	98.0	100	100	100	98.3
Trucks	9	0	9	0	8	8	0	0	0	17
% Trucks	1.6	0	1.6	0	2.0	2.0	0	0	0	1.7

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023
Page No : 2



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

Peak Hour for Each Approach Begins at:

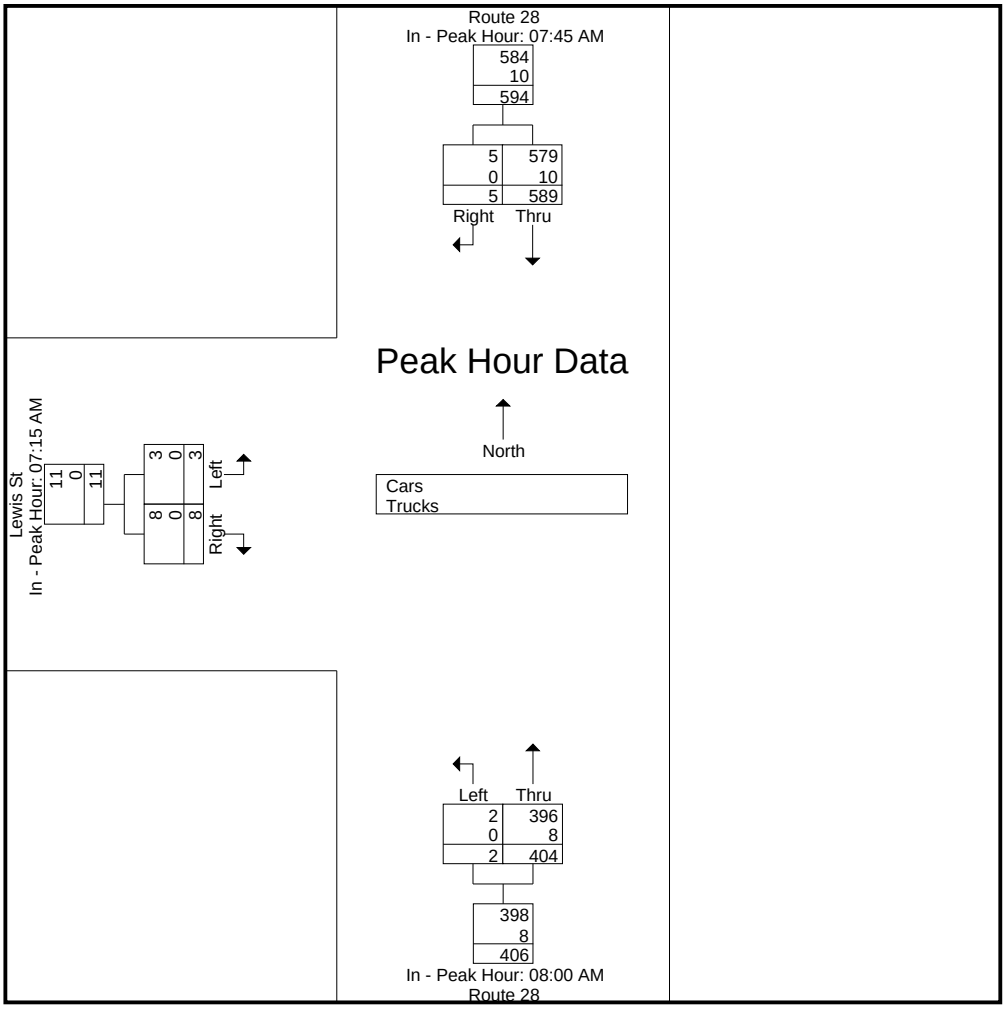
	07:45 AM			08:00 AM			07:15 AM		
+0 mins.	150	**2**	152	0	89	89	**1**	**2**	**3**
+15 mins.	**159**	1	**160**	0	80	80	1	2	3
+30 mins.	139	0	139	**2**	104	106	1	2	3
+45 mins.	141	2	143	0	**131**	**131**	0	2	2
Total Volume	589	5	594	2	404	406	3	8	11
% App. Total	99.2	0.8		0.5	99.5		27.3	72.7	
PHF	.926	.625	.928	.250	.771	.775	.750	1.000	.917
Cars	579	5	584	2	396	398	3	8	11
% Cars	98.3	100	98.3	100	98	98	100	100	100
Trucks	10	0	10	0	8	8	0	0	0
% Trucks	1.7	0	1.7	0	2	2	0	0	0

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023

Groups Printed- Cars

	Route 28 From North		Route 28 From South		Lewis St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
07:00 AM	153	0	0	55	0	1	209
07:15 AM	142	0	1	56	1	2	202
07:30 AM	129	0	1	73	1	2	206
07:45 AM	148	2	1	73	1	2	227
Total	572	2	3	257	3	7	844
08:00 AM	156	1	0	87	0	2	246
08:15 AM	136	0	0	78	1	0	215
08:30 AM	139	2	2	103	2	1	249
08:45 AM	115	3	0	128	0	3	249
Total	546	6	2	396	3	6	959
Grand Total	1118	8	5	653	6	13	1803
Apprch %	99.3	0.7	0.8	99.2	31.6	68.4	
Total %	62	0.4	0.3	36.2	0.3	0.7	

	Route 28 From North			Route 28 From South			Lewis St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**156**	1	**157**	0	87	87	0	2	2	246
08:15 AM	136	0	136	0	78	78	1	0	1	215
08:30 AM	139	2	141	**2**	103	105	**2**	1	**3**	**249**
08:45 AM	115	**3**	118	0	**128**	**128**	0	**3**	3	249
Total Volume	546	6	552	2	396	398	3	6	9	959
% App. Total	98.9	1.1		0.5	99.5		33.3	66.7		
PHF	.875	.500	.879	.250	.773	.777	.375	.500	.750	.963

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023

Groups Printed- Trucks

	Route 28 From North		Route 28 From South		Lewis St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
07:00 AM	2	0	0	1	0	0	3
07:15 AM	3	0	0	2	0	0	5
07:30 AM	0	0	0	3	0	0	3
07:45 AM	2	0	0	0	0	0	2
Total	7	0	0	6	0	0	13
08:00 AM	3	0	0	2	0	0	5
08:15 AM	3	0	0	2	0	0	5
08:30 AM	2	0	0	1	0	0	3
08:45 AM	1	0	0	3	0	0	4
Total	9	0	0	8	0	0	17
Grand Total	16	0	0	14	0	0	30
Apprch %	100	0	0	100	0	0	
Total %	53.3	0	0	46.7	0	0	

	Route 28 From North			Route 28 From South			Lewis St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**3**	0	**3**	0	2	2	0	0	0	**5**
08:15 AM	3	0	3	0	2	2	0	0	0	5
08:30 AM	2	0	2	0	1	1	0	0	0	3
08:45 AM	1	0	1	0	**3**	**3**	0	0	0	4
Total Volume	9	0	9	0	8	8	0	0	0	17
% App. Total	100	0		0	100		0	0		
PHF	.750	.000	.750	.000	.667	.667	.000	.000	.000	.850

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023

Groups Printed- Bikes Peds

	Route 28 From North			Route 28 From South			Lewis St From West					
Start Time	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	1	1	0	1
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	2	2	0	2
07:45 AM	0	0	0	0	0	0	0	0	3	3	0	3
Total	0	0	0	0	0	0	0	0	6	6	0	6
08:00 AM	0	0	0	0	0	0	0	0	3	3	0	3
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	3	0	0	2	5	0	5
08:45 AM	0	0	0	0	0	6	0	0	2	8	0	8
Total	0	0	0	0	0	9	0	0	7	16	0	16
Grand Total	0	0	0	0	0	9	0	0	13	22	0	22
Apprch %	0	0		0	0		0	0				
Total %										100	0	

	Route 28 From North			Route 28 From South			Lewis St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023

Groups Printed- Cars - Trucks

	Route 28 From North		Route 28 From South		Lewis St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
04:00 PM	113	2	1	143	0	3	262
04:15 PM	114	2	2	141	0	2	261
04:30 PM	91	1	0	142	0	1	235
04:45 PM	100	0	2	143	1	2	248
Total	418	5	5	569	1	8	1006
05:00 PM	125	1	0	136	1	0	263
05:15 PM	109	0	0	159	0	0	268
05:30 PM	114	3	1	147	0	2	267
05:45 PM	97	0	0	139	0	0	236
Total	445	4	1	581	1	2	1034
Grand Total	863	9	6	1150	2	10	2040
Apprch %	99	1	0.5	99.5	16.7	83.3	
Total %	42.3	0.4	0.3	56.4	0.1	0.5	
Cars	854	9	6	1139	2	10	2020
% Cars	99	100	100	99	100	100	99
Trucks	9	0	0	11	0	0	20
% Trucks	1	0	0	1	0	0	1

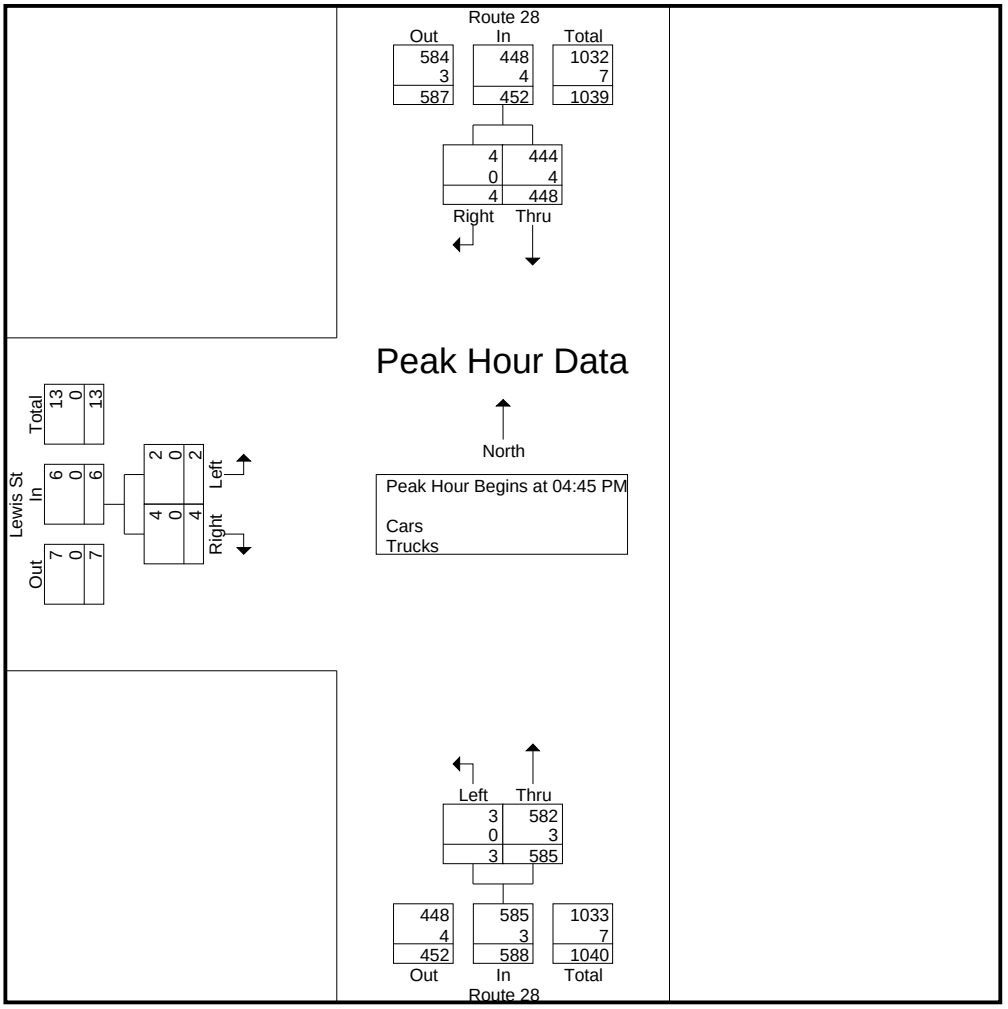
	Route 28 From North			Route 28 From South			Lewis St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	100	0	100	**2**	143	145	**1**	**2**	**3**	248
05:00 PM	**125**	1	**126**	0	136	136	1	0	1	263
05:15 PM	109	0	109	0	**159**	**159**	0	0	0	**268**
05:30 PM	114	**3**	117	1	147	148	0	2	2	267
Total Volume	448	4	452	3	585	588	2	4	6	1046
% App. Total	99.1	0.9		0.5	99.5		33.3	66.7		
PHF	.896	.333	.897	.375	.920	.925	.500	.500	.500	.976
Cars	444	4	448	3	582	585	2	4	6	1039
% Cars	99.1	100	99.1	100	99.5	99.5	100	100	100	99.3
Trucks	4	0	4	0	3	3	0	0	0	7
% Trucks	0.9	0	0.9	0	0.5	0.5	0	0	0	0.7

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023
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:

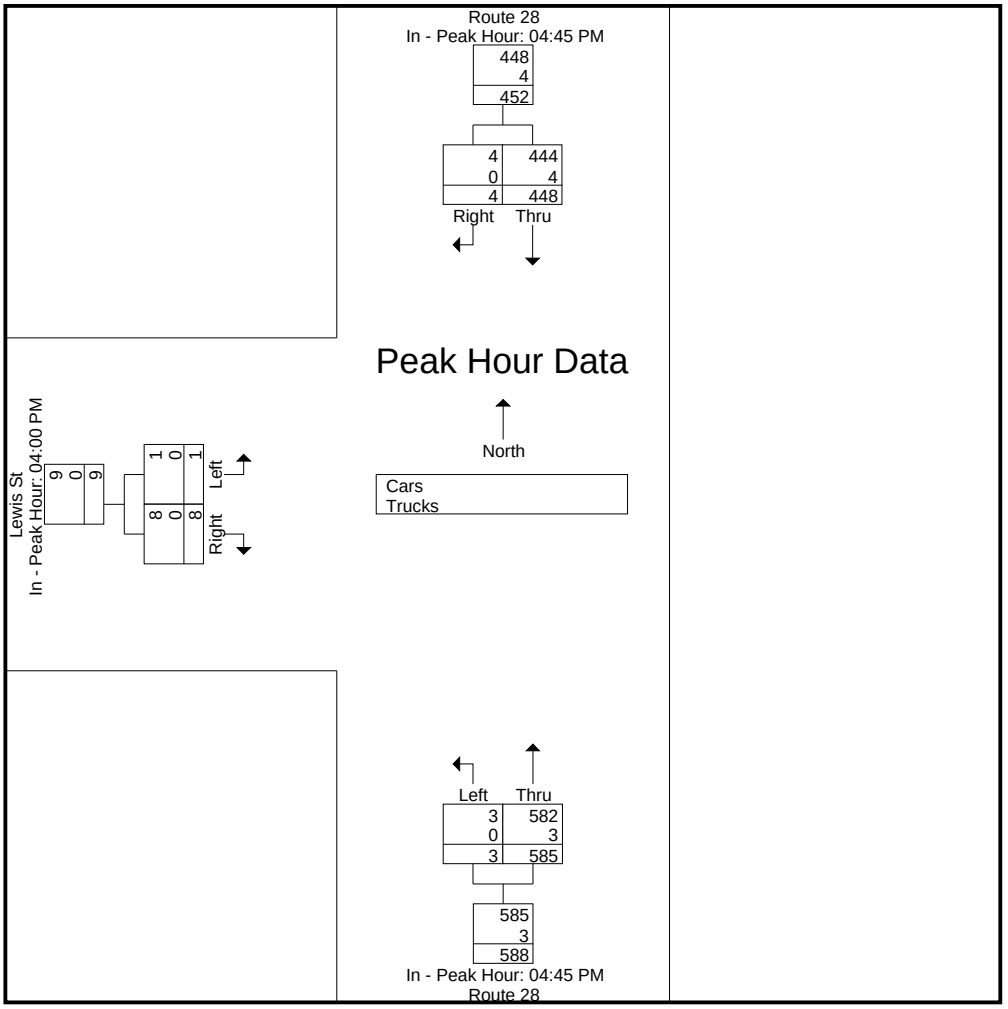
	04:45 PM			04:45 PM			04:00 PM		
+0 mins.	100	0	100	**2**	143	145	0	**3**	**3**
+15 mins.	**125**	1	**126**	0	136	136	0	2	2
+30 mins.	109	0	109	0	**159**	**159**	0	1	1
+45 mins.	114	**3**	117	1	147	148	**1**	2	3
Total Volume	448	4	452	3	585	588	1	8	9
% App. Total	99.1	0.9		0.5	99.5		11.1	88.9	
PHF	.896	.333	.897	.375	.920	.925	.250	.667	.750
Cars	444	4	448	3	582	585	1	8	9
% Cars	99.1	100	99.1	100	99.5	99.5	100	100	100
Trucks	4	0	4	0	3	3	0	0	0
% Trucks	0.9	0	0.9	0	0.5	0.5	0	0	0

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023

Groups Printed- Cars

	Route 28 From North		Route 28 From South		Lewis St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
04:00 PM	113	2	1	140	0	3	259
04:15 PM	112	2	2	138	0	2	256
04:30 PM	89	1	0	141	0	1	232
04:45 PM	98	0	2	143	1	2	246
Total	412	5	5	562	1	8	993
05:00 PM	125	1	0	135	1	0	262
05:15 PM	108	0	0	158	0	0	266
05:30 PM	113	3	1	146	0	2	265
05:45 PM	96	0	0	138	0	0	234
Total	442	4	1	577	1	2	1027
Grand Total	854	9	6	1139	2	10	2020
Apprch %	99	1	0.5	99.5	16.7	83.3	
Total %	42.3	0.4	0.3	56.4	0.1	0.5	

	Route 28 From North			Route 28 From South			Lewis St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	98	0	98	**2**	143	145	**1**	**2**	**3**	246
05:00 PM	**125**	1	**126**	0	135	135	1	0	1	262
05:15 PM	108	0	108	0	**158**	**158**	0	0	0	**266**
05:30 PM	113	**3**	116	1	146	147	0	2	2	265
Total Volume	444	4	448	3	582	585	2	4	6	1039
% App. Total	99.1	0.9		0.5	99.5		33.3	66.7		
PHF	.888	.333	.889	.375	.921	.926	.500	.500	.500	.977

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023

Groups Printed- Trucks

	Route 28 From North		Route 28 From South		Lewis St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
04:00 PM	0	0	0	3	0	0	3
04:15 PM	2	0	0	3	0	0	5
04:30 PM	2	0	0	1	0	0	3
04:45 PM	2	0	0	0	0	0	2
Total	6	0	0	7	0	0	13
05:00 PM	0	0	0	1	0	0	1
05:15 PM	1	0	0	1	0	0	2
05:30 PM	1	0	0	1	0	0	2
05:45 PM	1	0	0	1	0	0	2
Total	3	0	0	4	0	0	7
Grand Total	9	0	0	11	0	0	20
Apprch %	100	0	0	100	0	0	
Total %	45	0	0	55	0	0	

	Route 28 From North			Route 28 From South			Lewis St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	0	0	0	**3**	**3**	0	0	0	3
04:15 PM	**2**	0	**2**	0	3	3	0	0	0	**5**
04:30 PM	2	0	2	0	1	1	0	0	0	3
04:45 PM	2	0	2	0	0	0	0	0	0	2
Total Volume	6	0	6	0	7	7	0	0	0	13
% App. Total	100	0		0	100		0	0		
PHF	.750	.000	.750	.000	.583	.583	.000	.000	.000	.650

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Lewis Street
City/State : Andover, MA
Weather : Clear

File Name : 89750002
Site Code : 89750002
Start Date : 9/20/2023

Groups Printed- Bikes Peds

	Route 28 From North			Route 28 From South			Lewis St From West					
Start Time	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	1	1	0	1
04:15 PM	0	0	0	0	0	3	0	0	5	8	0	8
04:30 PM	0	0	0	0	0	1	0	0	2	3	0	3
04:45 PM	0	0	0	0	0	0	0	0	1	1	0	1
Total	0	0	0	0	0	4	0	0	9	13	0	13
05:00 PM	0	0	0	0	1	0	0	0	2	2	1	3
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	1	0	0	0	0	1	0	0	0	1	1	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	1	1	0	0	2	3	2	5
Grand Total	1	0	0	0	1	5	0	0	11	16	2	18
Apprch %	100	0		0	100		0	0				
Total %	50	0		0	50		0	0		88.9	11.1	

	Route 28 From North			Route 28 From South			Lewis St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	**1**	**1**	0	0	0	**1**
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	**1**	0	**1**	0	0	0	0	0	0	1
Total Volume	1	0	1	0	1	1	0	0	0	2
% App. Total	100	0		0	100		0	0		
PHF	.250	.000	.250	.000	.250	.250	.000	.000	.000	.500

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023

Groups Printed- Cars - Trucks

	Route 28 From North		Route 28 From South		Pearson St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
07:00 AM	160	5	3	51	2	6	227
07:15 AM	142	3	6	55	4	13	223
07:30 AM	121	6	15	76	4	11	233
07:45 AM	137	6	16	74	2	11	246
Total	560	20	40	256	12	41	929
08:00 AM	159	4	11	88	6	13	281
08:15 AM	133	7	11	79	0	11	241
08:30 AM	126	13	12	98	12	19	280
08:45 AM	115	7	11	128	6	18	285
Total	533	31	45	393	24	61	1087
Grand Total	1093	51	85	649	36	102	2016
Apprch %	95.5	4.5	11.6	88.4	26.1	73.9	
Total %	54.2	2.5	4.2	32.2	1.8	5.1	
Cars	1078	51	85	636	35	102	1987
% Cars	98.6	100	100	98	97.2	100	98.6
Trucks	15	0	0	13	1	0	29
% Trucks	1.4	0	0	2	2.8	0	1.4

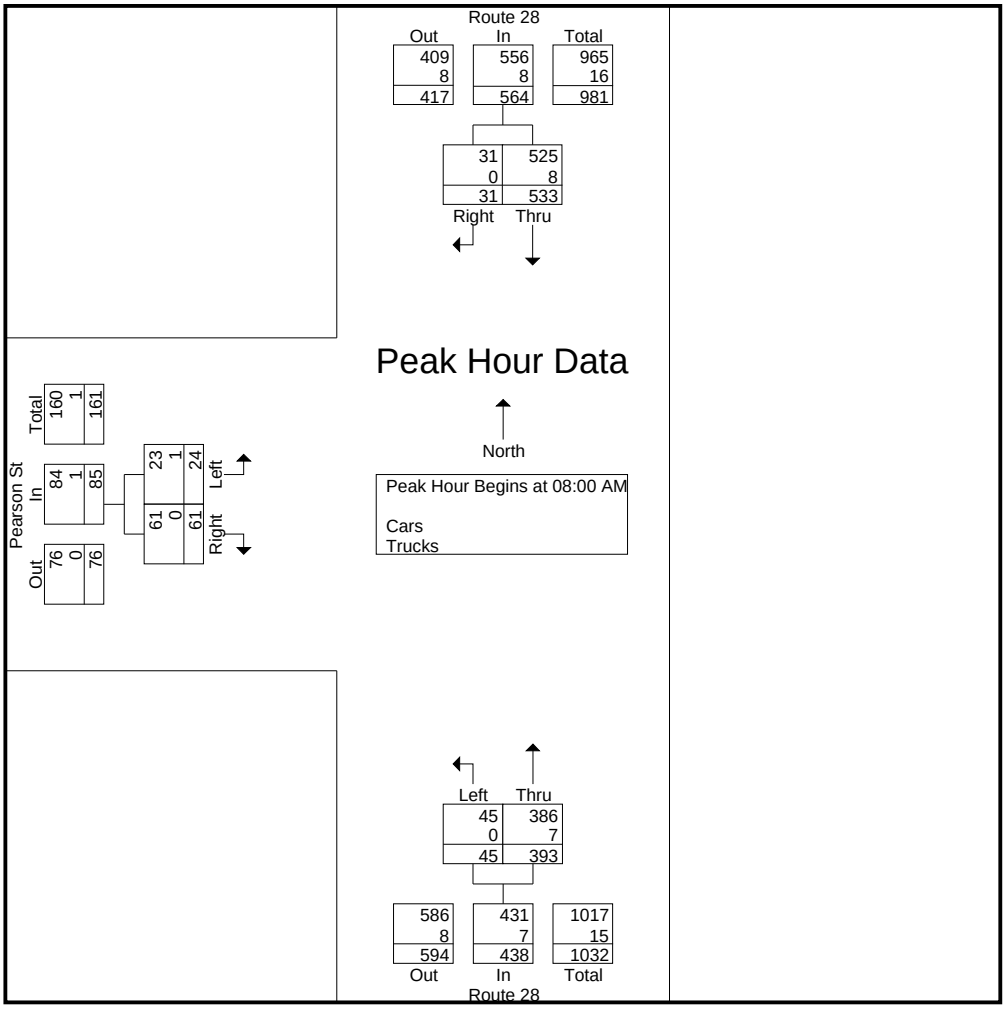
	Route 28 From North			Route 28 From South			Pearson St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**159**	4	**163**	11	88	99	6	13	19	281
08:15 AM	133	7	140	11	79	90	0	11	11	241
08:30 AM	126	**13**	139	**12**	98	110	**12**	**19**	**31**	280
08:45 AM	115	7	122	11	**128**	**139**	6	18	24	**285**
Total Volume	533	31	564	45	393	438	24	61	85	1087
% App. Total	94.5	5.5		10.3	89.7		28.2	71.8		
PHF	.838	.596	.865	.938	.768	.788	.500	.803	.685	.954
Cars	525	31	556	45	386	431	23	61	84	1071
% Cars	98.5	100	98.6	100	98.2	98.4	95.8	100	98.8	98.5
Trucks	8	0	8	0	7	7	1	0	1	16
% Trucks	1.5	0	1.4	0	1.8	1.6	4.2	0	1.2	1.5

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023
Page No : 2



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

Peak Hour for Each Approach Begins at:

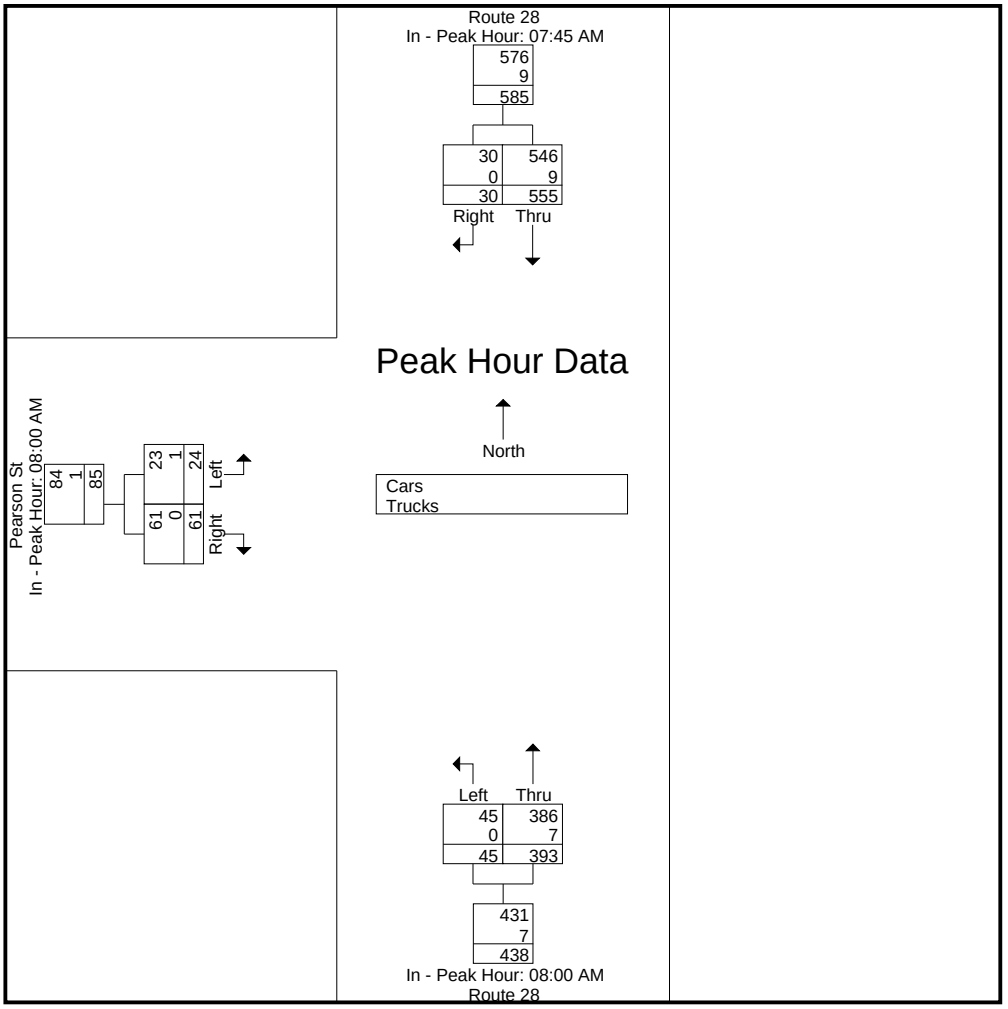
	07:45 AM			08:00 AM			08:00 AM		
+0 mins.	137	6	143	11	88	99	6	13	19
+15 mins.	**159**	4	**163**	11	79	90	0	11	11
+30 mins.	133	7	140	**12**	98	110	**12**	**19**	**31**
+45 mins.	126	**13**	139	11	**128**	**139**	6	18	24
Total Volume	555	30	585	45	393	438	24	61	85
% App. Total	94.9	5.1		10.3	89.7		28.2	71.8	
PHF	.873	.577	.897	.938	.768	.788	.500	.803	.685
Cars	546	30	576	45	386	431	23	61	84
% Cars	98.4	100	98.5	100	98.2	98.4	95.8	100	98.8
Trucks	9	0	9	0	7	7	1	0	1
% Trucks	1.6	0	1.5	0	1.8	1.6	4.2	0	1.2

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023

Groups Printed- Cars

	Route 28 From North		Route 28 From South		Pearson St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
07:00 AM	158	5	3	50	2	6	224
07:15 AM	139	3	6	53	4	13	218
07:30 AM	121	6	15	73	4	11	230
07:45 AM	135	6	16	74	2	11	244
Total	553	20	40	250	12	41	916
08:00 AM	156	4	11	87	5	13	276
08:15 AM	130	7	11	77	0	11	236
08:30 AM	125	13	12	97	12	19	278
08:45 AM	114	7	11	125	6	18	281
Total	525	31	45	386	23	61	1071
Grand Total	1078	51	85	636	35	102	1987
Apprch %	95.5	4.5	11.8	88.2	25.5	74.5	
Total %	54.3	2.6	4.3	32	1.8	5.1	

	Route 28 From North			Route 28 From South			Pearson St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**156**	4	**160**	11	87	98	5	13	18	276
08:15 AM	130	7	137	11	77	88	0	11	11	236
08:30 AM	125	**13**	138	**12**	97	109	**12**	**19**	**31**	278
08:45 AM	114	7	121	11	**125**	**136**	6	18	24	**281**
Total Volume	525	31	556	45	386	431	23	61	84	1071
% App. Total	94.4	5.6		10.4	89.6		27.4	72.6		
PHF	.841	.596	.869	.938	.772	.792	.479	.803	.677	.953

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023

Groups Printed- Trucks

	Route 28 From North		Route 28 From South		Pearson St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
07:00 AM	2	0	0	1	0	0	3
07:15 AM	3	0	0	2	0	0	5
07:30 AM	0	0	0	3	0	0	3
07:45 AM	2	0	0	0	0	0	2
Total	7	0	0	6	0	0	13
08:00 AM	3	0	0	1	1	0	5
08:15 AM	3	0	0	2	0	0	5
08:30 AM	1	0	0	1	0	0	2
08:45 AM	1	0	0	3	0	0	4
Total	8	0	0	7	1	0	16
Grand Total	15	0	0	13	1	0	29
Apprch %	100	0	0	100	100	0	
Total %	51.7	0	0	44.8	3.4	0	

	Route 28 From North			Route 28 From South			Pearson St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**3**	0	**3**	0	1	1	**1**	0	**1**	**5**
08:15 AM	3	0	3	0	2	2	0	0	0	5
08:30 AM	1	0	1	0	1	1	0	0	0	2
08:45 AM	1	0	1	0	**3**	**3**	0	0	0	4
Total Volume	8	0	8	0	7	7	1	0	1	16
% App. Total	100	0		0	100		100	0		
PHF	.667	.000	.667	.000	.583	.583	.250	.000	.250	.800

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023

Groups Printed- Bikes Peds

	Route 28 From North			Route 28 From South			Pearson St From West					
Start Time	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds	Exclu. Total	Inclu. 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	2	2	0	2
07:30 AM	0	0	0	1	0	0	0	0	2	2	1	3
07:45 AM	0	0	0	0	0	0	0	0	4	4	0	4
Total	0	0	0	1	0	0	0	0	8	8	1	9
08:00 AM	0	0	0	0	0	0	0	0	1	1	0	1
08:15 AM	0	0	1	0	0	1	0	0	2	4	0	4
08:30 AM	0	0	0	0	0	1	0	0	4	5	0	5
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	2	0	0	7	10	0	10
Grand Total	0	0	1	1	0	2	0	0	15	18	1	19
Apprch %	0	0		100	0		0	0				
Total %	0	0		100	0		0	0		94.7	5.3	

	Route 28 From North			Route 28 From South			Pearson St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	**1**	0	**1**	0	0	0	**1**
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	1	0	1	0	0	0	1
% App. Total	0	0		100	0		0	0		
PHF	.000	.000	.000	.250	.000	.250	.000	.000	.000	.250

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023
Page No : 1

Groups Printed- Cars - Trucks

	Route 28 From North		Route 28 From South		Pearson St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
04:00 PM	117	1	12	135	14	11	290
04:15 PM	113	2	9	141	3	18	286
04:30 PM	91	3	10	134	5	20	263
04:45 PM	96	3	9	134	9	17	268
Total	417	9	40	544	31	66	1107
05:00 PM	126	3	13	127	12	24	305
05:15 PM	109	3	3	150	6	18	289
05:30 PM	113	0	9	144	2	12	280
05:45 PM	92	2	11	134	7	10	256
Total	440	8	36	555	27	64	1130
Grand Total	857	17	76	1099	58	130	2237
Apprch %	98.1	1.9	6.5	93.5	30.9	69.1	
Total %	38.3	0.8	3.4	49.1	2.6	5.8	
Cars	848	17	76	1089	57	129	2216
% Cars	98.9	100	100	99.1	98.3	99.2	99.1
Trucks	9	0	0	10	1	1	21
% Trucks	1.1	0	0	0.9	1.7	0.8	0.9

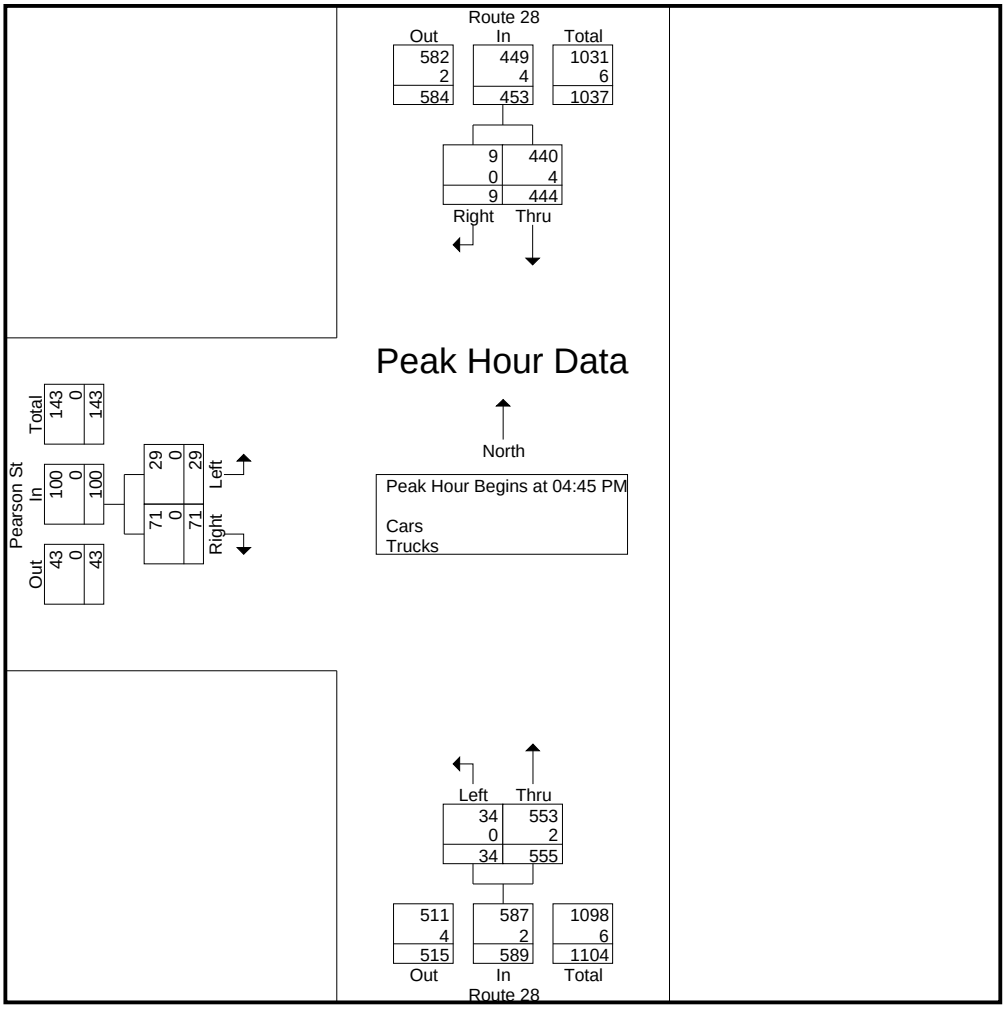
	Route 28 From North			Route 28 From South			Pearson St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	96	**3**	99	9	134	143	9	17	26	268
05:00 PM	**126**	3	**129**	**13**	127	140	**12**	**24**	**36**	**305**
05:15 PM	109	3	112	3	**150**	**153**	6	18	24	289
05:30 PM	113	0	113	9	144	153	2	12	14	280
Total Volume	444	9	453	34	555	589	29	71	100	1142
% App. Total	98	2		5.8	94.2		29	71		
PHF	.881	.750	.878	.654	.925	.962	.604	.740	.694	.936
Cars	440	9	449	34	553	587	29	71	100	1136
% Cars	99.1	100	99.1	100	99.6	99.7	100	100	100	99.5
Trucks	4	0	4	0	2	2	0	0	0	6
% Trucks	0.9	0	0.9	0	0.4	0.3	0	0	0	0.5

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023
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:

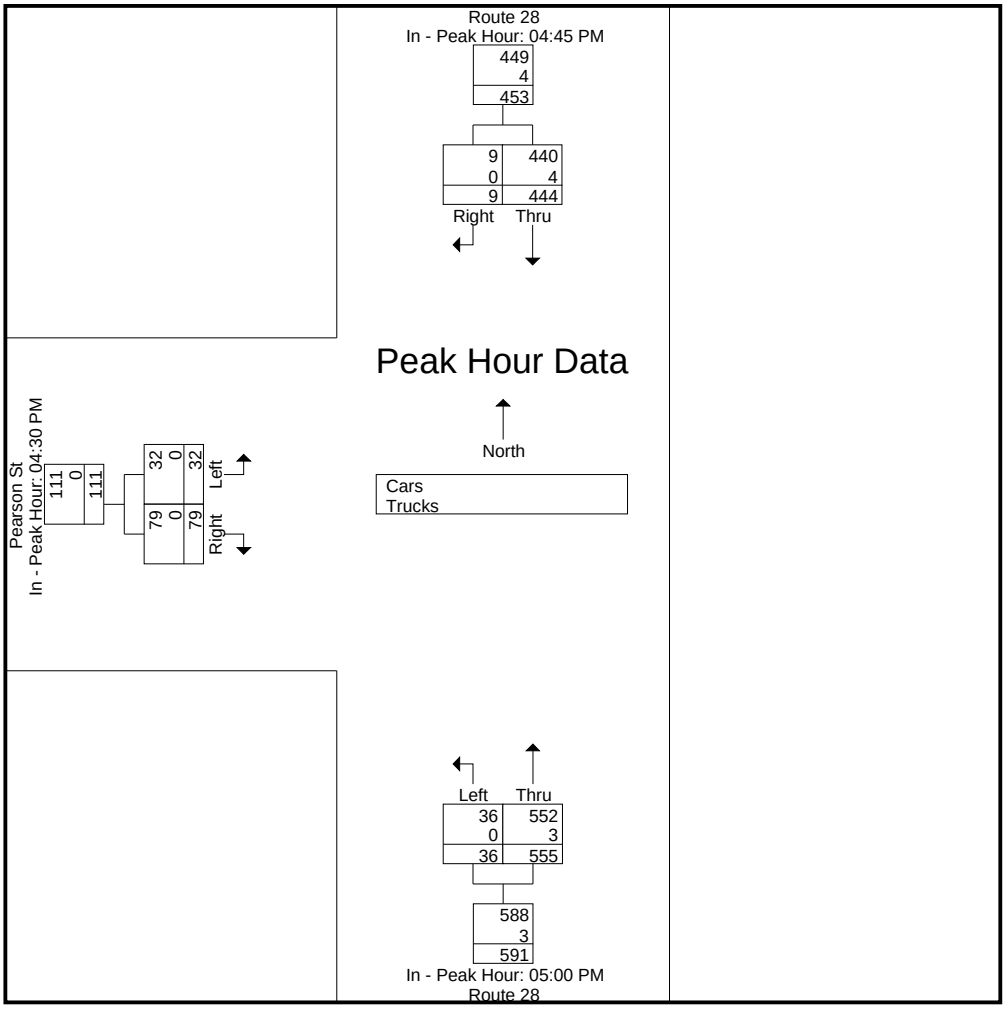
	04:45 PM			05:00 PM			04:30 PM		
+0 mins.	96	**3**	99	**13**	127	140	5	20	25
+15 mins.	**126**	3	**129**	3	**150**	**153**	9	17	26
+30 mins.	109	3	112	9	144	153	**12**	**24**	**36**
+45 mins.	113	0	113	11	134	145	6	18	24
Total Volume	444	9	453	36	555	591	32	79	111
% App. Total	98	2		6.1	93.9		28.8	71.2	
PHF	.881	.750	.878	.692	.925	.966	.667	.823	.771
Cars	440	9	449	36	552	588	32	79	111
% Cars	99.1	100	99.1	100	99.5	99.5	100	100	100
Trucks	4	0	4	0	3	3	0	0	0
% Trucks	0.9	0	0.9	0	0.5	0.5	0	0	0

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023

Groups Printed- Cars

	Route 28 From North		Route 28 From South		Pearson St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
04:00 PM	117	1	12	132	14	11	287
04:15 PM	111	2	9	138	3	17	280
04:30 PM	89	3	10	133	5	20	260
04:45 PM	94	3	9	134	9	17	266
Total	411	9	40	537	31	65	1093
05:00 PM	125	3	13	126	12	24	303
05:15 PM	108	3	3	150	6	18	288
05:30 PM	113	0	9	143	2	12	279
05:45 PM	91	2	11	133	6	10	253
Total	437	8	36	552	26	64	1123
Grand Total	848	17	76	1089	57	129	2216
Apprch %	98	2	6.5	93.5	30.6	69.4	
Total %	38.3	0.8	3.4	49.1	2.6	5.8	

	Route 28 From North			Route 28 From South			Pearson St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	94	**3**	97	9	134	143	9	17	26	266
05:00 PM	**125**	3	**128**	**13**	126	139	**12**	**24**	**36**	**303**
05:15 PM	108	3	111	3	**150**	**153**	6	18	24	288
05:30 PM	113	0	113	9	143	152	2	12	14	279
Total Volume	440	9	449	34	553	587	29	71	100	1136
% App. Total	98	2		5.8	94.2		29	71		
PHF	.880	.750	.877	.654	.922	.959	.604	.740	.694	.937

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023

Groups Printed- Trucks

	Route 28 From North		Route 28 From South		Pearson St From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
04:00 PM	0	0	0	3	0	0	3
04:15 PM	2	0	0	3	0	1	6
04:30 PM	2	0	0	1	0	0	3
04:45 PM	2	0	0	0	0	0	2
Total	6	0	0	7	0	1	14
05:00 PM	1	0	0	1	0	0	2
05:15 PM	1	0	0	0	0	0	1
05:30 PM	0	0	0	1	0	0	1
05:45 PM	1	0	0	1	1	0	3
Total	3	0	0	3	1	0	7
Grand Total	9	0	0	10	1	1	21
Apprch %	100	0	0	100	50	50	
Total %	42.9	0	0	47.6	4.8	4.8	

	Route 28 From North			Route 28 From South			Pearson St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	0	0	0	**3**	**3**	0	0	0	3
04:15 PM	**2**	0	**2**	0	3	3	0	**1**	**1**	**6**
04:30 PM	2	0	2	0	1	1	0	0	0	3
04:45 PM	2	0	2	0	0	0	0	0	0	2
Total Volume	6	0	6	0	7	7	0	1	1	14
% App. Total	100	0		0	100		0	100		
PHF	.750	.000	.750	.000	.583	.583	.000	.250	.250	.583

Accurate Counts

978-664-2565

N/S Street : Route 28
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750003
Site Code : 89750003
Start Date : 9/20/2023

Groups Printed- Bikes Peds

	Route 28 From North			Route 28 From South			Pearson St From West					
Start Time	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	1	1	0	1
04:15 PM	0	0	0	0	0	1	0	0	4	5	0	5
04:30 PM	0	0	0	0	0	0	0	0	3	3	0	3
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	0	8	9	0	9
05:00 PM	0	0	0	0	1	1	0	0	3	4	1	5
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	1	0	0	0	0	1	0	0	0	1	1	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	1	2	0	0	3	5	2	7
Grand Total	1	0	0	0	1	3	0	0	11	14	2	16
Apprch %	100	0		0	100		0	0				
Total %	50	0		0	50		0	0		87.5	12.5	

	Route 28 From North			Route 28 From South			Pearson St From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	**1**	**1**	0	0	0	**1**
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	**1**	0	**1**	0	0	0	0	0	0	1
Total Volume	1	0	1	0	1	1	0	0	0	2
% App. Total	100	0		0	100		0	0		
PHF	.250	.000	.250	.000	.250	.250	.000	.000	.000	.500

Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023

Groups Printed- Cars - Trucks

	Site Driveway From North			Pearson St From East			Depot Pizza Parking Lot From South			Pearson St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	1	0	0	0	0	0	0	0	8	0	9
07:15 AM	0	0	0	0	9	0	0	0	0	0	17	0	26
07:30 AM	0	0	0	0	13	0	0	0	0	0	13	0	26
07:45 AM	0	0	0	0	12	0	0	0	0	0	15	0	27
Total	0	0	1	0	34	0	0	0	0	0	53	0	88
08:00 AM	0	0	1	0	6	1	0	0	0	0	15	0	23
08:15 AM	0	0	0	0	10	1	0	0	0	0	13	0	24
08:30 AM	1	0	1	0	8	0	0	0	1	0	22	0	33
08:45 AM	1	0	0	0	12	0	0	0	0	1	21	0	35
Total	2	0	2	0	36	2	0	0	1	1	71	0	115
Grand Total	2	0	3	0	70	2	0	0	1	1	124	0	203
Apprch %	40	0	60	0	97.2	2.8	0	0	100	0.8	99.2	0	
Total %	1	0	1.5	0	34.5	1	0	0	0.5	0.5	61.1	0	
Cars	2	0	3	0	69	2	0	0	1	1	120	0	198
% Cars	100	0	100	0	98.6	100	0	0	100	100	96.8	0	97.5
Trucks	0	0	0	0	1	0	0	0	0	0	4	0	5
% Trucks	0	0	0	0	1.4	0	0	0	0	0	3.2	0	2.5

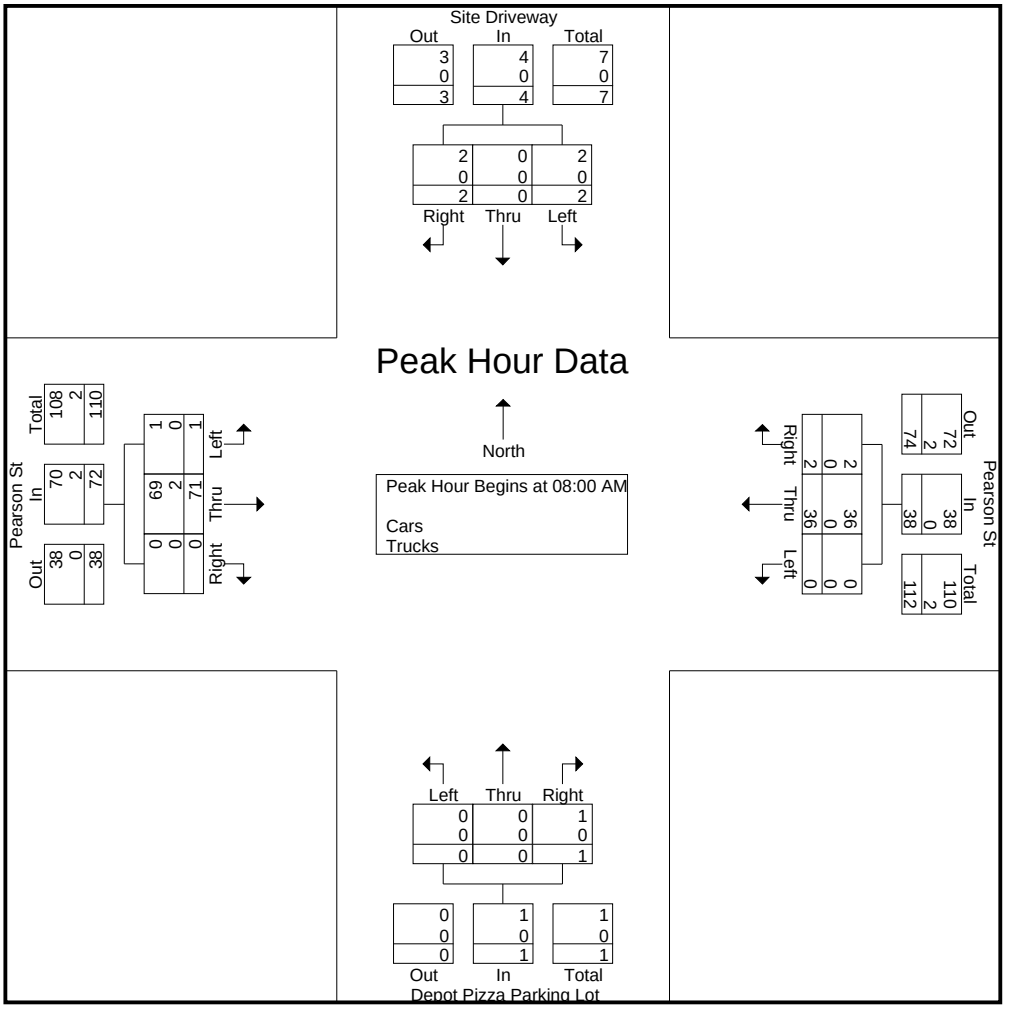
	Site Driveway From North				Pearson St From East				Depot Pizza Parking Lot From South				Pearson St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	**1**	1	0	6	**1**	7	0	0	0	0	0	15	0	15	23
08:15 AM	0	0	0	0	0	10	1	11	0	0	0	0	0	13	0	13	24
08:30 AM	**1**	0	1	**2**	0	8	0	8	0	0	**1**	**1**	0	**22**	0	**22**	33
08:45 AM	1	0	0	1	0	**12**	0	**12**	0	0	0	0	**1**	21	0	22	**35**
Total Volume	2	0	2	4	0	36	2	38	0	0	1	1	1	71	0	72	115
% App. Total	50	0	50		0	94.7	5.3		0	0	100		1.4	98.6	0		
PHF	.500	.000	.500	.500	.000	.750	.500	.792	.000	.000	.250	.250	.250	.807	.000	.818	.821
Cars	2	0	2	4	0	36	2	38	0	0	1	1	1	69	0	70	113
% Cars	100	0	100	100	0	100	100	100	0	0	100	100	100	97.2	0	97.2	98.3
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	2.8	0	2.8	1.7

Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023
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:

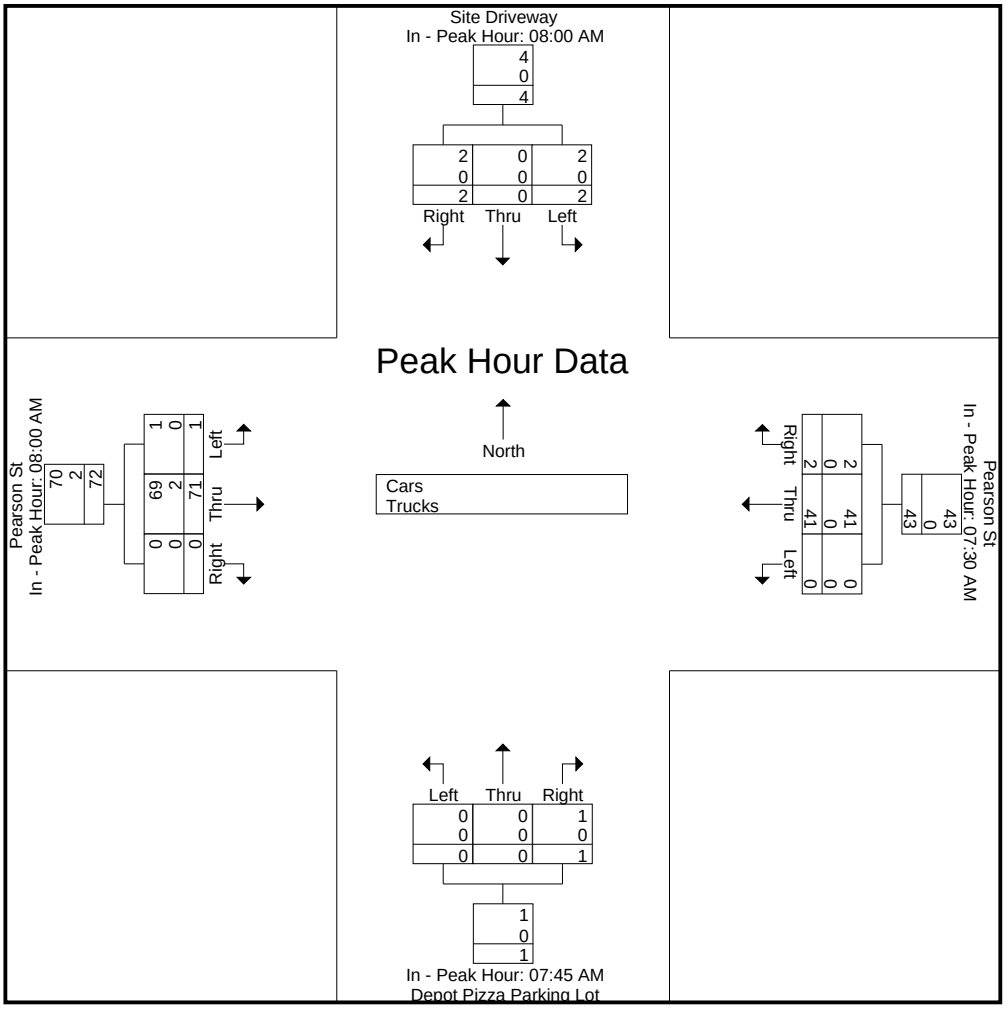
	08:00 AM				07:30 AM				07:45 AM				08:00 AM			
+0 mins.	0	0	**1**	1	0	**13**	0	**13**	0	0	0	0	0	15	0	15
+15 mins.	0	0	0	0	0	12	0	12	0	0	0	0	0	13	0	13
+30 mins.	**1**	0	1	**2**	0	6	**1**	7	0	0	0	0	0	**22**	0	**22**
+45 mins.	1	0	0	1	0	10	1	11	0	0	**1**	**1**	**1**	21	0	22
Total Volume	2	0	2	4	0	41	2	43	0	0	1	1	1	71	0	72
% App. Total	50	0	50		0	95.3	4.7		0	0	100		1.4	98.6	0	
PHF	.500	.000	.500	.500	.000	.788	.500	.827	.000	.000	.250	.250	.250	.807	.000	.818
Cars	2	0	2	4	0	41	2	43	0	0	1	1	1	69	0	70
% Cars	100	0	100	100	0	100	100	100	0	0	100	100	100	97.2	0	97.2
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	2.8	0	2.8

Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023
Page No : 4

Groups Printed- Cars

	Site Driveway From North			Pearson St From East			Depot Pizza Parking Lot From South			Pearson St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	1	0	0	0	0	0	0	0	7	0	8
07:15 AM	0	0	0	0	8	0	0	0	0	0	16	0	24
07:30 AM	0	0	0	0	13	0	0	0	0	0	13	0	26
07:45 AM	0	0	0	0	12	0	0	0	0	0	15	0	27
Total	0	0	1	0	33	0	0	0	0	0	51	0	85
08:00 AM	0	0	1	0	6	1	0	0	0	0	13	0	21
08:15 AM	0	0	0	0	10	1	0	0	0	0	13	0	24
08:30 AM	1	0	1	0	8	0	0	0	1	0	22	0	33
08:45 AM	1	0	0	0	12	0	0	0	0	1	21	0	35
Total	2	0	2	0	36	2	0	0	1	1	69	0	113
Grand Total	2	0	3	0	69	2	0	0	1	1	120	0	198
Apprch %	40	0	60	0	97.2	2.8	0	0	100	0.8	99.2	0	
Total %	1	0	1.5	0	34.8	1	0	0	0.5	0.5	60.6	0	

	Site Driveway From North				Pearson St From East				Depot Pizza Parking Lot From South				Pearson St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	**1**	1	0	6	**1**	7	0	0	0	0	0	13	0	13	21
08:15 AM	0	0	0	0	0	10	1	11	0	0	0	0	0	13	0	13	24
08:30 AM	**1**	0	1	**2**	0	8	0	8	0	0	**1**	**1**	0	**22**	0	**22**	33
08:45 AM	1	0	0	1	0	**12**	0	**12**	0	0	0	0	**1**	21	0	22	**35**
Total Volume	2	0	2	4	0	36	2	38	0	0	1	1	1	69	0	70	113
% App. Total	50	0	50		0	94.7	5.3		0	0	100		1.4	98.6	0		
PHF	.500	.000	.500	.500	.000	.750	.500	.792	.000	.000	.250	.250	.250	.784	.000	.795	.807

Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023

Groups Printed- Trucks

	Site Driveway From North			Pearson St From East			Depot Pizza Parking Lot From South			Pearson St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
07:15 AM	0	0	0	0	1	0	0	0	0	0	1	0	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	0	0	0	2	0	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	2	0	2
Grand Total	0	0	0	0	1	0	0	0	0	0	4	0	5
Apprch %	0	0	0	0	100	0	0	0	0	0	100	0	
Total %	0	0	0	0	20	0	0	0	0	0	80	0	

	Site Driveway From North				Pearson St From East				Depot Pizza Parking Lot From South				Pearson St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	1	0	1	**2**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**	0	**2**	2
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	3	0	3	4
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.375	.000	.375	.500

Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023

Groups Printed- Bikes Peds

	Site Driveway From North				Pearson St From East				Depot Pizza Parking Lot From South				Pearson St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	4	0	4
07:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	0	2
07:30 AM	0	0	0	5	0	1	0	1	0	0	0	0	0	0	0	2	8	1	9
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
Total	0	0	0	7	0	1	0	1	0	0	0	0	0	0	0	7	15	1	16
08:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
08:15 AM	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	1	8	0	8
08:30 AM	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	6	0	6
Total	0	0	0	14	0	0	0	0	0	0	0	1	0	0	0	6	21	0	21
Grand Total	0	0	0	21	0	1	0	1	0	0	0	1	0	0	0	13	36	1	37
Apprch %	0	0	0		0	100	0		0	0	0		0	0	0				
Total %	0	0	0		0	100	0		0	0	0		0	0	0		97.3	2.7	

	Site Driveway From North				Pearson St From East				Depot Pizza Parking Lot From South				Pearson St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	**1**
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.250

Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023
Page No : 1

Groups Printed- Cars - Trucks

	Site Driveway From North			Pearson St From East			Depot Pizza Parking Lot From South			Pearson St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	0	0	18	0	0	0	0	0	13	0	31
04:15 PM	0	0	0	0	10	0	0	0	0	0	12	0	22
04:30 PM	0	0	0	1	9	0	0	0	0	0	9	0	19
04:45 PM	0	0	1	0	14	0	0	0	1	1	8	0	25
Total	0	0	1	1	51	0	0	0	1	1	42	0	97
05:00 PM	1	0	1	0	23	0	0	0	0	0	16	0	41
05:15 PM	0	0	0	0	7	0	0	0	0	1	13	0	21
05:30 PM	0	0	0	0	11	0	0	0	0	0	8	0	19
05:45 PM	0	0	0	0	14	0	0	0	0	0	15	0	29
Total	1	0	1	0	55	0	0	0	0	1	52	0	110
Grand Total	1	0	2	1	106	0	0	0	1	2	94	0	207
Apprch %	33.3	0	66.7	0.9	99.1	0	0	0	100	2.1	97.9	0	
Total %	0.5	0	1	0.5	51.2	0	0	0	0.5	1	45.4	0	
Cars	1	0	2	1	105	0	0	0	1	2	92	0	204
% Cars	100	0	100	100	99.1	0	0	0	100	100	97.9	0	98.6
Trucks	0	0	0	0	1	0	0	0	0	0	2	0	3
% Trucks	0	0	0	0	0.9	0	0	0	0	0	2.1	0	1.4

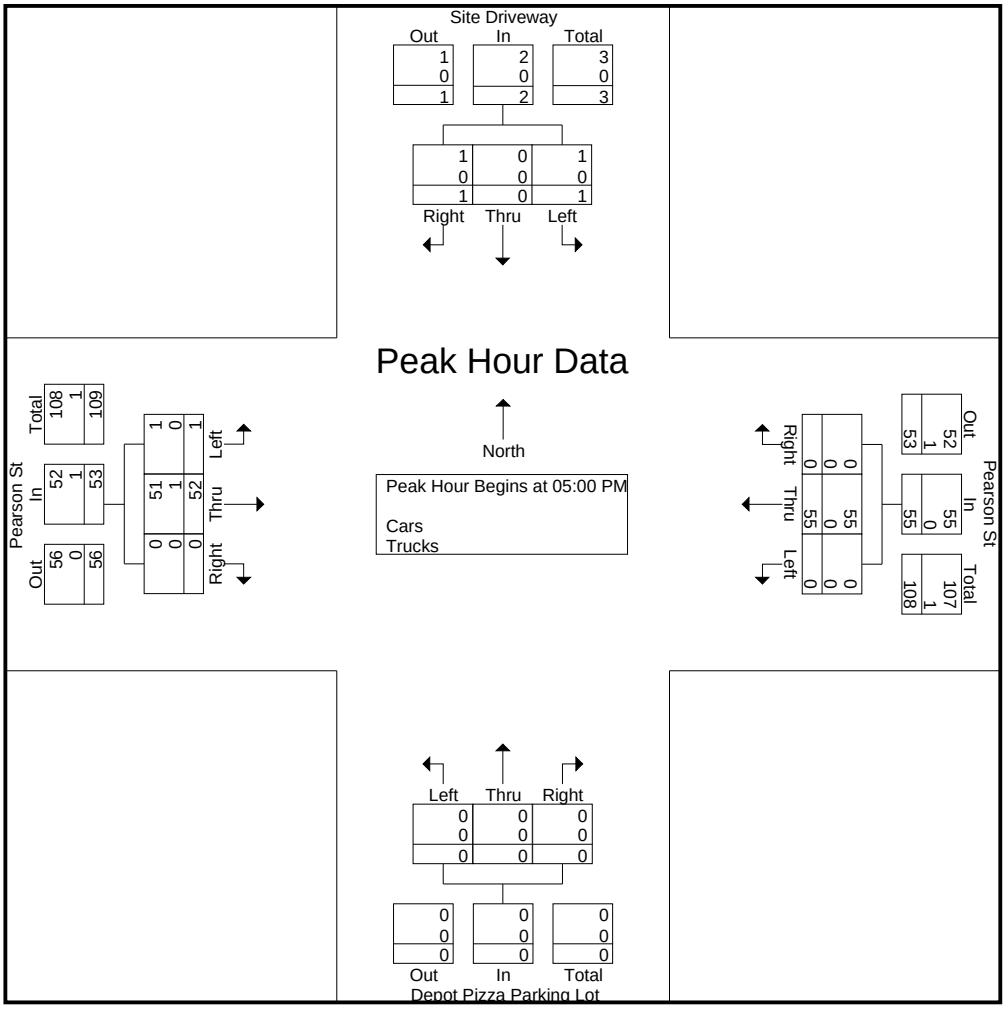
	Site Driveway From North				Pearson St From East				Depot Pizza Parking Lot From South				Pearson St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**1**	0	**1**	**2**	0	**23**	0	**23**	0	0	0	0	0	**16**	0	**16**	**41**
05:15 PM	0	0	0	0	0	7	0	7	0	0	0	0	**1**	13	0	14	21
05:30 PM	0	0	0	0	0	11	0	11	0	0	0	0	0	8	0	8	19
05:45 PM	0	0	0	0	0	14	0	14	0	0	0	0	0	15	0	15	29
Total Volume	1	0	1	2	0	55	0	55	0	0	0	0	1	52	0	53	110
% App. Total	50	0	50		0	100	0		0	0	0		1.9	98.1	0		
PHF	.250	.000	.250	.250	.000	.598	.000	.598	.000	.000	.000	.000	.250	.813	.000	.828	.671
Cars	1	0	1	2	0	55	0	55	0	0	0	0	1	51	0	52	109
% Cars	100	0	100	100	0	100	0	100	0	0	0	0	100	98.1	0	98.1	99.1
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9	0	1.9	0.9

Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023
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:

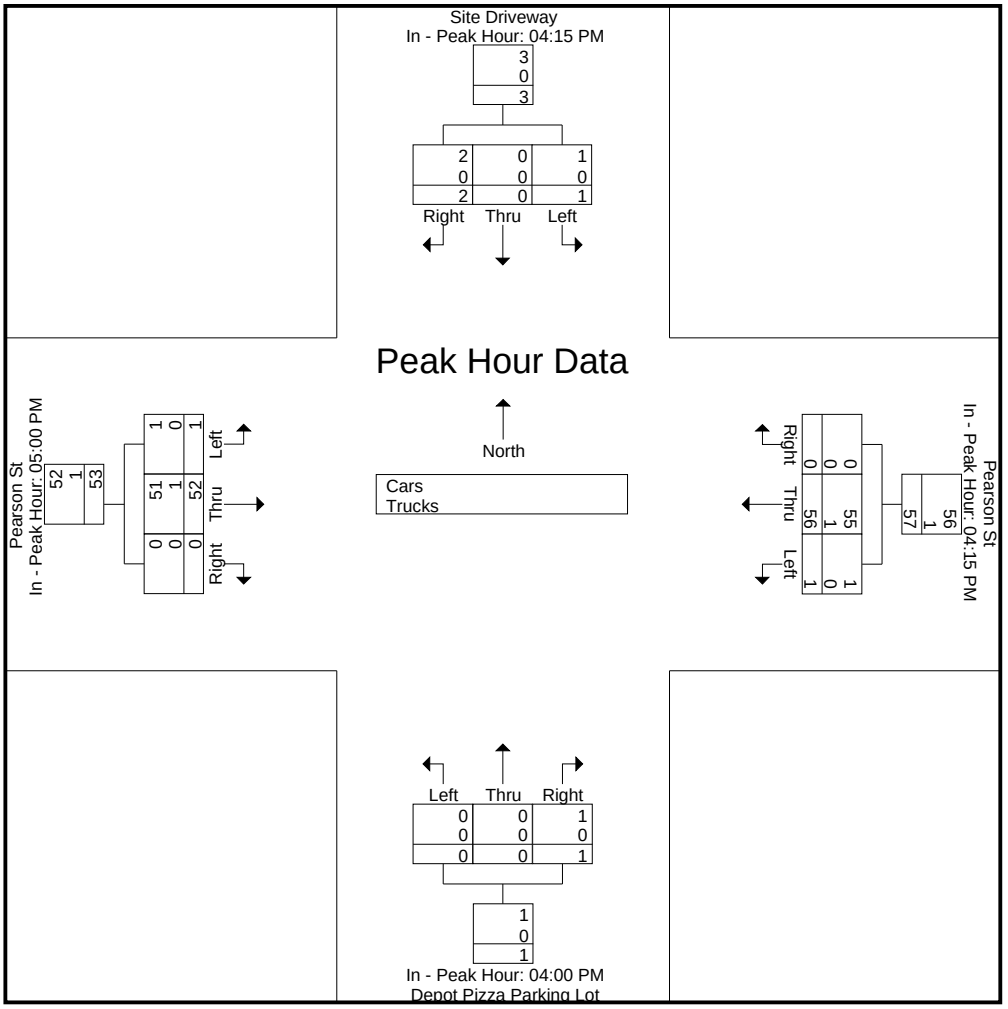
	04:15 PM				04:15 PM				04:00 PM				05:00 PM			
+0 mins.	0	0	0	0	0	10	0	10	0	0	0	0	0	**16**	0	**16**
+15 mins.	0	0	0	0	**1**	9	0	10	0	0	0	0	**1**	13	0	14
+30 mins.	0	0	**1**	1	0	14	0	14	0	0	0	0	0	8	0	8
+45 mins.	**1**	0	1	**2**	0	**23**	0	**23**	0	0	**1**	**1**	0	15	0	15
Total Volume	1	0	2	3	1	56	0	57	0	0	1	1	1	52	0	53
% App. Total	33.3	0	66.7		1.8	98.2	0		0	0	100		1.9	98.1	0	
PHF	.250	.000	.500	.375	.250	.609	.000	.620	.000	.000	.250	.250	.250	.813	.000	.828
Cars	1	0	2	3	1	55	0	56	0	0	1	1	1	51	0	52
% Cars	100	0	100	100	100	98.2	0	98.2	0	0	100	100	100	98.1	0	98.1
Trucks	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1
% Trucks	0	0	0	0	0	1.8	0	1.8	0	0	0	0	0	1.9	0	1.9

Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023

Groups Printed- Cars

	Site Driveway From North			Pearson St From East			Depot Pizza Parking Lot From South			Pearson St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	0	0	18	0	0	0	0	0	13	0	31
04:15 PM	0	0	0	0	10	0	0	0	0	0	11	0	21
04:30 PM	0	0	0	1	9	0	0	0	0	0	9	0	19
04:45 PM	0	0	1	0	13	0	0	0	1	1	8	0	24
Total	0	0	1	1	50	0	0	0	1	1	41	0	95
05:00 PM	1	0	1	0	23	0	0	0	0	0	16	0	41
05:15 PM	0	0	0	0	7	0	0	0	0	1	13	0	21
05:30 PM	0	0	0	0	11	0	0	0	0	0	8	0	19
05:45 PM	0	0	0	0	14	0	0	0	0	0	14	0	28
Total	1	0	1	0	55	0	0	0	0	1	51	0	109
Grand Total	1	0	2	1	105	0	0	0	1	2	92	0	204
Apprch %	33.3	0	66.7	0.9	99.1	0	0	0	100	2.1	97.9	0	
Total %	0.5	0	1	0.5	51.5	0	0	0	0.5	1	45.1	0	

	Site Driveway From North				Pearson St From East				Depot Pizza Parking Lot From South				Pearson St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**1**	0	**1**	**2**	0	**23**	0	**23**	0	0	0	0	0	**16**	0	**16**	**41**
05:15 PM	0	0	0	0	0	7	0	7	0	0	0	0	**1**	13	0	14	21
05:30 PM	0	0	0	0	0	11	0	11	0	0	0	0	0	8	0	8	19
05:45 PM	0	0	0	0	0	14	0	14	0	0	0	0	0	14	0	14	28
Total Volume	1	0	1	2	0	55	0	55	0	0	0	0	1	51	0	52	109
% App. Total	50	0	50		0	100	0		0	0	0		1.9	98.1	0		
PHF	.250	.000	.250	.250	.000	.598	.000	.598	.000	.000	.000	.000	.250	.797	.000	.813	.665

Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023
Page No : 7

Groups Printed- Trucks

	Site Driveway From North			Pearson St From East			Depot Pizza Parking Lot From South			Pearson St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	0	0	0	0	1	0	0	0	0	0	1	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	0	1	0	1
Grand Total	0	0	0	0	1	0	0	0	0	0	2	0	3
Apprch %	0	0	0	0	100	0	0	0	0	0	100	0	
Total %	0	0	0	0	33.3	0	0	0	0	0	66.7	0	

	Site Driveway From North				Pearson St From East				Depot Pizza Parking Lot From South				Pearson St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	**1**
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.500

Accurate Counts

978-664-2565

N/S Street : Site Driveway / Depot Pizza Parking Lot
E/W Street : Pearson Street
City/State : Andover, MA
Weather : Clear

File Name : 89750004
Site Code : 89750004
Start Date : 9/20/2023

Groups Printed- Bikes Peds

	Site Driveway From North				Pearson St From East				Depot Pizza Parking Lot From South				Pearson St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	6	0	6
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	2
04:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	4	0	4
04:45 PM	0	0	0	3	0	0	0	2	0	0	0	0	0	0	0	2	7	0	7
Total	0	0	0	4	0	0	0	2	0	0	0	2	0	0	0	11	19	0	19
05:00 PM	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	1	6	0	6
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	1	0	1	0	0	0	0	0	2	0	0	0	0	3	1	4
05:45 PM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	4	0	4
Total	0	0	0	4	0	1	0	0	0	0	0	6	0	0	0	3	13	1	14
Grand Total	0	0	0	8	0	1	0	2	0	0	0	8	0	0	0	14	32	1	33
Apprch %	0	0	0		0	100	0		0	0	0		0	0	0				
Total %	0	0	0		0	100	0		0	0	0		0	0	0		97	3	

	Site Driveway From North				Pearson St From East				Depot Pizza Parking Lot From South				Pearson St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	**1**
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.250

Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023
Page No : 1

Groups Printed- Cars - Trucks

	Railroad St From North				Pearson St From Northeast				Essex St From East				Dundee Park Dr From South				Essex St From West				
Start Time	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Int. Total
07:00 AM	1	12	1	7	1	0	0	0	0	17	8	0	1	1	1	0	5	6	45	3	109
07:15 AM	1	12	1	5	0	1	4	2	1	16	13	0	0	1	0	1	9	14	48	2	131
07:30 AM	4	14	1	19	0	0	6	7	2	43	11	1	1	1	0	2	14	8	36	4	174
07:45 AM	3	17	9	11	0	0	12	0	2	110	13	1	0	0	0	0	14	8	40	0	240
Total	9	55	12	42	1	1	22	9	5	186	45	2	2	3	1	3	42	36	169	9	654
08:00 AM	3	23	5	17	0	0	3	4	7	42	15	1	1	0	0	2	20	11	76	3	233
08:15 AM	5	26	6	13	0	0	5	4	4	37	14	0	0	3	0	1	13	7	64	2	204
08:30 AM	1	23	5	19	0	0	5	2	9	54	24	5	1	4	0	1	7	15	43	5	223
08:45 AM	5	12	5	7	0	0	7	5	11	40	31	1	0	1	0	2	12	15	53	7	214
Total	14	84	21	56	0	0	20	15	31	173	84	7	2	8	0	6	52	48	236	17	874
Grand Total	23	139	33	98	1	1	42	24	36	359	129	9	4	11	1	9	94	84	405	26	1528
Apprch %	7.8	47.4	11.3	33.4	1.5	1.5	61.8	35.3	6.8	67.4	24.2	1.7	16	44	4	36	15.4	13.8	66.5	4.3	
Total %	1.5	9.1	2.2	6.4	0.1	0.1	2.7	1.6	2.4	23.5	8.4	0.6	0.3	0.7	0.1	0.6	6.2	5.5	26.5	1.7	
Cars	23	138	33	97	1	1	42	24	36	350	122	9	4	11	1	9	94	83	398	26	1502
% Cars	100	99.3	100	99	100	100	100	100	100	97.5	94.6	100	100	100	100	100	100	98.8	98.3	100	98.3
Trucks	0	1	0	1	0	0	0	0	0	9	7	0	0	0	0	0	0	1	7	0	26
% Trucks	0	0.7	0	1	0	0	0	0	0	2.5	5.4	0	0	0	0	0	0	1.2	1.7	0	1.7

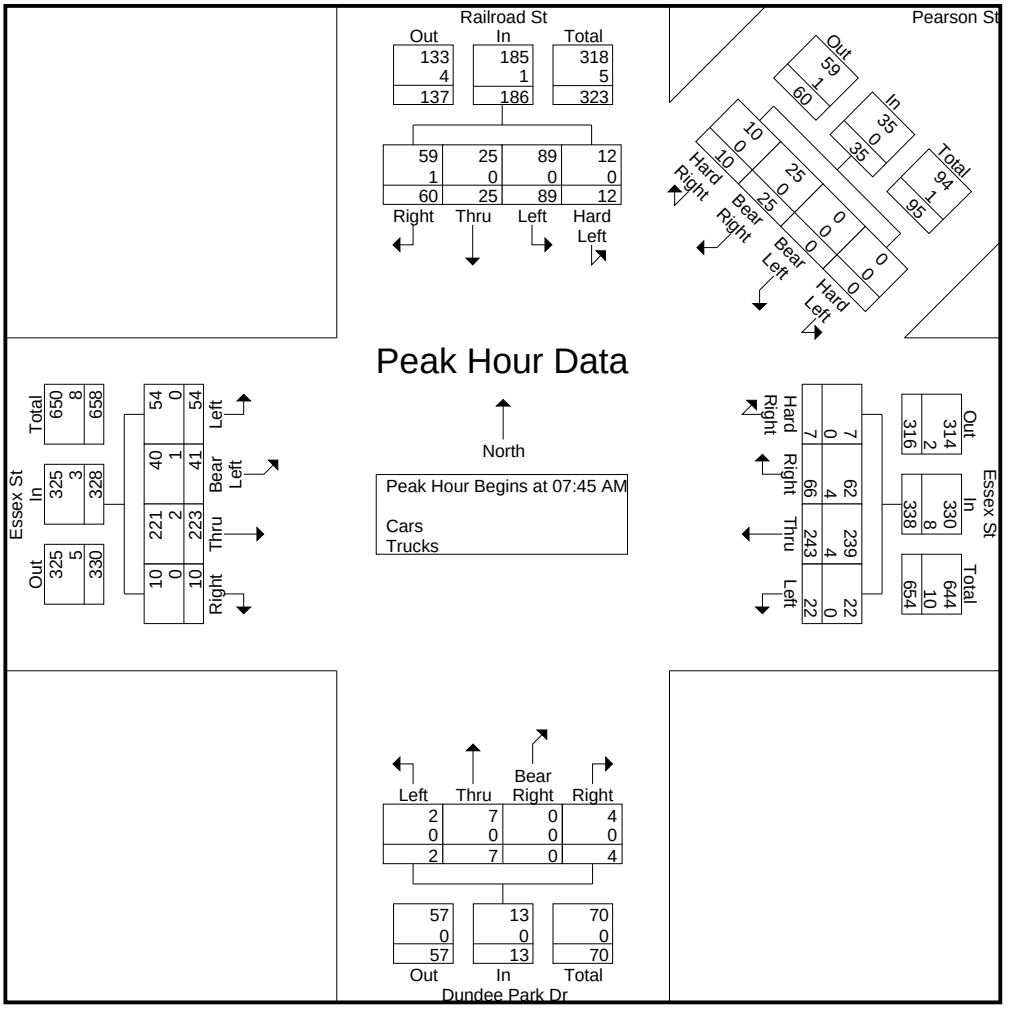
	Railroad St From North					Pearson St From Northeast					Essex St From East					Dundee Park Dr From South					Essex St From West					
Start Time	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 07:45 AM																										
07:45 AM	3	17	**9**	11	40	0	0	**12**	0	**12**	2	**110**	13	1	**126**	0	0	0	0	0	14	8	40	0	62	**240**
08:00 AM	3	23	5	17	48	0	0	3	**4**	7	7	42	15	1	65	**1**	0	0	**2**	3	**20**	11	**76**	3	**110**	233
08:15 AM	**5**	**26**	6	13	**50**	0	0	5	4	9	4	37	14	0	55	0	3	0	1	4	13	7	64	2	86	204
08:30 AM	1	23	5	**19**	48	0	0	5	2	7	**9**	54	**24**	**5**	92	1	**4**	0	1	**6**	7	**15**	43	**5**	70	223
Total Volume	12	89	25	60	186	0	0	25	10	35	22	243	66	7	338	2	7	0	4	13	54	41	223	10	328	900
% App. Total	6.5	47.8	13.4	32.3		0	0	71.4	28.6		6.5	71.9	19.5	2.1		15.4	53.8	0	30.8		16.5	12.5	68	3		
PHF	.600	.856	.694	.789	.930	.000	.000	.521	.625	.729	.611	.552	.688	.350	.671	.500	.438	.000	.500	.542	.675	.683	.734	.500	.745	.938
Cars	12	89	25	59	185	0	0	25	10	35	22	239	62	7	330	2	7	0	4	13	54	40	221	10	325	888
% Cars	100	100	100	98.3	99.5	0	0	100	100	100	100	98.4	93.9	100	97.6	100	100	0	100	100	100	97.6	99.1	100	99.1	98.7
Trucks	0	0	0	1	1	0	0	0	0	0	0	4	4	0	8	0	0	0	0	0	0	1	2	0	3	12
% Trucks	0	0	0	1.7	0.5	0	0	0	0	0	0	1.6	6.1	0	2.4	0	0	0	0	0	0	2.4	0.9	0	0.9	1.3

Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023
Page No : 2



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

Peak Hour for Each Approach Begins at:

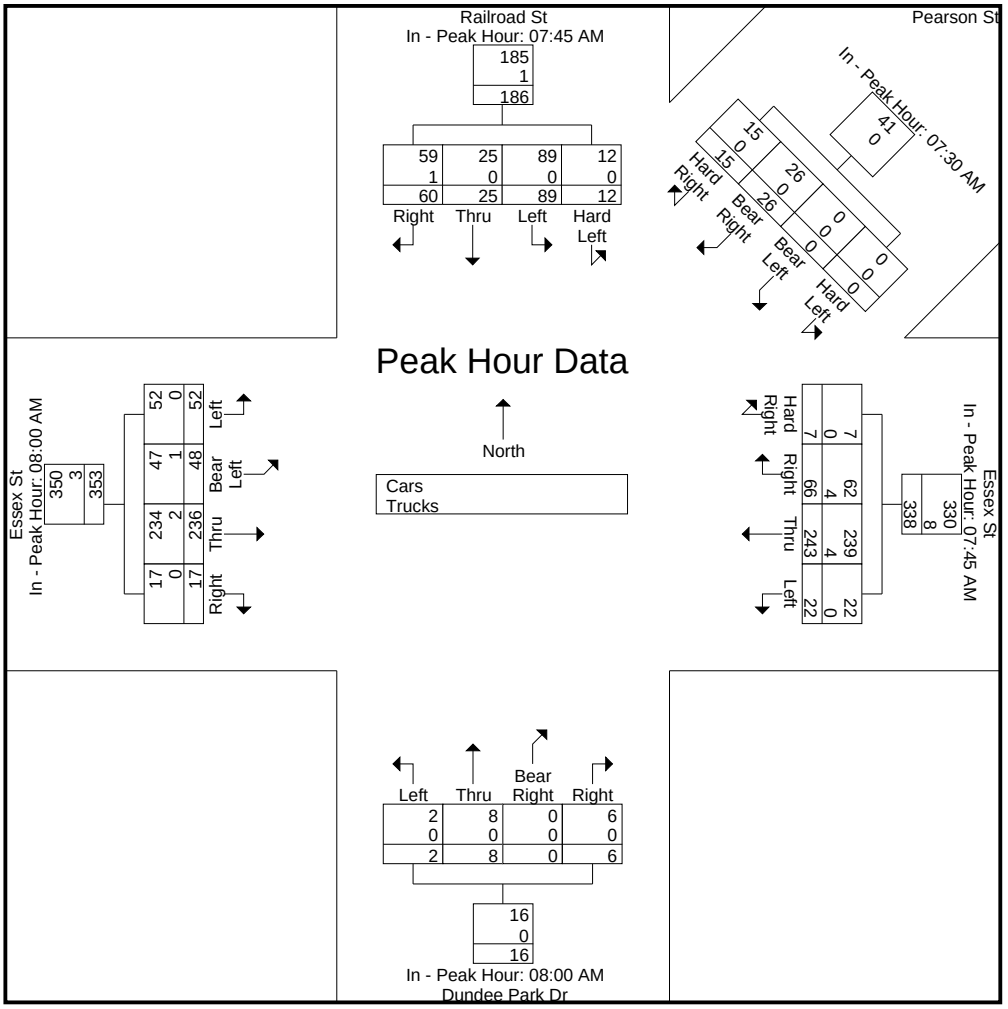
	07:45 AM					07:30 AM					07:45 AM					08:00 AM					08:00 AM				
+0 mins.	3	17	**9**	11	40	0	0	6	**7**	**13**	2	**110**	13	1	**126**	**1**	0	0	**2**	3	**20**	11	**76**	3	**110**
+15 mins.	3	23	5	17	48	0	0	**12**	0	12	7	42	15	1	65	0	3	0	1	4	13	7	64	2	86
+30 mins.	**5**	**26**	6	13	**50**	0	0	3	4	7	4	37	14	0	55	1	**4**	0	1	**6**	7	**15**	43	5	70
+45 mins.	1	23	5	**19**	48	0	0	5	4	9	**9**	54	**24**	**5**	92	0	1	0	2	3	12	15	53	**7**	87
Total Volume	12	89	25	60	186	0	0	26	15	41	22	243	66	7	338	2	8	0	6	16	52	48	236	17	353
% App. Total	6.5	47.8	13.4	32.3		0	0	63.4	36.6		6.5	71.9	19.5	2.1		12.5	50	0	37.5		14.7	13.6	66.9	4.8	
PHF	.600	.856	.694	.789	.930	.000	.000	.542	.536	.788	.611	.552	.688	.350	.671	.500	.500	.000	.750	.667	.650	.800	.776	.607	.802
Cars	12	89	25	59	185	0	0	26	15	41	22	239	62	7	330	2	8	0	6	16	52	47	234	17	350
% Cars	100	100	100	98.3	99.5	0	0	100	100	100	100	98.4	93.9	100	97.6	100	100	0	100	100	100	97.9	99.2	100	99.2
Trucks	0	0	0	1	1	0	0	0	0	0	0	4	4	0	8	0	0	0	0	0	0	1	2	0	3
% Trucks	0	0	0	1.7	0.5	0	0	0	0	0	0	1.6	6.1	0	2.4	0	0	0	0	0	0	2.1	0.8	0	0.8

Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023
Page No : 4

Groups Printed- Cars

	Railroad St From North				Pearson St From Northeast				Essex St From East				Dundee Park Dr From South				Essex St From West				
Start Time	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Int. Total
07:00 AM	1	11	1	7	1	0	0	0	0	16	7	0	1	1	1	0	5	6	44	3	105
07:15 AM	1	12	1	5	0	1	4	2	1	14	12	0	0	1	0	1	9	14	45	2	125
07:30 AM	4	14	1	19	0	0	6	7	2	41	11	1	1	1	0	2	14	8	35	4	171
07:45 AM	3	17	9	11	0	0	12	0	2	107	13	1	0	0	0	0	14	8	40	0	237
Total	9	54	12	42	1	1	22	9	5	178	43	2	2	3	1	3	42	36	164	9	638
08:00 AM	3	23	5	17	0	0	3	4	7	41	14	1	1	0	0	2	20	10	75	3	229
08:15 AM	5	26	6	13	0	0	5	4	4	37	12	0	0	3	0	1	13	7	64	2	202
08:30 AM	1	23	5	18	0	0	5	2	9	54	23	5	1	4	0	1	7	15	42	5	220
08:45 AM	5	12	5	7	0	0	7	5	11	40	30	1	0	1	0	2	12	15	53	7	213
Total	14	84	21	55	0	0	20	15	31	172	79	7	2	8	0	6	52	47	234	17	864
Grand Total	23	138	33	97	1	1	42	24	36	350	122	9	4	11	1	9	94	83	398	26	1502
Apprch %	7.9	47.4	11.3	33.3	1.5	1.5	61.8	35.3	7	67.7	23.6	1.7	16	44	4	36	15.6	13.8	66.2	4.3	
Total %	1.5	9.2	2.2	6.5	0.1	0.1	2.8	1.6	2.4	23.3	8.1	0.6	0.3	0.7	0.1	0.6	6.3	5.5	26.5	1.7	

	Railroad St From North					Pearson St From Northeast					Essex St From East					Dundee Park Dr From South					Essex St From West					
Start Time	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 07:45 AM																										
07:45 AM	3	17	**9**	11	40	0	0	**12**	0	**12**	2	**107**	13	1	**123**	0	0	0	0	0	14	8	40	0	62	**237**
08:00 AM	3	23	5	17	48	0	0	3	**4**	7	7	41	14	1	63	**1**	0	0	**2**	3	**20**	10	**75**	3	**108**	229
08:15 AM	**5**	**26**	6	13	**50**	0	0	5	4	9	4	37	12	0	53	0	3	0	1	4	13	7	64	2	86	202
08:30 AM	1	23	5	**18**	47	0	0	5	2	7	**9**	54	**23**	**5**	91	1	**4**	0	1	**6**	7	**15**	42	**5**	69	220
Total Volume	12	89	25	59	185	0	0	25	10	35	22	239	62	7	330	2	7	0	4	13	54	40	221	10	325	888
% App. Total	6.5	48.1	13.5	31.9		0	0	71.4	28.6		6.7	72.4	18.8	2.1		15.4	53.8	0	30.8		16.6	12.3	68	3.1		
PHF	.600	.856	.694	.819	.925	.000	.000	.521	.625	.729	.611	.558	.674	.350	.671	.500	.438	.000	.500	.542	.675	.667	.737	.500	.752	.937

Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023
Page No : 7

Groups Printed- Trucks

	Railroad St From North				Pearson St From Northeast				Essex St From East				Dundee Park Dr From South				Essex St From West				
Start Time	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Int. Total
07:00 AM	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	4
07:15 AM	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	3	0	6
07:30 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3
Total	0	1	0	0	0	0	0	0	0	8	2	0	0	0	0	0	0	0	5	0	16
08:00 AM	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	4
08:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
08:30 AM	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	3
08:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	1	0	0	0	0	0	1	5	0	0	0	0	0	0	1	2	0	10
Grand Total	0	1	0	1	0	0	0	0	0	9	7	0	0	0	0	0	0	1	7	0	26
Apprch %	0	50	0	50	0	0	0	0	0	56.2	43.8	0	0	0	0	0	0	12.5	87.5	0	
Total %	0	3.8	0	3.8	0	0	0	0	0	34.6	26.9	0	0	0	0	0	0	3.8	26.9	0	

	Railroad St From North					Pearson St From Northeast					Essex St From East					Dundee Park Dr From South					Essex St From West					
Start Time	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 07:00 AM																										
07:00 AM	0	**1**	0	0	**1**	0	0	0	0	0	0	1	**1**	0	2	0	0	0	0	0	0	0	1	0	1	4
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	1	0	**3**	0	0	0	0	0	0	0	**3**	0	**3**	**6**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	1	0	1	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	**3**	0	0	3	0	0	0	0	0	0	0	0	0	0	3
Total Volume	0	1	0	0	1	0	0	0	0	0	0	8	2	0	10	0	0	0	0	0	0	0	5	0	5	16
% App. Total	0	100	0	0		0	0	0	0		0	80	20	0		0	0	0	0		0	0	100	0		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.667	.500	.000	.833	.000	.000	.000	.000	.000	.000	.000	.417	.000	.417	.667

Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023
Page No : 10

Groups Printed- Bikes Peds

	Railroad St From North					Pearson St From Northeast					Essex St From East					Dundee Park Dr From South					Essex St From West							
Start Time	Hard Left	Left	Thru	Right	Peds	Hard Left	Bear Left	Bear Right	Hard Right	Peds	Left	Thru	Right	Hard Right	Peds	Left	Thru	Bear Right	Right	Peds	Left	Bear Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
07:15 AM	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
07:30 AM	0	0	0	0	5	0	0	0	1	8	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	14	3	17
07:45 AM	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
Total	0	0	0	0	8	0	0	0	1	10	0	1	3	0	1	0	0	0	0	0	0	0	0	0	0	19	5	24
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:15 AM	0	0	1	0	6	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	9	1	10
08:30 AM	0	0	0	0	3	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6	0	6
08:45 AM	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	4
Total	0	0	1	0	10	0	0	0	0	6	0	0	0	0	2	0	0	0	0	0	0	0	1	0	1	19	2	21
Grand Total	0	0	1	0	18	0	0	0	1	16	0	1	3	0	3	0	0	0	0	0	0	0	1	0	1	38	7	45
Apprch %	0	0	100	0		0	0	0	100		0	25	75	0		0	0	0	0		0	0	100	0			
Total %	0	0	14.3	0		0	0	0	14.3		0	14.3	42.9	0		0	0	0	0		0	0	14.3	0		84.4	15.6	

	Railroad St From North					Pearson St From Northeast					Essex St From East					Dundee Park Dr From South					Essex St From West					
Start Time	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 07:15 AM																										
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	**1**	**1**	0	0	**2**	0	**2**	0	0	0	0	0	0	0	0	0	0	**3**
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	1
Total Volume	0	0	0	0	0	0	0	0	1	1	0	1	3	0	4	0	0	0	0	0	0	0	1	0	1	6
% App. Total	0	0	0	0		0	0	0	100		0	25	75	0		0	0	0	0		0	0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.250	.375	.000	.500	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.500

Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023
Page No : 1

Groups Printed- Cars - Trucks

	Railroad St From North				Pearson St From Northeast				Essex St From East				Dundee Park Dr From South				Essex St From West				
Start Time	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Int. Total
04:00 PM	2	13	4	17	1	2	8	3	4	59	44	1	7	8	0	5	14	8	34	4	238
04:15 PM	4	15	2	16	0	0	8	2	3	66	28	1	6	8	0	2	15	6	42	8	232
04:30 PM	2	13	3	18	0	1	4	2	2	69	22	0	8	6	0	7	9	6	59	4	235
04:45 PM	0	16	7	15	0	0	11	3	7	58	29	3	9	10	0	6	13	5	66	20	278
Total	8	57	16	66	1	3	31	10	16	252	123	5	30	32	0	20	51	25	201	36	983
05:00 PM	3	14	4	23	0	0	16	6	0	72	32	0	13	10	3	15	20	8	34	6	279
05:15 PM	1	25	8	24	0	1	5	1	4	64	30	2	7	6	1	4	16	10	49	6	264
05:30 PM	3	13	3	18	1	1	6	1	2	64	31	1	9	7	1	10	12	2	45	4	234
05:45 PM	6	20	3	14	0	1	10	3	8	67	26	1	10	1	2	13	16	6	56	14	277
Total	13	72	18	79	1	3	37	11	14	267	119	4	39	24	7	42	64	26	184	30	1054
Grand Total	21	129	34	145	2	6	68	21	30	519	242	9	69	56	7	62	115	51	385	66	2037
Apprch %	6.4	39.2	10.3	44.1	2.1	6.2	70.1	21.6	3.8	64.9	30.2	1.1	35.6	28.9	3.6	32	18.6	8.3	62.4	10.7	
Total %	1	6.3	1.7	7.1	0.1	0.3	3.3	1	1.5	25.5	11.9	0.4	3.4	2.7	0.3	3	5.6	2.5	18.9	3.2	
Cars	20	126	34	144	2	6	68	21	30	515	236	9	69	56	7	62	114	50	380	66	2015
% Cars	95.2	97.7	100	99.3	100	100	100	100	100	99.2	97.5	100	100	100	100	100	99.1	98	98.7	100	98.9
Trucks	1	3	0	1	0	0	0	0	0	4	6	0	0	0	0	0	1	1	5	0	22
% Trucks	4.8	2.3	0	0.7	0	0	0	0	0	0.8	2.5	0	0	0	0	0	0.9	2	1.3	0	1.1

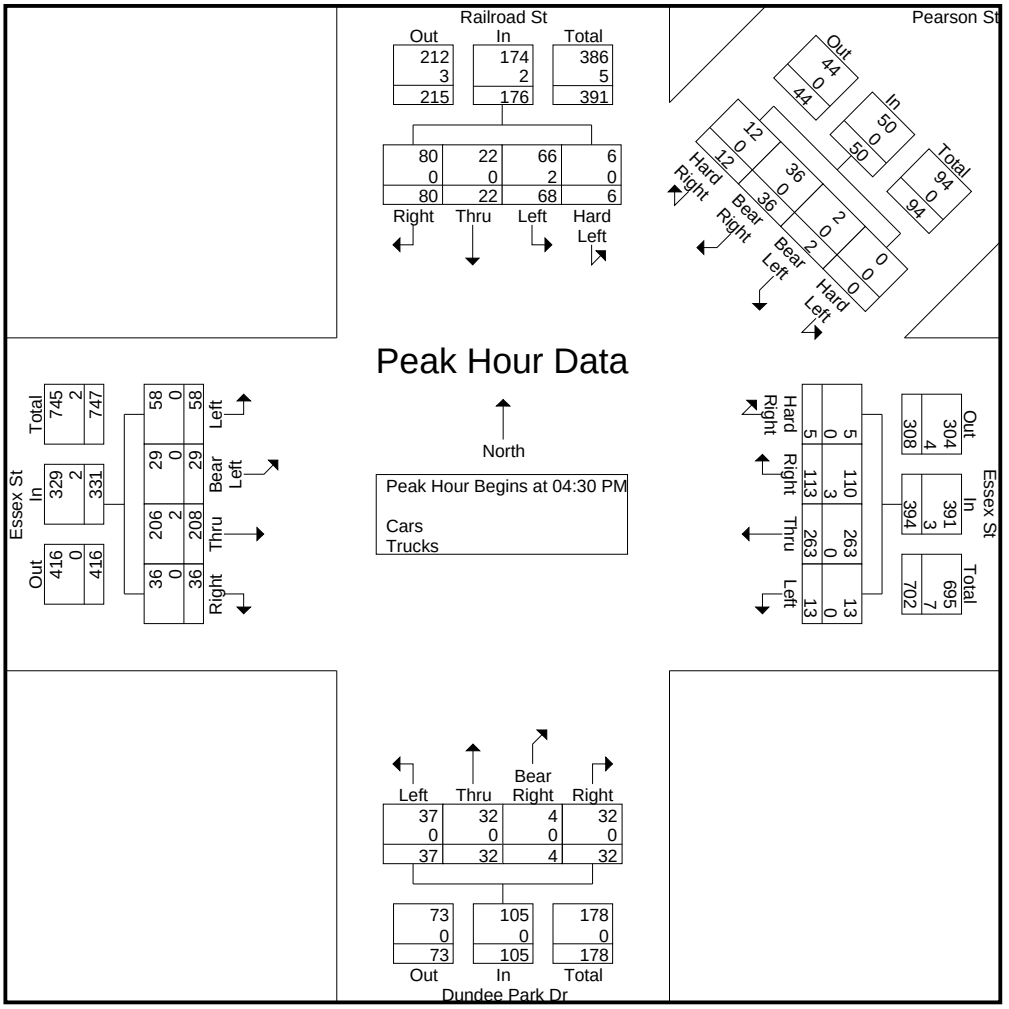
	Railroad St From North					Pearson St From Northeast					Essex St From East					Dundee Park Dr From South					Essex St From West					
Start Time	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:30 PM																										
04:30 PM	2	13	3	18	36	0	**1**	4	2	7	2	69	22	0	93	8	6	0	7	21	9	6	59	4	78	235
04:45 PM	0	16	7	15	38	0	0	11	3	14	**7**	58	29	**3**	97	9	**10**	0	6	25	13	5	**66**	**20**	**104**	278
05:00 PM	**3**	14	4	23	44	0	0	**16**	**6**	**22**	0	**72**	**32**	0	**104**	**13**	10	**3**	**15**	**41**	**20**	8	34	6	68	**279**
05:15 PM	1	**25**	**8**	**24**	**58**	0	1	5	1	7	4	64	30	2	100	7	6	1	4	18	16	**10**	49	6	81	264
Total Volume	6	68	22	80	176	0	2	36	12	50	13	263	113	5	394	37	32	4	32	105	58	29	208	36	331	1056
% App. Total	3.4	38.6	12.5	45.5		0	4	72	24		3.3	66.8	28.7	1.3		35.2	30.5	3.8	30.5		17.5	8.8	62.8	10.9		
PHF	.500	.680	.688	.833	.759	.000	.500	.563	.500	.568	.464	.913	.883	.417	.947	.712	.800	.333	.533	.640	.725	.725	.788	.450	.796	.946
Cars	6	66	22	80	174	0	2	36	12	50	13	263	110	5	391	37	32	4	32	105	58	29	206	36	329	1049
% Cars	100	97.1	100	100	98.9	0	100	100	100	100	100	100	97.3	100	99.2	100	100	100	100	100	100	100	99.0	100	99.4	99.3
Trucks	0	2	0	0	2	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	2	0	2	7
% Trucks	0	2.9	0	0	1.1	0	0	0	0	0	0	0	2.7	0	0.8	0	0	0	0	0	0	0	1.0	0	0.6	0.7

Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023
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:

	05:00 PM					04:15 PM					05:00 PM					05:00 PM					04:30 PM				
+0 mins.	3	14	4	23	44	0	0	8	2	10	0	**72**	**32**	0	**104**	**13**	**10**	**3**	**15**	**41**	9	6	59	4	78
+15 mins.	1	**25**	**8**	**24**	**58**	0	**1**	4	2	7	4	64	30	**2**	100	7	6	1	4	18	13	5	**66**	**20**	**104**
+30 mins.	3	13	3	18	37	0	0	11	3	14	2	64	31	1	98	9	7	1	10	27	**20**	8	34	6	68
+45 mins.	**6**	20	3	14	43	0	0	**16**	**6**	**22**	**8**	67	26	1	102	10	1	2	13	26	16	**10**	49	6	81
Total Volume	13	72	18	79	182	0	1	39	13	53	14	267	119	4	404	39	24	7	42	112	58	29	208	36	331
% App. Total	7.1	39.6	9.9	43.4		0	1.9	73.6	24.5		3.5	66.1	29.5	1		34.8	21.4	6.2	37.5		17.5	8.8	62.8	10.9	
PHF	.542	.720	.563	.823	.784	.000	.250	.609	.542	.602	.438	.927	.930	.500	.971	.750	.600	.583	.700	.683	.725	.725	.788	.450	.796
Cars	12	70	18	79	179	0	1	39	13	53	14	266	116	4	400	39	24	7	42	112	58	29	206	36	329
% Cars	92.3	97.2	100	100	98.4	0	100	100	100	100	100	99.6	97.5	100	99	100	100	100	100	100	100	100	99	100	99.4
Trucks	1	2	0	0	3	0	0	0	0	0	0	1	3	0	4	0	0	0	0	0	0	0	2	0	2
% Trucks	7.7	2.8	0	0	1.6	0	0	0	0	0	0	0.4	2.5	0	1	0	0	0	0	0	0	0	1	0	0.6

Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
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File Name : 89750005
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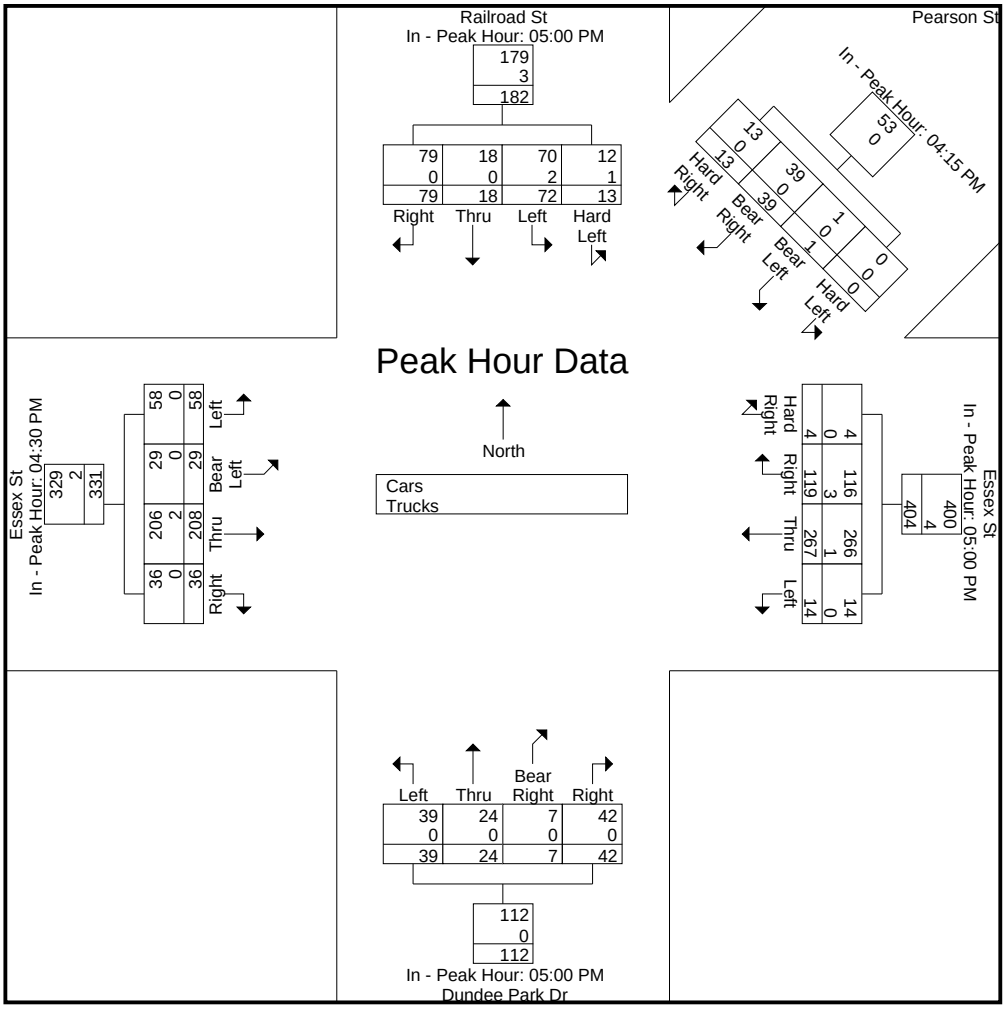


Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023

Groups Printed- Cars

	Railroad St From North				Pearson St From Northeast				Essex St From East				Dundee Park Dr From South				Essex St From West				
Start Time	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Int. Total
04:00 PM	2	12	4	16	1	2	8	3	4	57	43	1	7	8	0	5	14	8	32	4	231
04:15 PM	4	15	2	16	0	0	8	2	3	65	28	1	6	8	0	2	15	5	41	8	229
04:30 PM	2	13	3	18	0	1	4	2	2	69	20	0	8	6	0	7	9	6	59	4	233
04:45 PM	0	16	7	15	0	0	11	3	7	58	29	3	9	10	0	6	13	5	65	20	277
Total	8	56	16	65	1	3	31	10	16	249	120	5	30	32	0	20	51	24	197	36	970
05:00 PM	3	13	4	23	0	0	16	6	0	72	31	0	13	10	3	15	20	8	33	6	276
05:15 PM	1	24	8	24	0	1	5	1	4	64	30	2	7	6	1	4	16	10	49	6	263
05:30 PM	3	13	3	18	1	1	6	1	2	63	30	1	9	7	1	10	12	2	45	4	232
05:45 PM	5	20	3	14	0	1	10	3	8	67	25	1	10	1	2	13	15	6	56	14	274
Total	12	70	18	79	1	3	37	11	14	266	116	4	39	24	7	42	63	26	183	30	1045
Grand Total	20	126	34	144	2	6	68	21	30	515	236	9	69	56	7	62	114	50	380	66	2015
Apprch %	6.2	38.9	10.5	44.4	2.1	6.2	70.1	21.6	3.8	65.2	29.9	1.1	35.6	28.9	3.6	32	18.7	8.2	62.3	10.8	
Total %	1	6.3	1.7	7.1	0.1	0.3	3.4	1	1.5	25.6	11.7	0.4	3.4	2.8	0.3	3.1	5.7	2.5	18.9	3.3	

	Railroad St From North					Pearson St From Northeast					Essex St From East					Dundee Park Dr From South					Essex St From West					
Start Time	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:30 PM																										
04:30 PM	2	13	3	18	36	0	**1**	4	2	7	2	69	20	0	91	8	6	0	7	21	9	6	59	4	78	233
04:45 PM	0	16	7	15	38	0	0	11	3	14	**7**	58	29	**3**	97	9	**10**	0	6	25	13	5	**65**	**20**	**103**	**277**
05:00 PM	**3**	13	4	23	43	0	0	**16**	**6**	**22**	0	**72**	**31**	0	**103**	**13**	10	**3**	**15**	**41**	**20**	8	33	6	67	276
05:15 PM	1	**24**	**8**	**24**	**57**	0	1	5	1	7	4	64	30	2	100	7	6	1	4	18	16	**10**	49	6	81	263
Total Volume	6	66	22	80	174	0	2	36	12	50	13	263	110	5	391	37	32	4	32	105	58	29	206	36	329	1049
% App. Total	3.4	37.9	12.6	46		0	4	72	24		3.3	67.3	28.1	1.3		35.2	30.5	3.8	30.5		17.6	8.8	62.6	10.9		
PHF	.500	.688	.688	.833	.763	.000	.500	.563	.500	.568	.464	.913	.887	.417	.949	.712	.800	.333	.533	.640	.725	.725	.792	.450	.799	.947

Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023
Page No : 7

Groups Printed- Trucks

	Railroad St From North				Pearson St From Northeast				Essex St From East				Dundee Park Dr From South				Essex St From West				
Start Time	Hard Left	Left	Thru	Right	Hard Left	Bear Left	Bear Right	Hard Right	Left	Thru	Right	Hard Right	Left	Thru	Bear Right	Right	Left	Bear Left	Thru	Right	Int. Total
04:00 PM	0	1	0	1	0	0	0	0	0	2	1	0	0	0	0	0	0	0	2	0	7
04:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	3
04:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	1	0	1	0	0	0	0	0	3	3	0	0	0	0	0	0	1	4	0	13
05:00 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	3
05:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
05:45 PM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	3
Total	1	2	0	0	0	0	0	0	0	1	3	0	0	0	0	0	1	0	1	0	9
Grand Total	1	3	0	1	0	0	0	0	0	4	6	0	0	0	0	0	1	1	5	0	22
Apprch %	20	60	0	20	0	0	0	0	0	40	60	0	0	0	0	0	14.3	14.3	71.4	0	
Total %	4.5	13.6	0	4.5	0	0	0	0	0	18.2	27.3	0	0	0	0	0	4.5	4.5	22.7	0	

	Railroad St From North					Pearson St From Northeast					Essex St From East					Dundee Park Dr From South					Essex St From West					
Start Time	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:00 PM																										
04:00 PM	0	**1**	0	**1**	**2**	0	0	0	0	0	0	**2**	1	0	**3**	0	0	0	0	0	0	0	**2**	0	**2**	**7**
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	**1**	1	0	2	3
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	**2**	0	2	0	0	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	1	0	1	2	0	0	0	0	0	0	3	3	0	6	0	0	0	0	0	0	1	4	0	5	13
% App. Total	0	50	0	50		0	0	0	0		0	50	50	0		0	0	0	0		0	20	80	0		
PHF	.000	.250	.000	.250	.250	.000	.000	.000	.000	.000	.000	.375	.375	.000	.500	.000	.000	.000	.000	.000	.000	.250	.500	.000	.625	.464

Accurate Counts

978-664-2565

N/S Street : Railroad St / Dundee Park Dr
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750005
Site Code : 89750005
Start Date : 9/20/2023
Page No : 10

Groups Printed- Bikes Peds

	Railroad St From North					Pearson St From Northeast					Essex St From East					Dundee Park Dr From South					Essex St From West							
Start Time	Hard Left	Left	Thru	Right	Peds	Hard Left	Bear Left	Bear Right	Hard Right	Peds	Left	Thru	Right	Hard Right	Peds	Left	Thru	Bear Right	Right	Peds	Left	Bear Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	5	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	9	0	9
04:15 PM	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
04:30 PM	0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	0	7
04:45 PM	0	0	0	0	5	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	10	0	10
Total	0	0	0	0	15	0	0	0	0	10	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	29	0	29
05:00 PM	0	2	0	0	6	0	0	0	0	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	11	2	13
05:15 PM	0	0	0	0	6	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	11
05:30 PM	0	0	0	0	5	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9	0	9
05:45 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Total	0	2	0	0	19	0	0	0	0	12	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	33	2	35
Grand Total	0	2	0	0	34	0	0	0	0	22	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	62	2	64
Apprch %	0	100	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0			
Total %	0	100	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		96.9	3.1	

	Railroad St From North					Pearson St From Northeast					Essex St From East					Dundee Park Dr From South					Essex St From West						
Start Time	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:15 PM																										
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	**2**	0	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
Total Volume	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% App. Total	0	100	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023
Page No : 1

Groups Printed- Cars - Trucks

	Essex St From East		School St From South		Essex St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	1	15	15	1	28	41	101
07:15 AM	0	9	20	0	29	35	93
07:30 AM	0	26	46	3	28	29	132
07:45 AM	0	60	62	7	42	34	205
Total	1	110	143	11	127	139	531
08:00 AM	3	36	53	2	43	45	182
08:15 AM	2	14	38	2	43	49	148
08:30 AM	13	34	42	5	42	39	175
08:45 AM	7	17	41	10	34	35	144
Total	25	101	174	19	162	168	649
Grand Total	26	211	317	30	289	307	1180
Apprch %	11	89	91.4	8.6	48.5	51.5	
Total %	2.2	17.9	26.9	2.5	24.5	26	
Cars	26	205	304	27	285	296	1143
% Cars	100	97.2	95.9	90	98.6	96.4	96.9
Trucks	0	6	13	3	4	11	37
% Trucks	0	2.8	4.1	10	1.4	3.6	3.1

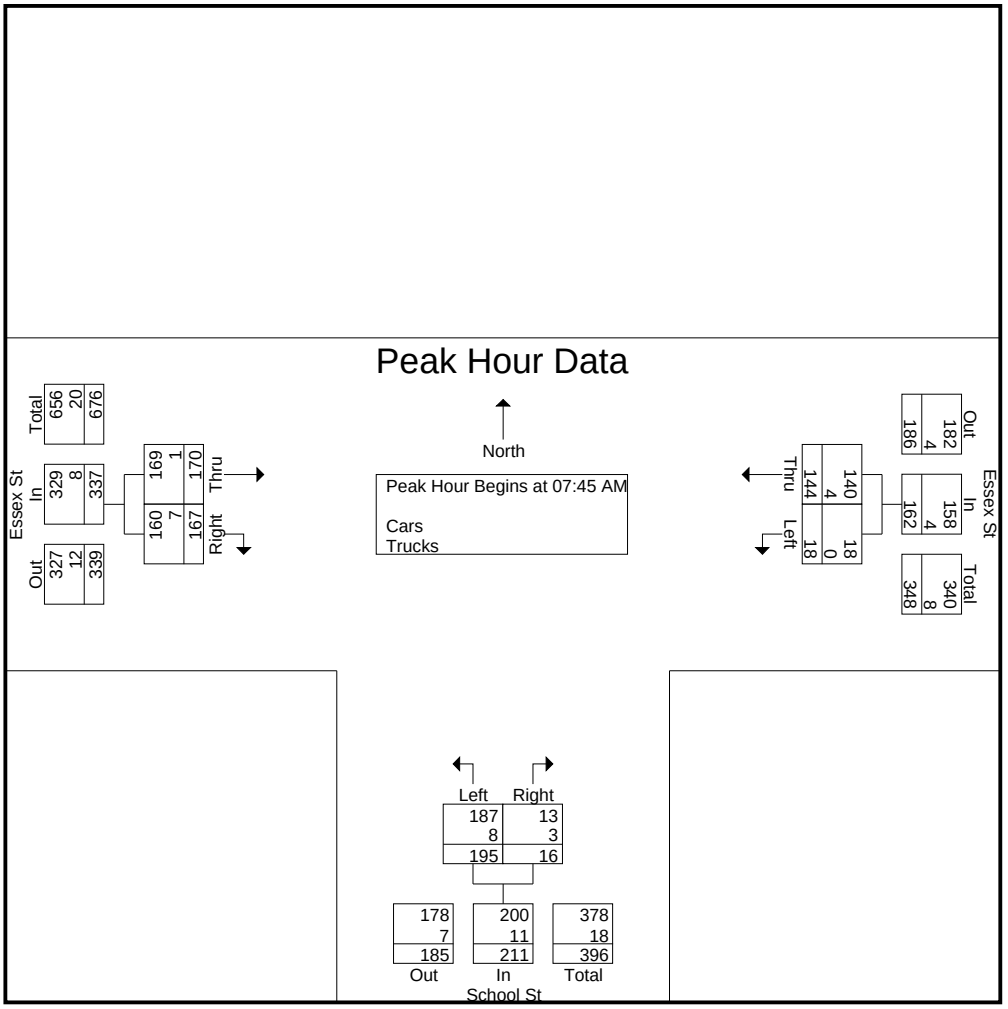
	Essex St From East			School St From South			Essex St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	0	**60**	**60**	**62**	**7**	**69**	42	34	76	**205**
08:00 AM	3	36	39	53	2	55	**43**	45	88	182
08:15 AM	2	14	16	38	2	40	43	**49**	**92**	148
08:30 AM	**13**	34	47	42	5	47	42	39	81	175
Total Volume	18	144	162	195	16	211	170	167	337	710
% App. Total	11.1	88.9		92.4	7.6		50.4	49.6		
PHF	.346	.600	.675	.786	.571	.764	.988	.852	.916	.866
Cars	18	140	158	187	13	200	169	160	329	687
% Cars	100	97.2	97.5	95.9	81.3	94.8	99.4	95.8	97.6	96.8
Trucks	0	4	4	8	3	11	1	7	8	23
% Trucks	0	2.8	2.5	4.1	18.8	5.2	0.6	4.2	2.4	3.2

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023
Page No : 2



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

Peak Hour for Each Approach Begins at:

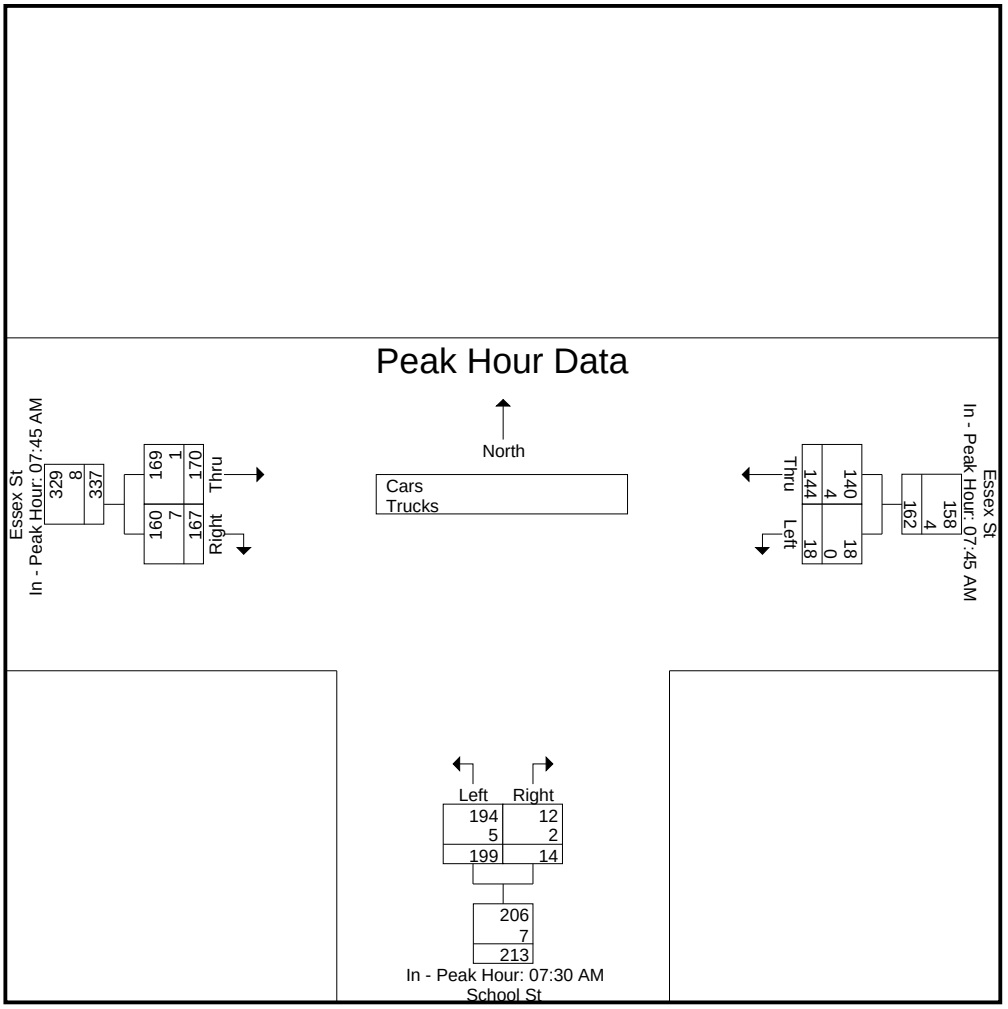
	07:45 AM			07:30 AM			07:45 AM		
+0 mins.	0	**60**	**60**	46	3	49	42	34	76
+15 mins.	3	36	39	**62**	**7**	**69**	**43**	45	88
+30 mins.	2	14	16	53	2	55	43	**49**	**92**
+45 mins.	**13**	34	47	38	2	40	42	39	81
Total Volume	18	144	162	199	14	213	170	167	337
% App. Total	11.1	88.9		93.4	6.6		50.4	49.6	
PHF	.346	.600	.675	.802	.500	.772	.988	.852	.916
Cars	18	140	158	194	12	206	169	160	329
% Cars	100	97.2	97.5	97.5	85.7	96.7	99.4	95.8	97.6
Trucks	0	4	4	5	2	7	1	7	8
% Trucks	0	2.8	2.5	2.5	14.3	3.3	0.6	4.2	2.4

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023
Page No : 4

Groups Printed- Cars

	Essex St From East		School St From South		Essex St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	1	14	15	1	26	39	96
07:15 AM	0	9	16	0	28	33	86
07:30 AM	0	25	45	3	28	29	130
07:45 AM	0	60	62	7	42	33	204
Total	1	108	138	11	124	134	516
08:00 AM	3	33	50	1	43	44	174
08:15 AM	2	14	37	1	43	46	143
08:30 AM	13	33	38	4	41	37	166
08:45 AM	7	17	41	10	34	35	144
Total	25	97	166	16	161	162	627
Grand Total	26	205	304	27	285	296	1143
Apprch %	11.3	88.7	91.8	8.2	49.1	50.9	
Total %	2.3	17.9	26.6	2.4	24.9	25.9	

	Essex St From East			School St From South			Essex St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	0	**60**	**60**	**62**	**7**	**69**	42	33	75	**204**
08:00 AM	3	33	36	50	1	51	**43**	44	87	174
08:15 AM	2	14	16	37	1	38	43	**46**	**89**	143
08:30 AM	**13**	33	46	38	4	42	41	37	78	166
Total Volume	18	140	158	187	13	200	169	160	329	687
% App. Total	11.4	88.6		93.5	6.5		51.4	48.6		
PHF	.346	.583	.658	.754	.464	.725	.983	.870	.924	.842

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023

Groups Printed- Trucks

	Essex St From East		School St From South		Essex St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	0	1	0	0	2	2	5
07:15 AM	0	0	4	0	1	2	7
07:30 AM	0	1	1	0	0	0	2
07:45 AM	0	0	0	0	0	1	1
Total	0	2	5	0	3	5	15
08:00 AM	0	3	3	1	0	1	8
08:15 AM	0	0	1	1	0	3	5
08:30 AM	0	1	4	1	1	2	9
08:45 AM	0	0	0	0	0	0	0
Total	0	4	8	3	1	6	22
Grand Total	0	6	13	3	4	11	37
Apprch %	0	100	81.2	18.8	26.7	73.3	
Total %	0	16.2	35.1	8.1	10.8	29.7	

	Essex St From East			School St From South			Essex St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	0	0	0	0	0	0	0	1	1	1
08:00 AM	0	**3**	**3**	3	**1**	4	0	1	1	8
08:15 AM	0	0	0	1	1	2	0	**3**	**3**	5
08:30 AM	0	1	1	**4**	1	**5**	**1**	2	3	**9**
Total Volume	0	4	4	8	3	11	1	7	8	23
% App. Total	0	100		72.7	27.3		12.5	87.5		
PHF	.000	.333	.333	.500	.750	.550	.250	.583	.667	.639

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023

Groups Printed- Bikes Peds

	Essex St From East			School St From South			Essex St From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. 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	1	0	1	0	0	0	0	5	5	2	7
07:45 AM	0	1	0	0	0	0	0	0	1	1	1	2
Total	0	2	0	1	0	0	0	0	6	6	3	9
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	1	0	0	1	1
08:30 AM	0	0	0	0	0	0	0	0	2	2	0	2
08:45 AM	0	0	0	0	0	1	0	0	0	1	0	1
Total	0	0	0	0	0	1	0	1	2	3	1	4
Grand Total	0	2	0	1	0	1	0	1	8	9	4	13
Apprch %	0	100		100	0		0	100				
Total %	0	50		25	0		0	25		69.2	30.8	

	Essex St From East			School St From South			Essex St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	0	**1**	**1**	**1**	0	**1**	0	0	0	**2**
07:45 AM	0	1	1	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	**1**	**1**	1
Total Volume	0	2	2	1	0	1	0	1	1	4
% App. Total	0	100		100	0		0	100		
PHF	.000	.500	.500	.250	.000	.250	.000	.250	.250	.500

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023
Page No : 1

Groups Printed- Cars - Trucks

	Essex St From East		School St From South		Essex St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	2	30	76	8	30	26	172
04:15 PM	4	28	61	4	43	34	174
04:30 PM	4	28	56	6	36	24	154
04:45 PM	0	29	63	3	36	39	170
Total	10	115	256	21	145	123	670
05:00 PM	3	42	68	8	48	38	207
05:15 PM	3	36	69	4	44	30	186
05:30 PM	3	31	64	6	41	40	185
05:45 PM	5	44	61	5	50	27	192
Total	14	153	262	23	183	135	770
Grand Total	24	268	518	44	328	258	1440
Apprch %	8.2	91.8	92.2	7.8	56	44	
Total %	1.7	18.6	36	3.1	22.8	17.9	
Cars	24	268	509	44	325	252	1422
% Cars	100	100	98.3	100	99.1	97.7	98.8
Trucks	0	0	9	0	3	6	18
% Trucks	0	0	1.7	0	0.9	2.3	1.2

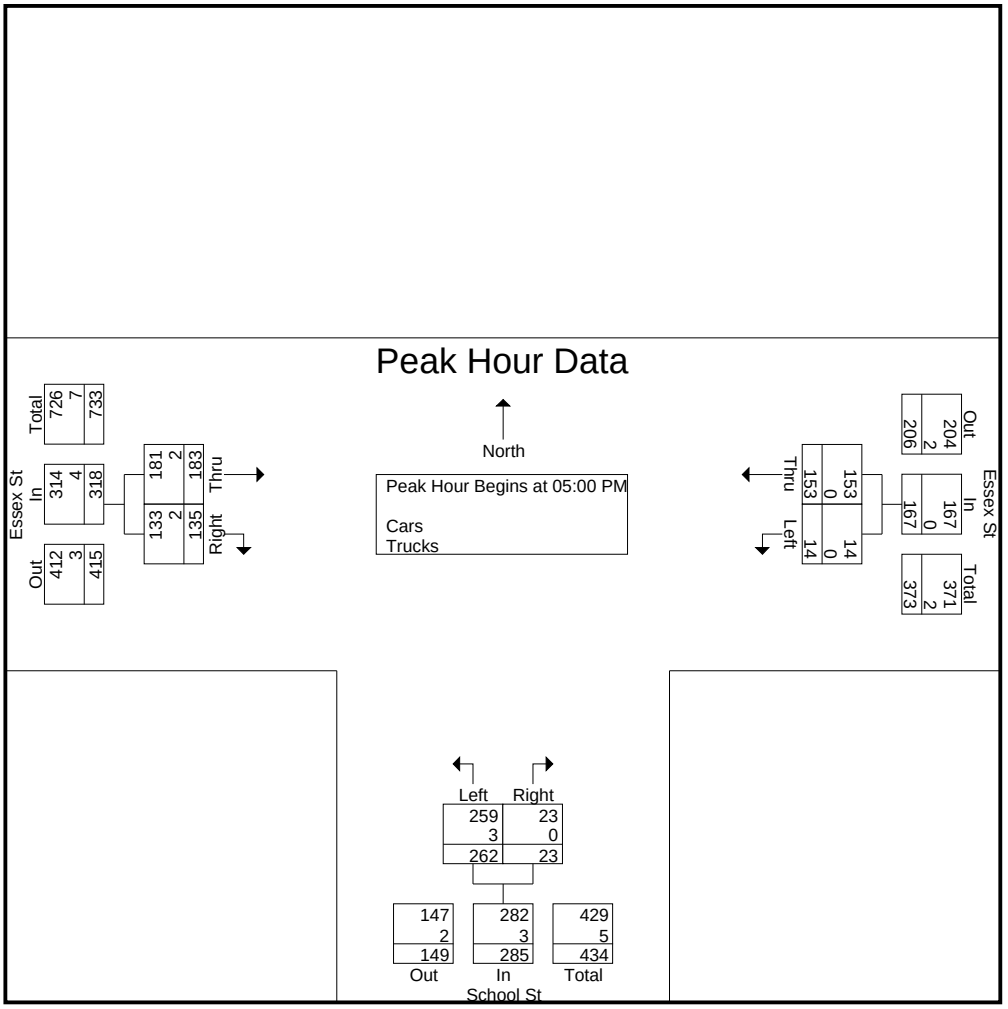
	Essex St From East			School St From South			Essex St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	3	42	45	68	**8**	**76**	48	38	**86**	**207**
05:15 PM	3	36	39	**69**	4	73	44	30	74	186
05:30 PM	3	31	34	64	6	70	41	**40**	81	185
05:45 PM	**5**	**44**	**49**	61	5	66	**50**	27	77	192
Total Volume	14	153	167	262	23	285	183	135	318	770
% App. Total	8.4	91.6		91.9	8.1		57.5	42.5		
PHF	.700	.869	.852	.949	.719	.938	.915	.844	.924	.930
Cars	14	153	167	259	23	282	181	133	314	763
% Cars	100	100	100	98.9	100	98.9	98.9	98.5	98.7	99.1
Trucks	0	0	0	3	0	3	2	2	4	7
% Trucks	0	0	0	1.1	0	1.1	1.1	1.5	1.3	0.9

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023
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:

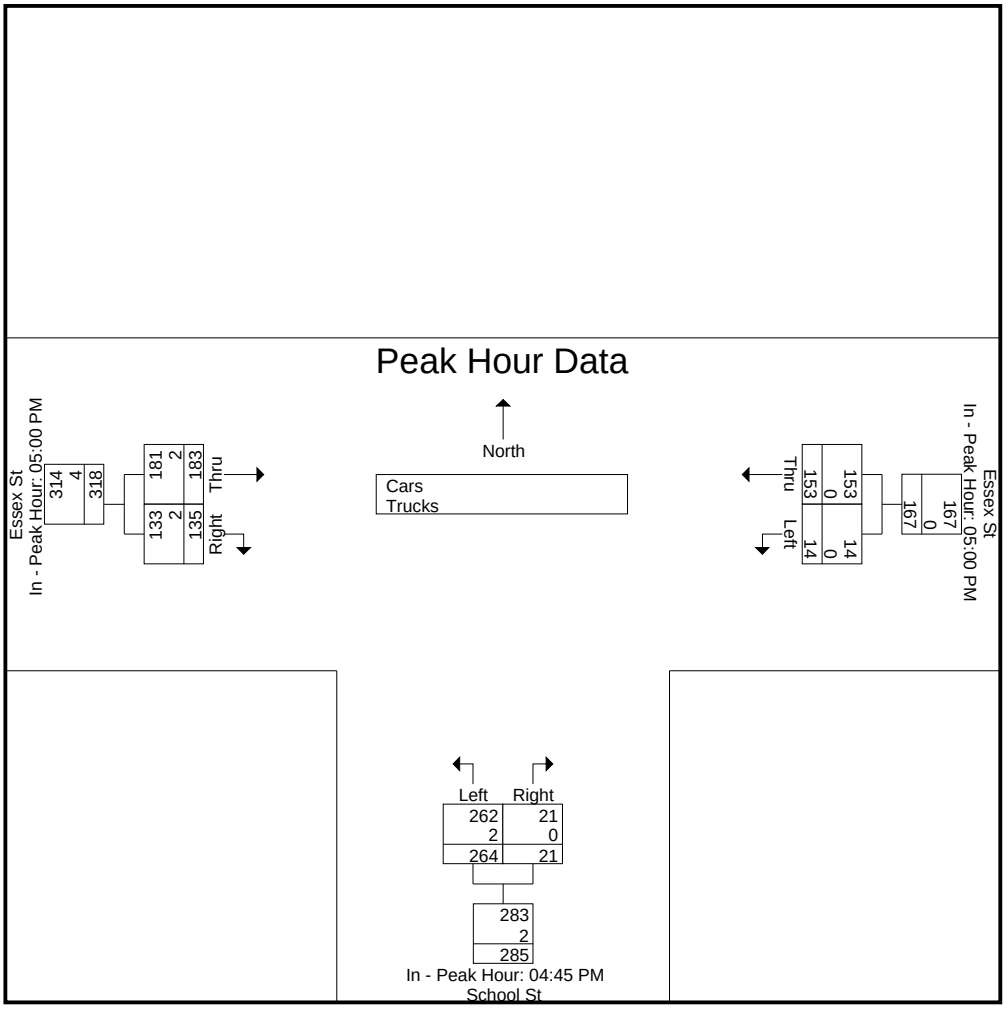
	05:00 PM			04:45 PM			05:00 PM		
+0 mins.	3	42	45	63	3	66	48	38	**86**
+15 mins.	3	36	39	68	**8**	**76**	44	30	74
+30 mins.	3	31	34	**69**	4	73	41	**40**	81
+45 mins.	**5**	**44**	**49**	64	6	70	**50**	27	77
Total Volume	14	153	167	264	21	285	183	135	318
% App. Total	8.4	91.6		92.6	7.4		57.5	42.5	
PHF	.700	.869	.852	.957	.656	.938	.915	.844	.924
Cars	14	153	167	262	21	283	181	133	314
% Cars	100	100	100	99.2	100	99.3	98.9	98.5	98.7
Trucks	0	0	0	2	0	2	2	2	4
% Trucks	0	0	0	0.8	0	0.7	1.1	1.5	1.3

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023
Page No : 4

Groups Printed- Cars

	Essex St From East		School St From South		Essex St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	2	30	75	8	30	23	168
04:15 PM	4	28	58	4	42	33	169
04:30 PM	4	28	54	6	36	24	152
04:45 PM	0	29	63	3	36	39	170
Total	10	115	250	21	144	119	659
05:00 PM	3	42	67	8	48	37	205
05:15 PM	3	36	69	4	44	29	185
05:30 PM	3	31	63	6	39	40	182
05:45 PM	5	44	60	5	50	27	191
Total	14	153	259	23	181	133	763
Grand Total	24	268	509	44	325	252	1422
Apprch %	8.2	91.8	92	8	56.3	43.7	
Total %	1.7	18.8	35.8	3.1	22.9	17.7	

	Essex St From East			School St From South			Essex St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	3	42	45	67	**8**	**75**	48	37	**85**	**205**
05:15 PM	3	36	39	**69**	4	73	44	29	73	185
05:30 PM	3	31	34	63	6	69	39	**40**	79	182
05:45 PM	**5**	**44**	**49**	60	5	65	**50**	27	77	191
Total Volume	14	153	167	259	23	282	181	133	314	763
% App. Total	8.4	91.6		91.8	8.2		57.6	42.4		
PHF	.700	.869	.852	.938	.719	.940	.905	.831	.924	.930

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023

Groups Printed- Trucks

	Essex St From East		School St From South		Essex St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	0	0	1	0	0	3	4
04:15 PM	0	0	3	0	1	1	5
04:30 PM	0	0	2	0	0	0	2
04:45 PM	0	0	0	0	0	0	0
Total	0	0	6	0	1	4	11
05:00 PM	0	0	1	0	0	1	2
05:15 PM	0	0	0	0	0	1	1
05:30 PM	0	0	1	0	2	0	3
05:45 PM	0	0	1	0	0	0	1
Total	0	0	3	0	2	2	7
Grand Total	0	0	9	0	3	6	18
Apprch %	0	0	100	0	33.3	66.7	
Total %	0	0	50	0	16.7	33.3	

	Essex St From East			School St From South			Essex St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	0	0	1	0	1	0	**3**	**3**	4
04:15 PM	0	0	0	**3**	0	**3**	**1**	1	2	**5**
04:30 PM	0	0	0	2	0	2	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	6	0	6	1	4	5	11
% App. Total	0	0		100	0		20	80		
PHF	.000	.000	.000	.500	.000	.500	.250	.333	.417	.550

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750006
Site Code : 89750006
Start Date : 9/26/2023

Groups Printed- Bikes Peds

	Essex St From East			School St From South			Essex St From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	2	0	0	0	0	0	0	2	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	3	1	0	2	0	0	0	5	1	6
04:45 PM	0	0	0	1	0	0	0	0	2	2	1	3
Total	0	0	5	2	0	2	0	0	2	9	2	11
05:00 PM	0	0	1	0	0	0	0	0	5	6	0	6
05:15 PM	0	0	2	0	0	1	0	0	0	3	0	3
05:30 PM	0	0	0	0	0	0	0	0	4	4	0	4
05:45 PM	0	0	0	0	0	0	0	0	1	1	0	1
Total	0	0	3	0	0	1	0	0	10	14	0	14
Grand Total	0	0	8	2	0	3	0	0	12	23	2	25
Apprch %	0	0		100	0		0	0				
Total %	0	0		100	0		0	0		92	8	

	Essex St From East			School St From South			Essex St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	**1**	0	**1**	0	0	0	**1**
04:45 PM	0	0	0	1	0	1	0	0	0	1
Total Volume	0	0	0	2	0	2	0	0	0	2
% App. Total	0	0		100	0		0	0		
PHF	.000	.000	.000	.500	.000	.500	.000	.000	.000	.500

Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023

Groups Printed- Cars - Trucks

	Essex St From East			Brook St From Southeast			Ridge St From South			Essex St From West			
Start Time	Hard Left	Left	Thru	Hard Left	Bear Left	Hard Right	Left	Right	Hard Right	Thru	Bear Right	Right	Int. Total
07:00 AM	3	0	13	0	0	0	0	0	0	0	26	0	42
07:15 AM	3	0	9	0	0	0	0	0	1	0	33	0	46
07:30 AM	2	1	28	0	0	0	2	0	0	0	22	2	57
07:45 AM	2	0	50	0	0	0	1	0	1	0	50	1	105
Total	10	1	100	0	0	0	3	0	2	0	131	3	250
08:00 AM	5	0	24	0	0	0	2	0	2	0	41	4	78
08:15 AM	4	2	23	0	0	0	1	0	2	1	45	4	82
08:30 AM	7	0	29	1	0	0	3	0	1	0	37	3	81
08:45 AM	5	2	32	0	0	0	2	0	0	0	32	0	73
Total	21	4	108	1	0	0	8	0	5	1	155	11	314
Grand Total	31	5	208	1	0	0	11	0	7	1	286	14	564
Apprch %	12.7	2	85.2	100	0	0	61.1	0	38.9	0.3	95	4.7	
Total %	5.5	0.9	36.9	0.2	0	0	2	0	1.2	0.2	50.7	2.5	
Cars	31	5	206	1	0	0	11	0	7	1	280	14	556
% Cars	100	100	99	100	0	0	100	0	100	100	97.9	100	98.6
Trucks	0	0	2	0	0	0	0	0	0	0	6	0	8
% Trucks	0	0	1	0	0	0	0	0	0	0	2.1	0	1.4

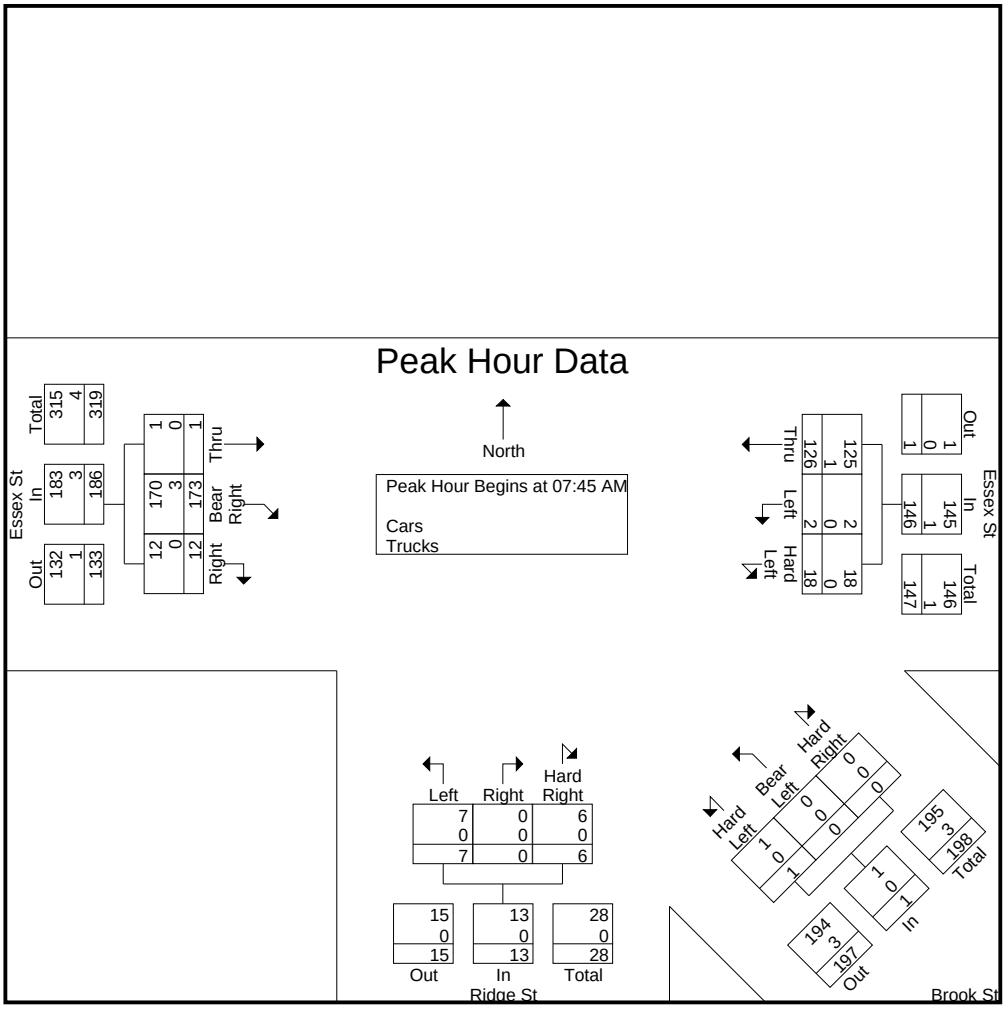
	Essex St From East				Brook St From Southeast				Ridge St From South				Essex St From West				
Start Time	Hard Left	Left	Thru	App. Total	Hard Left	Bear Left	Hard Right	App. Total	Left	Right	Hard Right	App. Total	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	2	0	**50**	**52**	0	0	0	0	1	0	1	2	0	**50**	1	**51**	**105**
08:00 AM	5	0	24	29	0	0	0	0	2	0	**2**	**4**	0	41	**4**	45	78
08:15 AM	4	**2**	23	29	0	0	0	0	1	0	2	3	**1**	45	4	50	82
08:30 AM	**7**	0	29	36	**1**	0	0	**1**	**3**	0	1	4	0	37	3	40	81
Total Volume	18	2	126	146	1	0	0	1	7	0	6	13	1	173	12	186	346
% App. Total	12.3	1.4	86.3		100	0	0		53.8	0	46.2		0.5	93	6.5		
PHF	.643	.250	.630	.702	.250	.000	.000	.250	.583	.000	.750	.813	.250	.865	.750	.912	.824
Cars	18	2	125	145	1	0	0	1	7	0	6	13	1	170	12	183	342
% Cars	100	100	99.2	99.3	100	0	0	100	100	0	100	100	100	98.3	100	98.4	98.8
Trucks	0	0	1	1	0	0	0	0	0	0	0	0	0	3	0	3	4
% Trucks	0	0	0.8	0.7	0	0	0	0	0	0	0	0	0	1.7	0	1.6	1.2

Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023
Page No : 2



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

Peak Hour for Each Approach Begins at:

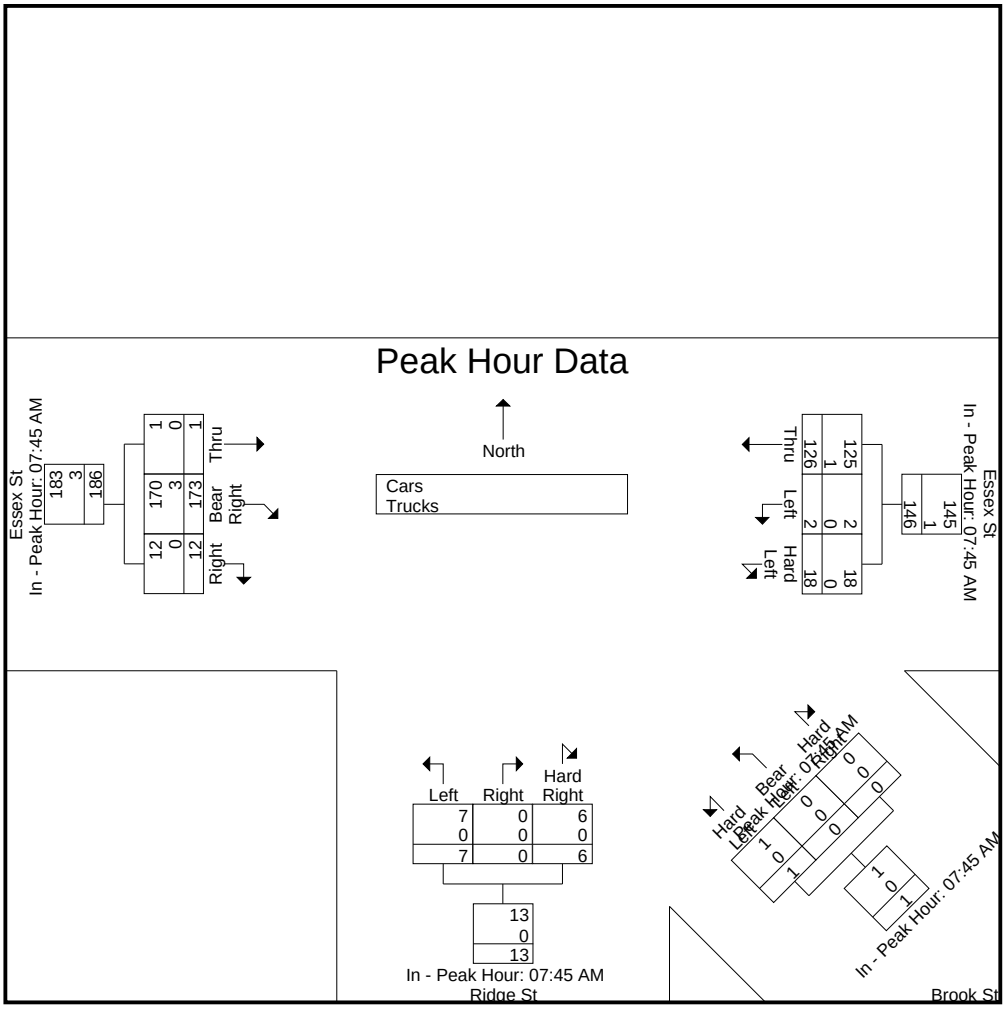
	07:45 AM				07:45 AM				07:45 AM				07:45 AM			
+0 mins.	2	0	**50**	**52**	0	0	0	0	1	0	1	2	0	**50**	1	**51**
+15 mins.	5	0	24	29	0	0	0	0	2	0	**2**	**4**	0	41	**4**	45
+30 mins.	4	**2**	23	29	0	0	0	0	1	0	2	3	**1**	45	4	50
+45 mins.	**7**	0	29	36	**1**	0	0	**1**	**3**	0	1	4	0	37	3	40
Total Volume	18	2	126	146	1	0	0	1	7	0	6	13	1	173	12	186
% App. Total	12.3	1.4	86.3		100	0	0		53.8	0	46.2		0.5	93	6.5	
PHF	.643	.250	.630	.702	.250	.000	.000	.250	.583	.000	.750	.813	.250	.865	.750	.912
Cars	18	2	125	145	1	0	0	1	7	0	6	13	1	170	12	183
% Cars	100	100	99.2	99.3	100	0	0	100	100	0	100	100	100	98.3	100	98.4
Trucks	0	0	1	1	0	0	0	0	0	0	0	0	0	3	0	3
% Trucks	0	0	0.8	0.7	0	0	0	0	0	0	0	0	0	1.7	0	1.6

Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023

Groups Printed- Cars

	Essex St From East			Brook St From Southeast			Ridge St From South			Essex St From West			
Start Time	Hard Left	Left	Thru	Hard Left	Bear Left	Hard Right	Left	Right	Hard Right	Thru	Bear Right	Right	Int. Total
07:00 AM	3	0	13	0	0	0	0	0	0	0	26	0	42
07:15 AM	3	0	9	0	0	0	0	0	1	0	33	0	46
07:30 AM	2	1	27	0	0	0	2	0	0	0	19	2	53
07:45 AM	2	0	50	0	0	0	1	0	1	0	49	1	104
Total	10	1	99	0	0	0	3	0	2	0	127	3	245
08:00 AM	5	0	23	0	0	0	2	0	2	0	40	4	76
08:15 AM	4	2	23	0	0	0	1	0	2	1	44	4	81
08:30 AM	7	0	29	1	0	0	3	0	1	0	37	3	81
08:45 AM	5	2	32	0	0	0	2	0	0	0	32	0	73
Total	21	4	107	1	0	0	8	0	5	1	153	11	311
Grand Total	31	5	206	1	0	0	11	0	7	1	280	14	556
Apprch %	12.8	2.1	85.1	100	0	0	61.1	0	38.9	0.3	94.9	4.7	
Total %	5.6	0.9	37.1	0.2	0	0	2	0	1.3	0.2	50.4	2.5	

	Essex St From East				Brook St From Southeast				Ridge St From South				Essex St From West				
Start Time	Hard Left	Left	Thru	App. Total	Hard Left	Bear Left	Hard Right	App. Total	Left	Right	Hard Right	App. Total	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	2	0	**50**	**52**	0	0	0	0	1	0	1	2	0	**49**	1	**50**	**104**
08:00 AM	5	0	23	28	0	0	0	0	2	0	**2**	**4**	0	40	**4**	44	76
08:15 AM	4	**2**	23	29	0	0	0	0	1	0	2	3	**1**	44	4	49	81
08:30 AM	**7**	0	29	36	**1**	0	0	**1**	**3**	0	1	4	0	37	3	40	81
Total Volume	18	2	125	145	1	0	0	1	7	0	6	13	1	170	12	183	342
% App. Total	12.4	1.4	86.2		100	0	0		53.8	0	46.2		0.5	92.9	6.6		
PHF	.643	.250	.625	.697	.250	.000	.000	.250	.583	.000	.750	.813	.250	.867	.750	.915	.822

Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023

Groups Printed- Trucks

	Essex St From East			Brook St From Southeast			Ridge St From South			Essex St From West			
Start Time	Hard Left	Left	Thru	Hard Left	Bear Left	Hard Right	Left	Right	Hard Right	Thru	Bear Right	Right	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	1	0	0	0	0	0	0	0	3	0	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	1	0	0	0	0	0	0	0	4	0	5
08:00 AM	0	0	1	0	0	0	0	0	0	0	1	0	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
08:30 AM	0	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	0
Total	0	0	1	0	0	0	0	0	0	0	2	0	3
Grand Total	0	0	2	0	0	0	0	0	0	0	6	0	8
Apprch %	0	0	100	0	0	0	0	0	0	0	100	0	
Total %	0	0	25	0	0	0	0	0	0	0	75	0	

	Essex St From East				Brook St From Southeast				Ridge St From South				Essex St From West				
Start Time	Hard Left	Left	Thru	App. Total	Hard Left	Bear Left	Hard Right	App. Total	Left	Right	Hard Right	App. Total	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	**1**	**1**	0	0	0	0	0	0	0	0	0	**3**	0	**3**	**4**
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:00 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	2	2	0	0	0	0	0	0	0	0	0	6	0	6	8
% App. Total	0	0	100		0	0	0		0	0	0		0	100	0		
PHF	.000	.000	.500	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.000	.500	.500

Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023

Groups Printed- Bikes Peds

	Essex St From East				Brook St From Southeast				Ridge St From South				Essex St From West						
Start Time	Hard Left	Left	Thru	Peds	Hard Left	Bear Left	Hard Right	Peds	Left	Right	Hard Right	Peds	Thru	Bear Right	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2	6	0	6
07:30 AM	0	0	1	3	0	0	0	1	2	0	0	0	0	0	0	0	4	3	7
07:45 AM	0	0	1	3	0	0	0	3	0	0	0	0	0	0	0	1	7	1	8
Total	0	0	2	8	0	0	0	4	2	0	0	2	0	0	0	3	17	4	21
08:00 AM	0	0	0	4	0	0	0	3	0	0	0	0	0	0	0	0	7	0	7
08:15 AM	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	3	0	3
08:30 AM	0	0	0	6	0	0	0	1	0	0	0	1	0	0	0	2	10	0	10
08:45 AM	0	0	0	3	0	0	0	4	0	0	0	1	0	0	0	0	8	0	8
Total	0	0	0	15	0	0	0	9	0	0	0	2	0	0	0	2	28	0	28
Grand Total	0	0	2	23	0	0	0	13	2	0	0	4	0	0	0	5	45	4	49
Apprch %	0	0	100		0	0	0		100	0	0		0	0	0				
Total %	0	0	50		0	0	0		50	0	0		0	0	0		91.8	8.2	

	Essex St From East				Brook St From Southeast				Ridge St From South				Essex St From West				
Start Time	Hard Left	Left	Thru	App. Total	Hard Left	Bear Left	Hard Right	App. Total	Left	Right	Hard Right	App. Total	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	**1**	**1**	0	0	0	0	**2**	0	0	**2**	0	0	0	0	**3**
07:45 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	0	2	2	0	0	0	0	2	0	0	2	0	0	0	0	4
% App. Total	0	0	100		0	0	0		100	0	0		0	0	0		
PHF	.000	.000	.500	.500	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.333

Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023
Page No : 1

Groups Printed- Cars - Trucks

	Essex St From East			Brook St From Southeast			Ridge St From South			Essex St From West			
Start Time	Hard Left	Left	Thru	Hard Left	Bear Left	Hard Right	Left	Right	Hard Right	Thru	Bear Right	Right	Int. Total
04:00 PM	2	1	30	0	0	0	0	0	1	0	36	0	70
04:15 PM	4	1	31	0	0	0	1	0	1	0	42	2	82
04:30 PM	5	0	32	0	0	0	0	0	0	1	40	0	78
04:45 PM	2	0	26	0	0	0	1	0	2	0	35	2	68
Total	13	2	119	0	0	0	2	0	4	1	153	4	298
05:00 PM	4	0	42	0	0	0	2	0	1	0	50	3	102
05:15 PM	5	1	39	0	0	0	2	0	0	0	45	0	92
05:30 PM	6	0	31	0	0	0	1	0	1	0	44	1	84
05:45 PM	4	0	44	0	0	0	2	0	1	0	52	1	104
Total	19	1	156	0	0	0	7	0	3	0	191	5	382
Grand Total	32	3	275	0	0	0	9	0	7	1	344	9	680
Apprch %	10.3	1	88.7	0	0	0	56.2	0	43.8	0.3	97.2	2.5	
Total %	4.7	0.4	40.4	0	0	0	1.3	0	1	0.1	50.6	1.3	
Cars	32	3	275	0	0	0	9	0	7	1	344	9	680
% Cars	100	100	100	0	0	0	100	0	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0

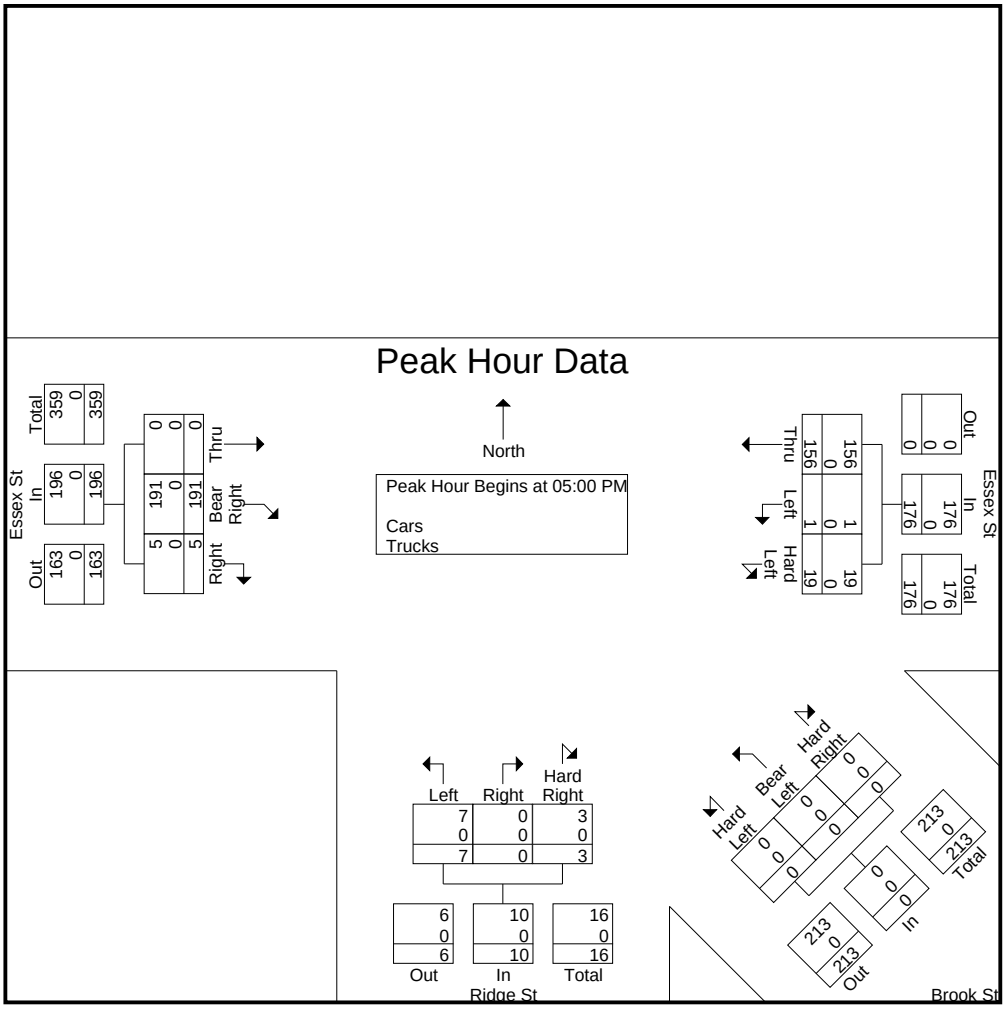
	Essex St From East				Brook St From Southeast				Ridge St From South				Essex St From West				
Start Time	Hard Left	Left	Thru	App. Total	Hard Left	Bear Left	Hard Right	App. Total	Left	Right	Hard Right	App. Total	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	4	0	42	46	0	0	0	0	**2**	0	**1**	**3**	0	50	**3**	**53**	102
05:15 PM	5	**1**	39	45	0	0	0	0	2	0	0	2	0	45	0	45	92
05:30 PM	**6**	0	31	37	0	0	0	0	1	0	1	2	0	44	1	45	84
05:45 PM	4	0	**44**	**48**	0	0	0	0	2	0	1	3	0	**52**	1	53	**104**
Total Volume	19	1	156	176	0	0	0	0	7	0	3	10	0	191	5	196	382
% App. Total	10.8	0.6	88.6		0	0	0		70	0	30		0	97.4	2.6		
PHF	.792	.250	.886	.917	.000	.000	.000	.000	.875	.000	.750	.833	.000	.918	.417	.925	.918
Cars	19	1	156	176	0	0	0	0	7	0	3	10	0	191	5	196	382
% Cars	100	100	100	100	0	0	0	0	100	0	100	100	0	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023
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:

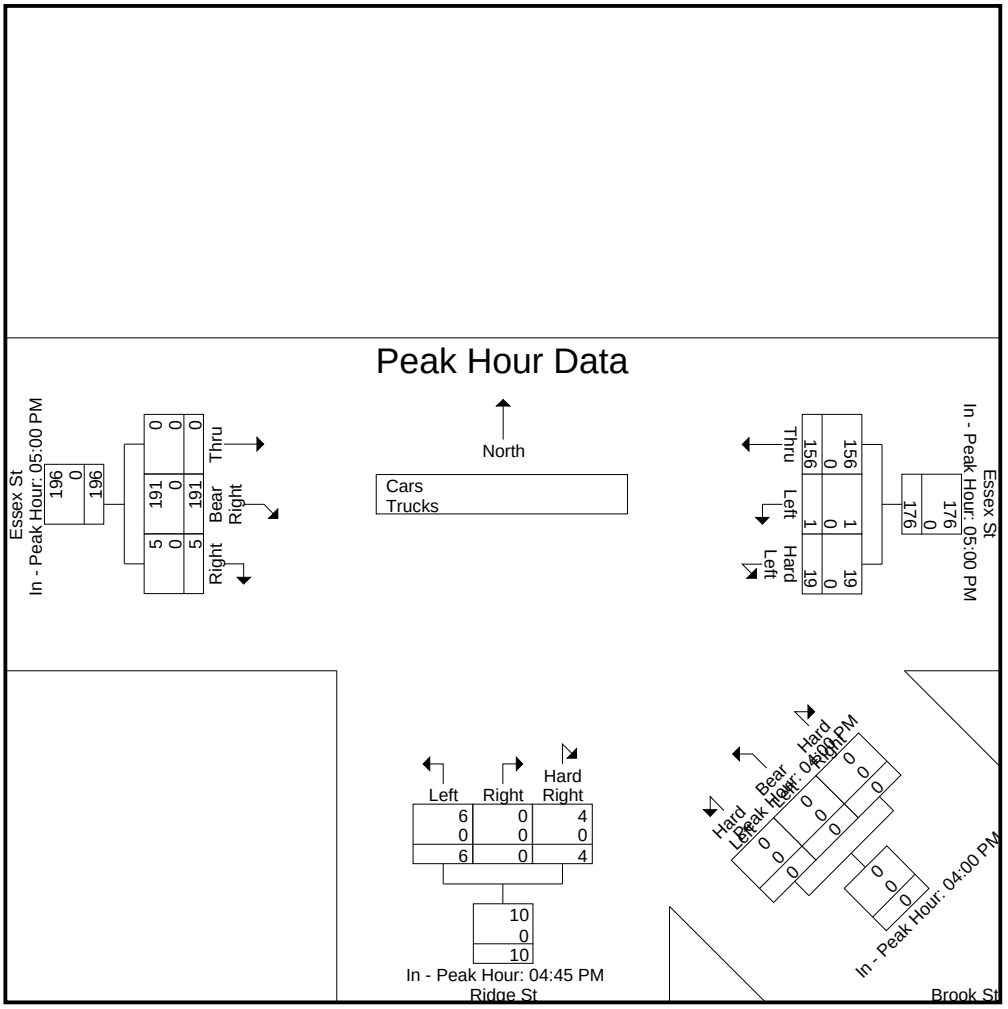
	05:00 PM				04:00 PM				04:45 PM				05:00 PM			
+0 mins.	4	0	42	46	0	0	0	0	1	0	**2**	**3**	0	50	**3**	**53**
+15 mins.	5	**1**	39	45	0	0	0	0	**2**	0	1	3	0	45	0	45
+30 mins.	**6**	0	31	37	0	0	0	0	2	0	0	2	0	44	1	45
+45 mins.	4	0	**44**	**48**	0	0	0	0	1	0	1	2	0	**52**	1	53
Total Volume	19	1	156	176	0	0	0	0	6	0	4	10	0	191	5	196
% App. Total	10.8	0.6	88.6		0	0	0		60	0	40		0	97.4	2.6	
PHF	.792	.250	.886	.917	.000	.000	.000	.000	.750	.000	.500	.833	.000	.918	.417	.925
Cars	19	1	156	176	0	0	0	0	6	0	4	10	0	191	5	196
% Cars	100	100	100	100	0	0	0	0	100	0	100	100	0	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023

Groups Printed- Cars

	Essex St From East			Brook St From Southeast			Ridge St From South			Essex St From West			
Start Time	Hard Left	Left	Thru	Hard Left	Bear Left	Hard Right	Left	Right	Hard Right	Thru	Bear Right	Right	Int. Total
04:00 PM	2	1	30	0	0	0	0	0	1	0	36	0	70
04:15 PM	4	1	31	0	0	0	1	0	1	0	42	2	82
04:30 PM	5	0	32	0	0	0	0	0	0	1	40	0	78
04:45 PM	2	0	26	0	0	0	1	0	2	0	35	2	68
Total	13	2	119	0	0	0	2	0	4	1	153	4	298
05:00 PM	4	0	42	0	0	0	2	0	1	0	50	3	102
05:15 PM	5	1	39	0	0	0	2	0	0	0	45	0	92
05:30 PM	6	0	31	0	0	0	1	0	1	0	44	1	84
05:45 PM	4	0	44	0	0	0	2	0	1	0	52	1	104
Total	19	1	156	0	0	0	7	0	3	0	191	5	382
Grand Total	32	3	275	0	0	0	9	0	7	1	344	9	680
Apprch %	10.3	1	88.7	0	0	0	56.2	0	43.8	0.3	97.2	2.5	
Total %	4.7	0.4	40.4	0	0	0	1.3	0	1	0.1	50.6	1.3	

	Essex St From East				Brook St From Southeast				Ridge St From South				Essex St From West				
Start Time	Hard Left	Left	Thru	App. Total	Hard Left	Bear Left	Hard Right	App. Total	Left	Right	Hard Right	App. Total	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	4	0	42	46	0	0	0	0	**2**	0	**1**	**3**	0	50	**3**	**53**	102
05:15 PM	5	**1**	39	45	0	0	0	0	2	0	0	2	0	45	0	45	92
05:30 PM	**6**	0	31	37	0	0	0	0	1	0	1	2	0	44	1	45	84
05:45 PM	4	0	**44**	**48**	0	0	0	0	2	0	1	3	0	**52**	1	53	**104**
Total Volume	19	1	156	176	0	0	0	0	7	0	3	10	0	191	5	196	382
% App. Total	10.8	0.6	88.6		0	0	0		70	0	30		0	97.4	2.6		
PHF	.792	.250	.886	.917	.000	.000	.000	.000	.875	.000	.750	.833	.000	.918	.417	.925	.918

Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023

Groups Printed- Trucks

	Essex St From East			Brook St From Southeast			Ridge St From South			Essex St From West			
Start Time	Hard Left	Left	Thru	Hard Left	Bear Left	Hard Right	Left	Right	Hard Right	Thru	Bear Right	Right	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	
Total %													

	Essex St From East				Brook St From Southeast				Ridge St From South				Essex St From West				
Start Time	Hard Left	Left	Thru	App. Total	Hard Left	Bear Left	Hard Right	App. Total	Left	Right	Hard Right	App. Total	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Ridge Street
E/W Street : Essex Street
City/State : Andover, MA
Weather : Clear

File Name : 89750007
Site Code : 89750007
Start Date : 9/26/2023
Page No : 10

Groups Printed- Bikes Peds

	Essex St From East				Brook St From Southeast				Ridge St From South				Essex St From West						
Start Time	Hard Left	Left	Thru	Peds	Hard Left	Bear Left	Hard Right	Peds	Left	Right	Hard Right	Peds	Thru	Bear Right	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	3	0	3
04:15 PM	0	0	0	4	0	0	0	5	0	0	0	0	0	0	0	3	12	0	12
04:30 PM	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	4	0	4
04:45 PM	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	4	0	4
Total	0	0	0	7	0	0	0	8	0	0	0	4	0	0	0	4	23	0	23
05:00 PM	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	4	0	4
05:15 PM	0	0	0	4	0	0	0	9	0	0	0	1	0	0	0	0	14	0	14
05:30 PM	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	4	0	4
05:45 PM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	2
Total	0	0	0	10	0	0	0	13	0	0	0	1	0	0	0	0	24	0	24
Grand Total	0	0	0	17	0	0	0	21	0	0	0	5	0	0	0	4	47	0	47
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

	Essex St From East				Brook St From Southeast				Ridge St From South				Essex St From West				
Start Time	Hard Left	Left	Thru	App. Total	Hard Left	Bear Left	Hard Right	App. Total	Left	Right	Hard Right	App. Total	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023
Page No : 1

Groups Printed- Cars - Trucks

	School St From North			Ridge St From East			School St From South			Lupine Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	21	10	0	1	0	2	7	0	10	0	0	51
07:15 AM	0	26	6	0	1	1	2	13	2	5	0	8	64
07:30 AM	0	19	10	0	0	0	1	43	0	12	4	1	90
07:45 AM	0	17	8	0	1	0	5	50	0	11	0	0	92
Total	0	83	34	0	3	1	10	113	2	38	4	9	297
08:00 AM	0	43	15	0	0	0	4	25	2	14	2	2	107
08:15 AM	0	33	15	0	0	0	3	30	1	8	1	2	93
08:30 AM	0	24	21	1	3	1	3	44	3	15	0	2	117
08:45 AM	0	21	10	1	0	0	6	34	1	14	1	3	91
Total	0	121	61	2	3	1	16	133	7	51	4	9	408
Grand Total	0	204	95	2	6	2	26	246	9	89	8	18	705
Apprch %	0	68.2	31.8	20	60	20	9.3	87.5	3.2	77.4	7	15.7	
Total %	0	28.9	13.5	0.3	0.9	0.3	3.7	34.9	1.3	12.6	1.1	2.6	
Cars	0	199	93	2	6	2	23	237	9	85	8	12	676
% Cars	0	97.5	97.9	100	100	100	88.5	96.3	100	95.5	100	66.7	95.9
Trucks	0	5	2	0	0	0	3	9	0	4	0	6	29
% Trucks	0	2.5	2.1	0	0	0	11.5	3.7	0	4.5	0	33.3	4.1

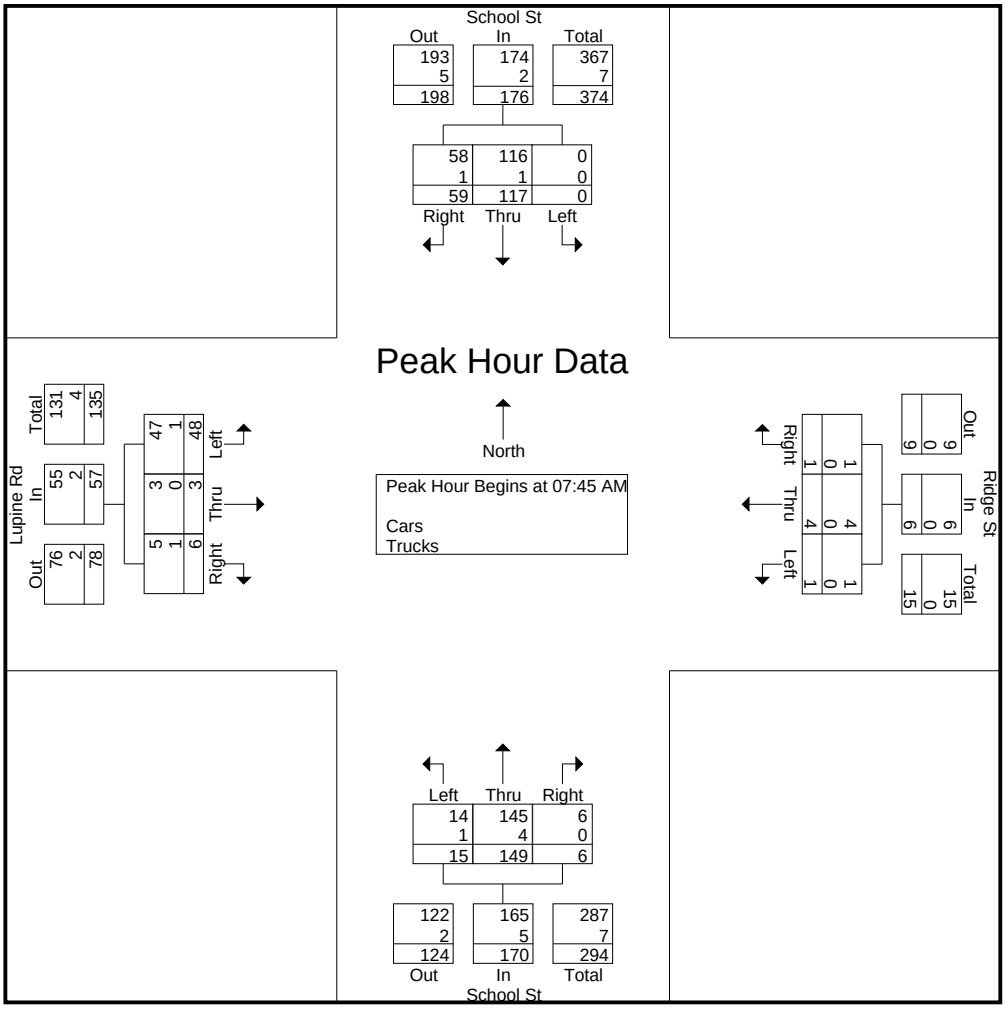
	School St From North				Ridge St From East				School St From South				Lupine Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	17	8	25	0	1	0	1	**5**	**50**	0	**55**	11	0	0	11	92
08:00 AM	0	**43**	15	**58**	0	0	0	0	4	25	2	31	14	**2**	**2**	**18**	107
08:15 AM	0	33	15	48	0	0	0	0	3	30	1	34	8	1	2	11	93
08:30 AM	0	24	**21**	45	**1**	**3**	**1**	**5**	3	44	**3**	50	**15**	0	2	17	**117**
Total Volume	0	117	59	176	1	4	1	6	15	149	6	170	48	3	6	57	409
% App. Total	0	66.5	33.5		16.7	66.7	16.7		8.8	87.6	3.5		84.2	5.3	10.5		
PHF	.000	.680	.702	.759	.250	.333	.250	.300	.750	.745	.500	.773	.800	.375	.750	.792	.874
Cars	0	116	58	174	1	4	1	6	14	145	6	165	47	3	5	55	400
% Cars	0	99.1	98.3	98.9	100	100	100	100	93.3	97.3	100	97.1	97.9	100	83.3	96.5	97.8
Trucks	0	1	1	2	0	0	0	0	1	4	0	5	1	0	1	2	9
% Trucks	0	0.9	1.7	1.1	0	0	0	0	6.7	2.7	0	2.9	2.1	0	16.7	3.5	2.2

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023
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:

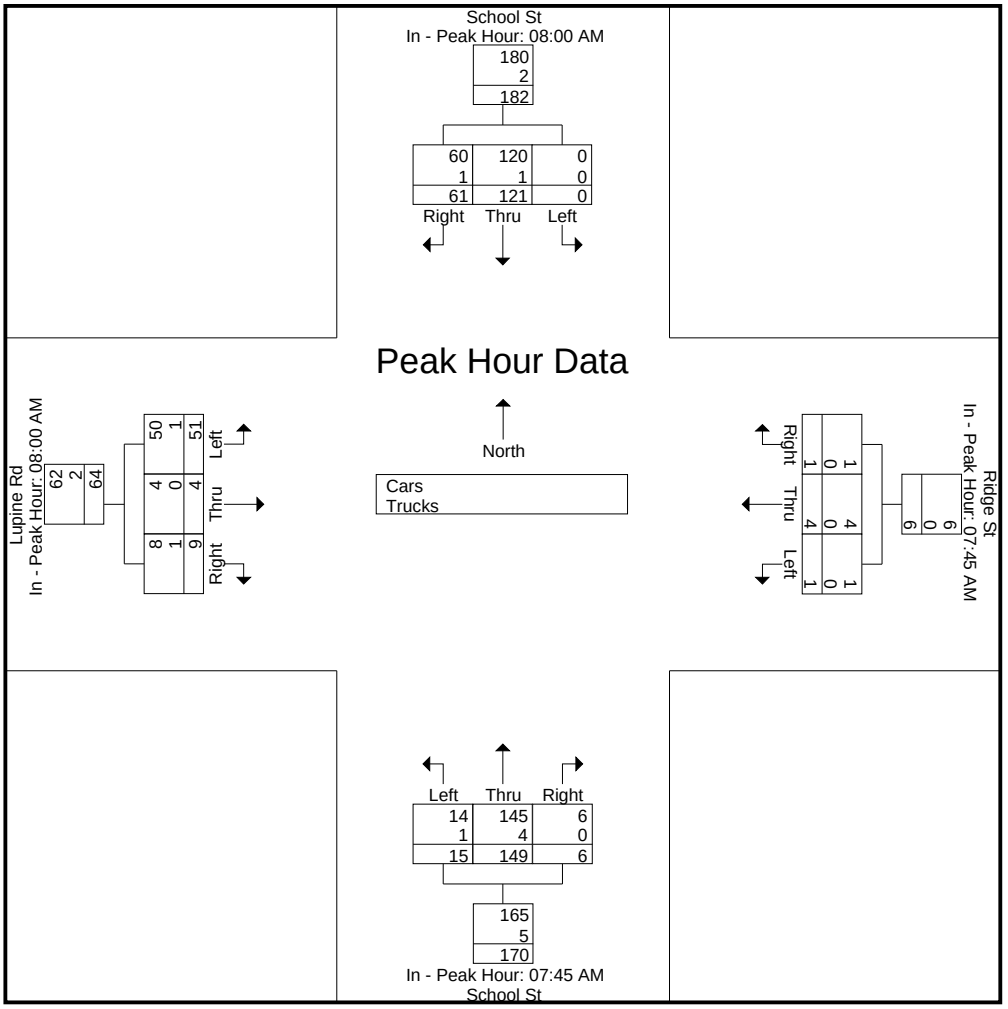
	08:00 AM				07:45 AM				07:45 AM				08:00 AM			
+0 mins.	0	**43**	15	**58**	0	1	0	1	**5**	**50**	0	**55**	14	**2**	2	**18**
+15 mins.	0	33	15	48	0	0	0	0	4	25	2	31	8	1	2	11
+30 mins.	0	24	**21**	45	0	0	0	0	3	30	1	34	**15**	0	2	17
+45 mins.	0	21	10	31	**1**	**3**	**1**	**5**	3	44	**3**	50	14	1	**3**	18
Total Volume	0	121	61	182	1	4	1	6	15	149	6	170	51	4	9	64
% App. Total	0	66.5	33.5		16.7	66.7	16.7		8.8	87.6	3.5		79.7	6.2	14.1	
PHF	.000	.703	.726	.784	.250	.333	.250	.300	.750	.745	.500	.773	.850	.500	.750	.889
Cars	0	120	60	180	1	4	1	6	14	145	6	165	50	4	8	62
% Cars	0	99.2	98.4	98.9	100	100	100	100	93.3	97.3	100	97.1	98	100	88.9	96.9
Trucks	0	1	1	2	0	0	0	0	1	4	0	5	1	0	1	2
% Trucks	0	0.8	1.6	1.1	0	0	0	0	6.7	2.7	0	2.9	2	0	11.1	3.1

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023

Groups Printed- Cars

	School St From North			Ridge St From East			School St From South			Lupine Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	20	10	0	1	0	2	6	0	10	0	0	49
07:15 AM	0	24	5	0	1	1	2	12	2	3	0	3	53
07:30 AM	0	18	10	0	0	0	1	41	0	11	4	1	86
07:45 AM	0	17	8	0	1	0	5	50	0	11	0	0	92
Total	0	79	33	0	3	1	10	109	2	35	4	4	280
08:00 AM	0	43	15	0	0	0	4	23	2	14	2	1	104
08:15 AM	0	33	15	0	0	0	2	29	1	7	1	2	90
08:30 AM	0	23	20	1	3	1	3	43	3	15	0	2	114
08:45 AM	0	21	10	1	0	0	4	33	1	14	1	3	88
Total	0	120	60	2	3	1	13	128	7	50	4	8	396
Grand Total	0	199	93	2	6	2	23	237	9	85	8	12	676
Apprch %	0	68.2	31.8	20	60	20	8.6	88.1	3.3	81	7.6	11.4	
Total %	0	29.4	13.8	0.3	0.9	0.3	3.4	35.1	1.3	12.6	1.2	1.8	

	School St From North				Ridge St From East				School St From South				Lupine Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	17	8	25	0	1	0	1	**5**	**50**	0	**55**	11	0	0	11	92
08:00 AM	0	**43**	15	**58**	0	0	0	0	4	23	2	29	14	**2**	1	**17**	104
08:15 AM	0	33	15	48	0	0	0	0	2	29	1	32	7	1	**2**	10	90
08:30 AM	0	23	**20**	43	**1**	**3**	**1**	**5**	3	43	**3**	49	**15**	0	2	17	**114**
Total Volume	0	116	58	174	1	4	1	6	14	145	6	165	47	3	5	55	400
% App. Total	0	66.7	33.3		16.7	66.7	16.7		8.5	87.9	3.6		85.5	5.5	9.1		
PHF	.000	.674	.725	.750	.250	.333	.250	.300	.700	.725	.500	.750	.783	.375	.625	.809	.877

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023
Page No : 7

Groups Printed- Trucks

	School St From North			Ridge St From East			School St From South			Lupine Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	1	0	0	0	0	0	1	0	0	0	0	2
07:15 AM	0	2	1	0	0	0	0	1	0	2	0	5	11
07:30 AM	0	1	0	0	0	0	0	2	0	1	0	0	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	4	1	0	0	0	0	4	0	3	0	5	17
08:00 AM	0	0	0	0	0	0	0	2	0	0	0	1	3
08:15 AM	0	0	0	0	0	0	1	1	0	1	0	0	3
08:30 AM	0	1	1	0	0	0	0	1	0	0	0	0	3
08:45 AM	0	0	0	0	0	0	2	1	0	0	0	0	3
Total	0	1	1	0	0	0	3	5	0	1	0	1	12
Grand Total	0	5	2	0	0	0	3	9	0	4	0	6	29
Apprch %	0	71.4	28.6	0	0	0	25	75	0	40	0	60	
Total %	0	17.2	6.9	0	0	0	10.3	31	0	13.8	0	20.7	

	School St From North				Ridge St From East				School St From South				Lupine Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	**2**	**1**	**3**	0	0	0	0	0	1	0	1	**2**	0	**5**	**7**	**11**
07:30 AM	0	1	0	1	0	0	0	0	0	**2**	0	**2**	1	0	0	1	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	1	1	3
Total Volume	0	3	1	4	0	0	0	0	0	5	0	5	3	0	6	9	18
% App. Total	0	75	25		0	0	0		0	100	0		33.3	0	66.7		
PHF	.000	.375	.250	.333	.000	.000	.000	.000	.000	.625	.000	.625	.375	.000	.300	.321	.409

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023

Groups Printed- Bikes Peds

	School St From North				Ridge St From East				School St From South				Lupine Rd From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	0	2
07:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
07:45 AM	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	1	3
Total	0	1	0	0	0	0	0	4	0	1	0	1	0	0	0	0	5	2	7
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	2	1	3
08:30 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	2	0	0	0	1	0	1	0	0	0	0	0	1	4	1	5
Grand Total	0	1	0	2	0	0	0	5	0	2	0	1	0	0	0	1	9	3	12
Apprch %	0	100	0		0	0	0		0	100	0		0	0	0				
Total %	0	33.3	0		0	0	0		0	66.7	0		0	0	0		75	25	

	School St From North				Ridge St From East				School St From South				Lupine Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	**1**
07:45 AM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total Volume	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.750

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023
Page No : 1

Groups Printed- Cars - Trucks

	School St From North			Ridge St From East			School St From South			Lupine Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	15	17	1	0	0	12	70	0	17	2	2	136
04:15 PM	0	21	12	1	0	1	7	53	2	17	1	6	121
04:30 PM	0	28	8	0	1	0	3	45	2	8	0	3	98
04:45 PM	0	29	7	1	0	0	1	48	0	13	0	2	101
Total	0	93	44	3	1	1	23	216	4	55	3	13	456
05:00 PM	0	20	7	0	0	0	8	67	1	13	2	5	123
05:15 PM	0	34	12	1	0	0	2	51	0	16	0	6	122
05:30 PM	0	25	7	0	3	0	0	52	2	12	0	2	103
05:45 PM	1	32	8	0	0	0	2	54	1	14	0	0	112
Total	1	111	34	1	3	0	12	224	4	55	2	13	460
Grand Total	1	204	78	4	4	1	35	440	8	110	5	26	916
Apprch %	0.4	72.1	27.6	44.4	44.4	11.1	7.2	91.1	1.7	78	3.5	18.4	
Total %	0.1	22.3	8.5	0.4	0.4	0.1	3.8	48	0.9	12	0.5	2.8	
Cars	1	200	76	4	4	1	32	431	8	110	5	26	898
% Cars	100	98	97.4	100	100	100	91.4	98	100	100	100	100	98
Trucks	0	4	2	0	0	0	3	9	0	0	0	0	18
% Trucks	0	2	2.6	0	0	0	8.6	2	0	0	0	0	2

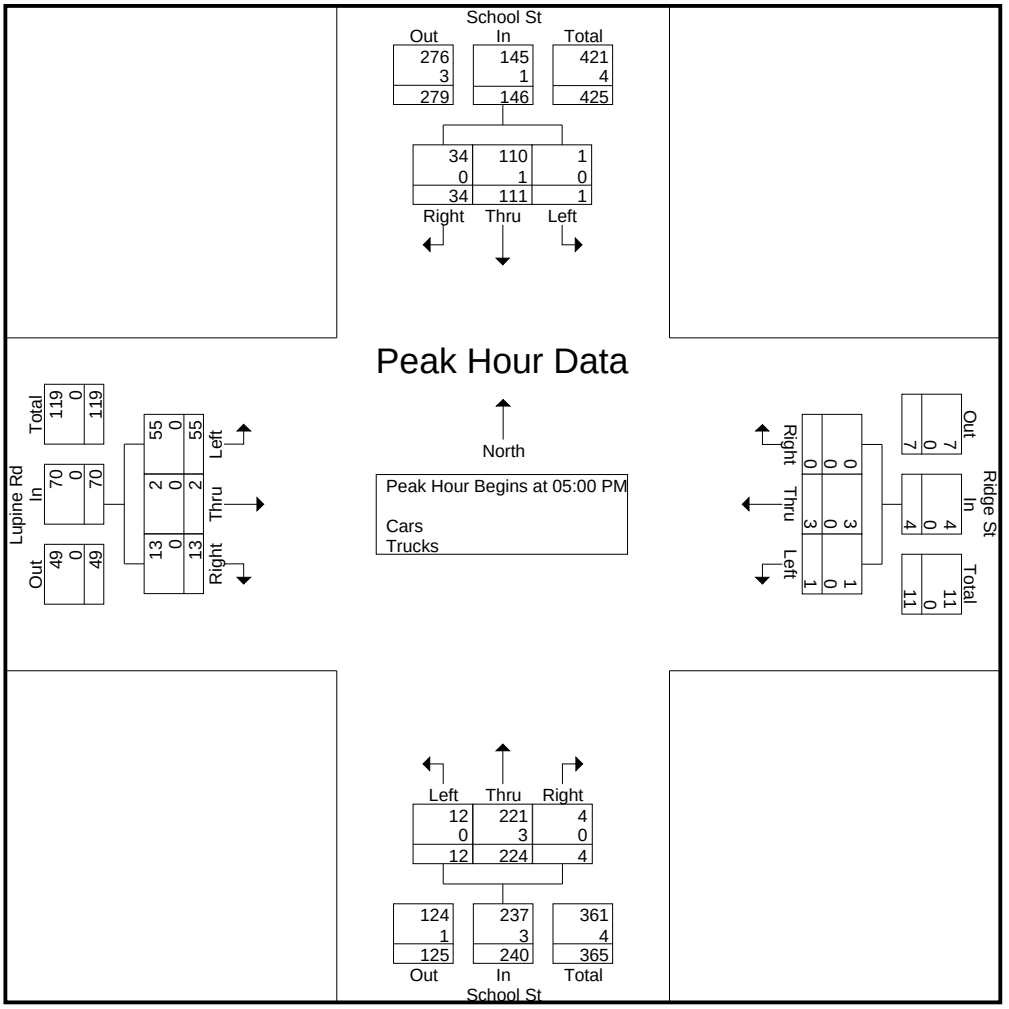
	School St From North				Ridge St From East				School St From South				Lupine Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	20	7	27	0	0	0	0	**8**	**67**	1	**76**	13	**2**	5	20	**123**
05:15 PM	0	**34**	**12**	**46**	**1**	0	0	1	2	51	0	53	**16**	0	**6**	**22**	122
05:30 PM	0	25	7	32	0	**3**	0	**3**	0	52	**2**	54	12	0	2	14	103
05:45 PM	**1**	32	8	41	0	0	0	0	2	54	1	57	14	0	0	14	112
Total Volume	1	111	34	146	1	3	0	4	12	224	4	240	55	2	13	70	460
% App. Total	0.7	76	23.3		25	75	0		5	93.3	1.7		78.6	2.9	18.6		
PHF	.250	.816	.708	.793	.250	.250	.000	.333	.375	.836	.500	.789	.859	.250	.542	.795	.935
Cars	1	110	34	145	1	3	0	4	12	221	4	237	55	2	13	70	456
% Cars	100	99.1	100	99.3	100	100	0	100	100	98.7	100	98.8	100	100	100	100	99.1
Trucks	0	1	0	1	0	0	0	0	0	3	0	3	0	0	0	0	4
% Trucks	0	0.9	0	0.7	0	0	0	0	0	1.3	0	1.3	0	0	0	0	0.9

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023
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:

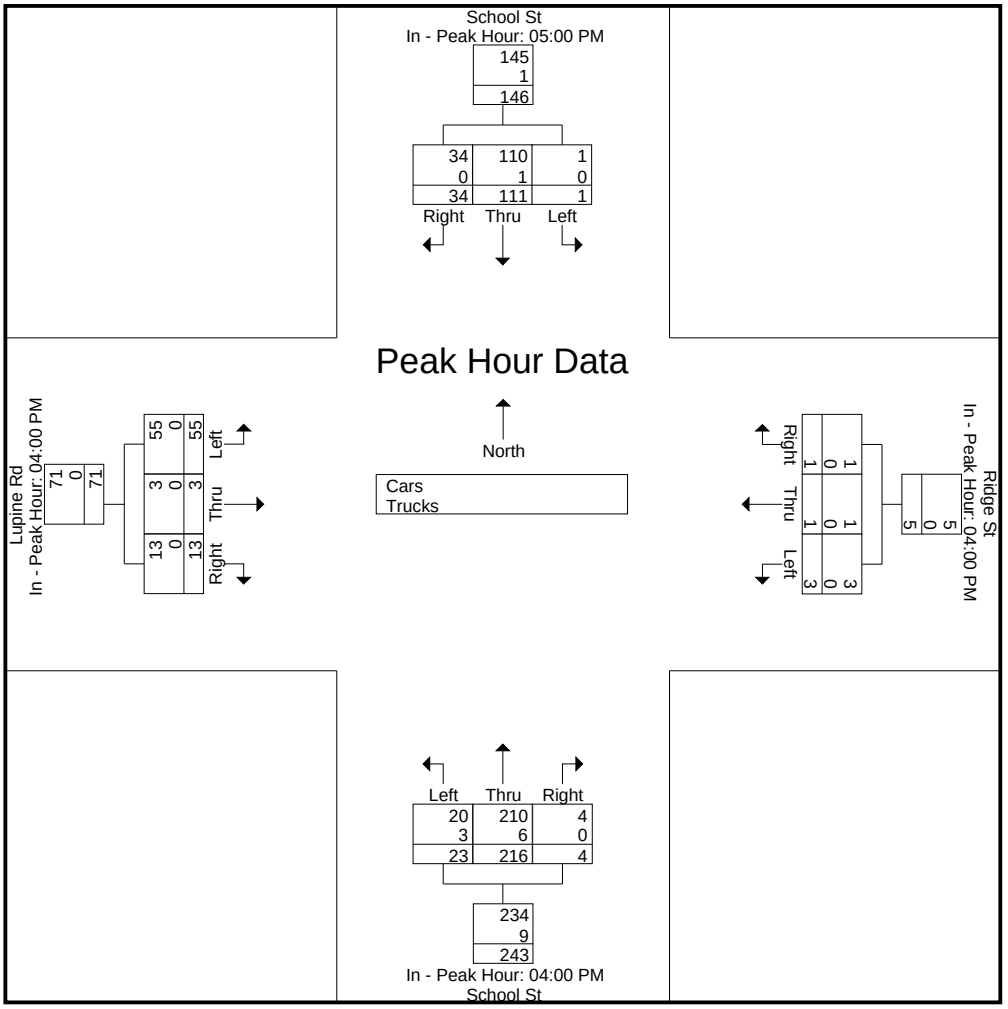
	05:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	20	7	27	**1**	0	0	1	**12**	**70**	0	**82**	**17**	**2**	2	21
+15 mins.	0	**34**	**12**	**46**	1	0	**1**	**2**	7	53	**2**	62	17	1	**6**	**24**
+30 mins.	0	25	7	32	0	**1**	0	1	3	45	2	50	8	0	3	11
+45 mins.	**1**	32	8	41	1	0	0	1	1	48	0	49	13	0	2	15
Total Volume	1	111	34	146	3	1	1	5	23	216	4	243	55	3	13	71
% App. Total	0.7	76	23.3		60	20	20		9.5	88.9	1.6		77.5	4.2	18.3	
PHF	.250	.816	.708	.793	.750	.250	.250	.625	.479	.771	.500	.741	.809	.375	.542	.740
Cars	1	110	34	145	3	1	1	5	20	210	4	234	55	3	13	71
% Cars	100	99.1	100	99.3	100	100	100	100	87	97.2	100	96.3	100	100	100	100
Trucks	0	1	0	1	0	0	0	0	3	6	0	9	0	0	0	0
% Trucks	0	0.9	0	0.7	0	0	0	0	13	2.8	0	3.7	0	0	0	0

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023
Page No : 3



Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023

Groups Printed- Cars

	School St From North			Ridge St From East			School St From South			Lupine Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	14	15	1	0	0	10	67	0	17	2	2	128
04:15 PM	0	20	12	1	0	1	6	52	2	17	1	6	118
04:30 PM	0	28	8	0	1	0	3	43	2	8	0	3	96
04:45 PM	0	28	7	1	0	0	1	48	0	13	0	2	100
Total	0	90	42	3	1	1	20	210	4	55	3	13	442
05:00 PM	0	20	7	0	0	0	8	66	1	13	2	5	122
05:15 PM	0	33	12	1	0	0	2	51	0	16	0	6	121
05:30 PM	0	25	7	0	3	0	0	51	2	12	0	2	102
05:45 PM	1	32	8	0	0	0	2	53	1	14	0	0	111
Total	1	110	34	1	3	0	12	221	4	55	2	13	456
Grand Total	1	200	76	4	4	1	32	431	8	110	5	26	898
Apprch %	0.4	72.2	27.4	44.4	44.4	11.1	6.8	91.5	1.7	78	3.5	18.4	
Total %	0.1	22.3	8.5	0.4	0.4	0.1	3.6	48	0.9	12.2	0.6	2.9	

	School St From North				Ridge St From East				School St From South				Lupine Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	20	7	27	0	0	0	0	**8**	**66**	1	**75**	13	**2**	5	20	**122**
05:15 PM	0	**33**	**12**	**45**	**1**	0	0	1	2	51	0	53	**16**	0	**6**	**22**	121
05:30 PM	0	25	7	32	0	**3**	0	**3**	0	51	**2**	53	12	0	2	14	102
05:45 PM	**1**	32	8	41	0	0	0	0	2	53	1	56	14	0	0	14	111
Total Volume	1	110	34	145	1	3	0	4	12	221	4	237	55	2	13	70	456
% App. Total	0.7	75.9	23.4		25	75	0		5.1	93.2	1.7		78.6	2.9	18.6		
PHF	.250	.833	.708	.806	.250	.250	.000	.333	.375	.837	.500	.790	.859	.250	.542	.795	.934

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023
Page No : 7

Groups Printed- Trucks

	School St From North			Ridge St From East			School St From South			Lupine Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	1	2	0	0	0	2	3	0	0	0	0	8
04:15 PM	0	1	0	0	0	0	1	1	0	0	0	0	3
04:30 PM	0	0	0	0	0	0	0	2	0	0	0	0	2
04:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	3	2	0	0	0	3	6	0	0	0	0	14
05:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
05:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	0	1	0	0	0	0	0	3	0	0	0	0	4
Grand Total	0	4	2	0	0	0	3	9	0	0	0	0	18
Apprch %	0	66.7	33.3	0	0	0	25	75	0	0	0	0	
Total %	0	22.2	11.1	0	0	0	16.7	50	0	0	0	0	

	School St From North				Ridge St From East				School St From South				Lupine Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	**1**	**2**	**3**	0	0	0	0	**2**	**3**	0	**5**	0	0	0	0	**8**
04:15 PM	0	1	0	1	0	0	0	0	1	1	0	2	0	0	0	0	3
04:30 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
04:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	3	2	5	0	0	0	0	3	6	0	9	0	0	0	0	14
% App. Total	0	60	40		0	0	0		33.3	66.7	0		0	0	0		
PHF	.000	.750	.250	.417	.000	.000	.000	.000	.375	.500	.000	.450	.000	.000	.000	.000	.438

Accurate Counts

978-664-2565

N/S Street : School Street
E/W Street : Ridge St / Lupine Rd
City/State : Andover, MA
Weather : Clear

File Name : 89750008
Site Code : 89750008
Start Date : 9/20/2023

Groups Printed- Bikes Peds

	School St From North				Ridge St From East				School St From South				Lupine Rd From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	2
04:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
04:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
04:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	5	0	5
05:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
05:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
05:30 PM	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	4	0	4
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	2	0	0	0	2	0	0	0	1	0	0	0	1	6	0	6
Grand Total	0	0	0	4	0	0	0	5	0	0	0	1	0	0	0	1	11	0	11
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

	School St From North				Ridge St From East				School St From South				Lupine Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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.

PUBLIC TRANSPORTATION SCHEDULES

HAVERHILL LINE FALL/WINTER SCHEDULE

Effective November 6, 2023

Monday to Friday

Inbound to Boston

ZONE	STATION		AM											PM										
	TRAIN #		280	200	202	282	204	284	206	286	208	288	210	290	212	292	214	294	216	218	296	298	220	224
	Bikes Allowed		🚲							🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲
7	Haverhill	♿	----	5:27	6:12	-	7:25	-	8:27	-	9:57	-	11:27	-	12:57	-	2:27	-	3:57	5:20	-	-	6:57	9:15
7	Bradford	♿	----	5:29	6:14	-	7:27	-	8:29	-	f 9:59	-	f 11:29	-	f 12:59	-	f 2:29	-	f 3:59	f 5:22	-	-	f 6:59	9:17
6	Lawrence	♿	4:51	5:36	6:21	-	7:34	-	8:36	-	10:06	-	11:36	-	1:06	-	2:36	-	4:06	5:29	-	-	7:06	9:24
5	Andover	♿	4:58	5:43	6:28	-	7:41	-	8:43	-	f 10:13	-	f 11:43	-	f 1:13	-	f 2:43	-	f 4:13	f 5:36	-	-	f 7:13	9:31
4	Ballardvale	♿	5:03	5:48	6:33	-	7:46	-	8:48	-	f 10:18	-	f 11:48	-	f 1:18	-	f 2:48	-	f 4:18	f 5:41	-	-	f 7:18	9:36
3	North Wilmington		5:11	5:56	6:41	-	-	-	8:56	-	f 10:26	-	f 11:56	-	f 1:26	-	f 2:56	-	f 4:26	-	-	-	f 7:26	9:43
2	Reading	♿	5:18	6:03	6:48	7:33	-	8:18	9:03	9:48	10:33	11:18	12:03	12:48	1:33	2:18	3:03	3:48	4:33	-	6:03	6:48	7:33	9:50
2	Wakefield		5:24	6:09	6:54	7:39	-	8:24	9:09	9:54	10:39	11:24	12:09	12:54	1:39	2:24	3:09	3:54	4:39	-	f 6:09	f 6:54	f 7:39	9:56
2	Greenwood		5:27	6:12	6:57	7:42	-	8:27	9:12	f 9:57	f 10:42	f 11:27	f 12:12	f 12:57	f 1:42	f 2:27	f 3:12	f 3:57	f 4:42	-	f 6:12	f 6:57	f 7:42	9:59
1	Melrose Highlands	♿	5:29	6:14	6:59	7:44	-	8:29	9:14	9:59	10:44	11:29	12:14	12:59	1:44	2:29	3:14	3:59	4:44	-	f 6:14	f 6:59	f 7:44	10:01
1	Melrose/Cedar Park		5:31	6:16	7:01	7:46	-	8:31	9:16	f 10:01	f 10:46	f 11:31	f 12:16	f 1:01	f 1:46	f 2:31	f 3:16	f 4:01	f 4:46	-	f 6:16	f 7:01	f 7:46	10:03
1	Wyoming Hill		5:33	6:18	7:03	7:48	-	8:33	9:18	f 10:03	f 10:48	f 11:33	f 12:18	f 1:03	f 1:48	f 2:33	f 3:18	f 4:03	f 4:48	-	f 6:18	f 7:03	f 7:48	10:05
1A	Oak Grove	♿	5:35	6:20	7:05	7:50	-	8:35	9:20	f 10:05	f 10:50	f 11:35	f 12:20	f 1:05	f 1:50	f 2:35	f 3:20	f 4:05	f 4:50	-	f 6:20	f 7:05	f 7:50	10:07
1A	Malden Center	♿	L 5:38	L 6:23	L 7:08	L 7:53	-	L 8:38	L 9:23	L 10:08	L 10:53	L 11:38	L 12:23	L 1:08	L 1:53	L 2:38	L 3:23	L 4:08	L 4:53	-	L 6:23	L 7:08	L 7:53	L 10:10
1A	North Station	♿	5:54	6:41	7:26	8:10	8:25	8:55	9:40	10:24	11:09	11:54	12:39	1:24	2:09	2:54	3:39	4:24	5:09	6:19	6:39	7:24	8:09	10:26

Monday to Friday

Outbound from Boston

ZONE	STATION		AM									PM												
	TRAIN #		201	281	283	203	285	205	287	207	289	209	291	211	293	213	215	295	217	297	219	221	223	225
	Bikes Allowed		🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲							🚲	🚲	🚲
1A	North Station	♿	5:55	6:40	7:25	8:10	8:55	9:40	10:25	11:10	11:55	12:40	1:25	2:10	2:55	3:40	4:25	5:10	5:35	5:55	6:40	7:30	9:40	11:40
1A	Malden Center	♿	f 6:06	f 6:51	f 7:36	f 8:21	f 9:06	f 9:51	f 10:36	f 11:21	f 12:06	f 12:51	f 1:36	f 2:21	f 3:06	3:51	4:36	5:21	-	6:06	6:51	f 7:41	f 9:51	11:51
1A	Oak Grove	♿	f 6:08	f 6:53	f 7:38	f 8:23	f 9:08	f 9:53	f 10:38	f 11:23	f 12:08	f 12:53	f 1:38	f 2:23	f 3:08	3:53	4:38	5:23	-	6:08	6:53	f 7:43	f 9:53	11:53
1	Wyoming Hill		f 6:10	f 6:55	f 7:40	f 8:25	f 9:10	f 9:55	f 10:40	f 11:25	f 12:10	f 12:55	f 1:40	f 2:25	f 3:10	3:55	4:40	5:25	-	6:10	6:55	f 7:45	f 9:55	11:55
1	Melrose/Cedar Park		f 6:12	f 6:57	f 7:42	f 8:27	f 9:12	f 9:57	f 10:42	f 11:27	f 12:12	f 12:57	f 1:42	f 2:27	f 3:12	3:57	4:42	5:27	-	6:12	6:57	f 7:47	f 9:57	11:57
1	Melrose Highlands	♿	f 6:15	f 7:00	f 7:45	f 8:30	f 9:15	10:00	10:45	11:30	12:15	1:00	1:45	2:30	3:15	4:00	4:45	5:30	-	6:15	7:00	7:50	f 10:00	12:00
2	Greenwood		f 6:18	f 7:03	f 7:48	f 8:33	f 9:18	f 10:03	f 10:48	f 11:33	f 12:18	f 1:03	f 1:48	f 2:33	f 3:18	4:03	4:48	5:33	-	6:18	7:03	f 7:53	f 10:03	12:03
2	Wakefield		f 6:22	f 7:07	f 7:52	f 8:37	f 9:22	10:07	10:52	11:37	12:22	1:07	1:52	2:37	3:22	4:07	4:52	5:37	-	6:22	7:07	7:57	f 10:07	12:07
2	Reading	♿	6:28	7:16	8:01	8:43	9:31	10:13	11:01	11:43	12:31	1:13	2:01	2:43	3:31	4:13	4:58	5:46	-	6:31	7:13	8:03	10:13	12:13
3	North Wilmington		f 6:34	-	-	f 8:49	-	f 10:19	-	f 11:49	-	f 1:19	-	f 2:49	-	4:19	5:05	-	-	-	7:19	f 8:09	f 10:19	12:19
4	Ballardvale	♿	f 6:42	-	-	f 8:57	-	f 10:27	-	f 11:57	-	f 1:27	-	f 2:57	-	4:27	5:13	-	6:07	-	7:27	8:17	f 10:26	12:26
5	Andover	♿	f 6:47	-	-	f 9:02	-	f 10:32	-	f 12:02	-	f 1:32	-	f 3:02	-	4:32	5:18	-	6:12	-	7:32	8:22	f 10:31	12:31
6	Lawrence	♿	6:54	-	-	9:09	-	10:39	-	12:09	-	1:39	-	3:09	-	4:39	5:25	-	6:19	-	7:39	8:29	10:38	12:38
7	Bradford	♿	f 7:02	-	-	f 9:17	-	L 10:49	-	L 12:19	-	L 1:49	-	L 3:19	-	L 4:50	L 5:37	-	L 6:31	-	L 7:50	L 8:39	f 10:46	12:46
7	Haverhill	♿	7:10	-	-	9:25	-	10:55	-	12:25	-	1:55	-	3:25	-	4:57	5:44	-	6:38	-	7:57	8:45	10:54	12:54

Weekend

Inbound to Boston

ZONE	STATION		AM			PM				
	SATURDAY TRAIN #		1200	1202	1204	1206	1208	1210	1212	1214
	SUNDAY TRAIN #		2200	2202	2204	2206	2208	2210	2212	2214
	Bikes Allowed		🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲
7	Haverhill	♿	5:35	8:35	10:50	12:50	2:50	4:50	6:50	9:50
7	Bradford	♿	5:37	8:37	10:52	12:52	2:52	4:52	6:52	9:52
6	Lawrence	♿	5:44	8:44	10:59	12:59	2:59	4:59	6:59	9:59
5	Andover	♿	f 5:51	f 8:51	f 11:06	f 1:06	f 3:06	f 5:06	f 7:06	10:06
4	Ballardvale	♿	f 5:56	f 8:56	f 11:11	f 1:11	f 3:11	f 5:11	f 7:11	10:11
3	North Wilmington		f 6:03	f 9:03	f 11:18	f 1:18	f 3:18	f 5:18	f 7:18	10:18
2	Reading	♿	6:10	9:10	11:25	1:25	3:25	5:25	7:25	10:25
2	Wakefield		6:16	9:16	11:31	1:31	3:31	5:31	7:31	10:31
2	Greenwood		f 6:19	f 9:19	f 11:34	f 1:34	f 3:34	f 5:34	f 7:34	10:34
1	Melrose Highlands	♿	6:21	9:21	11:36	1:36	3:36	5:36	7:36	10:36
1	Melrose/Cedar Park		f 6:23	f 9:23	f 11:38	f 1:38	f 3:38	f 5:38	f 7:38	10:38
1	Wyoming Hill		f 6:25	f 9:25	f 11:40	f 1:40	f 3:40	f 5:40	f 7:40	10:40
1A	Oak Grove	♿	f 6:27	f 9:27	f 11:43	f 1:43	f 3:42	f 5:42	f 7:42	10:42
1A	Malden Center	♿	L 6:30	L 9:30	L 11:45	L 1:45	L 3:45	L 5:45	L 7:45	L 10:45
1A	North Station	♿	6:45	9:45	12:00	2:00	4:00	6:00	8:00	11:00

Weekend

Outbound from Boston

ZONE	STATION		AM			PM				
	SATURDAY TRAIN #		1201	1203	1205	1207	1209	1211	1213	1215
	SUNDAY TRAIN #		2201	2203	2205	2207	2209	2211	2213	2215
	Bikes Allowed		🚲	🚲	🚲	🚲	🚲	🚲	🚲	🚲
1A	North Station	♿	7:00	9:00	11:15	1:15	3:15	5:15	8:15	11:30
1A	Malden Center	♿	f 7:11	f 9:11	f 11:26	f 1:26	f 3:26	f 5:26	f 8:26	11:41
1A	Oak Grove	♿	f 7:13	f 9:13	f 11:28	f 1:28	f 3:28	f 5:28	f 8:28	11:43
1	Wyoming Hill		f 7:15	f 9:15	f 11:30	f 1:30	f 3:30	f 5:30	f 8:30	11:45
1	Melrose/Cedar Park		f 7:17	f 9:17	f 11:32	f 1:32	f 3:32	f 5:32	f 8:32	11:47
1	Melrose Highlands	♿	7:20	9:20	11:35	1:35	3:35	5:35	8:35	11:50
2	Greenwood		f 7:23	f 9:23	f 11:38	f 1:38	f 3:38	f 5:38	f 8:38	11:53
2	Wakefield		7:27	9:27	11:42	1:42	3:42	5:42	8:42	11:57
2	Reading	♿	7:33	9:33	11:48	1:48	3:48	5:48	8:48	12:03
3	North Wilmington		f 7:39	f 9:39	f 11:54	f 1:54	f 3:54	f 5:54	f 8:54	12:09
4	Ballardvale	♿	f 7:46	f 9:46	f 12:01	f 2:01	f 4:01	f 6:01	f 9:01	12:16
5	Andover	♿	f 7:51	f 9:51	f 12:06	f 2:06	f 4:06	f 6:06	f 9:06	12:21
6	Lawrence	♿	7:58	9:58	12:13	2:13	4:13	6:13	9:13	12:28
7	Bradford	♿	f 8:06	f 10:06	f 12:21	f 2:21	f 4:21	f 6:21	f 9:21	12:36
7	Haverhill	♿	8:14	10:14	12:29	2:29	4:29	6:29	9:29	12:44

Schedules may change in the event of severe weather

During weather events, these symbols will communicate service level and impact on passengers. Service level for the following day will be announced mid afternoon the prior day.

REGULAR SERVICE
Trains will operate on a normal schedule

STORM SERVICE
Trains will operate on a reduced schedule. It will be available on MBTA.com and in Boston stations.

NO SERVICE
No passenger service on Commuter Rail.

Times in purple with "f" indicate a flag stop: Passengers must tell the conductor that they wish to leave. Passengers waiting to board must be visible on the platform for the train to stop.

Times in blue with "L" indicate an early departure: The train may leave ahead of schedule at these stops.

Bikes: Bicycles are allowed on trains with the bicycle symbol shown below the train number.

High level platform and bridge plate available. Visit **mbta.com/accessibility** for more information.

Keep in Mind:
This schedule will be effective from November 6, 2023 and will replace the schedule of October 2, 2023.

Holiday Service
On Thursday, November 23rd, 2023 (Thanksgiving Day), Friday, November 24th, 2023 (day after Thanksgiving), Monday, December 25th, 2023 (Christmas Day), Monday, January 1st, 2024 (New Year's Day), and on Monday, February 19th, 2024 (President's Day) all lines will operate on a weekend schedule.

On Monday, January 15th, 2024 (Martin Luther King Jr. Day), and on Monday, April 15th, 2024 (Patriots' Day), all lines will operate on a regular weekday schedule.

For all holiday schedules, please check MBTA.com/holidays or call 617-222-3200.

ROUTE 21 OUTBOUND

Andover Shuttle

MONDAY - FRIDAY

1	2	3	4	5	6	7	8	9
Bus starts at The Robb Center	Bus Leaves from Chestnut Court	Bus Leaves from The Robb Center	Bus Leaves from Main St & Central St	Bus Leaves from Andover Commons	Bus Leaves from Shawsheen Plaza	Bus Leaves from Frye Circle	Bus Leaves from Doctor's Park	Bus ends at ANA YMCA
8:10	8:13	8:15	8:19	8:21	8:25	8:28	8:33	8:35
9:20	9:23	9:25	9:29	9:31	9:35	9:38	9:43	9:45
10:30	10:33	10:35	10:39	10:41	10:45	10:48	10:53	10:55
11:40	11:43	11:45	11:49	11:51	11:55	11:58	**12:03**	**12:05**
12:50	**12:53**	**12:55**	**12:59**	**1:01**	**1:05**	**1:08**	**1:13**	**1:15**
2:00	**2:03**	**2:05**	**2:09**	**2:12**	**2:15**	**2:18**	**2:23**	**2:25**
3:10	**3:13**	**3:15**	**3:19**	**3:22**	**3:25**	**3:28**	**3:33**	**3:35**
4:20	**4:23**	**4:25**	**4:29**	**4:32**	**4:35**	**4:38**	**4:43**	**4:45**
5:30	**5:33**	**5:36**	**5:39**	**5:42**	**5:45**	**5:48**	**5:53**	**5:55**
6:40	**6:33**	-	-	-	-	-	-	-

Updated 07.24.2021

ROUTE 21 INBOUND

Andover Shuttle

MONDAY - FRIDAY

9	10	11	12	13	14	15
Bus starts at North Andover Mall	Bus Leaves from Doctor's Park	Bus Leaves from Frye Circle	Bus Leaves from Shawsheen Plaza	Bus Leaves from Andover Commons	Bus Leaves from Main St & Central St	Bus ends at The Robb Center
8:40	8:48	8:53	8:57	9:00	9:03	9:07
9:50	9:58	10:03	10:07	10:10	10:13	10:17
11:00	11:08	11:13	11:17	11:20	11:23	11:27
12:10	**12:18**	**12:23**	**12:27**	**12:30**	**12:33**	**12:37**
1:20	**1:28**	**1:33**	**1:37**	**1:40**	**1:43**	**1:47**
2:30	**2:38**	**2:43**	**2:47**	**2:50**	**2:53**	**2:57**
3:40	**3:48**	**3:53**	**3:57**	**4:00**	**4:03**	**4:07**
4:50	**4:58**	**5:03**	**5:07**	**5:10**	**4:13**	**4:17**
6:00	**6:08**	**6:13**	**6:17**	**6:20**	**6:23**	**6:27**

Updated 07.24.2021

ROUTE 2 OUTBOUND
Andover via South Broadway

WEEKDAYS

1	2	3	4	5
Bus starts at Buckley Transportation Center	Bus Leaves from So Broadway and Mt. Vernon	Bus Leaves from Shawsheen Square	Bus Leaves from Main St & Central St	Bus ends at Main St & School St
5:30	5:40	5:44	5:48	5:51
6:00	6:10	6:14	6:18	6:21
6:30	6:40	6:44	6:48	6:51
7:00	7:10	7:14	7:18	7:21
7:30	7:40	7:44	7:48	7:51
8:00	8:10	8:14	8:18	8:21
8:30	8:40	8:44	8:48	8:51
9:00	9:10	9:14	9:18	9:21
9:30	9:40	9:44	9:48	9:51
10:00	10:10	10:14	10:18	10:21
10:30	10:40	10:44	10:48	10:51
11:00	11:10	11:14	11:18	11:21
11:30	11:40	11:44	11:48	11:51
12:00	**12:10**	**12:14**	**12:18**	**12:21**
12:30	**12:40**	**12:44**	**12:48**	**12:51**
1:00	**1:10**	**1:14**	**1:18**	**1:21**
1:30	**1:40**	**1:44**	**1:48**	**1:51**
2:00	**2:10**	**2:14**	**2:18**	**2:21**
2:30	**2:40**	**2:44**	**2:48**	**2:51**
3:00	**3:10**	**3:14**	**3:18**	**3:21**
3:30	**3:40**	**3:44**	**3:48**	**3:51**
4:00	**4:10**	**4:14**	**4:18**	**4:21**
4:30	**4:40**	**4:44**	**4:48**	**4:51**
5:00	**5:10**	**5:14**	**5:18**	**5:21**
5:30	**5:40**	**5:44**	**5:48**	**5:51**
6:00	**6:10**	**6:14**	**6:18**	**6:21**
6:30	**6:40**	**6:44**	**6:48**	**6:51**
7:00	**7:10**	**7:14**	**7:18**	**7:21**
8:00	**8:10**	**8:14**	**8:18**	**8:21**
9:00	**9:10**	**9:14**	**9:18**	**9:21**

SATURDAYS

7:00	7:10	7:14	7:18	7:21
8:00	8:10	8:14	8:18	8:21
9:00	9:10	9:14	9:18	9:21
10:00	10:10	10:14	10:18	10:21
11:00	11:10	11:14	11:18	11:21
12:00	**12:10**	**12:14**	**12:18**	**12:21**
1:00	**1:10**	**1:14**	**1:18**	**1:21**
2:00	**2:10**	**2:14**	**2:18**	**2:21**
3:00	**3:10**	**3:14**	**3:18**	**3:21**
4:00	**4:10**	**4:14**	**4:18**	**4:21**
5:00	**5:10**	**5:14**	**5:18**	**5:21**
6:00	**6:10**	**6:14**	**6:18**	**6:21**

Updated 08.17.2023

ROUTE 2 INBOUND
Andover via South Broadway

WEEKDAYS

5	6	7	8	9	
Bus starts at School St & Mainl St	Bus Leaves from Andover Square	Bus Leaves from Shawsheen Square	Bus Leaves from So Broadway and Mt. Vernon	Bus ends at Buckley Transportation Center	Bus continues on as Route
-	5:24	5:31	5:34	5:45	6
5:51	5:54	6:01	6:04	6:15	6
6:21	6:24	6:31	6:34	6:45	6
6:51	6:54	7:01	7:04	7:15	6
7:21	7:24	7:31	7:34	7:45	6
7:51	7:54	8:01	8:04	8:15	6
8:21	8:24	8:31	8:34	8:45	6
8:51	8:54	9:01	9:04	9:15	6
9:21	9:24	9:31	9:34	9:45	6
9:51	9:54	10:01	10:04	10:15	6
10:21	10:24	10:31	10:34	10:45	6
10:51	10:54	11:01	11:04	11:15	6
11:21	11:24	11:31	11:34	11:45	6
11:51	11:54	12:01	12:04	**12:15**	**6**
12:21	**12:24**	**12:31**	**12:34**	**12:45**	**6**
12:51	**12:54**	**1:01**	**1:04**	**1:15**	**6**
1:21	**1:24**	**1:31**	**1:34**	**1:45**	**6**
1:51	**1:54**	**2:01**	**2:04**	**2:15**	**6**
2:21	**2:24**	**2:31**	**2:34**	**2:45**	**6**
2:51	**2:54**	**3:01**	**3:04**	**3:15**	**6**
3:21	**3:24**	**3:31**	**3:34**	**3:45**	**6**
3:51	**3:54**	**4:01**	**4:04**	**4:15**	**6**
4:21	**4:24**	**4:31**	**4:34**	**4:45**	**6**
4:51	**4:54**	**5:01**	**5:04**	**5:15**	**6**
5:21	**5:24**	**5:31**	**5:34**	**5:45**	**6**
5:51	**5:54**	**6:01**	**6:04**	**6:15**	**6**
6:21	**6:24**	**6:31**	**6:34**	**6:45**	**6**
6:51	**6:54**	**7:01**	**7:04**	**7:15**	**2**
7:21	**7:24**	**7:31**	**7:34**	**7:45**	**2**
8:21	**8:24**	**8:31**	**8:34**	**8:45**	**2**
9:21	**9:24**	**9:31**	**9:34**	**9:45**	**-**

SATURDAYS

7:21	7:24	7:33	7:36	7:45	6
8:21	8:24	8:33	8:36	8:45	6
9:21	9:24	9:33	9:36	9:45	6
10:21	10:24	10:33	10:36	10:45	6
11:21	11:24	11:33	11:36	11:45	6
12:21	**12:24**	**12:33**	**12:36**	**12:45**	**6**
1:21	**1:24**	**1:33**	**1:36**	**1:45**	**6**
2:21	**2:24**	**2:33**	**2:36**	**2:45**	**6**
3:21	**3:24**	**3:33**	**3:36**	**3:45**	**6**
4:21	**4:24**	**4:33**	**4:36**	**4:45**	**6**
5:21	**5:24**	**5:33**	**5:36**	**5:45**	**6**
6:21	**6:24**	**6:33**	**6:36**	**6:45**	**-**

MASSDOT CRASH RATE WORKSHEETS

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : Sep-23

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Route 28

MINOR STREET(S) : Railroad Street

INTERSECTION DIAGRAM (Label Approaches)

↑ *North*

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB	SEB	
PEAK HOURLY VOLUMES (AM) :	275	2	581	599	10	**1,467**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **16,300**

TOTAL # OF CRASHES : 4 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **0.80**

CRASH RATE CALCULATION : **0.13** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Andover Town Yard Redevelopment

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : Sep-23

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

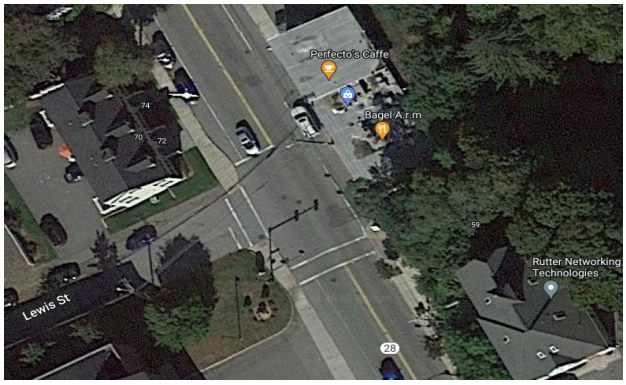
~ INTERSECTION DATA ~

MAJOR STREET : Route 28

MINOR STREET(S) : Lewis Street

INTERSECTION DIAGRAM
(Label Approaches)

↑ *North*



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	6		588	452		**1,046**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **11,622**

TOTAL # OF CRASHES : 12 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **2.40**

CRASH RATE CALCULATION : **0.57** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Andover Town Yard Redevelopment

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : Sep-23

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

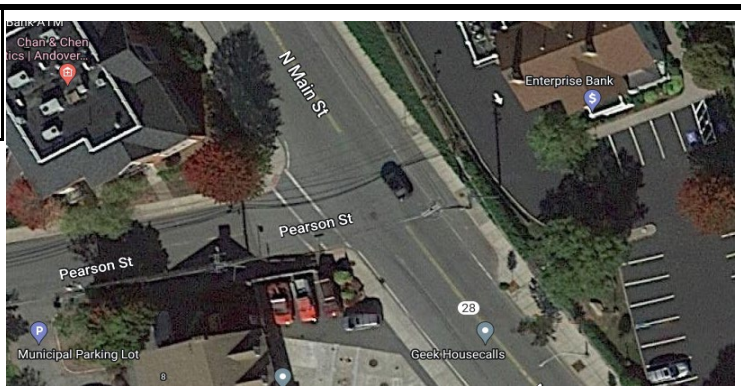
~ INTERSECTION DATA ~

MAJOR STREET : Route 28

MINOR STREET(S) : Pearson Street

INTERSECTION DIAGRAM (Label Approaches)

↑ *North*



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	100		589	453		**1,142**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **12,689**

TOTAL # OF CRASHES : 13 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **2.60**

CRASH RATE CALCULATION : **0.56** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Andover Town Yard Redevelopment

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : Sep-23

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

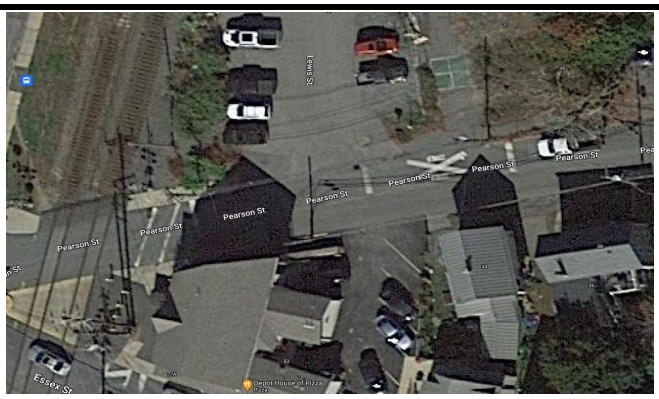
MAJOR STREET : Pearson Street

MINOR STREET(S) : Site Driveway

Depot Pizza parking lot

INTERSECTION DIAGRAM (Label Approaches)

↑ *North*



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	72	38	1	4		**115**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **1,278**

TOTAL # OF CRASHES : 2

OF YEARS : 5

AVERAGE # OF CRASHES PER YEAR (**A**) : **0.40**

CRASH RATE CALCULATION : **0.86**

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

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Andover Town Yard Redevelopment

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : Sep-23

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Essex Street

MINOR STREET(S) : Pearson Street

Railroad Street

Dundee Park Drive

INTERSECTION DIAGRAM
(Label Approaches)

↑ *North*

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB	SWB	
PEAK HOURLY VOLUMES (AM) :	344	416	107	179	56	**1,102**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **12,244**

TOTAL # OF CRASHES : 11 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **2.20**

CRASH RATE CALCULATION : **0.49** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Andover Town Yard Redevelopment

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : Sep-23

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Essex Street

MINOR STREET(S) : School Street

INTERSECTION DIAGRAM
(Label Approaches)

↑ *North*

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	318	167	286			771

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **8,567**

TOTAL # OF CRASHES : 10

OF YEARS : 5

AVERAGE # OF CRASHES PER YEAR (**A**) : **2.00**

CRASH RATE CALCULATION : **0.64**

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

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Andover Town Yard Redevelopment

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : Sep-23

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Essex Street

MINOR STREET(S) : Brook Street

Ridge Street

INTERSECTION DIAGRAM
(Label Approaches)

↑ *North*

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	206	180	10			**396**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **4,400**

TOTAL # OF CRASHES : 10

OF YEARS : 5

AVERAGE # OF CRASHES PER YEAR (**A**) : **2.00**

CRASH RATE CALCULATION : **1.25**

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

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Andover Town Yard Redevelopment

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : Sep-23

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : School Street

MINOR STREET(S) : Ridge Street

Lupine Road

INTERSECTION DIAGRAM
(Label Approaches)

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	176	170	57	6		**409**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **4,544**

TOTAL # OF CRASHES : 1 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **0.20**

CRASH RATE CALCULATION : **0.12** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Andover Town Yard Redevelopment

GROWTH RATE DATA

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
North Andover	Turnpike Street	North of Andover By-pass	37,586	36,069	37,710	37,026	37,999	37,998	38,917	39,114	39,544	40,029	40,189	**0.91%**
Andover	Summer Street	West of Hillside Road	1,279	1,100	1,161	1,140	1,169	1,205	1,233	1,420	1,444	1,448	1,266	**1.80%**
Andover	Lupine Road	South of School Street	1,600	1,596	1,629	1,478	1,493	1,539	1,629	1,730	1,759	1,143	1,138	**-2.16%**
North Andover	Turnpike Street	South of Route 133	29300	29365		25350	25795	27214	28375	28744	29060	29572	29690	**0.96%**
North Andover	Andover By-pass	South of Route 114	14145	14300	16718	16408	16834	19600	19816	20074	18281	18537	17323	**2.67%**
Andover	North Main Street	South of I-495	25401	25680	26651	27467	27501	26683	26977	27328	29708	30124	30244	**1.71%**
Andover	Haverhill Street	East of Route 28	13746	13897	14398	14676	14736	14743	14905	15099	15062	15273	15334	**1.05%**
North Andover	Peters Street	North of Route 114	8965	9063	9295	9219	9380	9569	9674	9840	9449	9581	9619	**0.71%**
North Andover	Andover Street	North of Route 114	15336	16516	17233	16993	17310	18234	18453	18675	16478	16709	16776	**0.64%**
														0.92%

MODE SPLIT DATA

		Adjusted Mode Splits				
	Base Mode Splits from Census	Residential	Gym	WeWorks	Com Cen	Coffee
Drove Vehicle	64	41	40	33	100	40
Public Transportation	2	25	--	33	0	--
Walked	13	13	30	34	0	30
Worked From Home	21	21	30	--	0	30
Total	100	100	100	100	100	100

TRIP GENERATION DATA

Base Trip Generation						
Square Footage:	164	2.5	1.7	0.8	2.2	
	Multifamily (Mid-Rise)	**Health Club[a]**	**Small Office**	**Coffee Shop**	**Com Cen**	**Totals**
Daily Trips	744.56	62.575	24.463	426.856	63.404	1322
Entering	372.28	31.2875	12.2315	213.428	31.702	661
Exiting	372.28	31.2875	12.2315	213.428	31.702	661
AM Peak	60.68	3.275	2.839	68.704	4.202	140
Entering	13.9564	1.67025	2.32798	35.03904	2.77332	56
Exiting	46.7236	1.60475	0.51102	33.66496	1.42868	84
PM Peak	63.96	8.625	3.672	31.192	5.5	113
Entering	39.0156	4.91625	1.24848	15.596	2.585	64
Exiting	24.9444	3.70875	2.42352	15.596	2.915	50

[a] ITE does not have data on Health Clubs for daily trips.Daily rate derived from ratio of daily to peak hour rates between LUC 492 and LUC 491

Internal Trips:	0.1	0.1	0.1	0.1	0	
	Multifamily (Mid-Rise)	**Health Club**	**Small Office**	**Coffee Shop**	**Com Cen**	**Totals**
Daily Trips	670.104	56.3175	22.0167	384.1704	63.404	1197
Entering	335.052	28.15875	11.00835	192.0852	31.702	599
Exiting	335.052	28.15875	11.00835	192.0852	31.702	599
AM Peak	54.612	2.9475	2.5551	61.8336	4.202	127
Entering	12.56076	1.503225	2.095182	31.535136	2.77332	51
Exiting	42.05124	1.444275	0.459918	30.298464	1.42868	76
PM Peak	57.564	7.7625	3.3048	28.0728	5.5	103
Entering	35.11404	4.424625	1.123632	14.0364	2.585	58
Exiting	22.44996	3.337875	2.181168	14.0364	2.915	45

V.O.R.:	1.05	1.05	1.05	1.05	1.05	
	Multifamily (Mid-Rise)	**Health Club**	**Small Office**	**Coffee Shop**	**Com Cen**	**Totals**
Daily Trips	274.74264	22.527	7.265511	153.66816	63.404	522
Entering	137.37132	11.2635	3.6327555	76.83408	31.702	261
Exiting	137.37132	11.2635	3.6327555	76.83408	31.702	261
AM Peak	22.39092	1.179	0.843183	24.73344	4.202	54
Entering	5.1499116	0.60129	0.69141006	12.6140544	2.77332	22
Exiting	17.2410084	0.57771	0.15177294	12.1193856	1.42868	32
PM Peak	23.60124	3.105	1.090584	11.22912	5.5	45
Entering	14.3967564	1.76985	0.37079856	5.61456	2.585	25
Exiting	9.2044836	1.33515	0.71978544	5.61456	2.915	20

Final Trip Generation						
	Multifamily (Mid-Rise)	**Health Club**	**Small Office**	**Coffee Shop**	**Com Cen**	**Totals**
Daily Trips	276	24	8	154	64	526
Entering	138	12	4	77	32	263
Exiting	138	12	4	77	32	263
AM Peak	22	2	1	25	4	54
Entering	5	1	1	13	3	23
Exiting	17	1	0	12	1	31
PM Peak	24	3	1	12	6	46
Entering	15	2	0	6	3	26
Exiting	9	1	1	6	3	20

JOURNEY TO WORK

Proposed Andover Town Yard Redevelopment
Andover, Massachusetts

Residence	Workplace	Number	Route 28 (North)		Route 28 (South)		Lupine Street (South)		Essex Street (West)		Essex Street (East)		Brook Street (East)		School Street (East)	
Andover town	Andover town	5,075	33%	1675	27%	1370	3%	152	19%	964	10%	508	10%	508	8%	406
Andover town	Boston city	2,011		0	40%	804		0	60%	1207		0		0		0
Andover town	North Andover town	856	40%	342	60%	514		0		0		0		0		0
Andover town	Lawrence city	748	60%	449	40%	299		0		0		0		0		0
Andover town	Cambridge city	533		0		0		0	100%	533		0		0		0
Andover town	Wilmington town	432		0	40%	173		0	60%	259		0		0		0
Andover town	Woburn city	411		0	30%	123		0	70%	288		0		0		0
Andover town	Burlington town	387		0		0		0	100%	387		0		0		0
Andover town	Lowell city	295	50%	148		0		0	50%	148		0		0		0
Andover town	Chelmsford town	264	100%	264		0		0		0		0		0		0
Andover town	Tewksbury town	262		0		0	30%	79	70%	183		0		0		0
Andover town	Wakefield town	241		0	50%	121		0	50%	121		0		0		0
Andover town	Billerica town	237	35%	83		0		0	65%	154		0		0		0
Andover town	Haverhill city	208	40%	83	30%	62		0	30%	62		0		0		0
Andover town	Lexington town	204		0		0		0	100%	204		0		0		0
Andover town	Bedford town	192	45%	86		0		0	55%	106		0		0		0
Andover town	North Reading town	176		0	100%	176		0		0		0		0		0
Andover town	Peabody city	174		0	60%	104		0	40%	70		0		0		0
Andover town	Salem town	171		0	100%	171		0		0		0		0		0
Andover town	Methuen Town city	155	34%	53		0		0	66%	102		0		0		0
Andover town	Danvers town	149		0	60%	89		0	40%	60		0		0		0
Andover town	Waltham city	147	50%	74		0		0	50%	74		0		0		0
Andover town	Lynn city	127		0	50%	64		0	50%	64		0		0		0
Andover town	Malden city	124		0		0		0	100%	124		0		0		0
Andover town	Medford city	124		0		0		0	100%	124		0		0		0
Andover town	Beverly city	114		0	60%	68		0	40%	46		0		0		0
Andover town	Salem city	113		0	100%	113		0		0		0		0		0
Andover town	Westford town	110	100%	110		0		0		0		0		0		0
Andover town	Stoneham town	107		0	40%	43		0	60%	64		0		0		0
Andover town	Reading town	104		0	60%	62		0	40%	42		0		0		0
Andover town	Newton city	91		0		0		0	100%	91		0		0		0
Andover town	Winchester town	90		0		0		0	100%	90		0		0		0
Andover town	Framingham town	84	35%	29		0		0	65%	55		0		0		0
Andover town	Nashua city	80	70%	56		0		0	30%	24		0		0		0
Andover town	Portsmouth city	79	100%	79		0		0		0		0		0		0
Andover town	Brookline town	72		0		0		0	100%	72		0		0		0
Andover town	Middleton town	71		0	100%	71		0		0		0		0		0
Andover town	Southborough town	71	50%	36		0		0	50%	36		0		0		0
Andover town	Gloucester city	64		0	66%	42		0	34%	22		0		0		0
Andover town	Needham town	61		0		0		0	100%	61		0		0		0
Andover town	Melrose city	54		0	30%	16		0	70%	38		0		0		0
Andover town	Arlington town	48		0		0		0	100%	48		0		0		0
Andover town	Newburyport city	46	50%	23	50%	23		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
				0		0		0		0		0		0		0
		15,162		3,589		4,510		231		5,919		508		508		406
				23.7%		29.7%		1.5%		39.0%		3.3%		3.3%		2.7%
		SAY		**24%**		**30%**		**1%**		**39%**		**3%**		**3%**		**3%**

CAPACITY ANALYSIS

2023 Existing Weekday Morning Peak Hour
2023 Existing Weekday Evening Peak Hour
2030 No-Build Weekday Morning Peak Hour
2030 No-Build Weekday Evening Peak Hour
2030 Build Weekday Morning Peak Hour
2030 Build Weekday Evening Peak Hour
2030 No-Build Weekday Morning Peak Hour Alternative
2030 No-Build Weekday Evening Peak Hour Alternative
2030 Build Weekday Morning Peak Hour Alternative
2030 Build Weekday Evening Peak Hour Alternative

2023 Existing Weekday Morning Peak Hour

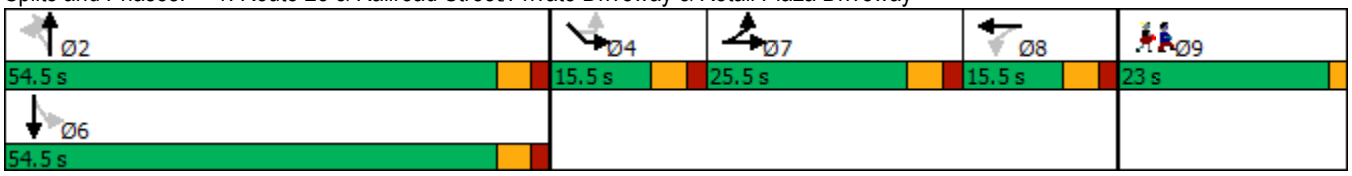
Lane Group	EBL	EBT	EBR	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	0	12	0	3	17	1	388	1	2	537	182
Future Volume (vph)	130	0	12	0	3	17	1	388	1	2	537	182
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.988		0.865							0.961	
Flt Protected		0.956						0.998				
Satd. Flow (prot)	0	1905	0	1863	0	0	0	3417	0	0	3297	0
Flt Permitted		0.956						0.903			0.954	
Satd. Flow (perm)	0	1905	0	1863	0	0	0	3092	0	0	3145	0
Satd. Flow (RTOR)		126		496							1	
Adj. Flow (vph)	135	0	13	0	8	22	1	497	1	2	610	207
Lane Group Flow (vph)	0	148	0	8	0	0	0	521	0	0	827	0
Turn Type	Split	NA		NA		Perm	Perm	NA		Perm	NA	
Protected Phases	7	7		8				2			6	
Permitted Phases						2	2			6		
Detector Phase	7	7		8		2	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0		5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.5	10.5		10.5		10.5	10.5	10.5		10.5	10.5	
Total Split (s)	25.5	25.5		15.5		54.5	54.5	54.5		54.5	54.5	
Total Split (%)	19.0%	19.0%		11.6%		40.7%	40.7%	40.7%		40.7%	40.7%	
Maximum Green (s)	20.0	20.0		10.0		49.0	49.0	49.0		49.0	49.0	
Yellow Time (s)	3.5	3.5		3.5		3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0				0.0			0.0	
Total Lost Time (s)		5.5		5.5				5.5			5.5	
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		None		Max	Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		7.3		5.7				50.7			50.7	
Actuated g/C Ratio		0.10		0.08				0.68			0.68	
v/c Ratio		0.49		0.01				0.25			0.38	
Control Delay		16.2		0.0				7.6			8.6	
Queue Delay		0.0		0.0				0.0			0.0	
Total Delay		16.2		0.0				7.6			8.6	
LOS		B		A				A			A	
Approach Delay		16.2						7.6			8.6	
Approach LOS		B						A			A	
Queue Length 50th (ft)		8		0				25			46	
Queue Length 95th (ft)		73		0				130			258	
Internal Link Dist (ft)		640		440				241			353	
Turn Bay Length (ft)												
Base Capacity (vph)		622		686				2114			2151	
Starvation Cap Reductn		0		0				0			0	
Spillback Cap Reductn		0		0				0			0	

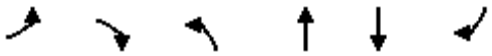
Lane Group	SBR2	SEL	Ø9
Lane Configurations			
Traffic Volume (vph)	7	0	
Future Volume (vph)	7	0	
Lane Util. Factor	0.95	1.00	
Frt			
Flt Protected			
Satd. Flow (prot)	0	1963	
Flt Permitted			
Satd. Flow (perm)	0	1963	
Satd. Flow (RTOR)			
Adj. Flow (vph)	8	0	
Lane Group Flow (vph)	0	0	
Turn Type		Prot	
Protected Phases		4	9
Permitted Phases			
Detector Phase		4	
Switch Phase			
Minimum Initial (s)		5.0	1.0
Minimum Split (s)		10.5	23.0
Total Split (s)		15.5	23.0
Total Split (%)		11.6%	17%
Maximum Green (s)		10.0	21.0
Yellow Time (s)		3.5	2.0
All-Red Time (s)		2.0	0.0
Lost Time Adjust (s)		0.0	
Total Lost Time (s)		5.5	
Lead/Lag			
Lead-Lag Optimize?			
Vehicle Extension (s)		3.0	3.0
Recall Mode		None	None
Walk Time (s)			7.0
Flash Dont Walk (s)			14.0
Pedestrian Calls (#/hr)			14
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)		415	
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			

Lane Group	EBL	EBT	EBR	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0		0				0			0	
Reduced v/c Ratio		0.24		0.01				0.25			0.38	

Intersection Summary	
Cycle Length: 134	
Actuated Cycle Length: 74.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 47.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Route 28 & Railroad Street/Private Driveway & Retail Plaza Driveway



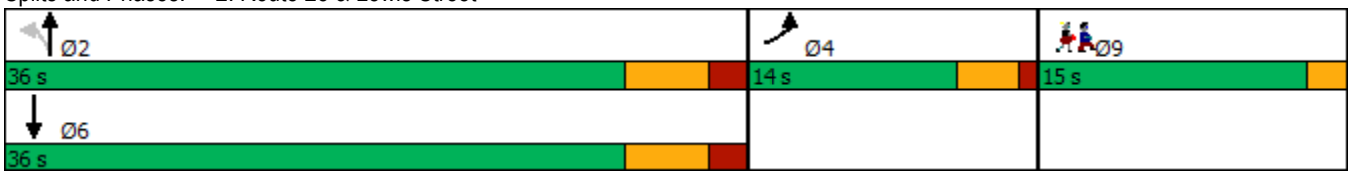


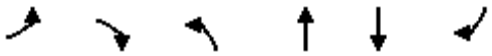
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	3	6	2	404	555	6	
Future Volume (vph)	3	6	2	404	555	6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.910				0.999		
Flt Protected	0.984						
Satd. Flow (prot)	1701	0	0	1987	2047	0	
Flt Permitted	0.984			0.998			
Satd. Flow (perm)	1701	0	0	1983	2047	0	
Satd. Flow (RTOR)	8				1		
Adj. Flow (vph)	4	8	3	518	631	7	
Lane Group Flow (vph)	12	0	0	521	638	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	4			2	6		9
Permitted Phases			2				
Detector Phase	4		2	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	5.0	5.0		1.0
Minimum Split (s)	9.5		11.0	11.0	11.0		15.0
Total Split (s)	14.0		36.0	36.0	36.0		15.0
Total Split (%)	21.5%		55.4%	55.4%	55.4%		23%
Maximum Green (s)	10.0		30.0	30.0	30.0		13.0
Yellow Time (s)	3.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	4.0			6.0	6.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		Max	Max	Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							16
Act Effct Green (s)	5.9			49.2	49.2		
Actuated g/C Ratio	0.11			0.91	0.91		
v/c Ratio	0.06			0.29	0.34		
Control Delay	18.2			3.8	4.1		
Queue Delay	0.0			0.0	0.0		
Total Delay	18.2			3.8	4.1		
LOS	B			A	A		
Approach Delay	18.2			3.8	4.1		
Approach LOS	B			A	A		
Queue Length 50th (ft)	1			0	0		
Queue Length 95th (ft)	13			163	250		
Internal Link Dist (ft)	365			358	462		
Turn Bay Length (ft)							
Base Capacity (vph)	323			1796	1854		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.04			0.29	0.34		

Intersection Summary		
Cycle Length: 65		
Actuated Cycle Length: 54.3		
Natural Cycle: 55		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.34		
Intersection Signal Delay: 4.1	Intersection LOS: A	
Intersection Capacity Utilization 42.1%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 2: Route 28 & Lewis Street

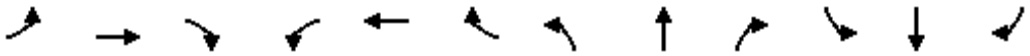




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	61	45	393	533	31
Future Volume (Veh/h)	24	61	45	393	533	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.79	0.79	0.87	0.87
Hourly flow rate (vph)	35	88	57	497	613	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					438	
pX, platoon unblocked	0.86	0.86	0.86			
vC, conflicting volume	1242	631	649			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1200	490	511			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	82	94			
cM capacity (veh/h)	163	501	916			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	123	57	497	649
Volume Left	35	57	0	0
Volume Right	88	0	0	36
cSH	316	916	1700	1700
Volume to Capacity	0.39	0.06	0.29	0.38
Queue Length 95th (ft)	45	5	0	0
Control Delay (s)	23.5	9.2	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	23.5	0.9		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	71	0	0	36	2	0	0	1	2	0	2
Future Volume (Veh/h)	1	71	0	0	36	2	0	0	1	2	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.79	0.79	0.79	0.25	0.25	0.25	0.50	0.50	0.50
Hourly flow rate (vph)	1	87	0	0	46	3	0	0	4	4	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	49			87			140	138	87	140	136	48
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	49			87			140	138	87	140	136	48
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1571			1522			830	756	977	830	758	1027

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	88	49	4	8
Volume Left	1	0	0	4
Volume Right	0	3	4	4
cSH	1571	1522	977	918
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.1	0.0	8.7	9.0
Lane LOS	A		A	A
Approach Delay (s)	0.1	0.0	8.7	9.0
Approach LOS			A	A

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	14.5%	ICU Level of Service	A	
Analysis Period (min)	15			

LANE SUMMARY

Site: 8975 [Andover (Site Folder: General)]

2023 Existing Weekday Morning Peak Hour
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Dundee Park Drive													
Lane 1	24	0.0	296	0.081	100	18.2	LOS C	0.3	6.8	Full	1600	0.0	0.0
Approach	24	0.0		0.081		18.2	LOS C	0.3	6.8				
East: Essex Street													
Lane 1	506	2.6	1529	0.331	100	5.0	LOS A	2.0	52.2	Full	1600	0.0	0.0
Approach	506	2.6		0.331		5.0	NA	2.0	52.2				
NorthEast: Pearson Street													
Lane 1	52	0.0	780	0.067	100	6.3	LOS A	0.4	9.1	Full	1600	0.0	0.0
Approach	52	0.0		0.067		6.3	NA	0.4	9.1				
North: Railroad Street													
Lane 1	210	0.6	325	0.646	100	34.3	LOS D	5.2	130.6	Full	1600	0.0	0.0
Approach	210	0.6		0.646		34.3	LOS D	5.2	130.6				
West: Essex Street													
Lane 1	468	1.0	1556	0.301	100	4.8	LOS A	1.6	40.5	Full	1600	0.0	0.0
Approach	468	1.0		0.301		4.8	NA	1.6	40.5				
Intersection	1260	1.5		0.646		10.1	NA	5.2	130.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Dundee Park Drive

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	4	13	7	24	0.0	296	0.081	100	NA	NA
Approach	4	13	7	24	0.0		0.081			

East: Essex Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	R3 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	33	363	99	12	506	2.6	1529	0.331	100	NA	NA
Approach	33	363	99	12	506	2.6		0.331			
NorthEast: Pearson Street											
Mov. From NE To Exit:	R1 W	R3 N	Total	%HV			Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	37	15	52	0.0			780	0.067	100	NA	NA
Approach	37	15	52	0.0				0.067			
North: Railroad Street											
Mov. From N To Exit:	L3 NE	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	16	102	27	65	210	0.6	325	0.646	100	NA	NA
Approach	16	102	27	65	210	0.6		0.646			
West: Essex Street											
Mov. From W To Exit:	L2 N	L1 NE	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	72	65	317	13	468	1.0	1556	0.301	100	NA	NA
Approach	72	65	317	13	468	1.0		0.301			
	Total	%HV	Deg.Satn (v/c)								
Intersection	1260	1.5	0.646								

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Dundee Park Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: Pearson Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Railroad Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	170	167	18	144	195	16
Future Volume (Veh/h)	170	167	18	144	195	16
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.68	0.68	0.76	0.76
Hourly flow rate (vph)	185	182	26	212	257	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			367		540	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			367		540	276
tC, single (s)			4.1		6.4	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.5
p0 queue free %			98		47	97
cM capacity (veh/h)			1203		489	724

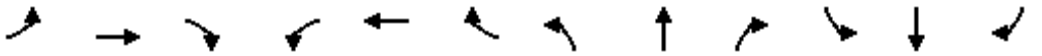
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	367	238	278
Volume Left	0	26	257
Volume Right	182	0	21
cSH	1700	1203	528
Volume to Capacity	0.22	0.02	0.53
Queue Length 95th (ft)	0	2	76
Control Delay (s)	0.0	1.1	19.5
Lane LOS		A	C
Approach Delay (s)	0.0	1.1	19.5
Approach LOS			C

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (veh/h)	174	12	18	3	153	9	6
Future Volume (Veh/h)	174	12	18	3	153	9	6
Sign Control	Free				Free	Stop	
Grade	0%				0%	0%	
Peak Hour Factor	0.91	0.91	0.70	0.70	0.70	0.81	0.81
Hourly flow rate (vph)	191	13	0	4	219	11	7
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None				None		
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked			0.00				
vC, conflicting volume			0	204		424	198
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0	204		424	198
tC, single (s)			0.0	4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)			0.0	2.2		3.5	3.3
p0 queue free %			0	100		98	99
cM capacity (veh/h)			0	1380		589	849

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	204	223	18
Volume Left	0	4	11
Volume Right	13	0	7
cSH	1700	1380	668
Volume to Capacity	0.12	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	10.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	10.5
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	117	59	15	149	6	48	3	6	1	4	1
Future Volume (Veh/h)	0	117	59	15	149	6	48	3	6	1	4	1
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.76	0.76	0.77	0.77	0.77	0.79	0.79	0.79	0.30	0.30	0.30
Hourly flow rate (vph)	0	154	78	19	194	8	61	4	8	3	13	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	202			232			438	433	193	439	468	198
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	202			232			438	433	193	439	468	198
tC, single (s)	4.1			4.2			7.1	6.5	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	100			99			88	99	99	99	97	100
cM capacity (veh/h)	1382			1307			510	511	812	517	489	848

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	232	221	73	19
Volume Left	0	19	61	3
Volume Right	78	8	8	3
cSH	1382	1307	532	529
Volume to Capacity	0.00	0.01	0.14	0.04
Queue Length 95th (ft)	0	1	12	3
Control Delay (s)	0.0	0.8	12.8	12.1
Lane LOS		A	B	B
Approach Delay (s)	0.0	0.8	12.8	12.1
Approach LOS			B	B

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	37.2%	ICU Level of Service	A	
Analysis Period (min)	15			

2023 Existing Weekday Evening Peak Hour

Lane Group	EBL2	EBL	EBT	EBR	WBT	NBL2	NBL	NBT	SBL	SBT	SBR	SBR2
Lane Configurations												
Traffic Volume (vph)	2	241	1	31	2	42	1	538	2	429	163	5
Future Volume (vph)	2	241	1	31	2	42	1	538	2	429	163	5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt			0.985							0.958		
Flt Protected			0.958					0.996				
Satd. Flow (prot)	0	0	1955	0	2153	0	0	3444	0	3310	0	0
Flt Permitted			0.958					0.851		0.954		
Satd. Flow (perm)	0	0	1955	0	2153	0	0	2942	0	3158	0	0
Satd. Flow (RTOR)			4							1		
Adj. Flow (vph)	2	271	1	35	8	44	1	566	2	482	183	6
Lane Group Flow (vph)	0	0	309	0	8	0	0	611	0	673	0	0
Turn Type	Split	Split	NA		NA	Perm	Perm	NA	Perm	NA		
Protected Phases	7	7	7		8			2		6		
Permitted Phases						2	2		6			
Detector Phase	7	7	7		8	2	2	2	6	6		
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0		
Minimum Split (s)	10.5	10.5	10.5		10.5	10.5	10.5	10.5	10.5	10.5		
Total Split (s)	25.5	25.5	25.5		15.5	54.5	54.5	54.5	54.5	54.5		
Total Split (%)	19.0%	19.0%	19.0%		11.6%	40.7%	40.7%	40.7%	40.7%	40.7%		
Maximum Green (s)	20.0	20.0	20.0		10.0	49.0	49.0	49.0	49.0	49.0		
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5		
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Lost Time Adjust (s)			0.0		0.0			0.0		0.0		
Total Lost Time (s)			5.5		5.5			5.5		5.5		
Lead/Lag	Lead	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		
Recall Mode	Min	Min	Min		None	Max	Max	Max	Max	Max		
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)			20.7		6.2			50.7		50.7		
Actuated g/C Ratio			0.21		0.06			0.50		0.50		
v/c Ratio			0.76		0.06			0.41		0.42		
Control Delay			54.4		54.5			20.6		20.6		
Queue Delay			0.0		0.0			0.0		0.0		
Total Delay			54.4		54.5			20.6		20.6		
LOS			D		D			C		C		
Approach Delay			54.4		54.5			20.6		20.6		
Approach LOS			D		D			C		C		
Queue Length 50th (ft)			194		5			135		150		
Queue Length 95th (ft)			#435		6			260		280		
Internal Link Dist (ft)			640		440			241		353		
Turn Bay Length (ft)												
Base Capacity (vph)			404		221			1481		1590		
Starvation Cap Reductn			0		0			0		0		
Spillback Cap Reductn			0		0			0		0		

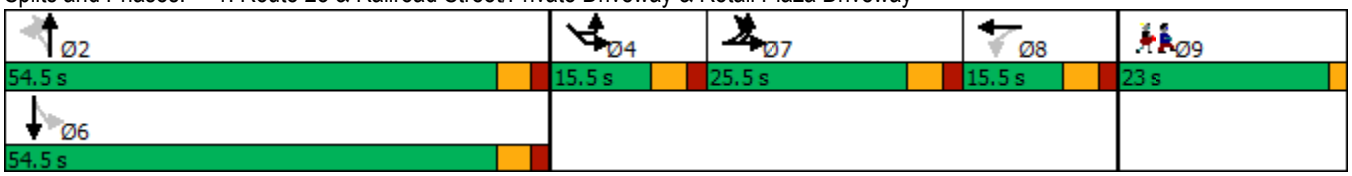
Lane Group	SEL2	SEL	SER	SER2	Ø9
Lane Configurations					
Traffic Volume (vph)	2	0	5	3	
Future Volume (vph)	2	0	5	3	
Lane Util. Factor	1.00	1.00	1.00	1.00	
Frt		0.892			
Flt Protected		0.990			
Satd. Flow (prot)	0	1734	0	0	
Flt Permitted		0.990			
Satd. Flow (perm)	0	1734	0	0	
Satd. Flow (RTOR)		126			
Adj. Flow (vph)	4	0	10	6	
Lane Group Flow (vph)	0	20	0	0	
Turn Type	Prot	Prot			
Protected Phases	4	4			9
Permitted Phases					
Detector Phase	4	4			
Switch Phase					
Minimum Initial (s)	5.0	5.0			1.0
Minimum Split (s)	10.5	10.5			23.0
Total Split (s)	15.5	15.5			23.0
Total Split (%)	11.6%	11.6%			17%
Maximum Green (s)	10.0	10.0			21.0
Yellow Time (s)	3.5	3.5			2.0
All-Red Time (s)	2.0	2.0			0.0
Lost Time Adjust (s)		0.0			
Total Lost Time (s)		5.5			
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0			3.0
Recall Mode	None	None			None
Walk Time (s)					7.0
Flash Dont Walk (s)					14.0
Pedestrian Calls (#/hr)					27
Act Effct Green (s)		5.7			
Actuated g/C Ratio		0.06			
v/c Ratio		0.09			
Control Delay		0.8			
Queue Delay		0.0			
Total Delay		0.8			
LOS		A			
Approach Delay		0.8			
Approach LOS		A			
Queue Length 50th (ft)		0			
Queue Length 95th (ft)		0			
Internal Link Dist (ft)		415			
Turn Bay Length (ft)					
Base Capacity (vph)		291			
Starvation Cap Reductn		0			
Spillback Cap Reductn		0			

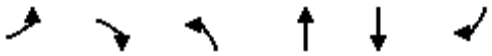
Lane Group	EBL2	EBL	EBT	EBR	WBT	NBL2	NBL	NBT	SBL	SBT	SBR	SBR2
Storage Cap Reductn			0		0			0		0		
Reduced v/c Ratio			0.76		0.04			0.41		0.42		

Intersection Summary		
Cycle Length: 134		
Actuated Cycle Length: 100.7		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.76		
Intersection Signal Delay: 26.9	Intersection LOS: C	
Intersection Capacity Utilization 78.0%	ICU Level of Service D	
Analysis Period (min) 15		

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

Splits and Phases: 1: Route 28 & Railroad Street/Private Driveway & Retail Plaza Driveway



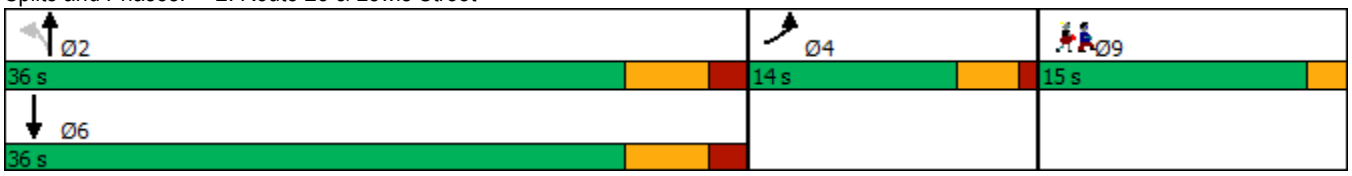


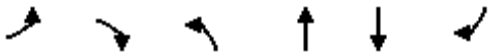
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	2	4	3	585	448	4	
Future Volume (vph)	2	4	3	585	448	4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.910				0.999		
Flt Protected	0.984						
Satd. Flow (prot)	1701	0	0	2007	2067	0	
Flt Permitted	0.984			0.998			
Satd. Flow (perm)	1701	0	0	2003	2067	0	
Satd. Flow (RTOR)	8				1		
Adj. Flow (vph)	4	8	3	629	498	4	
Lane Group Flow (vph)	12	0	0	632	502	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	4			2	6		9
Permitted Phases			2				
Detector Phase	4		2	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	5.0	5.0		1.0
Minimum Split (s)	9.5		11.0	11.0	11.0		15.0
Total Split (s)	14.0		36.0	36.0	36.0		15.0
Total Split (%)	21.5%		55.4%	55.4%	55.4%		23%
Maximum Green (s)	10.0		30.0	30.0	30.0		13.0
Yellow Time (s)	3.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	4.0			6.0	6.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		Max	Max	Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							4
Act Effct Green (s)	5.9			49.2	49.2		
Actuated g/C Ratio	0.11			0.91	0.91		
v/c Ratio	0.06			0.35	0.27		
Control Delay	18.3			4.2	3.6		
Queue Delay	0.0			0.0	0.0		
Total Delay	18.3			4.2	3.6		
LOS	B			A	A		
Approach Delay	18.3			4.2	3.6		
Approach LOS	B			A	A		
Queue Length 50th (ft)	1			0	0		
Queue Length 95th (ft)	7			261	188		
Internal Link Dist (ft)	365			358	462		
Turn Bay Length (ft)							
Base Capacity (vph)	323			1814	1872		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.04			0.35	0.27		

Intersection Summary			
Cycle Length: 65			
Actuated Cycle Length: 54.3			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.35			
Intersection Signal Delay: 4.1		Intersection LOS: A	
Intersection Capacity Utilization 45.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Route 28 & Lewis Street

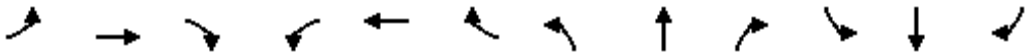




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	71	34	555	444	9
Future Volume (Veh/h)	29	71	34	555	444	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.96	0.96	0.88	0.88
Hourly flow rate (vph)	42	103	35	578	505	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					438	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1158	510	515			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1128	422	428			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	82	97			
cM capacity (veh/h)	203	584	1049			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	145	35	578	515
Volume Left	42	35	0	0
Volume Right	103	0	0	10
cSH	378	1049	1700	1700
Volume to Capacity	0.38	0.03	0.34	0.30
Queue Length 95th (ft)	44	3	0	0
Control Delay (s)	20.3	8.5	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	20.3	0.5		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	52	0	0	55	0	0	0	0	1	0	1
Future Volume (Veh/h)	1	52	0	0	55	0	0	0	0	1	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.60	0.60	0.60	0.25	0.25	0.25	0.25	0.25	0.25
Hourly flow rate (vph)	1	63	0	0	92	0	0	0	0	4	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	92			63			161	157	63	157	157	92
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	92			63			161	157	63	157	157	92
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1515			1553			805	738	1007	813	738	971

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	64	92	0	8
Volume Left	1	0	0	4
Volume Right	0	0	0	4
cSH	1515	1553	1700	885
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.1	0.0	0.0	9.1
Lane LOS	A		A	A
Approach Delay (s)	0.1	0.0	0.0	9.1
Approach LOS			A	A

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	13.5%	ICU Level of Service	A	
Analysis Period (min)	15			

LANE SUMMARY

Site: 8975 [Andover (Site Folder: General)]

2023 Existing Weekday Evening Peak Hour
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Dundee Park Drive													
Lane 1	194	0.0	265	0.734	100	48.6	LOS E	5.8	146.2	Full	1600	0.0	0.0
Approach	194	0.0		0.734		48.6	LOS E	5.8	146.2				
East: Essex Street													
Lane 1	619	0.9	1445	0.429	100	6.7	LOS A	3.6	90.3	Full	1600	0.0	0.0
Approach	619	0.9		0.429		6.7	NA	3.6	90.3				
NorthEast: Pearson Street													
Lane 1	77	0.0	715	0.107	100	7.1	LOS A	0.6	14.4	Full	1600	0.0	0.0
Approach	77	0.0		0.107		7.1	NA	0.6	14.4				
North: Railroad Street													
Lane 1	192	1.2	300	0.642	100	36.3	LOS E	4.8	121.4	Full	1600	0.0	0.0
Approach	192	1.2		0.642		36.3	LOS E	4.8	121.4				
West: Essex Street													
Lane 1	461	0.6	1497	0.308	100	5.2	LOS A	2.0	51.4	Full	1600	0.0	0.0
Approach	461	0.6		0.308		5.2	NA	2.0	51.4				
Intersection	1544	0.7		0.734		15.3	NA	5.8	146.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Dundee Park Drive

Mov. From S To Exit:	L2 W	T1 N	R1 NE	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	69	59	7	59	194	0.0	265	0.734	100	NA	NA
Approach	69	59	7	59	194	0.0		0.734			

East: Essex Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	R3 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	19	413	178	9	619	0.9	1445	0.429	100	NA	NA
Approach	19	413	178	9	619	0.9		0.429			
NorthEast: Pearson Street											
Mov. From NE To Exit:	L1 S	R1 W	R3 N	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	55	19	77	0.0		715	0.107	100	NA	NA
Approach	3	55	19	77	0.0			0.107			
North: Railroad Street											
Mov. From N To Exit:	L3 NE	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	8	75	24	86	192	1.2	300	0.642	100	NA	NA
Approach	8	75	24	86	192	1.2		0.642			
West: Essex Street											
Mov. From W To Exit:	L2 N	L1 NE	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	77	48	288	48	461	0.6	1497	0.308	100	NA	NA
Approach	77	48	288	48	461	0.6		0.308			
	Total	%HV	Deg.Satn (v/c)								
Intersection	1544	0.7	0.734								

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Dundee Park Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: Pearson Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Railroad Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	183	135	14	153	262	23
Future Volume (Veh/h)	183	135	14	153	262	23
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.85	0.85	0.94	0.94
Hourly flow rate (vph)	199	147	16	180	279	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			346		484	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			346		484	272
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		48	97
cM capacity (veh/h)			1224		536	771

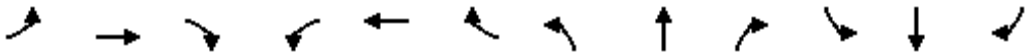
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	346	196	303
Volume Left	0	16	279
Volume Right	147	0	24
cSH	1700	1224	582
Volume to Capacity	0.20	0.01	0.52
Queue Length 95th (ft)	0	1	75
Control Delay (s)	0.0	0.8	18.1
Lane LOS		A	C
Approach Delay (s)	0.0	0.8	18.1
Approach LOS			C

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (veh/h)	201	5	19	1	160	7	3
Future Volume (Veh/h)	201	5	19	1	160	7	3
Sign Control	Free				Free	Stop	
Grade	0%				0%	0%	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.92	0.83	0.83
Hourly flow rate (vph)	216	5	0	1	174	8	4
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None				None		
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked			0.00				
vC, conflicting volume			0	221		394	218
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0	221		394	218
tC, single (s)			0.0	4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)			0.0	2.2		3.5	3.3
p0 queue free %			0	100		99	100
cM capacity (veh/h)			0	1360		614	826

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	221	175	12
Volume Left	0	1	8
Volume Right	5	0	4
cSH	1700	1360	671
Volume to Capacity	0.13	0.00	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	10.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.0	10.5
Approach LOS			B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	111	34	12	224	4	55	2	13	1	3	0
Future Volume (Veh/h)	1	111	34	12	224	4	55	2	13	1	3	0
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.80	0.80	0.80	0.33	0.33	0.33
Hourly flow rate (vph)	1	141	43	15	284	5	69	2	16	3	9	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	289			184			486	484	162	498	502	286
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	289			184			486	484	162	498	502	286
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			86	100	98	99	98	100
cM capacity (veh/h)	1284			1403			484	480	888	472	469	757

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	185	304	87	12
Volume Left	1	15	69	3
Volume Right	43	5	16	0
cSH	1284	1403	528	469
Volume to Capacity	0.00	0.01	0.16	0.03
Queue Length 95th (ft)	0	1	15	2
Control Delay (s)	0.0	0.5	13.2	12.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.0	0.5	13.2	12.9
Approach LOS			B	B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

2030 No-Build Weekday Morning Peak Hour

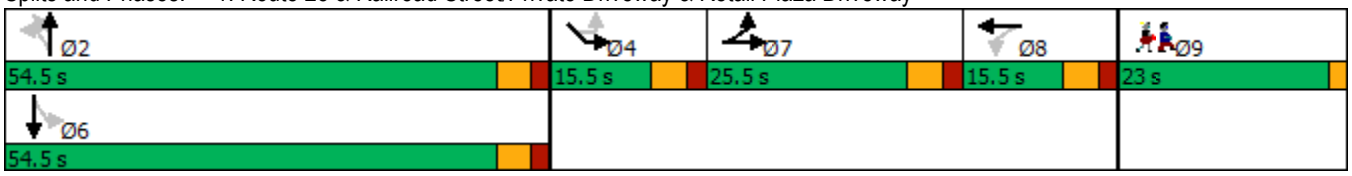
Lane Group	EBL	EBT	EBR	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	0	13	0	3	18	1	425	1	2	591	195
Future Volume (vph)	139	0	13	0	3	18	1	425	1	2	591	195
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.988		0.865							0.962	
Flt Protected		0.956						0.998				
Satd. Flow (prot)	0	1905	0	1863	0	0	0	3417	0	0	3300	0
Flt Permitted		0.956						0.899			0.954	
Satd. Flow (perm)	0	1905	0	1863	0	0	0	3078	0	0	3148	0
Satd. Flow (RTOR)		126		475							1	
Adj. Flow (vph)	145	0	14	0	8	23	1	545	1	2	672	222
Lane Group Flow (vph)	0	159	0	8	0	0	0	570	0	0	904	0
Turn Type	Split	NA		NA		Perm	Perm	NA		Perm	NA	
Protected Phases	7	7		8				2			6	
Permitted Phases						2	2			6		
Detector Phase	7	7		8		2	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0		5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.5	10.5		10.5		10.5	10.5	10.5		10.5	10.5	
Total Split (s)	25.5	25.5		15.5		54.5	54.5	54.5		54.5	54.5	
Total Split (%)	19.0%	19.0%		11.6%		40.7%	40.7%	40.7%		40.7%	40.7%	
Maximum Green (s)	20.0	20.0		10.0		49.0	49.0	49.0		49.0	49.0	
Yellow Time (s)	3.5	3.5		3.5		3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0				0.0			0.0	
Total Lost Time (s)		5.5		5.5				5.5			5.5	
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		None		Max	Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		7.6		5.7				50.7			50.7	
Actuated g/C Ratio		0.10		0.08				0.68			0.68	
v/c Ratio		0.52		0.01				0.27			0.42	
Control Delay		17.6		0.0				7.9			9.1	
Queue Delay		0.0		0.0				0.0			0.0	
Total Delay		17.6		0.0				7.9			9.1	
LOS		B		A				A			A	
Approach Delay		17.6						7.9			9.1	
Approach LOS		B						A			A	
Queue Length 50th (ft)		13		0				30			53	
Queue Length 95th (ft)		83		0				146			294	
Internal Link Dist (ft)		640		440				241			353	
Turn Bay Length (ft)												
Base Capacity (vph)		620		667				2096			2144	
Starvation Cap Reductn		0		0				0			0	
Spillback Cap Reductn		0		0				0			0	

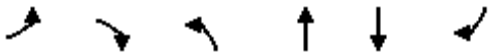
Lane Group	SBR2	SEL	Ø9
Lane Configurations			
Traffic Volume (vph)	7	0	
Future Volume (vph)	7	0	
Lane Util. Factor	0.95	1.00	
Frt			
Flt Protected			
Satd. Flow (prot)	0	1963	
Flt Permitted			
Satd. Flow (perm)	0	1963	
Satd. Flow (RTOR)			
Adj. Flow (vph)	8	0	
Lane Group Flow (vph)	0	0	
Turn Type		Prot	
Protected Phases		4	9
Permitted Phases			
Detector Phase		4	
Switch Phase			
Minimum Initial (s)		5.0	1.0
Minimum Split (s)		10.5	23.0
Total Split (s)		15.5	23.0
Total Split (%)		11.6%	17%
Maximum Green (s)		10.0	21.0
Yellow Time (s)		3.5	2.0
All-Red Time (s)		2.0	0.0
Lost Time Adjust (s)		0.0	
Total Lost Time (s)		5.5	
Lead/Lag			
Lead-Lag Optimize?			
Vehicle Extension (s)		3.0	3.0
Recall Mode		None	None
Walk Time (s)			7.0
Flash Dont Walk (s)			14.0
Pedestrian Calls (#/hr)			14
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)		415	
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			

Lane Group	EBL	EBT	EBR	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0		0				0			0	
Reduced v/c Ratio		0.26		0.01				0.27			0.42	

Intersection Summary	
Cycle Length: 134	
Actuated Cycle Length: 74.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 50.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Route 28 & Railroad Street/Private Driveway & Retail Plaza Driveway



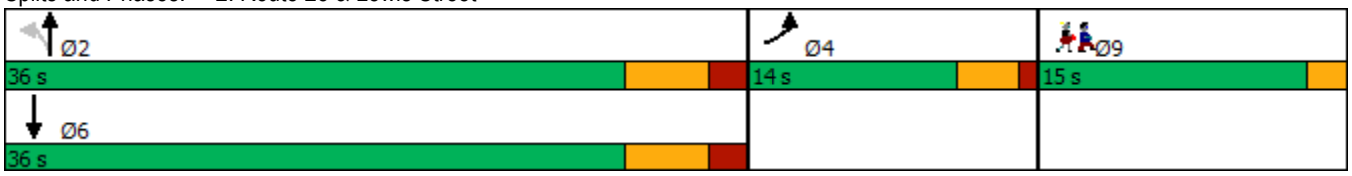


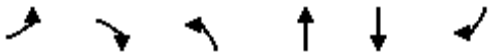
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	3	6	2	442	610	6	
Future Volume (vph)	3	6	2	442	610	6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.910				0.999		
Flt Protected	0.984						
Satd. Flow (prot)	1701	0	0	1987	2047	0	
Flt Permitted	0.984			0.998			
Satd. Flow (perm)	1701	0	0	1983	2047	0	
Satd. Flow (RTOR)	8				1		
Adj. Flow (vph)	4	8	3	567	693	7	
Lane Group Flow (vph)	12	0	0	570	700	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	4			2	6		9
Permitted Phases			2				
Detector Phase	4		2	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	5.0	5.0		1.0
Minimum Split (s)	9.5		11.0	11.0	11.0		15.0
Total Split (s)	14.0		36.0	36.0	36.0		15.0
Total Split (%)	21.5%		55.4%	55.4%	55.4%		23%
Maximum Green (s)	10.0		30.0	30.0	30.0		13.0
Yellow Time (s)	3.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	4.0			6.0	6.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		Max	Max	Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							16
Act Effct Green (s)	5.9			49.2	49.2		
Actuated g/C Ratio	0.11			0.91	0.91		
v/c Ratio	0.06			0.32	0.38		
Control Delay	18.2			4.0	4.4		
Queue Delay	0.0			0.0	0.0		
Total Delay	18.2			4.0	4.4		
LOS	B			A	A		
Approach Delay	18.2			4.0	4.4		
Approach LOS	B			A	A		
Queue Length 50th (ft)	1			0	0		
Queue Length 95th (ft)	13			182	287		
Internal Link Dist (ft)	365			358	462		
Turn Bay Length (ft)							
Base Capacity (vph)	323			1796	1854		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.04			0.32	0.38		

Intersection Summary		
Cycle Length: 65		
Actuated Cycle Length: 54.3		
Natural Cycle: 60		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.38		
Intersection Signal Delay: 4.4	Intersection LOS: A	
Intersection Capacity Utilization 45.0%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 2: Route 28 & Lewis Street

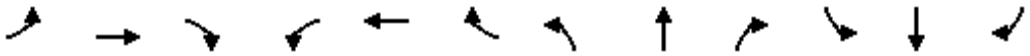




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	68	50	430	586	33
Future Volume (Veh/h)	26	68	50	430	586	33
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.79	0.79	0.87	0.87
Hourly flow rate (vph)	38	99	63	544	674	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					438	
pX, platoon unblocked	0.83	0.83	0.83			
vC, conflicting volume	1363	693	712			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1335	527	550			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	71	78	93			
cM capacity (veh/h)	129	460	854			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	137	63	544	712
Volume Left	38	63	0	0
Volume Right	99	0	0	38
cSH	269	854	1700	1700
Volume to Capacity	0.51	0.07	0.32	0.42
Queue Length 95th (ft)	67	6	0	0
Control Delay (s)	31.5	9.5	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	31.5	1.0		0.0
Approach LOS	D			

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	80	0	0	41	2	0	0	1	2	0	2
Future Volume (Veh/h)	1	80	0	0	41	2	0	0	1	2	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.79	0.79	0.79	0.25	0.25	0.25	0.50	0.50	0.50
Hourly flow rate (vph)	1	98	0	0	52	3	0	0	4	4	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	55			98			158	155	98	158	154	54
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55			98			158	155	98	158	154	54
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1563			1508			810	740	963	809	741	1019

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	99	55	4	8
Volume Left	1	0	0	4
Volume Right	0	3	4	4
cSH	1563	1508	963	902
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.1	0.0	8.8	9.0
Lane LOS	A		A	A
Approach Delay (s)	0.1	0.0	8.8	9.0
Approach LOS			A	A

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	15.0%	ICU Level of Service	A	
Analysis Period (min)	15			

LANE SUMMARY

Site: 8975 [Andover (Site Folder: General)]

2030 No-Build Weekday Morning Peak Hour
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Dundee Park Drive													
Lane 1	24	0.0	266	0.090	100	19.9	LOS C	0.3	7.5	Full	1600	0.0	0.0
Approach	24	0.0		0.090		19.9	LOS C	0.3	7.5				
East: Essex Street													
Lane 1	545	2.6	1525	0.357	100	5.3	LOS A	2.3	58.7	Full	1600	0.0	0.0
Approach	545	2.6		0.357		5.3	NA	2.3	58.7				
NorthEast: Pearson Street													
Lane 1	59	0.0	744	0.079	100	6.7	LOS A	0.4	10.8	Full	1600	0.0	0.0
Approach	59	0.0		0.079		6.7	NA	0.4	10.8				
North: Railroad Street													
Lane 1	223	0.6	292	0.762	100	48.0	LOS E	7.1	178.3	Full	1600	0.0	0.0
Approach	223	0.6		0.762		48.0	LOS E	7.1	178.3				
West: Essex Street													
Lane 1	508	1.0	1526	0.333	100	5.2	LOS A	2.2	56.5	Full	1600	0.0	0.0
Approach	508	1.0		0.333		5.2	NA	2.2	56.5				
Intersection	1358	1.5		0.762		12.6	NA	7.1	178.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Dundee Park Drive

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	4	13	7	24	0.0	266	0.090	100	NA	NA
Approach	4	13	7	24	0.0		0.090			

East: Essex Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	R3 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	33	393	106	13	545	2.6	1525	0.357	100	NA	NA
Approach	33	393	106	13	545	2.6		0.357			
NorthEast: Pearson Street											
Mov. From NE To Exit:	R1 W	R3 N	Total	%HV			Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	42	16	59	0.0			744	0.079	100	NA	NA
Approach	42	16	59	0.0				0.079			
North: Railroad Street											
Mov. From N To Exit:	L3 NE	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	17	110	27	69	223	0.6	292	0.762	100	NA	NA
Approach	17	110	27	69	223	0.6		0.762			
West: Essex Street											
Mov. From W To Exit:	L2 N	L1 NE	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	77	75	343	13	508	1.0	1526	0.333	100	NA	NA
Approach	77	75	343	13	508	1.0		0.333			
	Total	%HV	Deg.Satn (v/c)								
Intersection	1358	1.5	0.762								

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Dundee Park Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: Pearson Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Railroad Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	184	179	19	156	209	17
Future Volume (Veh/h)	184	179	19	156	209	17
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.68	0.68	0.76	0.76
Hourly flow rate (vph)	200	195	28	229	275	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			395		582	298
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			395		582	298
tC, single (s)			4.1		6.4	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.5
p0 queue free %			98		40	97
cM capacity (veh/h)			1175		460	704

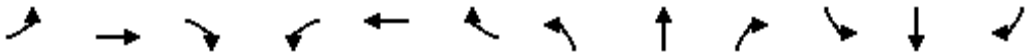
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	395	257	297
Volume Left	0	28	275
Volume Right	195	0	22
cSH	1700	1175	489
Volume to Capacity	0.23	0.02	0.61
Queue Length 95th (ft)	0	2	100
Control Delay (s)	0.0	1.1	23.1
Lane LOS		A	C
Approach Delay (s)	0.0	1.1	23.1
Approach LOS			C

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (veh/h)	188	13	19	3	165	10	6
Future Volume (Veh/h)	188	13	19	3	165	10	6
Sign Control	Free				Free	Stop	
Grade	0%				0%	0%	
Peak Hour Factor	0.91	0.91	0.70	0.70	0.70	0.81	0.81
Hourly flow rate (vph)	207	14	0	4	236	12	7
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None				None		
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked			0.00				
vC, conflicting volume			0	221		458	214
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0	221		458	214
tC, single (s)			0.0	4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)			0.0	2.2		3.5	3.3
p0 queue free %			0	100		98	99
cM capacity (veh/h)			0	1360		563	831

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	221	240	19
Volume Left	0	4	12
Volume Right	14	0	7
cSH	1700	1360	639
Volume to Capacity	0.13	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	125	63	16	160	6	51	3	6	1	4	1
Future Volume (Veh/h)	0	125	63	16	160	6	51	3	6	1	4	1
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.76	0.76	0.77	0.77	0.77	0.79	0.79	0.79	0.30	0.30	0.30
Hourly flow rate (vph)	0	164	83	21	208	8	65	4	8	3	13	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	216			247			469	464	206	470	501	212
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	216			247			469	464	206	470	501	212
tC, single (s)	4.1			4.2			7.1	6.5	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	100			98			87	99	99	99	97	100
cM capacity (veh/h)	1366			1290			486	491	799	493	467	833

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	247	237	77	19
Volume Left	0	21	65	3
Volume Right	83	8	8	3
cSH	1366	1290	507	507
Volume to Capacity	0.00	0.02	0.15	0.04
Queue Length 95th (ft)	0	1	13	3
Control Delay (s)	0.0	0.8	13.4	12.4
Lane LOS		A	B	B
Approach Delay (s)	0.0	0.8	13.4	12.4
Approach LOS			B	B

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	38.8%	ICU Level of Service	A	
Analysis Period (min)	15			

2030 No-Build Weekday Evening Peak Hour

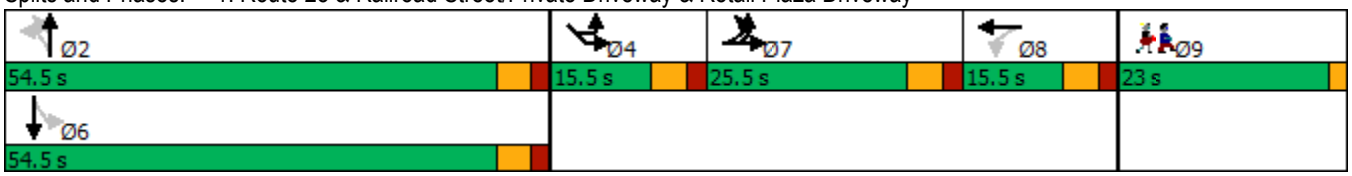
Lane Group	EBL2	EBL	EBT	EBR	WBT	NBL2	NBL	NBT	SBL	SBT	SBR	SBR2
Lane Configurations												
Traffic Volume (vph)	2	258	1	33	2	45	1	615	2	496	175	5
Future Volume (vph)	2	258	1	33	2	45	1	615	2	496	175	5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt			0.985							0.960		
Flt Protected			0.958					0.997				
Satd. Flow (prot)	0	0	1955	0	2153	0	0	3447	0	3317	0	0
Flt Permitted			0.958					0.833		0.954		
Satd. Flow (perm)	0	0	1955	0	2153	0	0	2880	0	3165	0	0
Satd. Flow (RTOR)			4							1		
Adj. Flow (vph)	2	290	1	37	8	47	1	647	2	557	197	6
Lane Group Flow (vph)	0	0	330	0	8	0	0	695	0	762	0	0
Turn Type	Split	Split	NA		NA	Perm	Perm	NA	Perm	NA		
Protected Phases	7	7	7		8			2		6		
Permitted Phases						2	2		6			
Detector Phase	7	7	7		8	2	2	2	6	6		
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0		
Minimum Split (s)	10.5	10.5	10.5		10.5	10.5	10.5	10.5	10.5	10.5		
Total Split (s)	25.5	25.5	25.5		15.5	54.5	54.5	54.5	54.5	54.5		
Total Split (%)	19.0%	19.0%	19.0%		11.6%	40.7%	40.7%	40.7%	40.7%	40.7%		
Maximum Green (s)	20.0	20.0	20.0		10.0	49.0	49.0	49.0	49.0	49.0		
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5		
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Lost Time Adjust (s)			0.0		0.0			0.0		0.0		
Total Lost Time (s)			5.5		5.5			5.5		5.5		
Lead/Lag	Lead	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		
Recall Mode	Min	Min	Min		None	Max	Max	Max	Max	Max		
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)			20.7		6.2			50.7		50.7		
Actuated g/C Ratio			0.21		0.06			0.50		0.50		
v/c Ratio			0.82		0.06			0.48		0.48		
Control Delay			58.3		54.5			21.7		21.4		
Queue Delay			0.0		0.0			0.0		0.0		
Total Delay			58.3		54.5			21.7		21.4		
LOS			E		D			C		C		
Approach Delay			58.3		54.5			21.7		21.4		
Approach LOS			E		D			C		C		
Queue Length 50th (ft)			210		5			160		175		
Queue Length 95th (ft)			#475		6			306		325		
Internal Link Dist (ft)			640		440			241		353		
Turn Bay Length (ft)												
Base Capacity (vph)			404		221			1450		1594		
Starvation Cap Reductn			0		0			0		0		
Spillback Cap Reductn			0		0			0		0		

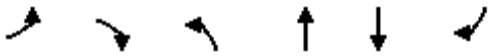
Lane Group	SEL2	SEL	SER	SER2	Ø9
Lane Configurations					
Traffic Volume (vph)	2	0	5	3	
Future Volume (vph)	2	0	5	3	
Lane Util. Factor	1.00	1.00	1.00	1.00	
Frt		0.892			
Flt Protected		0.990			
Satd. Flow (prot)	0	1734	0	0	
Flt Permitted		0.990			
Satd. Flow (perm)	0	1734	0	0	
Satd. Flow (RTOR)		126			
Adj. Flow (vph)	4	0	10	6	
Lane Group Flow (vph)	0	20	0	0	
Turn Type	Prot	Prot			
Protected Phases	4	4			9
Permitted Phases					
Detector Phase	4	4			
Switch Phase					
Minimum Initial (s)	5.0	5.0			1.0
Minimum Split (s)	10.5	10.5			23.0
Total Split (s)	15.5	15.5			23.0
Total Split (%)	11.6%	11.6%			17%
Maximum Green (s)	10.0	10.0			21.0
Yellow Time (s)	3.5	3.5			2.0
All-Red Time (s)	2.0	2.0			0.0
Lost Time Adjust (s)		0.0			
Total Lost Time (s)		5.5			
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0			3.0
Recall Mode	None	None			None
Walk Time (s)					7.0
Flash Dont Walk (s)					14.0
Pedestrian Calls (#/hr)					27
Act Effct Green (s)		5.7			
Actuated g/C Ratio		0.06			
v/c Ratio		0.09			
Control Delay		0.8			
Queue Delay		0.0			
Total Delay		0.8			
LOS		A			
Approach Delay		0.8			
Approach LOS		A			
Queue Length 50th (ft)		0			
Queue Length 95th (ft)		0			
Internal Link Dist (ft)		415			
Turn Bay Length (ft)					
Base Capacity (vph)		291			
Starvation Cap Reductn		0			
Spillback Cap Reductn		0			

Lane Group	EBL2	EBL	EBT	EBR	WBT	NBL2	NBL	NBT	SBL	SBT	SBR	SBR2
Storage Cap Reductn			0		0			0		0		
Reduced v/c Ratio			0.82		0.04			0.48		0.48		

Intersection Summary	
Cycle Length: 134	
Actuated Cycle Length: 100.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 28.2	Intersection LOS: C
Intersection Capacity Utilization 83.5%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Route 28 & Railroad Street/Private Driveway & Retail Plaza Driveway



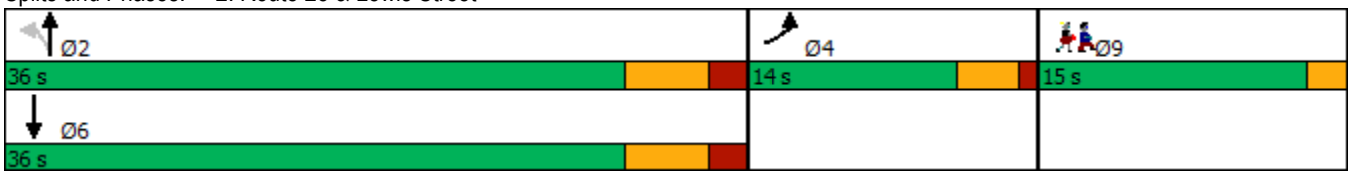


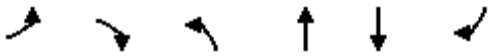
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	2	4	3	665	516	4	
Future Volume (vph)	2	4	3	665	516	4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.910				0.999		
Flt Protected	0.984						
Satd. Flow (prot)	1701	0	0	2007	2067	0	
Flt Permitted	0.984			0.998			
Satd. Flow (perm)	1701	0	0	2003	2067	0	
Satd. Flow (RTOR)	8				1		
Adj. Flow (vph)	4	8	3	715	573	4	
Lane Group Flow (vph)	12	0	0	718	577	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	4			2	6		9
Permitted Phases			2				
Detector Phase	4		2	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	5.0	5.0		1.0
Minimum Split (s)	9.5		11.0	11.0	11.0		15.0
Total Split (s)	14.0		36.0	36.0	36.0		15.0
Total Split (%)	21.5%		55.4%	55.4%	55.4%		23%
Maximum Green (s)	10.0		30.0	30.0	30.0		13.0
Yellow Time (s)	3.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	4.0			6.0	6.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		Max	Max	Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							4
Act Effct Green (s)	5.9			49.2	49.2		
Actuated g/C Ratio	0.11			0.91	0.91		
v/c Ratio	0.06			0.40	0.31		
Control Delay	18.3			4.6	3.9		
Queue Delay	0.0			0.0	0.0		
Total Delay	18.3			4.6	3.9		
LOS	B			A	A		
Approach Delay	18.3			4.6	3.9		
Approach LOS	B			A	A		
Queue Length 50th (ft)	1			0	0		
Queue Length 95th (ft)	7			316	225		
Internal Link Dist (ft)	365			358	462		
Turn Bay Length (ft)							
Base Capacity (vph)	323			1814	1872		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.04			0.40	0.31		

Intersection Summary		
Cycle Length: 65		
Actuated Cycle Length: 54.3		
Natural Cycle: 60		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.40		
Intersection Signal Delay: 4.4	Intersection LOS: A	
Intersection Capacity Utilization 49.9%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 2: Route 28 & Lewis Street

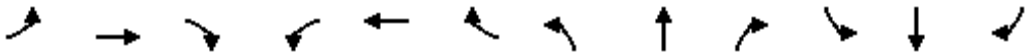




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	82	42	633	512	10
Future Volume (Veh/h)	31	82	42	633	512	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.96	0.96	0.88	0.88
Hourly flow rate (vph)	45	119	44	659	582	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					438	
pX, platoon unblocked	0.89	0.89	0.89			
vC, conflicting volume	1334	588	593			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1313	471	477			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	70	78	95			
cM capacity (veh/h)	149	529	972			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	164	44	659	593
Volume Left	45	44	0	0
Volume Right	119	0	0	11
cSH	312	972	1700	1700
Volume to Capacity	0.53	0.05	0.39	0.35
Queue Length 95th (ft)	72	4	0	0
Control Delay (s)	28.7	8.9	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	28.7	0.6		0.0
Approach LOS	D			

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	62	0	0	65	0	0	0	0	1	0	1
Future Volume (Veh/h)	1	62	0	0	65	0	0	0	0	1	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.60	0.60	0.60	0.25	0.25	0.25	0.25	0.25	0.25
Hourly flow rate (vph)	1	75	0	0	108	0	0	0	0	4	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	108			75			189	185	75	185	185	108
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	108			75			189	185	75	185	185	108
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1495			1537			772	712	992	780	712	951

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	108	0	8
Volume Left	1	0	0	4
Volume Right	0	0	0	4
cSH	1495	1537	1700	857
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.1	0.0	0.0	9.2
Lane LOS	A		A	A
Approach Delay (s)	0.1	0.0	0.0	9.2
Approach LOS			A	A

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	14.1%	ICU Level of Service	A	
Analysis Period (min)	15			

LANE SUMMARY

Site: 8975 [Andover (Site Folder: General)]

2030 No-Build Weekday Evening Peak Hour
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Dundee Park Drive													
Lane 1	194	0.0	226	0.860	100	74.0	LOS F	8.0	200.8	Full	1600	0.0	0.0
Approach	194	0.0		0.860		74.0	LOS F	8.0	200.8				
East: Essex Street													
Lane 1	676	0.9	1435	0.471	100	7.3	LOS A	4.2	106.4	Full	1600	0.0	0.0
Approach	676	0.9		0.471		7.3	NA	4.2	106.4				
NorthEast: Pearson Street													
Lane 1	90	0.0	663	0.136	100	7.9	LOS A	0.7	18.2	Full	1600	0.0	0.0
Approach	90	0.0		0.136		7.9	NA	0.7	18.2				
North: Railroad Street													
Lane 1	205	1.2	261	0.788	100	55.8	LOS F	7.1	178.4	Full	1600	0.0	0.0
Approach	205	1.2		0.788		55.8	LOS F	7.1	178.4				
West: Essex Street													
Lane 1	511	0.6	1454	0.351	100	5.9	LOS A	2.8	70.8	Full	1600	0.0	0.0
Approach	511	0.6		0.351		5.9	NA	2.8	70.8				
Intersection	1677	0.7		0.860		20.6	NA	8.0	200.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Dundee Park Drive

Mov. From S To Exit:	L2 W	T1 N	R1 NE	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	69	59	7	59	194	0.0	226	0.860	100	NA	NA
Approach	69	59	7	59	194	0.0		0.860			

East: Essex Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	R3 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	19	455	193	9	676	0.9	1435	0.471	100	NA	NA
Approach	19	455	193	9	676	0.9		0.471			
NorthEast: Pearson Street											
Mov. From NE To Exit:	L1 S	R1 W	R3 N	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	67	21	90	0.0		663	0.136	100	NA	NA
Approach	3	67	21	90	0.0			0.136			
North: Railroad Street											
Mov. From N To Exit:	L3 NE	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	9	81	24	92	205	1.2	261	0.788	100	NA	NA
Approach	9	81	24	92	205	1.2		0.788			
West: Essex Street											
Mov. From W To Exit:	L2 N	L1 NE	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	83	60	320	48	511	0.6	1454	0.351	100	NA	NA
Approach	83	60	320	48	511	0.6		0.351			
	Total	%HV	Deg.Satn (v/c)								
Intersection	1677	0.7	0.860								

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Dundee Park Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: Pearson Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Railroad Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	202	145	15	171	282	25
Future Volume (Veh/h)	202	145	15	171	282	25
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.85	0.85	0.94	0.94
Hourly flow rate (vph)	220	158	18	201	300	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			378		536	299
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			378		536	299
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		40	96
cM capacity (veh/h)			1192		500	745

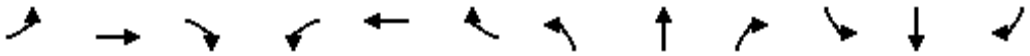
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	378	219	327
Volume Left	0	18	300
Volume Right	158	0	27
cSH	1700	1192	534
Volume to Capacity	0.22	0.02	0.61
Queue Length 95th (ft)	0	1	102
Control Delay (s)	0.0	0.8	21.8
Lane LOS		A	C
Approach Delay (s)	0.0	0.8	21.8
Approach LOS			C

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (veh/h)	222	5	20	1	178	8	3
Future Volume (Veh/h)	222	5	20	1	178	8	3
Sign Control	Free				Free	Stop	
Grade	0%				0%	0%	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.92	0.83	0.83
Hourly flow rate (vph)	239	5	0	1	193	10	4
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None				None		
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked			0.00				
vC, conflicting volume			0	244		436	242
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0	244		436	242
tC, single (s)			0.0	4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)			0.0	2.2		3.5	3.3
p0 queue free %			0	100		98	100
cM capacity (veh/h)			0	1334		580	802

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	244	194	14
Volume Left	0	1	10
Volume Right	5	0	4
cSH	1700	1334	630
Volume to Capacity	0.14	0.00	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.0	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	119	36	13	240	4	59	2	14	1	3	0
Future Volume (Veh/h)	1	119	36	13	240	4	59	2	14	1	3	0
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.80	0.80	0.80	0.33	0.33	0.33
Hourly flow rate (vph)	1	151	46	16	304	5	74	2	18	3	9	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	309			197			519	517	174	534	538	306
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	309			197			519	517	174	534	538	306
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			84	100	98	99	98	100
cM capacity (veh/h)	1263			1388			459	459	875	445	447	738

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	198	325	94	12
Volume Left	1	16	74	3
Volume Right	46	5	18	0
cSH	1263	1388	505	447
Volume to Capacity	0.00	0.01	0.19	0.03
Queue Length 95th (ft)	0	1	17	2
Control Delay (s)	0.0	0.5	13.8	13.3
Lane LOS	A	A	B	B
Approach Delay (s)	0.0	0.5	13.8	13.3
Approach LOS			B	B

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	39.4%	ICU Level of Service	A	
Analysis Period (min)	15			

2030 Build Weekday Morning Peak Hour

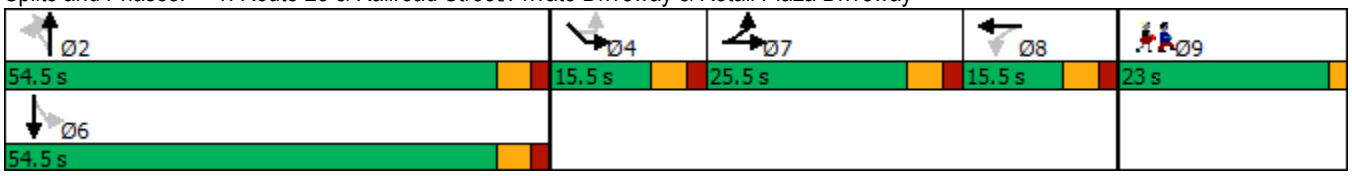
Lane Group	EBL	EBT	EBR	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	0	13	0	3	18	1	432	1	2	596	195
Future Volume (vph)	139	0	13	0	3	18	1	432	1	2	596	195
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.988		0.865							0.962	
Flt Protected		0.956						0.998				
Satd. Flow (prot)	0	1905	0	1863	0	0	0	3417	0	0	3300	0
Flt Permitted		0.956						0.899			0.954	
Satd. Flow (perm)	0	1905	0	1863	0	0	0	3078	0	0	3148	0
Satd. Flow (RTOR)		126		473							1	
Adj. Flow (vph)	145	0	14	0	8	23	1	554	1	2	677	222
Lane Group Flow (vph)	0	159	0	8	0	0	0	579	0	0	909	0
Turn Type	Split	NA		NA		Perm	Perm	NA		Perm	NA	
Protected Phases	7	7		8				2			6	
Permitted Phases						2	2			6		
Detector Phase	7	7		8		2	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0		5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.5	10.5		10.5		10.5	10.5	10.5		10.5	10.5	
Total Split (s)	25.5	25.5		15.5		54.5	54.5	54.5		54.5	54.5	
Total Split (%)	19.0%	19.0%		11.6%		40.7%	40.7%	40.7%		40.7%	40.7%	
Maximum Green (s)	20.0	20.0		10.0		49.0	49.0	49.0		49.0	49.0	
Yellow Time (s)	3.5	3.5		3.5		3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0				0.0			0.0	
Total Lost Time (s)		5.5		5.5				5.5			5.5	
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		None		Max	Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		7.6		5.7				50.7			50.7	
Actuated g/C Ratio		0.10		0.08				0.68			0.68	
v/c Ratio		0.52		0.01				0.28			0.42	
Control Delay		17.6		0.0				7.9			9.2	
Queue Delay		0.0		0.0				0.0			0.0	
Total Delay		17.6		0.0				7.9			9.2	
LOS		B		A				A			A	
Approach Delay		17.6						7.9			9.2	
Approach LOS		B						A			A	
Queue Length 50th (ft)		13		0				30			54	
Queue Length 95th (ft)		83		0				148			296	
Internal Link Dist (ft)		640		440				241			353	
Turn Bay Length (ft)												
Base Capacity (vph)		620		666				2096			2144	
Starvation Cap Reductn		0		0				0			0	
Spillback Cap Reductn		0		0				0			0	

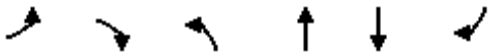
Lane Group	SBR2	SEL	Ø9
Lane Configurations			
Traffic Volume (vph)	7	0	
Future Volume (vph)	7	0	
Lane Util. Factor	0.95	1.00	
Frt			
Flt Protected			
Satd. Flow (prot)	0	1963	
Flt Permitted			
Satd. Flow (perm)	0	1963	
Satd. Flow (RTOR)			
Adj. Flow (vph)	8	0	
Lane Group Flow (vph)	0	0	
Turn Type		Prot	
Protected Phases		4	9
Permitted Phases			
Detector Phase		4	
Switch Phase			
Minimum Initial (s)		5.0	1.0
Minimum Split (s)		10.5	23.0
Total Split (s)		15.5	23.0
Total Split (%)		11.6%	17%
Maximum Green (s)		10.0	21.0
Yellow Time (s)		3.5	2.0
All-Red Time (s)		2.0	0.0
Lost Time Adjust (s)		0.0	
Total Lost Time (s)		5.5	
Lead/Lag			
Lead-Lag Optimize?			
Vehicle Extension (s)		3.0	3.0
Recall Mode		None	None
Walk Time (s)			7.0
Flash Dont Walk (s)			14.0
Pedestrian Calls (#/hr)			14
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)		415	
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			

Lane Group	EBL	EBT	EBR	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0		0				0			0	
Reduced v/c Ratio		0.26		0.01				0.28			0.42	

Intersection Summary	
Cycle Length: 134	
Actuated Cycle Length: 74.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 50.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Route 28 & Railroad Street/Private Driveway & Retail Plaza Driveway



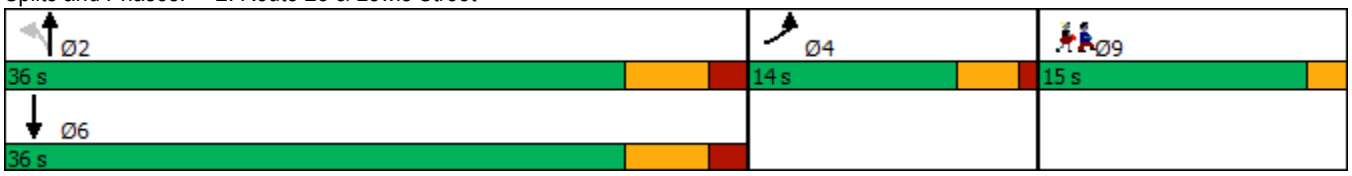


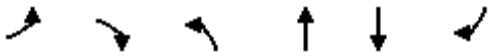
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	10	11	5	442	610	11	
Future Volume (vph)	10	11	5	442	610	11	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.928				0.998		
Flt Protected	0.977			0.999			
Satd. Flow (prot)	1723	0	0	1985	2046	0	
Flt Permitted	0.977			0.994			
Satd. Flow (perm)	1723	0	0	1975	2046	0	
Satd. Flow (RTOR)	15				2		
Adj. Flow (vph)	13	15	6	567	693	13	
Lane Group Flow (vph)	28	0	0	573	706	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	4			2	6		9
Permitted Phases			2				
Detector Phase	4		2	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	5.0	5.0		1.0
Minimum Split (s)	9.5		11.0	11.0	11.0		15.0
Total Split (s)	14.0		36.0	36.0	36.0		15.0
Total Split (%)	21.5%		55.4%	55.4%	55.4%		23%
Maximum Green (s)	10.0		30.0	30.0	30.0		13.0
Yellow Time (s)	3.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	4.0			6.0	6.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		Max	Max	Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							16
Act Effct Green (s)	6.2			46.7	46.7		
Actuated g/C Ratio	0.11			0.84	0.84		
v/c Ratio	0.14			0.34	0.41		
Control Delay	18.2			5.5	6.0		
Queue Delay	0.0			0.0	0.0		
Total Delay	18.2			5.5	6.0		
LOS	B			A	A		
Approach Delay	18.2			5.5	6.0		
Approach LOS	B			A	A		
Queue Length 50th (ft)	4			0	0		
Queue Length 95th (ft)	20			192	305		
Internal Link Dist (ft)	365			358	462		
Turn Bay Length (ft)							
Base Capacity (vph)	325			1662	1722		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.09			0.34	0.41		

Intersection Summary			
Cycle Length: 65			
Actuated Cycle Length: 55.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 6.0		Intersection LOS: A	
Intersection Capacity Utilization 45.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Route 28 & Lewis Street

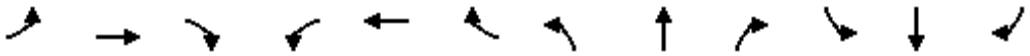




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	71	54	433	591	33
Future Volume (Veh/h)	26	71	54	433	591	33
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.79	0.79	0.87	0.87
Hourly flow rate (vph)	38	103	68	548	679	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					438	
pX, platoon unblocked	0.81	0.81	0.81			
vC, conflicting volume	1382	698	717			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1355	512	536			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	78	92			
cM capacity (veh/h)	122	459	846			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	141	68	548	717
Volume Left	38	68	0	0
Volume Right	103	0	0	38
cSH	263	846	1700	1700
Volume to Capacity	0.54	0.08	0.32	0.42
Queue Length 95th (ft)	73	7	0	0
Control Delay (s)	33.5	9.6	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	33.5	1.1		0.0
Approach LOS	D			

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	80	0	0	41	6	0	0	1	5	0	14
Future Volume (Veh/h)	9	80	0	0	41	6	0	0	1	5	0	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.79	0.79	0.79	0.25	0.25	0.25	0.50	0.50	0.50
Hourly flow rate (vph)	11	98	0	0	52	8	0	0	4	10	0	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	60			98			204	180	98	180	176	56
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	60			98			204	180	98	180	176	56
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	97
cM capacity (veh/h)	1556			1508			733	712	963	779	716	1016

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	109	60	4	38
Volume Left	11	0	0	10
Volume Right	0	8	4	28
cSH	1556	1508	963	941
Volume to Capacity	0.01	0.00	0.00	0.04
Queue Length 95th (ft)	1	0	0	3
Control Delay (s)	0.8	0.0	8.8	9.0
Lane LOS	A		A	A
Approach Delay (s)	0.8	0.0	8.8	9.0
Approach LOS			A	A

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	23.8%	ICU Level of Service	A
Analysis Period (min)	15		

LANE SUMMARY

Site: 8975 [Andover (Site Folder: General)]

2030 Build Weekday Morning Peak Hour
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Dundee Park Drive													
Lane 1	24	0.0	258	0.093	100	20.4	LOS C	0.3	7.7	Full	1600	0.0	0.0
Approach	24	0.0		0.093		20.4	LOS C	0.3	7.7				
East: Essex Street													
Lane 1	546	2.6	1515	0.361	100	5.4	LOS A	2.4	60.0	Full	1600	0.0	0.0
Approach	546	2.6		0.361		5.4	NA	2.4	60.0				
NorthEast: Pearson Street													
Lane 1	75	0.0	716	0.105	100	6.9	LOS A	0.6	13.9	Full	1600	0.0	0.0
Approach	75	0.0		0.105		6.9	NA	0.6	13.9				
North: Railroad Street													
Lane 1	223	0.6	281	0.791	100	53.0	LOS F	7.6	191.0	Full	1600	0.0	0.0
Approach	223	0.6		0.791		53.0	LOS F	7.6	191.0				
West: Essex Street													
Lane 1	517	1.0	1509	0.343	100	5.4	LOS A	2.5	62.3	Full	1600	0.0	0.0
Approach	517	1.0		0.343		5.4	NA	2.5	62.3				
Intersection	1386	1.5		0.791		13.4	NA	7.6	191.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Dundee Park Drive

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	4	13	7	24	0.0	258	0.093	100	NA	NA
Approach	4	13	7	24	0.0		0.093			

East: Essex Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	R3 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	33	393	106	15	546	2.6	1515	0.361	100	NA	NA
Approach	33	393	106	15	546	2.6		0.361			
NorthEast: Pearson Street											
Mov. From NE To Exit:	L3 E	R1 W	R3 N	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	56	16	75	0.0		716	0.105	100	NA	NA
Approach	3	56	16	75	0.0			0.105			
North: Railroad Street											
Mov. From N To Exit:	L3 NE	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	17	110	27	69	223	0.6	281	0.791	100	NA	NA
Approach	17	110	27	69	223	0.6		0.791			
West: Essex Street											
Mov. From W To Exit:	L2 N	L1 NE	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	77	84	343	13	517	1.0	1509	0.343	100	NA	NA
Approach	77	84	343	13	517	1.0		0.343			
	Total	%HV	Deg.Satn (v/c)								
Intersection	1386	1.5	0.791								

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Dundee Park Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: Pearson Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Railroad Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	185	180	19	156	210	17
Future Volume (Veh/h)	185	180	19	156	210	17
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.68	0.68	0.76	0.76
Hourly flow rate (vph)	201	196	28	229	276	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			397		584	299
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			397		584	299
tC, single (s)			4.1		6.4	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.5
p0 queue free %			98		40	97
cM capacity (veh/h)			1173		459	702

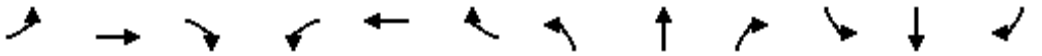
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	397	257	298
Volume Left	0	28	276
Volume Right	196	0	22
cSH	1700	1173	488
Volume to Capacity	0.23	0.02	0.61
Queue Length 95th (ft)	0	2	101
Control Delay (s)	0.0	1.1	23.3
Lane LOS		A	C
Approach Delay (s)	0.0	1.1	23.3
Approach LOS			C

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (veh/h)	189	13	19	3	165	10	6
Future Volume (Veh/h)	189	13	19	3	165	10	6
Sign Control	Free				Free	Stop	
Grade	0%				0%	0%	
Peak Hour Factor	0.91	0.91	0.70	0.70	0.70	0.81	0.81
Hourly flow rate (vph)	208	14	0	4	236	12	7
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None				None		
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked			0.00				
vC, conflicting volume			0	222		459	215
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0	222		459	215
tC, single (s)			0.0	4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)			0.0	2.2		3.5	3.3
p0 queue free %			0	100		98	99
cM capacity (veh/h)			0	1359		562	830

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	222	240	19
Volume Left	0	4	12
Volume Right	14	0	7
cSH	1700	1359	638
Volume to Capacity	0.13	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	126	63	16	161	6	51	3	6	1	4	1
Future Volume (Veh/h)	0	126	63	16	161	6	51	3	6	1	4	1
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.76	0.76	0.77	0.77	0.77	0.79	0.79	0.79	0.30	0.30	0.30
Hourly flow rate (vph)	0	166	83	21	209	8	65	4	8	3	13	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	217			249			472	466	208	472	504	213
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	217			249			472	466	208	472	504	213
tC, single (s)	4.1			4.2			7.1	6.5	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	100			98			87	99	99	99	97	100
cM capacity (veh/h)	1365			1288			484	489	796	491	465	832

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	249	238	77	19
Volume Left	0	21	65	3
Volume Right	83	8	8	3
cSH	1365	1288	505	505
Volume to Capacity	0.00	0.02	0.15	0.04
Queue Length 95th (ft)	0	1	13	3
Control Delay (s)	0.0	0.8	13.4	12.4
Lane LOS		A	B	B
Approach Delay (s)	0.0	0.8	13.4	12.4
Approach LOS			B	B

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	38.9%	ICU Level of Service	A	
Analysis Period (min)	15			

2030 Build Weekday Evening Peak Hour

Lane Group	EBL2	EBL	EBT	EBR	WBT	NBL2	NBL	NBT	SBL	SBT	SBR	SBR2
Lane Configurations												
Traffic Volume (vph)	2	258	1	33	2	45	1	619	2	501	175	5
Future Volume (vph)	2	258	1	33	2	45	1	619	2	501	175	5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt			0.985							0.960		
Flt Protected			0.958					0.997				
Satd. Flow (prot)	0	0	1955	0	2153	0	0	3447	0	3317	0	0
Flt Permitted			0.958					0.831		0.954		
Satd. Flow (perm)	0	0	1955	0	2153	0	0	2873	0	3165	0	0
Satd. Flow (RTOR)			4							1		
Adj. Flow (vph)	2	290	1	37	8	47	1	652	2	563	197	6
Lane Group Flow (vph)	0	0	330	0	8	0	0	700	0	768	0	0
Turn Type	Split	Split	NA		NA	Perm	Perm	NA	Perm	NA		
Protected Phases	7	7	7		8			2		6		
Permitted Phases						2	2		6			
Detector Phase	7	7	7		8	2	2	2	6	6		
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0		
Minimum Split (s)	10.5	10.5	10.5		10.5	10.5	10.5	10.5	10.5	10.5		
Total Split (s)	25.5	25.5	25.5		15.5	54.5	54.5	54.5	54.5	54.5		
Total Split (%)	19.0%	19.0%	19.0%		11.6%	40.7%	40.7%	40.7%	40.7%	40.7%		
Maximum Green (s)	20.0	20.0	20.0		10.0	49.0	49.0	49.0	49.0	49.0		
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5		
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Lost Time Adjust (s)			0.0		0.0			0.0		0.0		
Total Lost Time (s)			5.5		5.5			5.5		5.5		
Lead/Lag	Lead	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		
Recall Mode	Min	Min	Min		None	Max	Max	Max	Max	Max		
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)			20.7		6.2			50.7		50.7		
Actuated g/C Ratio			0.21		0.06			0.50		0.50		
v/c Ratio			0.82		0.06			0.48		0.48		
Control Delay			58.3		54.5			21.8		21.5		
Queue Delay			0.0		0.0			0.0		0.0		
Total Delay			58.3		54.5			21.8		21.5		
LOS			E		D			C		C		
Approach Delay			58.3		54.5			21.8		21.5		
Approach LOS			E		D			C		C		
Queue Length 50th (ft)			210		5			162		177		
Queue Length 95th (ft)			#475		6			309		328		
Internal Link Dist (ft)			640		440			241		353		
Turn Bay Length (ft)												
Base Capacity (vph)			404		221			1446		1594		
Starvation Cap Reductn			0		0			0		0		
Spillback Cap Reductn			0		0			0		0		

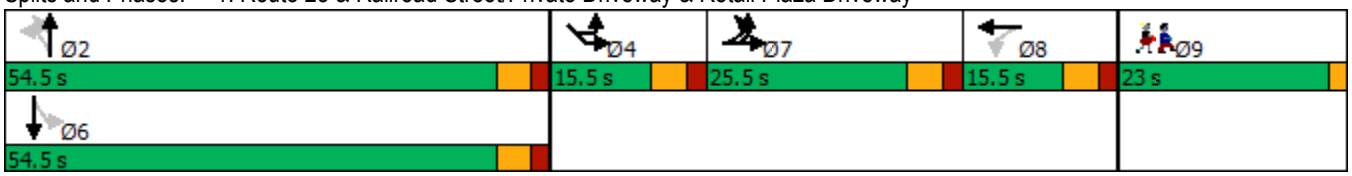
Lane Group	SEL2	SEL	SER	SER2	Ø9
Lane Configurations					
Traffic Volume (vph)	2	0	5	3	
Future Volume (vph)	2	0	5	3	
Lane Util. Factor	1.00	1.00	1.00	1.00	
Frt		0.892			
Flt Protected		0.990			
Satd. Flow (prot)	0	1734	0	0	
Flt Permitted		0.990			
Satd. Flow (perm)	0	1734	0	0	
Satd. Flow (RTOR)		126			
Adj. Flow (vph)	4	0	10	6	
Lane Group Flow (vph)	0	20	0	0	
Turn Type	Prot	Prot			
Protected Phases	4	4			9
Permitted Phases					
Detector Phase	4	4			
Switch Phase					
Minimum Initial (s)	5.0	5.0			1.0
Minimum Split (s)	10.5	10.5			23.0
Total Split (s)	15.5	15.5			23.0
Total Split (%)	11.6%	11.6%			17%
Maximum Green (s)	10.0	10.0			21.0
Yellow Time (s)	3.5	3.5			2.0
All-Red Time (s)	2.0	2.0			0.0
Lost Time Adjust (s)		0.0			
Total Lost Time (s)		5.5			
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0			3.0
Recall Mode	None	None			None
Walk Time (s)					7.0
Flash Dont Walk (s)					14.0
Pedestrian Calls (#/hr)					27
Act Effct Green (s)		5.7			
Actuated g/C Ratio		0.06			
v/c Ratio		0.09			
Control Delay		0.8			
Queue Delay		0.0			
Total Delay		0.8			
LOS		A			
Approach Delay		0.8			
Approach LOS		A			
Queue Length 50th (ft)		0			
Queue Length 95th (ft)		0			
Internal Link Dist (ft)		415			
Turn Bay Length (ft)					
Base Capacity (vph)		291			
Starvation Cap Reductn		0			
Spillback Cap Reductn		0			

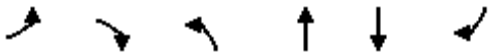
Lane Group	EBL2	EBL	EBT	EBR	WBT	NBL2	NBL	NBT	SBL	SBT	SBR	SBR2
Storage Cap Reductn			0		0			0		0		
Reduced v/c Ratio			0.82		0.04			0.48		0.48		

Intersection Summary		
Cycle Length: 134		
Actuated Cycle Length: 100.7		
Natural Cycle: 100		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.82		
Intersection Signal Delay: 28.2	Intersection LOS: C	
Intersection Capacity Utilization 83.7%	ICU Level of Service E	
Analysis Period (min) 15		

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

Splits and Phases: 1: Route 28 & Railroad Street/Private Driveway & Retail Plaza Driveway



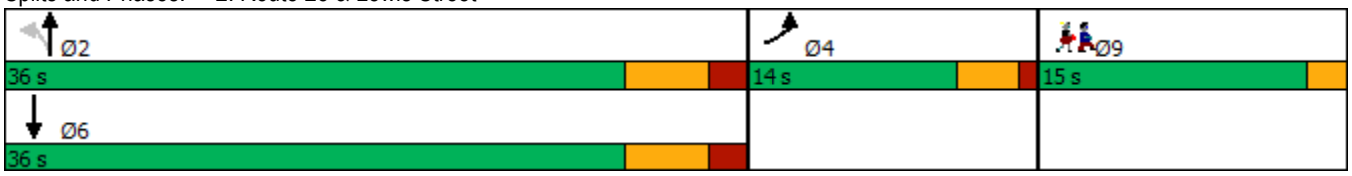


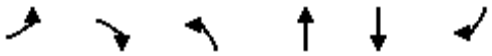
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	6	7	7	665	516	9	
Future Volume (vph)	6	7	7	665	516	9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.927				0.998		
Flt Protected	0.977			0.999			
Satd. Flow (prot)	1721	0	0	2005	2066	0	
Flt Permitted	0.977			0.994			
Satd. Flow (perm)	1721	0	0	1995	2066	0	
Satd. Flow (RTOR)	14				2		
Adj. Flow (vph)	12	14	8	715	573	10	
Lane Group Flow (vph)	26	0	0	723	583	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	4			2	6		9
Permitted Phases			2				
Detector Phase	4		2	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	5.0	5.0		1.0
Minimum Split (s)	9.5		11.0	11.0	11.0		15.0
Total Split (s)	14.0		36.0	36.0	36.0		15.0
Total Split (%)	21.5%		55.4%	55.4%	55.4%		23%
Maximum Green (s)	10.0		30.0	30.0	30.0		13.0
Yellow Time (s)	3.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	4.0			6.0	6.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		Max	Max	Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							4
Act Effct Green (s)	6.2			46.7	46.7		
Actuated g/C Ratio	0.11			0.84	0.84		
v/c Ratio	0.13			0.43	0.34		
Control Delay	18.4			6.5	5.3		
Queue Delay	0.0			0.0	0.0		
Total Delay	18.4			6.5	5.3		
LOS	B			A	A		
Approach Delay	18.4			6.5	5.3		
Approach LOS	B			A	A		
Queue Length 50th (ft)	3			0	0		
Queue Length 95th (ft)	11			337	239		
Internal Link Dist (ft)	365			358	462		
Turn Bay Length (ft)							
Base Capacity (vph)	324			1680	1740		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.08			0.43	0.34		

Intersection Summary		
Cycle Length: 65		
Actuated Cycle Length: 55.4		
Natural Cycle: 60		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.43		
Intersection Signal Delay: 6.2	Intersection LOS: A	
Intersection Capacity Utilization 53.1%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 2: Route 28 & Lewis Street

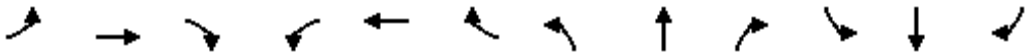




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	86	49	637	515	10
Future Volume (Veh/h)	31	86	49	637	515	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.96	0.96	0.88	0.88
Hourly flow rate (vph)	45	125	51	664	585	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					438	
pX, platoon unblocked	0.87	0.87	0.87			
vC, conflicting volume	1356	590	596			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1336	458	464			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	76	95			
cM capacity (veh/h)	141	530	967			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	170	51	664	596
Volume Left	45	51	0	0
Volume Right	125	0	0	11
cSH	307	967	1700	1700
Volume to Capacity	0.55	0.05	0.39	0.35
Queue Length 95th (ft)	79	4	0	0
Control Delay (s)	30.4	8.9	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	30.4	0.6		0.0
Approach LOS	D			

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	62	0	0	65	7	0	0	0	5	0	8
Future Volume (Veh/h)	10	62	0	0	65	7	0	0	0	5	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.60	0.60	0.60	0.25	0.25	0.25	0.25	0.25	0.25
Hourly flow rate (vph)	12	75	0	0	108	12	0	0	0	20	0	32
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	120			75			245	219	75	213	213	114
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	120			75			245	219	75	213	213	114
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	97	100	97
cM capacity (veh/h)	1480			1537			685	677	992	744	682	944

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	87	120	0	52
Volume Left	12	0	0	20
Volume Right	0	12	0	32
cSH	1480	1537	1700	855
Volume to Capacity	0.01	0.00	0.00	0.06
Queue Length 95th (ft)	1	0	0	5
Control Delay (s)	1.1	0.0	0.0	9.5
Lane LOS	A		A	A
Approach Delay (s)	1.1	0.0	0.0	9.5
Approach LOS			A	A

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	20.5%	ICU Level of Service	A	
Analysis Period (min)	15			

LANE SUMMARY

Site: 8975 [Andover (Site Folder: General)]

2030 Build Weekday Evening Peak Hour
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Dundee Park Drive													
Lane 1	194	0.0	220	0.882	100	79.7	LOS F	8.5	213.6	Full	1600	0.0	0.0
Approach	194	0.0		0.882		79.7	LOS F	8.5	213.6				
East: Essex Street													
Lane 1	678	0.9	1428	0.475	100	7.4	LOS A	4.3	108.1	Full	1600	0.0	0.0
Approach	678	0.9		0.475		7.4	NA	4.3	108.1				
NorthEast: Pearson Street													
Lane 1	100	0.0	653	0.153	100	8.1	LOS A	0.8	20.3	Full	1600	0.0	0.0
Approach	100	0.0		0.153		8.1	NA	0.8	20.3				
North: Railroad Street													
Lane 1	205	1.2	254	0.810	100	60.1	LOS F	7.5	188.5	Full	1600	0.0	0.0
Approach	205	1.2		0.810		60.1	LOS F	7.5	188.5				
West: Essex Street													
Lane 1	521	0.6	1435	0.363	100	6.2	LOS A	3.1	77.2	Full	1600	0.0	0.0
Approach	521	0.6		0.363		6.2	NA	3.1	77.2				
Intersection	1699	0.7		0.882		21.7	NA	8.5	213.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Dundee Park Drive

Mov. From S To Exit:	L2 W	T1 N	R1 NE	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	69	59	7	59	194	0.0	220	0.882	100	NA	NA
Approach	69	59	7	59	194	0.0		0.882			

East: Essex Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	R3 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	19	455	193	10	678	0.9	1428	0.475	100	NA	NA
Approach	19	455	193	10	678	0.9		0.475			
NorthEast: Pearson Street											
Mov. From NE To Exit:	L3 E	L1 S	R1 W	R3 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	3	75	21	100	0.0	653	0.153	100	NA	NA
Approach	1	3	75	21	100	0.0		0.153			
North: Railroad Street											
Mov. From N To Exit:	L3 NE	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	9	81	24	92	205	1.2	254	0.810	100	NA	NA
Approach	9	81	24	92	205	1.2		0.810			
West: Essex Street											
Mov. From W To Exit:	L2 N	L1 NE	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	83	71	320	48	521	0.6	1435	0.363	100	NA	NA
Approach	83	71	320	48	521	0.6		0.363			
	Total	%HV	Deg.Satn (v/c)								
Intersection	1699	0.7	0.882								

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Dundee Park Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: Pearson Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Railroad Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	202	146	15	171	283	25
Future Volume (Veh/h)	202	146	15	171	283	25
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.85	0.85	0.94	0.94
Hourly flow rate (vph)	220	159	18	201	301	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			379		536	300
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			379		536	300
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		40	96
cM capacity (veh/h)			1191		499	745

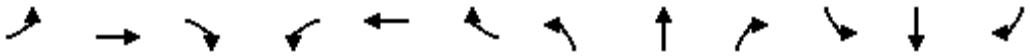
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	379	219	328
Volume Left	0	18	301
Volume Right	159	0	27
cSH	1700	1191	534
Volume to Capacity	0.22	0.02	0.61
Queue Length 95th (ft)	0	1	103
Control Delay (s)	0.0	0.8	21.9
Lane LOS		A	C
Approach Delay (s)	0.0	0.8	21.9
Approach LOS			C

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (veh/h)	222	5	20	1	178	8	3
Future Volume (Veh/h)	222	5	20	1	178	8	3
Sign Control	Free				Free	Stop	
Grade	0%				0%	0%	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.92	0.83	0.83
Hourly flow rate (vph)	239	5	0	1	193	10	4
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None				None		
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked			0.00				
vC, conflicting volume			0	244		436	242
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0	244		436	242
tC, single (s)			0.0	4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)			0.0	2.2		3.5	3.3
p0 queue free %			0	100		98	100
cM capacity (veh/h)			0	1334		580	802

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	244	194	14
Volume Left	0	1	10
Volume Right	5	0	4
cSH	1700	1334	630
Volume to Capacity	0.14	0.00	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.0	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	120	36	13	241	4	59	2	14	1	3	0
Future Volume (Veh/h)	1	120	36	13	241	4	59	2	14	1	3	0
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.80	0.80	0.80	0.33	0.33	0.33
Hourly flow rate (vph)	1	152	46	16	305	5	74	2	18	3	9	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	310			198			521	519	175	536	540	308
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	310			198			521	519	175	536	540	308
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			84	100	98	99	98	100
cM capacity (veh/h)	1262			1387			458	458	874	444	446	737

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	199	326	94	12
Volume Left	1	16	74	3
Volume Right	46	5	18	0
cSH	1262	1387	504	446
Volume to Capacity	0.00	0.01	0.19	0.03
Queue Length 95th (ft)	0	1	17	2
Control Delay (s)	0.0	0.5	13.8	13.3
Lane LOS	A	A	B	B
Approach Delay (s)	0.0	0.5	13.8	13.3
Approach LOS			B	B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

2030 No-Build Weekday Morning Peak Hour Alternative

LANE SUMMARY

Site: 8975 [Andover (Site Folder: General)]

2030 No-Build Weekday Morning Peak Hour MassWorks Grant Alternative
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Dundee Park Drive													
Lane 1	24	0.0	269	0.089	100	19.7	LOS C	0.3	7.4	Full	1600	0.0	0.0
Approach	24	0.0		0.089		19.7	LOS C	0.3	7.4				
East: Essex Street													
Lane 1	572	2.6	1791	0.319	100	3.1	LOS A	0.6	14.3	Full	1600	0.0	0.0
Approach	572	2.6		0.319		3.1	NA	0.6	14.3				
North: Railroad Street													
Lane 1	240	0.7	280	0.856	100	63.0	LOS F	9.4	235.2	Full	1600	0.0	0.0
Approach	240	0.7		0.856		63.0	LOS F	9.4	235.2				
West: Essex Street													
Lane 1	508	0.8	1710	0.297	100	3.8	LOS A	1.1	28.4	Full	1600	0.0	0.0
Approach	508	0.8		0.297		3.8	NA	1.1	28.4				
Intersection	1344	1.6		0.856		14.4	NA	9.4	235.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Dundee Park Drive

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	4	13	7	24	0.0	269	0.089	100	NA	NA
Approach	4	13	7	24	0.0		0.089			

East: Essex Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	33	433	106	572	2.6	1791	0.319	100	NA	NA
Approach	33	433	106	572	2.6		0.319			

North: Railroad Street

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	127	27	86	240	0.7	280	0.856	100	NA	NA
Approach	127	27	86	240	0.7		0.856			
West: Essex Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	77	417	13	508	0.8	1710	0.297	100	NA	NA
Approach	77	417	13	508	0.8		0.297			
	Total	%HV	Deg.Satn (v/c)							
Intersection	1344	1.6	0.856							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Dundee Park Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Railroad Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

2030 No-Build Weekday Evening Peak Hour Alternative

LANE SUMMARY

Site: 8975 [Andover (Site Folder: General)]

2030 No-Build Weekday Evening Peak Hour MassWorks Grant Alternative
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Dundee Park Drive													
Lane 1	194	0.0	238	0.816	100	63.8	LOS F	7.0	175.9	Full	1600	0.0	0.0
Approach	194	0.0		0.816		63.8	LOS F	7.0	175.9				
East: Essex Street													
Lane 1	731	0.8	1837	0.398	100	3.6	LOS A	0.6	14.4	Full	1600	0.0	0.0
Approach	731	0.8		0.398		3.6	NA	0.6	14.4				
North: Railroad Street													
Lane 1	216	1.2	243	0.891	100	76.3	LOS F	9.6	241.2	Full	1600	0.0	0.0
Approach	216	1.2		0.891		76.3	LOS F	9.6	241.2				
West: Essex Street													
Lane 1	511	0.7	1616	0.316	100	4.5	LOS A	1.8	44.4	Full	1600	0.0	0.0
Approach	511	0.7		0.316		4.5	NA	1.8	44.4				
Intersection	1653	0.7		0.891		20.5	NA	9.6	241.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Dundee Park Drive

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	69	59	67	194	0.0	238	0.816	100	NA	NA
Approach	69	59	67	194	0.0		0.816			

East: Essex Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	19	519	193	731	0.8	1837	0.398	100	NA	NA
Approach	19	519	193	731	0.8		0.398			

North: Railroad Street

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	89	24	103	216	1.2	243	0.891	100	NA	NA
Approach	89	24	103	216	1.2		0.891			
West: Essex Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	83	380	48	511	0.7	1616	0.316	100	NA	NA
Approach	83	380	48	511	0.7		0.316			
	Total	%HV	Deg.Satn (v/c)							
Intersection	1653	0.7	0.891							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Dundee Park Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Railroad Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

2030 Build Weekday Morning Peak Hour Alternative

LANE SUMMARY

Site: 8975 [Andover (Site Folder: General)]

2030 Build Weekday Morning Peak Hour MassWorks Grant Alternative
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Dundee Park Drive													
Lane 1	24	0.0	260	0.093	100	20.2	LOS C	0.3	7.6	Full	1600	0.0	0.0
Approach	24	0.0		0.093		20.2	LOS C	0.3	7.6				
East: Essex Street													
Lane 1	590	2.6	1794	0.329	100	3.2	LOS A	0.6	15.8	Full	1600	0.0	0.0
Approach	590	2.6		0.329		3.2	NA	0.6	15.8				
North: Railroad Street													
Lane 1	240	0.7	269	0.890	100	70.9	LOS F	10.3	257.9	Full	1600	0.0	0.0
Approach	240	0.7		0.890		70.9	LOS F	10.3	257.9				
West: Essex Street													
Lane 1	517	0.8	1707	0.303	100	3.8	LOS A	1.2	30.3	Full	1600	0.0	0.0
Approach	517	0.8		0.303		3.8	NA	1.2	30.3				
Intersection	1371	1.6		0.890		15.6	NA	10.3	257.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Dundee Park Drive

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	4	13	7	24	0.0	260	0.093	100	NA	NA
Approach	4	13	7	24	0.0		0.093			

East: Essex Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	33	451	106	590	2.6	1794	0.329	100	NA	NA
Approach	33	451	106	590	2.6		0.329			

North: Railroad Street

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	127	27	86	240	0.7	269	0.890	100	NA	NA
Approach	127	27	86	240	0.7		0.890			
West: Essex Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	77	427	13	517	0.8	1707	0.303	100	NA	NA
Approach	77	427	13	517	0.8		0.303			
	Total	%HV	Deg.Satn (v/c)							
Intersection	1371	1.6	0.890							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Dundee Park Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Railroad Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

2030 Build Weekday Evening Peak Hour Alternative

LANE SUMMARY

Site: 8975 [Andover (Site Folder: General)]

2030 Build Weekday Evening Peak Hour MassWorks Grant Alternative
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Dundee Park Drive													
Lane 1	194	0.0	232	0.840	100	69.2	LOS F	7.5	187.3	Full	1600	0.0	0.0
Approach	194	0.0		0.840		69.2	LOS F	7.5	187.3				
East: Essex Street													
Lane 1	742	0.8	1838	0.404	100	3.6	LOS A	0.6	15.0	Full	1600	0.0	0.0
Approach	742	0.8		0.404		3.6	NA	0.6	15.0				
North: Railroad Street													
Lane 1	216	1.2	236	0.917	100	83.3	LOS F	10.3	259.4	Full	1600	0.0	0.0
Approach	216	1.2		0.917		83.3	LOS F	10.3	259.4				
West: Essex Street													
Lane 1	521	0.7	1618	0.322	100	4.6	LOS A	1.8	46.0	Full	1600	0.0	0.0
Approach	521	0.7		0.322		4.6	NA	1.8	46.0				
Intersection	1674	0.7		0.917		21.8	NA	10.3	259.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Dundee Park Drive

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	69	59	67	194	0.0	232	0.840	100	NA	NA
Approach	69	59	67	194	0.0		0.840			

East: Essex Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	19	530	193	742	0.8	1838	0.404	100	NA	NA
Approach	19	530	193	742	0.8		0.404			

North: Railroad Street

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	89	24	103	216	1.2	236	0.917	100	NA	NA
Approach	89	24	103	216	1.2		0.917			
West: Essex Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	83	391	48	521	0.7	1618	0.322	100	NA	NA
Approach	83	391	48	521	0.7		0.322			
	Total	%HV	Deg.Satn (v/c)							
Intersection	1674	0.7	0.917							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Dundee Park Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Railroad Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Essex Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

TRAFFIC SIGNAL WARRANT ANALYSIS REPORTS

HCS Warrants Report

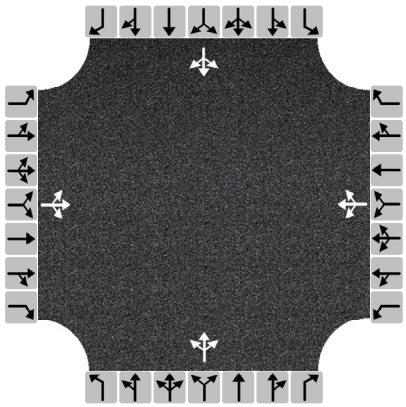
Project Information

Analyst	TJH/SWT	Date	10/30/2023
Agency	VAI	Analysis Year	2023
Jurisdiction		Time Period Analyzed	Morning and Evening
Project Description	8975 Andover Weekday		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	25	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	0	1	0	0	1	0
Lane Usage		LTR			LTR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	17	77	7	5	81	30	6	5	6	26	5	23
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	4
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	10

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (80%)	4A (100%)	4B (80%)
07 - 08	513	130	652	0	0	No	Yes	No	No	No	No	No	No	No
08 - 09	663	188	867	0	0	Yes	Yes	No	Yes	No	No	No	No	No
09 - 10	0	0	0	0	0	No	No	No	No	No	No	No	No	No
10 - 11	0	0	0	0	0	No	No	No	No	No	No	No	No	No
11 - 12	0	0	0	0	0	No	No	No	No	No	No	No	No	No
12 - 13	0	0	0	0	0	No	No	No	No	No	No	No	No	No
13 - 14	0	0	0	0	0	No	No	No	No	No	No	No	No	No
14 - 15	0	0	0	0	0	No	No	No	No	No	No	No	No	No
15 - 16	0	0	0	0	0	No	No	No	No	No	No	No	No	No
16 - 17	730	153	965	0	0	Yes	Yes	No	Yes	No	No	No	No	No
17 - 18	736	189	1037	0	0	Yes	Yes	No	Yes	Yes	No	No	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	2642	660	3521	0	0	3	4	0	3	1	0	0	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	
Warrant 3: Peak Hour	
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

HCS Warrants Report

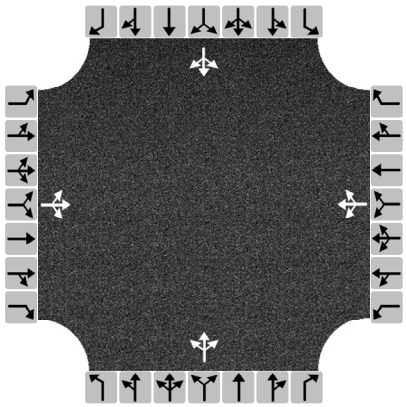
Project Information

Analyst	TJH/SWT	Date	10/30/2023
Agency	VAI	Analysis Year	2030
Jurisdiction		Time Period Analyzed	Morning and Evening
Project Description	8975 Andover Weekday		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	25	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	0	1	0	0	1	0
Lane Usage		LTR			LTR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	19	84	7	5	89	33	6	5	6	27	5	25
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	4
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	10

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (80%)	4A (100%)	4B (80%)
07 - 08	564	139	712	0	0	No	Yes	No	No	No	No	No	No	No
08 - 09	720	200	936	0	0	Yes	Yes	No	Yes	Yes	No	No	No	No
09 - 10	0	0	0	0	0	No	No	No	No	No	No	No	No	No
10 - 11	0	0	0	0	0	No	No	No	No	No	No	No	No	No
11 - 12	0	0	0	0	0	No	No	No	No	No	No	No	No	No
12 - 13	0	0	0	0	0	No	No	No	No	No	No	No	No	No
13 - 14	0	0	0	0	0	No	No	No	No	No	No	No	No	No
14 - 15	0	0	0	0	0	No	No	No	No	No	No	No	No	No
15 - 16	0	0	0	0	0	No	No	No	No	No	No	No	No	No
16 - 17	796	163	1041	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
17 - 18	804	201	1117	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	2884	703	3806	0	0	3	4	2	3	3	0	0	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	
Warrant 3: Peak Hour	
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	