Transportation Impact Assessment

Proposed Multifamily Residential Development
100 Old River Road
Andover, Massachusetts

Prepared for:

JMC/SVP 100 Old River Road LLC
Braintree, Massachusetts

November 2025

Prepared by:

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Dear Reviewer:

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

Sincerely,

VANASSE & ASSOCIATES, INC.

Jeffrey S. Dirk

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

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EXECUTIVE SUMMARY

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a multifamily residential development to be located at 100 Old River Road in Andover, Massachusetts (hereafter referred to as the "Project"). This assessment was prepared in consultation with the Massachusetts Department of Transportation (MassDOT) and the Town of Andover, and was performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports.

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

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE)[1] and with adjustments to account for internal and pass-by trips for the retail component, the Project is expected to generate approximately 2,008 new vehicle trips on an average weekday (two-way, 24 hour volume), with 179 new vehicle trips expected during the weekday morning peak-hour and 169 new vehicle trips expected during the weekday evening peak-hour;

2. In comparison to the existing office building that occupies the Project site, was recently vacated (April 2025) and will be removed to accommodate the Project, the Project is expected to generate approximately 1,090 additional vehicle trips on an average weekday (again, two-way, 24-hour volume), with 25 additional vehicle trips expected during the weekday morning peak-hour and 27 additional vehicle trips expected during the weekday evening peak-hour;

3. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition), with majority of movements at the study area intersections expected to continue to operate at a level-of-service (LOS) of D or better with the addition of Project-related traffic, where an LOS of "D" or better is defined as "acceptable" traffic operations. Project-related impacts were generally defined as an increase in average motorist delay of up to 12.0 seconds and in vehicle queuing of up to two (2) vehicles;

[1] *Trip Generation,* 12th Edition; Institute of Transportation Engineers; Washington, DC; August 2025.

4. All movements exiting the Project-site driveways to Old River Road are predicted to operate at LOS B or better during the peak hours with residual vehicle queuing of up to one (1) vehicle. All movements along Old River Road approaching the Project site driveways are predicted to operate at LOS A, with vehicle queuing of up to one (1) vehicle;

5. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections; and

6. Lines of sight to and from the Project site driveways exceed, or can be made to exceed, the recommended minimum distance to function in a safe manner based on the appropriate approach speed.

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

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended as a part of this evaluation and will be completed in coordination with the Town. The Project proponent will partner with the Town to prepare a Community One Stop for Growth grant application for a MassWorks or HousingWorks grant to construct the recommended off-site improvement measures.

Project Access

Access to the Project site will be provided by way of two (2) full-access driveways that will intersect the south side of Old River Road approximately 175 feet northwest of Campanelli Drive (approximately 360 feet northwest of River Road) and approximately 400 feet northwest of New England Business Center Drive, respectively. The existing driveways that serve the Project site will be closed in conjunction with the Project. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation:

- The Project site driveways and internal circulating drives should be a minimum of 24 feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle.

- Where perpendicular parking is proposed, the drive aisle behind the parking should be a minimum of 23-feet wide.

- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided.

- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).[2]

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

- Americans with Disabilities Act (ADA) compliant wheelchair ramps should be provided at all locations where pedestrian crossings are to be provided.

- Existing trees and vegetation located along the south side of Old River Road within the sight triangle areas of the Project site driveways should be selectively trimmed/removed and maintained so as to not restrict lines of sight. Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas should be designed and maintained so as not to restrict lines of sight.

- The existing embankment along the south side of Old River Road in the vicinity of the east Project site driveway and the existing stone wall along the Project site frontage on Old River Road should be modified as necessary to provide the required lines of sight to and from the driveways.

- Snow accumulations (windrows) within sight triangle areas shall be promptly removed where such accumulations would impede sight lines.

- Consideration should be given to providing electric vehicle (EV) charging stations for use by residents of the Project and to establishing short-term parking proximate to building entrances for delivery service providers and ride-share vehicles.

Off-Site

River Road Corridor Traffic Signal System

Independent of the Project, specific movements at signalized intersections located along the River Road corridor are currently or are predicted to operate at or over capacity (i.e., LOS "E or "F"). In an effort to improve operating conditions along the corridor, an optimal traffic signal timing, phasing and coordination (where appropriate) plan should be developed for the following signalized intersections along the River Road corridor:

- River Road at North Street and the Greater Lawrence Technical School Driveway
- River Road at Old River Road and Federal Street (coordinated)
- River Road at the I-95 Northbound Ramps (coordinated)
- River Road at the I-95 Southbound Ramps (coordinated)
- River Road at Shattuck Road (coordinated)

The Project proponent proposes to provide a financial contribution to the Town in an amount sufficient to allow the Town to design and implement these improvements. The amount of the financial contribution will be determined in consultation with the Town and will be deposited in an escrow account for use by the Town for said purpose as a condition of the issuance of the Building Permit for the Project. With implementation of an optimal traffic signal timing, phasing and coordination plan for the signalized intersections along the River Road corridor, overall intersection operations are expected to be maintained at or improve over No-Build conditions with the majority movements at the study intersections shown to continue to operate at LOS D or better.

Old River Road Mobility Improvements

Pedestrian accommodations are not currently provided along the Old River Road corridor which limits pedestrian connectivity to public transportation services that are provided by the Merrimack Valley Transit (MeVa) proximate to the Project site at Campanelli Drive. In order to improve mobility along Old River Road and to connect the Project and the proximate area business to the MeVa bus service, it is recommended that a sidewalk be constructed along the north side of Old River Road from a point just west of the south Project site driveway and Campanelli Drive (approximately 240 linear feet), with a marked crosswalk, accompanying ADA-compliant wheelchair ramps and a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) with associated pedestrian crossing warning signs installed for crossing Old River Road. The Project proponent, in coordination with the Town, will design and construct these improvements prior to the issuance of a certificate of occupancy for the Project, subject to receipt of all necessary rights, permits and approvals.

Extension of the sidewalk to the northwest to include New England Business Center Drive and to the southeast to include River Road and a crossing of River Road at the River Road/Old River Road/Federal Street as a part of a larger infrastructure improvement project could be the subject of the Community One Stop for Growth grant application and would serve to improve mobility along River Road beyond the infrastructure needed to connect the Project to the MeVa bus.

Transportation Demand Management

Regularly scheduled public transportation services are provided in the vicinity of the Project site by MeVa. MeVa operates bus Route 37, *Beacon Street*, which travels along River Road with service to the Buckley Transportation Center in Lawrence. At the Buckley Transportation Center, connections can be made to other MeVa bus routes and to the MBTA Commuter Rail system (Haverhill Line) with service to North Station in Boston. The closest regular stop to the Project site for the Route 37 bus is at 6 Campanelli Drive (American Training), which is an approximate 5-minutes walking distance. In addition to regular stops, MeVa buses also operate in a passenger demand service mode, where a passenger can request a stop anywhere along the regular service route where it is safe to pick-up or discharge a passenger by signaling to the driver.

In addition to fixed-route bus services, MeVa provides accessible transportation services for eligible persons who cannot use fixed-route transit all or some of the time due to a physical, cognitive, or mental disability in accordance with ADA requirements, and Andover Elder Services coordinates transportation for residents age 60+ from the Robb Center for medical appointments and shopping.

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

- A Transportation Coordinator (TC) will be assigned for the Project, who may also have other duties, to coordinate the TDM program;
- Information regarding public transportation services, maps, schedules, and fare information will be posted in a central location and/or otherwise made available to residents;

- A "welcome packet" will be provided to residents that will include the contact information for the TC and detailing available public transportation services, bicycle and walking alternatives, and other commuter options;

- A central mailroom and package delivery station will be provided; and

- Bicycle parking will be provided for 232 bicycles within the Project site, including 216 covered bicycle parking spaces and 16 exterior bicycle parking spaces.

In addition, it is recommended that the Town of Andover and MeVa be consulted to discuss opportunities to establish a bus stop for the Route 37 bus at or proximate to the Project site along Old River Road. To the extent that bus service is established to the Project site, a bus stop will be designed and constructed by the Project proponent in accordance with MeVa standards subject to receipt of all necessary rights, permits and approvals. The location of the bus stop should inform the Old River Road Mobility Improvements described above.

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

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a multifamily residential development to be located at 100 Old River Road in Andover, Massachusetts (hereafter referred to as the "Project"). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing traffic conditions and future traffic conditions, both with and without the Project, along Old River Road and River Road, and at major intersections located along these roadways through which Project-related traffic will travel.

PROJECT DESCRIPTION

The Project will entail the construction of a multifamily residential development to be located at 100 Old River Road in Andover, Massachusetts. The Project site is located within the Multifamily Overlay Zoning District that was adopted at the April 2024 Town Meeting as a part of the Massachusetts Bay Transportation Authority (MBTA) Communities Zoning law. The Multifamily Overlay Zoning allows for the construction of a four-story, 336-unit multifamily residential development at the Project site. Applying the density bonus that is allowable under the MBTA Communities Zoning law as approved by the Andover Town Meeting, the number of residential units that could be constructed at the Project site would increase to 432-units in a five-story residential building. In addition, the Project is envisioned to include supporting retail space (approximately 2,750± square feet (sf))[3] that will be open to the public and amenities for residents of the Project. The Project site encompasses approximately 9.62 ± acres of land that is bounded by Old River Road to the north and east, and River Road and the on-ramp to Interstate 93 (I-93) northbound to the south and west. The Project site is currently improved with a 121,615± square foot (sf) office building with 403 parking spaces in a surface parking lot and supporting driveways and appurtenances, all of which will be removed to accommodate the Project. The office building was vacated in April 2025. Figure 1 depicts the Project site in relation to the existing roadway network.

[3]The retail component of the Project is approximate and is expected to range between 2,500 sf and 3,000 sf. For the purpose of this assessment, a mid-range value of 2,750 sf was used. Increasing the size of the retail component to approximately 3,000 sf would not result in a material increase in peak-hour traffic volumes (approximately one (1) additional new vehicle trip).

Figure 1

Site Location Map

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Access to the Project site will be provided by way of two (2) full-access driveways that will intersect the south side of Old River Road approximately 175 feet northwest of Campanelli Drive (approximately 360 feet northwest of River Road) and approximately 400 feet northwest of New England Business Center Drive, respectively. The existing driveways that serve the Project site will be closed in conjunction with the Project.

On-site parking will be provided for approximately 648 vehicles in a surface parking lot and central parking garage, of which 636 parking space will support the residential component of the Project, or a parking ratio of 1.47 parking spaces per unit, and approximately 12 parking spaces will be provided to support the retail component, or a parking ratio of 4.0 parking spaces per 1,000 sf (based on 2,950± sf). The parking ratio for the residential component of the Project (1.47 parking spaces per unit) is within the range of observed parking demands for a multifamily residential development located in a similar setting documented by the ITE.[4]

STUDY METHODOLOGY

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

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian and bicycle facilities; public transportation services; observations of traffic flow; and collection of daily and 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 analyses consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

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

[4] *Parking Generation*, 6th Edition; Institute of Transportation Engineers; Washington D.C.; October 2023. The observed peak parking demand ratio for a multifamily (low-rise) residential development was observed to range from 0.39 to 1.75 spaces per residential unit, with an average observed peak-parking demand of 1.23 parking spaces per unit and an 85th percentile peak-parking demand of 1.45 parking spaces per unit.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in October 2025. The field investigation consisted of an inventory of existing roadway geometrics; pedestrian and bicycle facilities; public transportation services; traffic volumes; and operating characteristics; as well as posted speed limits and land use information within the study area. The study area that was assessed for the Project consisted of Old River Road and River Road, and the following specific intersections through which Project-related traffic will travel:

- River Road at North Street and the Greater Lawrence Tech School Driveway
- River Road at Old River Road and Federal Street
- River Road at the Interstate 93 (I-93) Northbound Ramps
- River Road at the I-93 Southbound Ramps
- River Road at Shattuck Road and Minuteman Road

The following describes the study area roadways and intersections.

ROADWAYS

Old River Road

Old River Road is a two-lane, local access roadway that is under Town jurisdiction and traverses a general northwest-southeast alignment between River Road and the DoubleTree hotel. In the vicinity of the Project site, Old River Road provides two 12- to 18-foot wide travel lanes separated by a double yellow center line with no marked shoulders provided. Sidewalks are not provided along Old River Road. A posted speed limit is not provided and, as such, the statutory or "prima facie" speed limit pursuant to MGL c. 90 § 17C is 25 miles per hour (mph).[5] Illumination is provided intermittently by way of streetlights mounted on wood poles. Land use in the vicinity of the Project site consists of residential and commercial properties and areas of open and wooded space.

[5]The statutory or "prima facie" speed is defined in M.G.L. c. 90, § 17 as the speed which would be deemed reasonable and proper to operate a motor vehicle in the absence of a regulated or posted speed limit. On September 20, 2023, the Town of Andover notified MassDOT of the adoption of MGL c. 90 § 17C, which defines a statutory speed limit of 25 mph in a thickly settled area where a regulatory or posted speed limit has not been approved.

River Road

River Road is a two to four-lane urban minor arterial roadway that traverses a general east-west direction and is under Town jurisdiction, with the exception of the segment of roadway between the driveway to The Chateau/Chili's/La Quinta Inn/Shattuck Office Center and Old River Road, which is under MassDOT jurisdiction. East of Minuteman Road, River Road provides four 11 to 12-foot-wide travel lanes separated by a raised median with variable width marked shoulders and additional turning lanes provided at major intersections. West of Minuteman Road, River Road provides two 11 to 12-foot wide travel lanes separated by a double-yellow centerline with variable width marked shoulders and additional turning lanes provided at major intersections. The posted speed limit is 35 mph west of the I-93 northbound ramps and 30 mph to the east. Sidewalks are provided along one or both sides of the roadway within the study area, with bicycle lanes provided along both sides of the roadway west of Minuteman Road. Illumination is provided by way of streetlights mounted on wood poles. Land use within the study area consists of residential and commercial properties and areas of open and wooded space.

INTERSECTIONS

Table 1 and Figure 2 summarize existing lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections as observed in October 2025.

Table 1
STUDY AREA INTERSECTION DESCRIPTION

Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
River Rd./ North St./ Greater Lawrence Tech Dwy	TS	1 left-turn lane and 2 through travel lanes provided on River Rd. eastbound approach with right-turns exiting prior to the intersection by way of a channelized right-turn lane; 1 left-turn lane, 1 through travel lane and 1 through/right-turn lane provided on River Rd. westbound approach; 1 left-turn lane and 1 through/right-turn lane provided on North St. and Greater Lawrence Tech dwy approaches	Yes; 5-feet on River Rd. and 1-foot on North St.	Yes; sidewalks are provided along both sides of River Rd. and North St. and along the east side of the Greater Lawrence Tech dwy; marked crosswalks are provided for crossing North St., the Greater Lawrence Tech dwy and the River Rd. west leg; pedestrian traffic signal equipment and phasing (exclusive) are provided for crossing the River Rd. west leg	Yes; shared traveled-way[b] is provided along River Rd. and North St.

See notes at end of Table.

Table 1 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
River Rd./ Old River Rd./ Federal St.	TS	2 left-turn lanes and 2 through travel lanes provided on River Rd. eastbound approach; 1 left-turn lane, 1 through travel lane and 1 through/right-turn lane provided on River Rd. westbound approach; 1 left-turn/through and 1 right-turn lane provided on Federal St. approach; 1 left-turn lane and 1 through travel lane provided on Old River Rd. approach; right-turns on the River. Rd. eastbound and Old River Rd. approaches exit prior to the intersection by way of channelized right-turn lanes	Yes; 2 to 6-feet on River Rd. and 1-foot on Federal St.	Yes; a sidewalk is provided along the south side of River Rd.; a marked crosswalk is provided across Federal St.; pedestrian traffic signal equipment and phasing are not provided at the intersection	Yes; shared traveled-way is provided along Old River Rd.
River Rd./I-93 Northbound Ramps	TS	2 left-turn lanes and 2 through travel lanes provided on River Rd. eastbound approach; 2 through travel lanes provided on River Rd. westbound approach with right-turns exiting prior the intersection by way of a channelized right-turn lane; 2 left-turn lanes and 2 right-turn lanes (signalized and channelized) provided on the I-93 northbound off-ramp approach	Yes; 1 to 4-feet on all legs	Yes; a sidewalk is provided along the south side of River Rd.	No

See notes at end of Table.

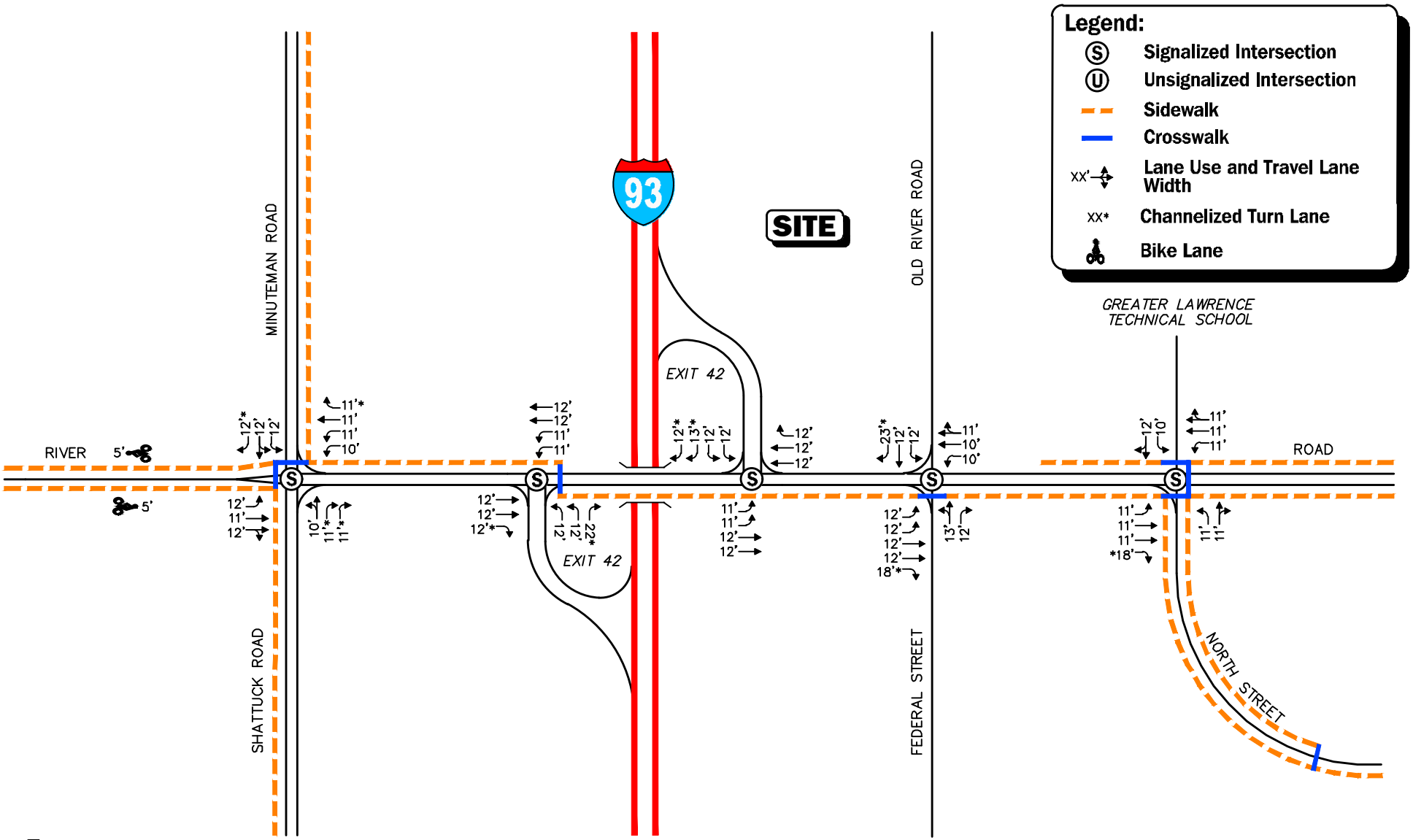
Table 1 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
River Rd./I-93 Southbound Ramps	TS	2 through travel lanes provided on River Rd. eastbound approach; 2 left-turn lanes and 2 through travel lanes provided on River Rd. westbound approach; 2 left-turn lanes provided on the I-93 off-ramp approach; right-turns from the River Rd. eastbound and I-93 southbound off-ramp approaches exit prior to the intersection by way of a channelized right-turn lane	Yes; 1 to 6-feet on all legs	Yes; a sidewalk is provided along the south side of River Rd. east of the intersection and along the north side to the west; marked crosswalks are provided for crossing the River. Rd east leg and the northbound channelized right-turn lane; pedestrian traffic signal equipment and phasing (concurrent) are provided for crossing the River Rd. east leg	No
River Rd./ Shattuck Rd./ Minuteman Rd.	TS	1 left-turn lane, 1 through travel lane and 1 through/right-turn lane provided on River Rd. eastbound approach; 2 left-turn lanes and 1 through travel lane provided on River Rd. westbound approach; 1 left-turn/through travel lane and 2 right-turn lanes (signalized and channelized) provided on Shattuck Rd. approach; 1 left-turn lane and 1 left-turn/through travel lane provided on Minuteman Rd. approach; right-turns from the River Rd. westbound and Minuteman Rd. approaches exit prior to the intersection by way of a channelized right-turn lane	Yes; 1 to 5-feet on River Rd. and 1-foot on Minuteman Rd. and Shattuck Rd.	Yes; sidewalks are provided along both sides of River. Rd. west of the intersection and along the north side to the east, along the east side of Minuteman Rd. and along the west side of Shattuck Rd.; marked crosswalks are provided across Minuteman Rd., the River Rd. west leg and the southbound and westbound channelized right-turn lanes; traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes are provided along River Rd. west of the intersection

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

EXISTING TRAFFIC VOLUMES

In order to determine existing traffic-volume demands and flow patterns within the study area, automatic traffic recorder (ATR) counts, turning movement counts (TMCs) and vehicle classification counts were completed in October 2025. The ATR counts were conducted on October 21st and 22nd, 2025 (Tuesday and Wednesday, respectively) on Old River Road in the



Not to Scale

Figure 2

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

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vicinity of the Project site in order to record weekday traffic conditions over an extended period, with peak-period TMCs performed at the study intersections during the weekday morning (7:00 to 9:00 AM) and evening (3:00 to 6:00 PM) peak-periods on Wednesday, October 15, 2025. These time periods were selected for analysis purposes as they are representative of the peak traffic-volume hours for both the Project and the adjacent roadway network.

Traffic-Volume Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, MassDOT weekday seasonal factors for Urban Groups 4 through 7 (major and minor collectors and local roads and streets, the functional classifications of the study roadways) were reviewed.[6] Based on a review of this data, it was determined that traffic volumes for the month of October are approximately 6.4 percent *above* average-month conditions. In order to provide a conservative (high) assessment of traffic volumes within the study area, no adjustment was made to the October traffic volumes.

Based on updated guidance from MassDOT,[7] adjustments to account for the impact on traffic volume and trip patterns resulting from the COVID-19 pandemic for traffic counts taken on or after March 1, 2022 are only recommended in areas where the predominant land use is office properties. Given that a significant portion of the uses within or adjacent to the study area consist of office space, pre- and post-COVID (October 2019 and 2025, respectively) traffic volume data from MassDOT Continuous Count Station No. 5075 located on Interstate 495 (I-495) in Andover were reviewed.[8] Based on a review of this data, October 2025 data was found to be generally consistent with or higher than October 2019 traffic volumes. As such, no adjustment was made to the October 2025 traffic volumes to account for the impact of the COVID-19 pandemic. Additionally, and as discussed in the *Future Conditions* section of this assessment, traffic volumes associated with the redevelopment or re-occupancy of specific office buildings along the River Road corridor were included in the future-year conditions traffic volumes.

The 2025 Existing traffic volumes are summarized in Table 2, with the weekday morning and evening peak-hour traffic volumes graphically depicted on Figures 3 and 4, respectively. Note that the peak-hour traffic volumes that are presented in Table 2 were obtained from the aforementioned figures.

[6]MassDOT statewide Traffic Data Collection; 2024 Weekday Seasonal Factors, Groups U4-7.

[7]*25% Design Submission Guidelines*; MassDOT Highway Division, Traffic and Safety Engineering; Revised May 31, 2022.

[8]MassDOT Traffic Volumes for the Commonwealth of Massachusetts; 2019 and 2025.

Table 2
2025 EXISTING TRAFFIC VOLUMES

Location/Peak Hour	AWT[a]	VPH[b]	K Factor[c]	Directional Distribution[d]
Old River Road, north of River Road:	2,970	--	--	--
Weekday Morning (7:30 – 8:30 AM)	--	559	18.8	64.4% NWB
Weekday Evening (4:00 – 5:00 PM)	--	518	17.4	75.1% SEB

[a]Average weekday traffic in vehicles per day.
[b]Vehicles per hour.
[c]Percent of daily traffic occurring during the peak hour.
[d]Percent traveling in peak direction.
NWB = northwestbound; SEB = southeastbound.

As can be seen in Table 2, Old River Road in the vicinity of the Project site was found to accommodate approximately 2,970 vehicles on an average weekday (two-way, 24-hour volume), with approximately 559 vehicles per hour (vph) during the weekday morning and 518 vph during the weekday evening peak-hour.

River Road/I-93 Northbound Weekday Evening Peak-Hour Vehicle Queuing

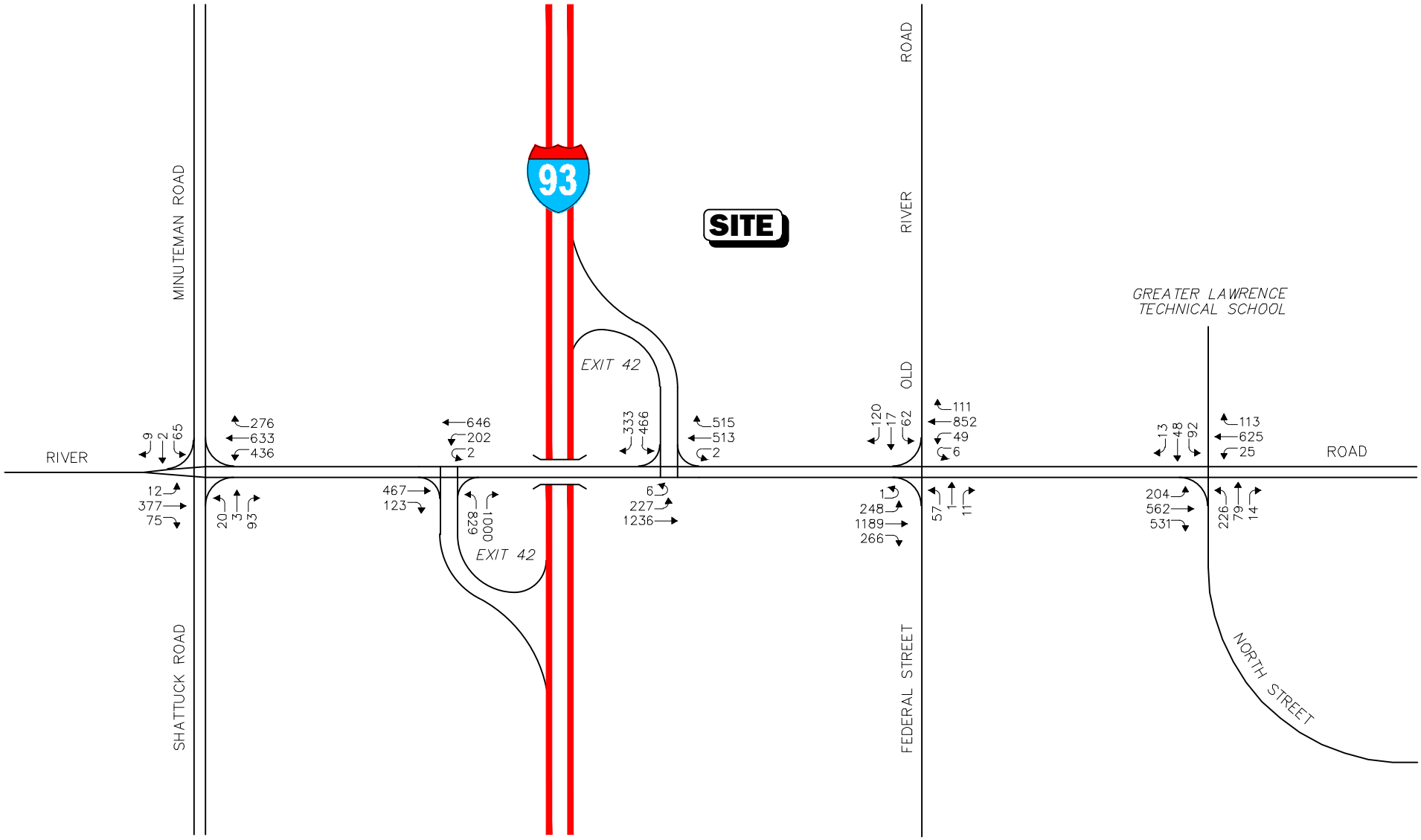
Based on observations of vehicle queuing along River Road approaching the I-93 northbound ramps during the weekday evening peak period, operating conditions (motorist delays and vehicle queuing) at the River Road/I-93 northbound ramps, River Road/Old River Road/Federal Street and River Road/North Street/Greater Lawrence Tech driveway intersections are impacted by residual vehicle queuing that occurs along River Road and the I-93 northbound on-ramp as a result of traffic conditions along I-93 northbound at the Merrimack-Methuen Bridge over the Merrimack River. Additional discussion of the effect of this vehicle queuing on the capacity analysis performed as a part of this assessment is provided in the *Analysis Results* section.

PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in October 2025. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study area intersections, as well as the location of existing and planned future bicycle facilities. As detailed on Figure 2, sidewalks are generally provided along one or both sides of River Road, with marked crosswalks provided for crossing one or more legs of the River Road/Shattuck Road/Minuteman Road, River Road/I-93 southbound ramps and the River Road/Old River Road/Federal Street intersections. Pedestrian traffic signal equipment and phasing are provided as a part of the traffic signal systems at the River Road/Shattuck Road/Minuteman Road, River Road/I-93 southbound ramps and River Road/North Street/Greater Lawrence Tech driveway intersections.

Bike lanes are provided along River Road west of Minuteman Road, with Old River Road and North Street generally providing sufficient width (combined travel lane and paved shoulder) to support bicycle travel in a shared traveled-way configuration.[9]

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



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

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Figure 3

2025 Existing
Weekday Morning
Peak-Hour Traffic Volumes

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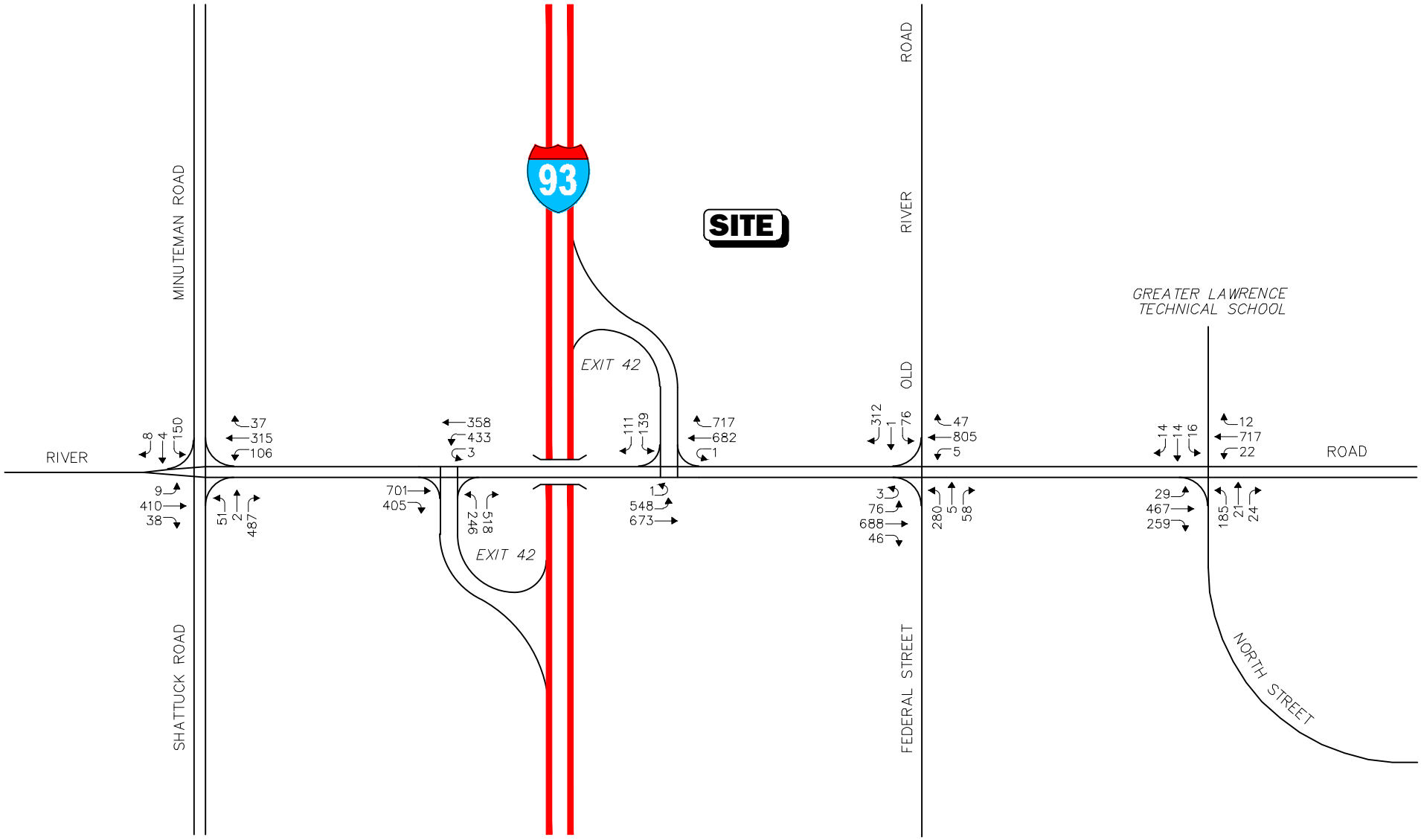

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 4

2025 Existing
Weekday Evening
Peak-Hour Traffic Volumes

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PUBLIC TRANSPORTATION

Regularly scheduled public transportation services are provided in the vicinity of the Project site by the Merrimack Valley Transit (MeVa). MeVa operates bus Route 37, *Beacon Street*, which travels along River Road with service to the Buckley Transportation Center in Lawrence. At the Buckley Transportation Center, connections can be made to other MeVa bus routes and to the MBTA Commuter Rail system (Haverhill Line) with service to North Station in Boston. The closest regular stop to the Project site for the Route 37 bus is at 6 Campanelli Drive (American Training), which is an approximate 5-minute walking distance. In addition to regular stops, MeVa buses also operate in a passenger demand service mode, where a passenger can request a stop anywhere along the regular service route where it is safe to pick-up or discharge a passenger by signaling to the driver.

In addition to fixed-route bus services, MeVa provides accessible transportation services for eligible persons who cannot use fixed-route transit all or some of the time due to a physical, cognitive, or mental disability in accordance with ADA requirements, and Andover Elder Services coordinates transportation for residents age 60+ from the Robb Center for medical appointments and shopping. The public transportation schedules are attached in the Appendix.

SPOT SPEED MEASUREMENTS

Vehicle travel speed measurements were performed on Old River Road in the vicinity of the Project site in conjunction with the ATR counts. Table 3 summarizes the vehicle travel speed measurements.

Table 3
VEHICLE TRAVEL SPEED MEASUREMENTS

	Old River Road	
	Northwestbound	Southeastbound
Mean Travel Speed (mph)	24	26
85th Percentile Speed (mph)	26	28
Statutory Speed Limit (mph)	25	25

mph = miles per hour.

As can be seen in Table 3, the mean vehicle travel speed along Old River Road in the vicinity of the Project site was found to be 24 mph in the northwestbound direction and 26 mph southeastbound. The measured 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be 26 mph in the northwestbound direction and 28 mph southbound, which generally approximates (1 to 3 mph *above*) the statutory speed limit along the roadway (25 mph).

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2018 through 2022, inclusive) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, and is presented in Table 4.

As can be seen in Table 4, the study area intersections were found to have experienced an average of 7.40 or fewer reported motor vehicle crashes per year over the five-year review period and were found to have motor vehicle crash rates *below* the MassDOT statewide and District average crash rates for similar intersections for the MassDOT Highway Division District in which the intersections are located (District 4). The majority of the reported crashes occurred on a weekday; under clear weather conditions; during daylight; and involved rear-end type collisions that resulted in property damage only.

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

The detailed MassDOT Crash Rate Worksheets, High Crash Location mapping and motor vehicle crash back-up are provided in the Appendix.

Table 4
MOTOR VEHICLE CRASH DATA SUMMARY[a]

	River Rd./ North St./ Lawrence Tech	River Rd./ Old River Rd./ Federal St.	River Rd./ I-93 Northbound Ramps	River Rd./ I-93 Southbound Ramps	River Rd./ Shattuck Rd./ Minuteman Rd.
Traffic Control Type:[b]	S	S	S	S	S
Year:					
2018	6	4	10	13	1
2019	7	3	3	7	0
2020	4	1	0	4	1
2021	2	2	1	9	2
2022	6	3	1	4	2
Total	25	13	15	37	6
Average	5.00	2.60	3.00	7.40	1.20
Rate[c]	0.69	0.27	0.26	0.68	0.17
MassDOT Crash Rate:[d]	0.78/0.73	0.78/0.73	0.78/0.73	0.78/0.73	0.78/0.73
Significant?[e]	No	No	No	No	No
Type:					
Angle	5	5	2	6	3
Rear-End	15	7	9	23	2
Head-On	0	0	0	1	0
Sideswipe	4	0	3	4	0
Single-Vehicle	1	1	1	2	1
Pedestrian/Bicycle	0	0	0	0	0
Unknown/Other	0	0	0	1	0
Total	25	13	15	37	6
Day of Week:					
Monday through Friday	24	11	14	34	5
Saturday	0	2	1	2	1
Sunday	1	0	0	1	0
Total	25	13	15	37	6
Conditions:					
Clear	18	8	9	24	5
Cloudy	3	4	2	7	1
Rain	3	1	4	4	0
Snow/Ice	1	0	0	2	0
Not Reported	0	0	0	0	0
Total	25	13	15	37	6
Lighting:					
Daylight	19	10	9	30	5
Dawn/Dusk	1	1	2	0	0
Dark (Road Lit)	4	1	3	4	1
Dark (Road Unlit)	1	1	1	3	0
Total	25	13	15	37	6
Severity:					
Property Damage Only	21	11	11	29	6
Personal Injury	3	1	3	8	0
Fatality	0	0	0	0	0
Not Reported	1	1	1	0	0
Total	25	13	15	37	6

[a]Source: MassDOT Safety Management/Traffic Operations Unit records, 2018 through 2022.
[b]Traffic Control Type: S = signalized.
[c]Crash rate per million vehicles entering the intersection.
[d]Statewide/District crash rates
[e]The intersection crash rate is significant if it is found to exceed the MassDOT crash rate for the MassDOT Highway Division District in which the Project is located (District 4).

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2032, which reflects a seven-year planning horizon consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. Independent of the Project, traffic volumes on the roadway network in the year 2032 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2032 No-Build traffic volumes reflect 2032 Build traffic-volume conditions with the Project.

FUTURE TRAFFIC GROWTH

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

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

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

Specific Development by Others

The Planning & Economic Development Department of the Town of Andover was contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on this consultation, the following developments were identified for review in conjunction with this assessment:

- ***Proposed Medical/cGMP Facility, 300 Minuteman Road, Andover, Massachusetts.*** This project entails the construction of a 224,500± sf cGMP facility to be located at 300 Minuteman Road to the west of the Project site. Traffic volumes associated with this project were obtained from the traffic study prepared for the development[10] and were included in the future-year condition traffic volumes.

[10] *Transportation Impact Assessment*, Proposed Medical/Pharmaceutical Manufacturing Facility, 300 Minuteman Road; Andover, Massachusetts; VAI; 2021.

- ***Philips Healthcare Campus Redevelopment, 3000 Minuteman Road, Andover, Massachusetts.*** This project entails the renovation and expansion of the former Philips Healthcare campus located at 3000 Minuteman Road to the west of the Project site, to accommodate approximately 1.126± million sf of laboratory and cGMP uses. Traffic volumes associated with this development were obtained from the traffic study prepared for the development[11] and were included in the future-year condition traffic volumes.

In addition to the aforementioned projects, traffic volumes associated with the full occupancy of the existing office building that occupies the Project (121,615 sf) were estimated using trip-generation statistics published by the Institute of Transportation Engineers (ITE)[12] for a similar land use (general office space) and were added to the future-year conditions traffic volumes. No other developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general traffic growth rate.

General Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count stations located in the Andover area were reviewed in order to determine general traffic growth trends in the area. This data indicates that traffic volumes have fluctuated over the 10-year period between 2009 and 2019, with an average traffic growth rate of 1.14 percent. In order to provide conservative (high) traffic volumes from which to assess the impact of the Project; a slightly higher 1.5 percent per year compounded annual background traffic growth rate was used to account for future traffic growth and presently unforeseen development within the study area.

Roadway Improvement Projects

MassDOT and the Town of Andover were contacted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2032 within the study area. Based on these discussions, the following roadway improvement projects are planned within the study area:

- **River Road/Old River Road/Federal Street Vehicle Detection Upgrades.** In conjunction with the National Grid utility improvement project along River Road that was underway during the preparation of this assessment, video detection is anticipated to be installed at the River Road/Old River Road/Federal Street.

- **River Road/Shattuck Road/Minuteman Road Intersection Improvements.** As a part of the mitigation commitment for the proposed cGMP facility to be located at 300 Minuteman Road, the proponent of that development has committed to the following improvements at the River Road/Shattuck Road/Minuteman Road intersection:

    - Replace the existing inductive loop vehicle detection system with video detection (four (4) video cameras required);
    - Replace the existing pedestrian signal indications (two (2)) with countdown-type indications; and

[11] *Transportation Impact Assessment*, Philips Healthcare Campus Redevelopment, 3000 Minuteman Road; Andover, Massachusetts; VAI; July 2022.

[12] Institute of Transportation Engineers, op. cit. 1.

- Replace the existing pedestrian pushbuttons with Americans with Disabilities Act (ADA)-compliant audible devices.

- **River Road Traffic Signal System Improvements.** As a part of the mitigation commitment for the proposed redevelopment and expansion of the Philips Healthcare campus located at 3000 Minuteman Road, the proponent of that development has committed to the following improvements along the River Road coordinated traffic signal system:

  - Design and implement an optimal traffic signal timing, phasing and coordination plan for the following intersections;
    - River Road/Shattuck Road/Minuteman Road
    - River Road/I-93 Southbound Ramps
    - River Road/I-93 Northbound Ramps
    - River Road/Old River Road and Federal Street
  - Reconstruct all non-ADA compliant wheelchair ramps and replace or upgrade as necessary non-ADA compliant pushbuttons and install countdown-type pedestrian indications where such indications are not currently installed.

These roadway and intersection improvements were assumed to be completed under the future-year conditions to accompany the additional traffic volumes associated with the specific development projects by others to which the improvements are associated. No other roadway improvement projects aside from routine maintenance were identified for the study area.

No-Build Traffic Volumes

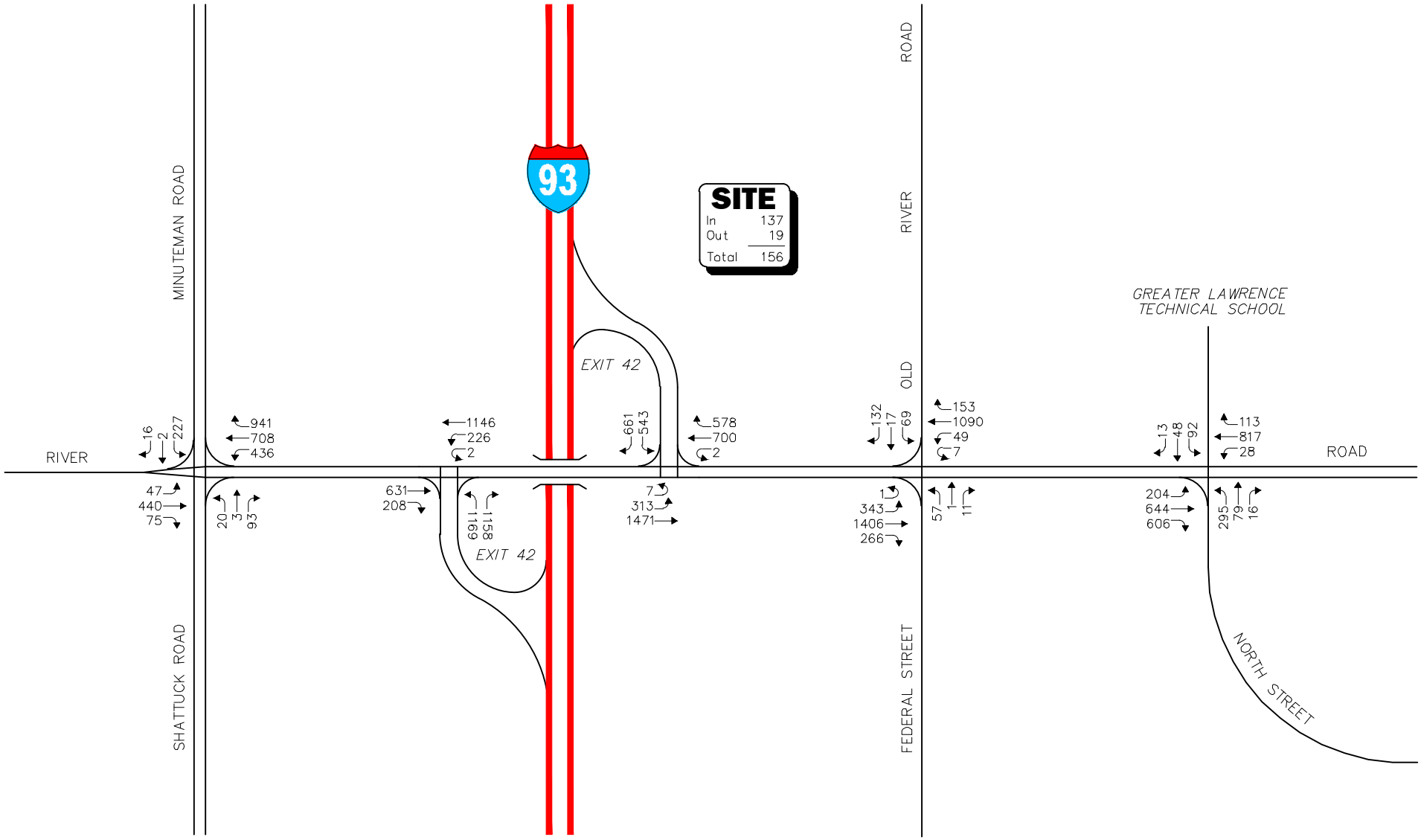
The 2032 No-Build condition peak-hour traffic-volumes were developed by applying the 1.5 percent per year compounded annual background traffic growth rate to the 2025 Existing peak-hour traffic volumes and then adding the peak-hour traffic associated with the identified specific development projects by others and the reoccupancy of the office building that currently occupies the Project site. The resulting 2032 No-Build weekday morning and evening peak-hour traffic volumes are shown on Figures 5 and 6, respectively.

PROJECT-GENERATED TRAFFIC

Design year (2032 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. The following sections describe the methodology used to develop the anticipated traffic characteristics of the Project.

As proposed, the Project will entail the construction of a 432-unit multifamily residential development with approximately 2,750± sf of supporting retail space. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the ITE[13] for similar land uses as those proposed were reviewed. ITE Land Use Codes (LUCs) 221, *Multifamily Housing (Mid-Rise)*, and 822, *Strip Retail Plaza*, were used to develop the base trip-generation characteristics of the Project.

[13]Institute of Transportation Engineers, op. cit. 1.



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

Not to Scale

Figure 5

2032 No-Build
Weekday Morning
Peak-Hour Traffic Volumes

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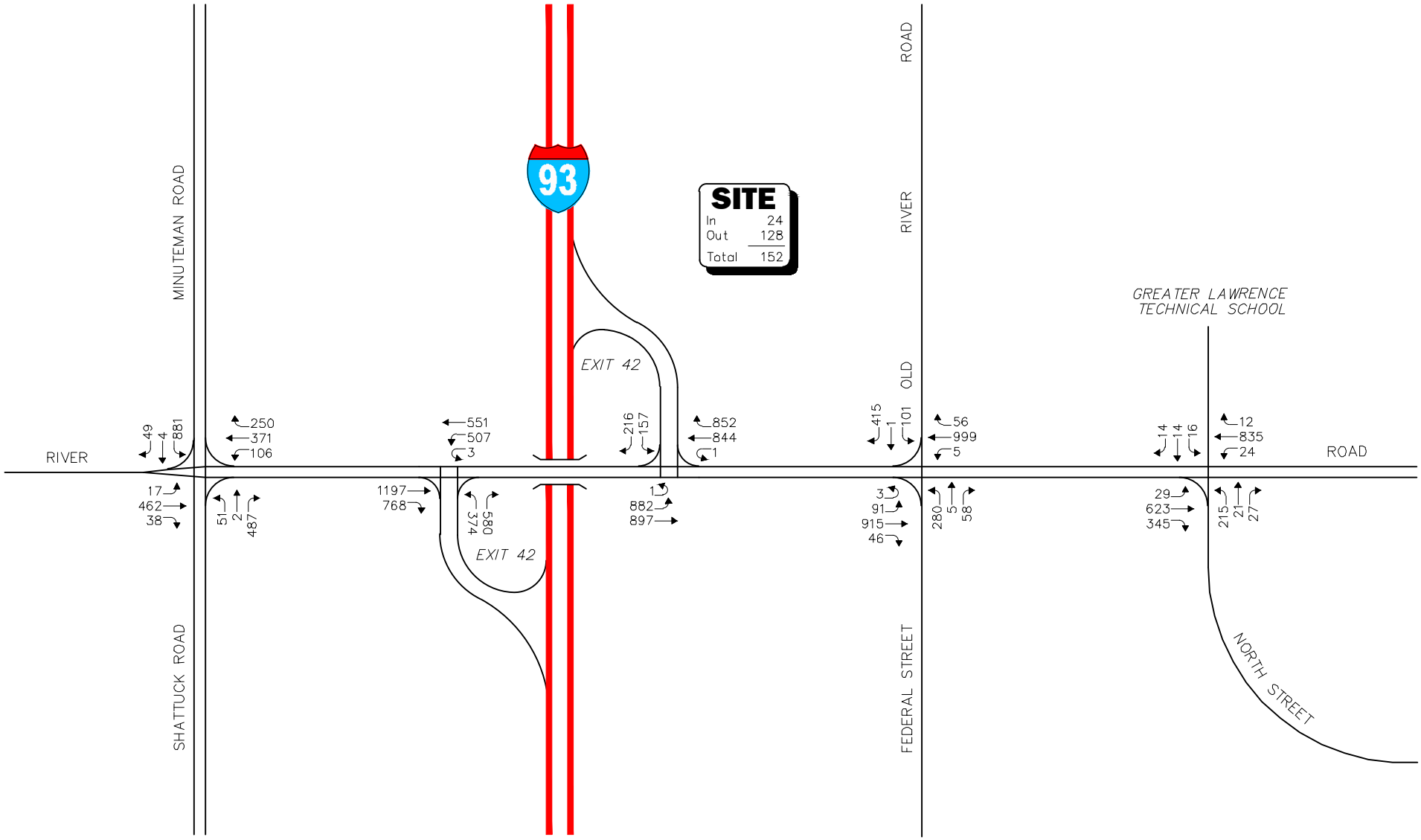

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 6

2032 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

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Internal Trips

A portion of the trips expected to be generated by the Project may consist of internal trips. An internal trip consists of a resident, customer and/or employee that patronizes more than one of the uses planned within a development and is common in mixed-use projects with appropriate accommodations to facilitate trips between uses. By way of example, a resident of the Project may also patronize the retail space provided within the Project site. In order to account for this interaction, the multi-use trip-generation calculation methodology promulgated by the ITE[14] was applied to the base ITE trip-generation calculations.

Pass-By Trips

Not all of the trips expected to be generated by the retail component of the Project will be new trips on the roadway network. A portion of these trips will consist of pass-by trips or vehicles already traveling along adjacent roadways for other purposes that will patronize the Project site in conjunction with their trip and then continue to their original destination. These trips are not new trips on the roadway network as a result of the Project. Statistics published by the ITE[15] indicate that, on average, up to 40 percent of the trips generated by the retail component of the Project may consist of pass-by trips. In accordance with MassDOT guidelines which limits pass-by trips to the lesser of: i) 15 percent of the adjacent roadway traffic volume; or ii) the ITE pass-by trip rate for the specific use; the methodology that resulted in the lower volume of pass-by trips was applied to the base trip-generation calculations for the commercial component of the Project.

Table 5 summarizes the anticipated trip characteristics of the Project using the aforementioned methodology and after accounting for internal and pass-by trips, with the detailed trip-generation calculations provided in the Appendix.

[14]Institute of Transportation Engineers; op. cit. 1.

[15]Institute of Transportation Engineers, op. cit. 1.

Table 6
TRIP-GENERATION SUMMARY

	Vehicle Trips			
	Residential Component	Retail Component		**Project Total**
Time Period/Direction	(A) New Trips (432 units)[a]	(B) New Trips (2,750 sf)[b]	(C) Pass-By Trips (2,750 sf)[c]	**(D = A+B) Total New Trips**
Average Weekday Daily:				
Entering	957	47	21	**1,004**
Exiting	957	47	21	**1,004**
Total	1,914	94	42	**2,008**
Weekday Morning Peak Hour:				
Entering	39	4	1	**43**
Exiting	133	3	1	**136**
Total	172	7	2	**179**
Weekday Evening Peak Hour:				
Entering	97	9	5	**106**
Exiting	56	7	5	**63**
Total	153	16	10	**169**

[a]Based on ITE LUC 221, *Multifamily Housing (Mid-Rise)* with appropriate adjustments to account for internal trips.
[b]Based on ITE LUC 822, *Strip Retail Plaza (<40k)* with appropriate adjustments to account of internal trips.
[c]Pass-by trip rates obtained from ITE LUC 821, *Shopping Plaza (40-150k)* and applied as follows: *average weekday daily and weekday morning peak-hour* – 31%; and *weekday evening peak-hour* – 40%.

Project-Generated Traffic-Volume Summary

As can be seen in Table 5, after applying appropriate adjustments to account for internal trips and pass-by trips, the Project is expected to generate approximately 2,008 new vehicle trips on an average weekday (two-way, 24-hour volume, or 1,004 vehicles entering and 1,004 exiting), with approximately 179 new vehicle trips (43 vehicles entering and 136 exiting) expected during the weekday morning peak-hour and 169 new vehicle trips (106 vehicles entering and 63 exiting) expected during the weekday evening peak-hour.

The retail component of the Project is approximate and is expected to range between 2,500 sf and 3,000 sf. For the purpose of this assessment, a mid-range value of 2,750 sf was used. Increasing the size of the retail component to approximately 3,000 sf would not result in a material increase in peak-hour traffic volumes (approximately one (1) additional new vehicle trip).

As previously mentioned, the Project site is currently occupied by a 121,615± sf office building that is supported by 403 parking spaces. Table 6 compares the traffic volumes associated with the Project to those of the former office building as measured at the driveways to the Project site and inclusive of pass-by trips.

Table 6
TRAFFIC-VOLUME COMPARISON

Time Period	Vehicle Trips		
	(A) Proposed Residential Development[a]	(B) Former Office Building (121,615 sf)[b]	(C=A-B) Difference
Average Weekday Daily:	2,050	960	+1,090
Weekday Morning Peak-Hour:	181	156	+25
Weekday Evening Peak-Hour:	179	152	+27

[a]See Column D of Table 5.
[b]Based on ITE LUC 710, *General Office Building*.

As can be seen in Table 6, in comparison to the existing office building that will be removed to accommodate the Project, the Project is expected to generate approximately 1,090 *additional* vehicle trips on an average weekday, with approximately 25 *additional* vehicle trips expected during the weekday morning peak-hour and approximately 27 *additional* vehicle trips expected during the weekday evening peak-hour.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of generated trips to and from the Project site was determined based on a review of Journey-to-Work data obtained from the U.S. Census for the Town of Andover and then refined based on existing traffic patterns within the study area. Given the relatively low volume of traffic expected to be generated by the retail component of the Project, a single distribution pattern was developed for all Project-related traffic which is graphically depicted on Figure 7. Traffic volumes expected to be generated by the Project were assigned onto the study area roadway network during the weekday morning and evening peak hours as shown on Figures 8 and 9, respectively.

FUTURE TRAFFIC VOLUMES – BUILD CONDITION

The 2032 Build condition traffic volumes were developed by: i) removing projected traffic volumes associated with the existing office building that currently occupies the Project site and that will be removed to accommodate the Project from the 2032 No-Build condition traffic volumes; and ii) adding the additional traffic expected to be generated by the Project. The resulting 2032 Build weekday morning and evening peak-hour traffic volumes are graphically depicted on Figures 10 and 11, respectively.

A summary of peak-hour projected traffic-volume changes outside of the study area that is the subject of this assessment is shown in Table 7. These changes are a result of the construction of the Project and represent a change in use and type of vehicle trip associated with the Project (from office use to residential use).

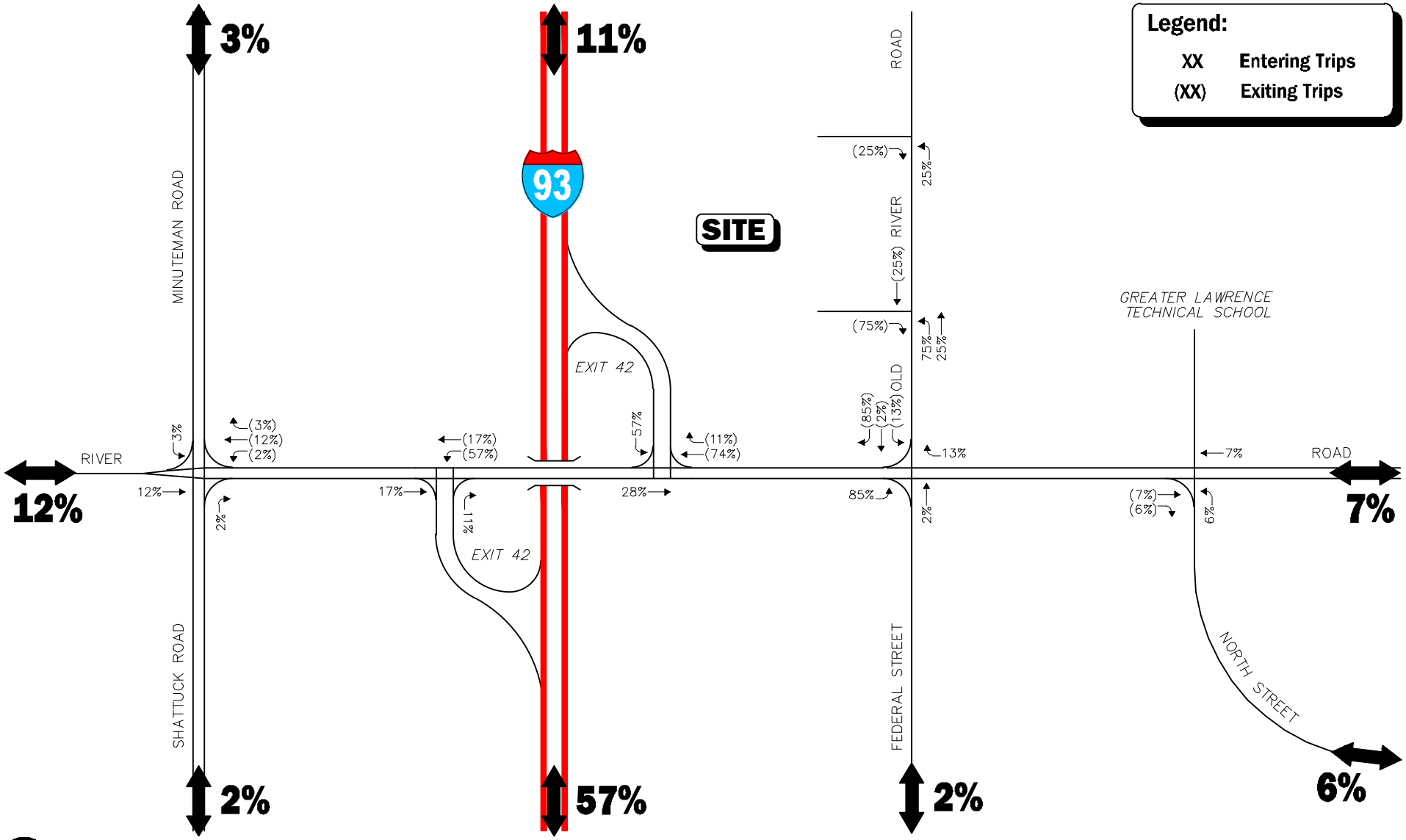

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Figure 7

Trip Distribution Map

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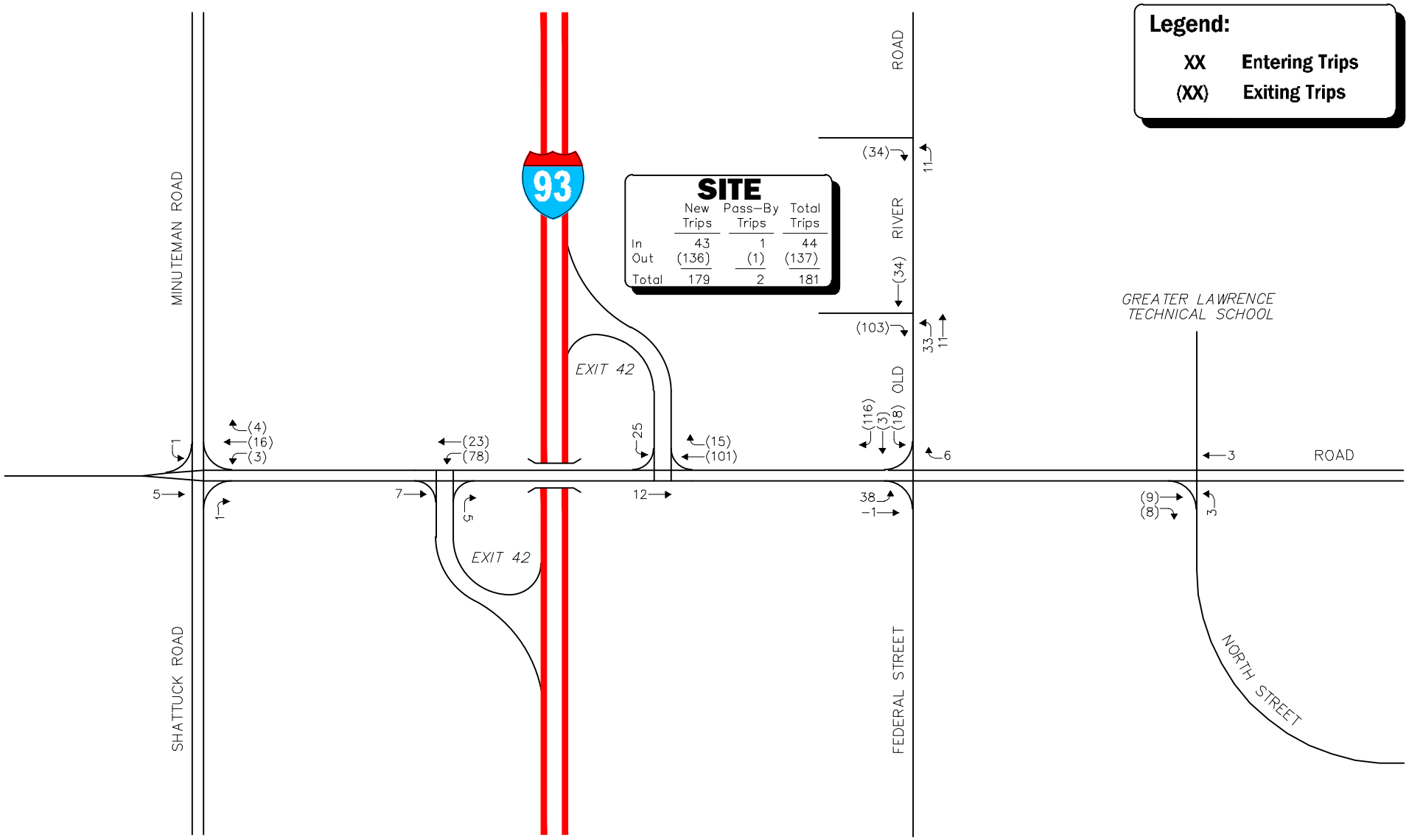

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Figure 8

Project-Generated Weekday Morning Peak-Hour Traffic Volumes

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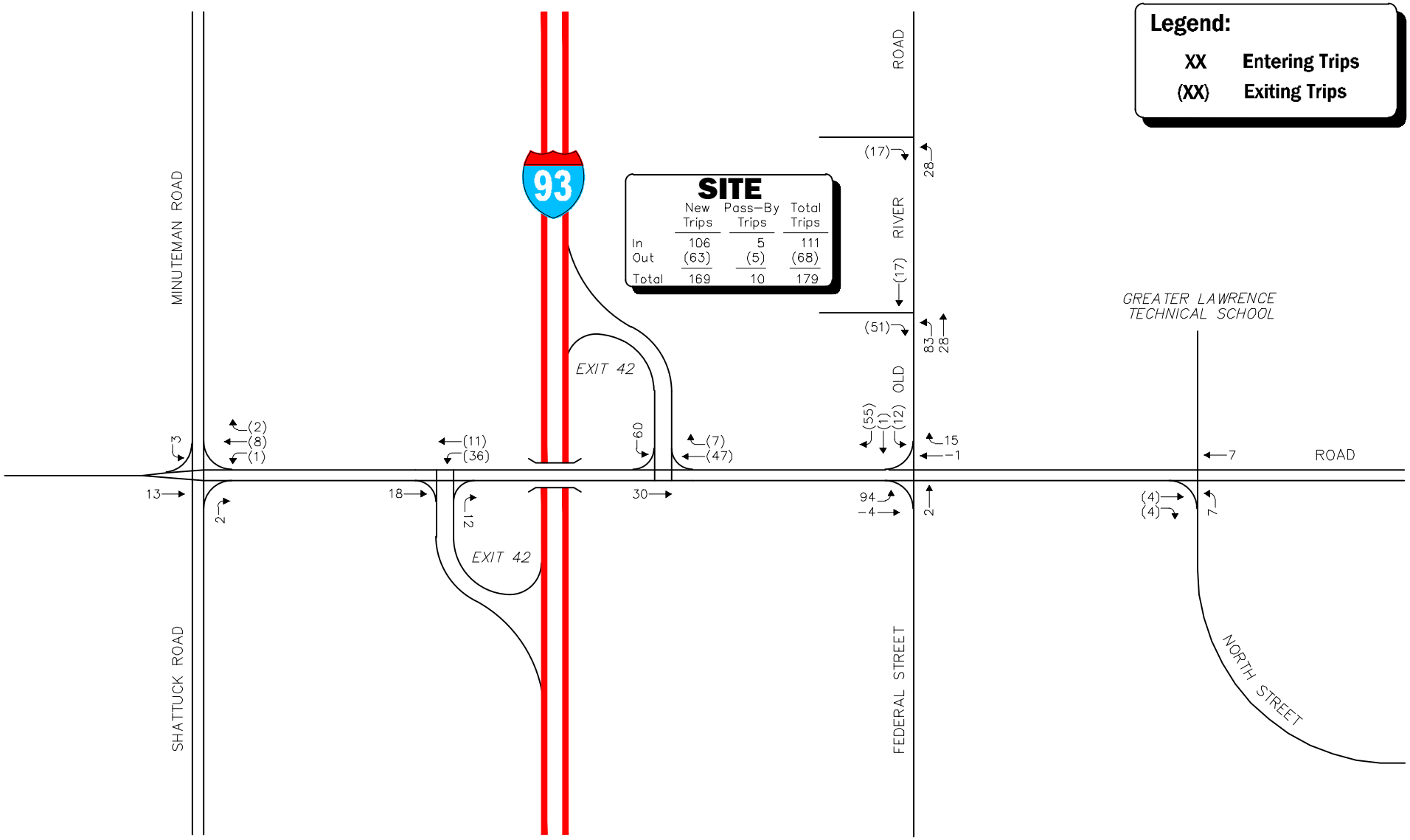

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Figure 9

Project-Generated Weekday Evening Peak-Hour Traffic Volumes

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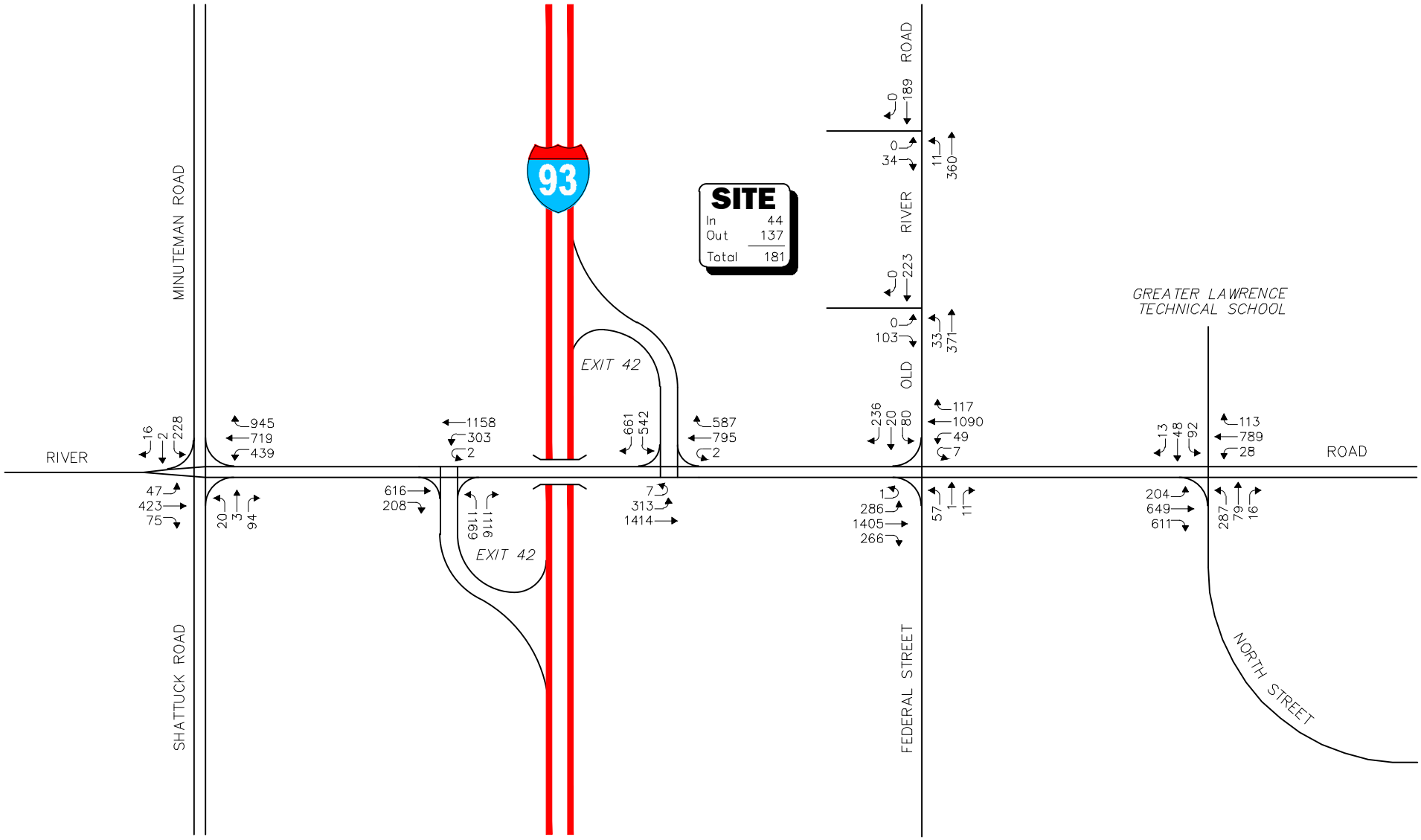

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 10

2032 Build
Weekday Morning
Peak-Hour Traffic Volumes

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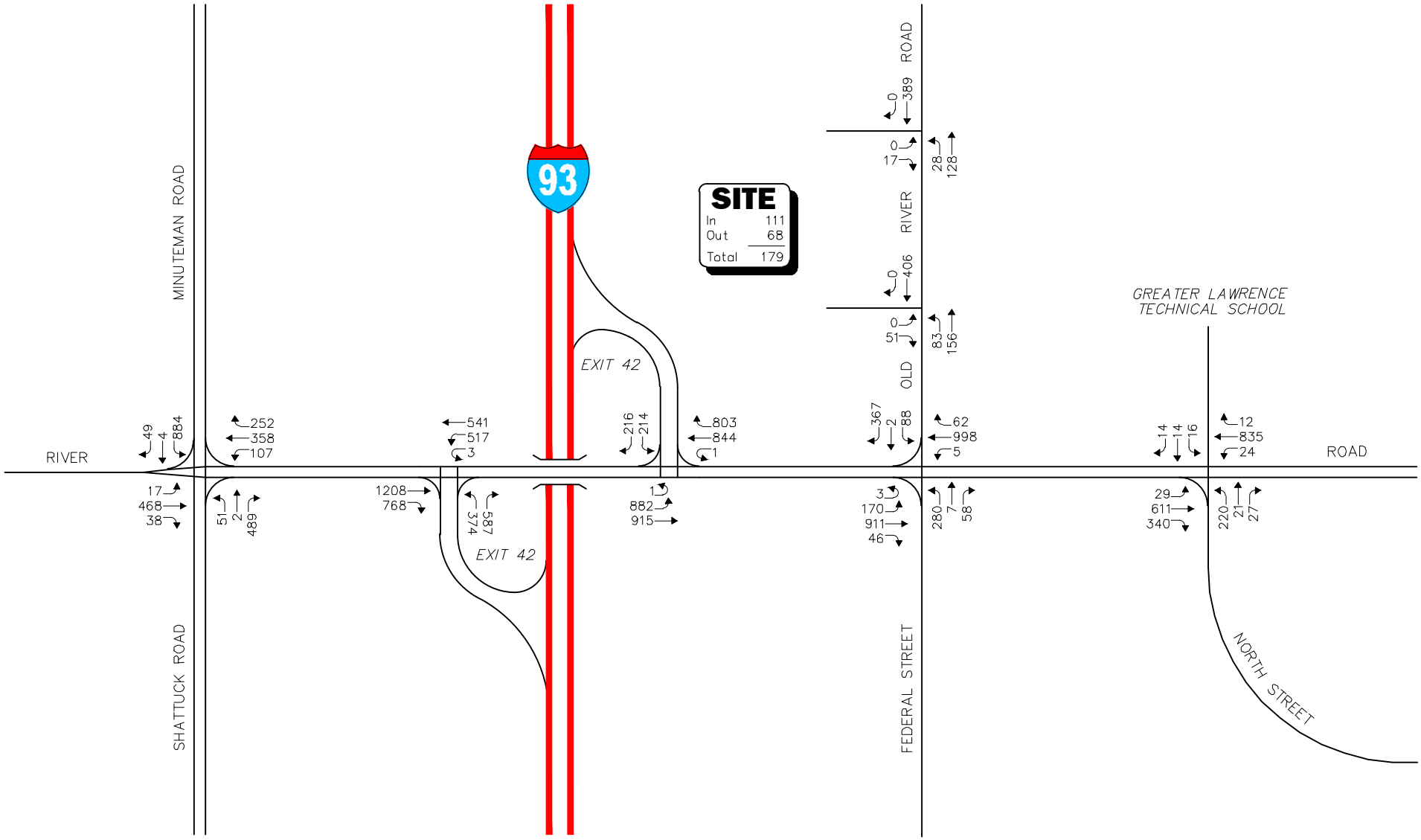

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 11

2032 Build
Weekday Evening
Peak-Hour Traffic Volumes

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Table 7
PEAK-HOUR TRAFFIC-VOLUME INCREASES

Location/Peak-Hour	2025 Existing	2032 No-Build	2032 Build	Traffic-Volume Change Over No-Build	Percent Change Over No-Build
I-93 Northbound Ramps, north of River Road					
Weekday Morning	1,541	2,095	2,104	+9	+0.4
Weekday Evening	1,515	2,107	2,115	+8	+0.4
I-93 Southbound Ramps, south of River Road					
Weekday Morning	2,154	2,761	2,796	+35	+1.3
Weekday Evening	1,602	2,229	2,246	+17	+0.8
River Road, east of North Street					
Weekday Morning	1,431	1,710	1,687	-23	-1.3
Weekday Evening	1,258	1,537	1,525	-12	-0.8
River Road, west of Minuteman Road					
Weekday Morning	1,126	1,306	1,300	-6	-0.5
Weekday Evening	831	988	981	-7	-0.7
North Street, south of River Road					
Weekday Morning	923	1,072	1,069	-3	-0.3
Weekday Evening	525	646	646	0	0.0

As shown in Table 7, Project-related traffic-volume changes outside of the study area relative to 2032 No-Build conditions are anticipated to range from decreases of 1.3 percent to increases of a similar magnitude (1.3 percent) during the peak periods, with vehicle changes shown to range from a decrease of 23 vehicles to an increase of 35 vehicles. ***When dispersed over the peak-hour, such increases would not result in a significant impact (increase) on motorist delays or vehicle queuing outside of the immediate study area that is the subject of this assessment.***

TRAFFIC OPERATIONS ANALYSIS

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

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.[16] 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.

[16]The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual;* 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 are 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 are calculated using the operational analysis methodology of the 2000 *Highway Capacity Manual*[17] and implemented as a part of the Synchro® 12 software. This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. Level-of-service designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. Table 8 summarizes the relationship between level of service and control delay. The tabulated control delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table 8
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS[a]

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

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

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

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 extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the *Highway Capacity Manual 7th Edition.*[18] 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 *Highway Capacity Manual 7th Edition*. Table 9 summarizes the relationship between level of service and average control delay for two-way stop controlled and all-way stop controlled intersections.

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

Level-Of-Service by Volume-to-Capacity Ratio		Average Control Delay
v/c ≤ 1.0	v/c > 1.0	(Seconds Per Vehicle)
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: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2023.

[18]*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2023.

Vehicle Queue Analysis

Vehicle queue analyses are a direct measurement of an intersection's ability to process vehicles under various traffic control and volume scenarios and lane use arrangements. The vehicle queue analysis was performed using the Synchro® intersection capacity analysis software. The Synchro® vehicle queue analysis methodology is a simulation-based model which reports the number of vehicles that experience a delay of six seconds or more at an intersection. For signalized intersections, Synchro® reports both the average (50th percentile) and the 95th percentile vehicle queue. For unsignalized intersections, Synchro® reports the 95th percentile vehicle queue. Vehicle queue lengths are a function of the capacity of the movement under study and the volume of traffic being processed by the intersection during the analysis period. The 95th percentile vehicle queue is the vehicle queue length that will be exceeded only 5 percent of the time, or approximately 3 minutes out of 60 minutes during the peak one hour of the day (during the remaining 57 minutes, the vehicle queue length will be less than the 95th percentile queue length).

ANALYSIS RESULTS

Level-of-service and vehicle queue analyses were conducted for 2025 Existing, 2032 No-Build and 2032 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Tables 10 and 11, with the detailed analysis results presented in the Appendix.

As previously discussed, there are existing delays and vehicle queuing that occur within the study area from residual traffic conditions along I-93 northbound during the weekday evening peak-hour. This additional vehicle queuing occurs independent of and unrelated to the flow of traffic along the River Road corridor, and its variability cannot be accounted for in the capacity analysis results in a meaningful manner. That being said, the impact of the Project as it relates to these conditions is expected to be minimal given: i) the relatively minor increases in peak-hour traffic the Project represents over the existing office building that currently occupies the Project site and that will be removed to accommodate the Project; and ii) the primary directional flow of the trips associated with the Project will be counter to the movements that experience delay and extended vehicle queuing during the weekday evening peak-hour (i.e., the majority of Project-related trips will be entering during the weekday evening peak-hour vs. exiting).

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

Signalized Intersections (Table 10)

River Road at North Street and the Greater Lawrence Tech School Driveway

No change in LOS was shown to occur for any movement over No-Build conditions, with Project-related impacts generally defined as a change in overall average motorist delay that ranged between a reduction of 1.9 seconds to an increase of 0.3 seconds. Vehicle queuing at the intersection was shown to decrease by up to one (1) vehicle over No-Build conditions that include traffic volumes associated with the re-occupancy of the existing office building that will be removed to accommodate the Project. Independent of the Project, left-turn movements from the North Street approach currently operate at capacity (i.e., LOS "E") during the weekday morning peak-hour.

River Road at Old River Road and Federal Street

No change in overall LOS was shown to occur over No-Build conditions, with Project-related impacts generally defined as a change in overall average motorist delay that ranged between a reduction of 0.4 seconds to an increase of 0.8 seconds. Changes in vehicle queuing at the intersection were shown to range between a decrease of up to two (2) vehicles to an increase of up to one (1) vehicle over No-Build conditions that include traffic volumes associated with the re-occupancy of the existing office building that will be removed to accommodate the Project.

River Road at the I-93 Northbound Ramps

No change in LOS was shown to occur for any movement over No-Build conditions, with Project-related impacts generally defined as a change in overall average motorist delay that ranged between a reduction of 0.1 seconds to an increase of 0.6 seconds. Changes in vehicle queuing at the intersection were shown to range between a decrease of up to two (2) vehicles to an increase of up to two (2) vehicles over No-Build conditions that include traffic volumes associated with the re-occupancy of the existing office building that will be removed to accommodate the Project.

River Road at the I-93 Southbound Ramps

No change in overall LOS was shown to occur over No-Build conditions, with Project-related impacts generally defined as an increase in overall average motorist delay of up to 1.2 seconds that resulted in a corresponding increase in vehicle queuing of up to two (2) vehicles. Focusing on specific movements, the addition of Project-related traffic to left-turn movements from the River Road westbound approach caused a change in LOS from LOS C to LOS D (12.0 second increase in average motorist delay) during the weekday morning peak-hour.

River Road at Shattuck Road and Minuteman Road

No change in LOS was shown to occur for any movement over No-Build conditions, with Project-related impacts generally defined as an increase in overall average motorist delay of less than 1.0 seconds. Changes in vehicle queuing at the intersection were shown to range between a decrease of up to one (1) vehicle to an increase of up to one (1) vehicle over No-Build conditions that include traffic volumes associated with the re-occupancy of the existing office building that will be removed to accommodate the Project. Independent of the Project, overall intersection operations are predicted to be at capacity during the weekday evening peak-hour and right-turn movements from Shattuck Road and left-turn/through movements from Minuteman Road are predicted to operate over capacity (i.e., LOS "F") as a result of the additional traffic associated with the proposed developments at 300 and 3000 Minuteman Road.

Unsignalized Intersections (Table 11)

Old River Road at the South Project Site Driveway

All movements exiting the south Project site driveway to Old River Road are predicted to operate at LOS B during the peak periods with residual vehicle queuing of up to one (1) vehicle. All movements along Old River Road approaching the Project site driveway are predicted to operate at LOS A with residual vehicle queuing of up to one (1) vehicle. Actual delays for motorists exiting the south Project site driveway will be directly related to the extent and duration of vehicle queuing on the Old River Road approach to the River Road/Old River Road/Federal Street intersection.

Old River Road at the North Project Site Driveway

All movements exiting the north Project site driveway to Old River Road are predicted to operate at LOS A during the weekday morning peak-hour and at LOS B during the weekday evening peak-hour with negligible vehicle queuing. All movements along Old River Road approaching the Project site driveway are predicted to operate at LOS A, also with negligible vehicle queuing.

Table 10
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

	2025 Existing				2032 No-Build				2032 Build			
Signalized Intersection/Peak-Hour/Movement	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
River Road at North Street and Greater Lawrence Tech Driveway												
Weekday Morning:												
River Road EB LT	0.72	40.0	D	5/9	0.76	45.1	D	5/9	0.76	45.1	D	5/9
River Road EB TH	0.41	13.6	B	3/9	0.49	16.1	B	5/11	0.49	16.2	B	5/11
River Road EB RT	0.44	0.9	A	0/0	0.50	1.2	A	0/0	0.50	1.2	A	0/0
River Road WB LT	0.39	44.5	D	1/2	0.41	47.8	D	1/2	0.41	47.8	D	1/2
River Road WB TH/RT	0.69	27.0	C	8/15	0.90	39.5	D	12/24	0.87	36.9	D	11/23
North Street NB LT	0.93	68.4	E	5/15	1.09	110.9	F	8/19	1.06	101.8	F	7/18
North Street NB TH/RT	0.24	28.0	C	2/5	0.22	27.4	C	2/4	0.22	27.4	C	2/4
Greater Lawrence Tech SB LT	0.60	33.9	C	3/4	0.54	31.8	C	3/4	0.54	31.8	C	3/4
Greater Lawrence Tech SB TH/RT	0.26	28.1	C	2/3	0.23	27.5	C	2/3	0.23	27.5	C	2/3
Overall	--	**23.5**	**C**	--	--	**32.1**	**C**	--	--	**30.2**	**C**	--
Weekday Evening:												
River Road EB LT	0.29	32.1	C	1/2	0.41	37.7	D	1/2	0.42	38.0	D	1/2
River Road EB TH	0.36	14.3	B	2/7	0.46	15.5	B	3/10	0.45	15.7	B	3/10
River Road EB RT	0.17	0.2	A	0/0	0.23	0.4	A	0/0	0.23	0.3	A	0/0
River Road WB LT	0.27	32.6	C	1/2	0.34	36.2	D	1/2	0.34	36.5	D	1/2
River Road WB TH/RT	0.64	17.8	B	4/13	0.69	18.8	B	5/16	0.70	19.2	B	5/16
North Street NB LT	0.59	23.7	C	2/9	0.67	27.1	C	3/10	0.67	27.2	C	3/10
North Street NB TH/RT	0.07	18.1	B	0/2	0.07	18.8	B	0/2	0.07	18.6	B	0/2
Greater Lawrence Tech SB LT	0.05	17.9	B	0/1	0.04	18.6	B	0/1	0.04	18.5	B	0/1
Greater Lawrence Tech SB TH/RT	0.04	17.9	B	0/2	0.04	18.6	B	0/2	0.04	18.4	B	0/2
Overall	--	**15.6**	**B**	--	--	**16.5**	**B**	--	--	**16.8**	**B**	--

See notes at end of Table.

Table 10 (Continued)
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-Hour/Movement	2025 Existing				2032 No-Build				2032 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
River Road at Old River Road and Federal Street												
Weekday Morning:												
River Road EB LT	0.55	31.9	C	3/4	0.76	33.0	C	4/6	0.67	30.8	C	3/4
River Road EB TH/RT	0.79	14.8	B	9/22	0.84	10.0	B	4/14	0.87	11.4	B	4/14
River Road WB LT	0.30	32.3	C	1/3	0.57	36.2	D	1/3	0.57	36.2	D	1/3
River Road WB TH/RT	0.57	11.4	B	7/11	0.74	13.5	B	9/12	0.73	14.0	B	9/12
Federal Street NB LT/TH	0.54	35.8	D	2/3	0.62	37.1	D	2/3	0.54	30.9	C	2/3
Federal Street NB RT	0.01	31.5	C	0/0	0.01	28.5	C	0/0	0.01	27.1	C	0/0
Old River Road SB LT/TH	0.63	39.7	D	2/4	0.79	55.1	E	2/4	0.74	44.4	D	2/5
Old River Road SB RT	0.08	0.1	A	0/0	0.09	0.1	A	0/0	0.16	0.2	A	0/0
Overall	--	**16.1**	**B**	--	--	**15.1**	**B**	--	--	**14.7**	**B**	--
Weekday Evening:												
River Road EB LT	0.31	42.3	D	1/2	0.40	42.6	D	1/2	0.55	39.9	D	2/3
River Road EB TH/RT	0.54	19.9	B	3/10	0.58	6.4	A	3/4	0.57	6.3	A	4/5
River Road WB LT	0.07	37.0	D	0/1	0.11	38.3	D	0/1	0.11	38.3	D	0/1
River Road WB TH/RT	0.70	24.6	C	8/9	0.71	20.2	C	10/14	0.74	21.9	C	11/14
Federal Street NB LT/TH	0.64	21.4	C	5/12	0.87	44.6	D	6/11	0.85	41.9	D	6/10
Federal Street NB RT	0.04	14.7	B	0/0	0.04	18.9	B	0/0	0.04	19.2	B	0/0
Old River Road SB LT/TH	0.31	16.7	B	2/3	0.73	35.0	D	3/4	0.64	25.2	C	2/3
Old River Road SB RT	0.25	0.3	A	0/0	0.34	0.5	A	0/0	0.30	0.4	A	0/0
Overall	--	**18.7**	**B**	--	--	**16.1**	**B**	--	--	**16.9**	**B**	--
River Road at the I-93 Northbound Ramps												
Weekday Morning:												
River Road EB LT	0.54	39.8	D	3/4	0.63	33.3	C	3/4	0.63	33.0	C	3/4
River Road EB TH	0.58	4.5	A	4/5	0.74	6.9	A	5/7	0.71	6.5	A	4/5
River Road WB TH	0.34	22.5	C	5/9	0.56	12.1	B	3/5	0.63	12.5	B	4/6
River Road WB RT	0.36	0.6	A	0/0	0.40	0.6	A	0/0	0.41	0.6	A	0/0
I-93 NB Ramps SB LT	0.71	31.1	C	5/7	0.72	26.4	C	5/7	0.72	26.1	C	5/7
I-93 NB Ramps SB RT	0.33	15.6	B	3/4	0.56	13.1	B	5/7	0.56	13.1	B	5/7
Overall	--	**14.1**	**B**	--	--	**12.4**	**B**	--	--	**12.3**	**B**	--
Weekday Evening:												
River Road EB LT	0.71	19.4	B	3/7	0.88	16.3	B	4/5	0.88	15.7	B	4/5
River Road EB TH	0.29	4.2	A	1/5	0.37	1.2	A	1/1	0.38	1.4	A	1/1
River Road WB TH	0.53	16.1	B	8/9	0.77	19.4	B	8/8	0.78	19.4	B	7/7
River Road WB RT	0.57	1.4	A	1/2	0.68	2.0	A	2/3	0.64	1.7	A	1/2
I-93 NB Ramps SB LT	0.42	33.2	C	2/3	0.59	36.6	D	2/3	0.74	42.3	D	3/5
I-93 NB Ramps SB RT	0.11	13.3	B	1/1	0.19	11.0	B	2/2	0.18	10.7	B	2/2
Overall	--	**10.9**	**B**	--	--	**10.8**	**B**	--	--	**11.4**	**B**	--

See notes at end of Table.

Table 10 (Continued)
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-Hour/Movement	2025 Existing				2032 No-Build				2032 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
River Road at the I-93 Southbound Ramps												
Weekday Morning:												
River Road EB TH	0.44	13.1	B	3/3	0.81	21.4	C	6/7	0.82	22.1	C	6/7
River Road EB RT	0.09	0.1	A	0/0	0.16	0.2	A	0/0	0.16	0.2	A	0/0
River Road WB LT	0.51	35.5	D	3/4	0.71	33.5	C	3/5	0.88	45.5	D	3/7
River Road WB TH	0.35	12.0	B	5/7	0.78	15.8	B	8/13	0.78	15.7	B	9/13
I-93 SB Ramps NB LT	0.87	34.1	C	9/14	0.91	27.5	C	11/16	0.91	27.5	C	11/16
I-93 SB Ramps NB RT	0.61	1.6	A	0/0	0.71	2.4	A	0/0	0.68	2.1	A	0/0
Overall	--	**15.4**	**B**	--	--	**16.3**	**B**	--	--	**17.5**	**B**	--
Weekday Evening:												
River Road EB TH	0.45	14.1	B	5/9	0.90	20.3	C	12/12	0.91	20.9	C	12/12
River Road EB RT	0.25	0.3	A	0/0	0.48	0.1	A	0/0	0.48	0.1	A	0/0
River Road WB LT	0.68	49.9	D	5/6	0.71	45.1	D	6/8	0.71	45.3	D	6/9
River Road WB TH	0.14	1.0	A	0/1	0.23	1.5	A	1/1	0.23	1.5	A	1/1
I-93 SB Ramps NB LT	0.56	32.2	C	3/4	0.66	31.4	C	5/5	0.66	31.4	C	5/5
I-93 SB Ramps NB RT	0.35	0.5	A	0/0	0.39	0.7	A	0/0	0.40	0.7	A	0/0
Overall	--	**14.8**	**B**	--	--	**15.0**	**B**	--	--	**15.3**	**B**	--

See notes at end of Table.

Table 10 (Continued)
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-Hour/Movement	2025 Existing				2032 No-Build				2032 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
River Road at Shattuck Road and Minuteman Road												
Weekday Morning:												
River Road EB LT	0.33	39.5	D	1/1	0.55	34.8	C	1/2	0.55	34.8	C	1/2
River Road EB TH/RT	0.42	17.3	B	5/6	0.56	19.7	B	5/6	0.54	19.2	B	5/5
Eiver Road WB LT	0.69	37.2	D	5/5	0.71	25.4	C	4/5	0.71	25.9	C	4/5
River Road WB TH	0.63	6.8	A	2/15	0.85	21.7	C	12/19	0.86	21.8	C	12/20
River Road WB RT	0.19	0.2	A	0/0	0.66	1.2	A	0/0	0.66	1.2	A	0/0
Shattuck Road NB LT/TH	0.20	34.5	C	1/2	0.20	30.2	C	1/2	0.20	30.2	C	1/2
Shattuck Road NB RT	0.12	17.9	B	1/2	0.12	15.6	B	1/1	0.12	15.6	B	1/2
Minuteman Road SB LT	0.30	34.8	C	1/2	0.72	40.7	D	3/6	0.74	43.5	D	3/6
Minuteman Road SB LT/TH	0.30	34.8	C	1/2	0.74	41.8	D	3/6	0.76	44.4	D	3/6
Minuteman Road SB RT	0.01	0.0	A	0/0	0.01	0.0	A	0/0	0.01	0.0	A	0/0
Overall	--	**16.9**	**B**	--	--	**17.2**	**B**	--	--	**17.4**	**B**	--
Weekday Evening:												
River Road EB LT	0.22	38.9	D	0/1	0.28	37.8	D	1/1	0.28	37.8	D	1/1
River Road EB TH/RT	0.57	27.7	C	5/8	0.77	36.4	D	6/8	0.78	36.8	D	6/8
Eiver Road WB LT	0.40	40.9	D	2/3	0.45	36.0	D	2/2	0.46	35.9	D	2/2
River Road WB TH	0.62	25.6	C	5/14	0.92	45.3	D	6/15	0.89	40.5	D	6/14
River Road WB RT	0.03	0.0	A	0/0	0.22	0.3	A	0/0	0.22	0.3	A	0/0
Shattuck Road NB LT/TH	0.18	21.0	C	2/2	0.38	31.8	C	2/2	0.38	31.8	C	2/2
Shattuck Road NB RT	0.66	18.6	B	5/7	1.08	84.0	F	8/11	1.08	85.3	F	8/11
Minuteman Road SB LT	0.49	32.7	C	2/3	1.07	81.9	F	15/16	1.07	83.0	F	15/16
Minuteman Road SB LT/TH	0.49	32.7	C	2/3	1.07	84.6	F	15/16	1.08	85.7	F	15/16
Minuteman Road SB RT	0.01	0.0	A	0/0	0.04	0.0	A	0/0	0.04	0.0	A	0/0
Overall	--	**24.4**	**C**	--	--	**59.5**	**E**	--	--	**59.7**	**E**	--

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

Table 11
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

	2025 Existing				2032 No-Build				2032 Build			
Unsignalized Intersection/Peak-Hour/Movement	Demand[a]	Delay[b]	LOS[c]	Queue[d] 95th	Demand	Delay	LOS	Queue 95th	Demand	Delay	LOS	Queue 95th
Old River Road at the South Project Site Driveway												
Weekday Morning:												
Project Site Driveway EB LT/RT	--	--	--	--	--	--	--	--	103	10.3	B	1
Old River Road NB LT/TH	--	--	--	--	--	--	--	--	404	0.6	A	0
Old River Road SB TH/RT	--	--	--	--	--	--	--	--	223	0.0	A	0
Weekday Evening:												
Project Site Driveway EB LT/RT	--	--	--	--	--	--	--	--	51	11.4	B	1
Old River Road NB LT/TH	--	--	--	--	--	--	--	--	239	3.0	A	1
Old River Road SB TH/RT	--	--	--	--	--	--	--	--	406	0.0	A	0
Old River Road at the North Project Site Driveway												
Weekday Morning:												
Project Site Driveway EB LT/RT	--	--	--	--	--	--	--	--	34	9.5	A	0
Old River Road NB LT/TH	--	--	--	--	--	--	--	--	371	0.2	A	0
Old River Road SB TH/RT	--	--	--	--	--	--	--	--	189	0.0	A	0
Weekday Evening:												
Project Site Driveway EB LT/RT	--	--	--	--	--	--	--	--	17	10.9	B	0
Old River Road NB LT/TH	--	--	--	--	--	--	--	--	156	1.5	A	0
Old River Road SB TH/RT	--	--	--	--	--	--	--	--	389	0.0	A	0

[a]Demand in vehicles per hour.
[b]Average control delay per vehicle (in seconds).
[c]Level of service.
[d]Queue length in vehicles.
NB = northbound; NEB = northeastbound; SWB = southwestbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the Project site driveway intersections with Old River Road in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)[19] requirements. Stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, if the measured ISD is at least equal to the required SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 12 presents the measured SSD and ISD at the subject intersections.

[19] *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 12
SIGHT DISTANCE MEASUREMENTS[a]

Intersection/Sight Distance Measurement	Feet		
	Required Minimum (SSD)	Desirable (ISD)[b]	Measured
Old River Road at the South Project Site Driveway			
Stopping Sight Distance:			
Old River Road approaching from the south	200	--	441
Old River Road approaching from the north	200	--	500+
Intersection Sight Distance:			
Looking to the south from the Project Site Driveway	200	335	410
Looking to the north from the Project Site Driveway	200	290	253/500+[c]
Old River Road at the North Project Site Driveway			
Stopping Sight Distance:			
Old River Road approaching from the south	200	--	401
Old River Road approaching from the north	200	--	255[c]
Intersection Sight Distance:			
Looking to the south from the Project Site Driveway	200	335	281[c]
Looking to the north from the Project Site Driveway	200	290	251[c]

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets,* 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018; and based on a 30 mph approach speed along Old River Road.

[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]Available sight distance with the selective trimming/removal of trees and vegetation located within the sight triangle areas.

As can be seen in Table 12, with the selective trimming/removal of trees and vegetation, the regrading of embankment areas and modification of the existing stone walls along the south side of Old River Road where present within the sight triangle areas of the Project site driveways, all of which will be required to allow for the construction of the Project and the associated driveways, the available lines of sight to and from the Project site driveways will exceed the required minimum sight distance for the driveways to function in a safe manner (SSD) based on a 30 mph approach speed along River Road, which is above the both the measured 85th percentile vehicle travel speeds (26/28 mph) and the statutory speed limit along the roadway (25 mph).

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

VAI has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed construction of a multifamily residential development to be located at 100 Old River Road in Andover, Massachusetts. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE[20] and with adjustments to account for internal and pass-by trips for the retail component, the Project is expected to generate approximately 2,008 new vehicle trips on an average weekday (two-way, 24 hour volume), with 179 new vehicle trips expected during the weekday morning peak-hour and 169 new vehicle trips expected during the weekday evening peak-hour;

2. In comparison to the existing office building that occupies the Project site, was recently vacated (April 2025) and will be removed to accommodate the Project, the Project is expected to generate approximately 1,090 additional vehicle trips on an average weekday (again, two-way, 24-hour volume), with 25 additional vehicle trips expected during the weekday morning peak-hour and 27 additional vehicle trips expected during the weekday evening peak-hour;

3. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition), with majority of movements at the study area intersections expected to continue to operate at LOS D or better with the addition of Project-related traffic, where an LOS of "D" or better is defined as "acceptable" traffic operations. Project-related impacts were generally defined as an increase in average motorist delay of up to 12.0 seconds and in vehicle queuing of up to two (2) vehicles;

4. All movements exiting the Project-site driveways to Old River Road are predicted to operate at LOS B or better during the peak hours with residual vehicle queuing of up to

[20]Institute of Transportation Engineers, op. cit. 1.

one (1) vehicle. All movements along Old River Road approaching the Project site driveways are predicted to operate at LOS A, with vehicle queuing of up to one (1) vehicle;

5. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections; and

6. Lines of sight to and from the Project site driveways exceed, or can be made to exceed, the recommended minimum distance to function in a safe manner based on the appropriate approach speed.

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

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended as a part of this evaluation and will be completed in coordination with the Town. The Project proponent will partner with the Town to prepare a Community One Stop for Growth grant application for a MassWorks or HousingWorks grant to construct the recommended off-site improvement measures.

Project Access

Access to the Project site will be provided by way of two (2) full-access driveways that will intersect the south side of Old River Road approximately 175 feet northwest of Campanelli Drive (approximately 360 feet northwest of River Road) and approximately 400 feet northwest of New England Business Center Drive, respectively. The existing driveways that serve the Project site will be closed in conjunction with the Project. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation:

- The Project site driveways and internal circulating drives should be a minimum of 24 feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle.

- Where perpendicular parking is proposed, the drive aisle behind the parking should be a minimum of 23-feet wide.

- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided.

- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).[21]

- Americans with Disabilities Act (ADA) compliant wheelchair ramps should be provided at all locations where pedestrian crossings are to be provided.

[21]Federal Highway Administration, op. cit. 3.

- Existing trees and vegetation located along the south side of Old River Road within the sight triangle areas of the Project site driveways should be selectively trimmed/removed and maintained so as to not restrict lines of sight. Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas should be designed and maintained so as not to restrict lines of sight.

- The existing embankment along the south side of Old River Road in the vicinity of the east Project site driveway and the existing stone wall along the Project site frontage on Old River Road should be modified as necessary to provide the required lines of sight to and from the driveways.

- Snow accumulations (windrows) within sight triangle areas shall be promptly removed where such accumulations would impede sight lines.

- Consideration should be given to providing electric vehicle (EV) charging stations for use by residents of the Project and to establishing short-term parking proximate to building entrances for delivery service providers and ride-share vehicles. At a minimum, 20% of the proposed parking spaces should be EV ready.

Off-Site

River Road Corridor Traffic Signal System

Independent of the Project, specific movements at signalized intersections located along the River Road corridor are currently or are predicted to operate at or over capacity (i.e., LOS "E or "F"). In an effort to improve operating conditions along the corridor, an optimal traffic signal timing, phasing and coordination (where appropriate) plan should be developed for the following signalized intersections along the River Road corridor:

- River Road at North Street and the Greater Lawrence Technical School Driveway
- River Road at Old River Road and Federal Street (coordinated)
- River Road at the I-95 Northbound Ramps (coordinated)
- River Road at the I-95 Southbound Ramps (coordinated)
- River Road at Shattuck Road (coordinated)

The Project proponent proposes to provide a financial contribution to the Town in an amount sufficient to allow the Town to design and implement these improvements. The amount of the financial contribution will be determined in consultation with the Town and will be deposited in an escrow account for use by the Town for said purpose as a condition of the issuance of the Building Permit for the Project. As can be seen in Table 13, with implementation of an optimal traffic signal timing, phasing and coordination plan for the signalized intersections along the River Road corridor, overall intersection operations are expected to be maintained at or improve over No-Build conditions with the majority movements at the study intersections shown to continue to operate at LOS D or better.

Old River Road Mobility Improvements

Pedestrian accommodations are not currently provided along the Old River Road corridor which limits pedestrian connectivity to public transportation services that are provided by the Merrimack Valley Transit (MeVa) proximate to the Project site at Campanelli Drive. In order to improve mobility along Old River Road and to connect the Project and the proximate area business to the MeVa bus service, it is recommended that a sidewalk be constructed along the north side of Old River Road from a point just west of the south Project site driveway and Campanelli Drive (approximately 240 linear feet), with a marked crosswalk, accompanying ADA-compliant wheelchair ramps and a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) with associated pedestrian crossing warning signs installed for crossing Old River Road. The Project proponent, in coordination with the Town, will design and construct these improvements as shown on Figure 12, prior to the issuance of a certificate of occupancy for the Project, subject to receipt of all necessary rights, permits and approvals.

Extension of the sidewalk to the northwest to include New England Business Center Drive and to the southeast to include River Road and a crossing of River Road at the River Road/Old River Road/Federal Street as a part of a larger infrastructure improvement project could be the subject of the Community One Stop for Growth grant application and would serve to improve mobility along River Road beyond the infrastructure needed to connect the Project to the MeVa bus.

Transportation Demand Management

Regularly scheduled public transportation services are provided in the vicinity of the Project site by MeVa. MeVa operates bus Route 37, *Beacon Street*, which travels along River Road with service to the Buckley Transportation Center in Lawrence. At the Buckley Transportation Center, connections can be made to other MeVa bus routes and to the MBTA Commuter Rail system (Haverhill Line) with service to North Station in Boston. The closest regular stop to the Project site for the Route 37 bus is at 6 Campanelli Drive (American Training), which is an approximate 5-minutes walking distance. In addition to regular stops, MeVa buses also operate in a passenger demand service mode, where a passenger can request a stop anywhere along the regular service route where it is safe to pick-up or discharge a passenger by signaling to the driver.

In addition to fixed-route bus services, MeVa provides accessible transportation services for eligible persons who cannot use fixed-route transit all or some of the time due to a physical, cognitive, or mental disability in accordance with ADA requirements, and Andover Elder Services coordinates transportation for residents age 60+ from the Robb Center for medical appointments and shopping.

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

- A Transportation Coordinator (TC) will be assigned for the Project, who may also have other duties, to coordinate the TDM program;
- Information regarding public transportation services, maps, schedules, and fare information will be posted in a central location and/or otherwise made available to residents;

N

LIMIT OF WORK MEET EXISTING

OLD RIVER ROAD

NEW ENGLAND BUSINESS CENTER DRIVE

ANDOVER COMPANIES DRIVEWAY

CAMPANELLI DRIVE

I-93 NB RAMPS

RIVER ROAD

FEDERAL STREET

R1-1

CLOSE EXISTING DRIVEWAY

PROPOSED CROSSWALK WITH RECTANGULAR RAPID FLASHING BEACON (SEE DETAIL)

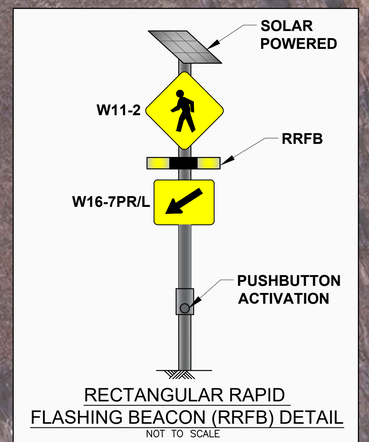
PROPOSED5.5' SIDEWALK (TYP.)

W4-2

DESIGN AND IMPLEMENT OPTIMAL TRAFFIC SIGNAL TIMING, PHASING AND COORDINATION PLAN FOR RIVER ROAD COORDINATED TRAFFIC SIGNAL SYSTEM

SIGN LEGEND

R1-1	STOP
R4-7	
W4-2	



RECTANGULAR RAPID FLASHING BEACON (RRFB) DETAIL
NOT TO SCALE

60 0 60 120
SCALE IN FEET

NOTES:
1. THIS PLAN IS FOR REVIEW PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION.
2. BASE PLAN INFORMATION OBTAINED FROM GOOGLE EARTH, BOHLER ENGINEERING, & MASSGIS.

FIGURE 12
OLD RIVER ROAD MOBILITY IMPROVEMENTS CONCEPTUAL IMPROVEMENT PLAN

PROJECT:
PROPOSED MULTIFAMILY RESIDENTIAL DEVELOPMENT
ANDOVER, MASSACHUSETTS

PROPONENT:
JMC/SVP 100 OLD RIVER ROAD LLC
BRAINTREE, MASSACHUSETTS

NO.	REVISIONS	DATE

Vanasse & Associates inc
Transportation Engineers & Planners
35 New England Business Center Drive – Suite 140 – Andover, MA 01810
www.rdva.com 978-474-8800

DESIGNED BY:	JSD	DATE:	11/24/2025
DRAWN BY:	JTG	SCALE:	1" = 60'
CHECKED BY:	JSD	SHEET	1 OF 1

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- A "welcome packet" will be provided to residents that will include the contact information for the TC and detailing available public transportation services, bicycle and walking alternatives, and other commuter options;

- A central mailroom and package delivery station will be provided; and

- Bicycle parking will be provided for 232 bicycles within the Project site, including 216 covered bicycle parking spaces and 16 exterior bicycle parking spaces.

In addition, it is recommended that the Town of Andover and MeVa be consulted to discuss opportunities to establish a bus stop for the Route 37 bus at or proximate to the Project site along Old River Road. To the extent that bus service is established to the Project site, a bus stop will be designed and constructed by the Project proponent in accordance with MeVa standards subject to receipt of all necessary rights, permits and approvals. The location of the bus stop should inform the Old River Road Mobility Improvements described above.

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

Table 13
MITIGATED SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-Hour/Movement	2032 No-Build				2032 Build				2032 Build Mitigated			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
River Road at North Street and Greater Lawrence Tech Driveway												
Weekday Morning:												
River Road EB LT	0.76	45.1	D	5/9	0.76	45.1	D	5/9	0.79	49.5	D	5/11
River Road EB TH	0.49	16.1	B	5/11	0.49	16.2	B	5/11	0.51	17.3	B	5/11
River Road EB RT	0.50	1.2	A	0/0	0.50	1.2	A	0/0	0.50	1.2	A	0/0
River Road WB LT	0.41	47.8	D	1/2	0.41	47.8	D	1/2	0.41	48.5	D	1/2
River Road WB TH/RT	0.90	39.5	D	12/24	0.87	36.9	D	11/23	0.89	39.3	D	11/23
North Street NB LT	1.09	110.9	F	8/19	1.06	101.8	F	7/18	0.99	79.8	E	7/18
North Street NB TH/RT	0.22	27.4	C	2/4	0.22	27.4	C	2/4	0.21	26.4	C	2/4
Greater Lawrence Tech SB LT	0.54	31.8	C	3/4	0.54	31.8	C	3/4	0.51	30.0	C	3/4
Greater Lawrence Tech SB TH/RT	0.23	27.5	C	2/3	0.23	27.5	C	2/3	0.22	26.5	C	2/3
Overall	--	**32.1**	**C**	--	--	**30.2**	**C**	--	--	**29.3**	**C**	--
Weekday Evening:												
River Road EB LT	0.41	37.7	D	1/2	0.42	38.0	D	1/2	0.42	38.0	D	1/2
River Road EB TH	0.46	15.5	B	3/10	0.45	15.7	B	3/10	0.45	15.5	B	3/10
River Road EB RT	0.23	0.4	A	0/0	0.23	0.3	A	0/0	0.23	0.3	A	0/0
River Road WB LT	0.34	36.2	D	1/2	0.34	36.5	D	1/2	0.34	36.5	D	1/2
River Road WB TH/RT	0.69	18.8	B	5/16	0.70	19.2	B	5/16	0.69	19.0	B	5/16
North Street NB LT	0.67	27.1	C	3/10	0.67	27.2	C	3/10	0.68	27.5	C	3/10
North Street NB TH/RT	0.07	18.8	B	0/2	0.07	18.6	B	0/2	0.07	18.8	B	0/2
Greater Lawrence Tech SB LT	0.04	18.6	B	0/1	0.04	18.5	B	0/1	0.04	18.6	B	0/1
Greater Lawrence Tech SB TH/RT	0.04	18.6	B	0/2	0.04	18.4	B	0/2	0.04	18.6	B	0/1
Overall	--	**16.5**	**B**	--	--	**16.8**	**B**	--	--	**16.7**	**B**	--

See notes at end of Table.

Table 13 (Continued)
MITIGATED SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-Hour/Movement	2032 No-Build				2032 Build				2032 Build Mitigated			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
River Road at Old River Road and Federal Street												
Weekday Morning:												
River Road EB LT	0.76	33.0	C	4/6	0.67	30.8	C	3/4	0.76	34.7	C	3/6
River Road EB TH/RT	0.84	10.0	B	4/14	0.87	11.4	B	4/14	0.87	11.4	B	4/14
River Road WB LT	0.57	36.2	D	1/3	0.57	36.2	D	1/3	0.57	36.2	D	1/3
River Road WB TH/RT	0.74	13.5	B	9/12	0.73	14.0	B	9/12	0.71	12.8	B	8/10
Federal Street NB LT/TH	0.62	37.1	D	2/3	0.54	30.9	C	2/3	0.54	30.9	C	2/3
Federal Street NB RT	0.01	28.5	C	0/0	0.01	27.1	C	0/0	0.01	27.1	C	0/0
Old River Road SB LT/TH	0.79	55.1	E	2/4	0.74	44.4	D	2/5	0.74	44.4	D	2/5
Old River Road SB RT	0.09	0.1	A	0/0	0.16	0.2	A	0/0	0.16	0.2	A	0/0
Overall	--	**15.1**	**B**	--	--	**14.7**	**B**	--	--	**14.7**	**B**	--
Weekday Evening:												
River Road EB LT	0.40	42.6	D	1/2	0.55	39.9	D	2/3	0.55	41.7	D	2/3
River Road EB TH/RT	0.58	6.4	A	3/4	0.57	6.3	A	4/5	0.57	6.0	A	3/5
River Road WB LT	0.11	38.3	D	0/1	0.11	38.3	D	0/1	0.11	38.3	D	0/1
River Road WB TH/RT	0.71	20.2	C	10/14	0.74	21.9	C	11/14	0.74	21.9	C	11/14
Federal Street NB LT/TH	0.87	44.6	D	6/11	0.85	41.9	D	6/10	0.85	41.9	D	6/10
Federal Street NB RT	0.04	18.9	B	0/0	0.04	19.2	B	0/0	0.04	19.2	B	0/0
Old River Road SB LT/TH	0.73	35.0	D	3/4	0.64	25.2	C	2/3	0.64	28.2	C	2/3
Old River Road SB RT	0.34	0.5	A	0/0	0.30	0.4	A	0/0	0.30	0.4	A	0/0
Overall	--	**16.1**	**B**	--	--	**16.9**	**B**	--	--	**16.9**	**B**	--
River Road at the I-93 Northbound Ramps												
Weekday Morning:												
River Road EB LT	0.63	33.3	C	3/4	0.63	33.0	C	3/4	0.63	33.0	C	3/4
River Road EB TH	0.74	6.9	A	5/7	0.71	6.5	A	4/5	0.71	6.5	A	4/5
River Road WB TH	0.56	12.1	B	3/5	0.63	12.5	B	4/6	0.63	12.3	B	4/6
River Road WB RT	0.40	0.6	A	0/0	0.41	0.6	A	0/0	0.41	0.7	A	0/0
I-93 NB Ramps SB LT	0.72	26.4	C	5/7	0.72	26.1	C	5/7	0.72	26.1	C	5/7
I-93 NB Ramps SB RT	0.56	13.1	B	5/7	0.56	13.1	B	5/7	0.56	13.1	B	5/7
Overall	--	**12.4**	**B**	--	--	**12.3**	**B**	--	--	**12.3**	**B**	--
Weekday Evening:												
River Road EB LT	0.88	16.3	B	4/5	0.88	15.7	B	4/5	0.88	16.1	B	5/5
River Road EB TH	0.37	1.2	A	1/1	0.38	1.4	A	1/1	0.39	1.8	A	1/1
River Road WB TH	0.77	19.4	B	8/8	0.78	19.4	B	7/7	0.79	20.3	C	8/8
River Road WB RT	0.68	2.0	A	2/3	0.64	1.7	A	1/2	0.64	1.7	A	1/2
I-93 NB Ramps SB LT	0.59	36.6	D	2/3	0.74	42.3	D	3/5	0.71	39.7	D	3/5
I-93 NB Ramps SB RT	0.19	11.0	B	2/2	0.18	10.7	B	2/2	0.18	10.4	B	2/2
Overall	--	**10.8**	**B**	--	--	**11.4**	**B**	--	--	**11.6**	**B**	--

See notes at end of Table.

Table 13 (Continued)
MITIGATED SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

	2032 No-Build				2032 Build				2032 Build Mitigated			
Signalized Intersection/Peak-Hour/Movement	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
River Road at the I-93 Southbound Ramps												
Weekday Morning:												
River Road EB TH	0.81	21.4	C	6/7	0.82	22.1	C	6/7	0.81	21.8	C	6/7
River Road EB RT	0.16	0.2	A	0/0	0.16	0.2	A	0/0	0.16	0.2	A	0/0
River Road WB LT	0.71	33.5	C	3/5	0.88	45.5	D	3/7	0.82	37.0	D	3/6
River Road WB TH	0.78	15.8	B	8/13	0.78	15.7	B	9/13	0.77	15.0	B	9/13
I-93 SB Ramps NB LT	0.91	27.5	C	11/16	0.91	27.5	C	11/16	0.93	30.7	C	11/16
I-93 SB Ramps NB RT	0.71	2.4	A	0/0	0.68	2.1	A	0/0	0.68	2.1	A	0/0
Overall	--	**16.3**	**B**	--	--	**17.5**	**B**	--	--	**17.5**	**B**	--
Weekday Evening:												
River Road EB TH	0.90	20.3	C	12/12	0.91	20.9	C	12/12	0.90	20.3	C	12/12
River Road EB RT	0.48	0.1	A	0/0	0.48	0.1	A	0/0	0.48	0.1	A	0/0
River Road WB LT	0.71	45.1	D	6/8	0.71	45.3	D	6/9	0.73	47.8	D	6/8
River Road WB TH	0.23	1.5	A	1/1	0.23	1.5	A	1/1	0.23	1.5	A	1/1
I-93 SB Ramps NB LT	0.66	31.4	C	5/5	0.66	31.4	C	5/5	0.66	31.4	C	5/5
I-93 SB Ramps NB RT	0.39	0.7	A	0/0	0.40	0.7	A	0/0	0.40	0.7	A	0/0
Overall	--	**15.0**	**B**	--	--	**15.3**	**B**	--	--	**15.4**	**B**	--

See notes at end of Table.

Table 13 (Continued)
MITIGATED SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

	2032 No-Build				2032 Build				2032 Build Mitigated			
Signalized Intersection/Peak-Hour/Movement	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
River Road at Shattuck Road and Minuteman Road												
Weekday Morning:												
River Road EB LT	0.55	34.8	C	1/2	0.55	34.8	C	1/2	0.55	34.8	C	1/2
River Road EB TH/RT	0.56	19.7	B	5/6	0.54	19.2	B	5/5	0.54	19.2	B	5/5
Eiver Road WB LT	0.71	25.4	C	4/5	0.71	25.9	C	4/5	0.71	25.9	C	4/5
River Road WB TH	0.85	21.7	C	12/19	0.86	21.8	C	12/20	0.86	21.8	C	12/19
River Road WB RT	0.66	1.2	A	0/0	0.66	1.2	A	0/0	0.66	1.2	A	0/0
Shattuck Road NB LT/TH	0.20	30.2	C	1/2	0.20	30.2	C	1/2	0.20	30.2	C	1/2
Shattuck Road NB RT	0.12	15.6	B	1/1	0.12	15.6	B	1/2	0.12	15.6	B	1/2
Minuteman Road SB LT	0.72	40.7	D	3/6	0.74	43.5	D	3/6	0.74	43.5	D	3/6
Minuteman Road SB LT/TH	0.74	41.8	D	3/6	0.76	44.4	D	3/6	0.76	44.4	D	3/6
Minuteman Road SB RT	0.01	0.0	A	0/0	0.01	0.0	A	0/0	0.01	0.0	A	0/0
Overall	--	**17.2**	**B**	--	--	**17.4**	**B**	--	--	**17.4**	**B**	--
Weekday Evening:												
River Road EB LT	0.28	37.8	D	1/1	0.28	37.8	D	1/1	0.28	37.8	D	1/1
River Road EB TH/RT	0.77	36.4	D	6/8	0.78	36.8	D	6/8	0.78	36.8	D	6/8
Eiver Road WB LT	0.45	36.0	D	2/2	0.46	35.9	D	2/2	0.46	35.7	D	2/2
River Road WB TH	0.92	45.3	D	6/15	0.89	40.5	D	6/14	0.89	40.2	D	6/14
River Road WB RT	0.22	0.3	A	0/0	0.22	0.3	A	0/0	0.22	0.3	A	0/0
Shattuck Road NB LT/TH	0.38	31.8	C	2/2	0.38	31.8	C	2/2	0.38	31.8	C	2/2
Shattuck Road NB RT	1.08	84.0	F	8/11	1.08	85.3	F	8/11	1.08	85.3	F	8/11
Minuteman Road SB LT	1.07	81.9	F	15/16	1.07	83.0	F	15/16	1.07	83.0	F	15/16
Minuteman Road SB LT/TH	1.07	84.6	F	15/16	1.08	85.7	F	15/16	1.08	85.7	F	15/16
Minuteman Road SB RT	0.04	0.0	A	0/0	0.04	0.0	A	0/0	0.04	0.0	A	0/0
Overall	--	**59.5**	**E**	--	--	**59.7**	**E**	--	--	**59.6**	**E**	--

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

APPENDIX

PROJECT SITE PLAN
AUTOMATIC TRAFFIC RECORDER COUNT DATA
TURNING MOVEMENT COUNT DATA
SEASONAL ADJUSTMENT DATA
COVID ADJUSTMENT DATA
PUBLIC TRANSPORTATION SCHEDULES
VEHICLE TRAVEL SPEED DATA
RIVER ROAD TRAFFIC SIGNAL SYSTEM TIMING PLANS
MASSDOT CRASH DATA
MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAP
GENERAL BACKGROUND TRAFFIC GROWTH
BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS
TRIP-GENERATION CALCULATIONS
TRIP DISTRIBUTION DATA
CAPACITY ANALYSIS WORKSHEETS

PROJECT SITE PLAN

NAD83

SITE PARKING LEGEND

QUANTITY	SYMBOL	TYPE	SIZE
106	XX	STANDARD PARKING SPACES	9' X 18'
6	XX	ACCESSIBLE PARKING SPACES	8' X 18'
46	XX	COMPACT PARKING SPACES	8' X 16'

PARKING REQUIREMENTS

ITEM	PERMITTED	EXISTING	PROPOSED
MIN PARKING STALL SIZE	9 X 18 FT	9 X 18.5 FT	9 X 18 FT
MIN COMPACT PARKING STALL SIZE	8 X 16 FT	8.5 X 16 FT	8 X 16 FT
MIN AISLE WIDTH (60-90 DEG STALLS)	24 FT	24 FT ±	24 FT
MIN SIDE YARD PARKING SETBACK	5 FT	46.4 FT	61.2 FT ±
MIN FRONT YARD PARKING SETBACK	20 FT	27.2 FT	38.1 FT
PARKING COUNT	648 [3]	115	648 [4]
MAX COMPACT PARKING STALLS	FOR "ALL DAY PARKERS" [1]	N/A	106 SPACES
COVERED BICYCLE SPACES	216	N/A	216
SITE BICYCLE SPACES		N/A	16

KEY
(V) VARIANCE
(W) WAIVER

MULTI-FAMILY RESIDENTIAL
REQUIRED CAR SPACES= 1.5 SPACES PER DWELLING UNIT
432 UNITS * 1.5 = 648 SPACES

RETAIL[3]: 4 SPACE PER 1,000 SF
2,950 SF* 4 SPACES/1000 SF = 12 SPACES [3]

REQUIRED BICYCLE SPACES: 1 BICYCLE SPACE PER 2 DWELLING UNITS
432 DWELLING UNITS = 216 BICYCLE SPACES

[1] SECTION 5.1.8.8 - THE SIZE OF A PARKING SPACE MAY BE REDUCED TO A COMPACT CAR SPACE AS PRESENTED IN APPENDIX A, TABLE 4, FOR THOSE SPACES SERVING ALL-DAY PARKERS. USES THAT GENERATE FREQUENT PARKING SPACE TURNOVER SHALL BE REQUIRED TO HAVE THE STANDARD SIZE PARKING SPACES.

[2] SECTION 8.9.5.4.B - NOR WITHIN ANY MINIMUM SETBACK UNDER SECTION 8.9.4. SURFACE PARKING SHALL BE LOCATED TO THE REAR OR SIDE OF THE PRINCIPAL BUILDING.

[3] SECTION 8.9.5.4.E - THE PLANNING BOARD MAY ALLOW FOR SHARED PARKING FACILITIES WITHIN THE MOD FOR DIFFERENT BUILDINGS OR USES

[4] 490 PARKING STALLS IN PROPOSED GARAGE, 158 SURFACE PARKING

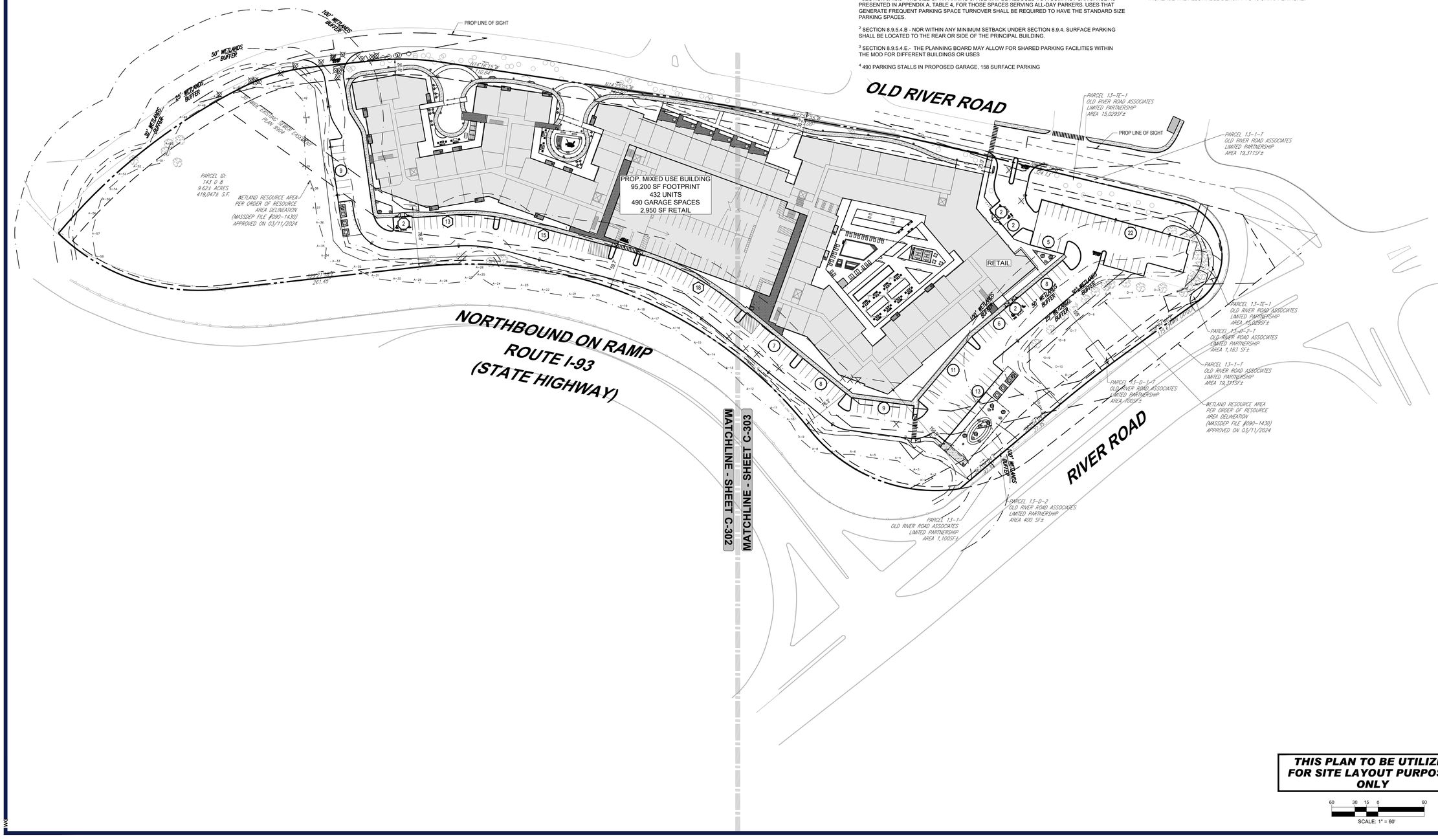
ZONING TABLE

BASE ZONE: INDUSTRIAL D2
OVERLAY ZONE: MODRR - MULTI-FAMILY OVERLAY DISTRICT (RIVER ROAD)
USE: MIXED USE

BULK REQUIREMENTS

ITEM	PERMITTED	EXISTING	PROPOSED
MIN LOT AREA	N/A	418,900 SF ±	418,900 SF ±
MIN LOT FRONTAGE	50'	1550'±	1550'±
MIN YARD SETBACKS			
FRONT YARD	20'	97.9'±	20.8'±
SIDE YARD	5'	90.8'±	156.9'±
REAR YARD	5'	92.6'±	59.7'±
MAX BUILDING HEIGHT (FT)	55' (65) [1]	37.7'±	64.5' (SP) [1]
MAX BUILDING HEIGHT (STORIES)	4 (5) [1]	3	5 (SP) [1]
MAX LOT COVERAGE	30%	10.0%	22.7%
MIN OPEN SPACE	10%	54.2%	33.3%
MAX UNITS PER ACRE	35 (45) [1]	N/A	45 (SP)[1]

SECTION 8.9.4.6 - IN THE MODRR SUBDISTRICT, THE PLANNING BOARD MAY GRANT A SPECIAL PERMIT TO AUTHORIZE AN INCREASE IN THE MAXIMUM BUILDING HEIGHT, UP TO 5 STORIES AND 65 FEET, FOR A MIXED-USE STRUCTURE AND INCREASE THE ALLOWABLE DENSITY TO 45 UNITS PER ACRE.



THIS PLAN TO BE UTILIZED FOR SITE LAYOUT PURPOSES ONLY

60 30 15 0 60
SCALE: 1" = 60'

Jan 09, 2026
\\BOHLERENG.NET\SHARES\MA-PROJECTS\2025\MAB250074.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVIL SITE-MAB250074.00-08 ----\LAYOUT\ C-301 SITE OVAL

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE WORKING DESIGN AND CONTENT OF THIS PLAN IS PROPRIETARY AND SHALL NOT BE COPIED OR USED FOR ANY PURPOSE WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

Know what's below. Call before you dig.
ALWAYS CALL 811
It's fast. It's free. It's the law.

ENTITLEMENT SET

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MAB250074.00-08
DRAWN BY:	WG/AT
CHECKED BY:	ZLR
DATE:	01/09/2025
CAD I.D.:	P-CIVL-SITE-MAB250074.00

PROJECT:

SITE PLAN REVIEW/SPECIAL PERMIT SET

FOR

JOHN M CORCORAN & CO
SV+P

PROPOSED
THE COMMONS AT RIVER ROAD

100 OLD RIVER ROAD
ESSEX COUNTY
TOWN OF ANDOVER, MA 01810
MAP, BLOCK & LOT: 143 - 0 - 8

BOHLER
45 FRANKLIN STREET, 5th FLOOR
BOSTON, MA 02110
Phone: (617) 849-8040
www.BohlerEngineering.com

SHEET TITLE:

OVERALL SITE PLAN

SHEET NUMBER:

C-301

ORG. DATE - 01/09/2025

AUTOMATIC TRAFFIC RECORDER COUNT DATA

Accurate Counts

978-664-2565

L OdR rR d S C d
L N r OdR rR d
C S A d r MA

	NB				H rT				SB				H rT				C dT			
	T	M r		A r		M r		A r		M r		A r		M r		A r		M r		A r

T
P r

Accurate Counts
978-664-2565

L OdR rR d S C d
L Nr OdR rR d
C S Ad r MA

	NB		H rT		SB		H rT		C dT	
T	M r	A r	M r	A r	M r	A r	M r	A r	M r	A r

Accurate Counts
978-664-2565

L O d R r R d S C d
L N r O d R r R d
C S A d r MA

T	M d NB	M d SB	T d NB	T d SB	d d NB	d d SB	T r d NB	T r d SB	Fr d NB	Fr d SB	S rd NB	S rd SB	S d NB	S d SB	A r NB	A r SB
AM																
PM																
T D																
AM P																
PM P																

C T
ADT ADT AADT

TURNING MOVEMENT COUNT DATA

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars - Trucks

	Greater Lawrence Technical School From North			River Rd From East			North St From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	17	19	2	4	93	5	38	18	2	105	140	108	551
07:15 AM	28	19	2	7	117	31	39	41	2	111	136	162	695
07:30 AM	48	25	1	6	133	62	54	34	4	75	166	109	717
07:45 AM	7	3	5	8	186	9	61	3	5	10	105	157	559
Total	100	66	10	25	529	107	192	96	13	301	547	536	2522
08:00 AM	9	1	5	4	189	11	72	1	3	8	155	103	561
08:15 AM	2	0	2	0	179	2	59	0	9	10	142	68	473
08:30 AM	3	0	1	7	188	6	73	0	3	4	150	50	485
08:45 AM	1	0	1	2	162	2	78	0	5	3	138	51	443
Total	15	1	9	13	718	21	282	1	20	25	585	272	1962
Grand Total	115	67	19	38	1247	128	474	97	33	326	1132	808	4484
Apprch %	57.2	33.3	9.5	2.7	88.3	9.1	78.5	16.1	5.5	14.4	50	35.7	
Total %	2.6	1.5	0.4	0.8	27.8	2.9	10.6	2.2	0.7	7.3	25.2	18	
Cars	113	55	19	37	1154	128	455	95	32	321	1083	782	4274
% Cars	98.3	82.1	100	97.4	92.5	100	96	97.9	97	98.5	95.7	96.8	95.3
Trucks	2	12	0	1	93	0	19	2	1	5	49	26	210
% Trucks	1.7	17.9	0	2.6	7.5	0	4	2.1	3	1.5	4.3	3.2	4.7

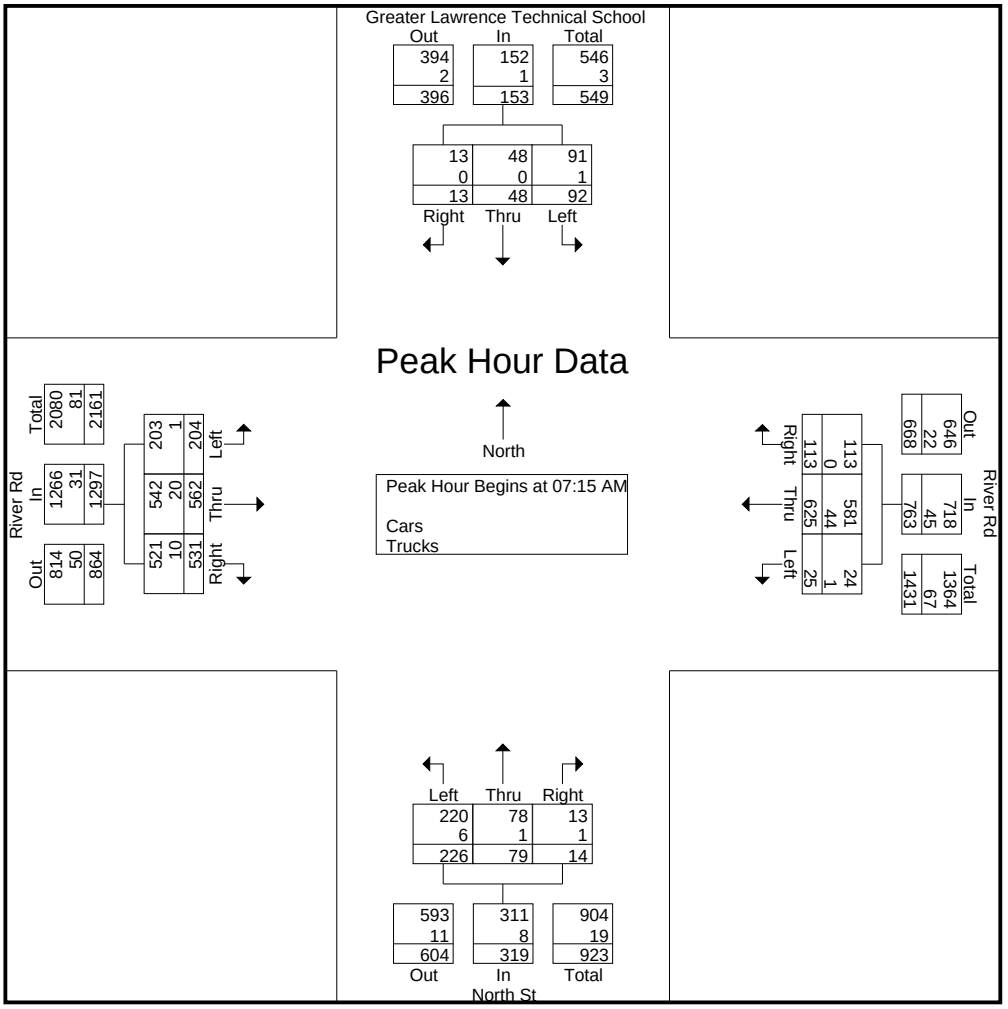
	Greater Lawrence Technical School From North				River Rd From East				North St From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	28	19	2	49	7	117	31	155	39	**41**	2	82	**111**	136	**162**	**409**	695
07:30 AM	**48**	**25**	1	**74**	6	133	**62**	201	54	34	4	**92**	75	**166**	109	350	**717**
07:45 AM	7	3	**5**	15	**8**	186	9	203	61	3	**5**	69	10	105	157	272	559
08:00 AM	9	1	5	15	4	**189**	11	**204**	**72**	1	3	76	8	155	103	266	561
Total Volume	92	48	13	153	25	625	113	763	226	79	14	319	204	562	531	1297	2532
% App. Total	60.1	31.4	8.5		3.3	81.9	14.8		70.8	24.8	4.4		15.7	43.3	40.9		
PHF	.479	.480	.650	.517	.781	.827	.456	.935	.785	.482	.700	.867	.459	.846	.819	.793	.883
Cars	91	48	13	152	24	581	113	718	220	78	13	311	203	542	521	1266	2447
% Cars	98.9	100	100	99.3	96.0	93.0	100	94.1	97.3	98.7	92.9	97.5	99.5	96.4	98.1	97.6	96.6
Trucks	1	0	0	1	1	44	0	45	6	1	1	8	1	20	10	31	85
% Trucks	1.1	0	0	0.7	4.0	7.0	0	5.9	2.7	1.3	7.1	2.5	0.5	3.6	1.9	2.4	3.4

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
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:

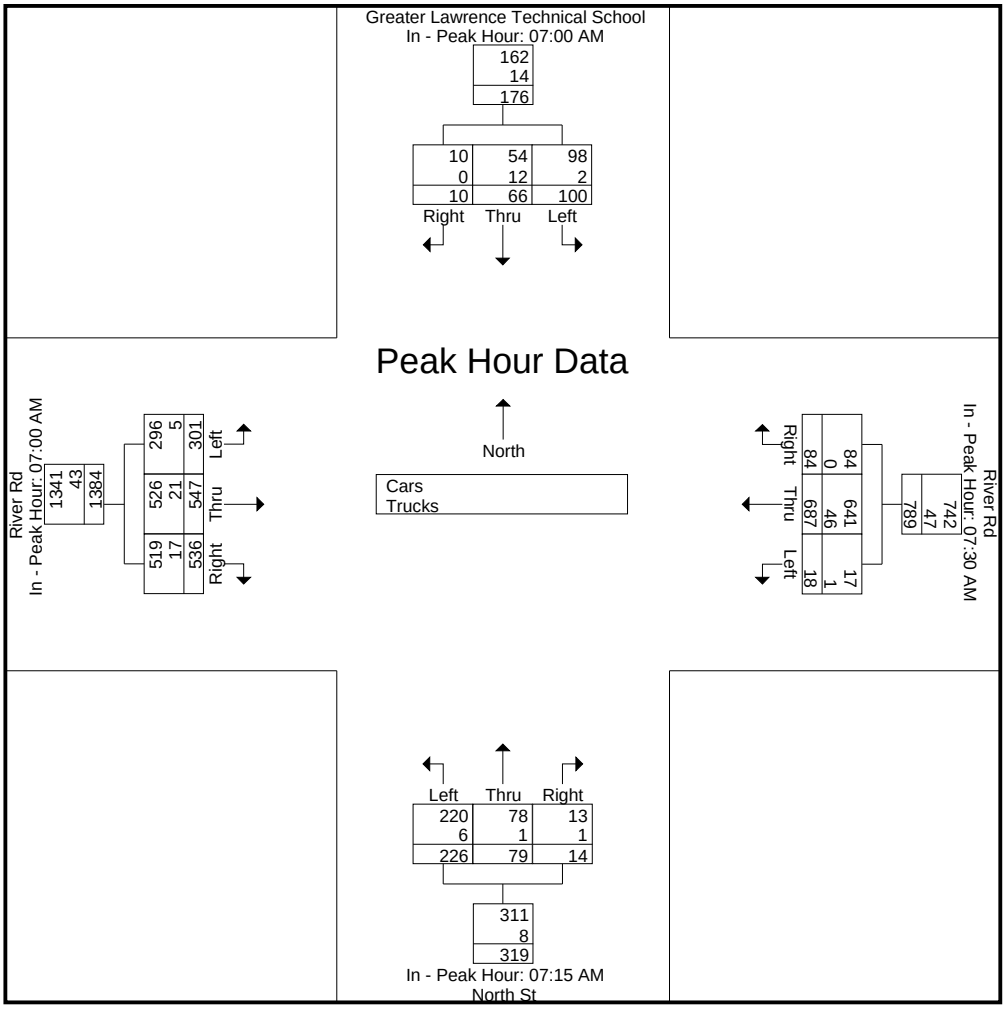
	07:00 AM				07:30 AM				07:15 AM				07:00 AM			
+0 mins.	17	19	2	38	6	133	**62**	201	39	**41**	2	82	105	140	108	353
+15 mins.	28	19	2	49	**8**	186	9	203	54	34	4	**92**	**111**	136	**162**	**409**
+30 mins.	**48**	**25**	1	**74**	4	**189**	11	**204**	61	3	**5**	69	75	**166**	109	350
+45 mins.	7	3	**5**	15	0	179	2	181	**72**	1	3	76	10	105	157	272
Total Volume	100	66	10	176	18	687	84	789	226	79	14	319	301	547	536	1384
% App. Total	56.8	37.5	5.7		2.3	87.1	10.6		70.8	24.8	4.4		21.7	39.5	38.7	
PHF	.521	.660	.500	.595	.563	.909	.339	.967	.785	.482	.700	.867	.678	.824	.827	.846
Cars	98	54	10	162	17	641	84	742	220	78	13	311	296	526	519	1341
% Cars	98	81.8	100	92	94.4	93.3	100	94	97.3	98.7	92.9	97.5	98.3	96.2	96.8	96.9
Trucks	2	12	0	14	1	46	0	47	6	1	1	8	5	21	17	43
% Trucks	2	18.2	0	8	5.6	6.7	0	6	2.7	1.3	7.1	2.5	1.7	3.8	3.2	3.1

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025

Groups Printed- Cars

	Greater Lawrence Technical School From North			River Rd From East			North St From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	16	7	2	4	82	5	37	17	2	101	135	99	507
07:15 AM	28	19	2	7	106	31	39	41	2	111	134	156	676
07:30 AM	47	25	1	5	122	62	53	34	3	74	158	108	692
07:45 AM	7	3	5	8	172	9	58	2	5	10	99	156	534
Total	98	54	10	24	482	107	187	94	12	296	526	519	2409
08:00 AM	9	1	5	4	181	11	70	1	3	8	151	101	545
08:15 AM	2	0	2	0	166	2	58	0	9	10	135	63	447
08:30 AM	3	0	1	7	178	6	71	0	3	4	140	48	461
08:45 AM	1	0	1	2	147	2	69	0	5	3	131	51	412
Total	15	1	9	13	672	21	268	1	20	25	557	263	1865
Grand Total	113	55	19	37	1154	128	455	95	32	321	1083	782	4274
Apprch %	60.4	29.4	10.2	2.8	87.5	9.7	78.2	16.3	5.5	14.7	49.5	35.8	
Total %	2.6	1.3	0.4	0.9	27	3	10.6	2.2	0.7	7.5	25.3	18.3	

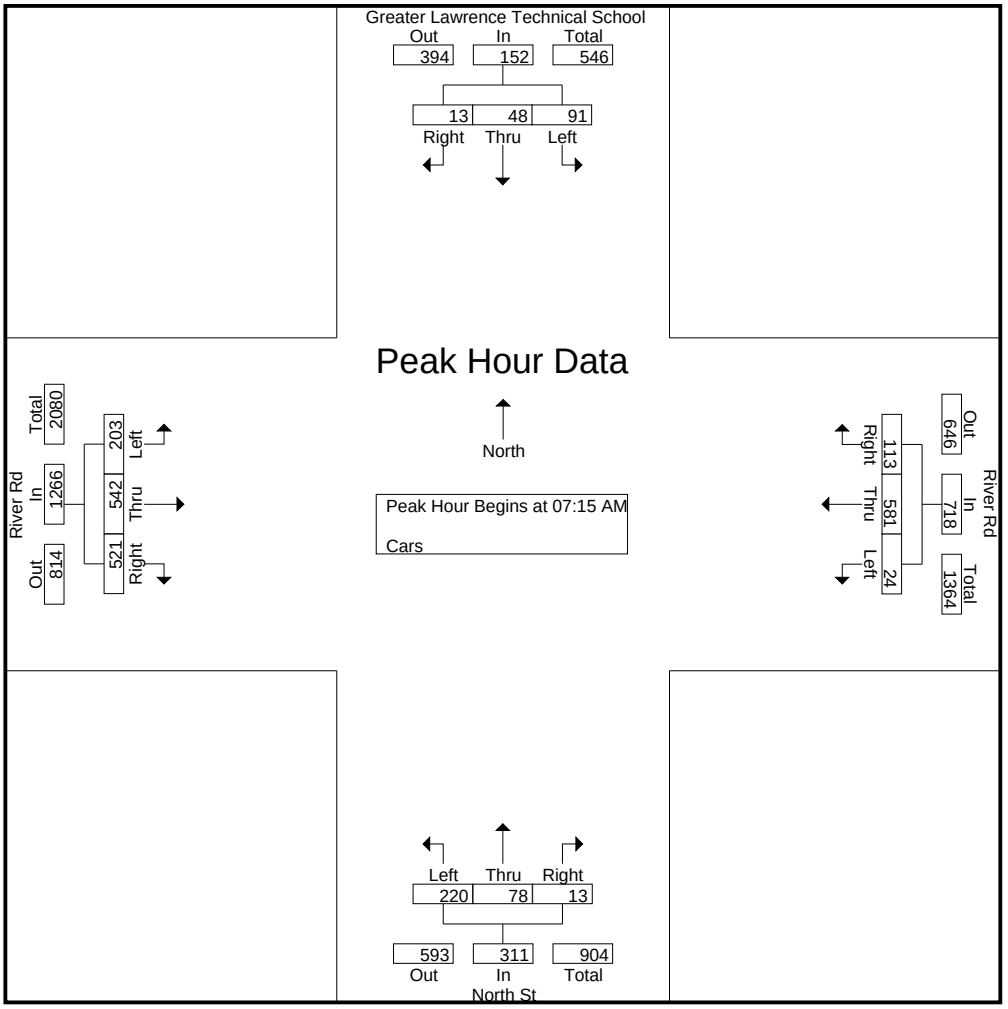
	Greater Lawrence Technical School From North				River Rd From East				North St From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	28	19	2	49	7	106	31	144	39	**41**	2	82	**111**	134	**156**	**401**	676
07:30 AM	**47**	**25**	1	**73**	5	122	**62**	189	53	34	3	**90**	74	**158**	108	340	**692**
07:45 AM	7	3	**5**	15	**8**	172	9	189	58	2	**5**	65	10	99	156	265	534
08:00 AM	9	1	5	15	4	**181**	11	**196**	**70**	1	3	74	8	151	101	260	545
Total Volume	91	48	13	152	24	581	113	718	220	78	13	311	203	542	521	1266	2447
% App. Total	59.9	31.6	8.6		3.3	80.9	15.7		70.7	25.1	4.2		16	42.8	41.2		
PHF	.484	.480	.650	.521	.750	.802	.456	.916	.786	.476	.650	.864	.457	.858	.835	.789	.884

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 5



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

Peak Hour for Each Approach Begins at:

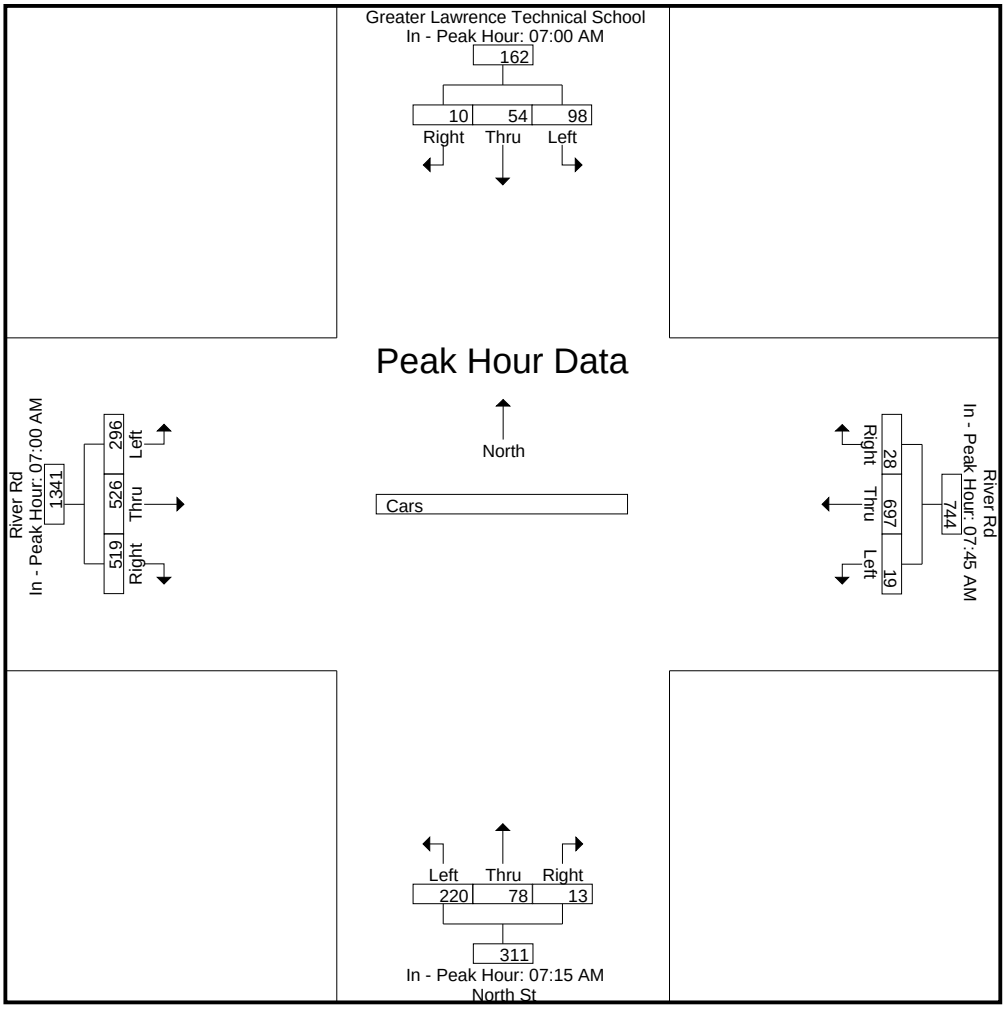
	07:00 AM				07:45 AM				07:15 AM				07:00 AM			
+0 mins.	16	7	2	25	**8**	172	9	189	39	**41**	2	82	101	135	99	335
+15 mins.	28	19	2	49	4	**181**	**11**	**196**	53	34	3	**90**	**111**	134	**156**	**401**
+30 mins.	**47**	**25**	1	**73**	0	166	2	168	58	2	**5**	65	74	**158**	108	340
+45 mins.	7	3	**5**	15	7	178	6	191	**70**	1	3	74	10	99	156	265
Total Volume	98	54	10	162	19	697	28	744	220	78	13	311	296	526	519	1341
% App. Total	60.5	33.3	6.2		2.6	93.7	3.8		70.7	25.1	4.2		22.1	39.2	38.7	
PHF	.521	.540	.500	.555	.594	.963	.636	.949	.786	.476	.650	.864	.667	.832	.832	.836

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025

Groups Printed- Trucks

	Greater Lawrence Technical School From North			River Rd From East			North St From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	1	12	0	0	11	0	1	1	0	4	5	9	44
07:15 AM	0	0	0	0	11	0	0	0	0	0	2	6	19
07:30 AM	1	0	0	1	11	0	1	0	1	1	8	1	25
07:45 AM	0	0	0	0	14	0	3	1	0	0	6	1	25
Total	2	12	0	1	47	0	5	2	1	5	21	17	113
08:00 AM	0	0	0	0	8	0	2	0	0	0	4	2	16
08:15 AM	0	0	0	0	13	0	1	0	0	0	7	5	26
08:30 AM	0	0	0	0	10	0	2	0	0	0	10	2	24
08:45 AM	0	0	0	0	15	0	9	0	0	0	7	0	31
Total	0	0	0	0	46	0	14	0	0	0	28	9	97
Grand Total	2	12	0	1	93	0	19	2	1	5	49	26	210
Apprch %	14.3	85.7	0	1.1	98.9	0	86.4	9.1	4.5	6.2	61.2	32.5	
Total %	1	5.7	0	0.5	44.3	0	9	1	0.5	2.4	23.3	12.4	

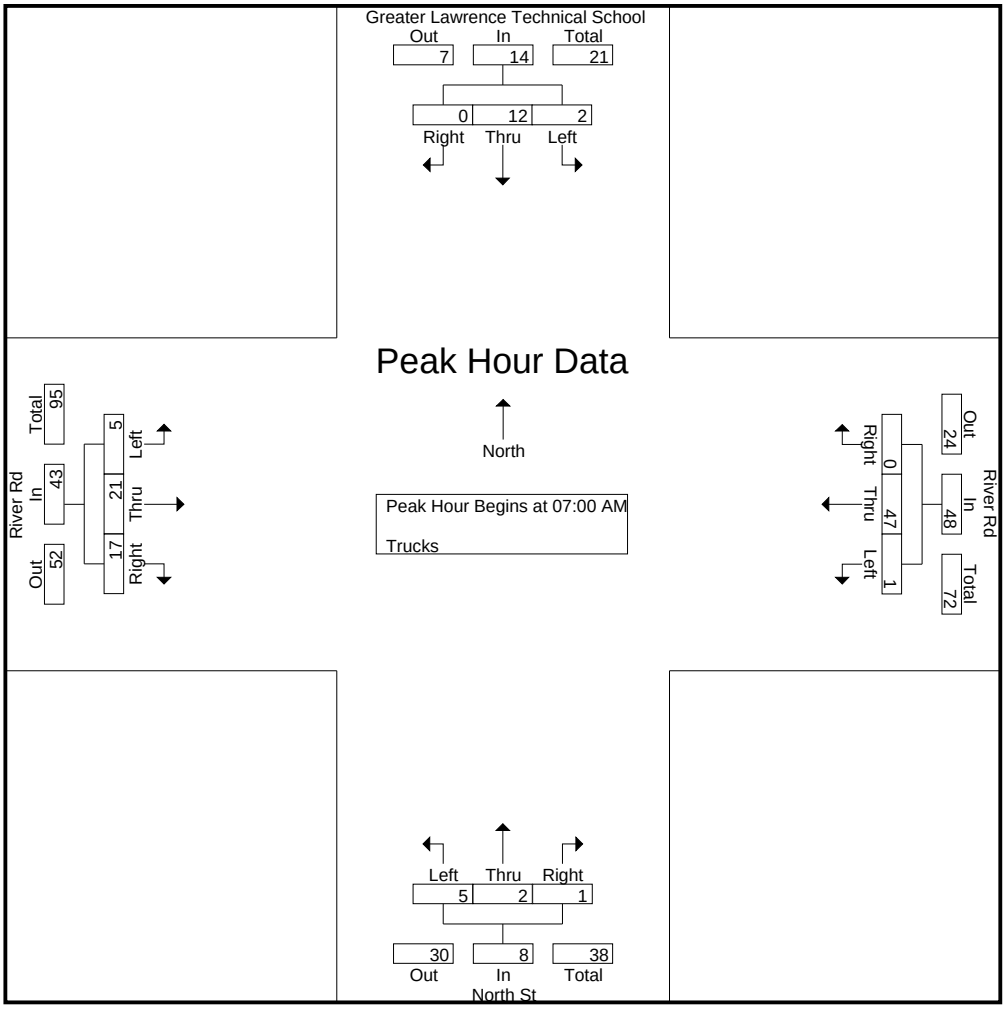
	Greater Lawrence Technical School From North				River Rd From East				North St From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**1**	**12**	0	**13**	0	11	0	11	1	**1**	0	2	**4**	5	**9**	**18**	**44**
07:15 AM	0	0	0	0	0	11	0	11	0	0	0	0	0	2	6	8	19
07:30 AM	1	0	0	1	**1**	11	0	12	1	0	**1**	2	1	**8**	1	10	25
07:45 AM	0	0	0	0	0	**14**	0	**14**	**3**	1	0	**4**	0	6	1	7	25
Total Volume	2	12	0	14	1	47	0	48	5	2	1	8	5	21	17	43	113
% App. Total	14.3	85.7	0		2.1	97.9	0		62.5	25	12.5		11.6	48.8	39.5		
PHF	.500	.250	.000	.269	.250	.839	.000	.857	.417	.500	.250	.500	.313	.656	.472	.597	.642

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 8



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

Peak Hour for Each Approach Begins at:

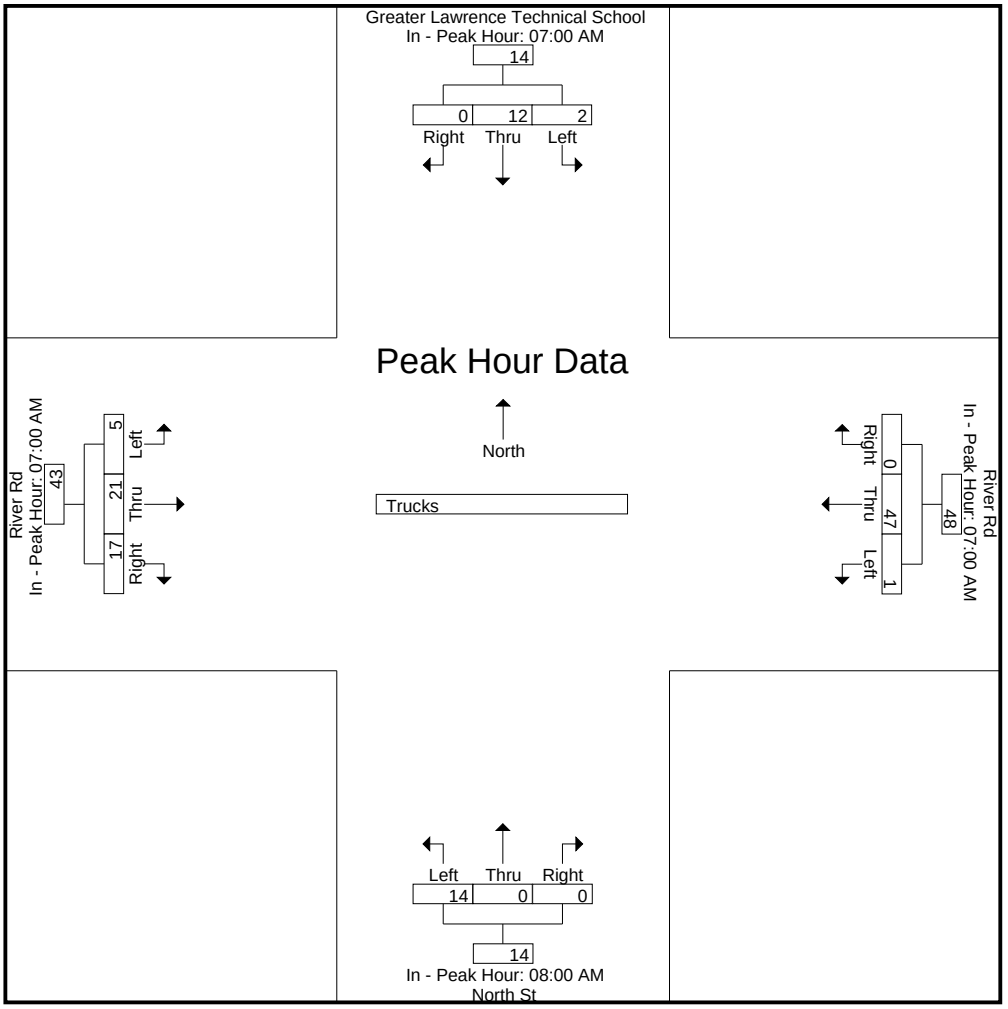
	07:00 AM				07:00 AM				08:00 AM				07:00 AM			
+0 mins.	**1**	**12**	0	**13**	0	11	0	11	2	0	0	2	**4**	5	**9**	**18**
+15 mins.	0	0	0	0	0	11	0	11	1	0	0	1	0	2	6	8
+30 mins.	1	0	0	1	**1**	11	0	12	2	0	0	2	1	**8**	1	10
+45 mins.	0	0	0	0	0	**14**	0	**14**	**9**	0	0	**9**	0	6	1	7
Total Volume	2	12	0	14	1	47	0	48	14	0	0	14	5	21	17	43
% App. Total	14.3	85.7	0		2.1	97.9	0		100	0	0		11.6	48.8	39.5	
PHF	.500	.250	.000	.269	.250	.839	.000	.857	.389	.000	.000	.389	.313	.656	.472	.597

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025

Groups Printed- Bikes Peds

	Greater Lawrence Technical School From North				River Rd From East				North St From South				River 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	0	0	0	0	0	0	0	0	0	0	0	0
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	3	0	0	0	0	0	1	0	0	3	1	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	0	4	1	5
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	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	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	2
Grand Total	0	0	0	1	0	1	0	4	0	0	0	0	0	1	0	0	5	2	7
Apprch %	0	0	0		0	100	0		0	0	0		0	100	0				
Total %	0	0	0		0	50	0		0	0	0		0	50	0		71.4	28.6	

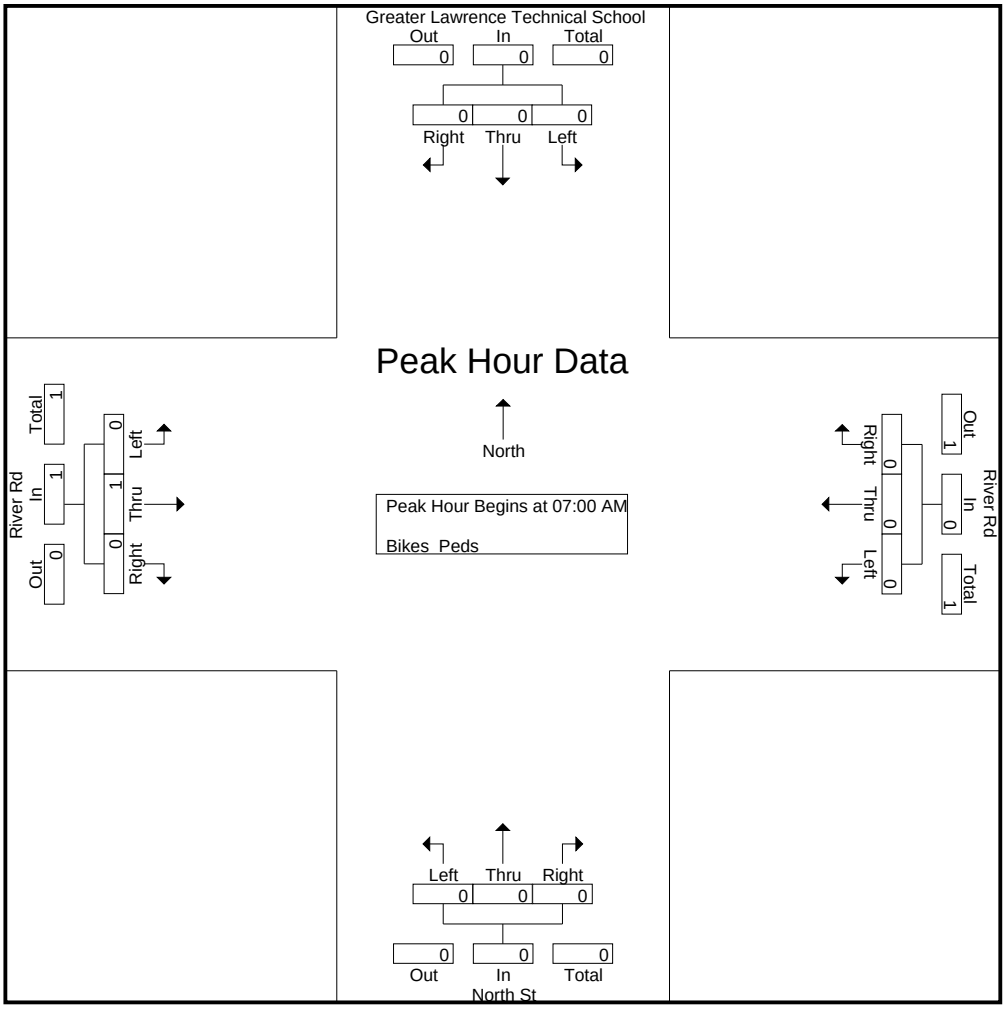
	Greater Lawrence Technical School From North				River Rd From East				North St From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of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

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 11



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

Peak Hour for Each Approach Begins at:

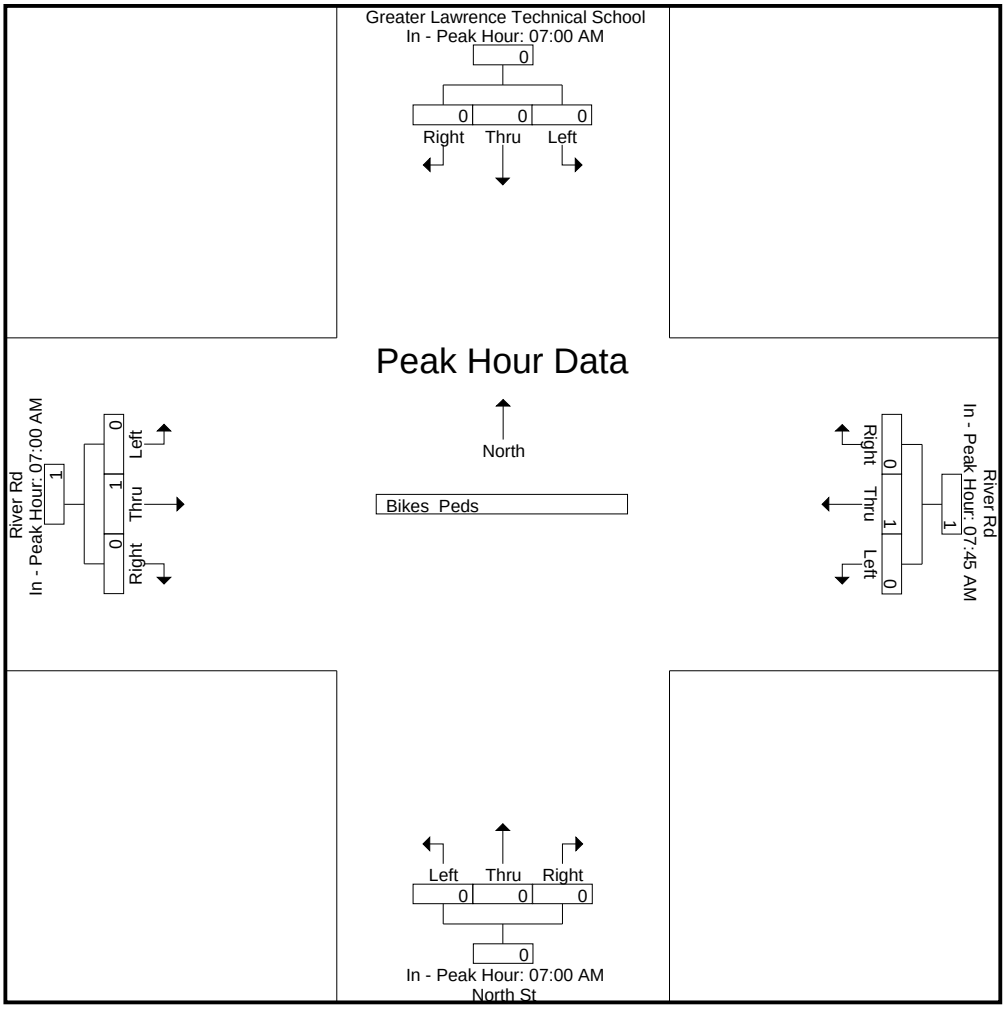
	07:00 AM				07:45 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**
+45 mins.	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1
% App. Total	0	0	0		0	100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

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars - Trucks

	Greater Lawrence Technical School From North			River Rd From East			North St From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
03:00 PM	2	2	9	5	194	3	41	4	1	7	128	61	457
03:15 PM	4	1	4	3	166	3	59	7	3	9	99	69	427
03:30 PM	5	3	4	6	203	3	54	5	8	6	125	66	488
03:45 PM	3	6	3	5	135	5	37	5	6	5	133	58	401
Total	14	12	20	19	698	14	191	21	18	27	485	254	1773
04:00 PM	4	4	3	8	213	1	35	4	7	9	110	66	464
04:15 PM	6	3	1	4	120	8	35	14	3	9	93	65	361
04:30 PM	4	13	4	3	162	9	35	4	4	19	102	72	431
04:45 PM	4	4	5	3	145	5	36	9	2	8	98	63	382
Total	18	24	13	18	640	23	141	31	16	45	403	266	1638
05:00 PM	4	13	2	5	170	7	28	3	4	18	113	69	436
05:15 PM	10	10	2	4	146	15	27	2	1	24	108	75	424
05:30 PM	14	5	6	4	148	21	42	10	4	51	112	64	481
05:45 PM	7	11	3	7	100	20	52	7	2	50	97	55	411
Total	35	39	13	20	564	63	149	22	11	143	430	263	1752
Grand Total	67	75	46	57	1902	100	481	74	45	215	1318	783	5163
Apprch %	35.6	39.9	24.5	2.8	92.4	4.9	80.2	12.3	7.5	9.3	56.9	33.8	
Total %	1.3	1.5	0.9	1.1	36.8	1.9	9.3	1.4	0.9	4.2	25.5	15.2	
Cars	64	73	46	55	1865	99	471	70	44	208	1266	770	5031
% Cars	95.5	97.3	100	96.5	98.1	99	97.9	94.6	97.8	96.7	96.1	98.3	97.4
Trucks	3	2	0	2	37	1	10	4	1	7	52	13	132
% Trucks	4.5	2.7	0	3.5	1.9	1	2.1	5.4	2.2	3.3	3.9	1.7	2.6

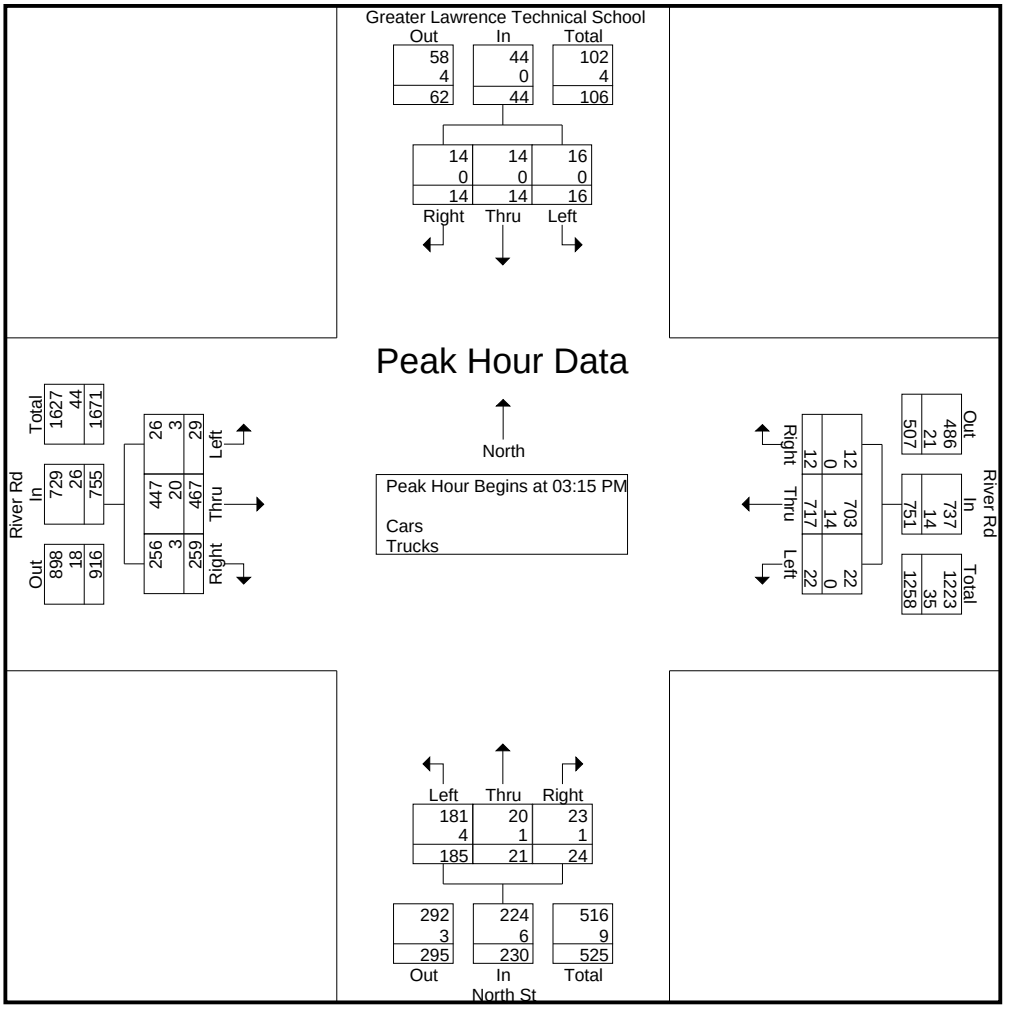
	Greater Lawrence Technical School From North				River Rd From East				North St From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	4	1	**4**	9	3	166	3	172	**59**	**7**	3	**69**	**9**	99	**69**	177	427
03:30 PM	**5**	3	4	**12**	6	203	3	212	54	5	**8**	67	6	125	66	**197**	**488**
03:45 PM	3	**6**	3	12	5	135	**5**	145	37	5	6	48	5	**133**	58	196	401
04:00 PM	4	4	3	11	**8**	**213**	1	**222**	35	4	7	46	9	110	66	185	464
Total Volume	16	14	14	44	22	717	12	751	185	21	24	230	29	467	259	755	1780
% App. Total	36.4	31.8	31.8		2.9	95.5	1.6		80.4	9.1	10.4		3.8	61.9	34.3		
PHF	.800	.583	.875	.917	.688	.842	.600	.846	.784	.750	.750	.833	.806	.878	.938	.958	.912
Cars	16	14	14	44	22	703	12	737	181	20	23	224	26	447	256	729	1734
% Cars	100	100	100	100	100	98.0	100	98.1	97.8	95.2	95.8	97.4	89.7	95.7	98.8	96.6	97.4
Trucks	0	0	0	0	0	14	0	14	4	1	1	6	3	20	3	26	46
% Trucks	0	0	0	0	0	2.0	0	1.9	2.2	4.8	4.2	2.6	10.3	4.3	1.2	3.4	2.6

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

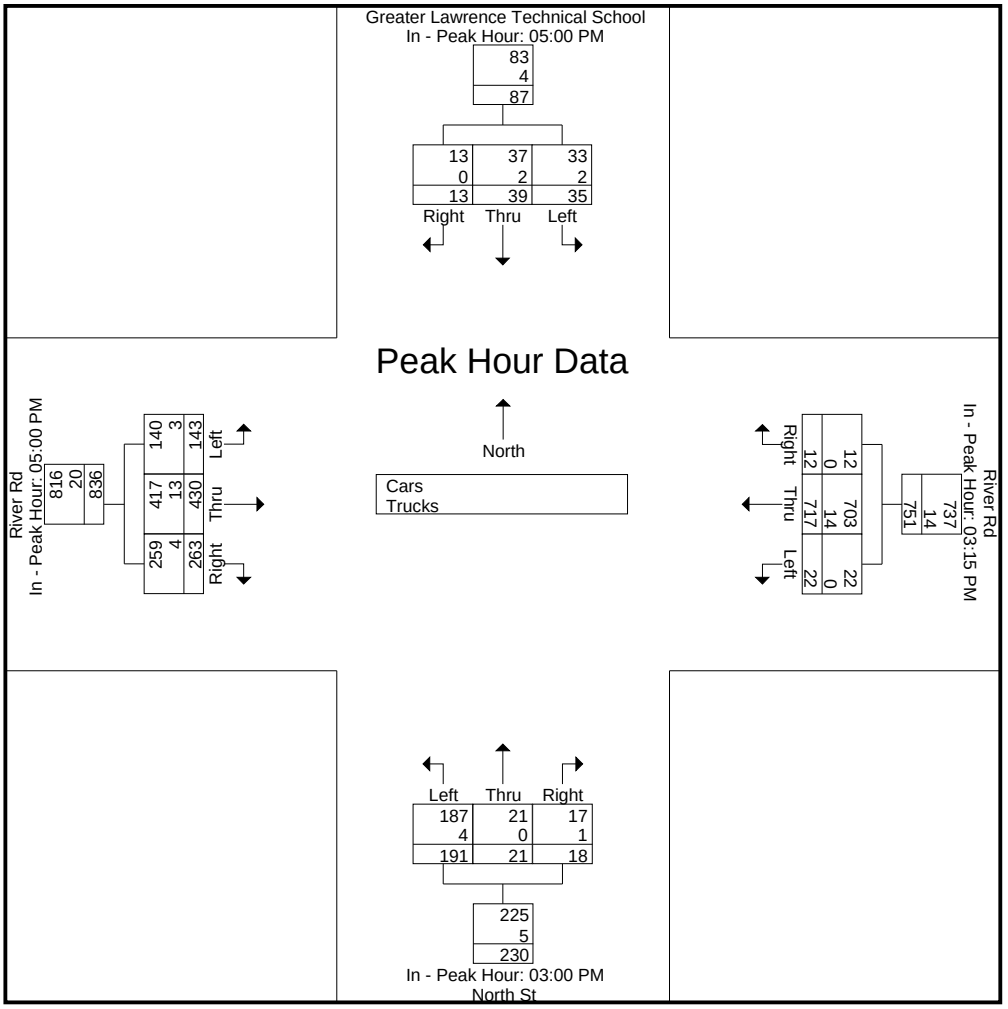
	05:00 PM				03:15 PM				03:00 PM				05:00 PM			
+0 mins.	4	**13**	2	19	3	166	3	172	41	4	1	46	18	**113**	69	200
+15 mins.	10	10	2	22	6	203	3	212	**59**	**7**	3	**69**	24	108	**75**	207
+30 mins.	**14**	5	**6**	**25**	5	135	**5**	145	54	5	**8**	67	**51**	112	64	**227**
+45 mins.	7	11	3	21	**8**	**213**	1	**222**	37	5	6	48	50	97	55	202
Total Volume	35	39	13	87	22	717	12	751	191	21	18	230	143	430	263	836
% App. Total	40.2	44.8	14.9		2.9	95.5	1.6		83	9.1	7.8		17.1	51.4	31.5	
PHF	.625	.750	.542	.870	.688	.842	.600	.846	.809	.750	.563	.833	.701	.951	.877	.921
Cars	33	37	13	83	22	703	12	737	187	21	17	225	140	417	259	816
% Cars	94.3	94.9	100	95.4	100	98	100	98.1	97.9	100	94.4	97.8	97.9	97	98.5	97.6
Trucks	2	2	0	4	0	14	0	14	4	0	1	5	3	13	4	20
% Trucks	5.7	5.1	0	4.6	0	2	0	1.9	2.1	0	5.6	2.2	2.1	3	1.5	2.4

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025

Groups Printed- Cars

	Greater Lawrence Technical School From North			River Rd From East			North St From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
03:00 PM	2	2	9	4	188	3	39	4	1	6	125	60	443
03:15 PM	4	1	4	3	165	3	58	7	3	9	89	68	414
03:30 PM	5	3	4	6	199	3	53	5	8	6	122	64	478
03:45 PM	3	6	3	5	130	5	37	5	5	5	129	58	391
Total	14	12	20	18	682	14	187	21	17	26	465	250	1726
04:00 PM	4	4	3	8	209	1	33	3	7	6	107	66	451
04:15 PM	6	3	1	3	119	8	34	12	3	9	89	62	349
04:30 PM	3	13	4	3	161	9	34	4	4	19	96	70	420
04:45 PM	4	4	5	3	145	5	36	9	2	8	92	63	376
Total	17	24	13	17	634	23	137	28	16	42	384	261	1596
05:00 PM	4	13	2	5	164	7	27	3	4	17	109	68	423
05:15 PM	9	8	2	4	144	15	27	2	1	22	105	74	413
05:30 PM	14	5	6	4	142	20	41	10	4	51	109	63	469
05:45 PM	6	11	3	7	99	20	52	6	2	50	94	54	404
Total	33	37	13	20	549	62	147	21	11	140	417	259	1709
Grand Total	64	73	46	55	1865	99	471	70	44	208	1266	770	5031
Apprch %	35	39.9	25.1	2.7	92.4	4.9	80.5	12	7.5	9.3	56.4	34.3	
Total %	1.3	1.5	0.9	1.1	37.1	2	9.4	1.4	0.9	4.1	25.2	15.3	

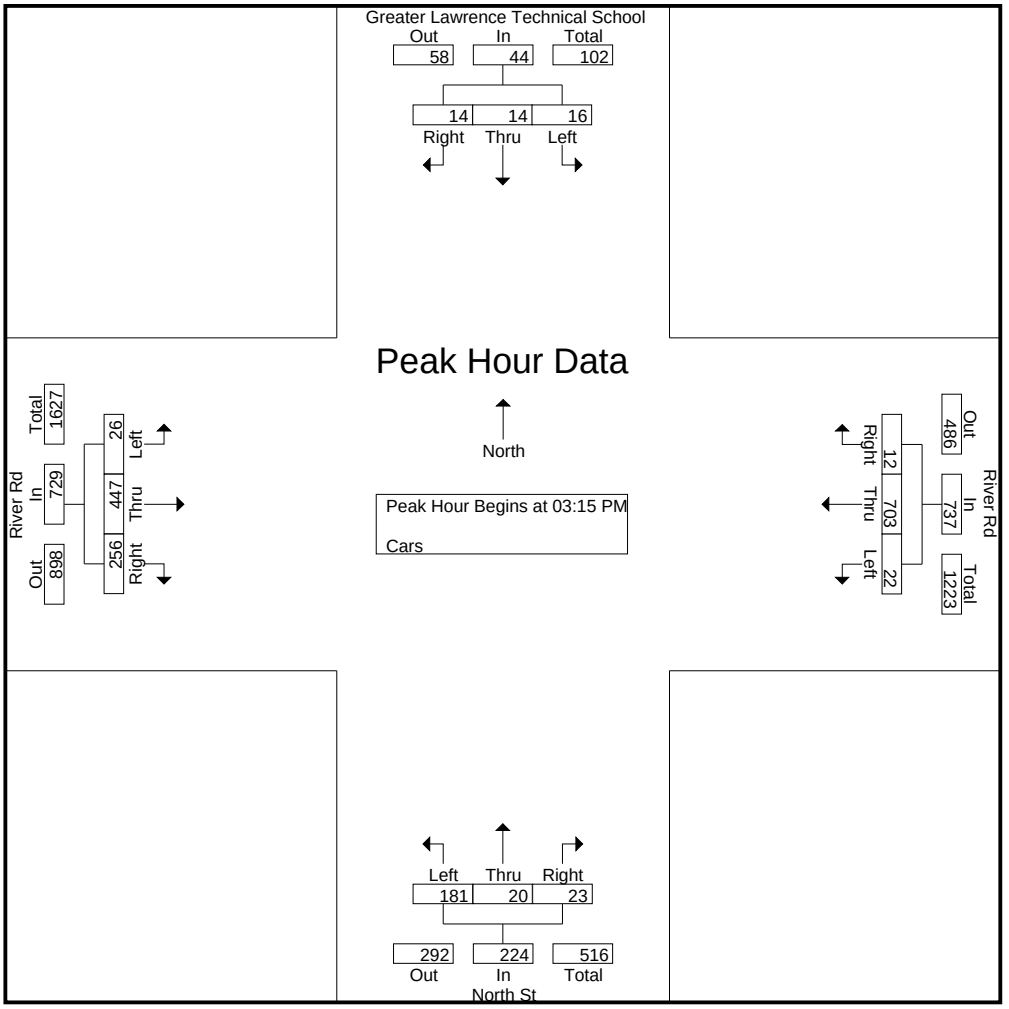
	Greater Lawrence Technical School From North				River Rd From East				North St From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	4	1	**4**	9	3	165	3	171	**58**	**7**	3	**68**	**9**	89	**68**	166	414
03:30 PM	**5**	3	4	**12**	6	199	3	208	53	5	**8**	66	6	122	64	**192**	**478**
03:45 PM	3	**6**	3	12	5	130	**5**	140	37	5	5	47	5	**129**	58	192	391
04:00 PM	4	4	3	11	**8**	**209**	1	**218**	33	3	7	43	6	107	66	179	451
Total Volume	16	14	14	44	22	703	12	737	181	20	23	224	26	447	256	729	1734
% App. Total	36.4	31.8	31.8		3	95.4	1.6		80.8	8.9	10.3		3.6	61.3	35.1		
PHF	.800	.583	.875	.917	.688	.841	.600	.845	.780	.714	.719	.824	.722	.866	.941	.949	.907

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 5



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

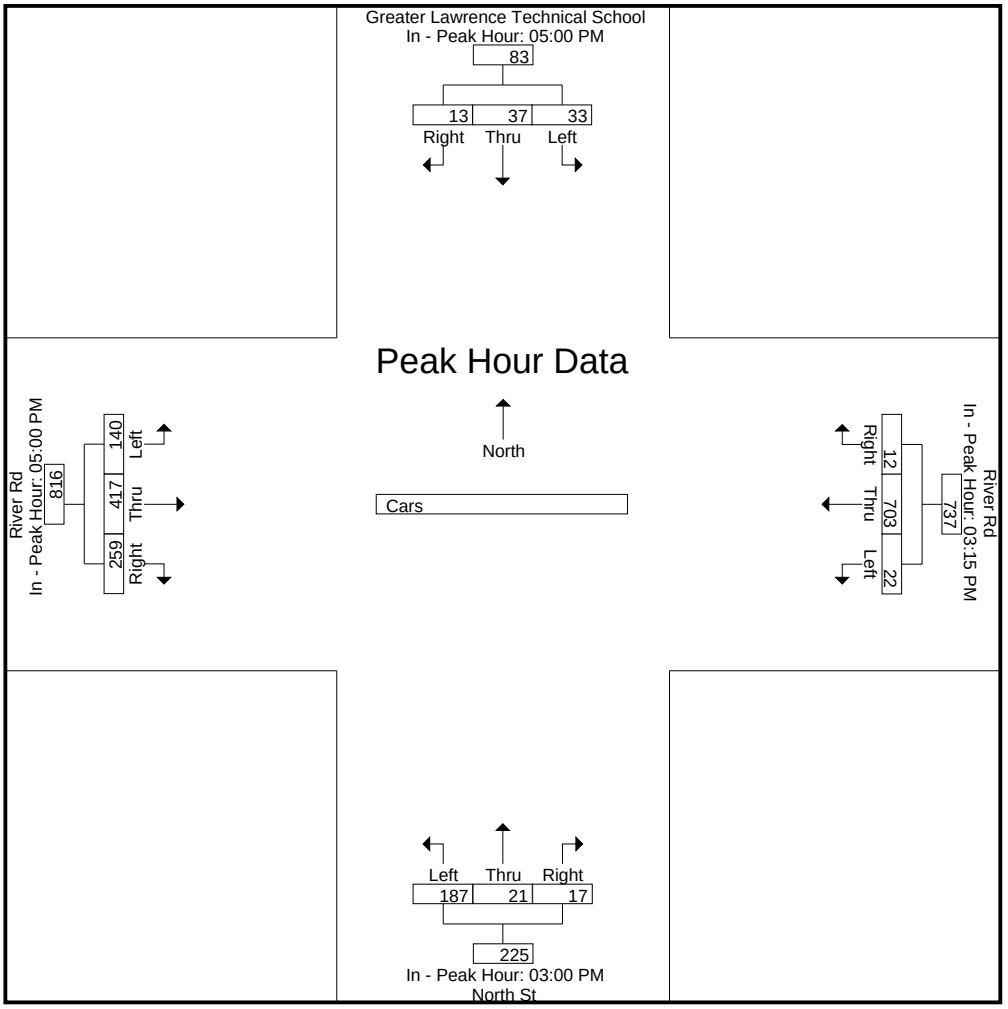
	05:00 PM				03:15 PM				03:00 PM				05:00 PM			
+0 mins.	4	**13**	2	19	3	165	3	171	39	4	1	44	17	**109**	68	194
+15 mins.	9	8	2	19	6	199	3	208	**58**	**7**	3	**68**	22	105	**74**	201
+30 mins.	**14**	5	**6**	**25**	5	130	**5**	140	53	5	**8**	66	**51**	109	63	**223**
+45 mins.	6	11	3	20	**8**	**209**	1	**218**	37	5	5	47	50	94	54	198
Total Volume	33	37	13	83	22	703	12	737	187	21	17	225	140	417	259	816
% App. Total	39.8	44.6	15.7		3	95.4	1.6		83.1	9.3	7.6		17.2	51.1	31.7	
PHF	.589	.712	.542	.830	.688	.841	.600	.845	.806	.750	.531	.827	.686	.956	.875	.915

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025

Groups Printed- Trucks

	Greater Lawrence Technical School From North			River Rd From East			North St From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
03:00 PM	0	0	0	1	6	0	2	0	0	1	3	1	14
03:15 PM	0	0	0	0	1	0	1	0	0	0	10	1	13
03:30 PM	0	0	0	0	4	0	1	0	0	0	3	2	10
03:45 PM	0	0	0	0	5	0	0	0	1	0	4	0	10
Total	0	0	0	1	16	0	4	0	1	1	20	4	47
04:00 PM	0	0	0	0	4	0	2	1	0	3	3	0	13
04:15 PM	0	0	0	1	1	0	1	2	0	0	4	3	12
04:30 PM	1	0	0	0	1	0	1	0	0	0	6	2	11
04:45 PM	0	0	0	0	0	0	0	0	0	0	6	0	6
Total	1	0	0	1	6	0	4	3	0	3	19	5	42
05:00 PM	0	0	0	0	6	0	1	0	0	1	4	1	13
05:15 PM	1	2	0	0	2	0	0	0	0	2	3	1	11
05:30 PM	0	0	0	0	6	1	1	0	0	0	3	1	12
05:45 PM	1	0	0	0	1	0	0	1	0	0	3	1	7
Total	2	2	0	0	15	1	2	1	0	3	13	4	43
Grand Total	3	2	0	2	37	1	10	4	1	7	52	13	132
Apprch %	60	40	0	5	92.5	2.5	66.7	26.7	6.7	9.7	72.2	18.1	
Total %	2.3	1.5	0	1.5	28	0.8	7.6	3	0.8	5.3	39.4	9.8	

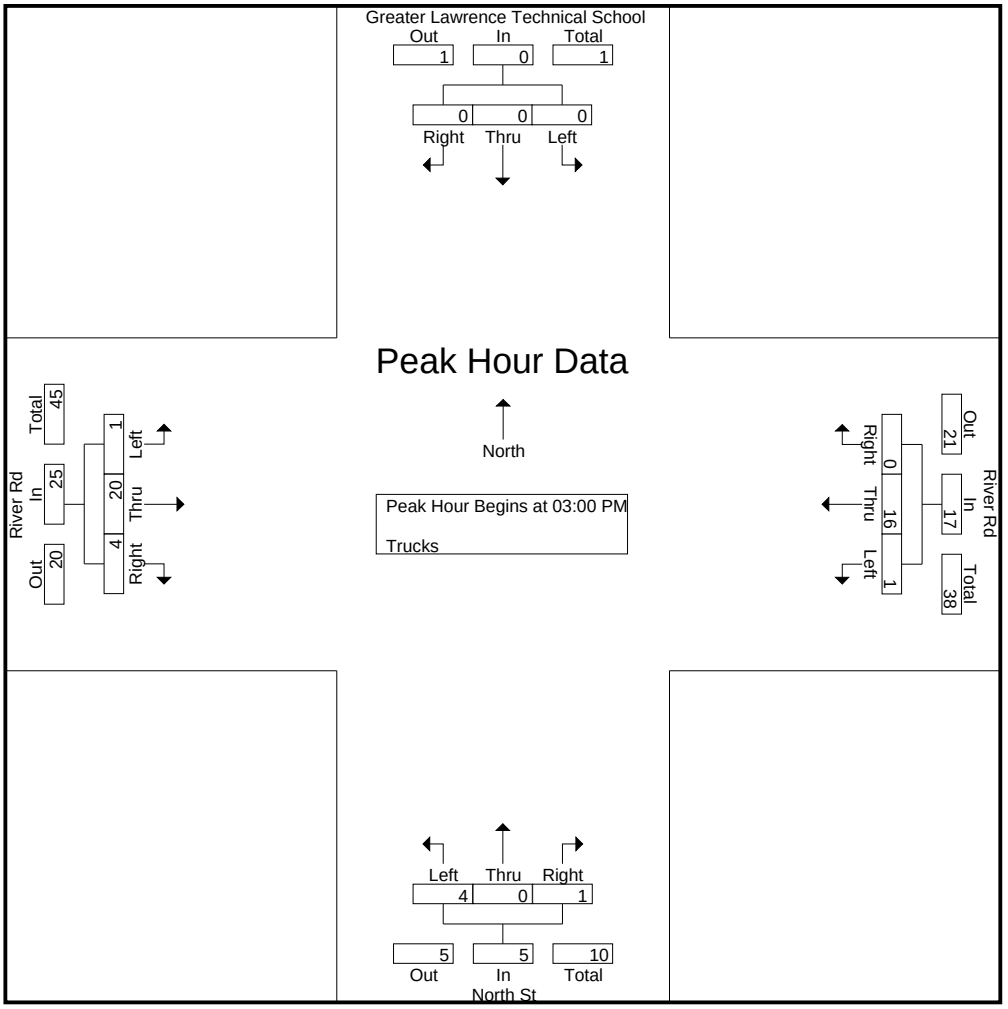
	Greater Lawrence Technical School From North				River Rd From East				North St From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	0	0	0	0	**1**	**6**	0	**7**	**2**	0	0	**2**	**1**	3	1	5	**14**
03:15 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	**10**	1	**11**	13
03:30 PM	0	0	0	0	0	4	0	4	1	0	0	1	0	3	**2**	5	10
03:45 PM	0	0	0	0	0	5	0	5	0	0	**1**	1	0	4	0	4	10
Total Volume	0	0	0	0	1	16	0	17	4	0	1	5	1	20	4	25	47
% App. Total	0	0	0		5.9	94.1	0		80	0	20		4	80	16		
PHF	.000	.000	.000	.000	.250	.667	.000	.607	.500	.000	.250	.625	.250	.500	.500	.568	.839

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 8



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

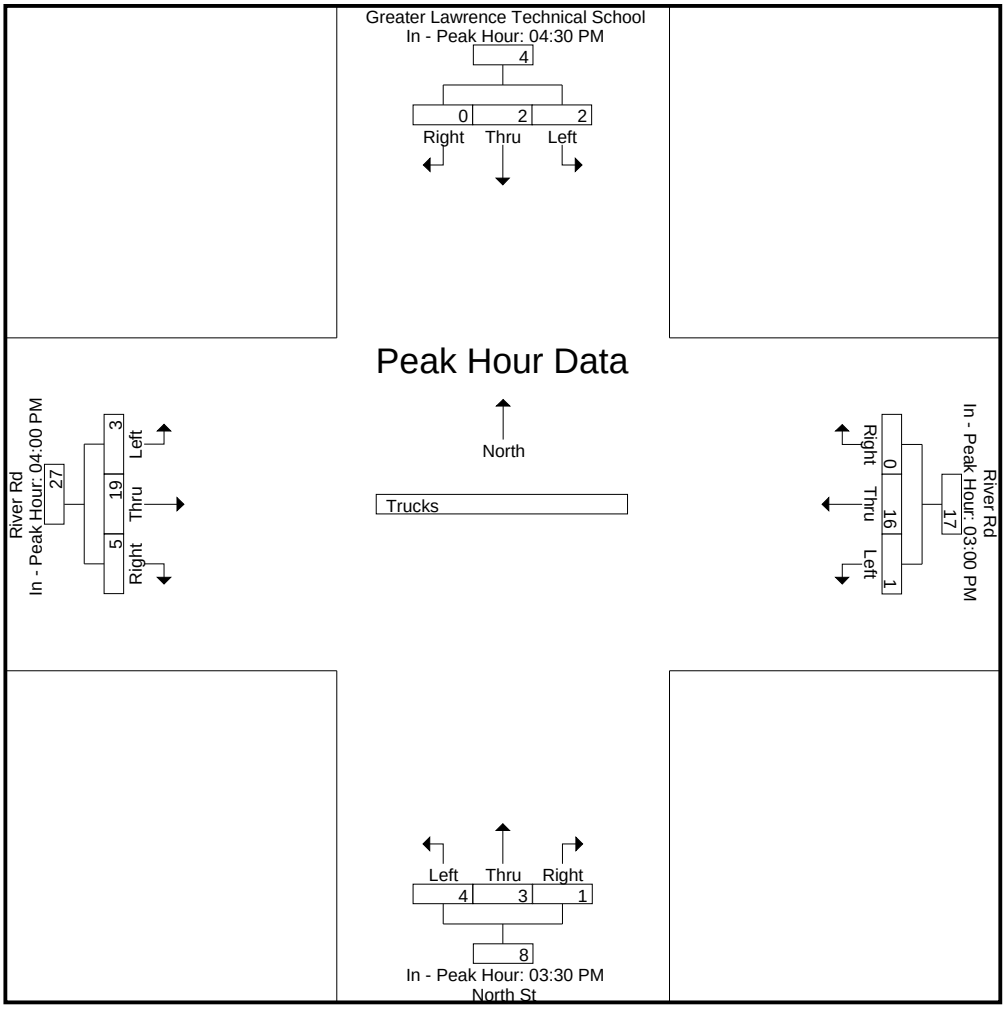
	04:30 PM				03:00 PM				03:30 PM				04:00 PM			
+0 mins.	**1**	0	0	1	**1**	**6**	0	**7**	1	0	0	1	**3**	3	0	6
+15 mins.	0	0	0	0	0	1	0	1	0	0	**1**	1	0	4	**3**	7
+30 mins.	0	0	0	0	0	4	0	4	**2**	1	0	**3**	0	**6**	2	**8**
+45 mins.	1	**2**	0	**3**	0	5	0	5	1	**2**	0	3	0	6	0	6
Total Volume	2	2	0	4	1	16	0	17	4	3	1	8	3	19	5	27
% App. Total	50	50	0		5.9	94.1	0		50	37.5	12.5		11.1	70.4	18.5	
PHF	.500	.250	.000	.333	.250	.667	.000	.607	.500	.375	.250	.667	.250	.792	.417	.844

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025

Groups Printed- Bikes Peds

	Greater Lawrence Technical School From North				River Rd From East				North St From South				River 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
03:00 PM	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	3	0	3
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
03:45 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	0	2
Total	0	0	0	0	0	0	0	3	0	0	0	2	0	1	0	0	5	1	6
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	3
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4	0	4
Grand Total	0	0	0	0	0	0	0	8	0	0	0	3	0	1	0	0	11	1	12
Apprch %	0	0	0		0	0	0		0	0	0		0	100	0				
Total %	0	0	0		0	0	0		0	0	0		0	100	0		91.7	8.3	

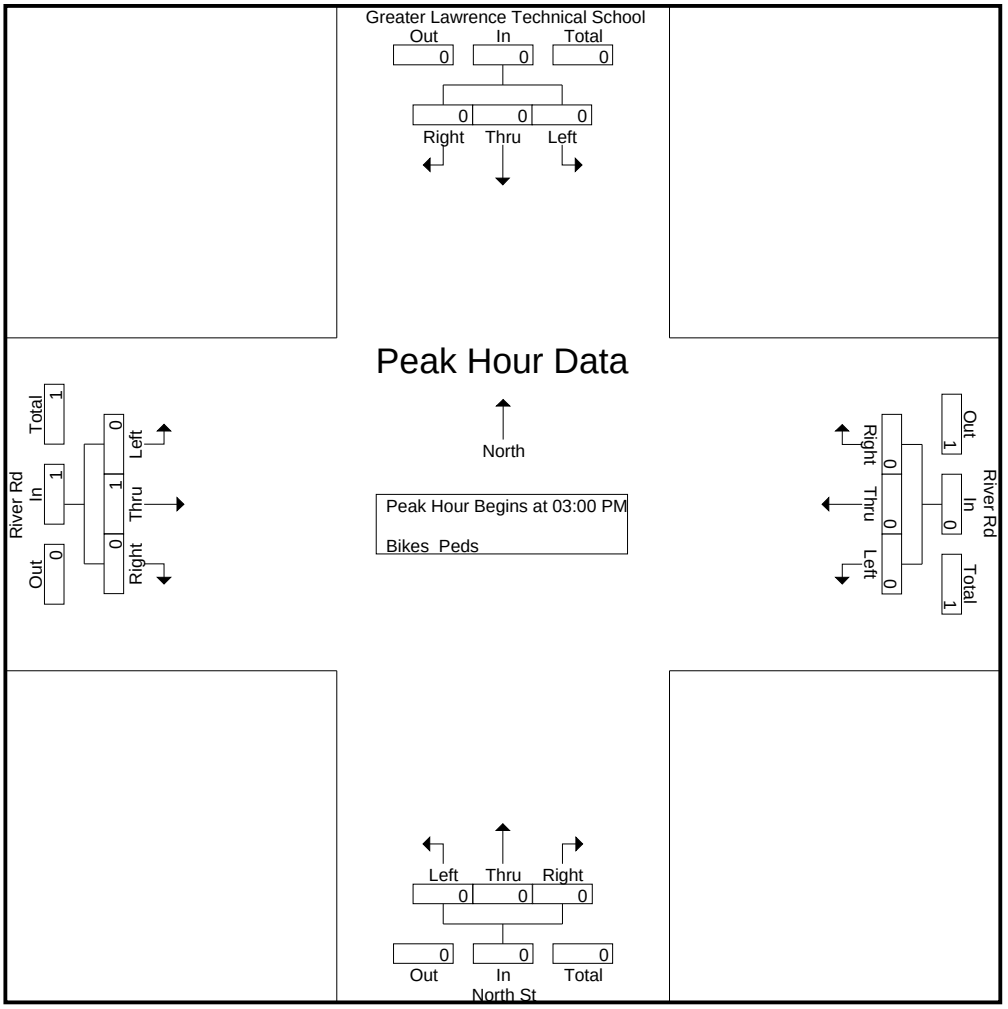
	Greater Lawrence Technical School From North				River Rd From East				North St From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	**1**
03:45 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	1	0	1	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 11



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

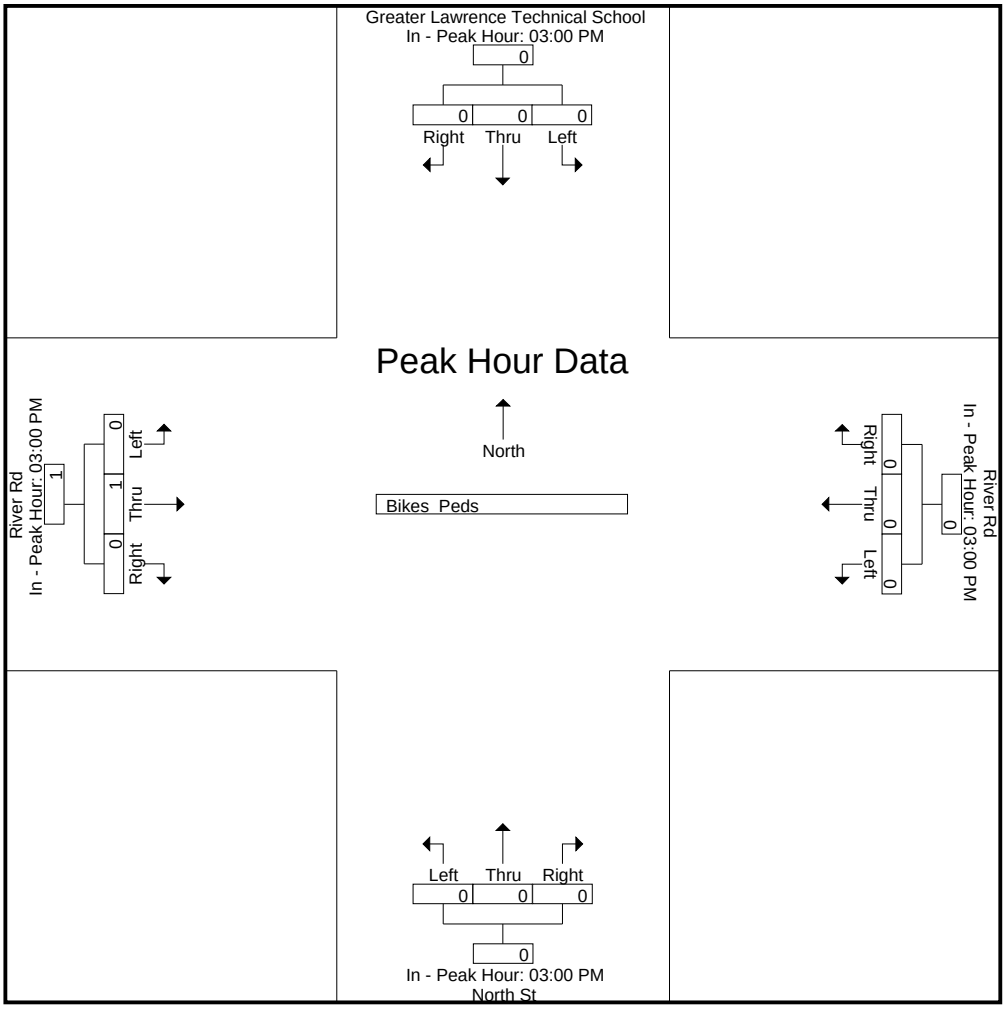
	03:00 PM				03:00 PM				03:00 PM				03:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250

Accurate Counts

978-664-2565

N/S Street : Greater Lawrence Technical School/North St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379001
Site Code : 10379001
Start Date : 10/15/2025
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars - Trucks

	Old River Rd From North			River Rd From East				Federal St From South			River Rd From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-Tr	Left	Thru	Right	Left	Thru	Right	U-Tr	Int. Total
07:00 AM	7	0	13	6	153	12	0	10	0	4	26	344	59	0	634
07:15 AM	16	2	25	10	179	15	3	8	0	3	42	392	64	0	759
07:30 AM	17	5	36	6	207	19	2	21	0	1	40	291	52	0	697
07:45 AM	16	7	21	14	223	38	0	14	0	5	48	250	70	0	706
Total	56	14	95	36	762	84	5	53	0	13	156	1277	245	0	2796
08:00 AM	13	3	32	19	201	39	1	11	1	2	118	256	80	1	777
08:15 AM	23	2	32	12	212	31	0	4	0	3	93	195	96	0	703
08:30 AM	11	1	30	15	225	17	0	9	1	5	66	183	81	0	644
08:45 AM	6	2	22	12	213	30	0	7	1	3	66	184	84	0	630
Total	53	8	116	58	851	117	1	31	3	13	343	818	341	1	2754
Grand Total	109	22	211	94	1613	201	6	84	3	26	499	2095	586	1	5550
Apprch %	31.9	6.4	61.7	4.9	84.3	10.5	0.3	74.3	2.7	23	15.7	65.9	18.4	0	
Total %	2	0.4	3.8	1.7	29.1	3.6	0.1	1.5	0.1	0.5	9	37.7	10.6	0	
Cars	105	22	208	94	1485	200	6	83	2	25	493	2021	582	1	5327
% Cars	96.3	100	98.6	100	92.1	99.5	100	98.8	66.7	96.2	98.8	96.5	99.3	100	96
Trucks	4	0	3	0	128	1	0	1	1	1	6	74	4	0	223
% Trucks	3.7	0	1.4	0	7.9	0.5	0	1.2	33.3	3.8	1.2	3.5	0.7	0	4

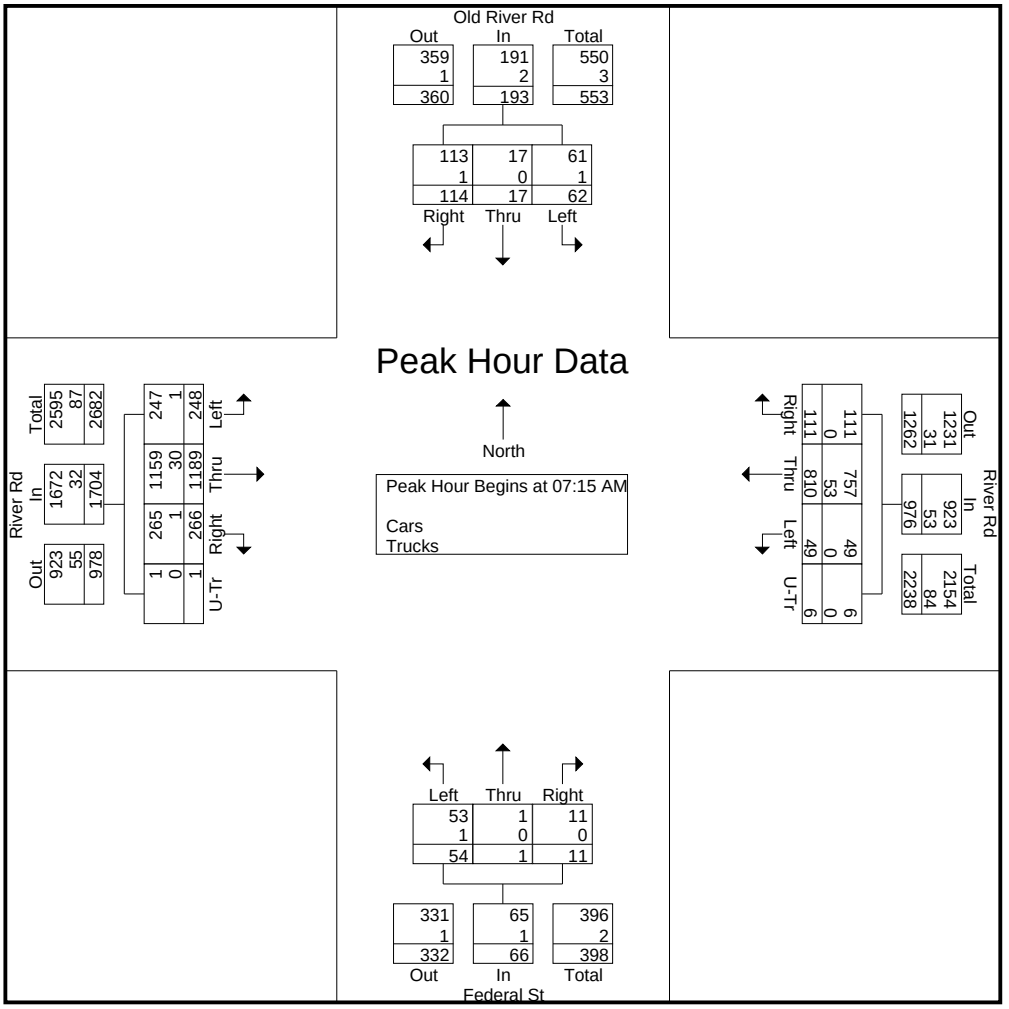
	Old River Rd From North				River Rd From East					Federal St From South				River Rd From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 07:15 AM																			
07:15 AM	16	2	25	43	10	179	15	**3**	207	8	0	3	11	42	**392**	64	0	**498**	759
07:30 AM	**17**	5	**36**	**58**	6	207	19	2	234	**21**	0	1	**22**	40	291	52	0	383	697
07:45 AM	16	**7**	21	44	14	**223**	38	0	**275**	14	0	**5**	19	48	250	70	0	368	706
08:00 AM	13	3	32	48	**19**	201	**39**	1	260	11	**1**	2	14	**118**	256	**80**	**1**	455	**777**
Total Volume	62	17	114	193	49	810	111	6	976	54	1	11	66	248	1189	266	1	1704	2939
% App. Total	32.1	8.8	59.1		5	83	11.4	0.6		81.8	1.5	16.7		14.6	69.8	15.6	0.1		
PHF	.912	.607	.792	.832	.645	.908	.712	.500	.887	.643	.250	.550	.750	.525	.758	.831	.250	.855	.946
Cars	61	17	113	191	49	757	111	6	923	53	1	11	65	247	1159	265	1	1672	2851
% Cars	98.4	100	99.1	99.0	100	93.5	100	100	94.6	98.1	100	100	98.5	99.6	97.5	99.6	100	98.1	97.0
Trucks	1	0	1	2	0	53	0	0	53	1	0	0	1	1	30	1	0	32	88
% Trucks	1.6	0	0.9	1.0	0	6.5	0	0	5.4	1.9	0	0	1.5	0.4	2.5	0.4	0	1.9	3.0

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 2



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

Peak Hour for Each Approach Begins at:

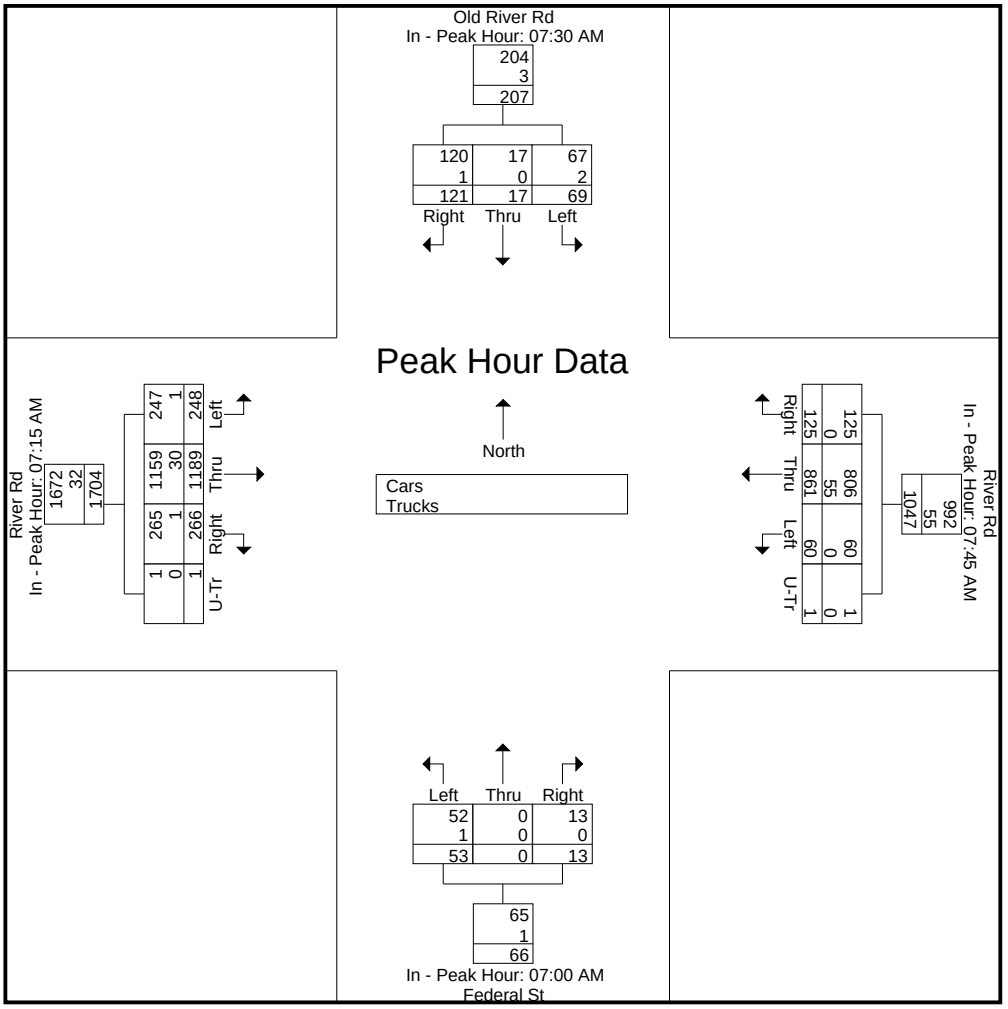
	07:30 AM				07:45 AM					07:00 AM				07:15 AM				
+0 mins.	17	5	**36**	**58**	14	223	38	0	**275**	10	0	4	14	42	**392**	64	0	**498**
+15 mins.	16	**7**	21	44	**19**	201	**39**	**1**	260	8	0	3	11	40	291	52	0	383
+30 mins.	13	3	32	48	12	212	31	0	255	**21**	0	1	**22**	48	250	70	0	368
+45 mins.	**23**	2	32	57	15	**225**	17	0	257	14	0	**5**	19	**118**	256	**80**	**1**	455
Total Volume	69	17	121	207	60	861	125	1	1047	53	0	13	66	248	1189	266	1	1704
% App. Total	33.3	8.2	58.5		5.7	82.2	11.9	0.1		80.3	0	19.7		14.6	69.8	15.6	0.1	
PHF	.750	.607	.840	.892	.789	.957	.801	.250	.952	.631	.000	.650	.750	.525	.758	.831	.250	.855
Cars	67	17	120	204	60	806	125	1	992	52	0	13	65	247	1159	265	1	1672
% Cars	97.1	100	99.2	98.6	100	93.6	100	100	94.7	98.1	0	100	98.5	99.6	97.5	99.6	100	98.1
Trucks	2	0	1	3	0	55	0	0	55	1	0	0	1	1	30	1	0	32
% Trucks	2.9	0	0.8	1.4	0	6.4	0	0	5.3	1.9	0	0	1.5	0.4	2.5	0.4	0	1.9

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars

	Old River Rd From North			River Rd From East				Federal St From South			River Rd From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-Tr	Left	Thru	Right	Left	Thru	Right	U-Tr	Int. Total
07:00 AM	6	0	12	6	132	12	0	10	0	4	25	327	59	0	593
07:15 AM	16	2	25	10	164	15	3	8	0	3	42	383	64	0	735
07:30 AM	16	5	36	6	194	19	2	20	0	1	39	282	51	0	671
07:45 AM	16	7	21	14	205	38	0	14	0	5	48	242	70	0	680
Total	54	14	94	36	695	84	5	52	0	13	154	1234	244	0	2679
08:00 AM	13	3	31	19	194	39	1	11	1	2	118	252	80	1	765
08:15 AM	22	2	32	12	196	31	0	4	0	3	91	184	95	0	672
08:30 AM	10	1	30	15	211	17	0	9	1	4	65	173	79	0	615
08:45 AM	6	2	21	12	189	29	0	7	0	3	65	178	84	0	596
Total	51	8	114	58	790	116	1	31	2	12	339	787	338	1	2648
Grand Total	105	22	208	94	1485	200	6	83	2	25	493	2021	582	1	5327
Apprch %	31.3	6.6	62.1	5.3	83.2	11.2	0.3	75.5	1.8	22.7	15.9	65.3	18.8	0	
Total %	2	0.4	3.9	1.8	27.9	3.8	0.1	1.6	0	0.5	9.3	37.9	10.9	0	

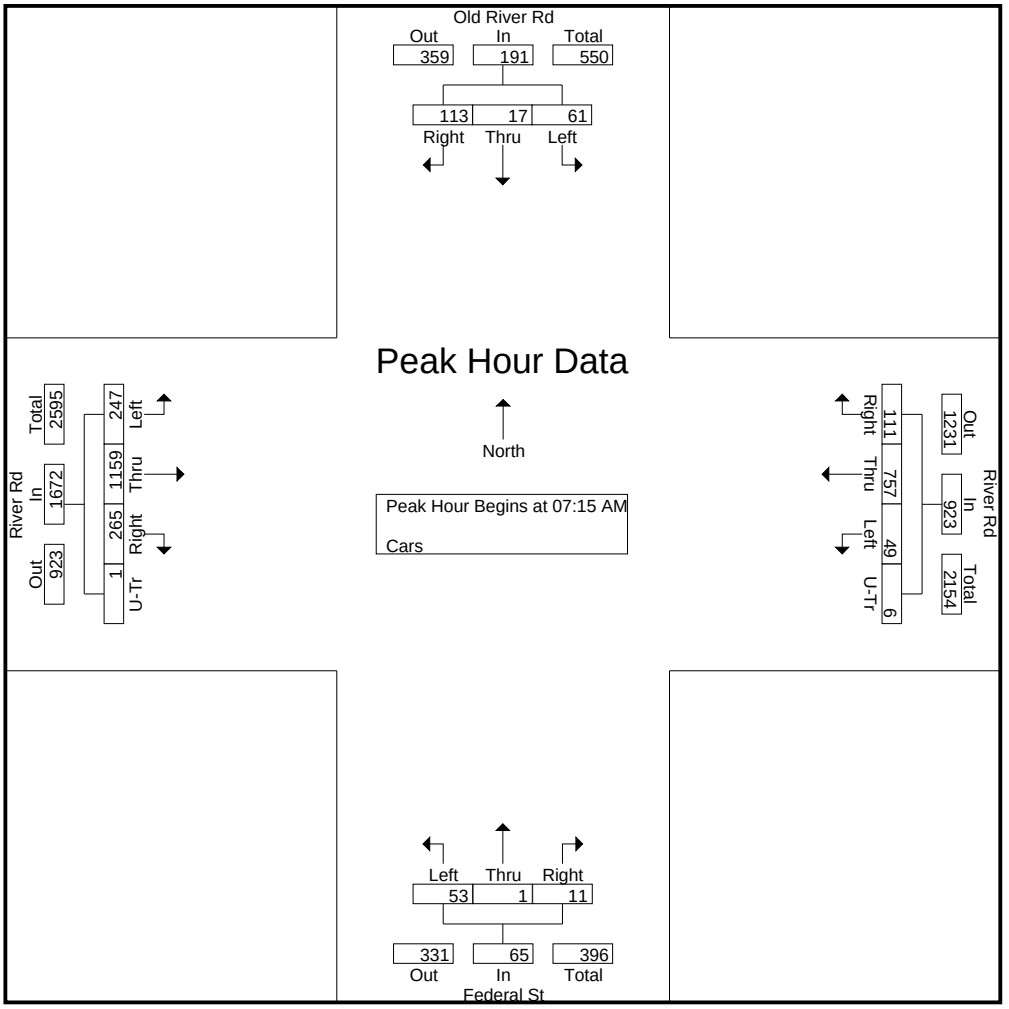
	Old River Rd From North				River Rd From East					Federal St From South				River Rd From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 07:15 AM																			
07:15 AM	**16**	2	25	43	10	164	15	**3**	192	8	0	3	11	42	**383**	64	0	**489**	735
07:30 AM	16	5	**36**	**57**	6	194	19	2	221	**20**	0	1	**21**	39	282	51	0	372	671
07:45 AM	16	**7**	21	44	14	**205**	38	0	**257**	14	0	**5**	19	48	242	70	0	360	680
08:00 AM	13	3	31	47	**19**	194	**39**	1	253	11	**1**	2	14	**118**	252	**80**	**1**	451	**765**
Total Volume	61	17	113	191	49	757	111	6	923	53	1	11	65	247	1159	265	1	1672	2851
% App. Total	31.9	8.9	59.2		5.3	82	12	0.7		81.5	1.5	16.9		14.8	69.3	15.8	0.1		
PHF	.953	.607	.785	.838	.645	.923	.712	.500	.898	.663	.250	.550	.774	.523	.757	.828	.250	.855	.932

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 2



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

Peak Hour for Each Approach Begins at:

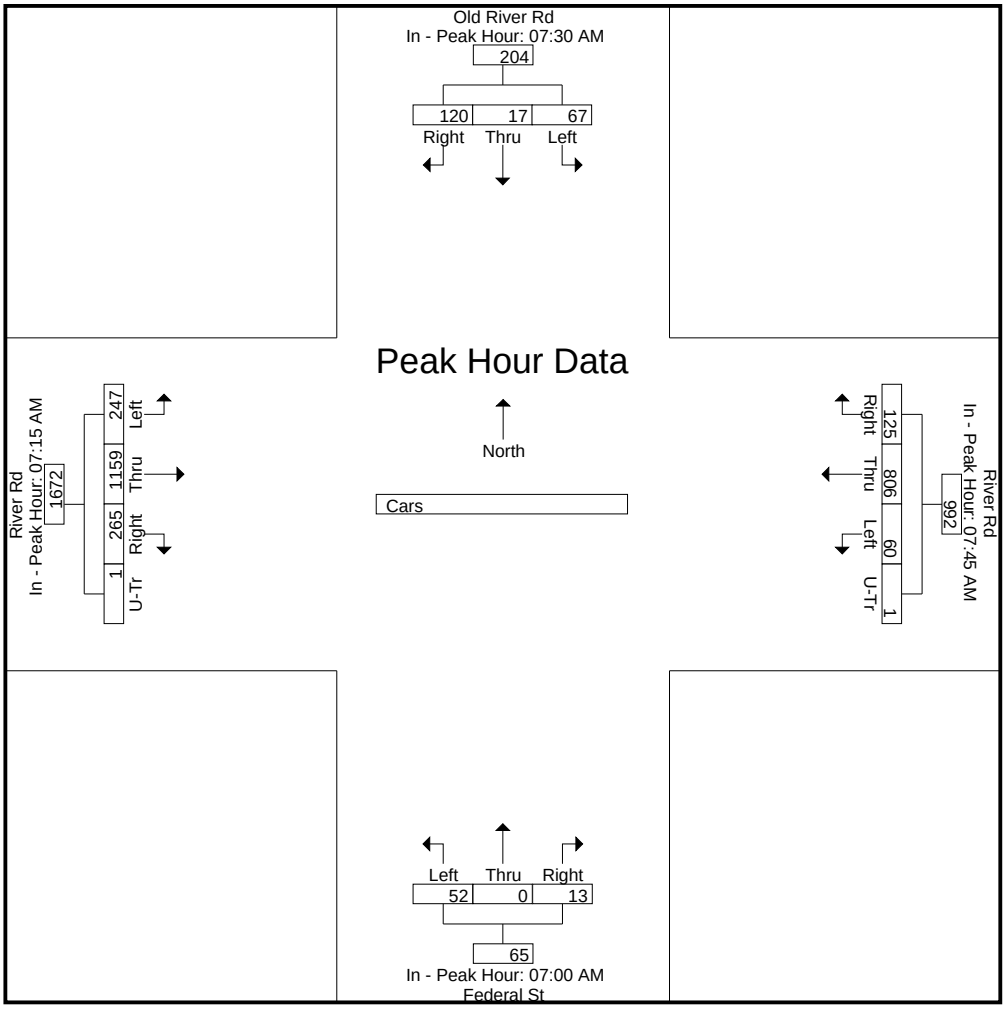
	07:30 AM				07:45 AM					07:00 AM				07:15 AM				
+0 mins.	16	5	**36**	**57**	14	205	38	0	**257**	10	0	4	14	42	**383**	64	0	**489**
+15 mins.	16	**7**	21	44	**19**	194	**39**	**1**	253	8	0	3	11	39	282	51	0	372
+30 mins.	13	3	31	47	12	196	31	0	239	**20**	0	1	**21**	48	242	70	0	360
+45 mins.	**22**	2	32	56	15	**211**	17	0	243	14	0	**5**	19	**118**	252	**80**	**1**	451
Total Volume	67	17	120	204	60	806	125	1	992	52	0	13	65	247	1159	265	1	1672
% App. Total	32.8	8.3	58.8		6	81.2	12.6	0.1		80	0	20		14.8	69.3	15.8	0.1	
PHF	.761	.607	.833	.895	.789	.955	.801	.250	.965	.650	.000	.650	.774	.523	.757	.828	.250	.855

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 1

Groups Printed- Trucks

	Old River Rd From North			River Rd From East				Federal St From South			River Rd From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-Tr	Left	Thru	Right	Left	Thru	Right	U-Tr	Int. Total
07:00 AM	1	0	1	0	21	0	0	0	0	0	1	17	0	0	41
07:15 AM	0	0	0	0	15	0	0	0	0	0	0	9	0	0	24
07:30 AM	1	0	0	0	13	0	0	1	0	0	1	9	1	0	26
07:45 AM	0	0	0	0	18	0	0	0	0	0	0	8	0	0	26
Total	2	0	1	0	67	0	0	1	0	0	2	43	1	0	117
08:00 AM	0	0	1	0	7	0	0	0	0	0	0	4	0	0	12
08:15 AM	1	0	0	0	16	0	0	0	0	0	2	11	1	0	31
08:30 AM	1	0	0	0	14	0	0	0	0	1	1	10	2	0	29
08:45 AM	0	0	1	0	24	1	0	0	1	0	1	6	0	0	34
Total	2	0	2	0	61	1	0	0	1	1	4	31	3	0	106
Grand Total	4	0	3	0	128	1	0	1	1	1	6	74	4	0	223
Apprch %	57.1	0	42.9	0	99.2	0.8	0	33.3	33.3	33.3	7.1	88.1	4.8	0	
Total %	1.8	0	1.3	0	57.4	0.4	0	0.4	0.4	0.4	2.7	33.2	1.8	0	

	Old River Rd From North				River Rd From East					Federal St From South				River Rd From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 07:00 AM																			
07:00 AM	**1**	0	**1**	**2**	0	**21**	0	0	**21**	0	0	0	0	**1**	**17**	0	0	**18**	**41**
07:15 AM	0	0	0	0	0	15	0	0	15	0	0	0	0	0	9	0	0	9	24
07:30 AM	1	0	0	1	0	13	0	0	13	**1**	0	0	**1**	1	9	**1**	0	11	26
07:45 AM	0	0	0	0	0	18	0	0	18	0	0	0	0	0	8	0	0	8	26
Total Volume	2	0	1	3	0	67	0	0	67	1	0	0	1	2	43	1	0	46	117
% App. Total	66.7	0	33.3		0	100	0	0		100	0	0		4.3	93.5	2.2	0		
PHF	.500	.000	.250	.375	.000	.798	.000	.000	.798	.250	.000	.000	.250	.500	.632	.250	.000	.639	.713

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
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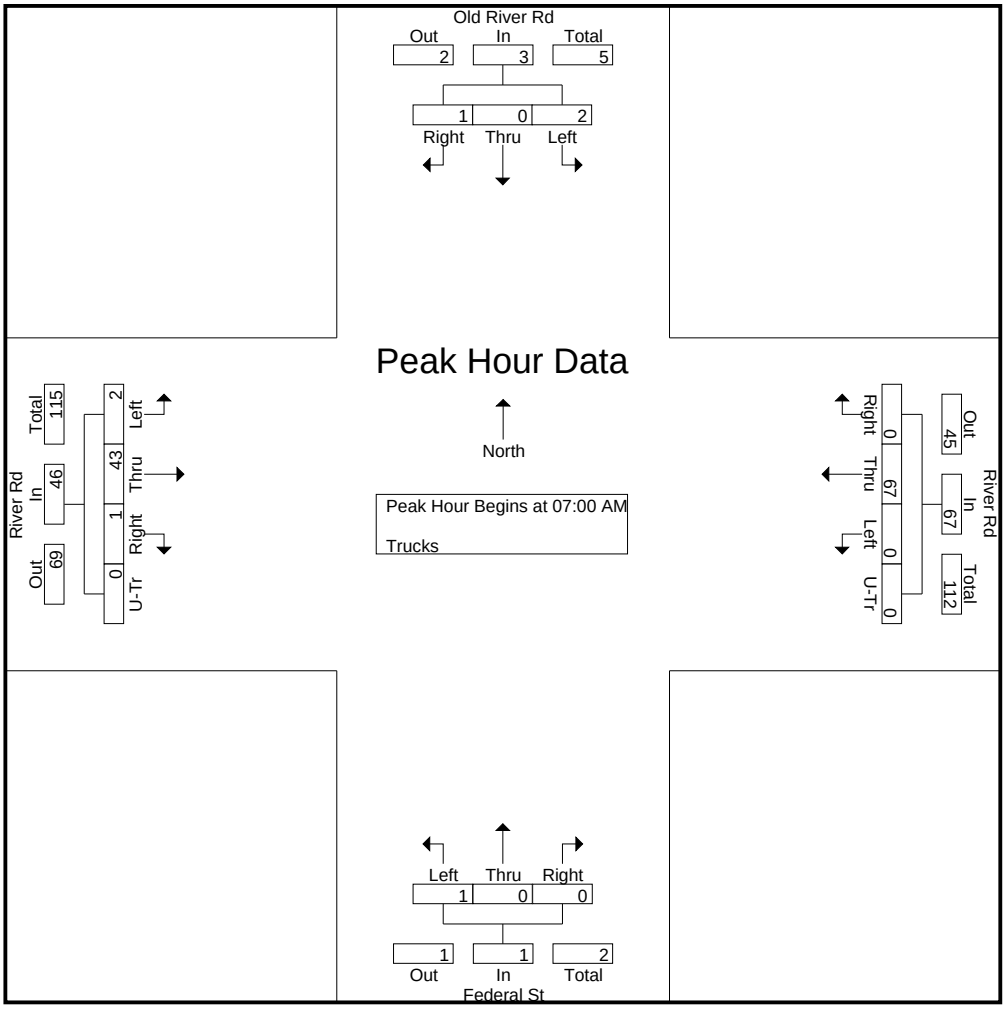


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

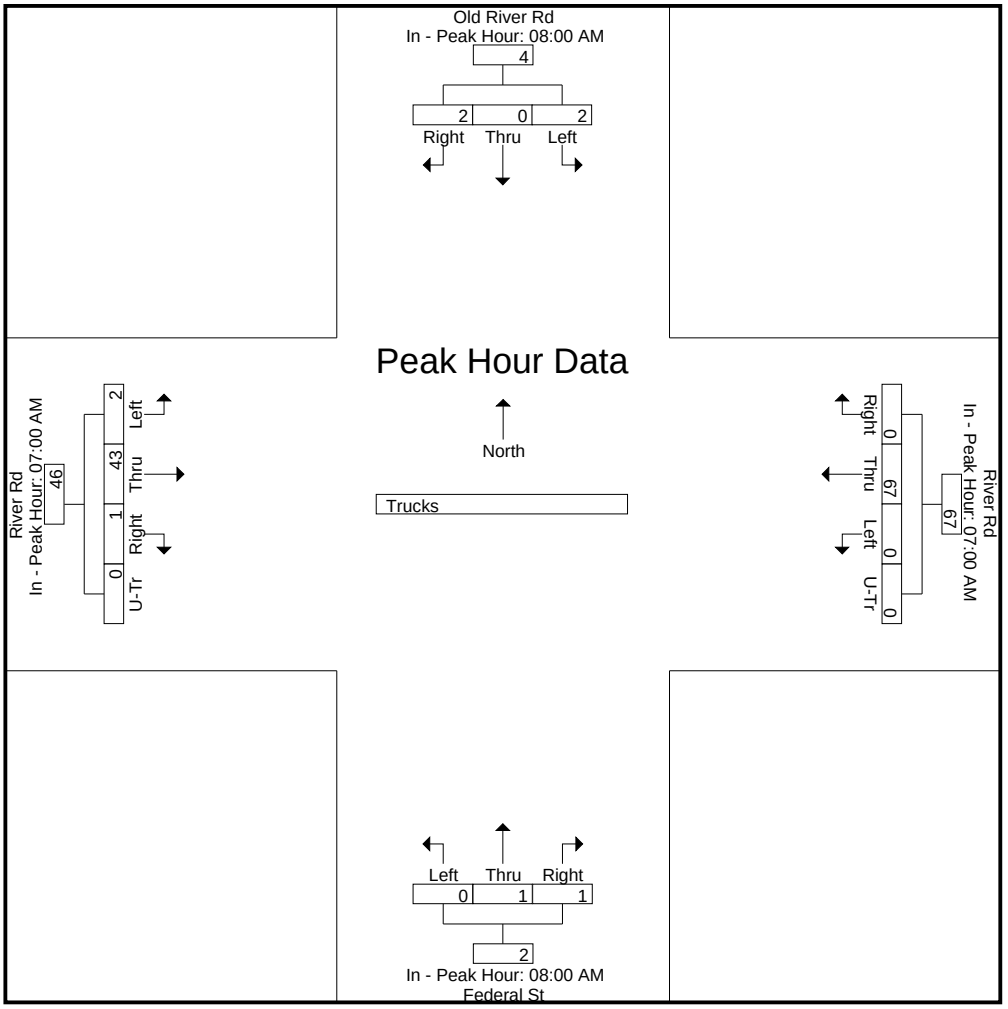
	08:00 AM				07:00 AM					08:00 AM				07:00 AM				
+0 mins.	0	0	**1**	**1**	0	**21**	0	0	**21**	0	0	0	0	**1**	**17**	0	0	**18**
+15 mins.	**1**	0	0	1	0	15	0	0	15	0	0	0	0	0	9	0	0	9
+30 mins.	1	0	0	1	0	13	0	0	13	0	0	**1**	**1**	1	9	**1**	0	11
+45 mins.	0	0	1	1	0	18	0	0	18	0	**1**	0	1	0	8	0	0	8
Total Volume	2	0	2	4	0	67	0	0	67	0	1	1	2	2	43	1	0	46
% App. Total	50	0	50		0	100	0	0		0	50	50		4.3	93.5	2.2	0	
PHF	.500	.000	.500	1.000	.000	.798	.000	.000	.798	.000	.250	.250	.500	.500	.632	.250	.000	.639

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 1

Groups Printed- Bikes Peds

	Old River Rd From North				River Rd From East				Federal St From South				River 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	0	0	0	0	1	0	0	0	0	1	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	3	1	4
08:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	2
Grand Total	0	0	0	0	0	1	1	0	0	0	0	3	0	1	0	0	3	3	6
Apprch %	0	0	0		0	50	50	0	0	0	0		0	100	0	0			
Total %	0	0	0		0	33.3	33.3	0	0	0	0		0	33.3	0	0	50	50	

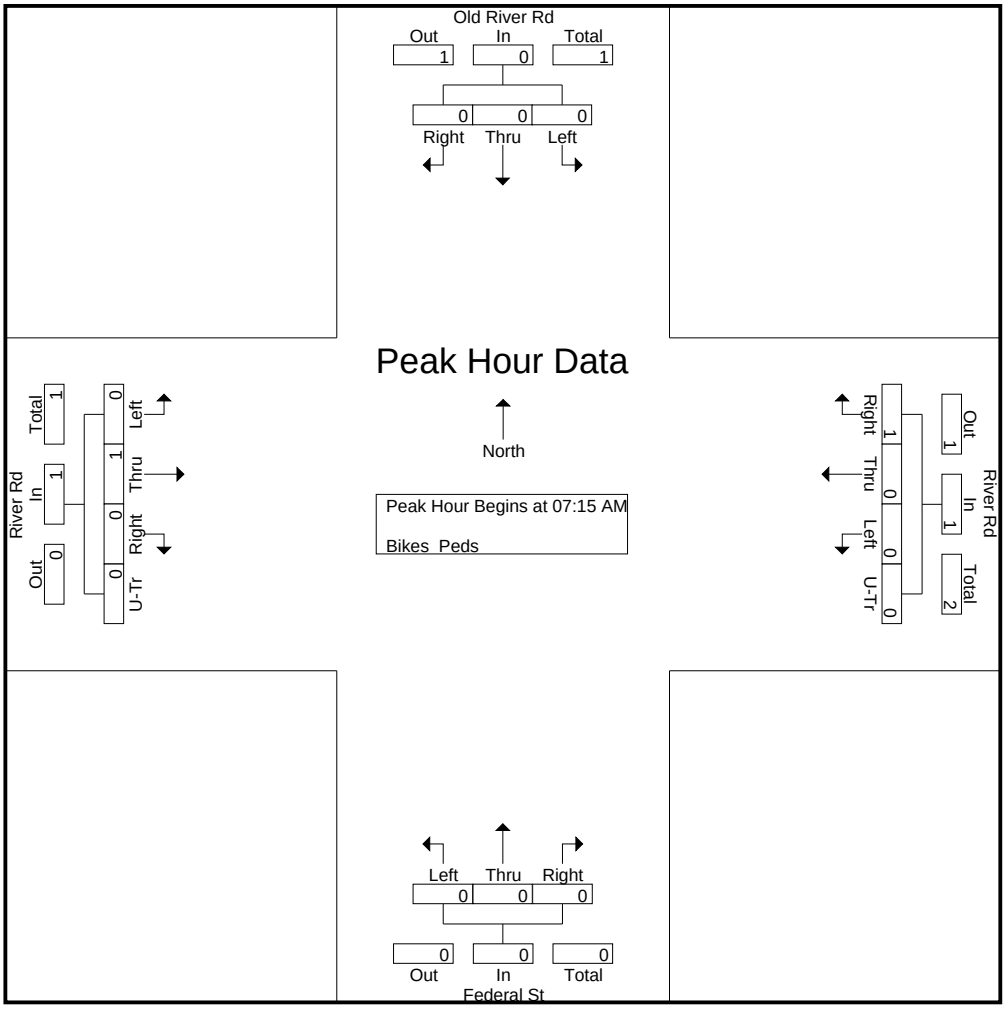
	Old River Rd From North				River Rd From East					Federal St From South				River Rd From West						
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1		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

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
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:

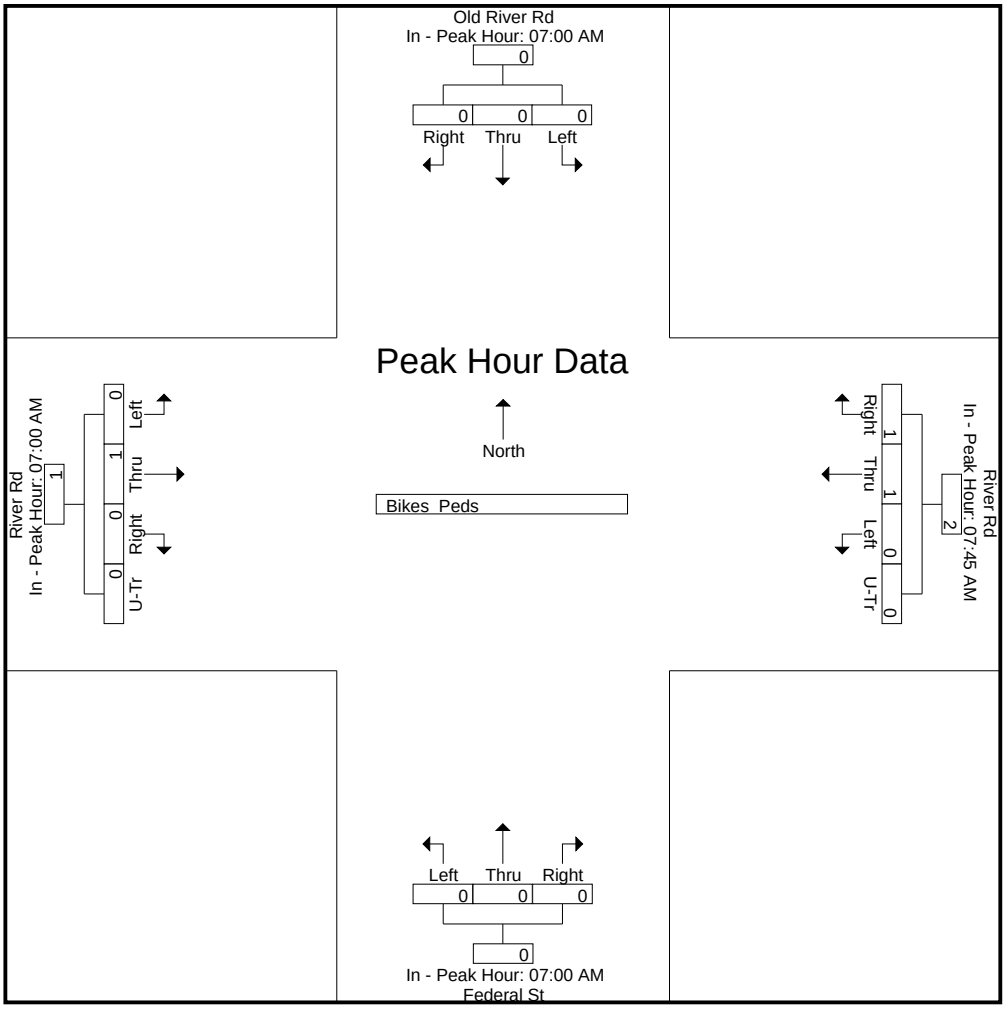
	07:00 AM				07:45 AM					07:00 AM				07:00 AM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	**1**
+45 mins.	0	0	0	0	0	**1**	0	0	1	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	1	0	2	0	0	0	0	0	1	0	0	1
% App. Total	0	0	0		0	50	50	0		0	0	0		0	100	0	0	
PHF	.000	.000	.000	.000	.000	.250	.250	.000	.500	.000	.000	.000	.000	.000	.250	.000	.000	.250

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars - Trucks

	Old River Rd From North			River Rd From East				Federal St From South			River Rd From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-Tr	Left	Thru	Right	Left	Thru	Right	U-Tr	Int. Total
03:00 PM	20	2	47	4	264	6	1	102	1	24	12	152	35	0	670
03:15 PM	6	0	23	8	245	8	0	50	0	4	12	161	18	0	535
03:30 PM	12	1	24	5	264	4	0	61	0	10	16	181	13	0	591
03:45 PM	3	1	25	3	176	5	0	43	0	7	10	186	17	1	477
Total	41	4	119	20	949	23	1	256	1	45	50	680	83	1	2273
04:00 PM	28	0	59	0	254	4	0	76	1	9	16	147	12	1	607
04:15 PM	8	0	67	0	152	9	0	47	0	6	18	148	10	0	465
04:30 PM	30	0	115	0	207	16	0	62	1	9	18	166	9	2	635
04:45 PM	14	1	62	1	175	14	0	61	1	13	17	148	11	1	519
Total	80	1	303	1	788	43	0	246	3	37	69	609	42	4	2226
05:00 PM	21	0	76	2	210	9	0	82	0	15	16	164	12	0	607
05:15 PM	11	0	56	2	205	8	0	72	3	21	21	171	11	0	581
05:30 PM	4	0	48	4	191	9	0	57	0	4	22	211	23	0	573
05:45 PM	13	1	35	4	174	5	0	62	3	6	24	171	14	0	512
Total	49	1	215	12	780	31	0	273	6	46	83	717	60	0	2273
Grand Total	170	6	637	33	2517	97	1	775	10	128	202	2006	185	5	6772
Apprch %	20.9	0.7	78.4	1.2	95.1	3.7	0	84.9	1.1	14	8.4	83.7	7.7	0.2	
Total %	2.5	0.1	9.4	0.5	37.2	1.4	0	11.4	0.1	1.9	3	29.6	2.7	0.1	
Cars	163	6	636	33	2466	96	1	771	10	128	196	1941	182	5	6634
% Cars	95.9	100	99.8	100	98	99	100	99.5	100	100	97	96.8	98.4	100	98
Trucks	7	0	1	0	51	1	0	4	0	0	6	65	3	0	138
% Trucks	4.1	0	0.2	0	2	1	0	0.5	0	0	3	3.2	1.6	0	2

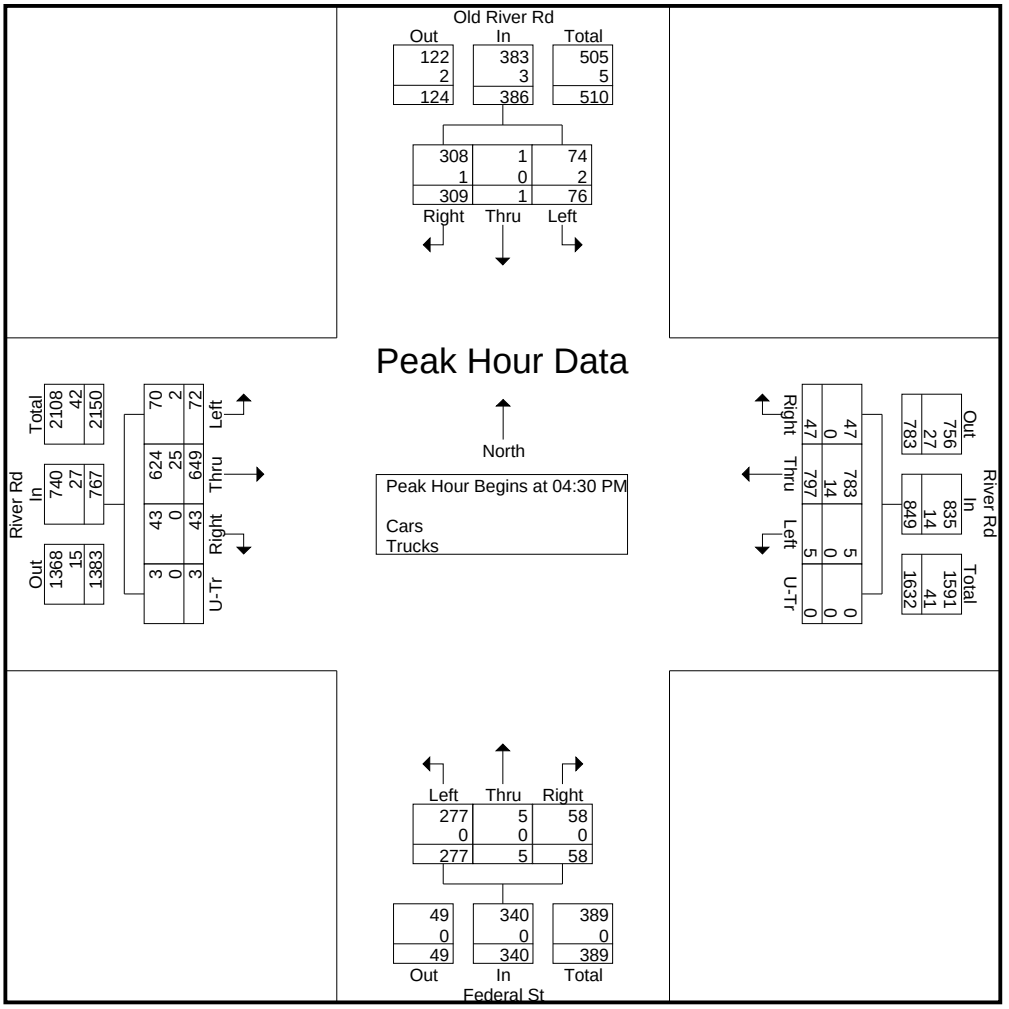
	Old River Rd From North				River Rd From East					Federal St From South				River Rd From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 04:30 PM																			
04:30 PM	**30**	0	**115**	**145**	0	207	**16**	0	**223**	62	1	9	72	18	166	9	**2**	195	**635**
04:45 PM	14	**1**	62	77	1	175	14	0	190	61	1	13	75	17	148	11	1	177	519
05:00 PM	21	0	76	97	**2**	**210**	9	0	221	**82**	0	15	**97**	16	164	**12**	0	192	607
05:15 PM	11	0	56	67	2	205	8	0	215	72	**3**	**21**	96	**21**	**171**	11	0	**203**	581
Total Volume	76	1	309	386	5	797	47	0	849	277	5	58	340	72	649	43	3	767	2342
% App. Total	19.7	0.3	80.1		0.6	93.9	5.5	0		81.5	1.5	17.1		9.4	84.6	5.6	0.4		
PHF	.633	.250	.672	.666	.625	.949	.734	.000	.952	.845	.417	.690	.876	.857	.949	.896	.375	.945	.922
Cars	74	1	308	383	5	783	47	0	835	277	5	58	340	70	624	43	3	740	2298
% Cars	97.4	100	99.7	99.2	100	98.2	100	0	98.4	100	100	100	100	97.2	96.1	100	100	96.5	98.1
Trucks	2	0	1	3	0	14	0	0	14	0	0	0	0	2	25	0	0	27	44
% Trucks	2.6	0	0.3	0.8	0	1.8	0	0	1.6	0	0	0	0	2.8	3.9	0	0	3.5	1.9

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

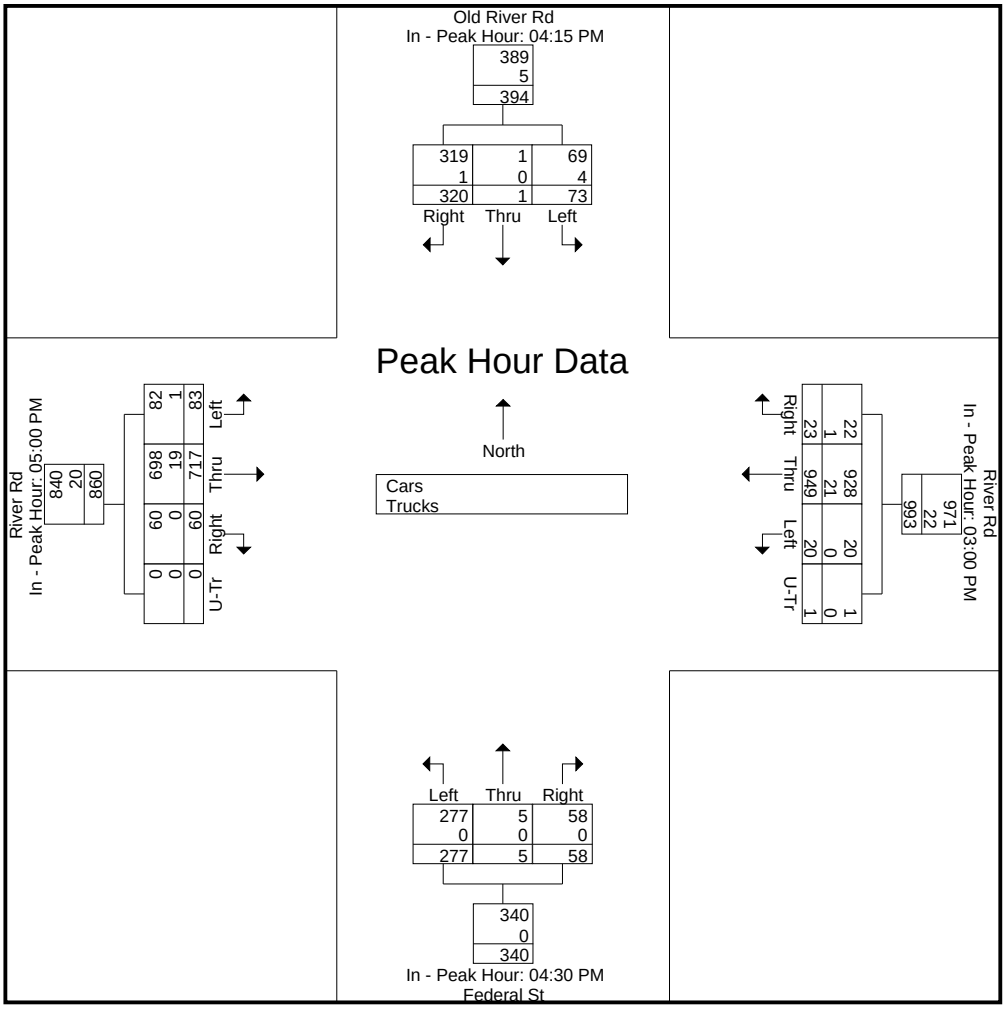
	04:15 PM				03:00 PM					04:30 PM				05:00 PM				
+0 mins.	8	0	67	75	4	**264**	6	**1**	**275**	62	1	9	72	16	164	12	0	192
+15 mins.	**30**	0	**115**	**145**	**8**	245	**8**	0	261	61	1	13	75	21	171	11	0	203
+30 mins.	14	**1**	62	77	5	264	4	0	273	**82**	0	15	**97**	22	**211**	**23**	0	**256**
+45 mins.	21	0	76	97	3	176	5	0	184	72	**3**	**21**	96	**24**	171	14	0	209
Total Volume	73	1	320	394	20	949	23	1	993	277	5	58	340	83	717	60	0	860
% App. Total	18.5	0.3	81.2		2	95.6	2.3	0.1		81.5	1.5	17.1		9.7	83.4	7	0	
PHF	.608	.250	.696	.679	.625	.899	.719	.250	.903	.845	.417	.690	.876	.865	.850	.652	.000	.840
Cars	69	1	319	389	20	928	22	1	971	277	5	58	340	82	698	60	0	840
% Cars	94.5	100	99.7	98.7	100	97.8	95.7	100	97.8	100	100	100	100	98.8	97.4	100	0	97.7
Trucks	4	0	1	5	0	21	1	0	22	0	0	0	0	1	19	0	0	20
% Trucks	5.5	0	0.3	1.3	0	2.2	4.3	0	2.2	0	0	0	0	1.2	2.6	0	0	2.3

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars

	Old River Rd From North			River Rd From East				Federal St From South			River Rd From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-Tr	Left	Thru	Right	Left	Thru	Right	U-Tr	Int. Total
03:00 PM	20	2	47	4	254	6	1	102	1	24	11	147	34	0	653
03:15 PM	5	0	23	8	243	8	0	50	0	4	12	152	18	0	523
03:30 PM	11	1	24	5	259	4	0	60	0	10	15	177	12	0	578
03:45 PM	3	1	25	3	172	4	0	43	0	7	10	182	16	1	467
Total	39	4	119	20	928	22	1	255	1	45	48	658	80	1	2221
04:00 PM	28	0	59	0	248	4	0	73	1	9	15	141	12	1	591
04:15 PM	6	0	67	0	150	9	0	47	0	6	17	143	10	0	455
04:30 PM	29	0	114	0	204	16	0	62	1	9	17	159	9	2	622
04:45 PM	14	1	62	1	175	14	0	61	1	13	17	142	11	1	513
Total	77	1	302	1	777	43	0	243	3	37	66	585	42	4	2181
05:00 PM	20	0	76	2	202	9	0	82	0	15	15	158	12	0	591
05:15 PM	11	0	56	2	202	8	0	72	3	21	21	165	11	0	572
05:30 PM	4	0	48	4	184	9	0	57	0	4	22	207	23	0	562
05:45 PM	12	1	35	4	173	5	0	62	3	6	24	168	14	0	507
Total	47	1	215	12	761	31	0	273	6	46	82	698	60	0	2232
Grand Total	163	6	636	33	2466	96	1	771	10	128	196	1941	182	5	6634
Apprch %	20.2	0.7	79	1.3	95	3.7	0	84.8	1.1	14.1	8.4	83.5	7.8	0.2	
Total %	2.5	0.1	9.6	0.5	37.2	1.4	0	11.6	0.2	1.9	3	29.3	2.7	0.1	

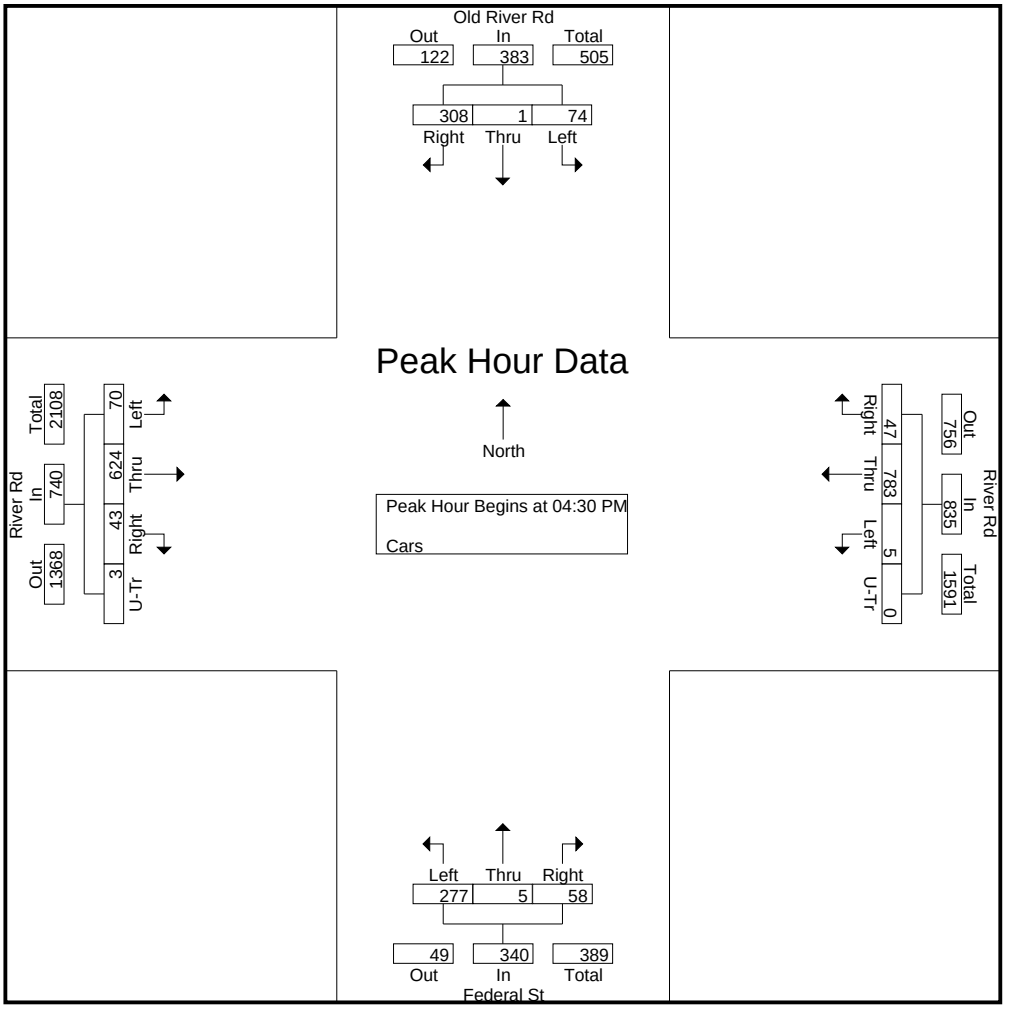
	Old River Rd From North				River Rd From East					Federal St From South				River Rd From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 04:30 PM																			
04:30 PM	**29**	0	**114**	**143**	0	**204**	**16**	0	**220**	62	1	9	72	17	159	9	**2**	187	**622**
04:45 PM	14	**1**	62	77	1	175	14	0	190	61	1	13	75	17	142	11	1	171	513
05:00 PM	20	0	76	96	**2**	202	9	0	213	**82**	0	15	**97**	15	158	**12**	0	185	591
05:15 PM	11	0	56	67	2	202	8	0	212	72	**3**	**21**	96	**21**	**165**	11	0	**197**	572
Total Volume	74	1	308	383	5	783	47	0	835	277	5	58	340	70	624	43	3	740	2298
% App. Total	19.3	0.3	80.4		0.6	93.8	5.6	0		81.5	1.5	17.1		9.5	84.3	5.8	0.4		
PHF	.638	.250	.675	.670	.625	.960	.734	.000	.949	.845	.417	.690	.876	.833	.945	.896	.375	.939	.924

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

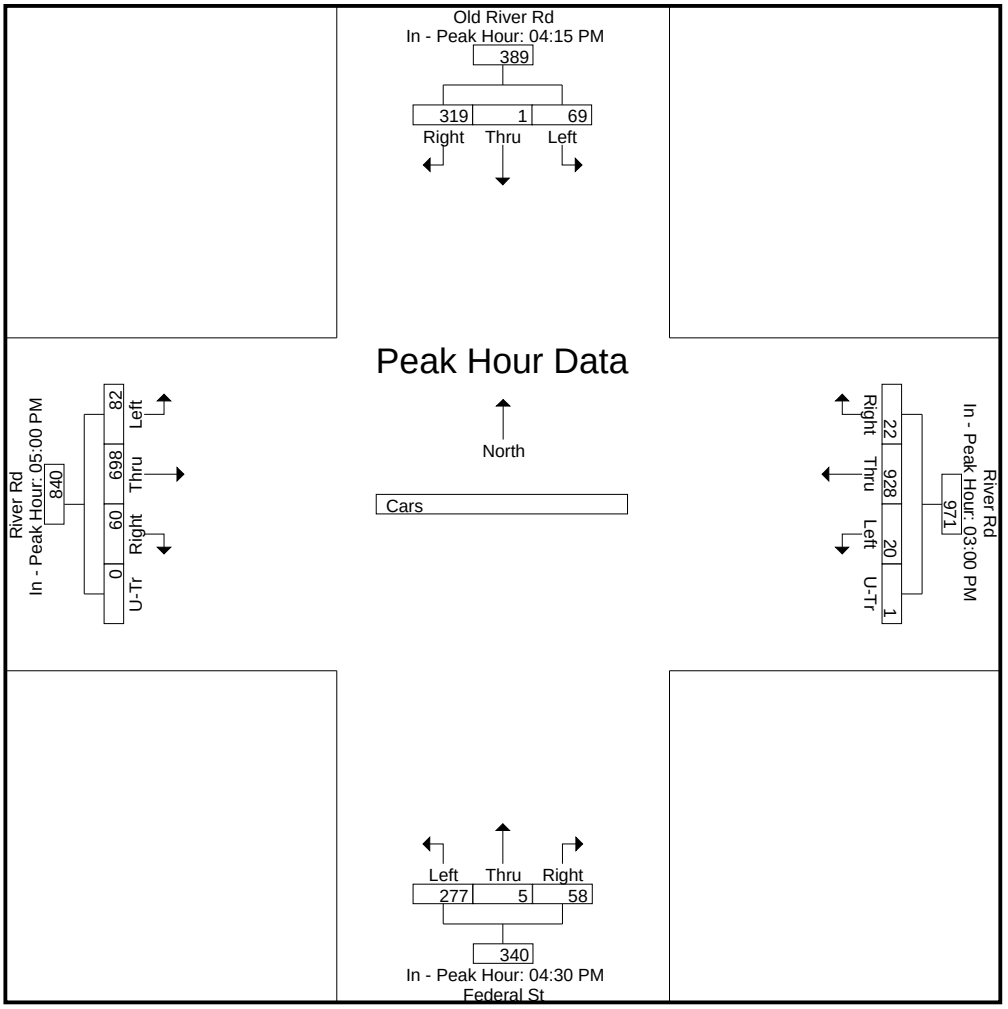
	04:15 PM				03:00 PM					04:30 PM				05:00 PM				
+0 mins.	6	0	67	73	4	254	6	**1**	265	62	1	9	72	15	158	12	0	185
+15 mins.	**29**	0	**114**	**143**	**8**	243	**8**	0	259	61	1	13	75	21	165	11	0	197
+30 mins.	14	**1**	62	77	5	**259**	4	0	**268**	**82**	0	15	**97**	22	**207**	**23**	0	**252**
+45 mins.	20	0	76	96	3	172	4	0	179	72	**3**	**21**	96	**24**	168	14	0	206
Total Volume	69	1	319	389	20	928	22	1	971	277	5	58	340	82	698	60	0	840
% App. Total	17.7	0.3	82		2.1	95.6	2.3	0.1		81.5	1.5	17.1		9.8	83.1	7.1	0	
PHF	.595	.250	.700	.680	.625	.896	.688	.250	.906	.845	.417	.690	.876	.854	.843	.652	.000	.833

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 1

Groups Printed- Trucks

	Old River Rd From North			River Rd From East				Federal St From South			River Rd From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-Tr	Left	Thru	Right	Left	Thru	Right	U-Tr	Int. Total
03:00 PM	0	0	0	0	10	0	0	0	0	0	1	5	1	0	17
03:15 PM	1	0	0	0	2	0	0	0	0	0	0	9	0	0	12
03:30 PM	1	0	0	0	5	0	0	1	0	0	1	4	1	0	13
03:45 PM	0	0	0	0	4	1	0	0	0	0	0	4	1	0	10
Total	2	0	0	0	21	1	0	1	0	0	2	22	3	0	52
04:00 PM	0	0	0	0	6	0	0	3	0	0	1	6	0	0	16
04:15 PM	2	0	0	0	2	0	0	0	0	0	1	5	0	0	10
04:30 PM	1	0	1	0	3	0	0	0	0	0	1	7	0	0	13
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6
Total	3	0	1	0	11	0	0	3	0	0	3	24	0	0	45
05:00 PM	1	0	0	0	8	0	0	0	0	0	1	6	0	0	16
05:15 PM	0	0	0	0	3	0	0	0	0	0	0	6	0	0	9
05:30 PM	0	0	0	0	7	0	0	0	0	0	0	4	0	0	11
05:45 PM	1	0	0	0	1	0	0	0	0	0	0	3	0	0	5
Total	2	0	0	0	19	0	0	0	0	0	1	19	0	0	41
Grand Total	7	0	1	0	51	1	0	4	0	0	6	65	3	0	138
Apprch %	87.5	0	12.5	0	98.1	1.9	0	100	0	0	8.1	87.8	4.1	0	
Total %	5.1	0	0.7	0	37	0.7	0	2.9	0	0	4.3	47.1	2.2	0	

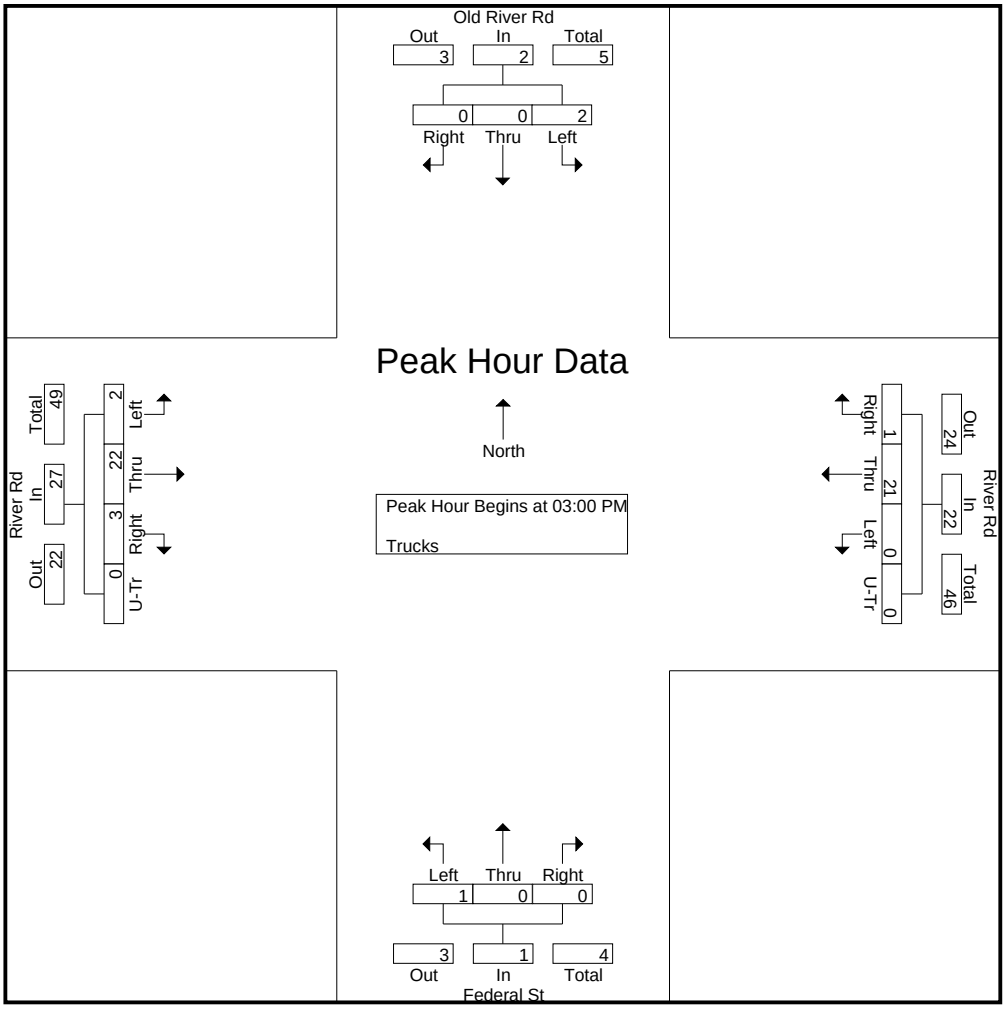
	Old River Rd From North				River Rd From East					Federal St From South				River Rd From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 03:00 PM																			
03:00 PM	0	0	0	0	0	**10**	0	0	**10**	0	0	0	0	**1**	5	**1**	0	7	**17**
03:15 PM	**1**	0	0	**1**	0	2	0	0	2	0	0	0	0	0	**9**	0	0	**9**	12
03:30 PM	1	0	0	1	0	5	0	0	5	**1**	0	0	**1**	1	4	1	0	6	13
03:45 PM	0	0	0	0	0	4	**1**	0	5	0	0	0	0	0	4	1	0	5	10
Total Volume	2	0	0	2	0	21	1	0	22	1	0	0	1	2	22	3	0	27	52
% App. Total	100	0	0		0	95.5	4.5	0		100	0	0		7.4	81.5	11.1	0		
PHF	.500	.000	.000	.500	.000	.525	.250	.000	.550	.250	.000	.000	.250	.500	.611	.750	.000	.750	.765

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

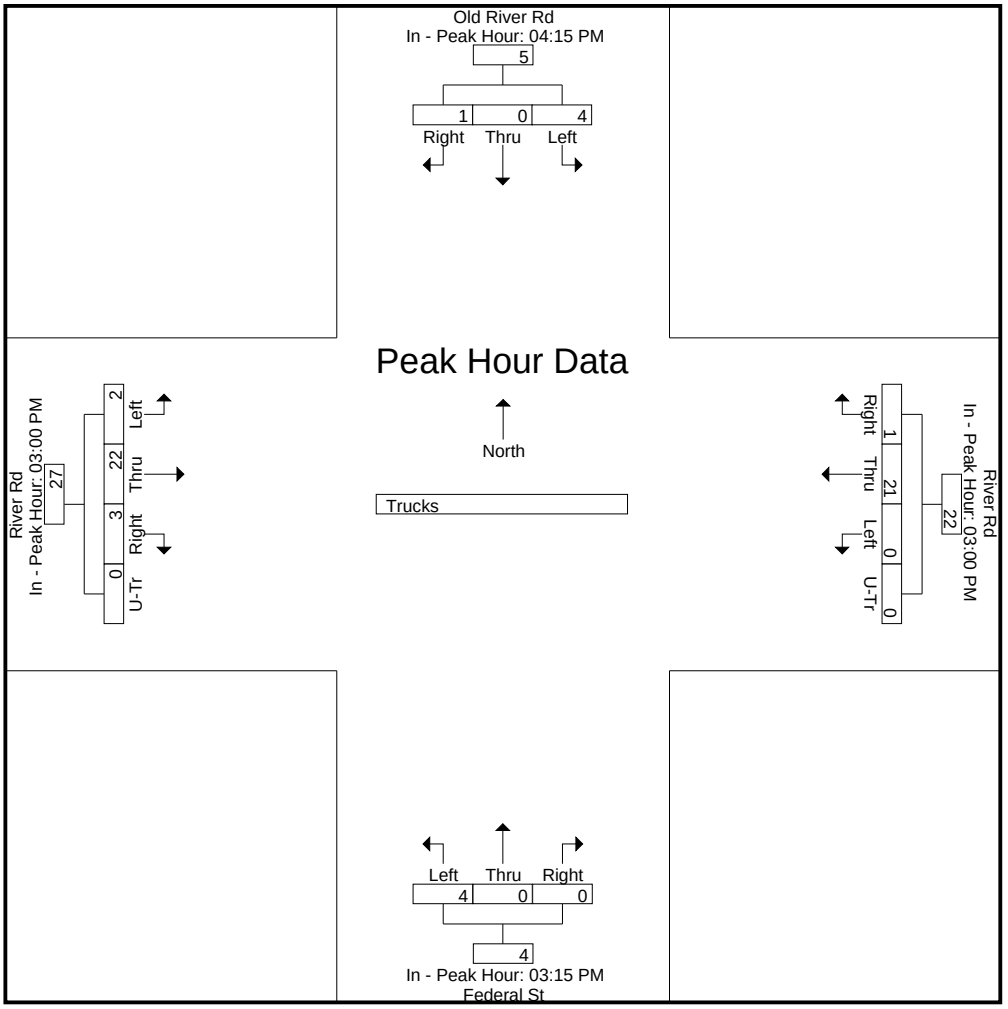
	04:15 PM				03:00 PM					03:15 PM				03:00 PM				
+0 mins.	**2**	0	0	**2**	0	**10**	0	0	**10**	0	0	0	0	**1**	5	**1**	0	7
+15 mins.	1	0	**1**	2	0	2	0	0	2	1	0	0	1	0	**9**	0	0	**9**
+30 mins.	0	0	0	0	0	5	0	0	5	0	0	0	0	1	4	1	0	6
+45 mins.	1	0	0	1	0	4	**1**	0	5	**3**	0	0	**3**	0	4	1	0	5
Total Volume	4	0	1	5	0	21	1	0	22	4	0	0	4	2	22	3	0	27
% App. Total	80	0	20		0	95.5	4.5	0		100	0	0		7.4	81.5	11.1	0	
PHF	.500	.000	.250	.625	.000	.525	.250	.000	.550	.333	.000	.000	.333	.500	.611	.750	.000	.750

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 1

Groups Printed- Bikes Peds

	Old River Rd From North				River Rd From East				Federal St From South				River 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
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	1	3
Grand Total	1	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	2	2	4
Apprch %	100	0	0		0	100	0	0	0	0	0		0	0	0	0			
Total %	50	0	0		0	50	0	0	0	0	0		0	0	0	0	50	50	

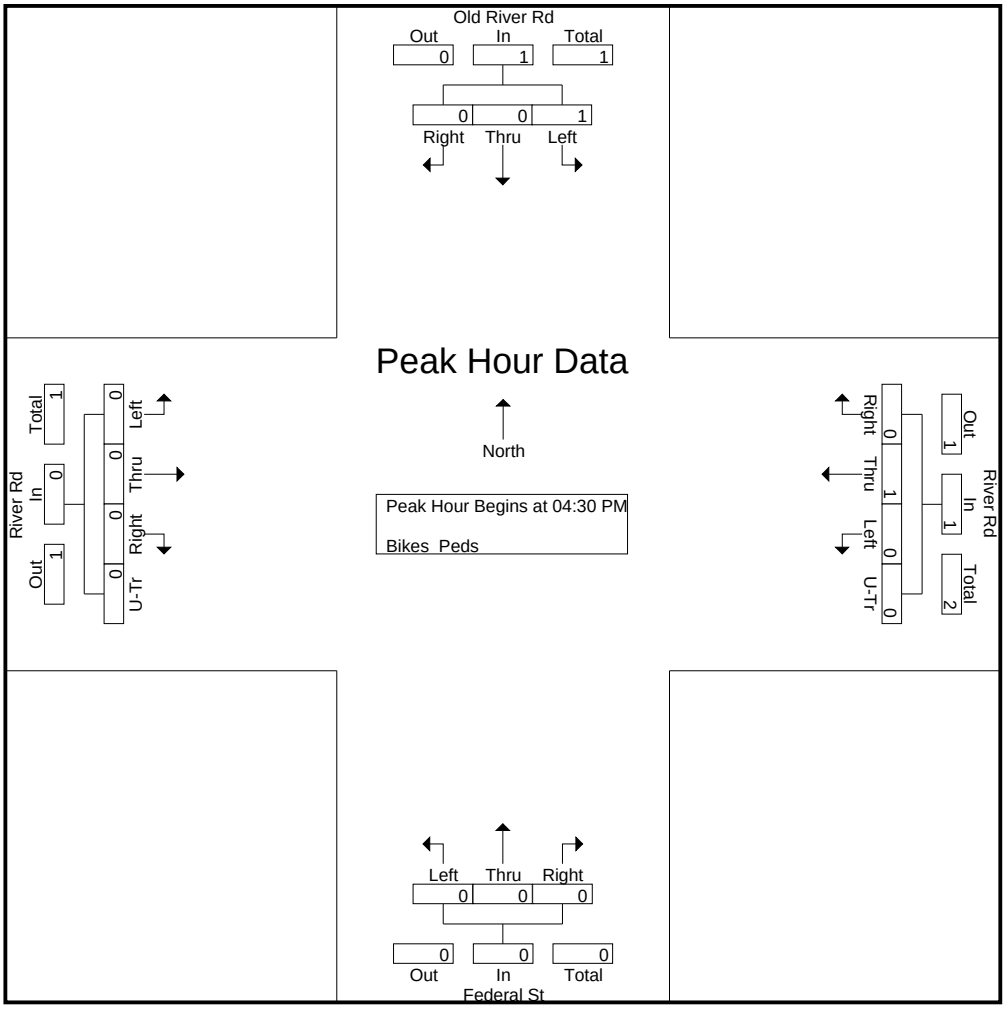
	Old River Rd From North				River Rd From East					Federal St From South				River Rd From West						
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																			
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
04:45 PM	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	**1**
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2
% App. Total	100	0	0		0	100	0	0		0	0	0		0	0	0	0		
PHF	.250	.000	.000	.250	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM					03:00 PM				03:00 PM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	**1**	0	0	**1**	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0
Total Volume	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0
% App. Total	100	0	0		0	100	0	0		0	0	0		0	0	0	0	
PHF	.250	.000	.000	.250	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Old River Rd/Federal St
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379002
Site Code : 10379002
Start Date : 10/15/2025
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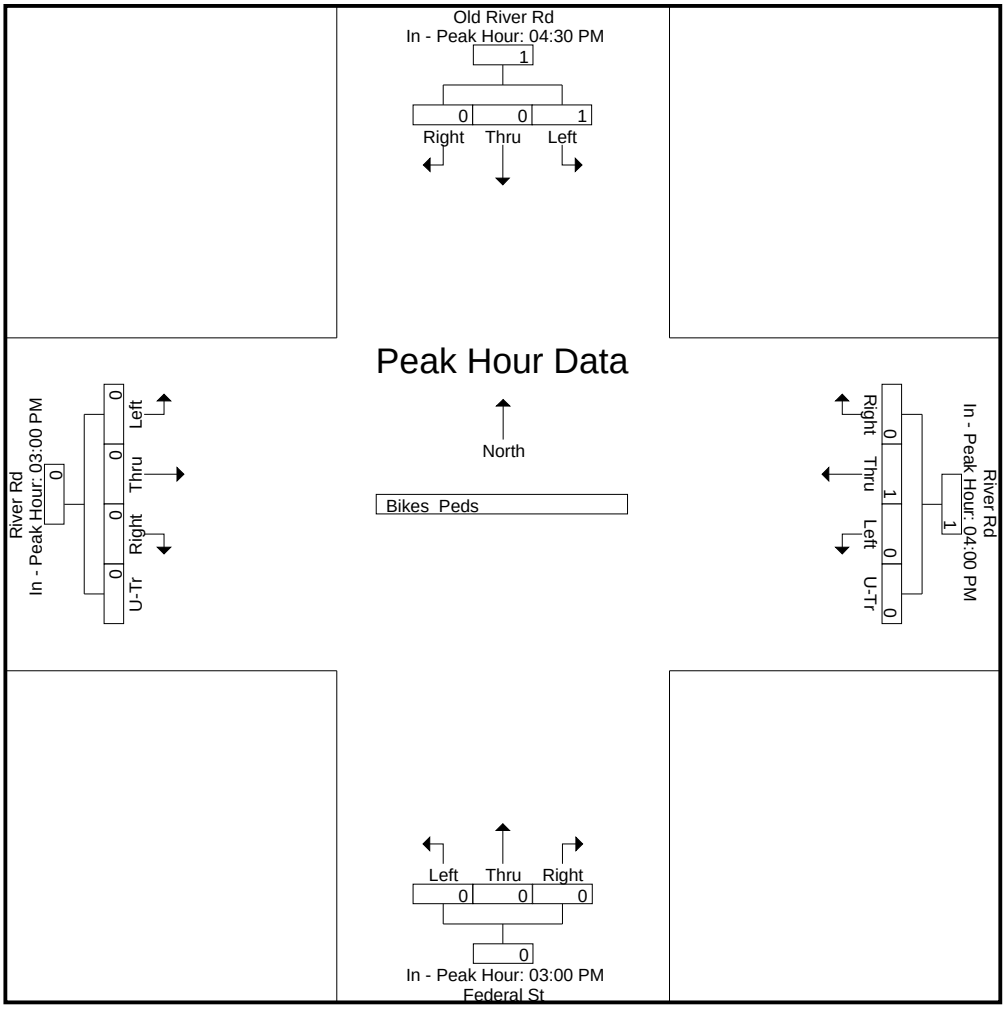


Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars - Trucks

	Route 93 NB From North		River Rd From East			River Rd From West			
Start Time	Left	Right	Thru	Right	U-Tr	Left	Thru	U-Tr	Int. Total
07:00 AM	126	44	78	90	0	60	315	0	713
07:15 AM	116	60	91	127	0	44	375	0	813
07:30 AM	93	62	119	152	1	35	290	2	754
07:45 AM	84	84	131	127	0	64	290	2	782
Total	419	250	419	496	1	203	1270	4	3062
08:00 AM	108	90	126	123	1	52	328	1	829
08:15 AM	151	97	137	113	0	76	249	1	824
08:30 AM	125	110	147	113	0	53	204	0	752
08:45 AM	138	118	102	126	0	85	199	1	769
Total	522	415	512	475	1	266	980	3	3174
Grand Total	941	665	931	971	2	469	2250	7	6236
Apprch %	58.6	41.4	48.9	51	0.1	17.2	82.5	0.3	
Total %	15.1	10.7	14.9	15.6	0	7.5	36.1	0.1	
Cars	913	652	862	909	2	445	2194	7	5984
% Cars	97	98	92.6	93.6	100	94.9	97.5	100	96
Trucks	28	13	69	62	0	24	56	0	252
% Trucks	3	2	7.4	6.4	0	5.1	2.5	0	4

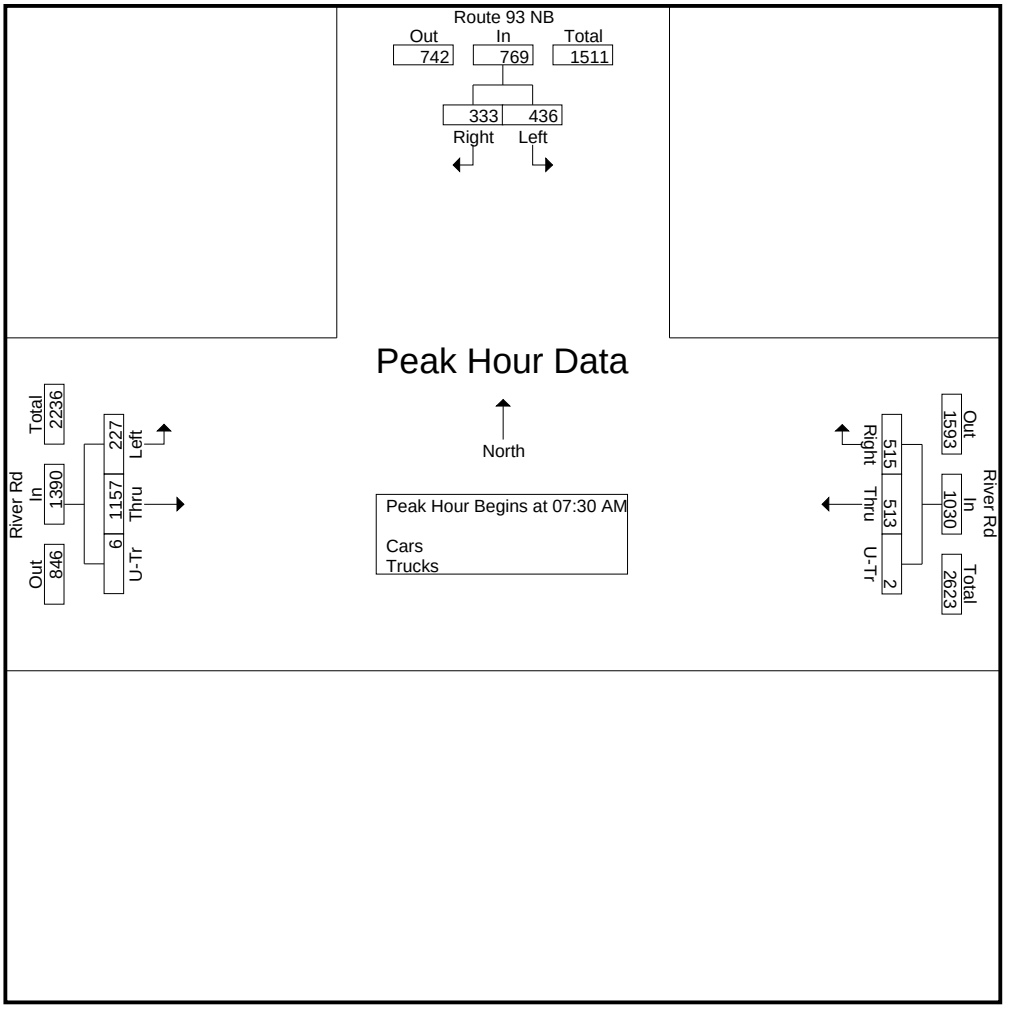
	Route 93 NB From North			River Rd From East				River Rd From West				
Start Time	Left	Right	App. Total	Thru	Right	U-Tr	App. Total	Left	Thru	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:30 AM												
07:30 AM	93	62	155	119	**152**	**1**	**272**	35	290	**2**	327	754
07:45 AM	84	84	168	131	127	0	258	64	290	2	356	782
08:00 AM	108	90	198	126	123	1	250	52	**328**	1	**381**	**829**
08:15 AM	**151**	**97**	**248**	**137**	113	0	250	**76**	249	1	326	824
Total Volume	436	333	769	513	515	2	1030	227	1157	6	1390	3189
% App. Total	56.7	43.3		49.8	50	0.2		16.3	83.2	0.4		
PHF	.722	.858	.775	.936	.847	.500	.947	.747	.882	.750	.912	.962

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
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:

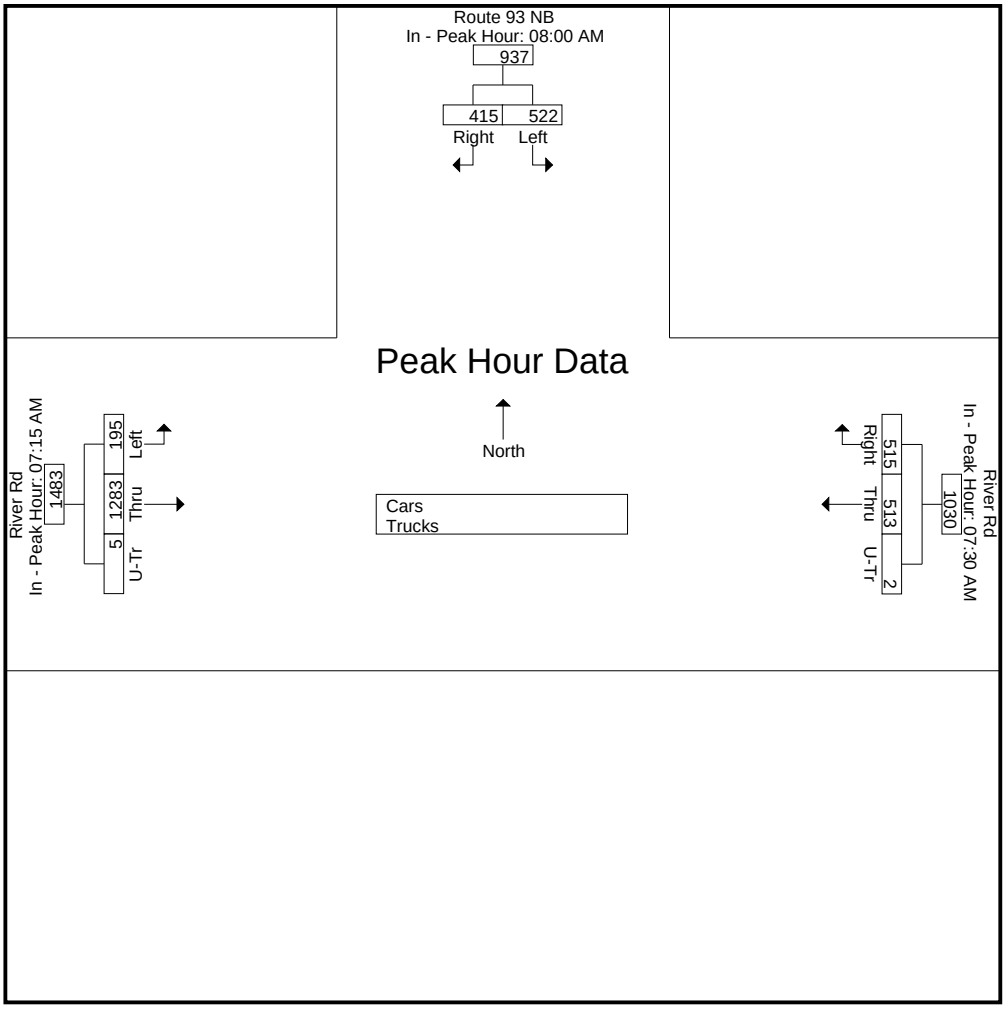
	08:00 AM			07:30 AM				07:15 AM			
+0 mins.	108	90	198	119	**152**	**1**	**272**	44	**375**	0	**419**
+15 mins.	**151**	97	248	131	127	0	258	35	290	**2**	327
+30 mins.	125	110	235	126	123	1	250	**64**	290	2	356
+45 mins.	138	**118**	**256**	**137**	113	0	250	52	328	1	381
Total Volume	522	415	937	513	515	2	1030	195	1283	5	1483
% App. Total	55.7	44.3		49.8	50	0.2		13.1	86.5	0.3	
PHF	.864	.879	.915	.936	.847	.500	.947	.762	.855	.625	.885

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars

	Route 93 NB From North		River Rd From East			River Rd From West			
Start Time	Left	Right	Thru	Right	U-Tr	Left	Thru	U-Tr	Int. Total
07:00 AM	123	44	67	78	0	58	300	0	670
07:15 AM	114	60	81	123	0	41	368	0	787
07:30 AM	88	60	110	146	1	34	284	2	725
07:45 AM	81	82	124	116	0	64	285	2	754
Total	406	246	382	463	1	197	1237	4	2936
08:00 AM	106	89	119	122	1	49	326	1	813
08:15 AM	147	95	131	103	0	70	239	1	786
08:30 AM	119	108	137	109	0	51	197	0	721
08:45 AM	135	114	93	112	0	78	195	1	728
Total	507	406	480	446	1	248	957	3	3048
Grand Total	913	652	862	909	2	445	2194	7	5984
Apprch %	58.3	41.7	48.6	51.3	0.1	16.8	82.9	0.3	
Total %	15.3	10.9	14.4	15.2	0	7.4	36.7	0.1	

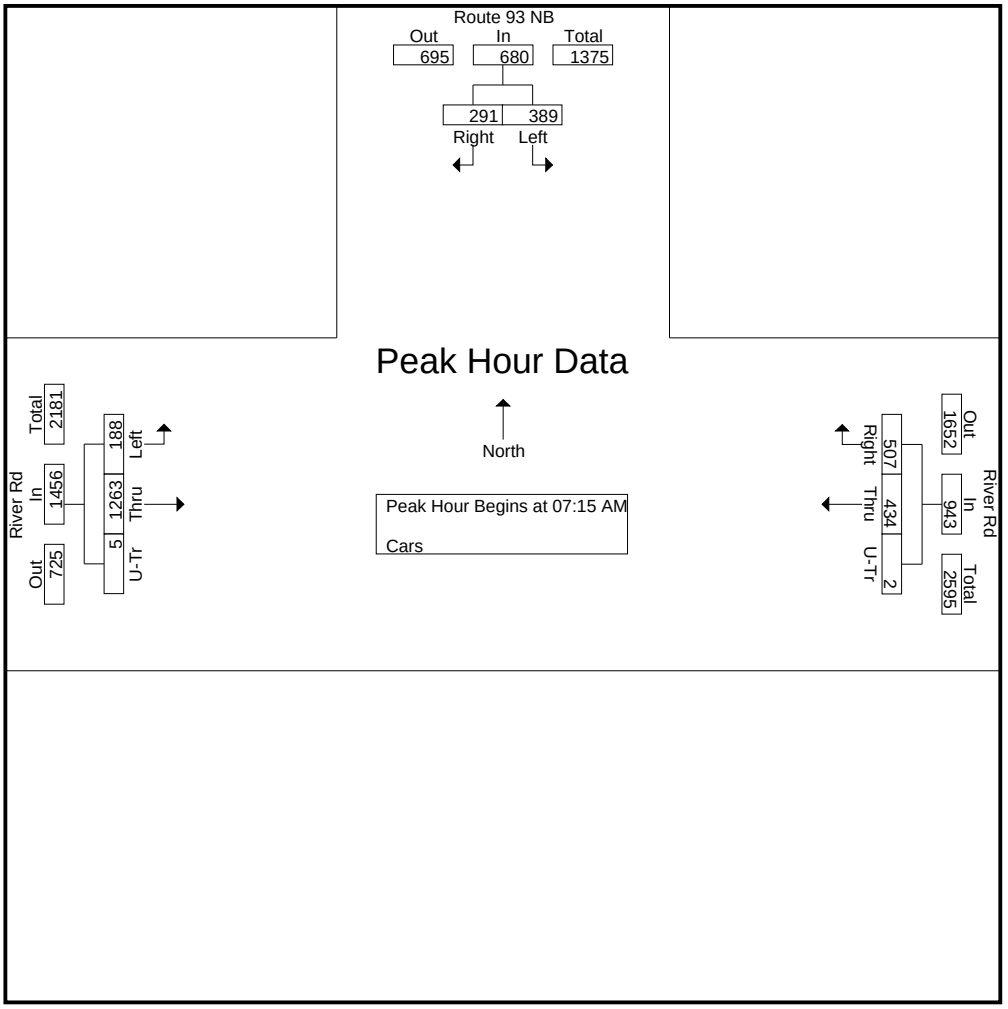
	Route 93 NB From North			River Rd From East				River Rd From West				
Start Time	Left	Right	App. Total	Thru	Right	U-Tr	App. Total	Left	Thru	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:15 AM												
07:15 AM	**114**	60	174	81	123	0	204	41	**368**	0	**409**	787
07:30 AM	88	60	148	110	**146**	**1**	**257**	34	284	**2**	320	725
07:45 AM	81	82	163	**124**	116	0	240	**64**	285	2	351	754
08:00 AM	106	**89**	**195**	119	122	1	242	49	326	1	376	**813**
Total Volume	389	291	680	434	507	2	943	188	1263	5	1456	3079
% App. Total	57.2	42.8		46	53.8	0.2		12.9	86.7	0.3		
PHF	.853	.817	.872	.875	.868	.500	.917	.734	.858	.625	.890	.947

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
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				07:15 AM			
+0 mins.	106	89	195	110	**146**	**1**	**257**	41	**368**	0	**409**
+15 mins.	**147**	95	242	124	116	0	240	34	284	**2**	320
+30 mins.	119	108	227	119	122	1	242	**64**	285	2	351
+45 mins.	135	**114**	**249**	**131**	103	0	234	49	326	1	376
Total Volume	507	406	913	484	487	2	973	188	1263	5	1456
% App. Total	55.5	44.5		49.7	50.1	0.2		12.9	86.7	0.3	
PHF	.862	.890	.917	.924	.834	.500	.946	.734	.858	.625	.890

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
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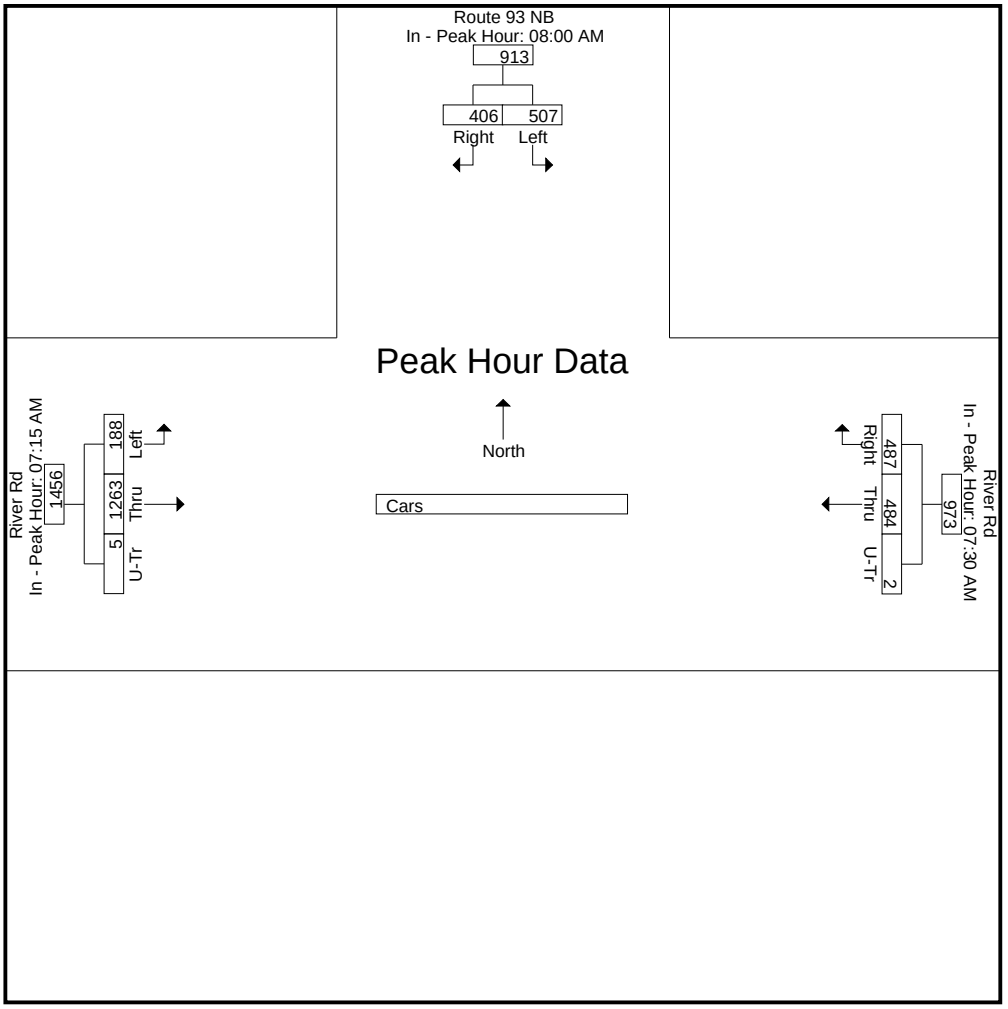
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 1

Groups Printed- Trucks

	Route 93 NB From North		River Rd From East			River Rd From West			
Start Time	Left	Right	Thru	Right	U-Tr	Left	Thru	U-Tr	Int. Total
07:00 AM	3	0	11	12	0	2	15	0	43
07:15 AM	2	0	10	4	0	3	7	0	26
07:30 AM	5	2	9	6	0	1	6	0	29
07:45 AM	3	2	7	11	0	0	5	0	28
Total	13	4	37	33	0	6	33	0	126
08:00 AM	2	1	7	1	0	3	2	0	16
08:15 AM	4	2	6	10	0	6	10	0	38
08:30 AM	6	2	10	4	0	2	7	0	31
08:45 AM	3	4	9	14	0	7	4	0	41
Total	15	9	32	29	0	18	23	0	126
Grand Total	28	13	69	62	0	24	56	0	252
Apprch %	68.3	31.7	52.7	47.3	0	30	70	0	
Total %	11.1	5.2	27.4	24.6	0	9.5	22.2	0	

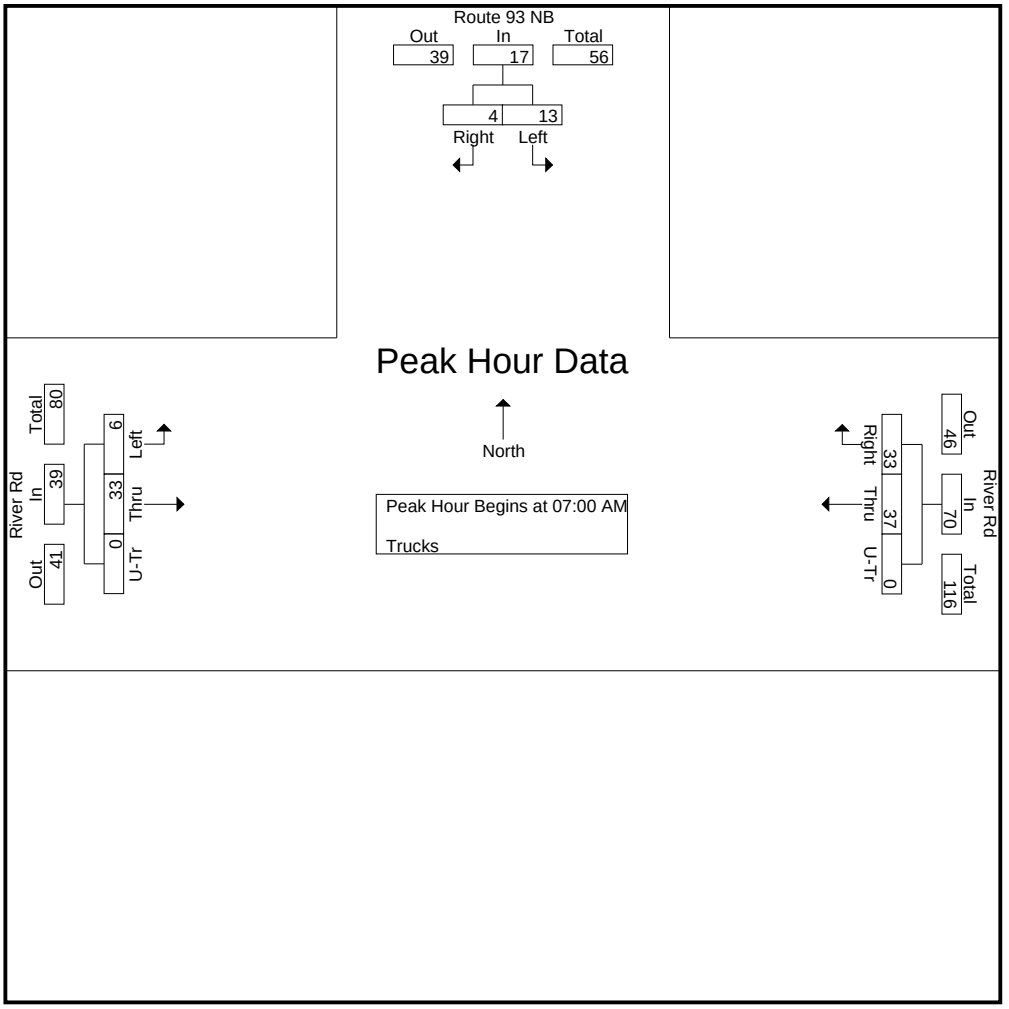
	Route 93 NB From North			River Rd From East				River Rd From West				
Start Time	Left	Right	App. Total	Thru	Right	U-Tr	App. Total	Left	Thru	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:00 AM												
07:00 AM	3	0	3	**11**	**12**	0	**23**	2	**15**	0	**17**	**43**
07:15 AM	2	0	2	10	4	0	14	**3**	7	0	10	26
07:30 AM	**5**	**2**	**7**	9	6	0	15	1	6	0	7	29
07:45 AM	3	2	5	7	11	0	18	0	5	0	5	28
Total Volume	13	4	17	37	33	0	70	6	33	0	39	126
% App. Total	76.5	23.5		52.9	47.1	0		15.4	84.6	0		
PHF	.650	.500	.607	.841	.688	.000	.761	.500	.550	.000	.574	.733

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
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			07:00 AM				08:00 AM			
+0 mins.	2	1	3	**11**	**12**	0	**23**	3	2	0	5
+15 mins.	4	2	6	10	4	0	14	6	**10**	0	**16**
+30 mins.	**6**	2	**8**	9	6	0	15	2	7	0	9
+45 mins.	3	**4**	7	7	11	0	18	**7**	4	0	11
Total Volume	15	9	24	37	33	0	70	18	23	0	41
% App. Total	62.5	37.5		52.9	47.1	0		43.9	56.1	0	
PHF	.625	.563	.750	.841	.688	.000	.761	.643	.575	.000	.641

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
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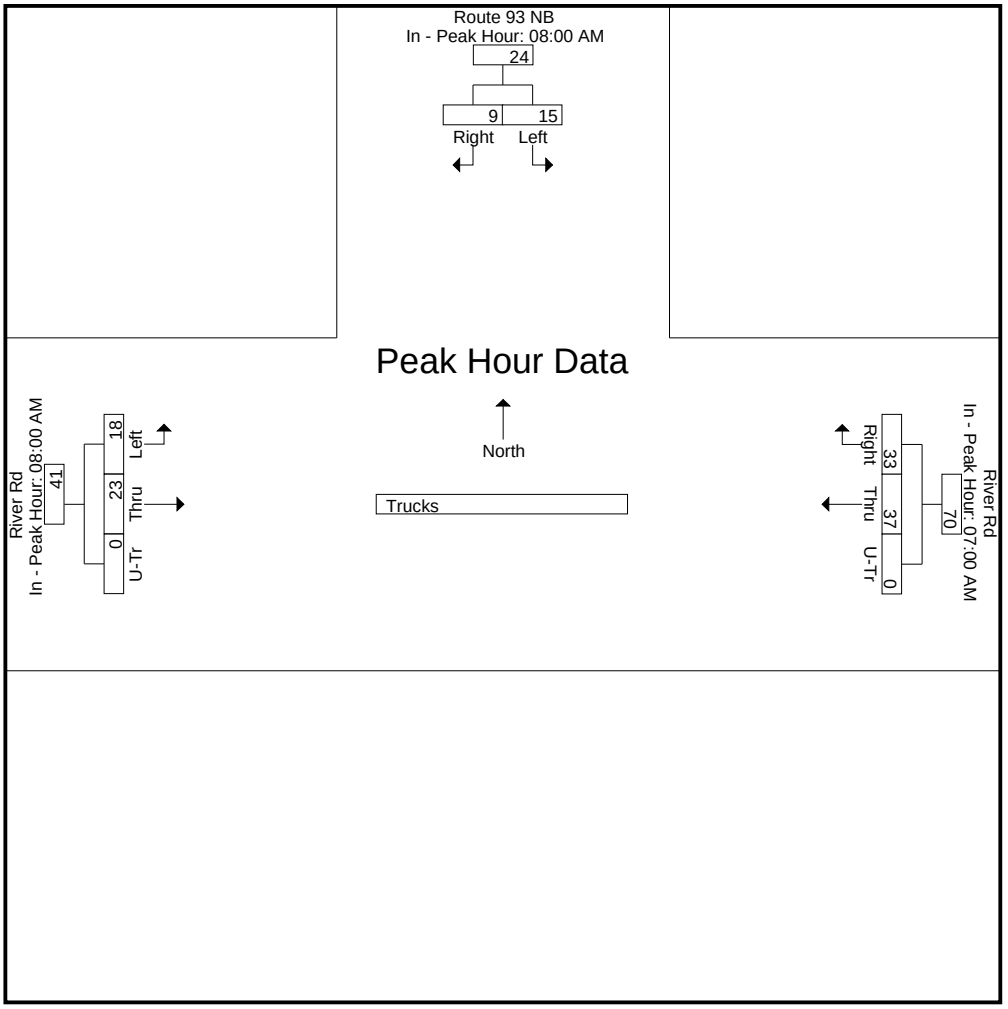

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 1

Groups Printed- Bikes Peds

	Route 93 NB From North			River Rd From East			River Rd From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	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	0	0	0	0	0	0	1	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	1	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	1	0	0	0	0	0	0	1	1
Total	0	0	0	1	0	0	0	0	0	0	1	1
Grand Total	0	0	0	1	0	0	0	1	0	0	2	2
Apprch %	0	0		100	0	0	0	100	0			
Total %	0	0		50	0	0	0	50	0	0	100	

	Route 93 NB From North			River Rd From East				River Rd From West				
Start Time	Left	Right	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:00 AM												
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	**1**	0	**1**	**1**
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	1	0	1	1
% App. Total	0	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
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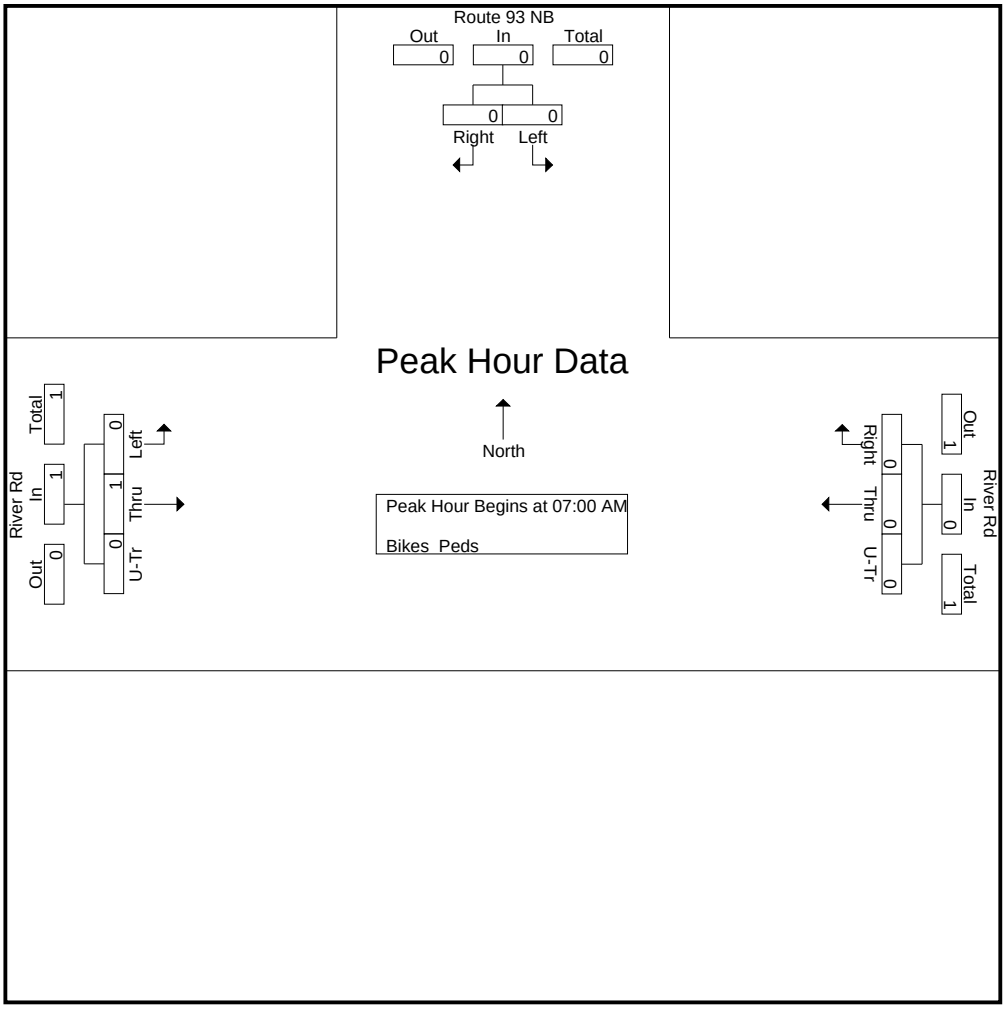

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM			08:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	**1**	0	**1**
+45 mins.	0	0	0	**1**	0	0	**1**	0	0	0	0
Total Volume	0	0	0	1	0	0	1	0	1	0	1
% App. Total	0	0		100	0	0		0	100	0	
PHF	.000	.000	.000	.250	.000	.000	.250	.000	.250	.000	.250

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
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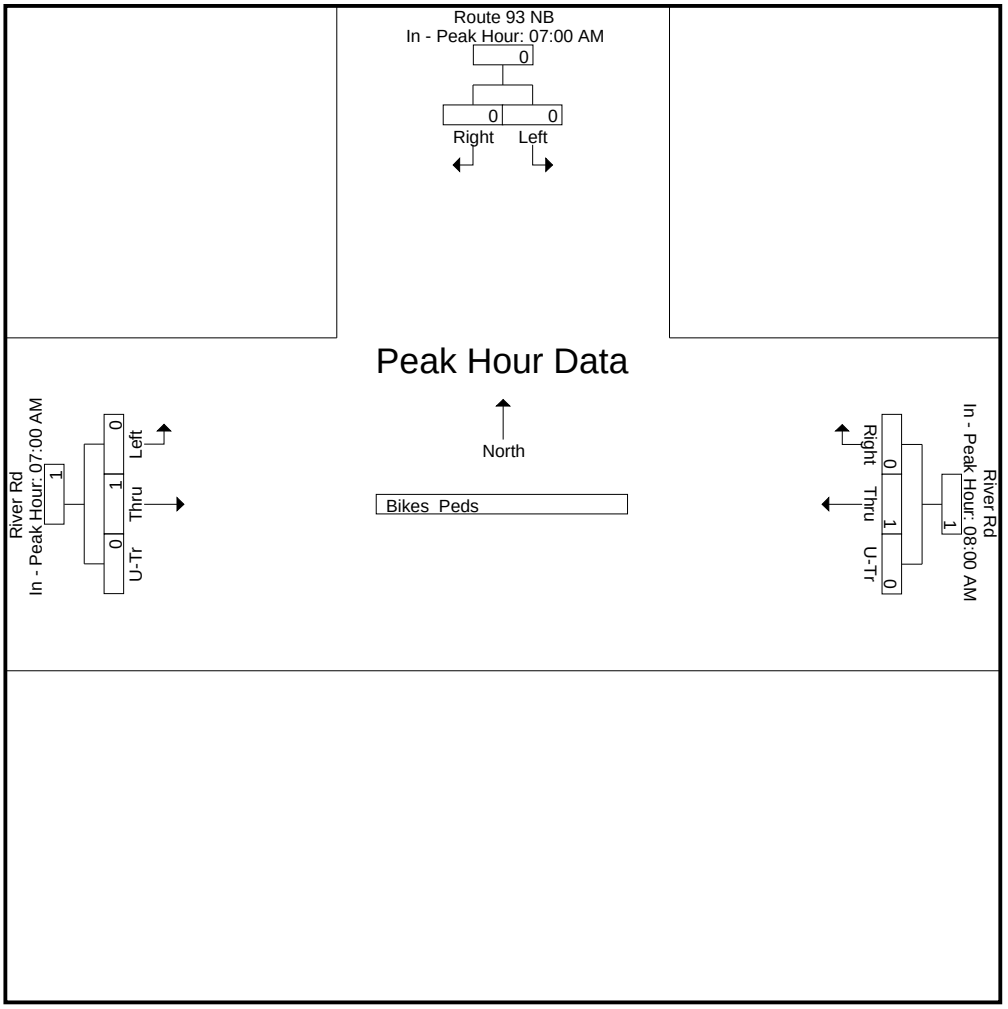


Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars - Trucks

	Route 93 NB From North		River Rd From East			River Rd From West			
Start Time	Left	Right	Thru	Right	U-Tr	Left	Thru	U-Tr	Int. Total
03:00 PM	41	29	185	238	0	114	152	0	759
03:15 PM	30	31	135	167	1	114	163	0	641
03:30 PM	26	26	167	171	0	174	185	0	749
03:45 PM	42	12	117	141	0	146	173	1	632
Total	139	98	604	717	1	548	673	1	2781
04:00 PM	26	15	188	188	0	121	152	0	690
04:15 PM	29	18	116	168	0	106	160	0	597
04:30 PM	26	33	196	168	0	109	154	0	686
04:45 PM	31	32	167	165	0	92	145	0	632
Total	112	98	667	689	0	428	611	0	2605
05:00 PM	26	25	194	169	0	99	167	0	680
05:15 PM	35	35	161	172	0	123	176	0	702
05:30 PM	44	37	132	159	0	106	200	2	680
05:45 PM	47	28	126	145	0	65	181	0	592
Total	152	125	613	645	0	393	724	2	2654
Grand Total	403	321	1884	2051	1	1369	2008	3	8040
Apprch %	55.7	44.3	47.9	52.1	0	40.5	59.4	0.1	
Total %	5	4	23.4	25.5	0	17	25	0	
Cars	378	314	1855	2026	1	1349	1958	3	7884
% Cars	93.8	97.8	98.5	98.8	100	98.5	97.5	100	98.1
Trucks	25	7	29	25	0	20	50	0	156
% Trucks	6.2	2.2	1.5	1.2	0	1.5	2.5	0	1.9

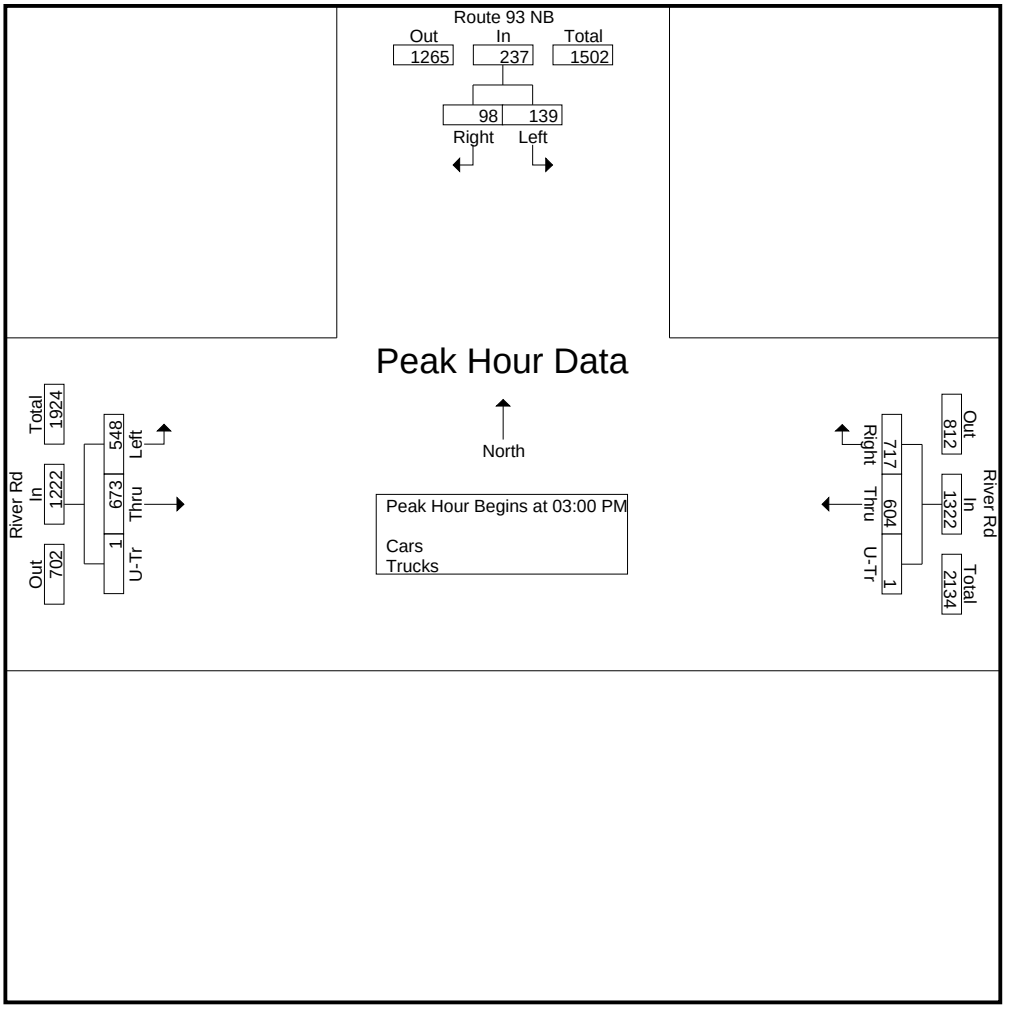
	Route 93 NB From North			River Rd From East				River Rd From West				
Start Time	Left	Right	App. Total	Thru	Right	U-Tr	App. Total	Left	Thru	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 03:00 PM												
03:00 PM	41	29	**70**	**185**	**238**	0	**423**	114	152	0	266	**759**
03:15 PM	30	**31**	61	135	167	**1**	303	114	163	0	277	641
03:30 PM	26	26	52	167	171	0	338	**174**	**185**	0	**359**	749
03:45 PM	**42**	12	54	117	141	0	258	146	173	**1**	320	632
Total Volume	139	98	237	604	717	1	1322	548	673	1	1222	2781
% App. Total	58.6	41.4		45.7	54.2	0.1		44.8	55.1	0.1		
PHF	.827	.790	.846	.816	.753	.250	.781	.787	.909	.250	.851	.916

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM			04:30 PM				03:15 PM			
+0 mins.	26	25	51	**196**	168	0	**364**	114	163	0	277
+15 mins.	35	35	70	167	165	0	332	**174**	**185**	0	**359**
+30 mins.	44	**37**	**81**	194	169	0	363	146	173	**1**	320
+45 mins.	**47**	28	75	161	**172**	0	333	121	152	0	273
Total Volume	152	125	277	718	674	0	1392	555	673	1	1229
% App. Total	54.9	45.1		51.6	48.4	0		45.2	54.8	0.1	
PHF	.809	.845	.855	.916	.980	.000	.956	.797	.909	.250	.856

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
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File Name : 10379003
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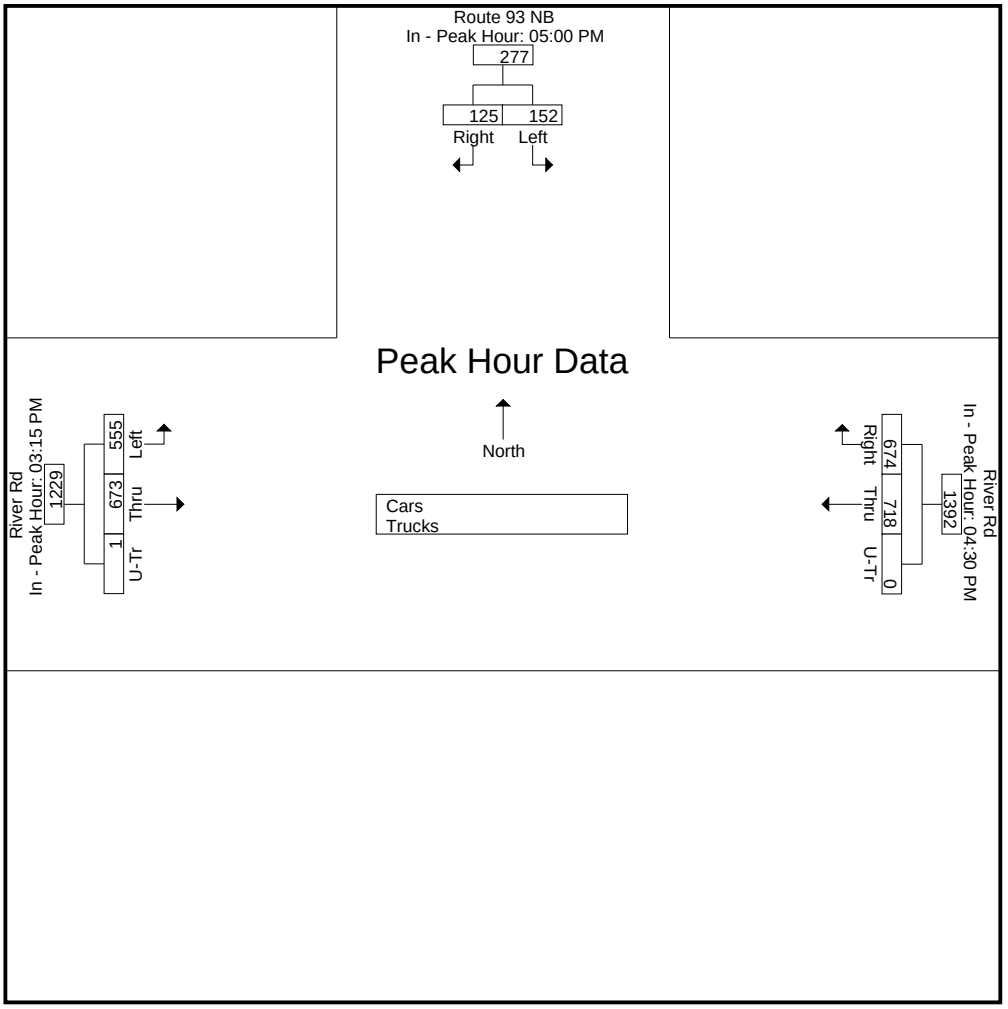


Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars

	Route 93 NB From North		River Rd From East			River Rd From West			
Start Time	Left	Right	Thru	Right	U-Tr	Left	Thru	U-Tr	Int. Total
03:00 PM	40	27	178	236	0	107	147	0	735
03:15 PM	25	30	134	166	1	112	159	0	627
03:30 PM	26	25	166	168	0	174	179	0	738
03:45 PM	42	12	115	137	0	144	168	1	619
Total	133	94	593	707	1	537	653	1	2719
04:00 PM	24	15	182	185	0	118	147	0	671
04:15 PM	28	18	116	166	0	102	155	0	585
04:30 PM	22	30	194	166	0	107	150	0	669
04:45 PM	26	32	167	165	0	92	144	0	626
Total	100	95	659	682	0	419	596	0	2551
05:00 PM	25	25	189	167	0	99	160	0	665
05:15 PM	34	35	159	171	0	123	172	0	694
05:30 PM	41	37	129	156	0	106	197	2	668
05:45 PM	45	28	126	143	0	65	180	0	587
Total	145	125	603	637	0	393	709	2	2614
Grand Total	378	314	1855	2026	1	1349	1958	3	7884
Apprch %	54.6	45.4	47.8	52.2	0	40.8	59.2	0.1	
Total %	4.8	4	23.5	25.7	0	17.1	24.8	0	

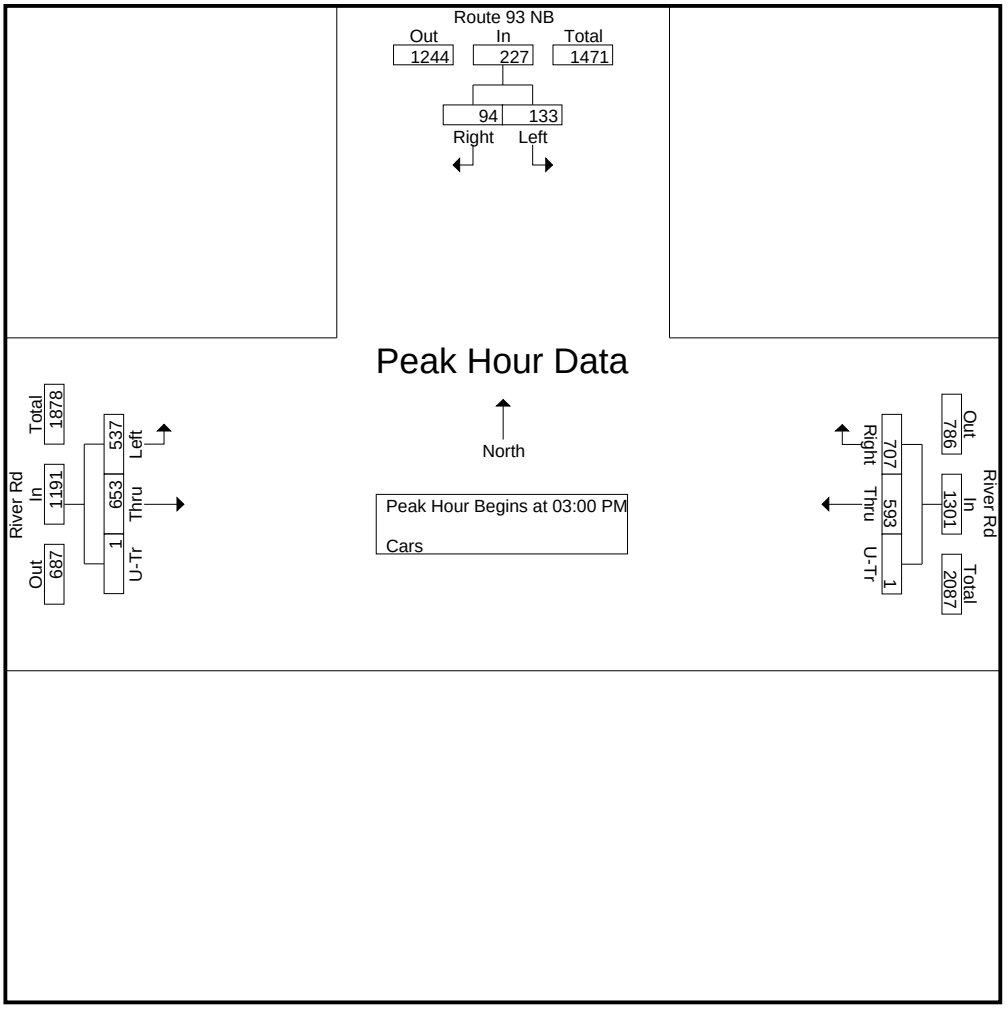
	Route 93 NB From North			River Rd From East				River Rd From West				
Start Time	Left	Right	App. Total	Thru	Right	U-Tr	App. Total	Left	Thru	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 03:00 PM												
03:00 PM	40	27	**67**	**178**	**236**	0	**414**	107	147	0	254	735
03:15 PM	25	**30**	55	134	166	**1**	301	112	159	0	271	627
03:30 PM	26	25	51	166	168	0	334	**174**	**179**	0	**353**	**738**
03:45 PM	**42**	12	54	115	137	0	252	144	168	**1**	313	619
Total Volume	133	94	227	593	707	1	1301	537	653	1	1191	2719
% App. Total	58.6	41.4		45.6	54.3	0.1		45.1	54.8	0.1		
PHF	.792	.783	.847	.833	.749	.250	.786	.772	.912	.250	.843	.921

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

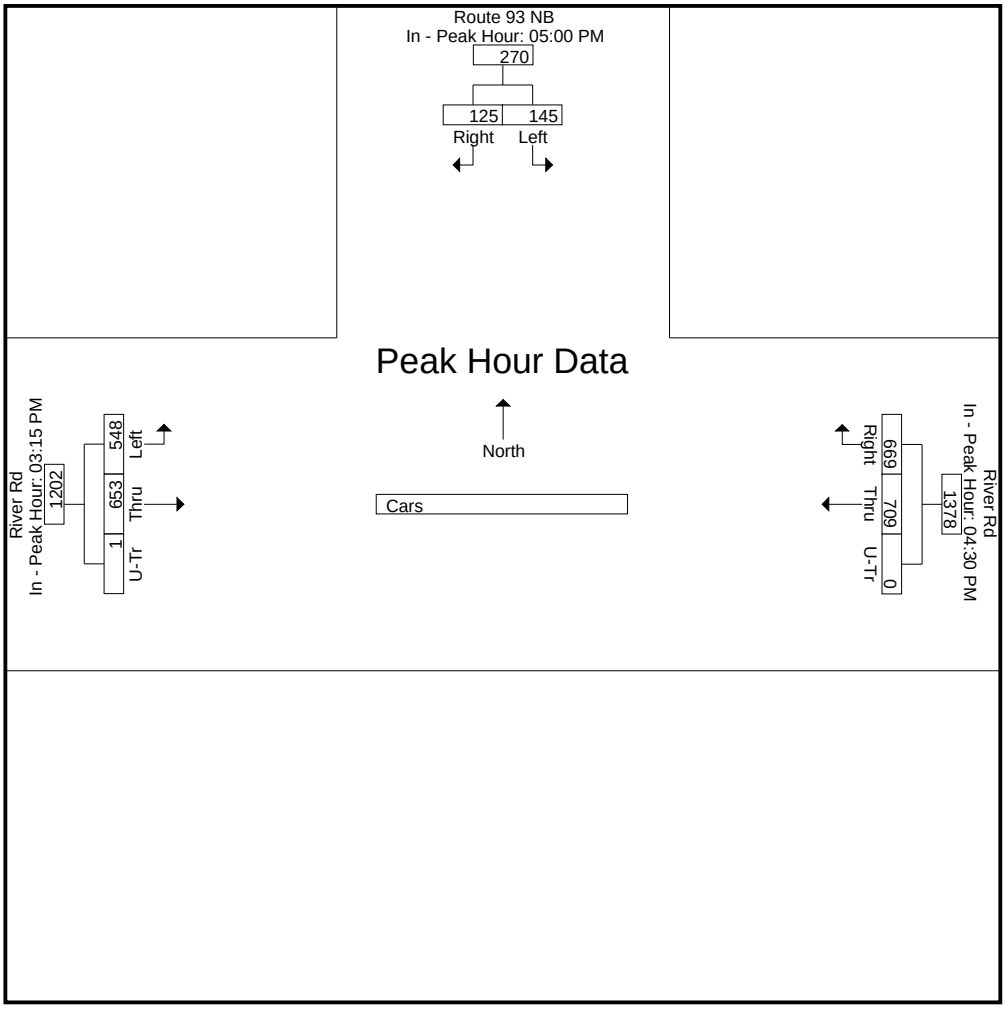
	05:00 PM			04:30 PM				03:15 PM			
+0 mins.	25	25	50	**194**	166	0	**360**	112	159	0	271
+15 mins.	34	35	69	167	165	0	332	**174**	**179**	0	**353**
+30 mins.	41	**37**	**78**	189	167	0	356	144	168	**1**	313
+45 mins.	**45**	28	73	159	**171**	0	330	118	147	0	265
Total Volume	145	125	270	709	669	0	1378	548	653	1	1202
% App. Total	53.7	46.3		51.5	48.5	0		45.6	54.3	0.1	
PHF	.806	.845	.865	.914	.978	.000	.957	.787	.912	.250	.851

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 1

Groups Printed- Trucks

	Route 93 NB From North		River Rd From East			River Rd From West			
Start Time	Left	Right	Thru	Right	U-Tr	Left	Thru	U-Tr	Int. Total
03:00 PM	1	2	7	2	0	7	5	0	24
03:15 PM	5	1	1	1	0	2	4	0	14
03:30 PM	0	1	1	3	0	0	6	0	11
03:45 PM	0	0	2	4	0	2	5	0	13
Total	6	4	11	10	0	11	20	0	62
04:00 PM	2	0	6	3	0	3	5	0	19
04:15 PM	1	0	0	2	0	4	5	0	12
04:30 PM	4	3	2	2	0	2	4	0	17
04:45 PM	5	0	0	0	0	0	1	0	6
Total	12	3	8	7	0	9	15	0	54
05:00 PM	1	0	5	2	0	0	7	0	15
05:15 PM	1	0	2	1	0	0	4	0	8
05:30 PM	3	0	3	3	0	0	3	0	12
05:45 PM	2	0	0	2	0	0	1	0	5
Total	7	0	10	8	0	0	15	0	40
Grand Total	25	7	29	25	0	20	50	0	156
Apprch %	78.1	21.9	53.7	46.3	0	28.6	71.4	0	
Total %	16	4.5	18.6	16	0	12.8	32.1	0	

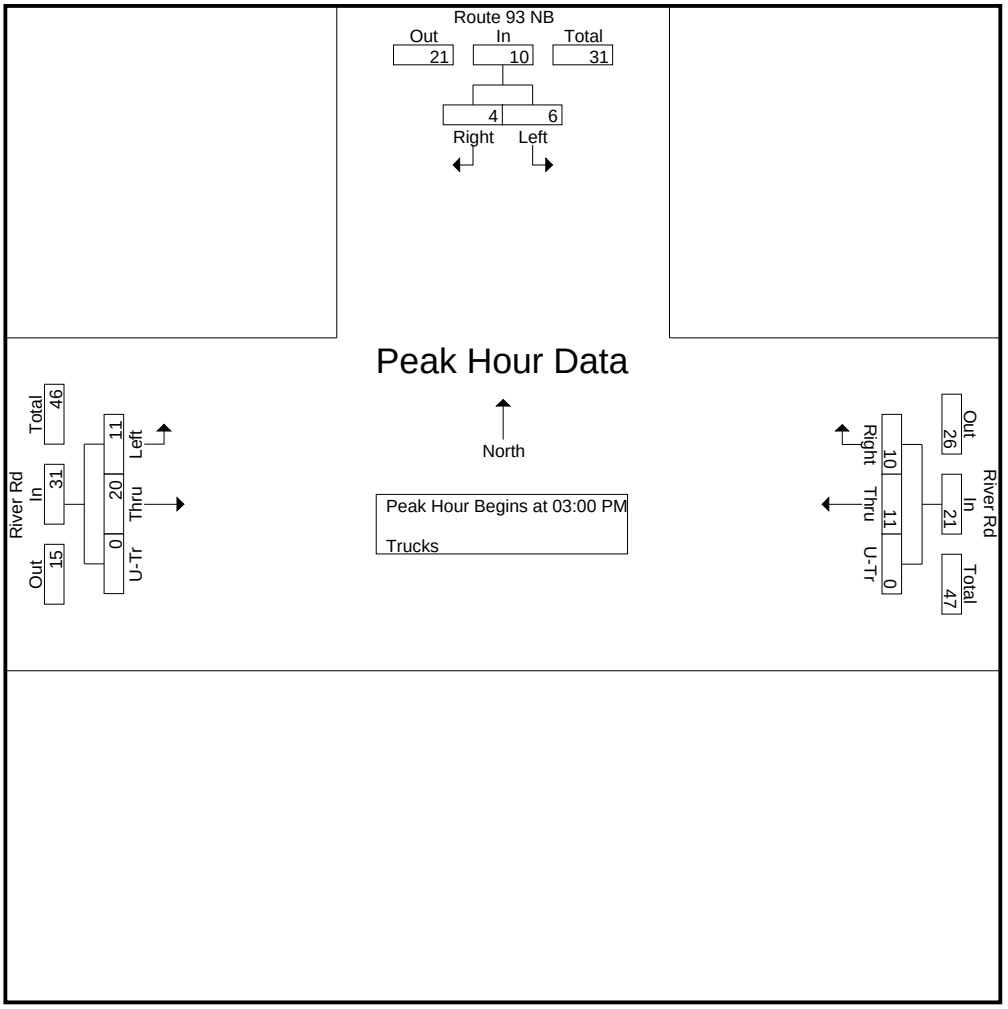
	Route 93 NB From North			River Rd From East				River Rd From West				
Start Time	Left	Right	App. Total	Thru	Right	U-Tr	App. Total	Left	Thru	U-Tr	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 03:00 PM												
03:00 PM	1	**2**	3	**7**	2	0	**9**	**7**	5	0	**12**	**24**
03:15 PM	**5**	1	**6**	1	1	0	2	2	4	0	6	14
03:30 PM	0	1	1	1	3	0	4	0	**6**	0	6	11
03:45 PM	0	0	0	2	**4**	0	6	2	5	0	7	13
Total Volume	6	4	10	11	10	0	21	11	20	0	31	62
% App. Total	60	40		52.4	47.6	0		35.5	64.5	0		
PHF	.300	.500	.417	.393	.625	.000	.583	.393	.833	.000	.646	.646

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

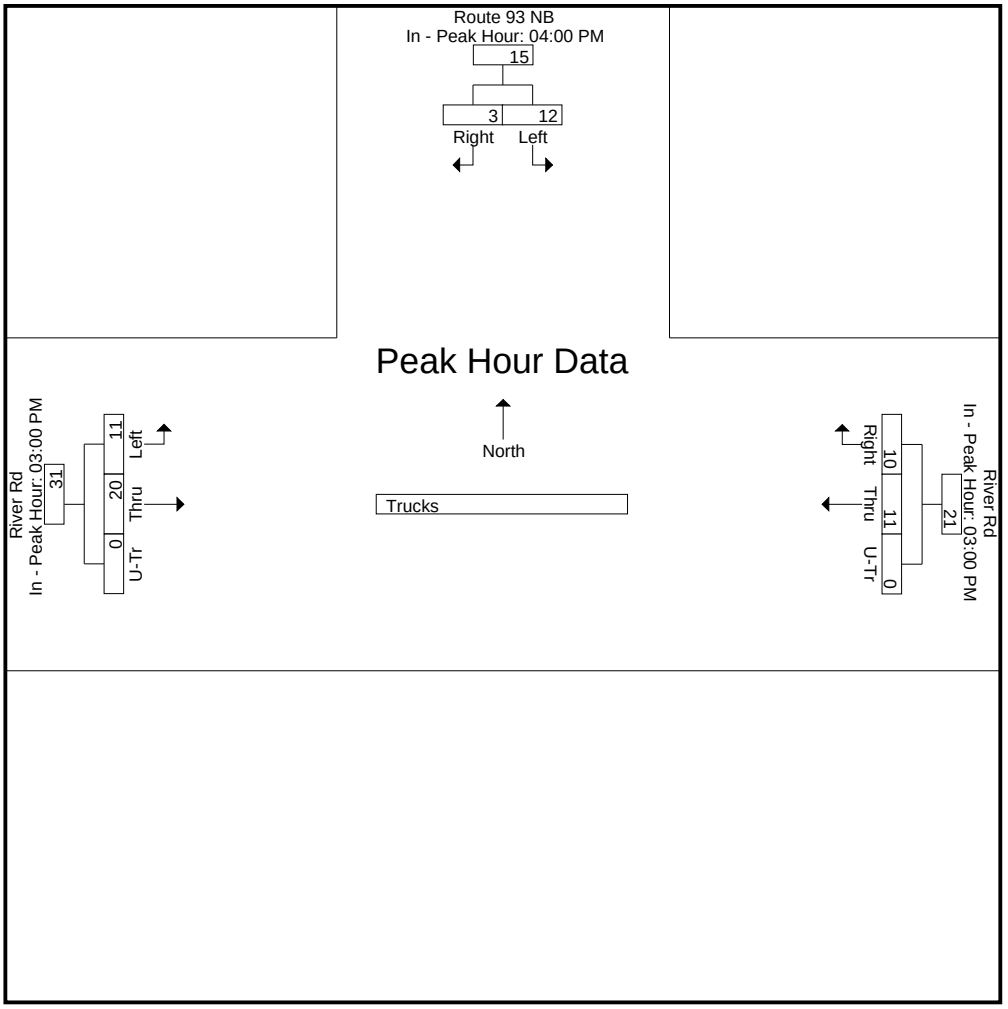
	04:00 PM			03:00 PM				03:00 PM			
+0 mins.	2	0	2	**7**	2	0	**9**	**7**	5	0	**12**
+15 mins.	1	0	1	1	1	0	2	2	4	0	6
+30 mins.	4	**3**	**7**	1	3	0	4	0	**6**	0	6
+45 mins.	**5**	0	5	2	**4**	0	6	2	5	0	7
Total Volume	12	3	15	11	10	0	21	11	20	0	31
% App. Total	80	20		52.4	47.6	0		35.5	64.5	0	
PHF	.600	.250	.536	.393	.625	.000	.583	.393	.833	.000	.646

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 1

Groups Printed- Bikes Peds

	Route 93 NB From North			River Rd From East			River Rd From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	1	0	0	0	0	0	0	1	1
Total	0	0	0	1	0	0	0	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	1	0	0	0	0	0	0	1	1
Apprch %	0	0		100	0	0	0	0	0			
Total %	0	0		100	0	0	0	0	0	0	100	

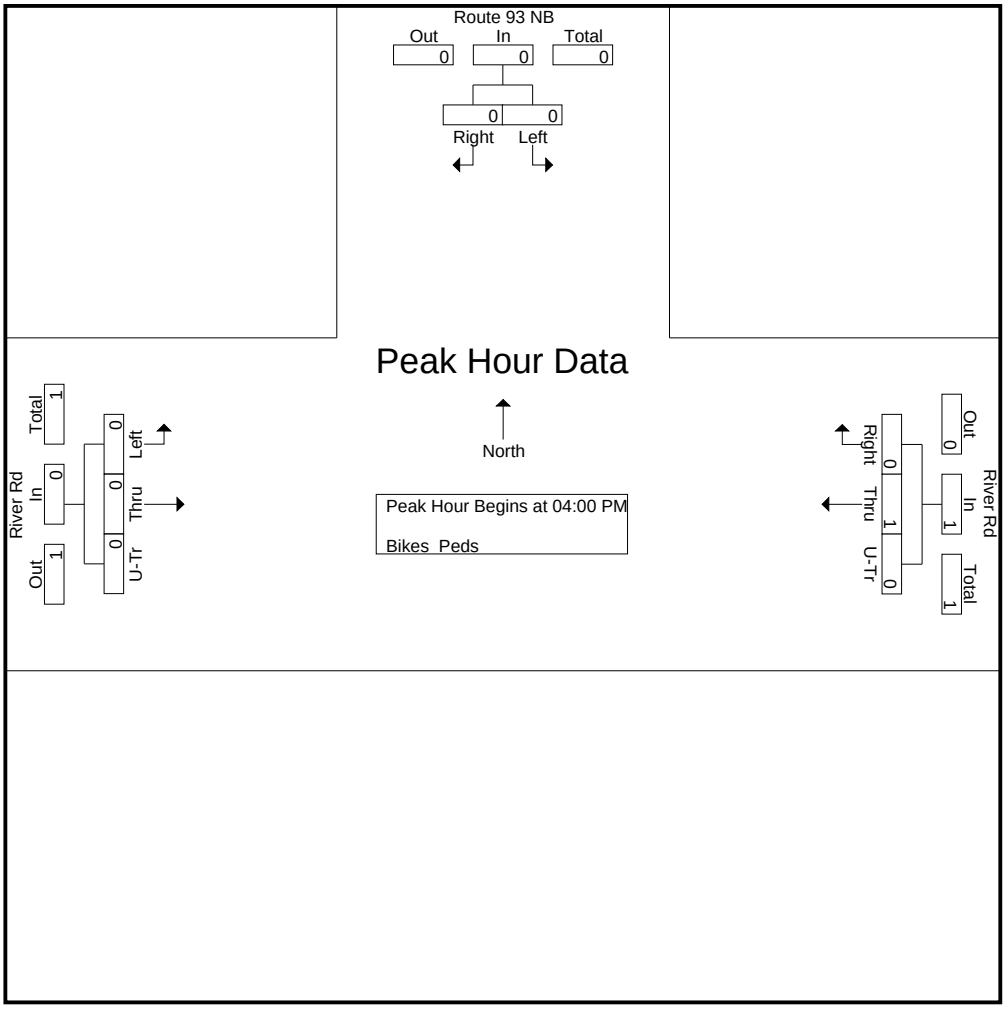
	Route 93 NB From North			River Rd From East				River Rd From West				
Start Time	Left	Right	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 04:00 PM												
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	**1**	0	0	**1**	0	0	0	0	**1**
Total Volume	0	0	0	1	0	0	1	0	0	0	0	1
% App. Total	0	0		100	0	0		0	0	0		
PHF	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.250

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

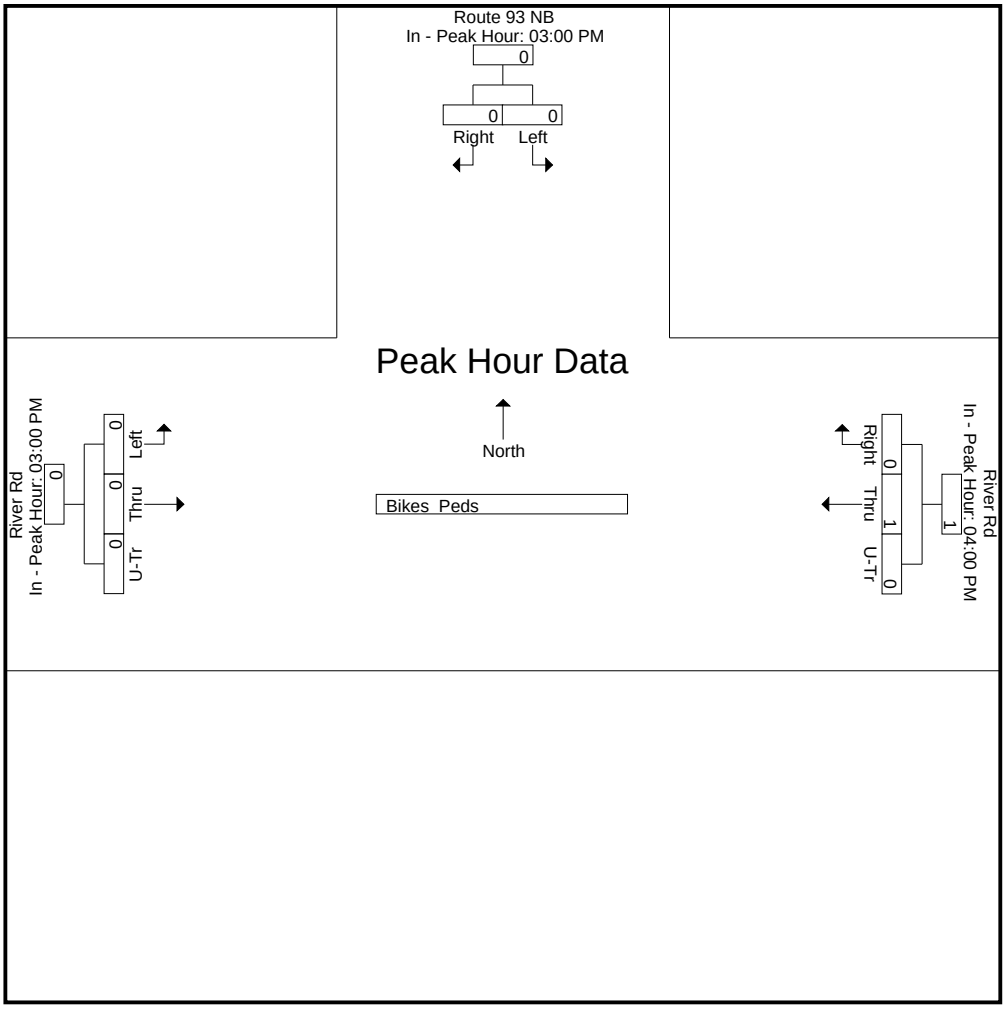
	03:00 PM			04:00 PM				03:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	**1**	0	0	**1**	0	0	0	0
Total Volume	0	0	0	1	0	0	1	0	0	0	0
% App. Total	0	0		100	0	0		0	0	0	
PHF	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379003
Site Code : 10379003
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars - Trucks

	River Rd From East			Route 93 SB From South		River Rd From West		
Start Time	Left	Thru	U-Tr	Left	Right	Thru	Right	Int. Total
07:00 AM	40	92	0	68	272	96	38	606
07:15 AM	37	108	1	130	318	106	27	727
07:30 AM	34	139	0	226	239	94	21	753
07:45 AM	39	180	1	230	244	105	21	820
Total	150	519	2	654	1073	401	107	2906
08:00 AM	47	160	1	212	284	95	43	842
08:15 AM	58	174	0	161	182	149	38	762
08:30 AM	64	185	0	137	147	107	43	683
08:45 AM	51	163	0	138	142	146	50	690
Total	220	682	1	648	755	497	174	2977
Grand Total	370	1201	3	1302	1828	898	281	5883
Apprch %	23.5	76.3	0.2	41.6	58.4	76.2	23.8	
Total %	6.3	20.4	0.1	22.1	31.1	15.3	4.8	
Cars	330	1160	3	1275	1790	855	268	5681
% Cars	89.2	96.6	100	97.9	97.9	95.2	95.4	96.6
Trucks	40	41	0	27	38	43	13	202
% Trucks	10.8	3.4	0	2.1	2.1	4.8	4.6	3.4

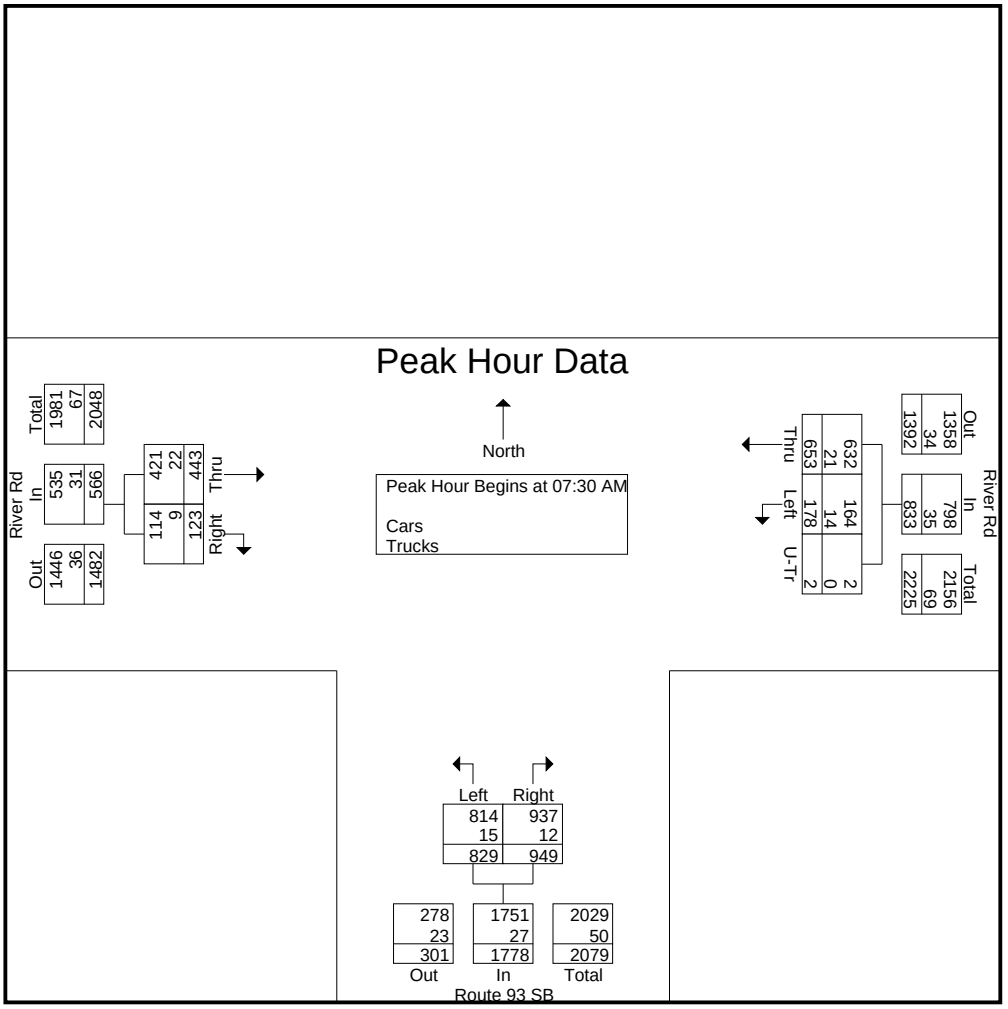
	River Rd From East				Route 93 SB From South			River Rd From West			
Start Time	Left	Thru	U-Tr	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:30 AM											
07:30 AM	34	139	0	173	226	239	465	94	21	115	753
07:45 AM	39	**180**	**1**	220	**230**	244	474	105	21	126	820
08:00 AM	47	160	1	208	212	**284**	**496**	95	**43**	138	**842**
08:15 AM	**58**	174	0	**232**	161	182	343	**149**	38	**187**	762
Total Volume	178	653	2	833	829	949	1778	443	123	566	3177
% App. Total	21.4	78.4	0.2		46.6	53.4		78.3	21.7		
PHF	.767	.907	.500	.898	.901	.835	.896	.743	.715	.757	.943
Cars	164	632	2	798	814	937	1751	421	114	535	3084
% Cars	92.1	96.8	100	95.8	98.2	98.7	98.5	95.0	92.7	94.5	97.1
Trucks	14	21	0	35	15	12	27	22	9	31	93
% Trucks	7.9	3.2	0	4.2	1.8	1.3	1.5	5.0	7.3	5.5	2.9

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
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:

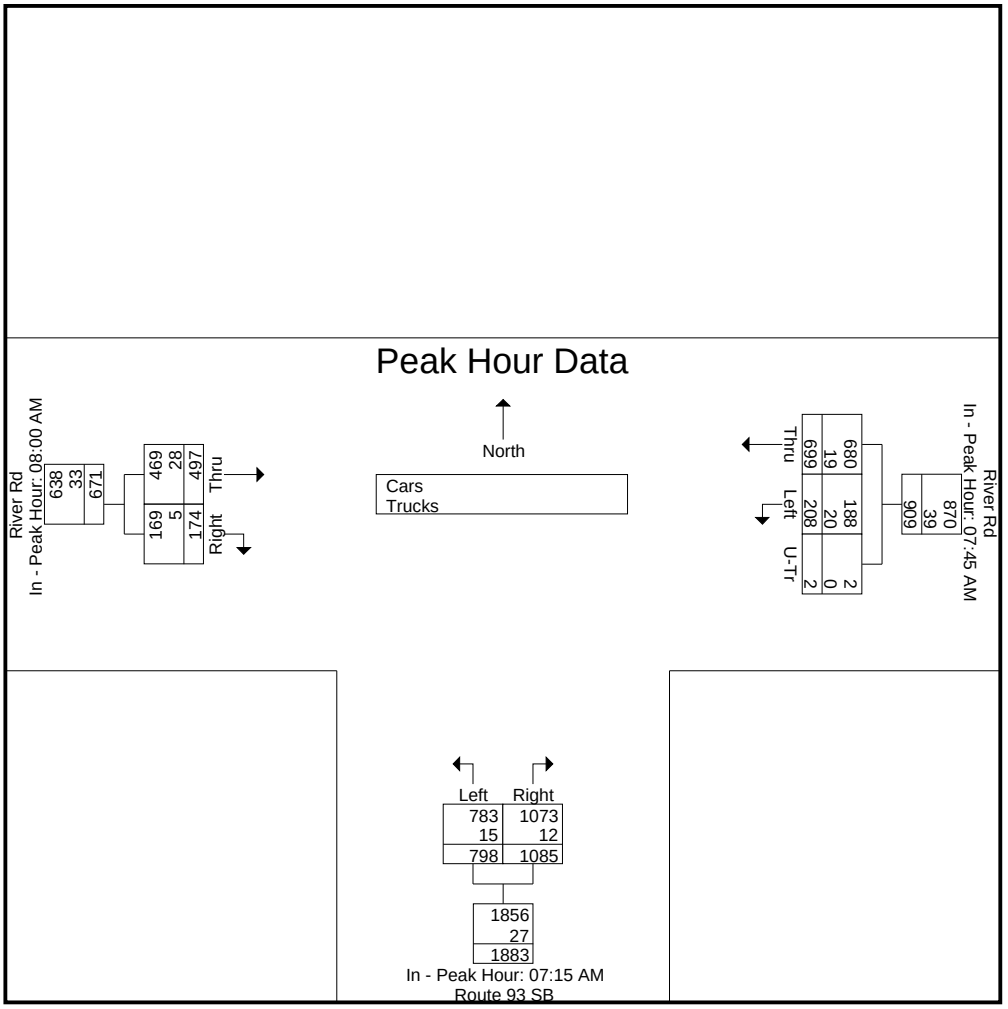
	07:45 AM				07:15 AM			08:00 AM		
+0 mins.	39	180	**1**	220	130	**318**	448	95	43	138
+15 mins.	47	160	1	208	226	239	465	**149**	38	187
+30 mins.	58	174	0	232	**230**	244	474	107	43	150
+45 mins.	**64**	**185**	0	**249**	212	284	**496**	146	**50**	**196**
Total Volume	208	699	2	909	798	1085	1883	497	174	671
% App. Total	22.9	76.9	0.2		42.4	57.6		74.1	25.9	
PHF	.813	.945	.500	.913	.867	.853	.949	.834	.870	.856
Cars	188	680	2	870	783	1073	1856	469	169	638
% Cars	90.4	97.3	100	95.7	98.1	98.9	98.6	94.4	97.1	95.1
Trucks	20	19	0	39	15	12	27	28	5	33
% Trucks	9.6	2.7	0	4.3	1.9	1.1	1.4	5.6	2.9	4.9

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars

	River Rd From East			Route 93 SB From South		River Rd From West		
Start Time	Left	Thru	U-Tr	Left	Right	Thru	Right	Int. Total
07:00 AM	33	88	0	68	259	93	37	578
07:15 AM	31	104	1	129	312	101	25	703
07:30 AM	33	132	0	220	236	90	19	730
07:45 AM	34	174	1	227	242	102	18	798
Total	131	498	2	644	1049	386	99	2809
08:00 AM	44	155	1	207	283	91	40	821
08:15 AM	53	171	0	160	176	138	37	735
08:30 AM	57	180	0	133	143	103	42	658
08:45 AM	45	156	0	131	139	137	50	658
Total	199	662	1	631	741	469	169	2872
Grand Total	330	1160	3	1275	1790	855	268	5681
Apprch %	22.1	77.7	0.2	41.6	58.4	76.1	23.9	
Total %	5.8	20.4	0.1	22.4	31.5	15.1	4.7	

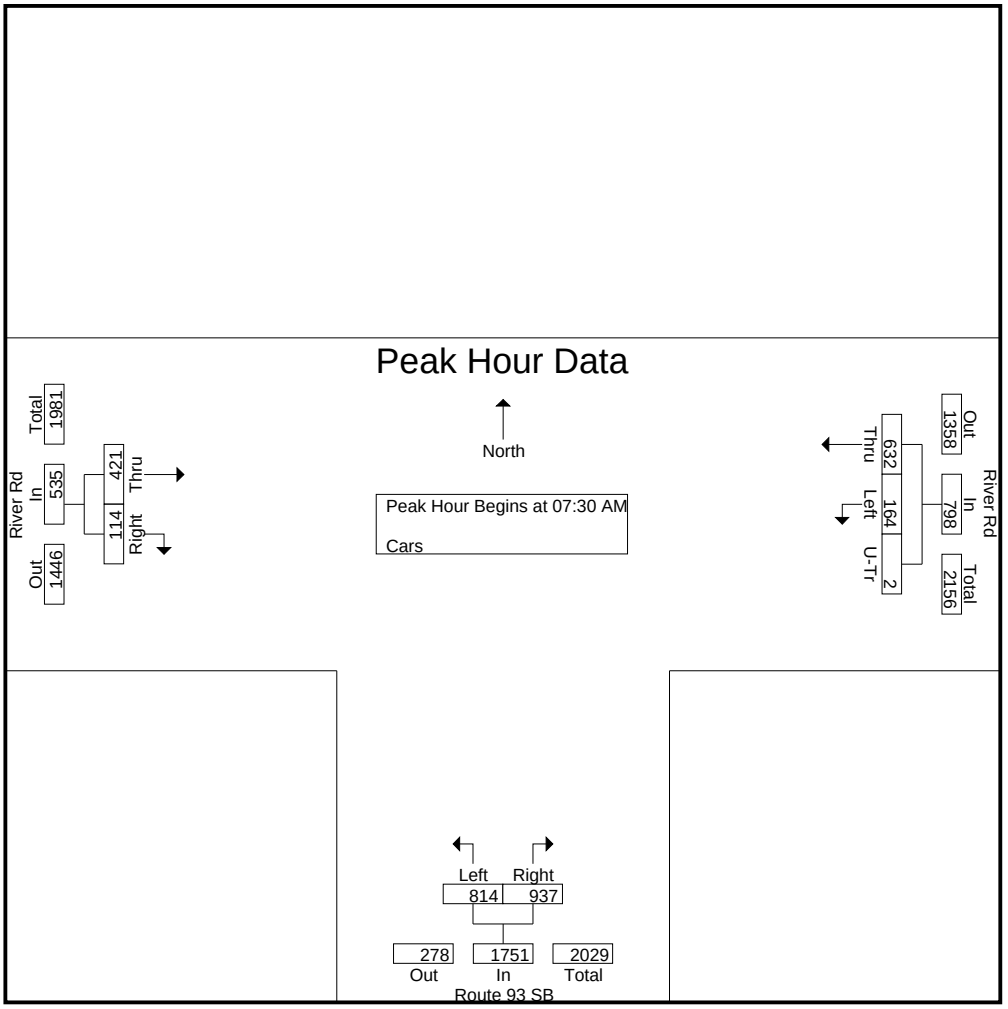
	River Rd From East				Route 93 SB From South			River Rd From West			
Start Time	Left	Thru	U-Tr	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:30 AM											
07:30 AM	33	132	0	165	220	236	456	90	19	109	730
07:45 AM	34	**174**	**1**	209	**227**	242	469	102	18	120	798
08:00 AM	44	155	1	200	207	**283**	**490**	91	**40**	131	**821**
08:15 AM	**53**	171	0	**224**	160	176	336	**138**	37	**175**	735
Total Volume	164	632	2	798	814	937	1751	421	114	535	3084
% App. Total	20.6	79.2	0.3		46.5	53.5		78.7	21.3		
PHF	.774	.908	.500	.891	.896	.828	.893	.763	.713	.764	.939

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
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		
+0 mins.	34	174	**1**	209	129	**312**	441	91	40	131
+15 mins.	44	155	1	200	220	236	456	**138**	37	175
+30 mins.	53	171	0	224	**227**	242	469	103	42	145
+45 mins.	**57**	**180**	0	**237**	207	283	**490**	137	**50**	**187**
Total Volume	188	680	2	870	783	1073	1856	469	169	638
% App. Total	21.6	78.2	0.2		42.2	57.8		73.5	26.5	
PHF	.825	.944	.500	.918	.862	.860	.947	.850	.845	.853

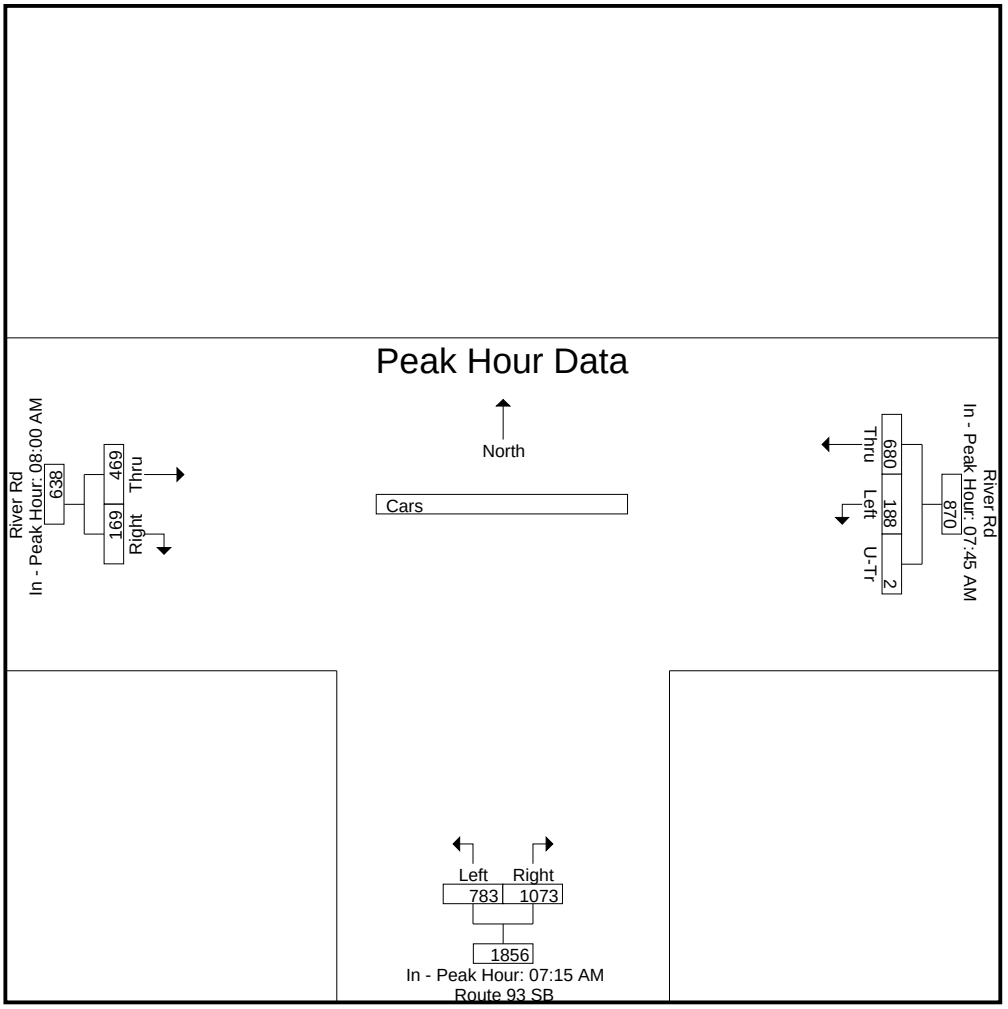
Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 3

Peak Hour Data



Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 1

Groups Printed- Trucks

	River Rd From East			Route 93 SB From South		River Rd From West		
Start Time	Left	Thru	U-Tr	Left	Right	Thru	Right	Int. Total
07:00 AM	7	4	0	0	13	3	1	28
07:15 AM	6	4	0	1	6	5	2	24
07:30 AM	1	7	0	6	3	4	2	23
07:45 AM	5	6	0	3	2	3	3	22
Total	19	21	0	10	24	15	8	97
08:00 AM	3	5	0	5	1	4	3	21
08:15 AM	5	3	0	1	6	11	1	27
08:30 AM	7	5	0	4	4	4	1	25
08:45 AM	6	7	0	7	3	9	0	32
Total	21	20	0	17	14	28	5	105
Grand Total	40	41	0	27	38	43	13	202
Apprch %	49.4	50.6	0	41.5	58.5	76.8	23.2	
Total %	19.8	20.3	0	13.4	18.8	21.3	6.4	

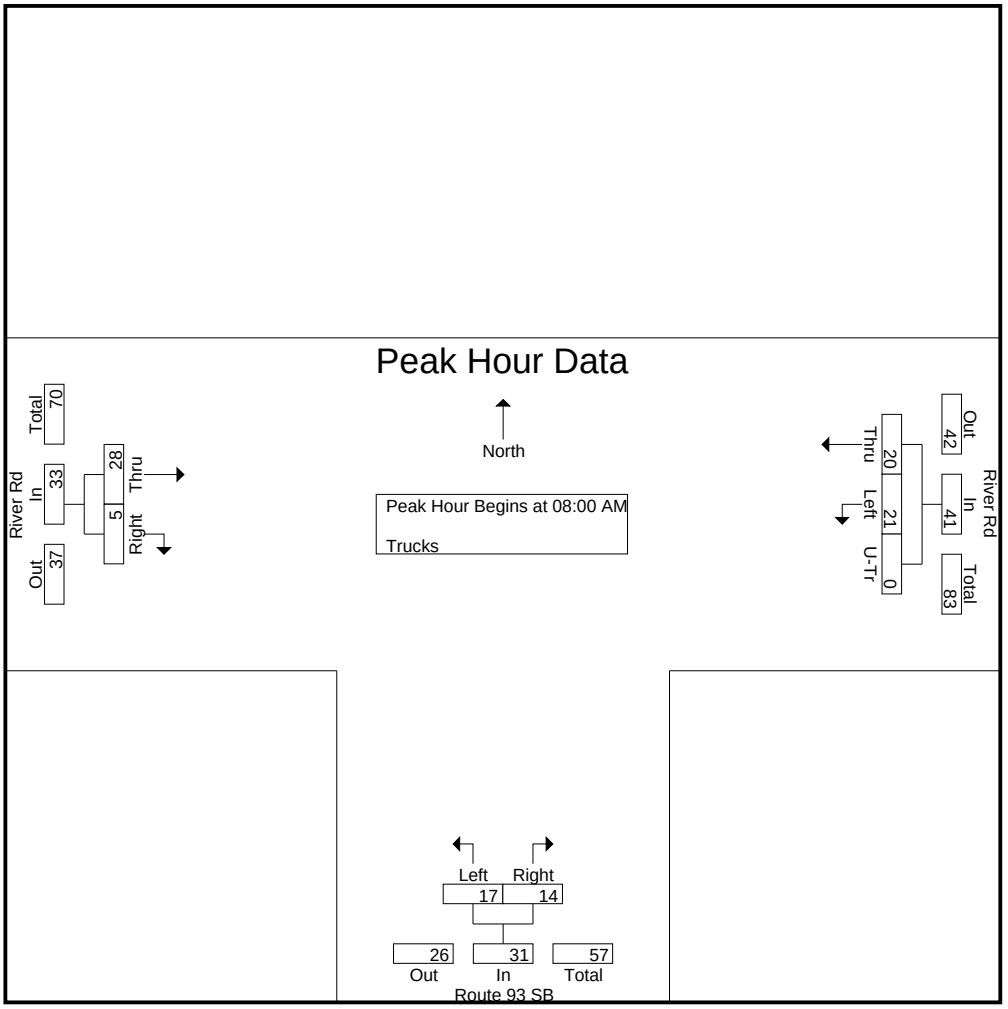
	River Rd From East				Route 93 SB From South			River Rd From West			
Start Time	Left	Thru	U-Tr	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 08:00 AM											
08:00 AM	3	5	0	8	5	1	6	4	**3**	7	21
08:15 AM	5	3	0	8	1	**6**	7	**11**	1	**12**	27
08:30 AM	**7**	5	0	12	4	4	8	4	1	5	25
08:45 AM	6	**7**	0	**13**	**7**	3	**10**	9	0	9	**32**
Total Volume	21	20	0	41	17	14	31	28	5	33	105
% App. Total	51.2	48.8	0		54.8	45.2		84.8	15.2		
PHF	.750	.714	.000	.788	.607	.583	.775	.636	.417	.688	.820

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
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				07:00 AM			08:00 AM		
+0 mins.	3	5	0	8	0	**13**	**13**	4	**3**	7
+15 mins.	5	3	0	8	1	6	7	**11**	1	**12**
+30 mins.	**7**	5	0	12	**6**	3	9	4	1	5
+45 mins.	6	**7**	0	**13**	3	2	5	9	0	9
Total Volume	21	20	0	41	10	24	34	28	5	33
% App. Total	51.2	48.8	0		29.4	70.6		84.8	15.2	
PHF	.750	.714	.000	.788	.417	.462	.654	.636	.417	.688

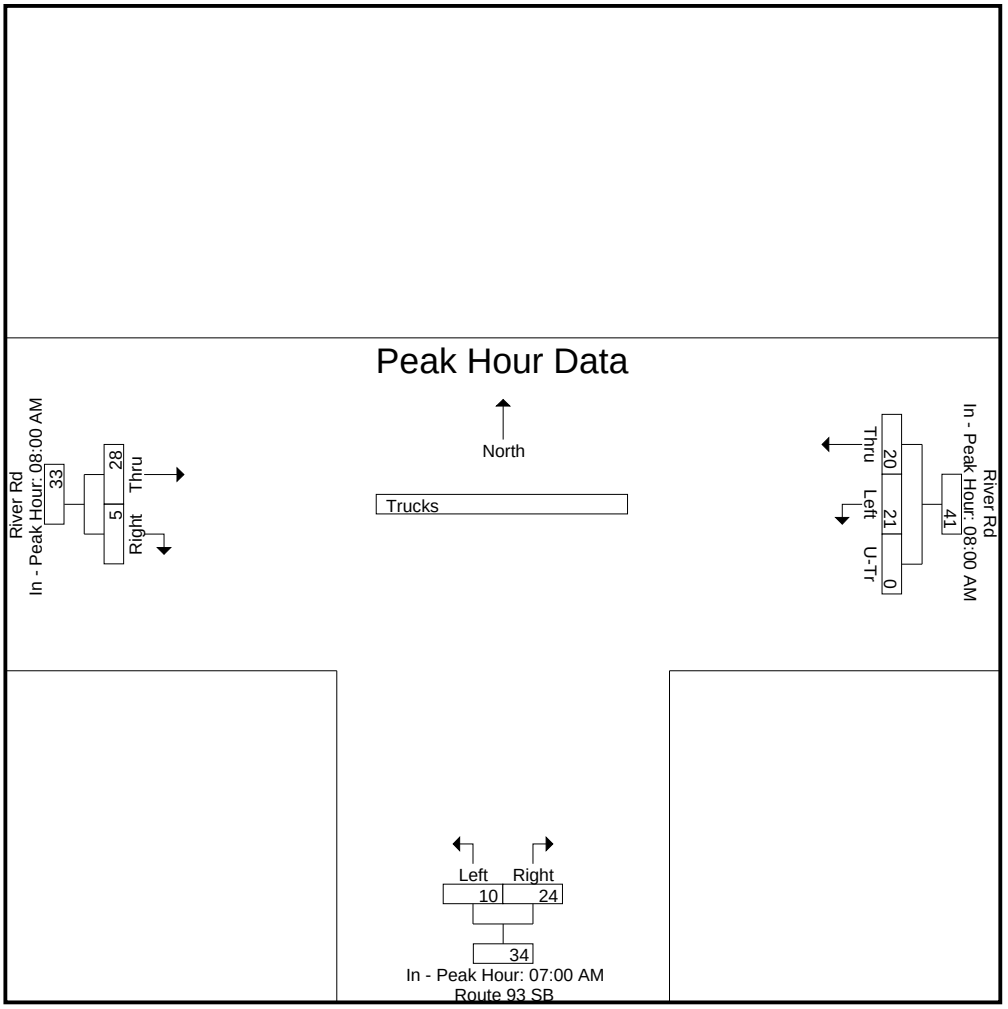
Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 3

Peak Hour Data



Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 1

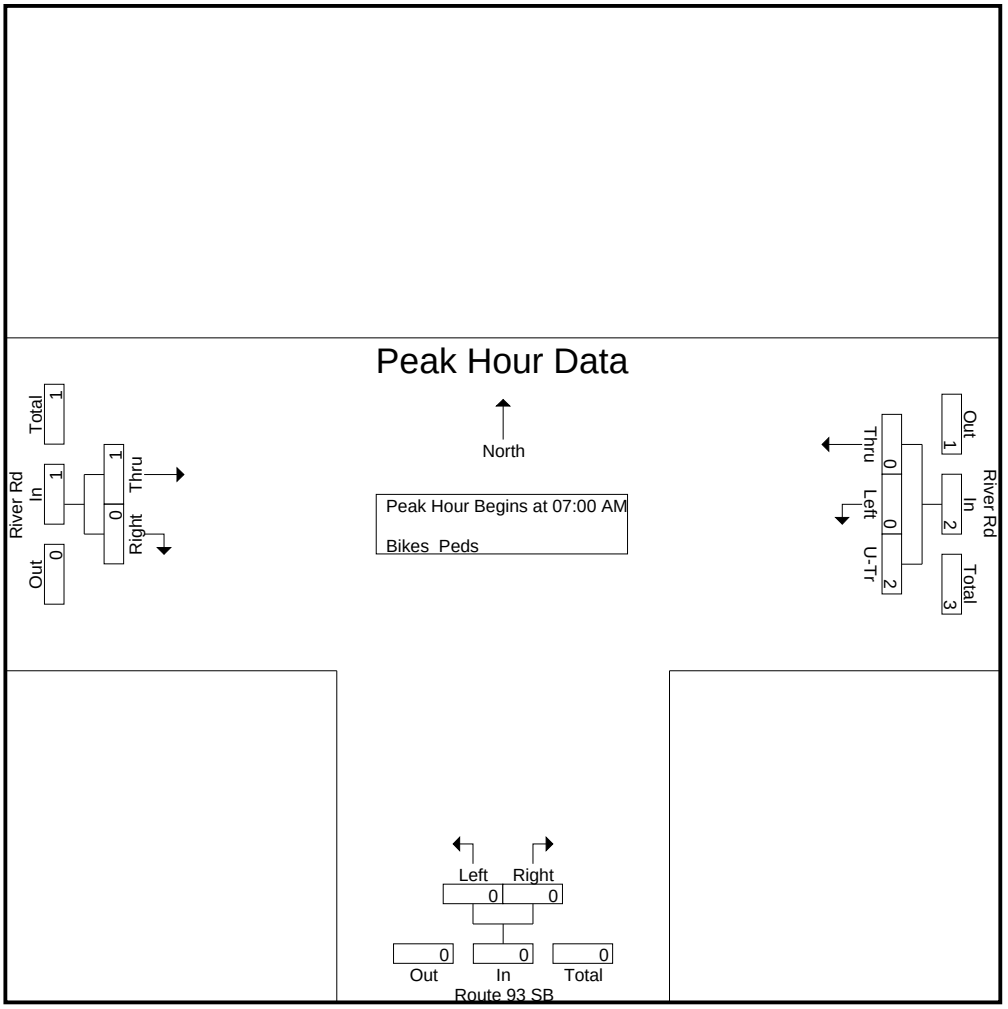
Groups Printed- Bikes Peds

	River Rd From East			Route 93 SB From South			River Rd From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	2	0	0	0	0	0	0	0	2	2
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	1	0	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	2	0	0	0	1	0	0	0	3	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	2	0	0	0	1	0	0	0	3	3
Apprch %	0	0	100	0	0		100	0				
Total %	0	0	66.7	0	0		33.3	0		0	100	

	River Rd From East				Route 93 SB From South			River Rd From West			
Start Time	Left	Thru	Peds	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 07:00 AM											
07:00 AM	0	0	**2**	**2**	0	0	0	0	0	0	**2**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	**1**	0	**1**	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	2	2	0	0	0	1	0	1	3
% App. Total	0	0	100		0	0		100	0		
PHF	.000	.000	.250	.250	.000	.000	.000	.250	.000	.250	.375

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
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:

	07:00 AM				07:00 AM			07:00 AM		
+0 mins.	0	0	**2**	**2**	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	**1**	0	**1**
+45 mins.	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	2	2	0	0	0	1	0	1
% App. Total	0	0	100		0	0		100	0	
PHF	.000	.000	.250	.250	.000	.000	.000	.250	.000	.250

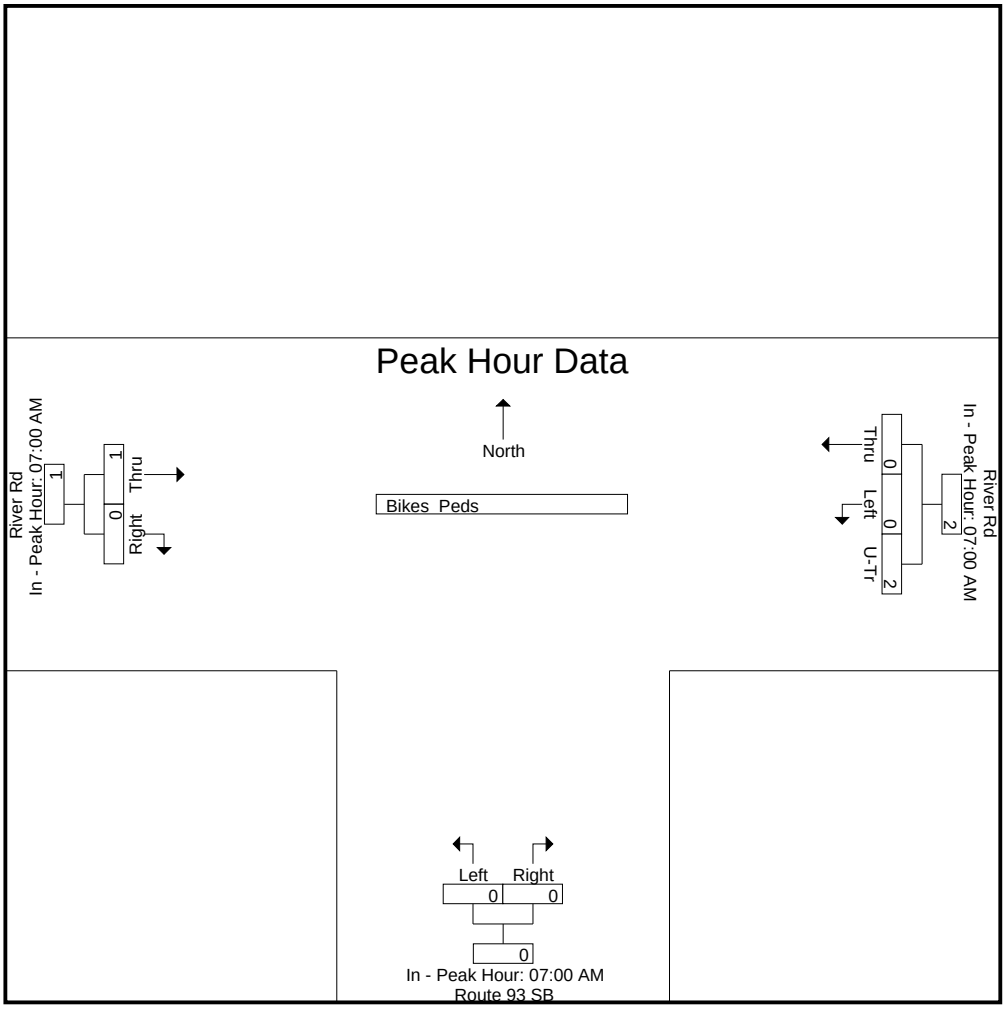
Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 3

Peak Hour Data



Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars - Trucks

	River Rd From East			Route 93 SB From South		River Rd From West		
Start Time	Left	Thru	U-Tr	Left	Right	Thru	Right	Int. Total
03:00 PM	115	87	1	47	90	192	76	608
03:15 PM	80	87	1	69	120	165	85	607
03:30 PM	110	79	2	60	125	263	97	736
03:45 PM	82	58	2	57	124	182	78	583
Total	387	311	6	233	459	802	336	2534
04:00 PM	115	72	0	53	104	166	94	604
04:15 PM	88	54	4	55	115	138	81	535
04:30 PM	125	91	1	51	121	154	105	648
04:45 PM	109	99	2	54	92	143	83	582
Total	437	316	7	213	432	601	363	2369
05:00 PM	117	89	1	50	112	160	137	666
05:15 PM	100	88	0	73	118	182	98	659
05:30 PM	107	82	0	69	151	156	87	652
05:45 PM	76	73	0	58	140	109	62	518
Total	400	332	1	250	521	607	384	2495
Grand Total	1224	959	14	696	1412	2010	1083	7398
Apprch %	55.7	43.7	0.6	33	67	65	35	
Total %	16.5	13	0.2	9.4	19.1	27.2	14.6	
Cars	1208	938	14	686	1382	1968	1075	7271
% Cars	98.7	97.8	100	98.6	97.9	97.9	99.3	98.3
Trucks	16	21	0	10	30	42	8	127
% Trucks	1.3	2.2	0	1.4	2.1	2.1	0.7	1.7

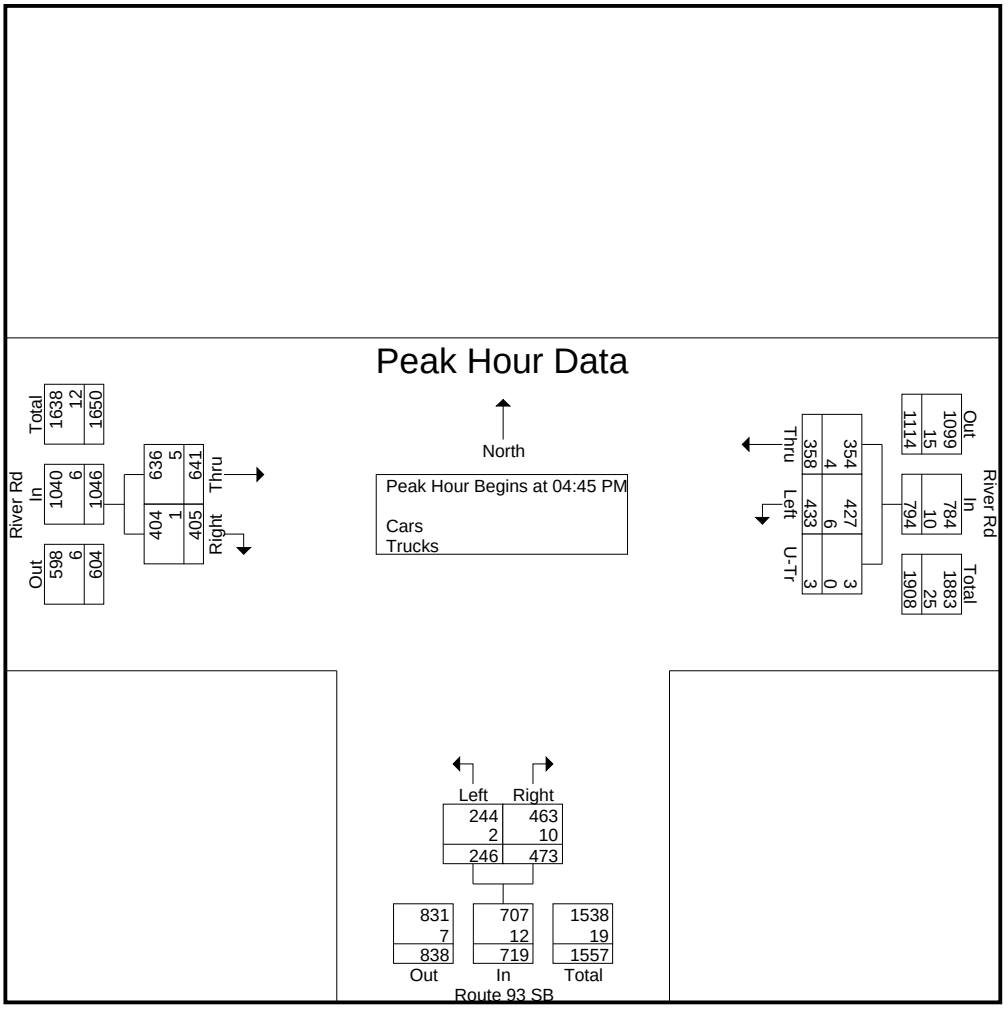
	River Rd From East				Route 93 SB From South			River Rd From West			
Start Time	Left	Thru	U-Tr	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 04:45 PM											
04:45 PM	109	**99**	**2**	**210**	54	92	146	143	83	226	582
05:00 PM	**117**	89	1	207	50	112	162	160	**137**	**297**	**666**
05:15 PM	100	88	0	188	**73**	118	191	**182**	98	280	659
05:30 PM	107	82	0	189	69	**151**	**220**	156	87	243	652
Total Volume	433	358	3	794	246	473	719	641	405	1046	2559
% App. Total	54.5	45.1	0.4		34.2	65.8		61.3	38.7		
PHF	.925	.904	.375	.945	.842	.783	.817	.880	.739	.880	.961
Cars	427	354	3	784	244	463	707	636	404	1040	2531
% Cars	98.6	98.9	100	98.7	99.2	97.9	98.3	99.2	99.8	99.4	98.9
Trucks	6	4	0	10	2	10	12	5	1	6	28
% Trucks	1.4	1.1	0	1.3	0.8	2.1	1.7	0.8	0.2	0.6	1.1

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

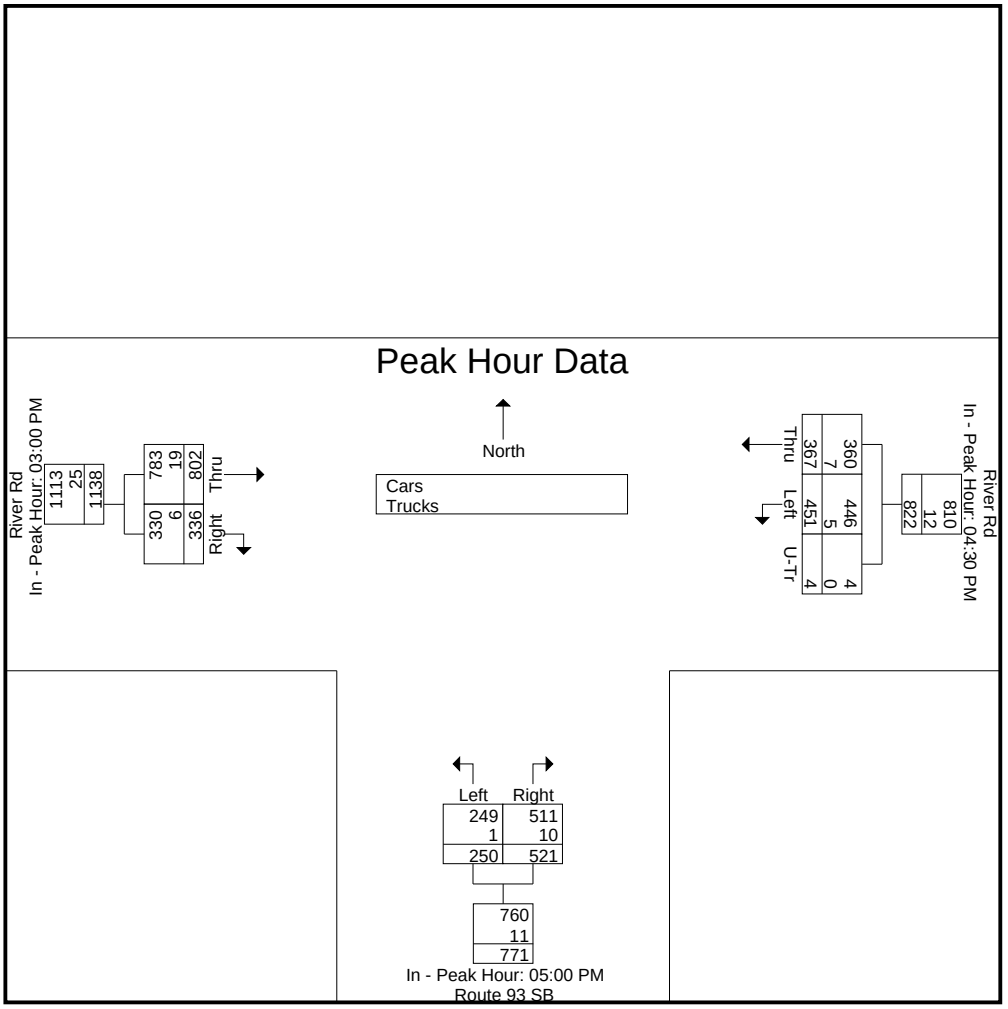
	04:30 PM				05:00 PM			03:00 PM		
+0 mins.	**125**	91	1	**217**	50	112	162	192	76	268
+15 mins.	109	**99**	**2**	210	**73**	118	191	165	85	250
+30 mins.	117	89	1	207	69	**151**	**220**	**263**	**97**	**360**
+45 mins.	100	88	0	188	58	140	198	182	78	260
Total Volume	451	367	4	822	250	521	771	802	336	1138
% App. Total	54.9	44.6	0.5		32.4	67.6		70.5	29.5	
PHF	.902	.927	.500	.947	.856	.863	.876	.762	.866	.790
Cars	446	360	4	810	249	511	760	783	330	1113
% Cars	98.9	98.1	100	98.5	99.6	98.1	98.6	97.6	98.2	97.8
Trucks	5	7	0	12	1	10	11	19	6	25
% Trucks	1.1	1.9	0	1.5	0.4	1.9	1.4	2.4	1.8	2.2

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars

	River Rd From East			Route 93 SB From South		River Rd From West		
Start Time	Left	Thru	U-Tr	Left	Right	Thru	Right	Int. Total
03:00 PM	113	80	1	46	89	181	74	584
03:15 PM	78	86	1	67	116	163	84	595
03:30 PM	110	77	2	59	122	260	96	726
03:45 PM	80	58	2	57	120	179	76	572
Total	381	301	6	229	447	783	330	2477
04:00 PM	113	69	0	52	103	157	93	587
04:15 PM	87	54	4	53	111	133	81	523
04:30 PM	124	87	1	50	119	150	105	636
04:45 PM	109	99	2	53	91	143	83	580
Total	433	309	7	208	424	583	362	2326
05:00 PM	113	88	1	50	107	157	136	652
05:15 PM	100	86	0	73	115	182	98	654
05:30 PM	105	81	0	68	150	154	87	645
05:45 PM	76	73	0	58	139	109	62	517
Total	394	328	1	249	511	602	383	2468
Grand Total	1208	938	14	686	1382	1968	1075	7271
Apprch %	55.9	43.4	0.6	33.2	66.8	64.7	35.3	
Total %	16.6	12.9	0.2	9.4	19	27.1	14.8	

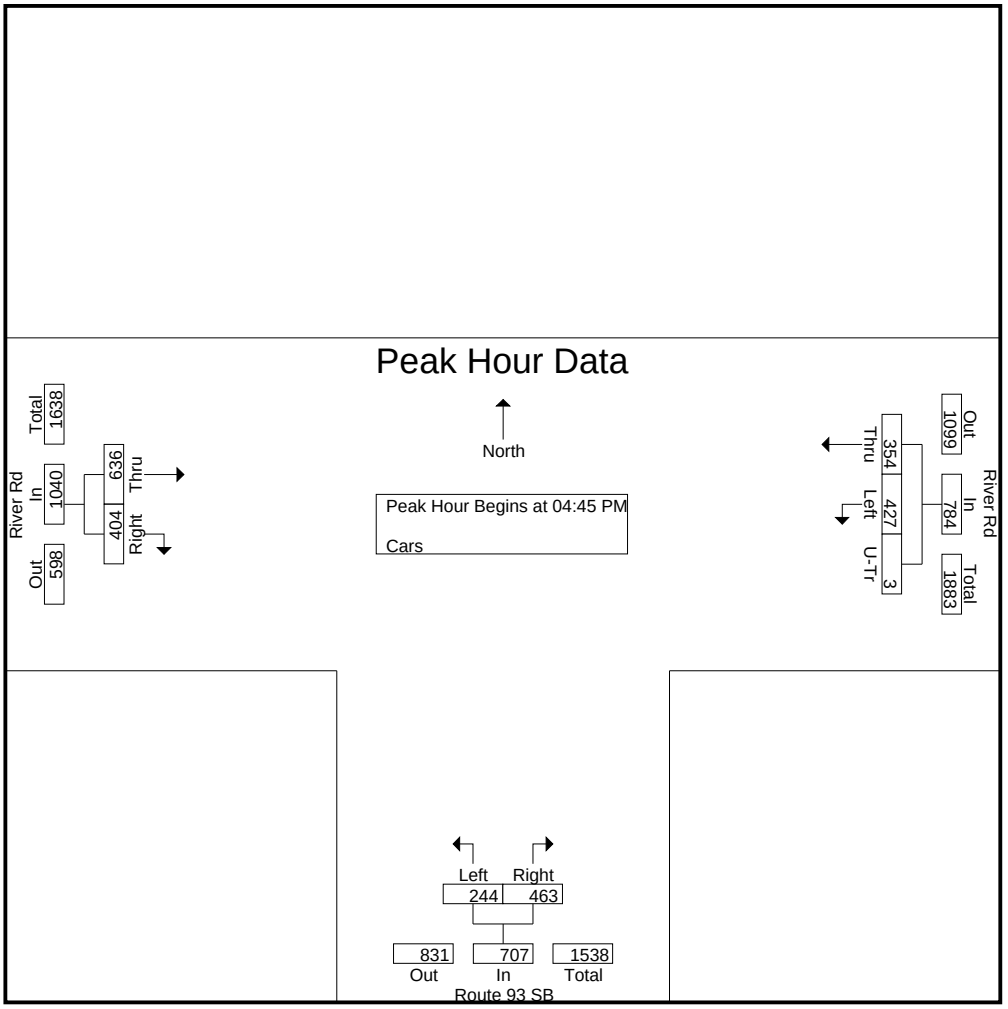
	River Rd From East				Route 93 SB From South			River Rd From West			
Start Time	Left	Thru	U-Tr	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 04:45 PM											
04:45 PM	109	**99**	**2**	**210**	53	91	144	143	83	226	580
05:00 PM	**113**	88	1	202	50	107	157	157	**136**	**293**	652
05:15 PM	100	86	0	186	**73**	115	188	**182**	98	280	**654**
05:30 PM	105	81	0	186	68	**150**	**218**	154	87	241	645
Total Volume	427	354	3	784	244	463	707	636	404	1040	2531
% App. Total	54.5	45.2	0.4		34.5	65.5		61.2	38.8		
PHF	.945	.894	.375	.933	.836	.772	.811	.874	.743	.887	.968

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:30 PM				05:00 PM			03:00 PM		
+0 mins.	**124**	87	1	**212**	50	107	157	181	74	255
+15 mins.	109	**99**	**2**	210	**73**	115	188	163	84	247
+30 mins.	113	88	1	202	68	**150**	**218**	**260**	**96**	**356**
+45 mins.	100	86	0	186	58	139	197	179	76	255
Total Volume	446	360	4	810	249	511	760	783	330	1113
% App. Total	55.1	44.4	0.5		32.8	67.2		70.4	29.6	
PHF	.899	.909	.500	.955	.853	.852	.872	.753	.859	.782

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
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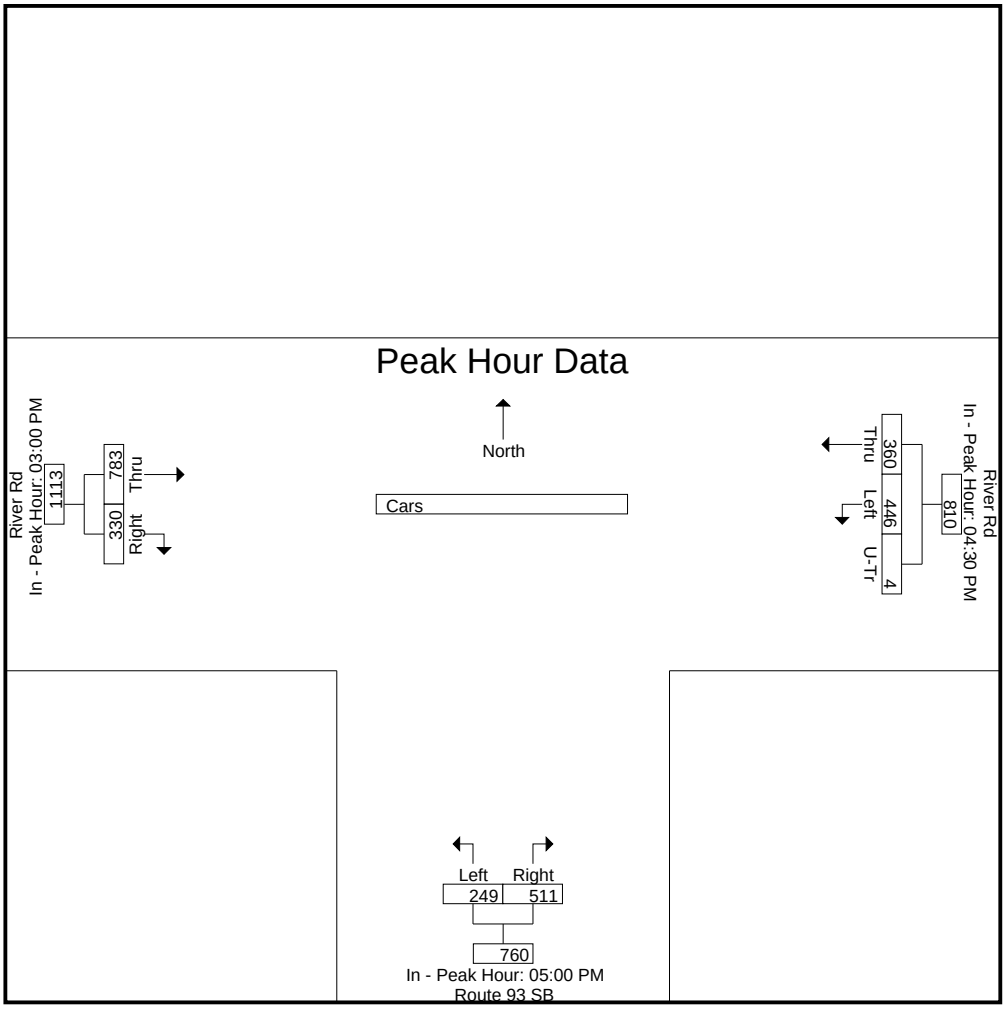
Peak Hour Data



Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 1

Groups Printed- Trucks

	River Rd From East			Route 93 SB From South		River Rd From West		
Start Time	Left	Thru	U-Tr	Left	Right	Thru	Right	Int. Total
03:00 PM	2	7	0	1	1	11	2	24
03:15 PM	2	1	0	2	4	2	1	12
03:30 PM	0	2	0	1	3	3	1	10
03:45 PM	2	0	0	0	4	3	2	11
Total	6	10	0	4	12	19	6	57
04:00 PM	2	3	0	1	1	9	1	17
04:15 PM	1	0	0	2	4	5	0	12
04:30 PM	1	4	0	1	2	4	0	12
04:45 PM	0	0	0	1	1	0	0	2
Total	4	7	0	5	8	18	1	43
05:00 PM	4	1	0	0	5	3	1	14
05:15 PM	0	2	0	0	3	0	0	5
05:30 PM	2	1	0	1	1	2	0	7
05:45 PM	0	0	0	0	1	0	0	1
Total	6	4	0	1	10	5	1	27
Grand Total	16	21	0	10	30	42	8	127
Apprch %	43.2	56.8	0	25	75	84	16	
Total %	12.6	16.5	0	7.9	23.6	33.1	6.3	

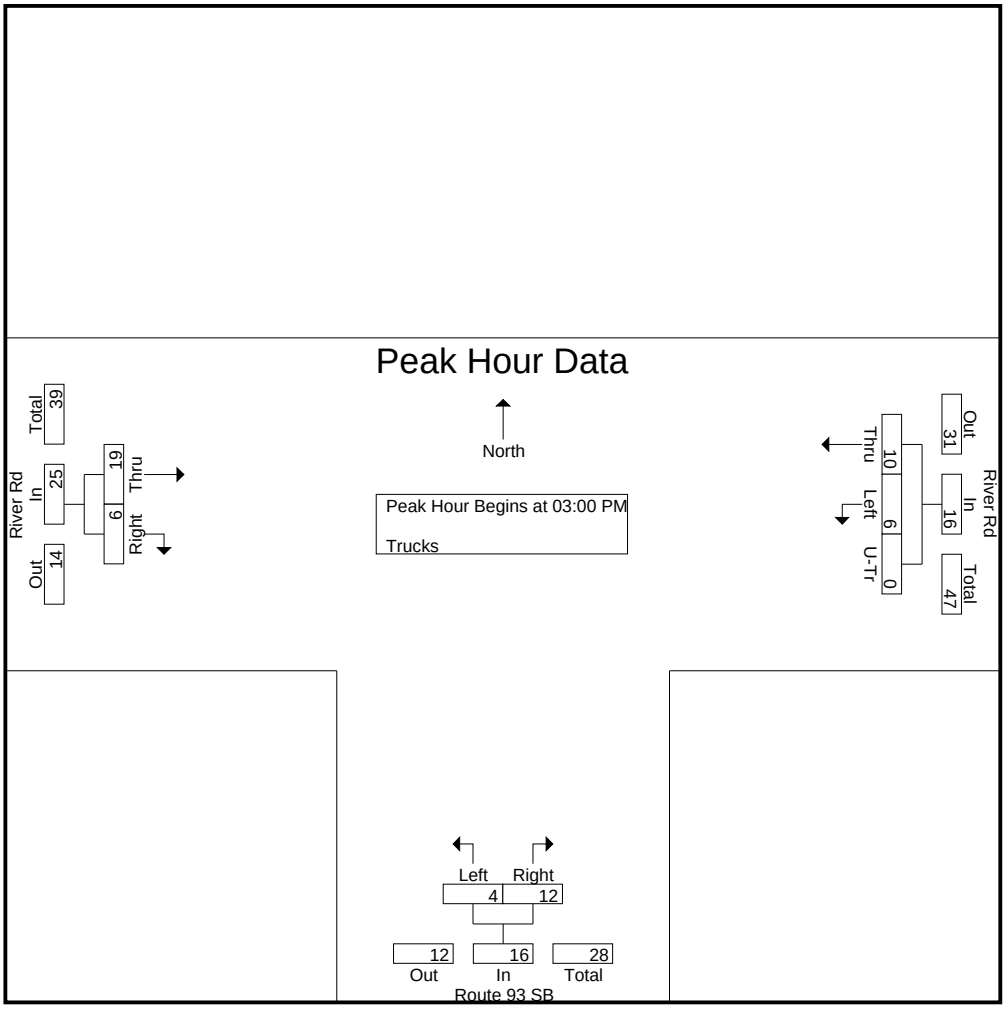
	River Rd From East				Route 93 SB From South			River Rd From West			
Start Time	Left	Thru	U-Tr	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 03:00 PM											
03:00 PM	**2**	**7**	0	**9**	1	1	2	**11**	**2**	**13**	**24**
03:15 PM	2	1	0	3	**2**	**4**	**6**	2	1	3	12
03:30 PM	0	2	0	2	1	3	4	3	1	4	10
03:45 PM	2	0	0	2	0	4	4	3	2	5	11
Total Volume	6	10	0	16	4	12	16	19	6	25	57
% App. Total	37.5	62.5	0		25	75		76	24		
PHF	.750	.357	.000	.444	.500	.750	.667	.432	.750	.481	.594

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	03:00 PM				03:00 PM			03:00 PM		
+0 mins.	**2**	**7**	0	**9**	1	1	2	**11**	**2**	**13**
+15 mins.	2	1	0	3	**2**	**4**	**6**	2	1	3
+30 mins.	0	2	0	2	1	3	4	3	1	4
+45 mins.	2	0	0	2	0	4	4	3	2	5
Total Volume	6	10	0	16	4	12	16	19	6	25
% App. Total	37.5	62.5	0		25	75		76	24	
PHF	.750	.357	.000	.444	.500	.750	.667	.432	.750	.481

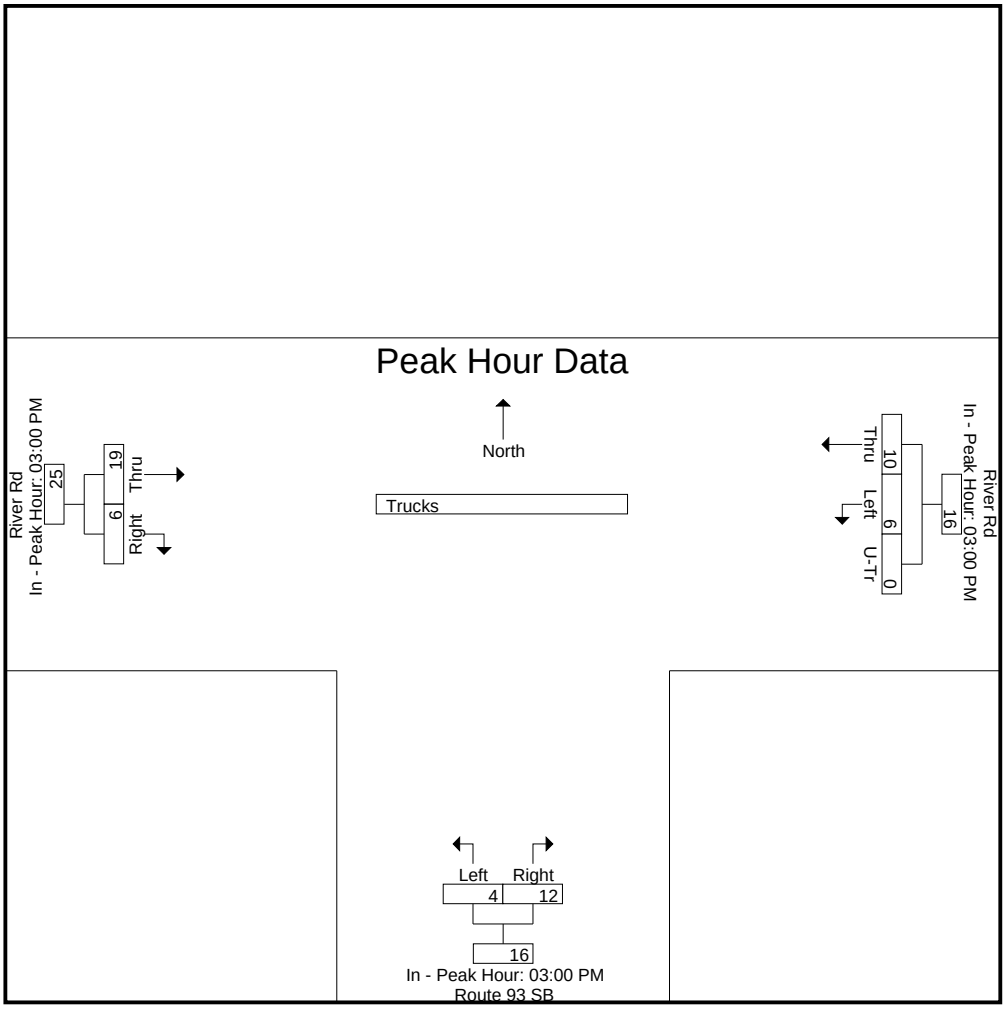
Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 3

Peak Hour Data



Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 1

Groups Printed- Bikes Peds

	River Rd From East			Route 93 SB From South			River Rd From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	1	0	0	0	0	0	0	0	1	1
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	0	0	0	0	1	1
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	2	0	0	0	2	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	2	0	0	0	2	0	2
Grand Total	0	0	1	0	0	2	0	0	0	2	1	3
Apprch %	0	0	100	0	0		0	0				
Total %	0	0	100	0	0		0	0		66.7	33.3	

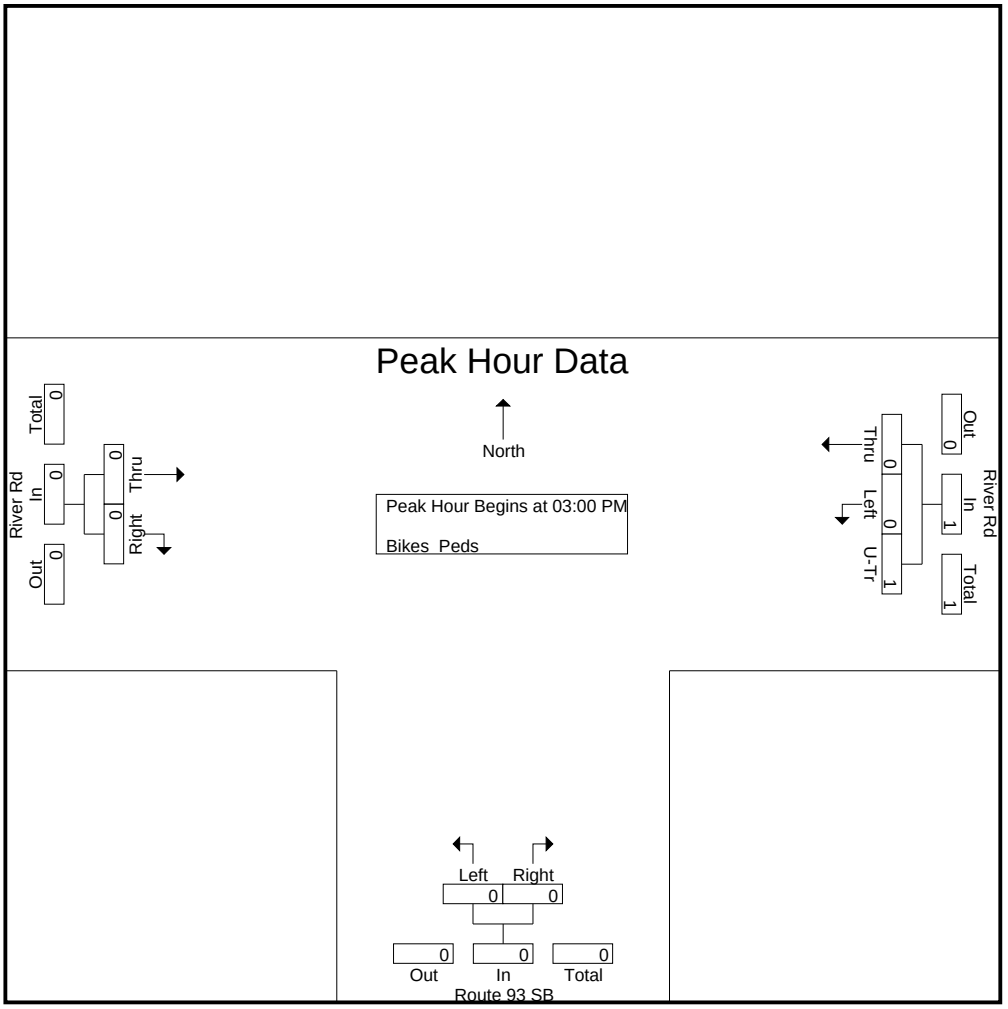
	River Rd From East				Route 93 SB From South			River Rd From West			
Start Time	Left	Thru	Peds	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 03:00 PM											
03:00 PM	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	**1**	**1**	0	0	0	0	0	0	**1**
03:30 PM	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	1	1	0	0	0	0	0	0	1
% App. Total	0	0	100		0	0		0	0		
PHF	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.250

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	03:00 PM				03:00 PM			03:00 PM		
+0 mins.	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	**1**	**1**	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	1	1	0	0	0	0	0	0
% App. Total	0	0	100		0	0		0	0	
PHF	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000

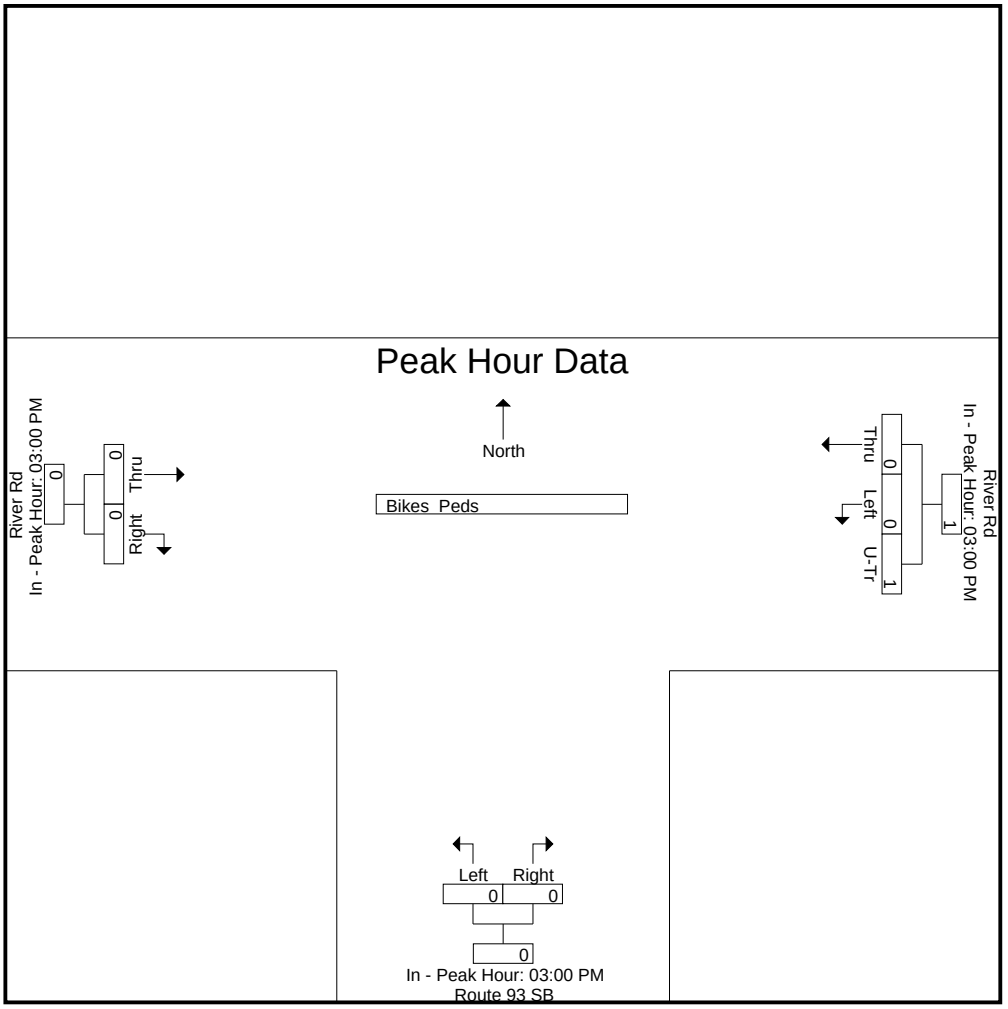
Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379004
Site Code : 10379004
Start Date : 10/15/2025
Page No : 3

Peak Hour Data



Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars - Trucks

	Minuteman Rd From North			River Rd From East			Shattuck Rd From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	8	1	1	55	60	32	15	1	48	0	60	5	286
07:15 AM	6	0	2	56	120	23	3	0	27	1	73	7	318
07:30 AM	8	2	6	48	259	42	9	1	22	1	56	12	466
07:45 AM	13	0	3	98	224	55	4	3	25	3	77	14	519
Total	35	3	12	257	663	152	31	5	122	5	266	38	1589
08:00 AM	17	0	4	146	154	52	4	0	30	1	78	23	509
08:15 AM	16	0	0	88	133	85	5	0	14	6	138	18	503
08:30 AM	19	2	2	104	122	84	7	0	24	2	84	20	470
08:45 AM	9	0	1	116	89	87	12	1	54	6	117	14	506
Total	61	2	7	454	498	308	28	1	122	15	417	75	1988
Grand Total	96	5	19	711	1161	460	59	6	244	20	683	113	3577
Apprch %	80	4.2	15.8	30.5	49.8	19.7	19.1	1.9	79	2.5	83.7	13.8	
Total %	2.7	0.1	0.5	19.9	32.5	12.9	1.6	0.2	6.8	0.6	19.1	3.2	
Cars	87	5	19	705	1131	449	59	6	239	20	663	113	3496
% Cars	90.6	100	100	99.2	97.4	97.6	100	100	98	100	97.1	100	97.7
Trucks	9	0	0	6	30	11	0	0	5	0	20	0	81
% Trucks	9.4	0	0	0.8	2.6	2.4	0	0	2	0	2.9	0	2.3

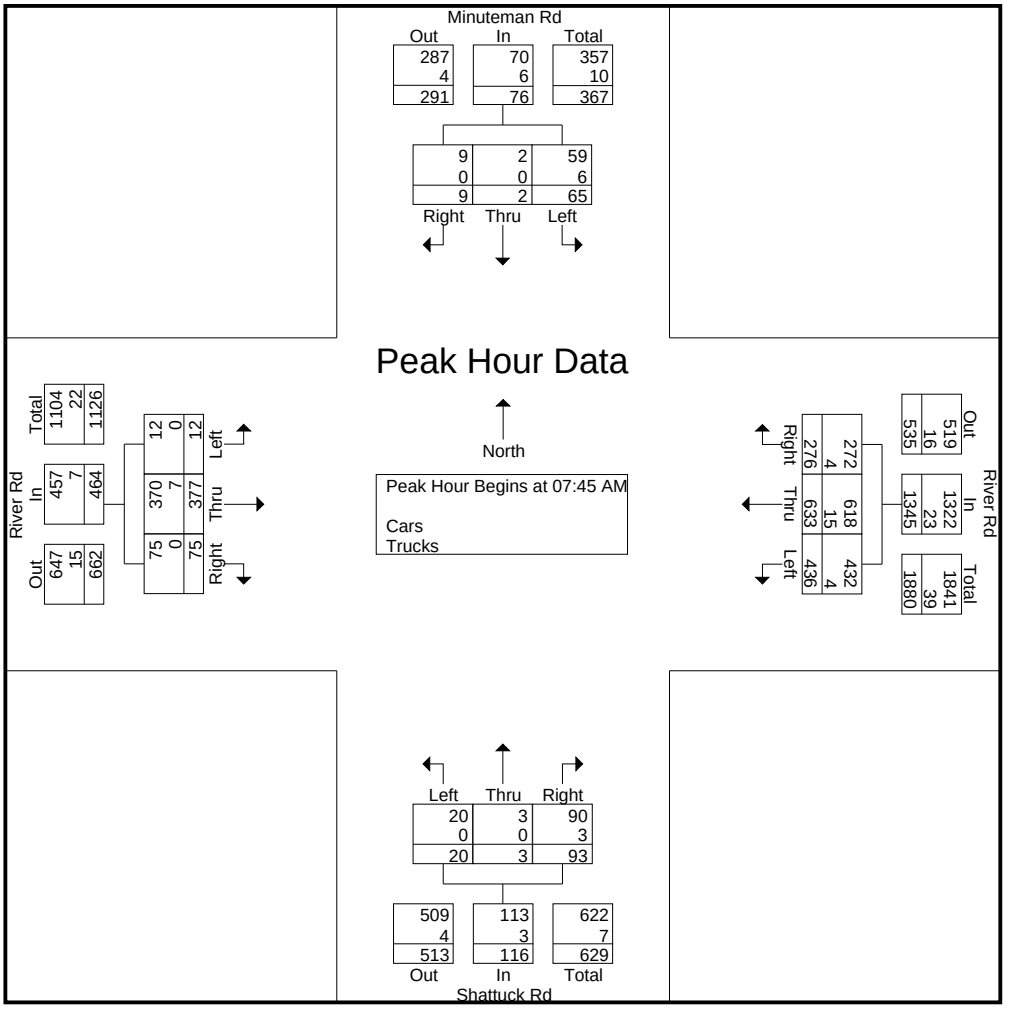
	Minuteman Rd From North				River Rd From East				Shattuck Rd From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	13	0	3	16	98	**224**	55	**377**	4	**3**	25	32	3	77	14	94	**519**
08:00 AM	17	0	**4**	21	**146**	154	52	352	4	0	**30**	**34**	1	78	**23**	102	509
08:15 AM	16	0	0	16	88	133	**85**	306	5	0	14	19	**6**	**138**	18	**162**	503
08:30 AM	**19**	**2**	2	**23**	104	122	84	310	**7**	0	24	31	2	84	20	106	470
Total Volume	65	2	9	76	436	633	276	1345	20	3	93	116	12	377	75	464	2001
% App. Total	85.5	2.6	11.8		32.4	47.1	20.5		17.2	2.6	80.2		2.6	81.2	16.2		
PHF	.855	.250	.563	.826	.747	.706	.812	.892	.714	.250	.775	.853	.500	.683	.815	.716	.964
Cars	59	2	9	70	432	618	272	1322	20	3	90	113	12	370	75	457	1962
% Cars	90.8	100	100	92.1	99.1	97.6	98.6	98.3	100	100	96.8	97.4	100	98.1	100	98.5	98.1
Trucks	6	0	0	6	4	15	4	23	0	0	3	3	0	7	0	7	39
% Trucks	9.2	0	0	7.9	0.9	2.4	1.4	1.7	0	0	3.2	2.6	0	1.9	0	1.5	1.9

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
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:

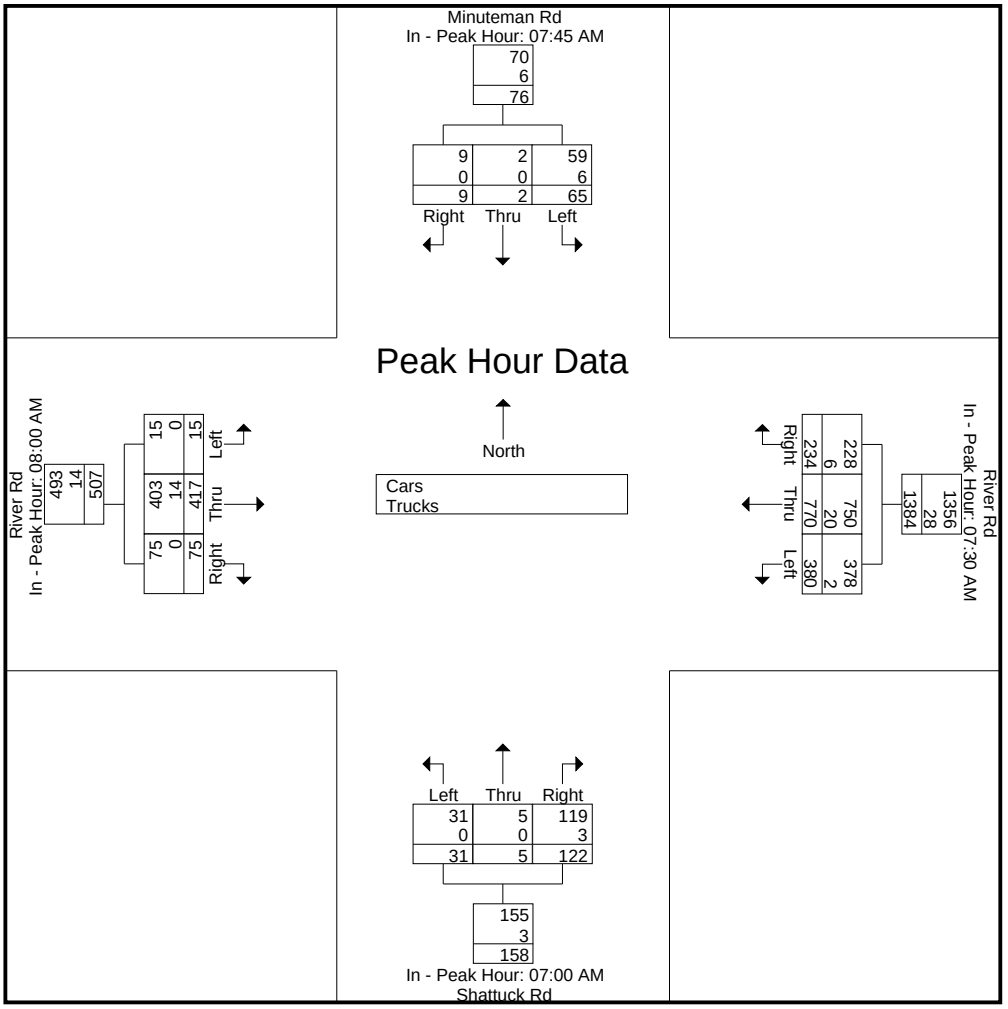
	07:45 AM				07:30 AM				07:00 AM				08:00 AM			
+0 mins.	13	0	3	16	48	**259**	42	349	**15**	1	**48**	**64**	1	78	**23**	102
+15 mins.	17	0	**4**	21	98	224	55	**377**	3	0	27	30	**6**	**138**	18	**162**
+30 mins.	16	0	0	16	**146**	154	52	352	9	1	22	32	2	84	20	106
+45 mins.	**19**	**2**	2	**23**	88	133	**85**	306	4	**3**	25	32	6	117	14	137
Total Volume	65	2	9	76	380	770	234	1384	31	5	122	158	15	417	75	507
% App. Total	85.5	2.6	11.8		27.5	55.6	16.9		19.6	3.2	77.2		3	82.2	14.8	
PHF	.855	.250	.563	.826	.651	.743	.688	.918	.517	.417	.635	.617	.625	.755	.815	.782
Cars	59	2	9	70	378	750	228	1356	31	5	119	155	15	403	75	493
% Cars	90.8	100	100	92.1	99.5	97.4	97.4	98	100	100	97.5	98.1	100	96.6	100	97.2
Trucks	6	0	0	6	2	20	6	28	0	0	3	3	0	14	0	14
% Trucks	9.2	0	0	7.9	0.5	2.6	2.6	2	0	0	2.5	1.9	0	3.4	0	2.8

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025

Groups Printed- Cars

	Minuteman Rd From North			River Rd From East			Shattuck Rd From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	6	1	1	55	56	31	15	1	48	0	59	5	278
07:15 AM	6	0	2	55	119	23	3	0	25	1	70	7	311
07:30 AM	7	2	6	48	250	39	9	1	22	1	55	12	452
07:45 AM	12	0	3	98	219	54	4	3	24	3	76	14	510
Total	31	3	12	256	644	147	31	5	119	5	260	38	1551
08:00 AM	16	0	4	144	149	51	4	0	29	1	77	23	498
08:15 AM	15	0	0	88	132	84	5	0	13	6	134	18	495
08:30 AM	16	2	2	102	118	83	7	0	24	2	83	20	459
08:45 AM	9	0	1	115	88	84	12	1	54	6	109	14	493
Total	56	2	7	449	487	302	28	1	120	15	403	75	1945
Grand Total	87	5	19	705	1131	449	59	6	239	20	663	113	3496
Apprch %	78.4	4.5	17.1	30.9	49.5	19.6	19.4	2	78.6	2.5	83.3	14.2	
Total %	2.5	0.1	0.5	20.2	32.4	12.8	1.7	0.2	6.8	0.6	19	3.2	

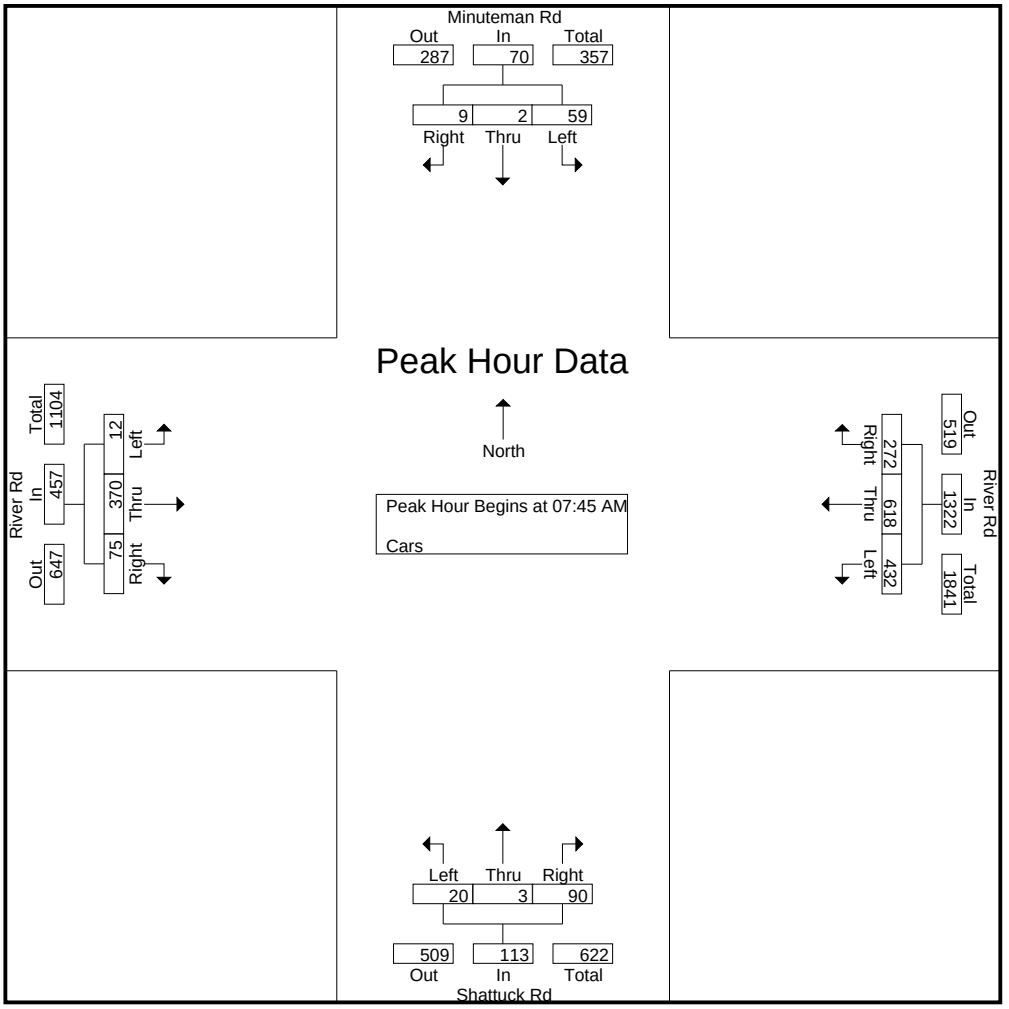
	Minuteman Rd From North				River Rd From East				Shattuck Rd From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	12	0	3	15	98	**219**	54	**371**	4	**3**	24	31	3	76	14	93	**510**
08:00 AM	**16**	0	**4**	**20**	**144**	149	51	344	4	0	**29**	**33**	1	77	**23**	101	498
08:15 AM	15	0	0	15	88	132	**84**	304	5	0	13	18	**6**	**134**	18	**158**	495
08:30 AM	16	**2**	2	20	102	118	83	303	**7**	0	24	31	2	83	20	105	459
Total Volume	59	2	9	70	432	618	272	1322	20	3	90	113	12	370	75	457	1962
% App. Total	84.3	2.9	12.9		32.7	46.7	20.6		17.7	2.7	79.6		2.6	81	16.4		
PHF	.922	.250	.563	.875	.750	.705	.810	.891	.714	.250	.776	.856	.500	.690	.815	.723	.962

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 5



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

Peak Hour for Each Approach Begins at:

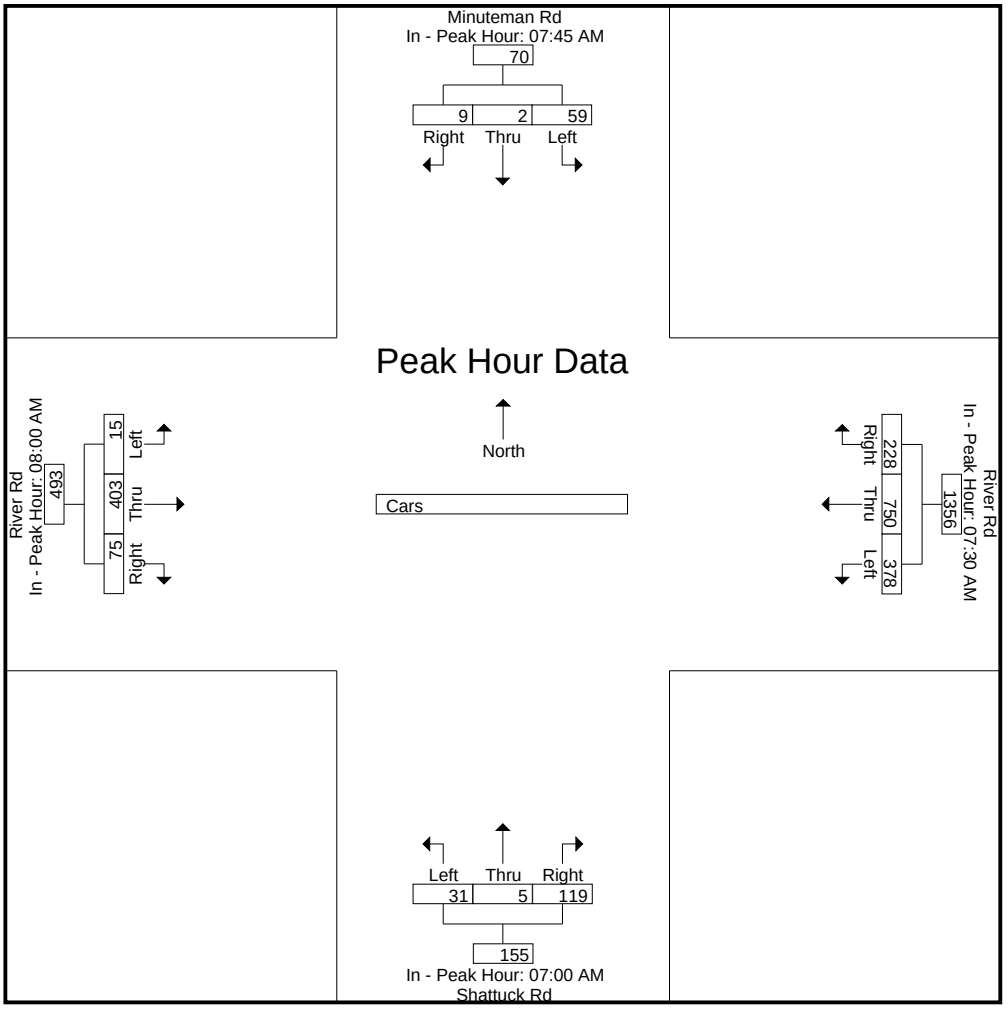
	07:45 AM				07:30 AM				07:00 AM				08:00 AM			
+0 mins.	12	0	3	15	48	**250**	39	337	**15**	1	**48**	**64**	1	77	**23**	101
+15 mins.	**16**	0	**4**	**20**	98	219	54	**371**	3	0	25	28	**6**	**134**	18	**158**
+30 mins.	15	0	0	15	**144**	149	51	344	9	1	22	32	2	83	20	105
+45 mins.	16	**2**	2	20	88	132	**84**	304	4	**3**	24	31	6	109	14	129
Total Volume	59	2	9	70	378	750	228	1356	31	5	119	155	15	403	75	493
% App. Total	84.3	2.9	12.9		27.9	55.3	16.8		20	3.2	76.8		3	81.7	15.2	
PHF	.922	.250	.563	.875	.656	.750	.679	.914	.517	.417	.620	.605	.625	.752	.815	.780

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025

Groups Printed- Trucks

	Minuteman Rd From North			River Rd From East			Shattuck Rd From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	2	0	0	0	4	1	0	0	0	0	1	0	8
07:15 AM	0	0	0	1	1	0	0	0	2	0	3	0	7
07:30 AM	1	0	0	0	9	3	0	0	0	0	1	0	14
07:45 AM	1	0	0	0	5	1	0	0	1	0	1	0	9
Total	4	0	0	1	19	5	0	0	3	0	6	0	38
08:00 AM	1	0	0	2	5	1	0	0	1	0	1	0	11
08:15 AM	1	0	0	0	1	1	0	0	1	0	4	0	8
08:30 AM	3	0	0	2	4	1	0	0	0	0	1	0	11
08:45 AM	0	0	0	1	1	3	0	0	0	0	8	0	13
Total	5	0	0	5	11	6	0	0	2	0	14	0	43
Grand Total	9	0	0	6	30	11	0	0	5	0	20	0	81
Apprch %	100	0	0	12.8	63.8	23.4	0	0	100	0	100	0	
Total %	11.1	0	0	7.4	37	13.6	0	0	6.2	0	24.7	0	

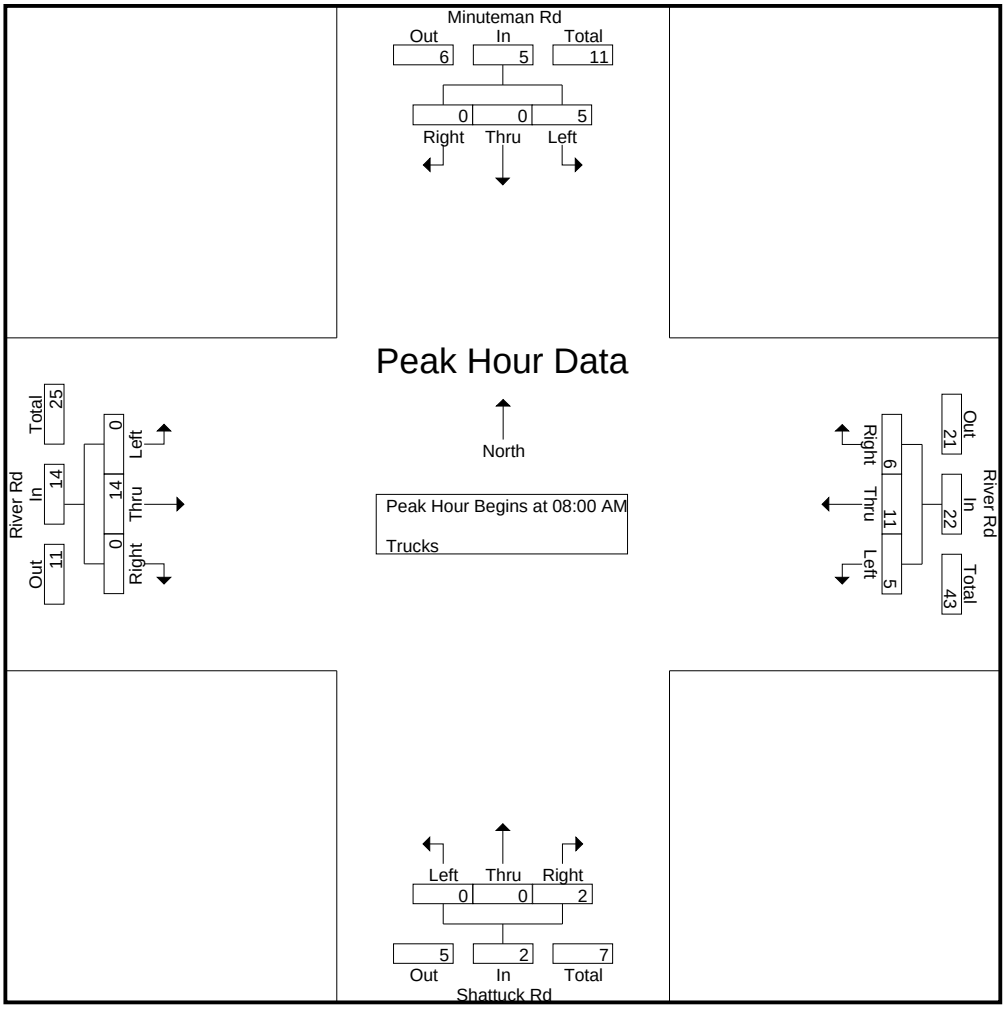
	Minuteman Rd From North				River Rd From East				Shattuck Rd From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	1	0	0	1	**2**	**5**	1	**8**	0	0	**1**	**1**	0	1	0	1	11
08:15 AM	1	0	0	1	0	1	1	2	0	0	1	1	0	4	0	4	8
08:30 AM	**3**	0	0	**3**	2	4	1	7	0	0	0	0	0	1	0	1	11
08:45 AM	0	0	0	0	1	1	**3**	5	0	0	0	0	0	**8**	0	**8**	**13**
Total Volume	5	0	0	5	5	11	6	22	0	0	2	2	0	14	0	14	43
% App. Total	100	0	0		22.7	50	27.3		0	0	100		0	100	0		
PHF	.417	.000	.000	.417	.625	.550	.500	.688	.000	.000	.500	.500	.000	.438	.000	.438	.827

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 8



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

Peak Hour for Each Approach Begins at:

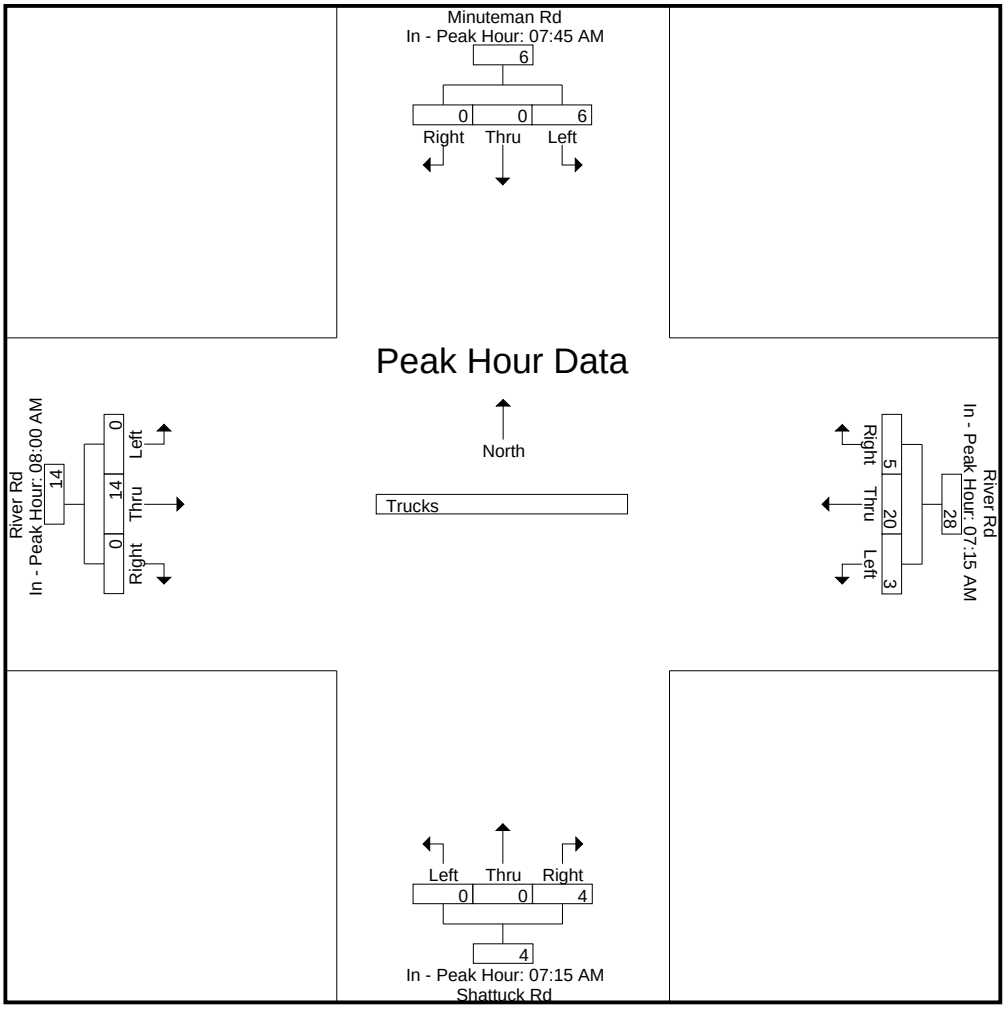
	07:45 AM				07:15 AM				07:15 AM				08:00 AM			
+0 mins.	1	0	0	1	1	1	0	2	0	0	**2**	**2**	0	1	0	1
+15 mins.	1	0	0	1	0	**9**	**3**	**12**	0	0	0	0	0	4	0	4
+30 mins.	1	0	0	1	0	5	1	6	0	0	1	1	0	1	0	1
+45 mins.	**3**	0	0	**3**	**2**	5	1	8	0	0	1	1	0	**8**	0	**8**
Total Volume	6	0	0	6	3	20	5	28	0	0	4	4	0	14	0	14
% App. Total	100	0	0		10.7	71.4	17.9		0	0	100		0	100	0	
PHF	.500	.000	.000	.500	.375	.556	.417	.583	.000	.000	.500	.500	.000	.438	.000	.438

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025

Groups Printed- Bikes Peds

	Minuteman Rd From North				River Rd From East				Shattuck Rd From South				River 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	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	2	1	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	2	1	3
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	2	0	0	0	0	0	0	0	0	0	0	0	2	4	0	4
08:30 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
08:45 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	0	2
Total	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	3	7	0	7
Grand Total	0	0	0	4	0	0	0	2	0	0	0	0	0	1	0	3	9	1	10
Apprch %	0	0	0		0	0	0		0	0	0		0	100	0				
Total %	0	0	0		0	0	0		0	0	0		0	100	0		90	10	

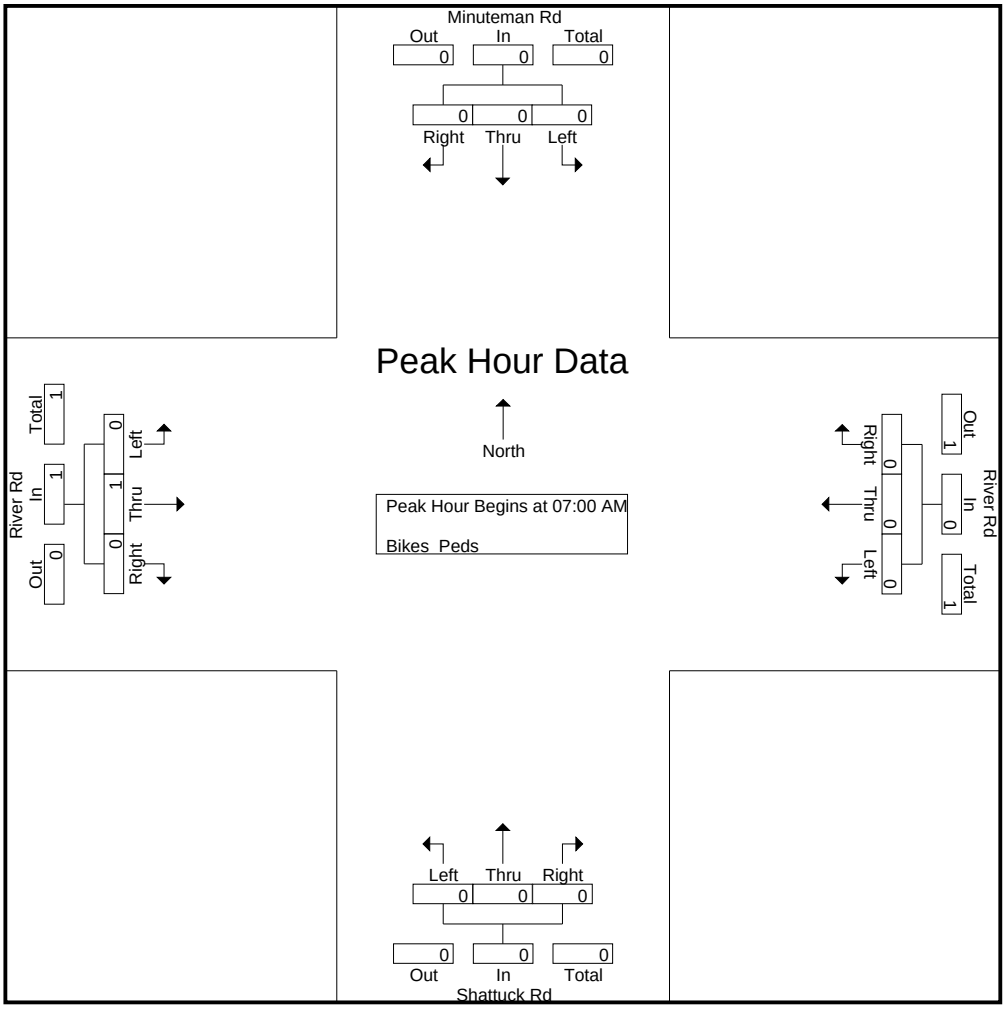
	Minuteman Rd From North				River Rd From East				Shattuck Rd From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1														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

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 11



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

Peak Hour for Each Approach Begins at:

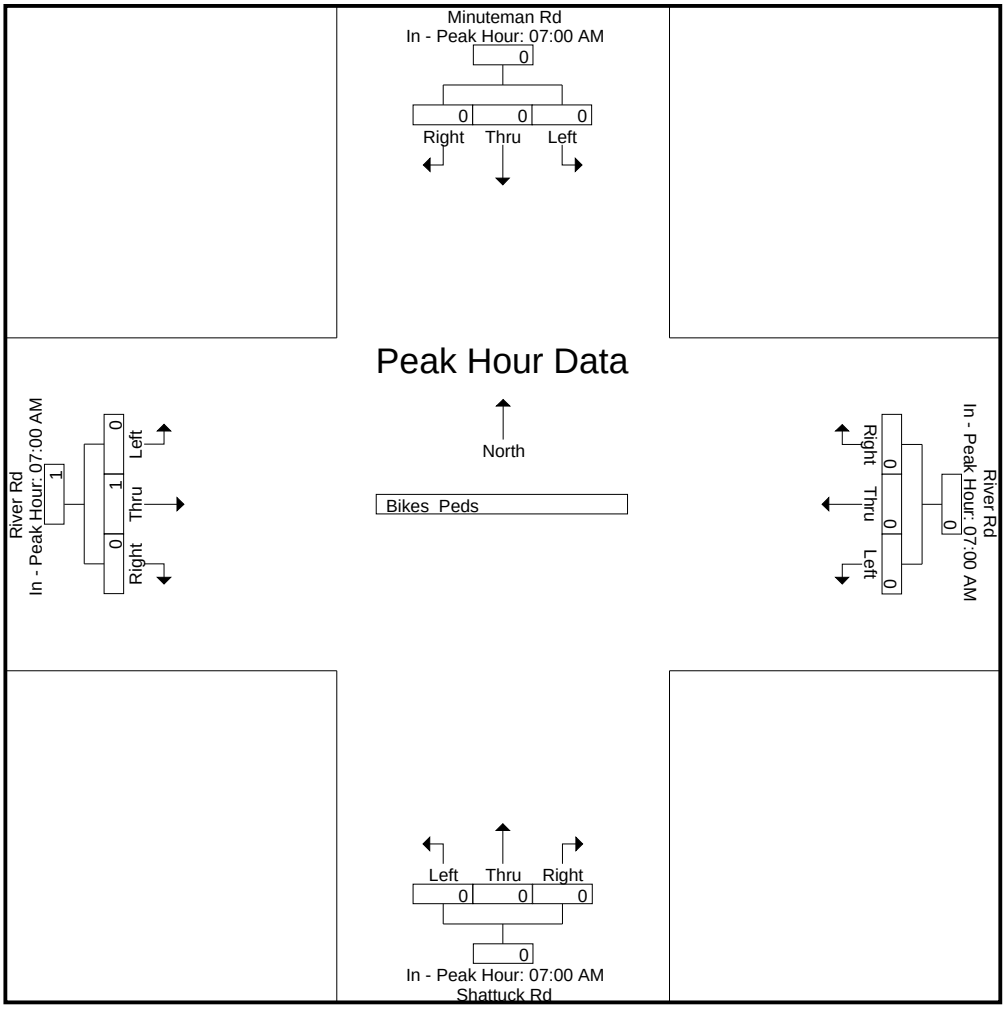
	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
% App. Total	0	0	0		0	0	0		0	0	0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

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 1

Groups Printed- Cars - Trucks

	Minuteman Rd From North			River Rd From East			Shattuck Rd From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
03:00 PM	50	3	4	23	74	8	8	1	103	3	84	8	369
03:15 PM	22	1	2	40	92	12	9	1	114	0	85	11	389
03:30 PM	43	0	2	26	86	8	26	0	199	3	112	10	515
03:45 PM	35	0	0	20	63	9	8	0	71	3	129	9	347
Total	150	4	8	109	315	37	51	2	487	9	410	38	1620
04:00 PM	40	0	3	17	76	12	6	0	83	3	105	5	350
04:15 PM	31	0	4	12	56	9	9	0	46	3	120	7	297
04:30 PM	62	0	2	18	73	19	15	0	62	3	116	6	376
04:45 PM	53	1	3	12	76	24	8	1	44	3	107	9	341
Total	186	1	12	59	281	64	38	1	235	12	448	27	1364
05:00 PM	85	3	4	22	83	13	10	0	72	5	115	10	422
05:15 PM	55	0	9	17	94	13	10	0	55	4	137	10	404
05:30 PM	58	0	5	22	82	14	6	1	51	2	117	4	362
05:45 PM	42	1	2	11	79	15	4	1	28	2	82	8	275
Total	240	4	20	72	338	55	30	2	206	13	451	32	1463
Grand Total	576	9	40	240	934	156	119	5	928	34	1309	97	4447
Apprch %	92.2	1.4	6.4	18	70.2	11.7	11.3	0.5	88.2	2.4	90.9	6.7	
Total %	13	0.2	0.9	5.4	21	3.5	2.7	0.1	20.9	0.8	29.4	2.2	
Cars	564	9	40	239	927	145	119	5	926	34	1291	97	4396
% Cars	97.9	100	100	99.6	99.3	92.9	100	100	99.8	100	98.6	100	98.9
Trucks	12	0	0	1	7	11	0	0	2	0	18	0	51
% Trucks	2.1	0	0	0.4	0.7	7.1	0	0	0.2	0	1.4	0	1.1

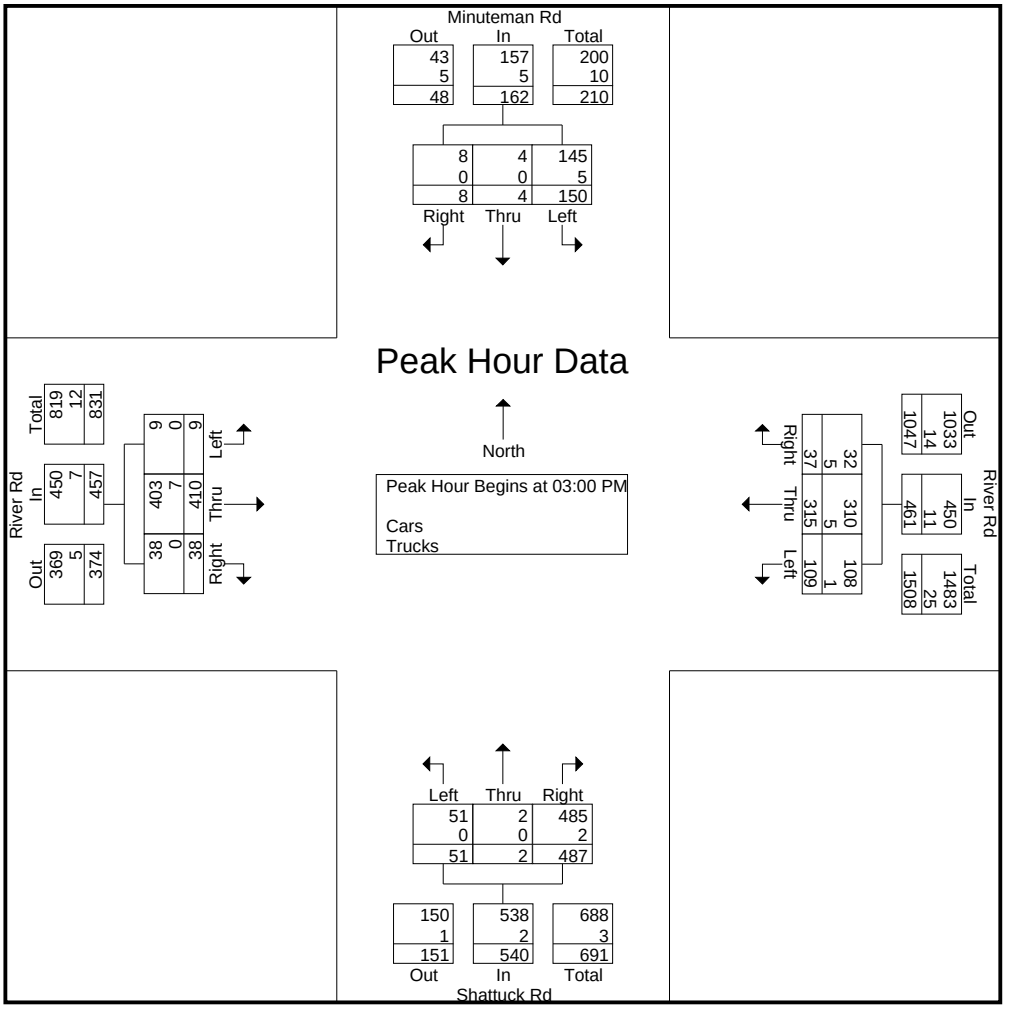
	Minuteman Rd From North				River Rd From East				Shattuck Rd From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	**50**	**3**	**4**	**57**	23	74	8	105	8	**1**	103	112	**3**	84	8	95	369
03:15 PM	22	1	2	25	**40**	**92**	**12**	**144**	9	1	114	124	0	85	**11**	96	389
03:30 PM	43	0	2	45	26	86	8	120	**26**	0	**199**	**225**	3	112	10	125	**515**
03:45 PM	35	0	0	35	20	63	9	92	8	0	71	79	3	**129**	9	**141**	347
Total Volume	150	4	8	162	109	315	37	461	51	2	487	540	9	410	38	457	1620
% App. Total	92.6	2.5	4.9		23.6	68.3	8		9.4	0.4	90.2		2	89.7	8.3		
PHF	.750	.333	.500	.711	.681	.856	.771	.800	.490	.500	.612	.600	.750	.795	.864	.810	.786
Cars	145	4	8	157	108	310	32	450	51	2	485	538	9	403	38	450	1595
% Cars	96.7	100	100	96.9	99.1	98.4	86.5	97.6	100	100	99.6	99.6	100	98.3	100	98.5	98.5
Trucks	5	0	0	5	1	5	5	11	0	0	2	2	0	7	0	7	25
% Trucks	3.3	0	0	3.1	0.9	1.6	13.5	2.4	0	0	0.4	0.4	0	1.7	0	1.5	1.5

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

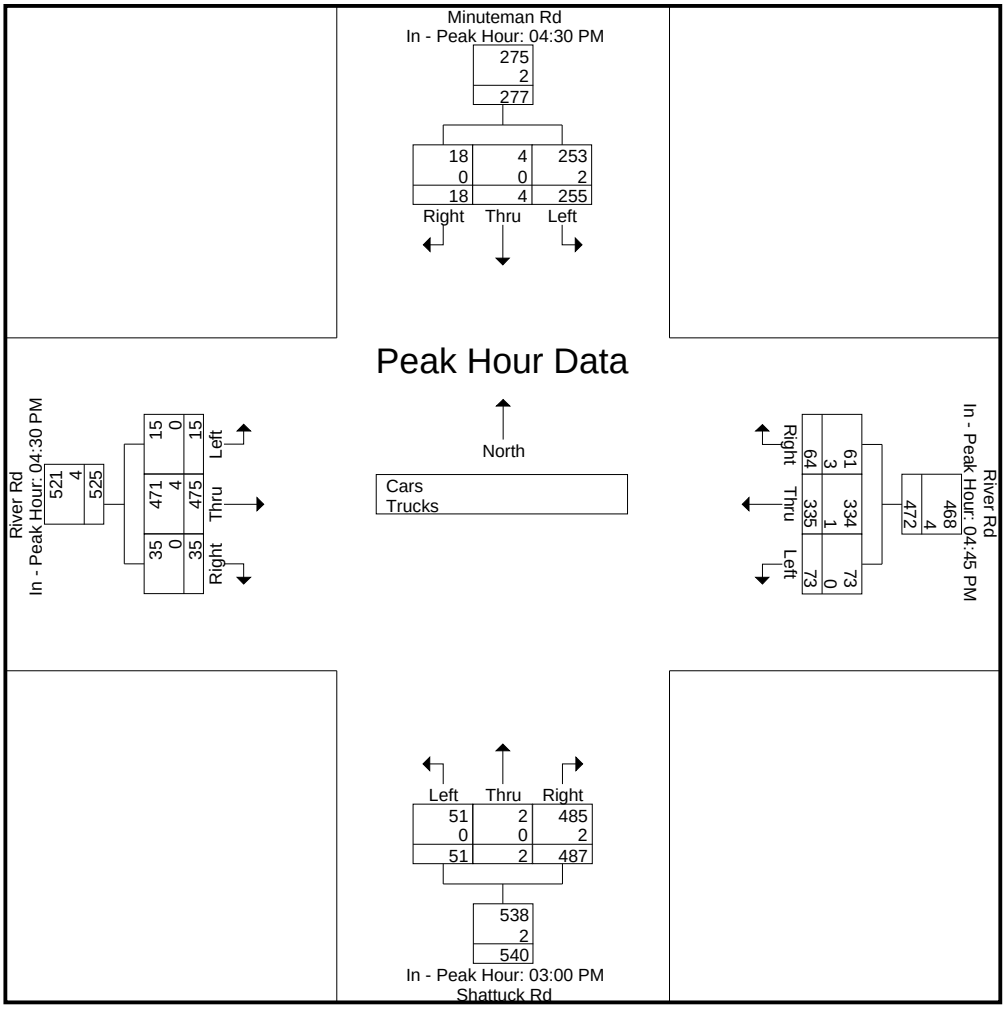
	04:30 PM				04:45 PM				03:00 PM				04:30 PM			
+0 mins.	62	0	2	64	12	76	**24**	112	8	**1**	103	112	3	116	6	125
+15 mins.	53	1	3	57	**22**	83	13	118	9	1	114	124	3	107	9	119
+30 mins.	**85**	**3**	4	**92**	17	**94**	13	**124**	**26**	0	**199**	**225**	**5**	115	**10**	130
+45 mins.	55	0	**9**	64	22	82	14	118	8	0	71	79	4	**137**	10	**151**
Total Volume	255	4	18	277	73	335	64	472	51	2	487	540	15	475	35	525
% App. Total	92.1	1.4	6.5		15.5	71	13.6		9.4	0.4	90.2		2.9	90.5	6.7	
PHF	.750	.333	.500	.753	.830	.891	.667	.952	.490	.500	.612	.600	.750	.867	.875	.869
Cars	253	4	18	275	73	334	61	468	51	2	485	538	15	471	35	521
% Cars	99.2	100	100	99.3	100	99.7	95.3	99.2	100	100	99.6	99.6	100	99.2	100	99.2
Trucks	2	0	0	2	0	1	3	4	0	0	2	2	0	4	0	4
% Trucks	0.8	0	0	0.7	0	0.3	4.7	0.8	0	0	0.4	0.4	0	0.8	0	0.8

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025

Groups Printed- Cars

	Minuteman Rd From North			River Rd From East			Shattuck Rd From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
03:00 PM	48	3	4	22	71	6	8	1	102	3	81	8	357
03:15 PM	21	1	2	40	90	11	9	1	114	0	85	11	385
03:30 PM	42	0	2	26	86	6	26	0	198	3	111	10	510
03:45 PM	34	0	0	20	63	9	8	0	71	3	126	9	343
Total	145	4	8	108	310	32	51	2	485	9	403	38	1595
04:00 PM	38	0	3	17	76	10	6	0	83	3	99	5	340
04:15 PM	29	0	4	12	56	9	9	0	46	3	120	7	295
04:30 PM	61	0	2	18	72	18	15	0	62	3	113	6	370
04:45 PM	53	1	3	12	76	24	8	1	44	3	107	9	341
Total	181	1	12	59	280	61	38	1	235	12	439	27	1346
05:00 PM	84	3	4	22	83	11	10	0	72	5	114	10	418
05:15 PM	55	0	9	17	93	13	10	0	55	4	137	10	403
05:30 PM	57	0	5	22	82	13	6	1	51	2	116	4	359
05:45 PM	42	1	2	11	79	15	4	1	28	2	82	8	275
Total	238	4	20	72	337	52	30	2	206	13	449	32	1455
Grand Total	564	9	40	239	927	145	119	5	926	34	1291	97	4396
Apprch %	92	1.5	6.5	18.2	70.7	11.1	11.3	0.5	88.2	2.4	90.8	6.8	
Total %	12.8	0.2	0.9	5.4	21.1	3.3	2.7	0.1	21.1	0.8	29.4	2.2	

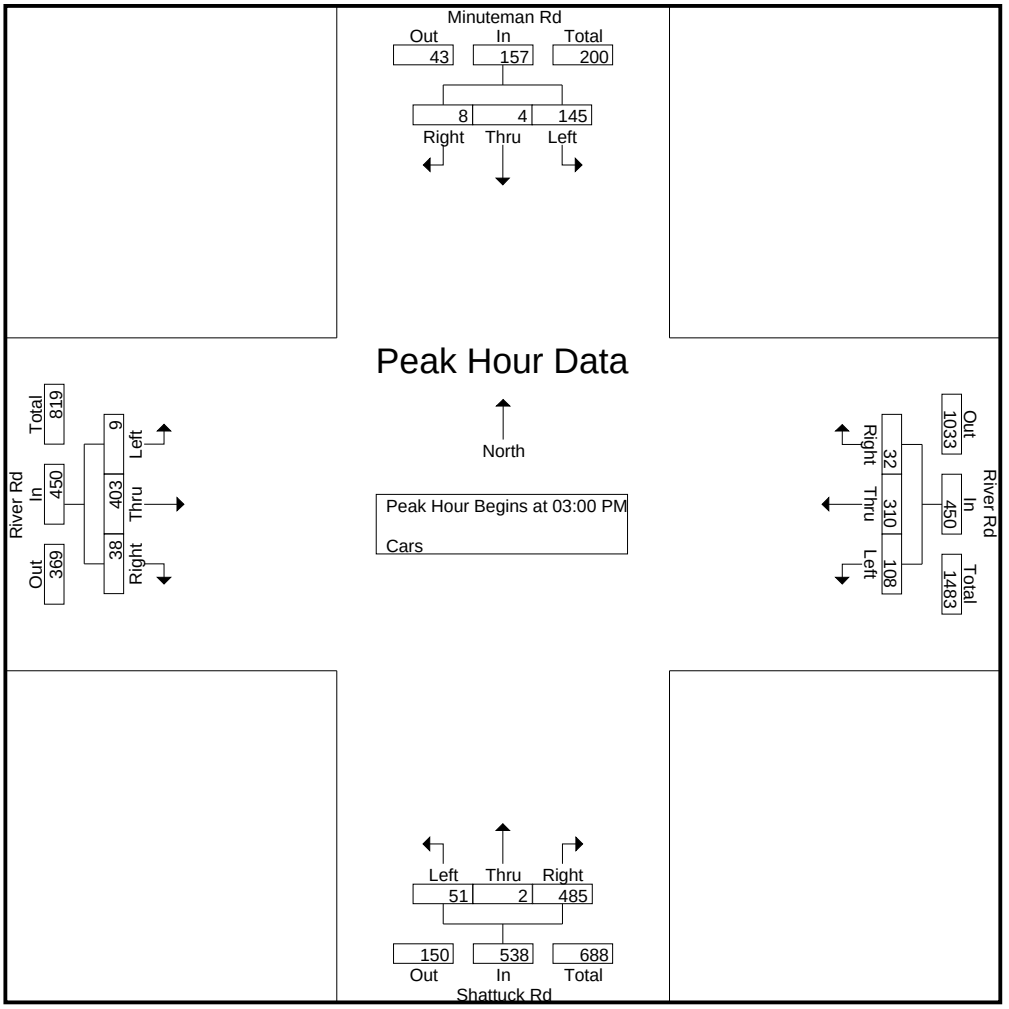
	Minuteman Rd From North				River Rd From East				Shattuck Rd From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	**48**	**3**	**4**	**55**	22	71	6	99	8	**1**	102	111	**3**	81	8	92	357
03:15 PM	21	1	2	24	**40**	**90**	**11**	**141**	9	1	114	124	0	85	**11**	96	385
03:30 PM	42	0	2	44	26	86	6	118	**26**	0	**198**	**224**	3	111	10	124	**510**
03:45 PM	34	0	0	34	20	63	9	92	8	0	71	79	3	**126**	9	**138**	343
Total Volume	145	4	8	157	108	310	32	450	51	2	485	538	9	403	38	450	1595
% App. Total	92.4	2.5	5.1		24	68.9	7.1		9.5	0.4	90.1		2	89.6	8.4		
PHF	.755	.333	.500	.714	.675	.861	.727	.798	.490	.500	.612	.600	.750	.800	.864	.815	.782

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 5



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

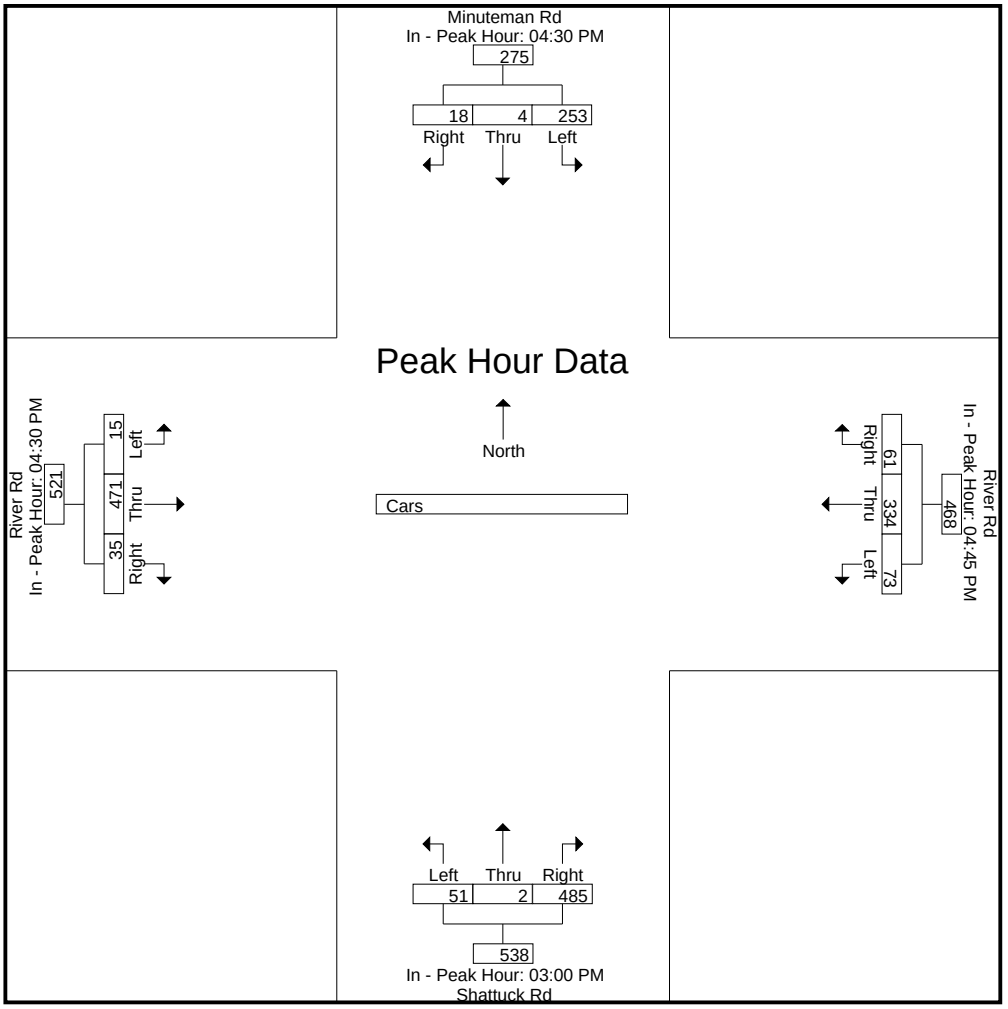
	04:30 PM				04:45 PM				03:00 PM				04:30 PM			
+0 mins.	61	0	2	63	12	76	**24**	112	8	**1**	102	111	3	113	6	122
+15 mins.	53	1	3	57	**22**	83	11	116	9	1	114	124	3	107	9	119
+30 mins.	**84**	**3**	4	**91**	17	**93**	13	**123**	**26**	0	**198**	**224**	**5**	114	**10**	129
+45 mins.	55	0	**9**	64	22	82	13	117	8	0	71	79	4	**137**	10	**151**
Total Volume	253	4	18	275	73	334	61	468	51	2	485	538	15	471	35	521
% App. Total	92	1.5	6.5		15.6	71.4	13		9.5	0.4	90.1		2.9	90.4	6.7	
PHF	.753	.333	.500	.755	.830	.898	.635	.951	.490	.500	.612	.600	.750	.859	.875	.863

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025

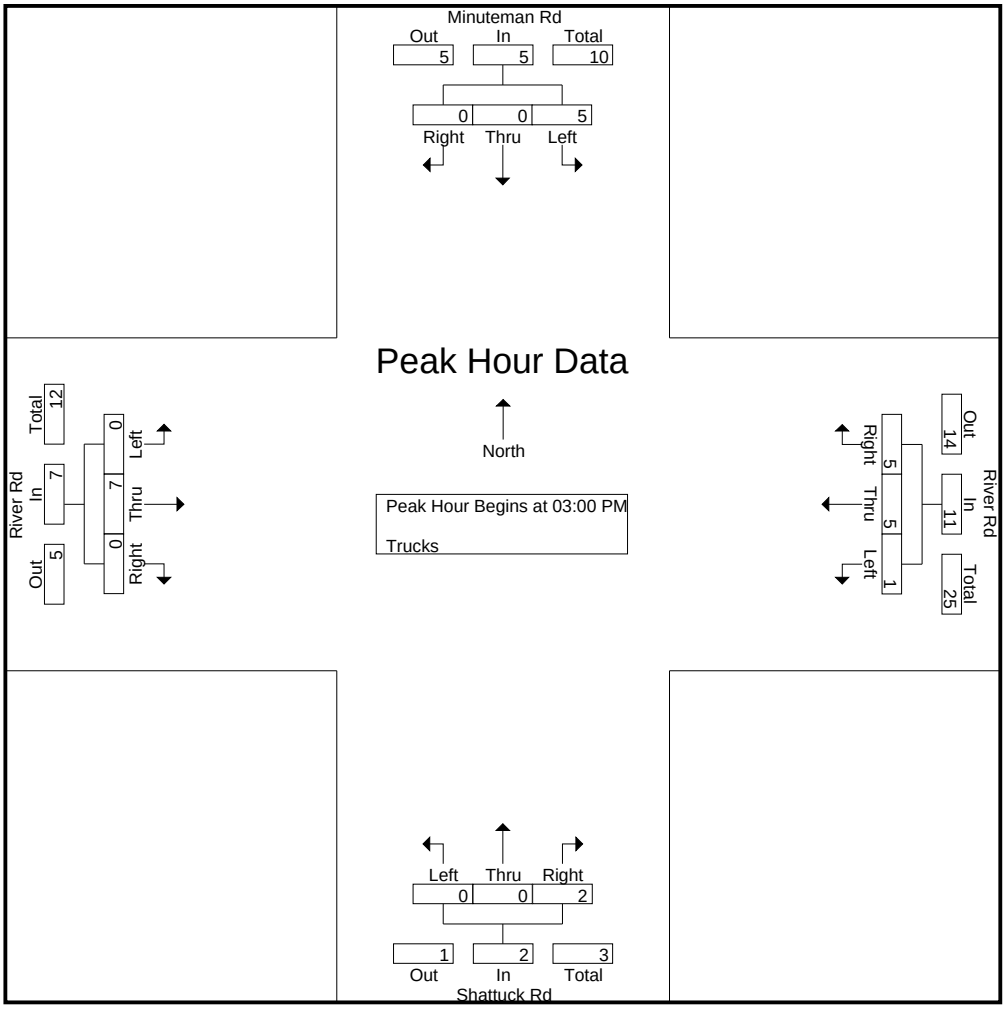
Groups Printed- Trucks

	Minuteman Rd From North			River Rd From East			Shattuck Rd From South			River Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
03:00 PM	2	0	0	1	3	2	0	0	1	0	3	0	12
03:15 PM	1	0	0	0	2	1	0	0	0	0	0	0	4
03:30 PM	1	0	0	0	0	2	0	0	1	0	1	0	5
03:45 PM	1	0	0	0	0	0	0	0	0	0	3	0	4
Total	5	0	0	1	5	5	0	0	2	0	7	0	25
04:00 PM	2	0	0	0	0	2	0	0	0	0	6	0	10
04:15 PM	2	0	0	0	0	0	0	0	0	0	0	0	2
04:30 PM	1	0	0	0	1	1	0	0	0	0	3	0	6
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	5	0	0	0	1	3	0	0	0	0	9	0	18
05:00 PM	1	0	0	0	0	2	0	0	0	0	1	0	4
05:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
05:30 PM	1	0	0	0	0	1	0	0	0	0	1	0	3
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	0	0	0	1	3	0	0	0	0	2	0	8
Grand Total	12	0	0	1	7	11	0	0	2	0	18	0	51
Apprch %	100	0	0	5.3	36.8	57.9	0	0	100	0	100	0	
Total %	23.5	0	0	2	13.7	21.6	0	0	3.9	0	35.3	0	

	Minuteman Rd From North				River Rd From East				Shattuck Rd From South				River 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 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	**2**	0	0	**2**	**1**	**3**	**2**	**6**	0	0	**1**	**1**	0	**3**	0	**3**	**12**
03:15 PM	1	0	0	1	0	2	1	3	0	0	0	0	0	0	0	0	4
03:30 PM	1	0	0	1	0	0	2	2	0	0	1	1	0	1	0	1	5
03:45 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	3	0	3	4
Total Volume	5	0	0	5	1	5	5	11	0	0	2	2	0	7	0	7	25
% App. Total	100	0	0		9.1	45.5	45.5		0	0	100		0	100	0		
PHF	.625	.000	.000	.625	.250	.417	.625	.458	.000	.000	.500	.500	.000	.583	.000	.583	.521

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 8



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

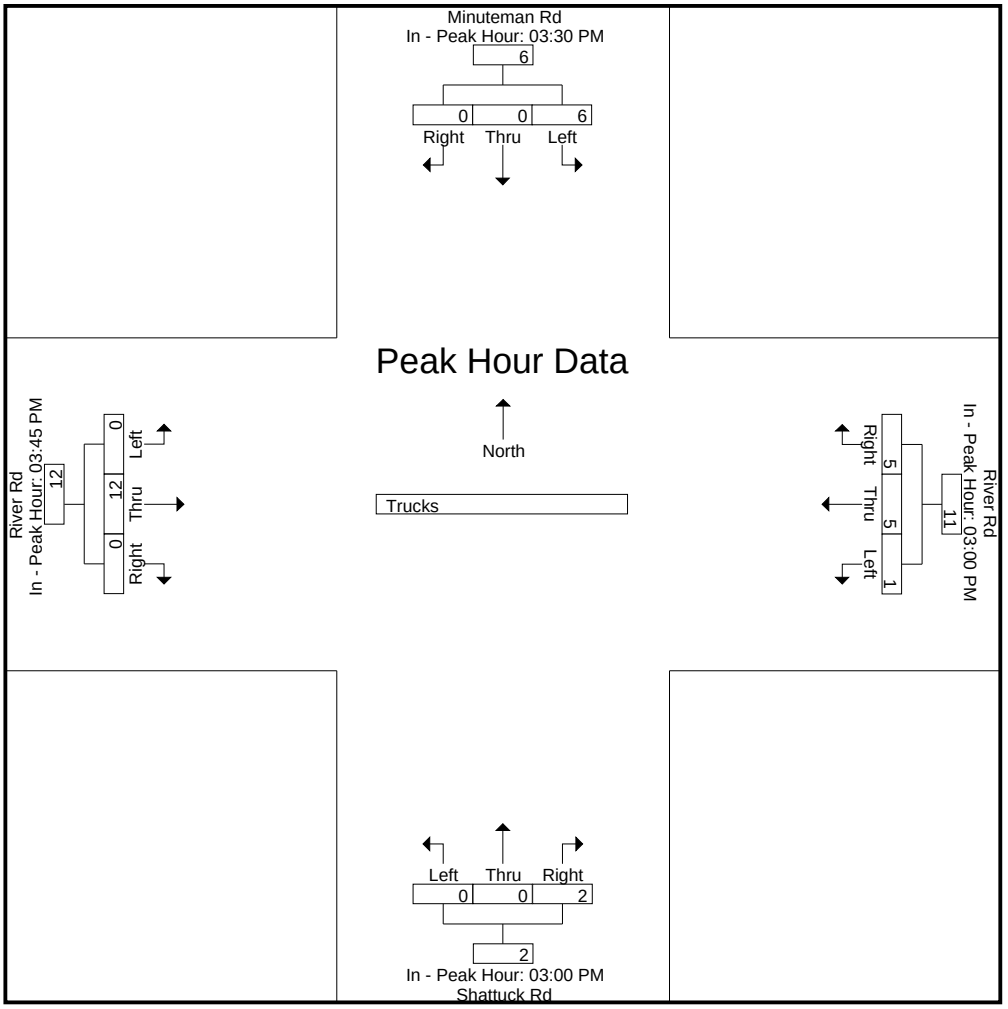
	03:30 PM				03:00 PM				03:00 PM				03:45 PM			
+0 mins.	1	0	0	1	**1**	**3**	**2**	**6**	0	0	**1**	**1**	0	3	0	3
+15 mins.	1	0	0	1	0	2	1	3	0	0	0	0	0	**6**	0	**6**
+30 mins.	**2**	0	0	**2**	0	0	2	2	0	0	1	1	0	0	0	0
+45 mins.	2	0	0	2	0	0	0	0	0	0	0	0	0	3	0	3
Total Volume	6	0	0	6	1	5	5	11	0	0	2	2	0	12	0	12
% App. Total	100	0	0		9.1	45.5	45.5		0	0	100		0	100	0	
PHF	.750	.000	.000	.750	.250	.417	.625	.458	.000	.000	.500	.500	.000	.500	.000	.500

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025

Groups Printed- Bikes Peds

	Minuteman Rd From North				River Rd From East				Shattuck Rd From South				River 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
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	0	2
03:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	2	1	3
04:00 PM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	3	5	0	5
04:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
04:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	4	6	2	8
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	4	0	4
05:30 PM	0	0	0	2	0	0	0	0	0	1	0	2	0	0	0	4	8	1	9
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2
Total	0	0	0	2	0	0	0	0	0	1	0	4	0	0	0	9	15	1	16
Grand Total	0	1	0	4	0	1	0	1	0	2	0	4	0	0	0	14	23	4	27
Apprch %	0	100	0		0	100	0		0	100	0		0	0	0				
Total %	0	25	0		0	25	0		0	50	0		0	0	0		85.2	14.8	

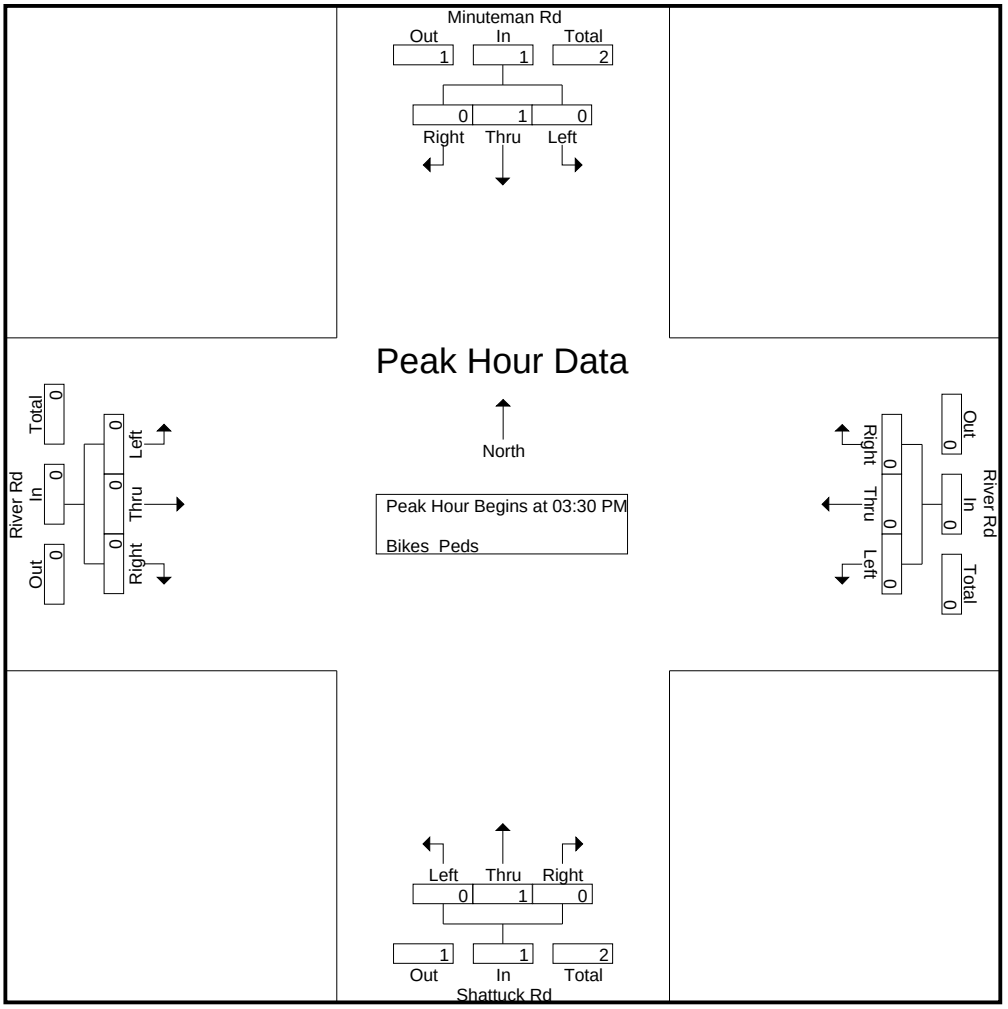
	Minuteman Rd From North				River Rd From East				Shattuck Rd From South				River Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:30 PM																	
03:30 PM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	**1**
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.500

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 11



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

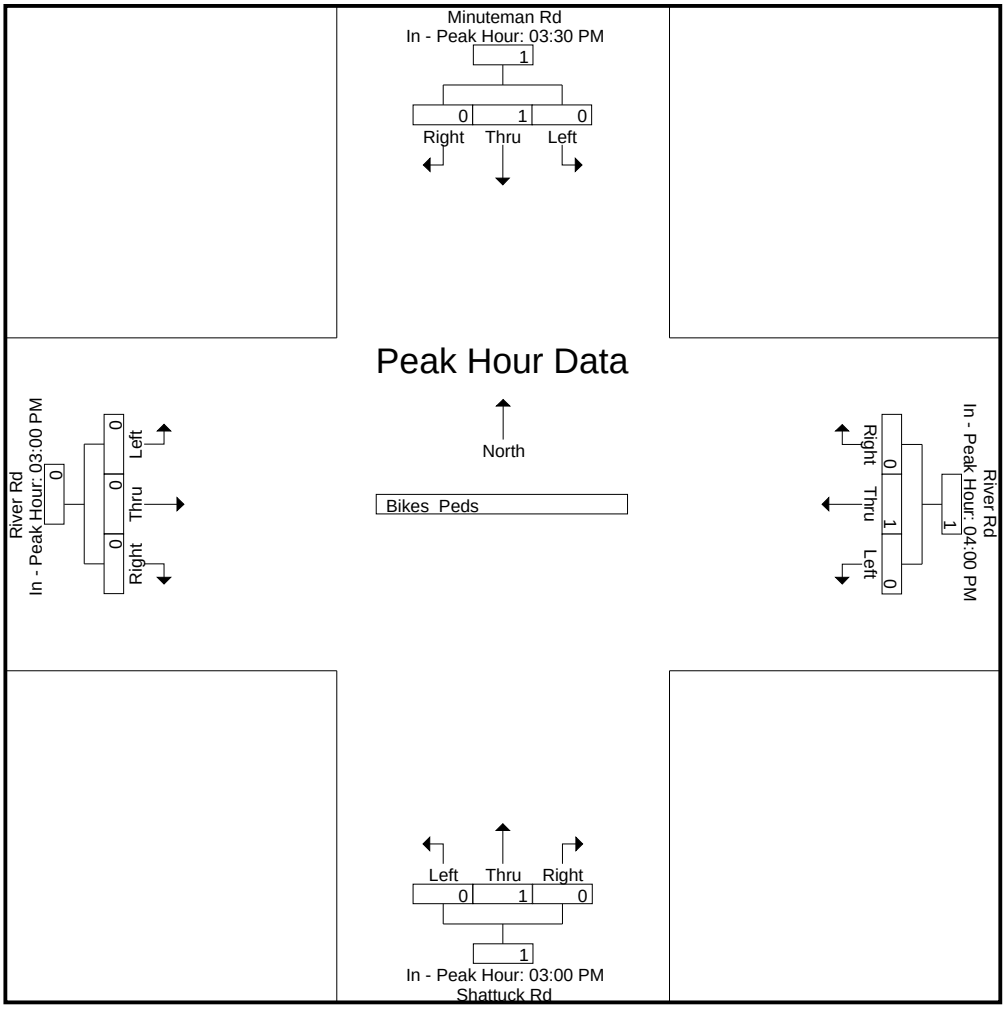
	03:30 PM				04:00 PM				03:00 PM				03:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0
+45 mins.	0	**1**	0	**1**	0	**1**	0	**1**	0	0	0	0	0	0	0	0
Total Volume	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0
% App. Total	0	100	0		0	100	0		0	100	0		0	0	0	
PHF	.000	.250	.000	.250	.000	.250	.000	.250	.000	.250	.000	.250	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Minuteman Rd/Shattuck Rd
E/W Street : River Road
City/State : Andover, MA
Weather : Cloudy

File Name : 10379005
Site Code : 10379005
Start Date : 10/15/2025
Page No : 12



SEASONAL ADJUSTMENT DATA

Massachusetts Highway Department
Statewide Traffic Data Collection
2024 Weekday Seasonal Factors

Factor Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Axle Factor
R1	1.17	1.12	1.11	1.06	1.00	0.96	0.94	0.92	1.00	0.98	1.06	1.07	0.78
R3	1.10	1.04	1.04	1.02	0.91	0.88	0.88	0.87	0.92	0.92	0.99	1.01	0.98
R4-R7	1.16	1.12	1.08	1.03	0.92	0.89	0.88	0.89	0.92	0.94	1.04	1.10	0.98
U1-Boston	1.07	1.03	0.98	0.97	0.94	0.91	0.94	0.91	0.94	0.94	0.98	1.02	0.94
U1-Essex	1.13	1.09	1.06	1.04	0.95	0.89	0.88	0.87	0.95	0.95	1.03	1.05	0.96
U1-Southeast	1.14	1.10	1.04	0.99	0.93	0.86	0.87	0.85	0.91	0.93	0.99	1.02	0.96
U1-West	1.10	1.02	0.98	0.96	0.95	0.92	0.94	0.91	0.91	0.91	0.96	1.00	0.83
U1-Worcester	1.08	1.03	0.99	0.98	0.94	0.91	0.93	0.91	0.92	0.91	0.95	1.00	0.93
U3	1.06	1.02	0.98	0.96	0.93	0.91	0.95	0.94	0.93	0.93	0.96	1.00	0.98
U4-U7	1.04	1.02	0.96	0.95	0.91	0.90	0.94	0.94	0.93	0.94	0.98	1.02	0.99
UR2	1.08	1.02	0.98	0.97	0.93	0.90	0.93	0.90	0.92	0.92	0.97	1.01	0.98
Rec - East	1.21	1.20	1.09	1.01	0.91	0.81	0.77	0.79	0.91	0.95	1.05	1.13	0.99
Rec - West	1.46	1.38	1.32	1.06	0.94	0.79	0.59	0.69	0.97	0.99	1.18	1.28	0.99

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

UR2 Group - Combination of Urban Freeways and Expressways and Rural Freeways and Expressways.

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.

5/2/2025

COVID ADJUSTMENT DATA

Massachusetts Highway Department

5075: Monthly Hourly Volume for October 2019

Location ID:	**5075**	**Seasonal Factor Group:**	**U1-Essex**
County:	**Essex**	**Daily Factor Group:**	
Functional Class	**1**	**Axle Factor Group:**	**U1-Essex**
Location:	**INTERSTATE 495**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1																										
2																										
3																										
4																										
5																										
6																										
7																										
8	703	534	530	710	1,836	4,614	6,854	7,741	7,607	6,463	6,517	6,161	6,445	6,941	8,407	8,992	9,226	8,825	7,255	5,236	3,746	2,878	2,224	1,556	122,001	Accepted
9	897	633	563	705	1,830	4,996	6,942	8,092	8,027	7,188	6,334	6,649	6,731	7,303	8,560	9,443	9,246	8,645	6,706	5,233	3,704	2,941	2,189	1,611	125,168	Accepted
10	934	606	559	772	1,885	4,835	7,444	7,255	8,030	7,207	6,761	6,689	7,201	7,444	8,860	9,459	9,231	8,923	7,478	5,524	4,020	3,103	2,319	1,973	128,512	Accepted
11	1,205	887	724	784	1,872	4,382	6,757	8,766	8,069	7,678	7,752	8,185	8,653	8,989	9,134	8,574	8,792	8,124	7,452	6,692	5,243	4,098	3,077	2,494	138,383	Accepted
12	1,514	909	793	664	820	1,725	2,805	4,268	5,541	6,845	8,213	8,658	8,775	8,282	8,461	8,291	7,454	7,044	6,092	4,856	3,801	3,498	2,947	2,368	114,624	Accepted
13	1,353	1,036	624	502	495	857	1,703	2,677	3,815	5,774	7,359	8,590	9,360	8,938	8,685	8,536	8,460	8,115	7,452	5,930	4,371	3,250	2,329	1,595	111,806	Accepted
14	917	604	533	577	1,299	3,192	4,980	6,258	6,352	6,628	7,338	8,000	7,284	8,475	8,892	8,437	8,070	7,740	7,198	6,189	4,285	2,964	2,102	1,439	119,753	Accepted
15	758	540	544	680	1,903	4,801	7,643	8,414	7,661	7,013	7,007	6,806	6,965	7,429	8,730	8,993	8,634	7,735	7,512	5,345	3,828	2,909	2,097	1,539	125,486	Accepted
16	853	560	574	721	1,873	4,724	7,570	7,997	7,466	7,344	6,535	6,477	6,752	7,164	8,676	9,496	9,229	8,828	7,298	4,985	3,692	2,897	2,084	1,448	125,243	Accepted
17	731	538	533	735	1,785	4,371	6,875	8,079	7,897	6,980	6,586	6,567	6,777	7,009	7,969	9,062	8,858	8,493	6,719	5,302	3,770	3,229	2,475	1,789	123,129	Accepted
18	955	701	633	800	1,878	4,513	7,045	8,561	8,365	7,421	7,105	7,595	7,766	8,215	9,228	9,545	8,960	8,758	7,677	6,388	4,419	3,567	3,241	2,458	135,794	Accepted
19	1,514	978	744	688	917	1,853	2,966	4,520	5,796	6,477	7,603	8,629	8,432	8,257	8,300	8,246	8,485	7,889	7,191	5,489	4,239	3,694	3,229	2,552	118,688	Accepted
20	1,479	991	698	516	528	913	1,691	2,697	4,266	6,369	7,615	8,608	9,045	9,230	8,729	8,814	8,308	7,954	6,831	5,590	4,453	2,449	1,508	1,028	110,310	Accepted
21																										
22																										
23																										
24																										
25																										
26																										
27																										
28																										
29																										
30																										
31																										

122,992 **Oct. 2019 ADT**

Massachusetts Highway Department

5075: Monthly Hourly Volume for October 2025

Location ID:	**5075**	**Seasonal Factor Group:**	**U1-Essex**
County:	**Essex**	**Daily Factor Group:**	
Functional Class	**1**	**Axle Factor Group:**	**U1-Essex**
Location:	**INTERSTATE 495**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	910	696	701	904	2,081	4,890	7,451	8,015	7,889	7,465	6,816	6,941	7,161	7,603	8,584	9,102	8,790	8,536	7,602	5,690	3,870	2,975	2,200	1,646	128,518	Accepted
2	960	802	749	931	2,138	4,821	7,497	8,476	6,030	7,814	7,343	7,393	7,628	8,056	9,243	9,265	9,191	8,504	8,265	5,999	3,894	2,477	2,254	1,823	131,553	Accepted
3	1,154	839	773	929	2,079	4,396	6,784	8,541	8,087	7,514	7,458	8,052	8,269	8,885	9,017	8,912	8,228	8,127	9,049	6,545	4,707	4,276	3,094	2,440	138,155	Accepted
4	1,478	987	962	782	1,136	1,929	3,183	4,591	6,357	7,457	8,802	9,097	8,923	8,881	8,758	9,157	8,741	8,032	7,938	6,128	4,706	3,806	3,266	2,298	127,395	Accepted
5	1,448	1,087	740	608	769	1,227	2,172	3,042	4,457	6,480	8,035	9,300	9,445	9,059	9,027	8,088	8,232	7,782	7,853	6,302	3,944	2,626	2,173	1,416	115,312	Accepted
6	885	683	647	854	2,044	4,848	7,149	8,469	7,789	7,426	7,164	7,327	6,926	7,125	8,577	8,819	8,473	8,523	7,297	4,892	3,437	2,488	2,076	1,565	125,483	Accepted
7	935	721	701	921	2,015	4,987	6,839	8,413	8,205	7,758	6,881	6,892	6,914	7,488	8,558	9,179	8,646	8,680	7,292	4,983	3,683	2,718	2,095	1,617	127,121	Accepted
8	1,037	746	665	869	1,985	4,768	6,989	7,518	6,517	7,081	6,513	6,844	6,945	7,540	8,883	9,233	8,954	8,807	7,133	5,220	3,665	2,857	2,170	1,657	124,596	Accepted
9	1,009	760	721	947	2,041	5,025	7,485	8,189	7,886	7,685	7,157	7,337	7,921	8,328	9,038	9,016	9,135	8,433	8,405	6,218	4,398	2,997	2,460	2,024	134,615	Accepted
10	1,265	914	809	988	2,075	4,537	6,392	8,336	8,150	7,687	8,025	8,259	8,823	8,997	8,850	8,303	7,966	8,067	8,242	7,125	5,499	4,274	3,466	2,465	139,514	Accepted
11	1,652	1,215	941	830	1,121	2,033	3,066	4,506	6,138	6,844	8,678	9,200	9,131	9,225	9,471	9,164	8,821	8,384	7,455	6,024	4,628	3,913	3,422	2,489	128,351	Accepted
12	1,556	1,125	787	615	653	1,178	1,903	2,732	3,882	5,752	6,975	8,017	8,197	7,823	7,675	7,021	7,041	7,133	5,732	4,614	3,476	2,701	2,231	1,556	100,375	Accepted
13	956	713	623	732	1,492	3,021	4,552	5,597	5,558	5,928	6,729	7,079	7,118	6,984	7,870	8,081	7,615	7,513	5,773	4,460	3,466	2,583	1,995	1,394	107,832	Accepted
14	919	612	616	866	2,028	4,656	6,886	7,708	7,603	7,400	7,020	6,730	7,330	7,828	8,540	9,554	9,485	8,824	7,255	4,996	3,619	2,681	1,983	1,546	126,685	Accepted
15	950	685	705	911	2,109	4,832	7,510	7,697	8,174	7,615	7,024	7,111	7,155	7,859	8,825	9,296	9,206	9,183	7,536	5,547	3,889	2,846	2,205	1,659	130,529	Accepted
16	1,080	729	723	910	2,171	4,788	7,356	8,265	7,878	7,481	7,160	7,151	5,829	6,901	8,997	9,484	9,284	8,763	7,628	5,559	3,961	3,033	2,269	1,859	129,259	Accepted
17	1,136	794	745	880	1,995	4,490	6,787	8,338	7,796	7,050	7,276	7,892	8,216	8,303	9,407	9,146	9,020	8,696	8,452	6,291	4,641	3,696	3,296	2,611	136,954	Accepted
18	1,554	1,044	921	800	1,134	1,947	3,058	4,644	5,860	7,101	8,375	8,937	8,550	8,705	8,574	8,497	8,452	8,381	7,354	5,831	4,645	3,837	3,477	2,501	124,179	Accepted
19	1,608	1,114	757	662	753	1,128	2,072	2,977	4,116	6,105	7,380	8,508	8,768	8,185	7,979	7,205	7,796	7,719	7,000	5,381	4,077	2,763	2,120	1,532	107,705	Accepted
20	876	665	627	790	2,068	4,366	6,651	8,477	7,688	6,800	6,184	6,309	6,692	6,850	8,176	9,005	8,884	8,198	5,757	4,305	3,202	2,271	1,869	1,486	118,196	Accepted
21	912	693	645	854	2,121	4,809	7,586	8,331	7,693	7,355	6,655	6,696	6,986	7,261	8,356	8,892	8,849	8,586	7,165	5,153	3,457	2,504	2,069	1,697	125,325	Accepted
22	981	680	682	855	2,085	4,535	6,324	7,586	6,976	7,134	6,484	6,615	7,019	7,163	8,418	8,793	8,948	8,994	6,999	5,062	3,595	2,576	2,228	1,742	122,474	Accepted
23	984	769	693	852	2,206	4,781	7,388	8,426	8,060	7,480	7,147	7,195	7,191	7,597	8,765	9,196	8,986	8,975	7,250	5,461	4,072	3,069	2,521	1,916	130,980	Accepted
24	1,060	837	733	892	1,967	4,419	6,157	8,152	7,788	7,313	7,341	7,253	8,312	8,410	9,439	9,582	9,015	7,771	8,344	5,871	4,289	4,106	3,256	2,215	134,522	Accepted
25	1,557	972	815	735	1,080	1,904	2,899	4,436	5,682	7,038	8,251	8,845	8,677	8,922	8,749	8,922	9,026	8,454	7,226	5,814	4,711	3,860	3,337	2,471	124,383	Accepted
26	1,624	1,101	817	596	726	1,084	1,821	2,945	4,222	5,670	6,843	8,010	8,256	7,898	8,308	8,217	7,940	7,876	6,842	5,431	4,120	2,502	2,055	1,495	106,399	Accepted
27	869	750	582	856	1,984	4,536	7,168	8,533	7,773	6,988	6,435	6,642	6,687	7,156	8,440	9,218	9,038	8,515	6,454	4,352	3,361	2,299	1,859	1,534	122,029	Accepted
28	920	593	667	891	2,103	4,677	7,324	8,056	7,644	7,288	6,353	6,449	6,650	7,127	8,126	9,093	9,154	8,801	6,863	4,796	3,534	2,508	2,132	1,607	123,356	Accepted
29	955	663	626	860	2,071	4,689	7,419	8,202	8,147	7,157	6,031	6,562	6,868	7,334	8,474	9,763	9,565	9,132	7,280	4,913	3,887	2,846	2,422	1,712	127,578	Accepted
30	1,007	775	640	860	2,113	4,666	7,373	8,562	8,064	7,024	6,669	6,370	6,603	7,102	8,271	8,896	7,562	7,594	6,357	4,873	3,547	2,785	2,432	1,751	121,896	Accepted
31	1,029	762	677	880	1,983	4,211	6,284	7,926	7,356	6,530	6,653	7,105	7,819	8,123	9,172	9,344	9,047	7,978	5,882	4,692	3,973	3,343	2,734	2,279	125,782	Accepted
																									124,744	**Oct. 2025 ADT**

PUBLIC TRANSPORTATION SCHEDULES

ROUTE 7 OUTBOUND

BEACON STREET/MOUNT VERNON

WEEKDAYS

1	2	3	4
Bus starts at McGovern	Bus leaves from Beacon & Andover Street	Bus leaves from Lawrence Vocational School (GLTS)	Bus ends at Springhill Marriott
5:15	5:20	5:30	5:35
6:15	6:20	6:30	6:35
7:15	7:20	7:30	7:35
8:15	8:20	8:30	8:35
8:45	8:50	9:00	9:05
9:15	9:20	9:30	9:35
9:45	9:50	10:00	10:05
10:15	10:20	10:30	10:35
10:45	10:50	11:00	11:05
11:15	11:20	11:30	11:35
11:45	11:50	**12:00**	**12:05**
12:15	**12:20**	**12:30**	**12:35**
12:45	**12:50**	**1:00**	**1:05**
1:15	**1:20**	**1:30**	**1:35**
1:45	**1:50**	**2:00**	**2:05**
2:15	**2:20**	**2:30**	**2:35**
2:45	**2:50**	**3:00**	**3:05**
3:15	**3:20**	**3:30**	**3:35**
3:45	**3:50**	**4:00**	**4:05**
4:15	**4:20**	**4:30**	**4:35**
4:45	**4:50**	**5:00**	**5:05**
5:15	**5:20**	**5:30**	**5:35**
6:15	**6:20**	**6:30**	**6:35**
7:15	**7:20**	**7:30**	**7:35**

SATURDAYS

7:15	7:20	7:30	7:35
8:15	8:20	8:30	8:35
9:15	9:20	9:30	9:35
10:15	10:20	10:30	10:35
11:15	11:20	11:30	11:35
12:15	12:20	12:30	12:35
1:15	**1:20**	**1:30**	**1:35**
2:15	**2:20**	**2:30**	**2:35**
3:15	**3:20**	**3:30**	**3:35**
4:15	**4:20**	**4:30**	**4:35**
5:15	**5:20**	**5:30**	**5:35**
6:15	**6:20**	**6:30**	**6:35**

Updated 01/24/25

ROUTE 7 INBOUND

BEACON STREET/MCGOVERN

WEEKDAYS

4 Bus starts at Springhill Marriott	5 Bus leaves from Courtyard Marriott	6 Bus leaves from Andover & Beacon Street	7 Bus ends at McGovern	Bus continues on as Route
5:35	5:40	5:50	5:55	9
6:35	6:40	6:50	6:55	9
7:35	7:40	7:50	7:55	9
8:35	8:40	8:50	8:55	9
9:05	9:10	9:20	9:25	9
9:35	9:40	9:50	9:55	9
10:05	10:10	10:20	10:25	9
10:35	10:40	10:50	10:55	9
11:05	11:10	11:20	11:25	9
11:35	11:40	11:50	11:55	9
12:05	**12:10**	**12:20**	**12:25**	**9**
12:35	**12:40**	**12:50**	**12:55**	**9**
1:05	**1:10**	**1:20**	**1:25**	**9**
1:35	**1:40**	**1:50**	**1:55**	**9**
2:05	**2:10**	**2:20**	**2:25**	**9**
2:35	**2:40**	**2:50**	**2:55**	**9**
3:05	**3:10**	**3:20**	**3:25**	**9**
3:35	**3:40**	**3:50**	**3:55**	**9**
4:05	**4:10**	**4:20**	**4:25**	**9**
4:35	**4:40**	**4:50**	**4:55**	**9**
5:05	**5:10**	**5:20**	**5:25**	**-**
5:35	**5:40**	**5:50**	**5:55**	**9**
6:35	**6:40**	**6:50**	**6:55**	**9**
7:35	**7:40**	**7:50**	**7:55**	**-**

SATURDAYS

7:35	7:40	7:50	7:55	9
8:35	8:40	8:50	8:55	9
9:35	9:40	9:50	9:55	9
10:35	10:40	10:50	10:55	9
11:35	11:40	11:50	11:55	9
12:35	**12:40**	**0:50**	**0:55**	**9**
1:35	**1:40**	**1:50**	**1:55**	**9**
2:35	**2:40**	**2:50**	**2:55**	**9**
3:35	**3:40**	**3:50**	**3:55**	**9**
4:35	**4:40**	**4:50**	**4:55**	**9**
5:35	**5:40**	**5:50**	**5:55**	**9**
6:35	**6:40**	**6:50**	**6:55**	**-**

Updated 01/24/25

VEHICLE TRAVEL SPEED DATA

Accurate Counts
978-664-2565

L O d R r R d S C d
L N r O d R r R d
C S A d r MA
D r NB

T	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	T
AM															
PM															

T

P r
S d
M S d (A r)
MPH P S d
N r P
P r P
N r MPH
P r MPH

Accurate Counts
978-664-2565

L O d R r R d S C d
L N r O d R r R d
C S A d r MA
D r NB

T	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	T
AM															
PM															

T

P r
S d
M S d (A r)
MPH P S d
N r P
P r P
N r MPH
P r MPH

Gr d T

S P r
S d
M S d (A r)
MPH P S d
N r P
P r P
N r MPH
P r MPH

Accurate Counts
978-664-2565

L O d R r R d S C d
L N r O d R r R d
C S A d r MA
D r SB

T	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	T
AM															
PM															

T

P r
S d
M S d (A r)
MPH P S d
N r P
P r P
N r MPH
P r MPH

Accurate Counts
978-664-2565

L O d R r R d S C d
L N r O d R r R d
C S A d r MA
D r SB

T	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	T
AM															
PM															

T

P r
S d
M S d (A r)
MPH P S d
N r P
P r P
N r MPH
P r MPH

Gr d T

S P r
S d
M S d (A r)
MPH P S d
N r P
P r P
N r MPH
P r MPH

Accurate Counts
978-664-2565

L O d R r R d S C d
L N r O d R r R d
C S A d r MA
D r C d

T	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	T
AM															
PM															

T

P r
S d
M S d (A r)
MPH P S d
N r P
P r P
N r MPH
P r MPH

L O d R r R d S C d
L N r O d R r R d
C S A d r MA
D r C d

T	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	T
AM															
PM															

T

P r
S d
M S d (A r)
MPH P S d
N r P
P r P
N r MPH
P r MPH

Gr d T

S P r
S d
M S d (A r)
MPH P S d
N r P
P r P
N r MPH
P r MPH

RIVER ROAD TRAFFIC SIGNAL SYSTEM TIMING PLANS

ANDOVER
RIVER ROAD AT I-93 SB RAMP

STATE	SIGNAL ID NO.	REVISION NO.	SHEET NO.	TOTAL SHEETS
MASS	1047	01	3	3

TRAFFIC SIGNAL DATA

DETECTOR DATA						
DETECTOR NUMBER	NUMBER SECTION/ SIZE	NUMBER OF TURNS	OPERATIONS	CALL DELAY	CALL PHASE	LOOP CONNECTION
1	1-6'x50'	2	PRESENCE	0	Ø2	DIRECT
2	1-6'x50'	2	PRESENCE	0	Ø2	DIRECT
3	1-6'x50'	2	PRESENCE	0	Ø6	DIRECT
4	1-6'x50'	2	PRESENCE	0	Ø6	DIRECT
5	1-6'x50'	2	PRESENCE	0	Ø1	DIRECT
6	1-6'x50'	2	PRESENCE	0	Ø1	DIRECT
7	1-6'x50'	2	PRESENCE	0	Ø8	DIRECT
8	1-6'x50'	2	PRESENCE	0	Ø8	DIRECT
9	1-6'x6'	4	PRESENCE	0	Ø2 EXT. SYSTEM	DIRECT
10	1-6'x6'	4	PRESENCE	0	Ø2 EXT. SYSTEM	DIRECT
11	1-6'x6'	4	PRESENCE	0	Ø6 EXT. SYSTEM	DIRECT
12	1-6'x6'	4	PRESENCE	0	Ø6 EXT. SYSTEM	DIRECT
13	1-6'x6'	4	PRESENCE	0	Ø1 EXT. SYSTEM	DIRECT
14	1-6'x6'	4	PRESENCE	0	Ø1 EXT. SYSTEM	DIRECT
15	1-6'x6'	4	PRESENCE	0	Ø8 EXT. SYSTEM	DIRECT
16	1-6'x6'	4	PRESENCE	0	Ø8 EXT. SYSTEM	DIRECT
17	1-6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
18	1-6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
19	1-6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
20	1-6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
21	1-6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
22	1-6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
23	1-6'x6'	4	PRESENCE	0	SYSTEM	DIRECT

SIGNAL HEAD DATA

A,B,E,F	C,D,G,H,I	P1-P2
R Y G **	R Y G **	
ALL 12" LENS		

** ALL SIGNALS SHALL HAVE 5" BACK PLATES

TIMING														
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	FLASHING OPERATION
RIVER ROAD	WBLT	A,B	←G-	←Y-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	F ←R-
RIVER ROAD	EB	G,H	R	R	R	G	Y	R	R	R	R	R	R	R	FY
RIVER ROAD	WB	C,D	R	R	R	R	R	R	G	Y	R	R	R	R	FY
I-93 SB RAMP	NB	E,F	R	R	R	R	R	R	R	R	R	G	Y	R	FR
PEDESTRIAN	N/S	P1-P2	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
MINIMUM INTERVAL			6			6			6			6			
VEHICLE EXTENSION			2			2			2			2			
MAXIMUM 1 A.M.			10			16			77			33			
MAXIMUM 2 P.M.			19			55			17			10			
YELLOW CLEARANCE				4			4			4			4		
RED CLEARANCE					1			1			1			1	
MAXIMUM EXTEND			10			10			10			10			
AUTO MAXIMUM			49			46			47			63			
ADDED MAX. RED								2			2				
WALK INTERVAL												6			
PED. CLEARANCE													20		
DETECTOR			NON-LOCK			LOCK			LOCK			NON-LOCK			
RECALL			OFF			SOFT			SOFT			SOFT			
			Ø1			Ø2			Ø6			Ø8			

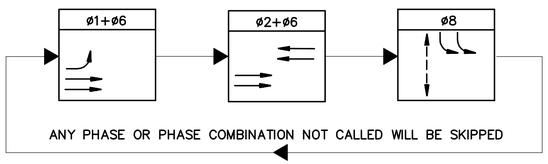
NOTES:
1. FLASHING OPERATION PER M.U.T.C.D. SECTION 4B-18.
2. * = YIELD SIGN CONTROL
3. MAX. 1 7:00-9:00 AM
4. MAX. 2 4:00-6:00 PM

ITEM 815.83
TRAFFIC SIGNAL RECONSTRUCTION
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	T.S. CONTROLLER TYPE 8DW TS2-TYPE 2 IN BASE MOUNTED CABINET INCLUDING FOUNDATION AND CONCRETE PAD WITH CLOSED LOOP COMMUNICATION AND PREEMPTION
1	COMMUNICATION SERVICE ENTRANCE
1	OVERHEAD SERVICE CONNECTION
15	VEHICLE/SYSTEM DETECTION LOOPS 6'X6'
8	VEHICLE DETECTION LOOPS 6'X50' 2T QUADRUPOLE
13	2 CHANNEL LOOP DETECTORS/HARNESS
13	PULLBOXES 12"X12"
1	PREEMPTION CONFIRMATION HIGH INTENSITY WHELEN #1500 CLEAR STROBE
1	30 FT MAST ARM TYPE II STEEL INCLUDING FOUNDATIONS
1	35 FT MAST ARM TYPE II STEEL INCLUDING FOUNDATIONS
9	SIGNAL HEAD 1-WAY 3-SECTION 12" LENS W/BACKPLATES RED = L.E.D.
2	FIBRE OPTIC PEDESTRIAN HEADS AND BUTTONS
3	OPTICOM RECEIVERS AND AMPLIFIERS, RACK
2	10 FT PEDESTAL POLE W/FOUNDATION

PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL SYSTEM.

PREFERENTIAL PHASE SEQUENCE



ANY PHASE OR PHASE COMBINATION NOT CALLED WILL BE SKIPPED

EMERGENCY VEHICLE PREEMPTION OPERATION:

1. EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED OPTICALLY BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT THE INTERSECTION. A SEPARATE RECEIVER IS REQUIRED FOR EACH APPROACH.
2. PREEMPTION SIGNALS SHALL BE SERVICED ON A FIRST COME FIRST SERVED BASIS.
3. IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN APPROACH BY OPTICAL DETECTOR #1 (OR #2, #3, #4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PREEMPTION SEQUENCE #1 (OR #2, #3, #4) UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SERVICE EMERGENCY VEHICLE PREEMPTION SEQUENCE #2 (OR #1,) IF NECESSARY, THEN TIME CLEARANCES AND RESUME NORMAL SIGNAL OPERATION. EMERGENCE VEHICLE PREEMPTION SEQUENCE #3 AND #4 SHALL BE SIMILARLY SERVED.
4. NORMAL VEHICLE CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PREEMPTION DEMAND.

PREEMPTION		
RECEIVER	ø MOVING	
1	WESTBOUND	ø1+ø6
2	EASTBOUND	ø2
3	NORTHBOUND	ø8
4	NOT USED	

SEE NOTES ABOVE

CONSTRUCTION NOTES:

1. EXISTING SIGNAL OPERATION TO BE MAINTAINED UNTIL SWITCH OVER.
2. PREEMPTION CONFIRMATION STROBE TO BE VISIBLE CONTINUALLY ON ALL APPROACHES WHEN ACTIVATED.
3. ALL DETECTION LOOPS TO BE RETURNED TO CABINET AND TAGGED AS SHOWN.
4. CONTROLLER AND CABINET TO BE REPLACED TO PROVIDE CLOSED LOOP SYSTEM.
5. CLOSED LOOP SYSTEM INTERCONNECT TO BE FIBRE OPTIC ON UTILITY POLES.
6. CONTROLLER PROGRAMMING TO BE ACCOMPLISHED BY QUALIFIED FACTORY REPRESENTATIVES.
7. CONTROLLER CABINET TO FACE AS SHOWN.
8. COORDINATION PROGRAMMING SHALL NOT OVERRIDE PEDESTRIAN TIMING WHEN ACTIVATED.
9. EXISTING EQUIPMENT TO BE SALVAGED AS DIRECTED BY M.H.D. DISTRICT OFFICE.
10. SIGNALS ON MAST ARM TO BE RIGID MOUNTED.
11. ALL RED INDICATIONS TO BE L.E.D.
12. QUEUE DETECTORS ON RAMP TO FORCE ON ø8
13. PEDESTRIAN INTERVAL TO BE CALLED BY PUSH BUTTON ONLY.

CONTROLLER MAKE & MODEL: NA
UTILITY POLE No. NA
METER No. NA
EMERGENCY PRE-EMPTION (TYPE): OPTICOM

APPROVED BY:

STATE TRAFFIC ENGINEER Date

1047D0201

ANDOVER
RIVER ROAD AT I-93 SB RAMPS

STATE	SIGNAL ID NO.	REVISION NO	SHEET NO.	TOTAL SHEETS
MASS	1047	02	2	

TRAFFIC SIGNAL PLAN

MATCH LINE

MATCH LINE

EXIST 1957 S.H.L.O.

I-93 SOUTHBOUND OFF-RAMP

I-93 SOUTHBOUND ON-RAMP

PC = 2+45.33

MHB (Found & Held)

63+65.32 RIVER ROAD STATE HWY BSLN = 63+65.32 RIVER ROAD CONSTRUCTION BSLN

0+00 I-93 SOUTHBOUND RAMPS BSLN = 60+90.00 RIVER ROAD STATE HWY BSLN

PROP. 6'x50' QUADRUPOLE LOOP DETECTOR (TYP.)

PROP. MAST ARM POLE (TYP.)

PROP. 12"x12" PULL BOX (TYP.)

PROP. 1 1/2"*NM CONDUIT

PROP. 8DW TRAFFIC CONTROLLER

PROP. 3" NM CONDUIT (TYP.)

STATE HWY. ℄

RIVER ROAD

Comm. of Mass. Drainage Easement

EXIST. 1957 S.H.L.O. (NO Access)

PROP. PEDESTRIAN SIGNAL HEAD (TYP.)

PROP. TRAFFIC SIGNAL PEDESTAL POLE (TYP.)

PROP. PEDESTRIAN PUSH BUTTON W/SIGN (TYP.)

PROP. SIGNAL HEAD W/ BACKPLATE (TYP.)

PROP. 6'x6' LOOP DETECTOR (TYP.)

APPROX. LOCATION OF PROPOSED OVERHEAD INTERCONNECTION (TYP.) (UTILITY POLE LOCATION TO BE DETERMINED BY OTHERS)

PROP. OPTICOM RECEIVER (TYP.)

PROP. DOUBLE CONDUIT RUN FOR SYSTEM INTERCONNECT AND SERVICE CONNECTION (UTILITY POLE LOCATION TO BE DETERMINED BY OTHERS)

PROP. PREEMPTION CONFIRMATION STROBE

Guard Rail

Bit Berm

Gran. Edging

Grass

Small Trees

Wire Fence

Bit. Paving Area

Edge Pvm't

Traffic Light Control Box

Reflector

Mast Arm

UP#7631/48 w/Light

UP#7633/49 w/Light

UP#7632 w/Riser

UP#7630/46

MHB (Found)

1957 TOWN

ONLY

0 20 50 100 FEET

1" = 20' HORIZONTAL

LEGEND

- SIGNAL CONTROLLER
- VEHICULAR SIGNAL
- OPTICALLY PROGRAMMED VEHICULAR SIGNAL
- FIRE PRE-EMPTION RECEIVER
- FIRE PRE-EMPTION STROBE LIGHT
- PEDESTRIAN SIGNAL
- PEDESTRIAN PUSH BUTTON PULL BOX

APPROVED BY:

STATE TRAFFIC ENGINEER Date

1047P0201.DWG

ANDOVER
RIVER ROAD

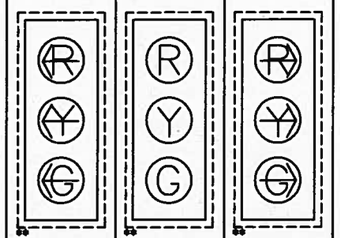
STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
MA		1997	45	144
PROJECT FILE NO. 602300				

TRAFFIC SIGNAL PLAN
RIVER ROAD @ NORTHBOUND RAMPS

DETECTOR DATA						
DETECTOR NUMBER	NUMBER SECTION/ SIZE	NUMBER OF TURNS	OPERATIONS	CALL DELAY	CALL PHASE	LOOP CONNECTION
1	1–6'x50'	2	PRESENCE	0	ø6	DIRECT
2	1–6'x50'	2	PRESENCE	0	ø6	DIRECT
3	1–6'x50'	2	PRESENCE	0	ø2	DIRECT
4	1–6'x50'	2	PRESENCE	0	ø2	DIRECT
5	1–6'x50'	2	PRESENCE	0	ø5	DIRECT
6	1–6'x50'	2	PRESENCE	0	ø5	DIRECT
7	1–6'x50'	2	PRESENCE	0	ø3+ø5 SWITCHING	DIRECT
8	1–6'x50'	2	PRESENCE	0	ø3+ø5 SWITCHING	DIRECT
9	1–6'x50'	2	PRESENCE	0	ø3	DIRECT
10	1–6'x50'	2	PRESENCE	0	ø3	DIRECT
11	1–6'x6'	4	PRESENCE	0	ø6 EXT. SYSTEM	DIRECT
12	1–6'x6'	4	PRESENCE	0	ø6 EXT. SYSTEM	DIRECT
13	1–6'x6'	4	PRESENCE	0	ø2 EXT. SYSTEM	DIRECT
14	1–6'x6'	4	PRESENCE	0	ø2 EXT. SYSTEM	DIRECT
15	1–6'x6'	4	PRESENCE	0	ø5 EXT. SYSTEM	DIRECT
16	1–6'x6'	4	PRESENCE	0	ø5 EXT. SYSTEM	DIRECT
17	1–6'x6'	4	PRESENCE	0	ø3+ø5 EXT. SYSTEM	DIRECT
18	1–6'x6'	4	PRESENCE	0	ø3+ø5 EXT. SYSTEM	DIRECT
19	1–6'x6'	4	PRESENCE	0	ø3 EXT. SYSTEM	DIRECT
20	1–6'x6'	4	PRESENCE	0	ø3 EXT. SYSTEM	DIRECT
21	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
22	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
23	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
24	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
25	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
26	1–6'x16'	4	PRESENCE	0	SYSTEM	DIRECT

SIGNAL HEAD DATA

E,F,G,H,J	A,B,C,D,K,L	J



ALL 12" LENS

** ALL SIGNALS SHALL HAVE 5" BACKPLATES

TIMING														
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	FLASHING OPERATION
RIVER ROAD	EBLT	E,H	←G–	←Y–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	F ←R–
RIVER ROAD	EB	C,D	R	R	R	G	Y	R	R	R	R	R	R	R	FY
RIVER ROAD	WB	A,B	R	R	R	R	R	R	G	Y	R	R	R	R	FY
NORTHBOUND RAMP	SB	F,G,I	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←G–	←Y–	←R–	F ←R–
NORTHBOUND RAMP	SBRT	J	–G→	–Y→	–R→	–R→	–R→	–R→	–R→	–R→	–R→	–G→	–Y→	–R→	F –R→
NORTHBOUND RAMP	SBRT	K,L	G	Y	R	R	R	R	R	R	R	G	Y	R	FR
MINIMUM INTERVAL			6			6			6			6			
VEHICLE EXTENSION			2			2			2			2			
MAXIMUM 1 A.M.			10			39			24			59			
MAXIMUM 2 P.M.			37			34			27			18			
YELLOW CLEARANCE				4			4			4			4		
RED CLEARANCE					1			1			1			1	
MAXIMUM EXTEND			10			10									
AUTO MAXIMUM			67			69									
ADDED MAX. RED								2			2				
DETECTOR			NON–LOCK			LOCK			LOCK			NON–LOCK			
RECALL			OFF			SOFT			SOFT			SOFT			
			ø5			ø2			ø6			ø3			

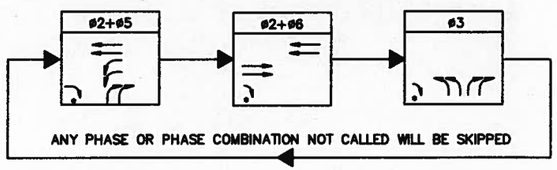
NOTES:
1. FLASHING OPERATION PER M.U.T.C.D. SECTION 4B–18.
2. * = YIELD SIGN CONTROL
3. MAX. 1 7:00–9:00 AM
4. MAX. 2 4:00–6:00 PM

ITEM 815.82
TRAFFIC SIGNAL RECONSTRUCTION
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	T.S. CONTROLLER TYPE 8DW TS2–TYPE 2 WITH ON STREET MASTER IN BASE MOUNTED CABINET INCLUDING FOUNDATION AND CONCRETE PAD WITH CLOSED LOOP COMMUNICATION AND PREEMPTION
1	COMMUNICATION SERVICE ENTRANCE WITH TELEPHONE SERVICE CONNECTION
1	OVERHEAD SERVICE CONNECTION
15	VEHICLE/SYSTEM DETECTION LOOPS 6'X6'
10	VEHICLE DETECTION LOOPS 6'X50' 2T QUADRUPOLE
13	2 CHANNEL LOOP DETECTORS/HARNESS
1	SYSTEM DETECTION LOOP 6'x16'
12	PULLBOXES 12"X12" AND 2 RELOCATED
2	PREEMPTION CONFIRMATION HIGH INTENSITY WHELEN @1500 CLEAR STROBE
1	25 FT MAST ARM TYPE II STEEL INCLUDING FOUNDATIONS
6	SIGNAL HEAD 1–WAY 3–SECTION 12" LENS W/BACKPLATES RED = L.E.D.
1	NEW FOUNDATION FOR EXISTING 35' MAST ARM
3	OPTICOM RECEIVERS AND AMPLIFIERS, RACK
1	10 FT PEDESTAL POLE W/FOUNDATION

PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL SYSTEM.

PREFERENTIAL PHASE SEQUENCE



ANY PHASE OR PHASE COMBINATION NOT CALLED WILL BE SKIPPED

EMERGENCY VEHICLE PREEMPTION OPERATION:

1. EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED OPTICALLY BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT THE INTERSECTION. A SEPARATE RECEIVER IS REQUIRED FOR EACH APPROACH.
2. PREEMPTION SIGNALS SHALL BE SERVICED ON A FIRST COME FIRST SERVED BASIS.
3. IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN APPROACH BY OPTICAL DETECTOR #1 (OR #2, #3, #4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PREEMPTION SEQUENCE #1 (OR #2, #3, #4) UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SERVICE EMERGENCY VEHICLE PREEMPTION SEQUENCE #2 (OR #1,) IF NECESSARY, THEN TIME CLEARANCES AND RESUME NORMAL SIGNAL OPERATION. EMERGENCY VEHICLE PREEMPTION SEQUENCE #3 AND #4 SHALL BE SIMILARLY SERVED.
4. NORMAL VEHICLE CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PREEMPTION DEMAND.

PREEMPTION		
RECEIVER	ø MOVING	
1	WESTBOUND	ø6
2	EASTBOUND	ø2+ø5
3	SOUTHBOUND	ø3
4	NOT USED	

SEE NOTES ABOVE

CONSTRUCTION NOTES:

1. EXISTING SIGNAL OPERATION TO BE MAINTAINED UNTIL SWITCH OVER.
2. PREEMPTION CONFIRMATION STROBE TO BE VISABLE CONTINUALLY ON ALL APPROACHES WHEN ACTIVATED.
3. ALL DETECTION LOOPS TO BE RETURNED TO CABINET AND TAGGED AS SHOWN.
4. CONTROLLER AND CABINET TO BE REPLACED TO PROVIDE CLOSED LOOP SYSTEM.
5. CLOSED LOOP SYSTEM INTERCONNECT TO BE FIBRE OPTIC ON UTILITY POLES.
6. CONTROLLER PROGRAMMING TO BE ACCOMPLISHED BY QUALIFIED FACTORY REPRESENTATIVES.
7. CONTROLLER CABINET TO FACE AS SHOWN.
8. SIGNAL INDICATIONS TO BE CORRECTED AS SHOWN.
9. EXISTING EQUIPMENT TO BE SALVAGED AS DIRECTED BY M.H.D. DISTRICT OFFICE.
10. SIGNALS ON MAST ARM TO BE RIGID MOUNTED.
11. ALL RED INDICATIONS TO BE L.E.D.
12. QUEUE DETECTORS ON RAMP TO FORCE ON ø3

ANDOVER
RIVER ROAD

STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
MA		1997	44	144

PROJECT FILE NO. 602300

TRAFFIC SIGNAL PLAN

PROP. 3" NM CONDUIT (TYP.)
RELOCATE 35' MAST ARM
RELOCATED SIGNAL HEAD (TYP.)
PROP. SIGNAL HEAD (TYP.)
RELOCATE 10' TRAFFIC SIGNAL PEDESTAL POLE AND FOUNDATION
0+00.00 I-93 NORTHBOUND RAMPS BSLN = 49+56.00 RIVER ROAD STATE HWY BSLN
PROP. 6'x6' LOOP DETECTOR (TYP.)
PROP. 12"x12" PULL BOX (TYP.)
PROP. TRAFFIC SIGNAL PEDESTAL POLE
RIVER
ROAD
EXIST. 1957 S.H.L.O. (No Access)
RIGHT OF WAY FENCE
STATE HWY. @
Granite Edging
Median Pvm't
DMH
5' Bit Conc. Walk
Granite Curb
Guard Rail
ONLY
SIGN
PROPOSED OVERHEAD INTERCONNECTION (TYP.)
EXIST. 1957 S.H.L.O.
PROP. DOUBLE CONDUIT RUN FOR SYSTEM INTERCONNECT AND SERVICE CONNECTION
RELOC.
REM.
PROP. 8DW TRAFFIC CONTROLLER AND MASTER
APPROX. LOCATION OF PROPOSED OVERHEAD INTERCONNECTION (TYP.) (UTILITY POLE LOCATION TO BE DETERMINED BY OTHERS)
PROP. MAST ARM POLE (TYP.)
PROP. PREEMPTION CONFIRMATION STROBE (TYP.)
PROP. OPTICOM RECEIVER (TYP.)
PROP. 6'x50' QUADRUPOLE LOOP DETECTOR (TYP.)
MATCH LINE
LEDGE
I-93 NORTHBOUND ON-RAMP
I-93 NORTHBOUND OFF-RAMP
MATCH LINE
SCALE IN FEET
20 0 20 40

NOTE: FOR SIGNAL SYSTEM DATA REFER TO SHEET NO. 45

ANDOVER

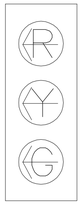
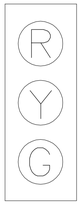
RIVER RD AT OLD RIVER RD & FEDERAL ST

STATE	SIGNAL ID NO.	REVISION NO.	SHEET NO.	TOTAL SHEETS
MASS	1049	01	3	3

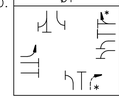
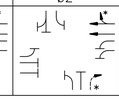
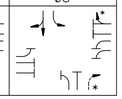
TRAFFIC SIGNAL DATA

DETECTOR DATA						
DETECTOR NUMBER	NUMBER SECTION/ SIZE	NUMBER OF TURNS	OPERATIONS	CALL DELAY	CALL PHASE	LOOP CONNECTION
1	1–6'x6'	4	PRESENCE	0	Ø2 EXT. SYSTEM	DIRECT
2	1–6'x6'	4	PRESENCE	0	Ø2 EXT. SYSTEM	DIRECT
3	4–6'x6'	4	PRESENCE	0	Ø5	S/P
4	4–6'x6'	4	PRESENCE	0	Ø5	S/P
5	4–6'x6'	4	PRESENCE	0	Ø1	S/P
6	1–6'x6'	4	PRESENCE	0	Ø6 EXT. SYSTEM	DIRECT
7	1–6'x6'	4	PRESENCE	0	Ø6 EXT. SYSTEM	DIRECT
8	4–6'x6'	4	PRESENCE	0	Ø3	S/P
9	4–6'x6'	4	PRESENCE	0	Ø3	S/P
10	4–6'x6'	4	PRESENCE	0	Ø8	S/P
11	4–6'x6'	4	PRESENCE	0	Ø8	S/P
12	1–6'x50'	2	PRESENCE	0	Ø6	DIRECT
13	1–6'x50'	2	PRESENCE	0	Ø6	DIRECT
14	1–6'x50'	2	PRESENCE	0	Ø2	DIRECT
15	1–6'x50'	2	PRESENCE	0	Ø2	DIRECT
16	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
17	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
18	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
19	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
20	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
21	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
*	LOOPS TO BE SEPARATED, DIRECT TO CABINET (FUTURE USE)					

SIGNAL HEAD DATA

A,D,E	B,C,F,G,H,J,K,L,M
	

ALL 12" LENS

TIMING																			
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	FLASHING OPERATION
RIVER ROAD	WBLT	A	←G–	←Y–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	F ←R–
RIVER ROAD	EB	F,G	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
RIVER ROAD	EBLT	D,E	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←G–	←Y–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	F ←R–
RIVER ROAD	WB	B,C	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FY
FEDERAL STREET	NB	H,J	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR
OLD RIVER ROAD	SB	K,L,M	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FR
MINIMUM INTERVAL			6			6			6			6			6			6			
VEHICLE EXTENSION			2			2			2			2			2			2			
MAXIMUM 1 A.M.			10			49			10			16			38			10			
MAXIMUM 2 P.M.			10			39			12			10			44			14			
YELLOW CLEARANCE				4			4			4			4			4			4		
RED CLEARANCE					1			1			1			1			1			1	
MAX. EXTEND						10									10						
AUTO MAXIMUM						79									74						
ADDED MAX. RED								2									2				
DETECTOR			NON–LOCK			LOCK			NON–LOCK			NON–LOCK			LOCK			NON–LOCK			
RECALL			OFF			SOFT			OFF			OFF			SOFT			OFF			
			Ø1			Ø2			Ø3			Ø5			Ø6			Ø8			
																					

NOTES:
1. FLASHING OPERATION PER M.U.T.C.D. SECTION 4B–18.
2. * = YIELD SIGN CONTROL
3. MAX 1 7–9 AM
4. MAX 2 4–6 PM

PREEMPTION			
RECEIVER	Ø MOVING		
1		WESTBOUND	Ø1+Ø6
2		EASTBOUND	Ø2+Ø5
3		SOUTHBOUND	Ø3
4		NORTHBOUND	Ø8

SEE NOTES ABOVE

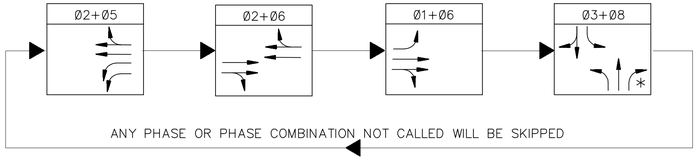
EMERGENCY VEHICLE PREEMPTION OPERATION:

1. EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED OPTICALLY BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT THE INTERSECTION. A SEPARATE RECEIVER IS REQUIRED FOR EACH APPROACH.
2. PREEMPTION SIGNALS SHALL BE SERVICED ON A FIRST COME FIRST SERVED BASIS.
3. IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN APPROACH BY OPTICAL DETECTOR #1 (OR #2, #3, #4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PREEMPTION SEQUENCE #1 (OR #2, #3, #4) UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SERVICE EMERGENCY VEHICLE PREEMPTION SEQUENCE #2 (OR #1,) IF NECESSARY, THEN TIME CLEARANCES AND RESUME NORMAL SIGNAL OPERATION. EMERGENCE VEHICLE PREEMPTION SEQUENCE #3 AND #4 SHALL BE SIMILARLY SERVED.
4. NORMAL VEHICLE CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PREEMPTION DEMAND.

CONSTRUCTION NOTES:

1. INTERSECTION TO BE RE–PHASED (N.E.M.A STANDARD).
2. OPTICOM RECEIVER PLACEMENT AND WIRING TO BE CORRECTED TO NEW PHASING.
   RECEIVER #1 WESTBOUND AND WESTBOUND LEFT–TURN Ø1 + Ø6
   RECEIVER #2 EASTBOUND AND EASTBOUND LEFT–TURN Ø2 + Ø5
   RECEIVER #3 SOUTHBOUND ONLY Ø3
   RECEIVER #4 NORTHBOUND ONLY Ø8
3. NEW PRE–EMPTION CONFIRMATION STROBE TO BE INSTALLED WHELEN MODEL 1500 CLEAR.
4. ALL NEW AND EXISTING DETECTION LOOPS TO BE RETURNED TO CABINET, TESTED AND TAGGED AS SHOWN.
5. CONTROLLER CABINET TO BE MODIFIED OR REPLACED TO PROVIDE CLOSED LOOP OPERATION.
6. CONDUIT INSTALLATION TO ACCOMMODATE EXISTING INFRASTRUCTURE AND FOLIAGE.
7. CONTROLLER PROGRAMMING TO BE ACCOMPLISHED BY QUALIFIED FACTORY REPRESENTATIVES.
8. ALL RED SIGNAL INDICATIONS TO BE REPLACED WITH L.E.D.
9. PREEMPTION CONFIRMATION STROBE TO BE VISABLE CONTINUALLY ON ALL APPROACHES WHEN ACTIVATED.

PREFERENTIAL PHASE SEQUENCE



ITEM 816.01 TRAFFIC SIGNAL RECONSTRUCTION LIST OF MAJOR ITEMS REQUIRED	
QUANTITY	DESCRIPTION
12	RED L.E.D. SIGNALS
1	CONTROLLER COMMUNICATION BOARD
1	COMMUNICATION TERMINATION HARDWARE
1	COMMUNICATION SERVICE ENTRANCE
6	VEHICLE/SYSTEM DETECTION LOOPS 6'X6'
4	VEHICLE DETECTION LOOPS 6'X50' 2T QUADRUPOLE
10	2 CHANNEL LOOP DETECTORS/HARNESS
2	PULLBOXES 12"X12"
1	PREEMPTION CONFIRMATION HIGH–INTENSITY CLEAR STROBE WHELEN MODEL 1500

PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL SYSTEM.

CONTROLLER MAKE & MODEL: NA
UTILITY POLE No. NA
METER No. NA
EMERGENCY PRE–EMPTION (TYPE): NA

APPROVED BY:

STATE TRAFFIC ENGINEER Date

1049D0201

ANDOVER

RIVER RD AT OLD RIVER RD & FEDERAL ST

STATE	SIGNAL ID NO.	REVISION NO.	SHEET NO.	TOTAL SHEETS
MASS	1049	01	2	

TRAFFIC SIGNAL PLAN

PROP. 3" NM CONDUIT (TYP.)

PROP. 12"x12" PULL BOX (TYP.)

PROP. 6'x50' QUADRUPOLE LOOP DETECTOR (TYP.)

EXIST. 6'x6' LOOP DETECTORS TO REMAIN (NOT USED)

EXIST. 6'x6' LOOP DETECTORS TO REMAIN (NOT USED)

EXIST. 6'x6' LOOP DETECTOR (TYP.)

PROP. SYSTEM INTERCONNECT SERVICE

PROP. OPTICOM RECEIVER (TYP.)

EXIST. SERVICE CONNECTION

PROP. PREEMPTION CONFORMATION STROBE

EXIST. SPAN POLE (TYP.)

EXIST. 3" NM CONDUIT (TYP.)

EXIST. SIGNAL HEAD (TYP.)

EXIST. 12"x12" PULL BOX (TYP.)

PROPOSED OVERHEAD INTERCONNECTION (TYP.)

NOTE: FOR SIGNAL SYSTEM DATA REFER TO SHEET NO. 43

0 20 50 100 FEET

1" = 20' HORIZONTAL

LEGEND

- SIGNAL CONTROLLER
- VEHICULAR SIGNAL
- OPTICALLY PROGRAMMED VEHICULAR SIGNAL
- FIRE PRE-EMPTION RECEIVER
- FIRE PRE-EMPTION STROBE LIGHT
- PEDESTRIAN SIGNAL
- PEDESTRIAN PUSH BUTTON
- PULL BOX

APPROVED BY:

STATE TRAFFIC ENGINEER Date

1049P0102

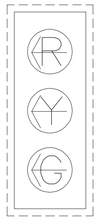
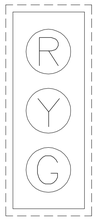
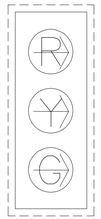
ANDOVER
RIVER RD AT SHATTUCK RD & 1776 DR.

STATE	SIGNAL ID NO.	REVISION NO.	SHEET NO.	TOTAL SHEETS
MASS	1050	01	3	3

TRAFFIC SIGNAL DATA

DETECTOR DATA						
DETECTOR NUMBER	NUMBER SECTION/ SIZE	NUMBER OF TURNS	OPERATIONS	CALL DELAY	CALL PHASE	LOOP CONNECTION
1	1–6'x50'	2	PRESENCE	0	Ø1	DIRECT
2	1–6'x50'	2	PRESENCE	0	Ø1	DIRECT
3	1–6'x50'	2	PRESENCE	0	Ø6	DIRECT
4	1–6'x6'	4	PRESENCE	0	Ø6 EXT. SYSTEM	DIRECT
5	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
6	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
7	1–6'x50'	2	PRESENCE	0	Ø8+Ø1 SWITCHING	DIRECT
8	1–6'x50'	2	PRESENCE	0	Ø8+Ø1 SWITCHING	DIRECT
9	1–6'x50'	2	PRESENCE	0	Ø8	DIRECT
10	1–6'x6'	4	PRESENCE	0	Ø1 EXT. SYSTEM	DIRECT
11	1–6'x6'	4	PRESENCE	0	Ø1 EXT. SYSTEM	DIRECT
12	1–6'x50'	2	PRESENCE	0	Ø2	DIRECT
13	1–6'x50'	2	PRESENCE	0	Ø2	DIRECT
14	1–6'x50'	2	PRESENCE	0	Ø5	DIRECT
15	1–6'x6'	4	PRESENCE	0	Ø2 EXT. SYSTEM	DIRECT
16	1–6'x6'	4	PRESENCE	0	Ø2 EXT. SYSTEM	DIRECT
17	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
18	1–6'x50'	2	PRESENCE	0	Ø3	DIRECT
19	1–6'x50'	2	PRESENCE	0	Ø3	DIRECT
20	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
21	1–6'x6'	4	PRESENCE	0	SYSTEM	DIRECT
22	1–6'x6'	4	PRESENCE	0	Ø8+Ø1 SYSTEM	DIRECT
23	1–6'x6'	4	PRESENCE	0	Ø8+Ø1 SYSTEM	DIRECT

SIGNAL HEAD DATA

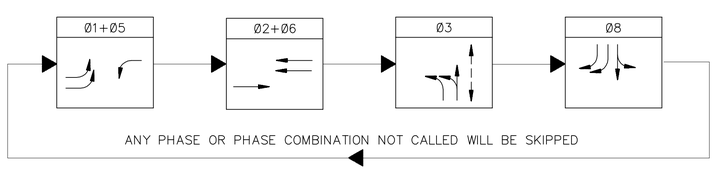
A,D,E	B,C,F,G,H,J,K,L	M,N,O	P1–P2
			
ALL 12" LENS			

ALL SIGNALS SHALL HAVE 5" BACK PLATES
ALL SIGNALS SHALL BE TETHERED

TIMING																				
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	FLASHING OPERATION
RIVER ROAD	WBLT	D,E	←G–	←Y–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	F ←R–
RIVER ROAD	EB	B,C	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
RIVER ROAD	EBLT	A	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	←G–	←Y–	←R–	←R–	←R–	←R–	←R–	←R–	←R–	F ←R–
RIVER ROAD	WB	F,G	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FY
1776 DRIVE	SB	H,J	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FR
SHATTUCK ROAD	NB	K,L	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR
SHATTUCK ROAD	NBRT	M,N,O	–G→	–Y→	–R→	–R→	–R→	–R→	–R→	–R→	–R→	–R→	–R→	–R→	–R→	–R→	–R→	–G→	–Y→	–R→	F –R→
PEDESTRIAN	N/S	P1–P2	DW	DW	DW	DW	DW	DW	W	FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT
MINIMUM INTERVAL			6			6			6			6			6			6			
VEHICLE EXTENSION			2			2			2			2			2			2			
MAXIMUM 1 A.M.			49			14			10			16			12			27			
MAXIMUM 2 P.M.			10			14			41			10			17			48			
YELLOW CLEARANCE				4			4			4			4			4			4		
RED CLEARANCE					1			1			1			1			1			1	
MAXIMUM EXTEND			10			10									10						
AUTO MAXIMUM			79			44									42						
ADDED MAX. RED					2			2									2				
WALK INTERVAL									6												
PED. CLEARANCE										20											
DETECTOR			NON–LOCK			LOCK			NON–LOCK			NON–LOCK			LOCK			NON–LOCK			
RECALL			OFF			SOFT			OFF			OFF			SOFT			OFF			
			Ø1			Ø2			Ø3			Ø5			Ø6			Ø8			

NOTES: 1. FLASHING OPERATION PER M.U.T.C.D. SECTION 4B–18.
2. * = YIELD SIGN CONTROL
3. MAX. 1 7:00–9:00 AM
4. MAX. 2 4:00–6:00 PM

PREFERENTIAL PHASE SEQUENCE



ITEM 815.84
TRAFFIC SIGNAL RECONSTRUCTION
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	T.S. CONTROLLER TYPE 8DW TS2–TYPE 2 IN BASE MOUNTED CABINET INCLUDING FOUNDATION AND CONCRETE PAD WITH CLOSED LOOP COMMUNICATION AND PREEMPTION
1	COMMUNICATION SERVICE ENTRANCE
12	VEHICLE/SYSTEM DETECTION LOOPS 6'X6'
11	2 CHANNEL LOOP DETECTORS/HARNESS
11	PULLBOXES 12"X12"
11	VEHICLE DETECTION LOOP 6'X50' 2T QUADRUPOLE
1	PREEMPTION CONFIRMATION HIGH INTENSITY WHELEN #1500 CLEAR STROBE
4	30' STEEL STRAIN POLES INCLUDING FOUNDATIONS
4	SPAN WIRE ASSEMBLY WITH TETHER WIRE
1	25 FT MAST ARM TYPE II STEEL INCLUDING FOUNDATION
14	SIGNAL HEAD 1–WAY 3–SECTION 12" LENS W/BACKPLATES RED = L.E.D.
2	FIBRE OPTIC PEDESTRIAN HEADS AND BUTTONS
1	OVERHEAD SERVICE CONNECTION
4	OPTICOM RECEIVERS AND AMPLIFIERS, RACK

PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL SYSTEM.

EMERGENCY VEHICLE PREEMPTION OPERATION:

1. EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED OPTICALLY BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT THE INTERSECTION. A SEPARATE RECEIVER IS REQUIRED FOR EACH APPROACH.
2. PREEMPTION SIGNALS SHALL BE SERVICED ON A FIRST COME FIRST SERVED BASIS WITH RECEIVERS 1, 2, 3, AND 4.
3. IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN APPROACH BY OPTICAL DETECTOR #1 (OR #2, #3, #4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PREEMPTION SEQUENCE #1 (OR #2, #3, #4) UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SERVICE EMERGENCY VEHICLE PREEMPTION SEQUENCE #2 (OR #1,) IF NECESSARY, THEN TIME CLEARANCES AND RESUME NORMAL SIGNAL OPERATION. EMERGENCE VEHICLE PREEMPTION SEQUENCE #3 AND #4 SHALL BE SIMILARLY SERVED.
4. NORMAL VEHICLE CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PREEMPTION DEMAND.

PREEMPTION			
RECEIVER	Ø MOVING		
1		WESTBOUND	Ø1+Ø6
2		EASTBOUND	Ø2+Ø5
3		SOUTHBOUND	Ø3
4		NORTHBOUND	Ø8

SEE NOTES ABOVE

CONSTRUCTION NOTES:

1. EXISTING SIGNAL OPERATION TO BE MAINTAINED UNTIL SWITCH OVER.
2. PREEMPTION CONFIRMATION STROBE TO BE VISIBLE CONTINUALLY ON ALL APPROACHES WHEN ACTIVATED.
3. ALL DETECTOR LOOPS TO BE RETURNED TO CABINET AND TAGGED AS SHOWN.
4. CONTROLLER AND CABINET TO BE REPLACED TO PROVIDE CLOSED LOOP OPERATION.
5. CLOSED LOOP SYSTEM INTERCONNECT TO BE FIBRE OPTIC ON UTILITY POLES.
6. CONTROLLER PROGRAMMING TO BE ACCOMPLISHED BY QUALIFIED FACTORY REPRESENTATIVES.
7. CONTROLLER CABINET TO FACE AWAY FROM STREET.
8. COORDINATION PROGRAMMING SHALL NOT OVERRIDE PEDESTRIAN TIMING WHEN ACTIVATED.
9. EXISTING EQUIPMENT TO BE SALVAGED AS DIRECTED BY M.H.D. DISTRICT OFFICES.
10. SIGNALS ON MAST ARM TO BE RIGID MOUNTED.
11. ALL RED INDICATIONS TO BE L.E.D.

CONTROLLER MAKE & MODEL: NA
UTILITY POLE No. NA
METER No. NA
EMERGENCY PRE–EMPTION (TYPE): NA

APPROVED BY:

STATE TRAFFIC ENGINEER Date

1050D0201

ANDOVER
RIVER RD AT SHATTUCK RD & 1776 DR.

STATE	SIGNAL ID NO.	REVISION NO	NO.	TOTAL SHEETS
MASS	1050	01	2	

TRAFFIC SIGNAL PLAN

SHATTUCK ROAD

ROAD

RIVER

1776 DRIVE

OLD RIVER ROAD

PROP. PEDESTRIAN PUSH BUTTON W/SIGN (TYP.)

PROP. SPAN POLE (TYP.)

PROP. PEDESTRIAN SIGNAL HEAD (TYP.)

PROP. 6'x50' QUADRUPOLE LOOP DETECTOR (TYP.)

PROP. SIGNAL HEAD (TYP.)

PROP. MAST ARM

PROP. 3" NM CONDUIT (TYP.)

PROP. 12"x12" PULL BOX (TYP.)

PROP. 6'x6' LOOP DETECTOR (TYP.)

PROP. 8DW TRAFFIC CONTROLLER 5'x 7' Util. Box

PROP. PREEMPTION CONFIRMATION STROBE 5'x 7' Util. Box

PROP. OPTICOM RECEIVER (TYP.)

PROP. 1 1/2" NM CONDUIT

PROP. DOUBLE CONDUIT RUN FOR SYSTEM INTERCONNECT AND SERVICE CONNECTION (UTILITY POLE LOCATION TO BE DETERMINED BY OTHERS)

APPROX. LOCATION OF PROPOSED OVERHEAD INTERCONNECTION (TYP.) (UTILITY POLE LOCATION TO BE DETERMINED BY OTHERS)

10+00.00 SHATTUCK RD CONST. BSLN = 73+34.29 RIVER ROAD STATE HWY BSLN

10+00.00 1776 DR CONST. BSLN = 73+35.50 RIVER ROAD STATE HWY BSLN

S 41°06'17" W 218.68'

0 20 50 100 FEET

1" = 20' HORIZONTAL

LEGEND

- SIGNAL CONTROLLER
- VEHICULAR SIGNAL
- OPTICALLY PROGRAMMED VEHICULAR SIGNAL
- FIRE PRE-EMPTION RECEIVER
- FIRE PRE-EMPTION STROBE LIGHT
- PEDESTRIAN SIGNAL
- PEDESTRIAN PUSH BUTTON
- PULL BOX

APPROVED BY:

STATE TRAFFIC ENGINEER Date

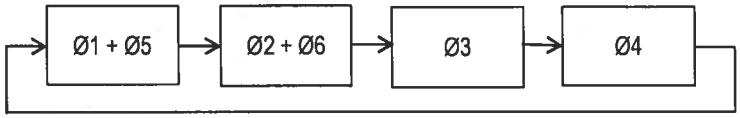
1050P0101.DWG

Andover - River Road at 4 Locations
Coordination Data

River Road at Shattuck Road

			Phase Splits							
Plan	Cycle Length	Offset	1	2	3	4	5	6	7	8
1/1/1	80	39	25	23	15	17	25	23	--	--
2/1/1	80	29	12	18	28	22	12	18	--	--

Splits include yellow and red timing
Coordination: Ø2 + Ø6 End of Green
Inhibit Max

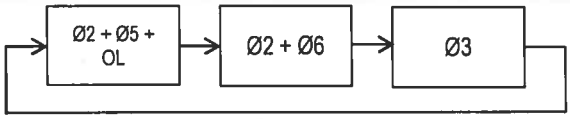


Time Of Day	
111	7 - 9 AM
FREE	9 AM - 3 PM
211	3 - 6:30 PM
FREE	6:30 PM - 7 AM

River Road at I-93NB Ramps

			Phase Splits							
Plan	Cycle Length	Offset	1	2	3	4	5	6	7	8
1/1/1	80	0	--	54	26	--	29	25	--	--
2/1/1	80	0	--	65	15	--	42	23	--	--

Master Controller
Splits include yellow and red timing
Coordination: Ø2 + Ø6 End of Green
Inhibit Max

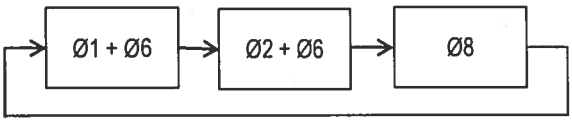


Time Of Day	
111	7 - 9 AM
FREE	9 AM - 3 PM
211	3 - 6:30 PM
FREE	6:30 PM - 7 AM

River Road at I-93 SB Ramps

			Phase Splits							
Plan	Cycle Length	Offset	1	2	3	4	5	6	7	8
1/1/1	80	53	28	24	--	--	--	52	--	28
2/1/1	80	32	20	32	--	--	--	52	--	28

Splits include yellow and red timing
Coordination: Ø2 + Ø6 End of Green
Inhibit Max

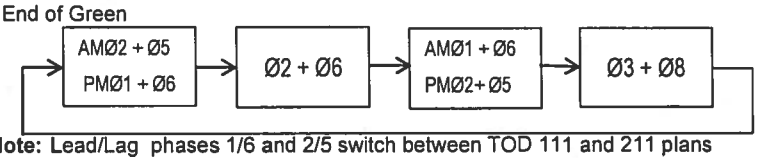


Time Of Day	
111	7 - 9 AM
FREE	9 AM - 3 PM
211	3 - 6:30 PM
FREE	6:30 PM - 7 AM

River Road at Federal Street/Old River Road

			Phase Splits							
Plan	Cycle Length	Offset	1	2	3	4	5	6	7	8
1/1/1	80	9	20	45	15	--	26	39	--	15
2/1/1	80	42	12	47	21	--	12	47	--	21

Splits include yellow and red timing
Coordination: Ø2 + Ø6 End of Green
Inhibit Max



Note: Lead/Lag phases 1/6 and 2/5 switch between TOD 111 and 211 plans
Use AM phase sequence for Free TOD plan

Time Of Day	
111	7 - 9 AM
FREE	9 AM - 3 PM
211	3 - 6:30 PM
FREE	6:30 PM - 7 AM

MASSDOT CRASH DATA

Crash Number	City Town Name	Crash Date	Day	Crash Severity	Crash Status	Crash Time	Crash Year	Driver Contributing Circumstances (All Drivers)	Driver Distracted By (All Vehicles)	First Harmful Event	Light Conditions	Manner of Collision	MassDOT District	Road Surface Condition	Roadway Junction Type
4486441	ANDOVER	01/05/2018	Fri	Property damage only (none injured)	Closed	9:50 AM	2018	D1: (Visibility obstructed) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Slush	T-intersection
4549818	ANDOVER	06/07/2018	Thu	Property damage only (none injured)	Closed	4:53 PM	2018	D1: (Inattention) / D2: (No improper driving),(No improper driving)	D1: Other activity (searching, eating, personal hygiene, etc.) / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	4	Dry	Four-way intersection
4552739	ANDOVER	06/07/2018	Thu	Property damage only (none injured)	Closed	12:24 PM	2018	D1: (Operating vehicle in erratic, reckless, careless, negligent or aggressive manner),(Followed too closely) / D2: (No improper driving) / D3: (No improper driving)	D1: Not Distracted / D2: Not Distracted / D3: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Four-way intersection
4569600	ANDOVER	07/20/2018	Fri	Property damage only (none injured)	Closed	10:32 AM	2018	D1: (No improper driving) / D2: (Followed too closely),(Inattention)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Four-way intersection
4585559	ANDOVER	08/14/2018	Tue	Property damage only (none injured)	Closed	4:11 PM	2018	D1: (No improper driving) / D2: (Followed too closely)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Four-way intersection
4603301	ANDOVER	09/21/2018	Fri	Non-fatal injury	Closed	2:51 PM	2018	D1: (No improper driving) / D2: (No improper driving) / D3: (Inattention)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Not at junction
4661082	ANDOVER	01/30/2019	Wed	Property damage only (none injured)	Closed	5:50 AM	2019	D1: (Driving too fast for conditions) / D2: (No improper driving),(No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dawn	Sideswipe, opposite direction	4	Snow	Not at junction
4663287	ANDOVER	02/06/2019	Wed	Property damage only (none injured)	Closed	7:22 AM	2019	D1: (No improper driving),(No improper driving) / D2: (Glare)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Not at junction
4731884	ANDOVER	07/17/2019	Wed	Property damage only (none injured)	Closed	7:22 PM	2019	D1: (No improper driving) / D2: (No improper driving) / D3: (No improper driving) / D4: (Inattention)	D1: Not Distracted / D2: Not Distracted / D3: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4		Not at junction
4756732	ANDOVER	09/25/2019	Wed	Non-fatal injury	Closed	6:09 PM	2019	D1: (Over-correcting/over-steering)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Single vehicle crash	4	Dry	Four-way intersection
4765119	ANDOVER	10/08/2019	Tue	Property damage only (none injured)	Closed	8:54 PM	2019	D1: (No improper driving)	D1: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Rear-end	4	Dry	Four-way intersection
4765117	ANDOVER	10/20/2019	Sun	Property damage only (none injured)	Closed	12:51 PM	2019	D1: (Inattention) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Four-way intersection
4774440	ANDOVER	11/07/2019	Thu	Non-fatal injury	Closed	6:14 PM	2019	D1: (Failed to yield right of way) / D2: (No improper driving),(No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	4	Wet	Four-way intersection
4809877	ANDOVER	01/13/2020	Mon	Property damage only (none injured)	Closed	7:24 AM	2020	D1: (No improper driving),(No improper driving) / D2: (Inattention),(Inattention)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Four-way intersection
4810412	ANDOVER	01/28/2020	Tue	Property damage only (none injured)	Closed	5:43 PM	2020	D1: (Inattention),(Followed too closely) / D2: (No improper driving),(No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Rear-end	4	Dry	Four-way intersection
4829663	ANDOVER	03/13/2020	Fri	Property damage only (none injured)	Closed	2:22 PM	2020	D1: (Distracted) / D2: (No improper driving)	D1: Other activity (searching, eating, personal hygiene, etc.) / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Wet	Four-way intersection
4851483	ANDOVER	06/09/2020	Tue	Property damage only (none injured)	Closed	1:47 PM	2020	D1: (No improper driving)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	T-intersection
4993781	ANDOVER	06/14/2021	Mon	Property damage only (none injured)	Closed	11:47 AM	2021	D1: (No improper driving) / D2: (Distracted)	D1: Not Distracted / D2: Other activity, electronic device	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Four-way intersection
5024935	ANDOVER	10/04/2021	Mon	Property damage only (none injured)	Closed	8:45 PM	2021	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings),(Failed to yield right of way)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	4	Wet	Four-way intersection
5081580	ANDOVER	03/15/2022	Tue	Property damage only (none injured)	Closed	7:31 AM	2022	D1: (No improper driving) / D2: (Other improper action)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	4	Dry	Not at junction
5084222	ANDOVER	03/17/2022	Thu	Property damage only (none injured)	Closed	5:20 PM	2022	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Dry	Four-way intersection
5099551	ANDOVER	04/29/2022	Fri	Property damage only (none injured)	Closed	7:31 AM	2022	D1: (Failure to keep in proper lane or running off road) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	4	Dry	Four-way intersection
5181129	ANDOVER	07/26/2022	Tue	Unknown	Closed	3:50 PM	2022	D1: (No improper driving)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Not at junction
5175828	ANDOVER	10/28/2022	Fri	Property damage only (none injured)	Closed	10:57 AM	2022	D1: (No improper driving) / D2: (Followed too closely),(Inattention)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	T-intersection
5186309	ANDOVER	12/09/2022	Fri	Property damage only (none injured)	Closed	4:34 PM	2022	D1: (Followed too closely) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Dark - roadway not lighted	Rear-end	4	Dry	Not at junction

Crash Number	Traffic Control Device Type	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway	Near Intersection Roadway	Distance and Direction From Intersection
4486441	Flashing traffic control signal	V1: Turning left / V2: Travelling straight ahead	V1: N / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		
4549818	No controls	V1: Turning right / V2: Turning right	V1: E / V2: E	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		15 feet N of
4552739	Traffic control signal	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: E / V2: E / V3: E	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)	57	RIVER RD		30 feet W of
4569600	Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		
4585559	Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		
4603301	No controls	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Travelling straight ahead	V1: W / V2: W / V3: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)	50	RIVER RD		100 feet E of
4661082	No controls	V1: Turning right / V2: Travelling straight ahead	V1: N / V2: S	Snow/Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	146	NORTH STREET		50 feet S of
4663287	No controls	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		550 feet W of
4731884	No controls	V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic / V4: Slowing or stopped in traffic / V1: Slowing or stopped in traffic	V2: N / V3: N / V4: N / V1: N	Rain	V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic) V4:(Collision with motor vehicle in traffic) V1:(Collision with motor vehicle in traffic)	152	NORTH ST		180 feet S of
4756732	Traffic control signal	V1: Turning left	V1: Not Reported	Clear/Clear	V1:(Collision with motor vehicle in traffic),(Collision with curb)	57	RIVER RD		
4765119	Traffic control signal	V1: Slowing or stopped in traffic	V1: W	Clear	V1:(Collision with motor vehicle in traffic)	57	RIVER RD		
4765117	Traffic control signal	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		
4774440	Traffic control signal	V1: Turning left / V2: Travelling straight ahead	V1: Not Reported / V2: Not Reported	Rain/Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		
4809877	Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		
4810412	Traffic control signal	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: Not Reported / V2: Not Reported	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		
4829663	Traffic control signal	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: S	Clear/Cloudy	V1:(Collision with motor vehicle in traffic),(Collision with other movable object) V2:(Collision with motor vehicle in traffic),(Collision with other movable object)	57	RIVER RD		
4851483	Traffic control signal	V1: Slowing or stopped in traffic	V1: W	Cloudy	V1:(Collision with motor vehicle in traffic)	57	RIVER RD		
4993781	Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	50	RIVER RD		
5024935	Yield signs	V1: Travelling straight ahead / V2: Turning right	V1: S / V2: S	Rain/Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		
5081580	No controls	V1: Travelling straight ahead / V2: Changing lanes	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	62	RIVER RD	NORTH ST	
5084222	Traffic control signal	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: S / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER RD		
5099551	Traffic control signal	V1: Overtaking/passing / V2: Travelling straight ahead	V1: N / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	148	NORTH STREET	NORTH STREET EXTENSION	
5181129	Traffic control signal	V1: Slowing or stopped in traffic	V1: N	Clear	V1:(Collision with motor vehicle in traffic)		NORTH ST / RIVER RD		
5175828	Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: N / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		NORTH ST / RIVER RD		
5186309	No controls	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: W	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	57	RIVER ROAD	NORTH STREET	

Crash Number	City Town Name	Crash Date	Day	Crash Severity	Crash Status	Crash Time	Crash Year	Driver Contributing Circumstances (All Drivers)	Driver Distracted By (All Vehicles)	First Harmful Event	Light Conditions	Manner of Collision	MassDOT District	Road Surface Condition	Roadway Junction Type
4486443	ANDOVER	01/09/2018	Tue	Property damage only (none injured)	Closed	10:04 PM	2018	D1: (Operating vehicle in erratic, reckless, careless, negligent or aggressive manner)	D1: Not Distracted	Other	Dark - lighted roadway	Single vehicle crash	4	Wet	Not at junction
4766006	ANDOVER	10/23/2019	Wed	Property damage only (none injured)	Closed	8:03 PM	2019	D1: (Inattention),(Distracted) / D2: (No improper driving),(No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Dark - roadway not lighted	Rear-end	4	Dry	Four-way intersection
5127266	ANDOVER	07/15/2022	Fri	Property damage only (none injured)	Closed	5:24 PM	2022	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Dry	Four-way intersection
4877845	ANDOVER	09/11/2020	Fri	Non-fatal injury	Closed	4:32 PM	2020	D1: (No improper driving) / D2: (Other improper action)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	On-ramp
4508769	ANDOVER	02/19/2018	Mon	Property damage only (none injured)	Closed	2:32 PM	2018	D1: (Inattention) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Four-way intersection
4734130	ANDOVER	07/27/2019	Sat	Property damage only (none injured)	Closed	12:17 PM	2019	D1: (No improper driving)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Dry	Four-way intersection
5134263	ANDOVER	07/30/2022	Sat	Property damage only (none injured)	Closed	4:58 PM	2022	D1: (Inattention) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Not at junction
4559458	ANDOVER	06/21/2018	Thu	Property damage only (none injured)	Closed	12:19 PM	2018	D1: (No improper driving) / D2: (Made an improper turn)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Dry	Four-way intersection
5132298	ANDOVER	07/26/2022	Tue	Property damage only (none injured)	Closed	4:39 PM	2022	D1: (Inattention) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Dry	Four-way intersection
5051229	ANDOVER	12/29/2021	Wed	Unknown	Closed	3:13 PM	2021	D1: (Failed to yield right of way) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Dry	Four-way intersection
5001741	ANDOVER	08/20/2021	Fri	Property damage only (none injured)	Closed	4:23 PM	2021	D1: (Inattention),(Followed too closely) / D2: (No improper driving),(No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Four-way intersection
4759985	ANDOVER	10/01/2019	Tue	Property damage only (none injured)	Closed	1:35 PM	2019	D1: (Inattention) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Four-way intersection
4623099	ANDOVER	11/09/2018	Fri	Property damage only (none injured)	Closed	7:26 PM	2018	D1: (No improper driving) / D2: (Operating vehicle in erratic, reckless, careless, negligent or aggressive manner),(Followed too closely)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dusk	Rear-end	4	Wet	Four-way intersection

Traffic Control Device Type	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway	Near Intersection Roadway	Distance and Direction From Intersection
No controls	V1: Travelling straight ahead	V1: W	Cloudy	V1:(Collision with motor vehicle in traffic),(Other)	75	RIVER RD		10 feet W of
Traffic control signal	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Clear/Cloudy	V1:(Collision with motor vehicle in traffic),(Collision with other movable object) V2:(Collision with motor vehicle in traffic)	74	RIVER RD		15 feet W of
Traffic control signal	V1: Travelling straight ahead / V2: Turning left	V1: E / V2: W	Clear	V1:(Collision with motor vehicle in traffic),(Cross median or centerline),(Ran off road left),(Collision with other fixed object(wall, building, tunnel, etc.)) V2:(Collision with motor vehicle in traffic)		FEDERAL STREET / RIVER ROAD		
Yield signs	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	74	RIVER RD		
Traffic control signal	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	74	RIVER RD		
Traffic control signal	V1: Travelling straight ahead	V1: W	Clear	V1:(Collision with motor vehicle in traffic)	74	RIVER RD		
No controls	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RIVER ROAD	OLD RIVER ROAD	
Traffic control signal	V1: Travelling straight ahead / V2: Turning right	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	74	RIVER RD		
Traffic control signal	V1: Backing / V2: Slowing or stopped in traffic	V1: S / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		FEDERAL ST / RIVER RD		
Traffic control signal	V1: Turning left / V2: Turning left	V1: E / V2: W	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		FEDERAL ST / OLD RIVER RD		
Traffic control signal	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Clear/Cloudy	V1:(Collision with motor vehicle in traffic),(Collision with other movable object) V2:(Collision with motor vehicle in traffic)		RIVER RD / OLD RIVER ROAD Rte 1		
Traffic control signal	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: W / V2: W	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	75	RIVER RD		
Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Cloudy/Rain	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	81	RIVER RD		20 feet E of

Crash Number	City Town Name	Crash Date	Day	Crash Severity	Crash Status	Crash Time	Crash Year	Driver Contributing Circumstances (All Drivers)	Driver Distracted By (All Vehicles)	First Harmful Event	Light Conditions	Manner of Collision	MassDOT District	Road Surface Condition	Roadway Junction Type
4566992	ANDOVER	04/13/2018	Fri	Property damage only (none injured)	Closed	12:40 AM	2018			Collision with guardrail	Dark - lighted roadway	Angle	4	Wet	On-ramp
4526845	ANDOVER	04/13/2018	Fri	Property damage only (none injured)	Closed	4:30 PM	2018	D1: (No improper driving),(No improper driving) / D2: (Inattention),(Inattention)	D1: Not Distracted / D2: Other activity (searching, eating, personal hygiene, etc.)	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Off-ramp
4557254	ANDOVER	06/15/2018	Fri	Non-fatal injury	Closed	2:28 PM	2018	D1: (No improper driving) / D2: (Followed too closely)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	T-intersection
4606703	ANDOVER	09/28/2018	Fri	Non-fatal injury	Closed	9:06 AM	2018	D1: (No improper driving) / D2: (Followed too closely)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Wet	On-ramp
4612724	ANDOVER	10/18/2018	Thu	Property damage only (none injured)	Closed	5:51 PM	2018	D1: (No improper driving)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	On-ramp
4620178	ANDOVER	10/29/2018	Mon	Property damage only (none injured)	Closed	7:55 AM	2018	D1: (No improper driving) / D2: (Followed too closely),(Inattention)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dawn	Rear-end	4	Wet	Off-ramp
4626794	ANDOVER	11/15/2018	Thu	Property damage only (none injured)	Closed	7:06 AM	2018	D1: (No improper driving) / D2: (Inattention),(Fatigued/asleep)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dawn	Rear-end	4	Dry	T-intersection
4637107	ANDOVER	12/07/2018	Fri	Property damage only (none injured)	Closed	5:55 PM	2018	D1: (Followed too closely) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Rear-end	4	Dry	Not at junction
4637105	ANDOVER	12/07/2018	Fri	Property damage only (none injured)	Closed	7:18 AM	2018	D1: (No improper driving),(No improper driving) / D2: (Other improper action),(Other improper action)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	On-ramp
4641010	ANDOVER	12/20/2018	Thu	Non-fatal injury	Closed	6:24 PM	2018	D1: (No improper driving) / D2: (Unknown)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	4	Dry	T-intersection
4670529	ANDOVER	02/16/2019	Sat	Property damage only (none injured)	Closed	8:40 AM	2019	D1: (Failed to yield right of way) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	4	Dry	On-ramp
4757689	ANDOVER	10/02/2019	Wed	Not Reported	Closed	12:10 PM	2019	D1: (Exceeded authorized speed limit)		Collision with curb	Daylight	Single vehicle crash	4	Dry	On-ramp
4794913	ANDOVER	12/23/2019	Mon	Property damage only (none injured)	Closed	10:50 AM	2019	D1: (No improper driving) / D2: (Inattention)	D1: Not Distracted / D2: External distraction (outside the vehicle)	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	On-ramp
5021811	ANDOVER	10/08/2021	Fri	Property damage only (none injured)	Closed	4:17 PM	2021	D1: (No improper driving) / D2: (Failed to yield right of way)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	4	Dry	On-ramp
5206254	ANDOVER	12/23/2022	Fri	Property damage only (none injured)	Closed	5:20 PM	2022	D1: (Made an improper turn) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Dark - roadway not lighted	Sideswipe, same direction	4	Wet	On-ramp

Traffic Control Device Type	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway	Near Intersection Roadway	Distance and Direction From Intersection
No controls	V1: Entering traffic lane	V1: N	Rain	V1:(Collision with guardrail)		RAMP-RIVER RD TO RT 93 NB		
Traffic control signal	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: S / V2: S	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RIVER ROAD / RAMP-RT 93 NB TO RIVER RD Rte N		
Traffic control signal	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RIVER ROAD / RAMP-RIVER RD TO RT 93 NB Rte		
Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Rain	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RIVER ROAD / RAMP-RIVER RD TO RT 93 NB Rte		
Yield signs	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: N / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RIVER RD TO RT 93 NB Rte N / RIVER ROAD		
Yield signs	V1: Slowing or stopped in traffic / V2: Turning right	V1: S / V2: S	Rain/Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RT 93 NB TO RIVER RD / RIVER ROAD Rte		
Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: S / V2: S	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RIVER ROAD / RAMP-RT 93 NB TO RIVER RD Rte		
Traffic control signal	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	90	RIVER RD		500 feet W of
Traffic control signal	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RIVER ROAD / RAMP-RIVER RD TO RT 93 NB Rte		
Traffic control signal	V1: Travelling straight ahead / V2: Turning left	V1: W / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RIVER ROAD / RAMP- RIVER RD TO RT 93 NB Rte		
Warning signs	V1: Changing lanes / V2: Travelling straight ahead	V1: N / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RIVER RD TO RT 93 NB	INTERSTATE 93	
No controls	V1: Other	V1: N	Cloudy	V1:(Ran off road left),(Collision with curb)		RAMP-RIVER RD TO RT 93 NB	RIVER ROAD	
Yield signs	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RIVER RD TO RT 93 NB	RIVER ROAD	250 feet N of
No controls	V1: Travelling straight ahead / V2: Entering traffic lane	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RIVER RD TO RT 93 NB	RIVER ROAD	
Traffic control signal	V2: Turning left / V1: Turning left	V2: N / V1: N	Rain/Severe crosswinds	V2:(Collision with motor vehicle in traffic) V1:(Collision with motor vehicle in traffic)		RAMP-RIVER RD TO RT 93 NB		

Crash Number	City Town Name	Crash Date	Day	Crash Severity	Crash Status	Crash Time	Crash Year	Driver Contributing Circumstances (All Drivers)	Driver Distracted By (All Vehicles)	First Harmful Event	Light Conditions	Manner of Collision	MassDOT District	Road Surface Condition	Roadway Junction Type	Traffic Control Device Type
4497649	ANDOVER	02/05/2018	Mon	Property damage only (none injured)	Closed	7:55 AM	2018	D1: (Inattention) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Off-ramp	Yield signs
4508771	ANDOVER	02/23/2018	Fri	Non-fatal injury	Closed	3:51 PM	2018	D1: (No improper driving) / D2: (Other improper action)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	T-intersection	Traffic control signal
4536892	ANDOVER	05/10/2018	Thu	Property damage only (none injured)	Closed	4:24 PM	2018	D1: (No improper driving) / D2: (Followed too closely)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Off-ramp	Yield signs
4573556	ANDOVER	07/16/2018	Mon	Property damage only (none injured)	Closed	5:12 PM	2018	D1: (No improper driving) / D2: (Followed too closely),(Other improper action)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Off-ramp	Yield signs
4598782	ANDOVER	09/13/2018	Thu	Property damage only (none injured)	Closed	1:00 PM	2018	D1: (No improper driving) / D2: (Inattention)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Off-ramp	Yield signs
4606707	ANDOVER	10/01/2018	Mon	Property damage only (none injured)	Closed	4:42 PM	2018	D1: (No improper driving) / D2: (No improper driving) / D3: (Followed too closely)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Wet	Off-ramp	Traffic control signal
4607966	ANDOVER	10/04/2018	Thu	Non-fatal injury	Closed	4:09 PM	2018	D1: (Other improper action) / D2: (No improper driving) / D3: (No improper driving)	D1: Not Distracted / D2: Not Distracted / D3: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Not at junction	No controls
4610420	ANDOVER	10/12/2018	Fri	Property damage only (none injured)	Closed	4:03 PM	2018	D1: (No improper driving) / D2: (Followed too closely)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Wet	T-intersection	Traffic control signal
4612723	ANDOVER	10/18/2018	Thu	Property damage only (none injured)	Closed	5:49 PM	2018	D1: (Followed too closely) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Off-ramp	Yield signs
4614722	ANDOVER	10/24/2018	Wed	Property damage only (none injured)	Closed	1:16 AM	2018	D1: (Unknown)		Collision with motor vehicle in traffic	Dark - lighted roadway	Single vehicle crash	4	Wet	T-intersection	Traffic control signal
4617915	ANDOVER	11/03/2018	Sat	Property damage only (none injured)	Closed	9:20 AM	2018	D1: (Distracted) / D2: (No improper driving)	D1: Other activity (searching, eating, personal hygiene, etc.) / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Sideswipe, opposite direction	4	Wet	On-ramp	No controls
4626802	ANDOVER	11/19/2018	Mon	Property damage only (none injured)	Closed	5:05 PM	2018	D1: (No improper driving) / D2: (Inattention)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dark - roadway not lighted	Rear-end	4	Wet	On-ramp	Yield signs
4634607	ANDOVER	12/08/2018	Sat	Property damage only (none injured)	Closed	9:49 PM	2018	D1: (No improper driving) / D2: (Operating vehicle in erratic, reckless, careless, negligent or aggressive manner),(Disregarded traffic signs, signals, road markings)	D1: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Head-on	4	Dry	T-intersection	No controls
4654623	ANDOVER	01/21/2019	Mon	Property damage only (none injured)	Closed	3:21 PM	2019	D1: (Unknown) / D2: (Unknown)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	4	Slush	Off-ramp	Traffic control signal
4678251	ANDOVER	03/14/2019	Thu	Property damage only (none injured)	Closed	4:39 PM	2019	D1: (No improper driving),(No improper driving) / D2: (Followed too closely),(Followed too closely)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Not at junction	No controls
4687561	ANDOVER	04/05/2019	Fri	Non-fatal injury	Closed	4:45 PM	2019	D1: (No improper driving) / D2: (Followed too closely)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Off-ramp	Yield signs
4733147	ANDOVER	07/25/2019	Thu	Property damage only (none injured)	Closed	7:27 AM	2019	D1: (Other improper action) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4		Off-ramp	Yield signs
4748716	ANDOVER	09/05/2019	Thu	Property damage only (none injured)	Closed	6:39 PM	2019	D1: (No improper driving),(No improper driving) / D2: (Inattention),(Failed to yield right of way)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Dry	Not at junction	No controls
4761828	ANDOVER	10/15/2019	Tue	Property damage only (none injured)	Closed	9:30 PM	2019	D1: (No improper driving)	D1: Not Distracted	Collision with animal - deer	Dark - roadway not lighted	Single vehicle crash	4	Dry	On-ramp	No controls
4776847	ANDOVER	11/15/2019	Fri	Non-fatal injury	Closed	3:07 PM	2019	D1: (No improper driving) / D2: (Distracted),(Inattention)	D1: Not Distracted / D2: Other activity, electronic device	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Not at junction	Traffic control signal
4845546	ANDOVER	05/20/2020	Wed	Non-fatal injury	Closed	5:49 AM	2020	D1: (Other improper action) / D2: (Unknown)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	4	Dry	T-intersection	Traffic control signal
4861604	ANDOVER	07/09/2020	Thu	Property damage only (none injured)	Closed	12:55 PM	2020	D1: (Inattention) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Dry	T-intersection	Stop signs
4864562	ANDOVER	07/17/2020	Fri	Non-fatal injury	Closed	8:08 AM	2020	D1: (History heart/epilepsy/fainting) / D2: (No improper driving) / D3: (No improper driving)	D1: Not Distracted / D2: Not Distracted / D3: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Off-ramp	Traffic control signal
4917762	ANDOVER	12/28/2020	Mon	Property damage only (none injured)	Closed	7:36 PM	2020	D1: (No improper driving)	D1: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Rear-end	4	Dry	On-ramp	Traffic control signal
4923528	ANDOVER	01/19/2021	Tue	Property damage only (none injured)	Closed	3:56 PM	2021	D1: (Other improper action),(Inattention) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	4	Dry	On-ramp	No controls
4962491	ANDOVER	05/06/2021	Thu	Property damage only (none injured)	Closed	3:20 PM	2021	D1: (No improper driving) / D2: (Unknown)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Off-ramp	Traffic control signal
4993766	ANDOVER	05/21/2021	Fri	Property damage only (none injured)	Closed	8:59 PM	2021	D1: (No improper driving) / D2: (Inattention)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Rear-end	4	Dry	Off-ramp	Yield signs
4993680	ANDOVER	06/01/2021	Tue	Property damage only (none injured)	Closed	7:32 AM	2021	D1: (Inattention),(Followed too closely) / D2: (No improper driving),(No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	T-intersection	Yield signs
4993777	ANDOVER	06/08/2021	Tue	Property damage only (none injured)	Closed	9:47 PM	2021	D1: (Inattention),(Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Dark - roadway not lighted	Angle	4	Dry	On-ramp	Traffic control signal
5017213	ANDOVER	09/30/2021	Thu	Property damage only (none injured)	Closed	8:28 AM	2021	D1: (Inattention) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Not at junction	No controls
5032539	ANDOVER	10/26/2021	Tue	Property damage only (none injured)	Closed	9:40 AM	2021	D1: (No improper driving)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Wet	T-intersection	Traffic control signal
5032721	ANDOVER	11/16/2021	Tue	Non-fatal injury	Closed	12:22 PM	2021	D1: (Other improper action)		Collision with utility pole	Daylight	Single vehicle crash	4	Dry	Not at junction	No controls
5134255	ANDOVER	12/07/2021	Tue	Property damage only (none injured)	Closed	11:22 AM	2021	D1: (Followed too closely) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Off-ramp	Yield signs
5065953	ANDOVER	01/31/2022	Mon	Non-fatal injury	Closed	7:50 AM	2022	D1: (Failed to yield right of way) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Slush	T-intersection	No controls
5079533	ANDOVER	03/09/2022	Wed	Property damage only (none injured)	Closed	4:19 PM	2022	D1: (Failed to yield right of way) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Snow	T-intersection	No controls
5129649	ANDOVER	07/21/2022	Thu	Property damage only (none injured)	Closed	4:38 PM	2022	D1: (Followed too closely) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry	Not at junction	No controls
5175965	ANDOVER	09/25/2022	Sun	Property damage only (none injured)	Closed	3:09 PM	2022	D1: (No improper driving)	D1: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Wet	T-intersection	Traffic control signal

Crash Number	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway	Near Intersection Roadway	Distance and Direction From Intersection	Landmark	Distance and Direction From Landmark
4497649	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: W / V2: W	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RT 93 SB TO RIVER RD	RIVER ROAD		RT 93 SB EXIT 45 OFF RAMP	
4508771	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	145	RIVER RD	Rte 93	50 feet W of		
4536892	V1: Entering traffic lane / V2: Entering traffic lane	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	145	RIVER RD				
4573556	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	110	RIVER RD				
4598782	V1: Entering traffic lane / V2: Entering traffic lane	V1: S / V2: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RT 93 SB TO RIVER RD				
4606707	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Travelling straight ahead	V1: E / V2: E / V3: E	Cloudy/Rain	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)		RIVER ROAD / RAMP-RIVER RD TO RT 93 SB Rte				
4607966	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: E / V2: E / V3: E	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)	123	RIVER RD		100 feet W of		
4610420	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RIVER ROAD / RAMP-RIVER RD TO RT 93 SB Rte				
4612723	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RT 93 SB TO RIVER RD Rte E / RIVER ROAD				
4614722	V1: Turning left	V1: W	Cloudy	V1:(Collision with motor vehicle in traffic),(Collision with curb)	145	RIVER RD		510 feet W of		
4617915	V1: Turning right / V2: Turning right	V1: S / V2: S	Cloudy/Rain	V1:(Ran off road left),(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RIVER RD TO RT 93 SB				
4626802	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: S / V2: S	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RIVER RD TO RT 93 SB Rte S / RIVER ROAD				
4634607	V1: Turning left / V2: Travelling straight ahead	V1: E / V2: W	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	100	RIVER RD				
4654623	V1: Unknown / V2: Slowing or stopped in traffic	V1: S / V2: S	Snow	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RT 93 SB TO RIVER RD	RIVER ROAD			
4678251	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	145	RIVER RD	Rte 93 N	300 feet W of		
4687561	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: S / V2: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RT 93 SB TO RIVER RD	RIVER ROAD			
4733147	V1: Turning right / V2: Slowing or stopped in traffic	V1: N / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RT 93 SB TO RIVER RD	RIVER ROAD			
4748716	V1: Travelling straight ahead / V2: Turning left	V1: E / V2: E	Clear/Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic),(Collision with other movable object)	139	RIVER RD		250 feet E of		
4761828	V1: Travelling straight ahead	V1: S	Clear	V1:(Collision with animal - deer)		RAMP-RIVER RD TO RT 93 SB	RIVER ROAD			
4776847	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	145	RIVER RD				200 feet E of
4845546	V1: Turning left / V2: Turning left	V1: S / V2: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RIVER RD TO RT 93 SB / RIVER ROAD				
4861604	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	145	RIVER RD				
4864562	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: N / V2: N / V3: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)		RAMP-RT 93 SB TO RIVER RD	RIVER ROAD	50 feet S of		
4917762	V1: Travelling straight ahead	V1: W	Clear	V1:(Collision with motor vehicle in traffic)	100	RIVER RD				
4923528	V1: Changing lanes / V2: Travelling straight ahead	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	145	RIVER RD		200 feet E of		
4962491	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	139	RIVER RD				
4993766	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RT 93 SB TO RIVER RD	RIVER ROAD			
4993680	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: Not Reported / V2: Not Reported	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	145	RIVER RD				
4993777	V1: Travelling straight ahead / V2: Turning left	V1: W / V2: E	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	125	RIVER RD				
5017213	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	139	RIVER ROAD		801 feet E of		
5032539	V1: Travelling straight ahead	V1: E	Rain	V1:(Collision with motor vehicle in traffic)	100	RIVER RD				
5032721	V1: Travelling straight ahead	V1: W	Clear/Clear	V1:(Collision with utility pole),(Collision with ditch)	139	RIVER RD				
5134255	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP 45	RIVER ROAD			
5065953	V1: Turning left / V2: Travelling straight ahead	V1: S / V2: W	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		RAMP-RT 93 SB TO RIVER RD	RIVER ROAD			
5079533	V1: Entering traffic lane / V2: Travelling straight ahead	V1: S / V2: W	Cloudy/Snow	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	139	RIVER RD	495 SOUTH ON RAMP		495 SOUTH ON RAMP	
5129649	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	100	RIVER RD Rte 93S	93S Rte 93S E		93S	
5175965	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Rain/Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	110	RIVER ROAD	139 RIVER RD		139 RIVER RD	

Crash Number	City Town Name	Crash Date	Day	Crash Severity	Crash Status	Crash Time	Crash Year	Driver Contributing Circumstances (All Drivers)	Driver Distracted By (All Vehicles)	First Harmful Event	Light Conditions	Manner of Collision	MassDOT District	Road Surface Condition
4578198	ANDOVER	07/27/2018	Fri	Property damage only (none injured)	Closed	4:23 PM	2018	D1: (Inattention)		Collision with other movable object	Daylight	Single vehicle crash	4	Dry
4899449	ANDOVER	11/14/2020	Sat	Property damage only (none injured)	Closed	2:14 PM	2020	D1: (Distracted) / D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	4	Dry
4993681	ANDOVER	06/01/2021	Tue	Property damage only (none injured)	Closed	4:03 PM	2021	D1: (Unknown) / D2: (Unknown)		Collision with motor vehicle in traffic	Daylight	Angle	4	Dry
5032982	ANDOVER	11/08/2021	Mon	Property damage only (none injured)	Closed	1:33 PM	2021	D1: (No improper driving) / D2: (Followed too closely),(Inattention)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry
5117107	ANDOVER	06/16/2022	Thu	Property damage only (none injured)	Closed	3:58 PM	2022	D1: (No improper driving) / D2: (Followed too closely),(Inattention)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	4	Dry
5186651	ANDOVER	12/09/2022	Fri	Property damage only (none injured)	Closed	9:20 PM	2022	D1: (No improper driving) / D2: (Failed to yield right of way)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	4	Dry

Crash Number	Roadway Junction Type	Traffic Control Device Type	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway
4578198	Y-intersection	Stop signs	V1: Turning right	V1: E	Clear	V1:(Collision with motor vehicle in traffic),(Collision with other movable object)	159	RIVER RD
4899449	Four-way intersection	Traffic control signal	V1: Travelling straight ahead / V2: Turning left	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	159	RIVER RD
4993681	Not reported	Traffic control signal	V1: Turning left / V2: Turning left	V1: S / V2: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		SHATTUCK RD / RIVER ROAD
5032982	Four-way intersection	Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: N / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	159	RIVER ROAD
5117107	T-intersection	Traffic control signal	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: N / V2: N	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		SHATTUCK ROAD / RIVER ROAD
5186651	Four-way intersection	Traffic control signal	V1: Travelling straight ahead / V2: Turning left	V1: E / V2: W	Clear/Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		SHATTUCK RD / RIVER RD

MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAP

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : 10/15/2025

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

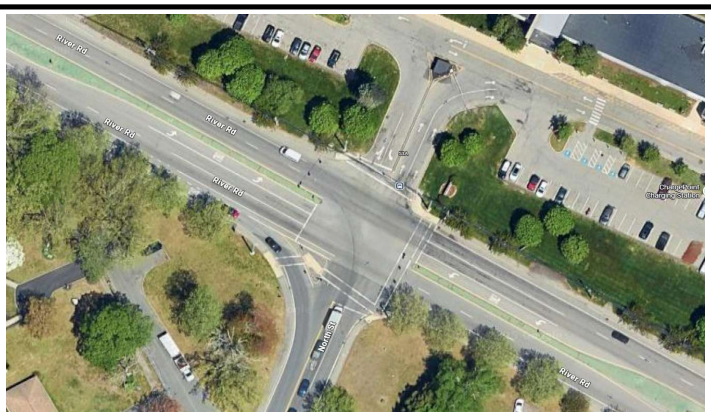
MAJOR STREET : River Road

MINOR STREET(S) : North Street

Greater Lawrence Tech Driveway

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 (PM) :	755	751	230	44		**1,780**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **19,778**

TOTAL # OF CRASHES : 25

OF YEARS : 5

AVERAGE # OF CRASHES PER YEAR (**A**) : **5.00**

CRASH RATE CALCULATION : **0.69**

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

Comments : Below MassDOT Statewide and Distrct Average Crash Rates (0.78/0.73)

Project Title & Date: Propopsed Multifamily Residential Development - 10397

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : 10/15/2025

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : River Road

MINOR STREET(S) : Old River Road

Federal 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 (PM) :	813	857	343	389		**2,402**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **26,689**

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

CRASH RATE CALCULATION : **0.27** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below MassDOT Statewide and Distrct Average Crash Rates (0.78/0.73)

Project Title & Date: Propopsed Multifamily Residential Development - 10397

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : 10/15/2025

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : River Road

MINOR STREET(S) : I-93 Northbound Ramps

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 (PM) :	1,222	1,400		250		**2,872**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **31,911**

TOTAL # OF CRASHES : 15

OF YEARS : 5

AVERAGE # OF CRASHES PER YEAR (**A**) : **3.00**

CRASH RATE CALCULATION : **0.26**

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

Comments : Below MassDOT Statewide and Distrct Average Crash Rates (0.78/0.73)

Project Title & Date: Propopsed Multifamily Residential Development - 10397

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : 10/15/2025

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : River Road

MINOR STREET(S) : I-93 Southbound Ramps

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 (PM) :	1,106	794	764			**2,664**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **29,600**

TOTAL # OF CRASHES : 37 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **7.40**

CRASH RATE CALCULATION : **0.68** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below MassDOT Statewide and Distrct Average Crash Rates (0.78/0.73)

Project Title & Date: Propopsed Multifamily Residential Development - 10397

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover COUNT DATE : 10/15/2025

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

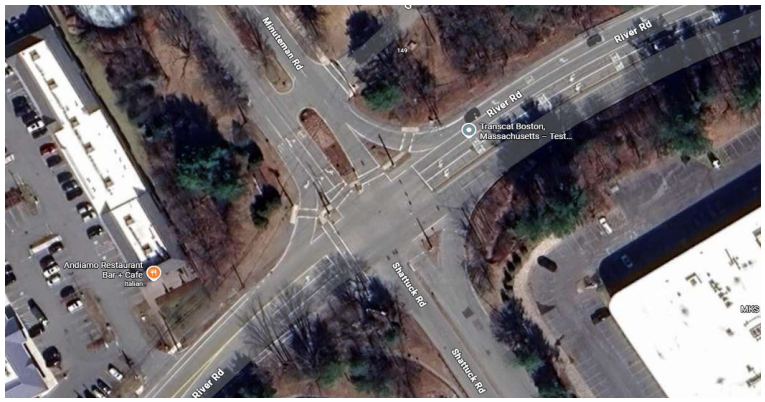
MAJOR STREET : River Road

MINOR STREET(S) : Shattuck Road

Minuteman Road

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 (PM) :	457	458	640	162		1,717

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **19,078**

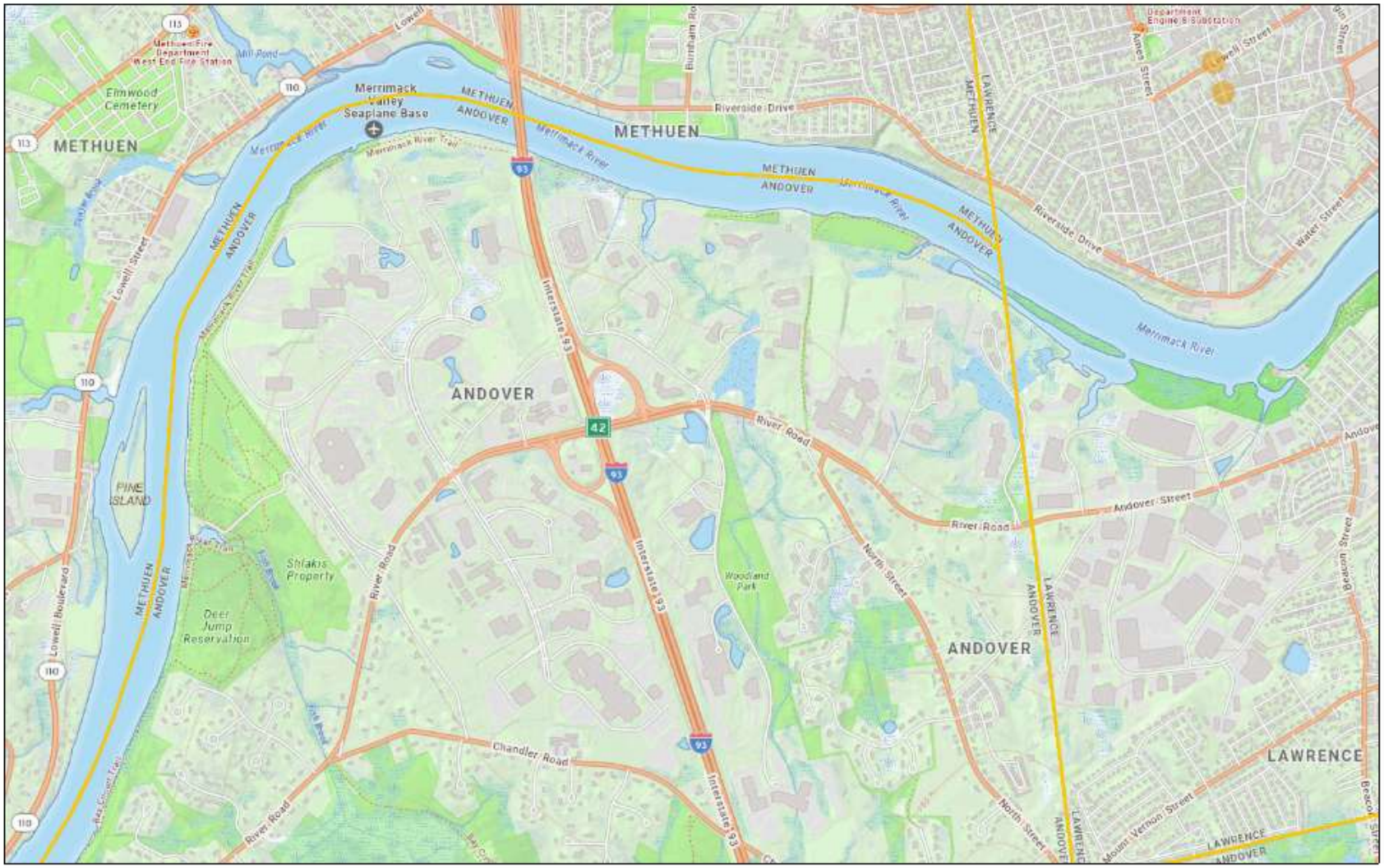
TOTAL # OF CRASHES : 6 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **1.20**

CRASH RATE CALCULATION : **0.17** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below MassDOT Statewide and Distrct Average Crash Rates (0.78/0.73)

Project Title & Date: Propopsed Multifamily Residential Development - 10397

MassDOT HSIP Map



August 12, 2025

1:26,332

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

MassGIS

GENERAL BACKGROUND TRAFFIC GROWTH

General Background Traffic Growth - Daily Traffic Volumes

CITY/TOWN	ROUTE/STREET	LOCATION	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Annual Growth Rate
Dracut	Broadway	at the Methuen Town Line							11,937	12,677	12,893	12,932	12,880	**1.78%**
Andover	River Road	West of Shattuck Road						6,600	6,752	7,171	7,293	7,315	7,286	**2.16%**
Methuen	Interstate 93	North of Route 110/113	119,732	114,628	117,713	115,082	111,501	111,072	116,586	118,710	116,829	115,369	116,638	**-0.05%**
Andover	Interstate 93	North of Interstate 495		123,320			122,302	122,026	147,095	131,150	130,905	127,682	129,087	**0.77%**
Andover	Interstate 93	South of Methuen Town Line	123,633	124,488		123,295	121,630	123,614	126,235	129,908	130,817	132,947	134,409	**1.03%**
														1.14%

BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS

MEMORANDUM

TO: Mr. Charles Scott Doty
Managing Principal
John G. Crowe Associates, Inc.
One Hardy Road, No. 214
Bedford, New Hampshire 03110

FROM: Mr. Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066
(978) 269-6830
jdirk@rdva.com
Professional Engineer in CT, MA, ME, NH, RI and VA

DATE: July 29, 2021

RE: 8853

SUBJECT: Transportation Impact Assessment
Proposed Medical/Pharmaceutical Manufacturing Facility – 300 Minuteman Road
Andover, Massachusetts

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a medical/pharmaceutical manufacturing facility to be located at 300 Minuteman Road in Andover, Massachusetts (hereafter referred to as the "Project"). The Project will replace a larger (and more impactful) office building that was to be constructed on the Project site as a part of the Minuteman Office Park, which included substantial improvements to the transportation infrastructure along River Road and at the I-93 ramps that have been constructed.

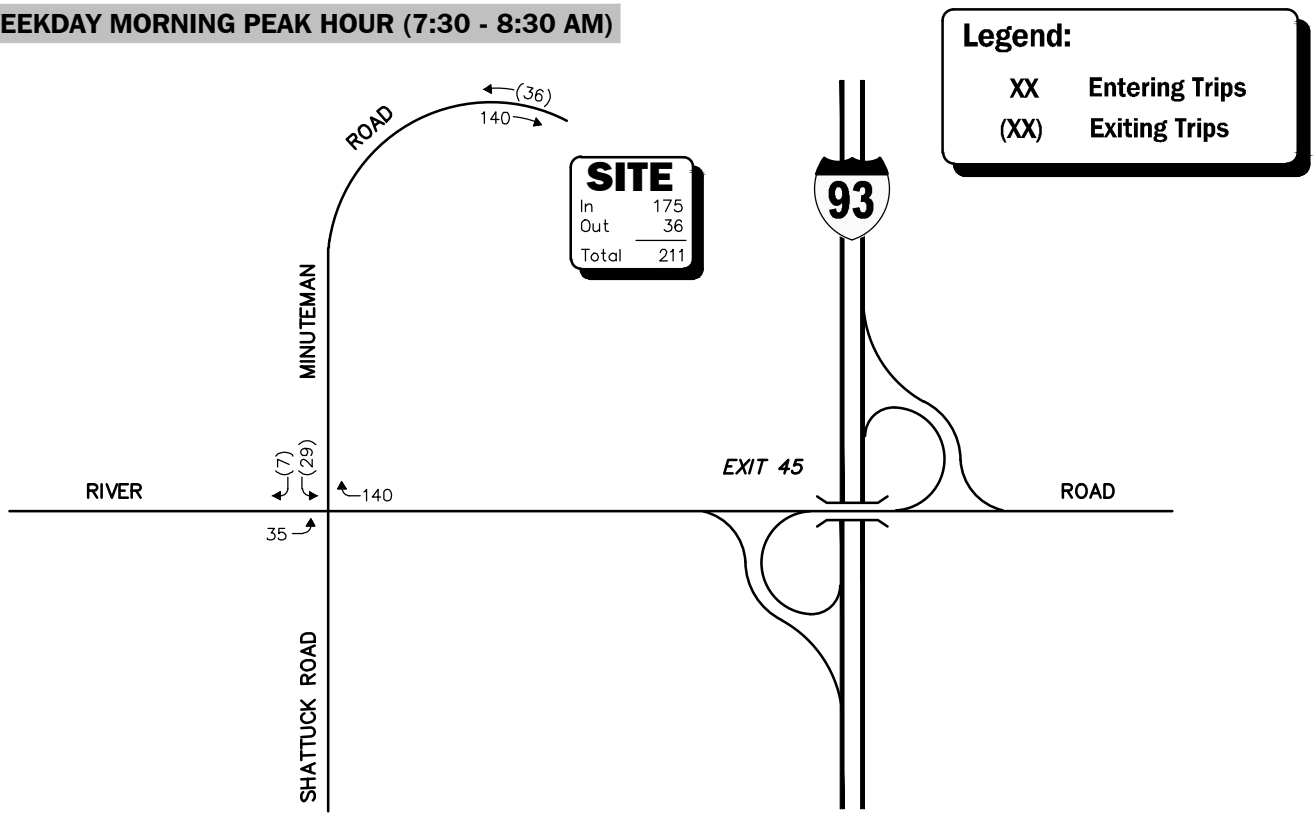
This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing traffic conditions and future traffic conditions, both with and without the Project, along River Road and Minuteman Road, and at the intersection of River Road at Minuteman Road and Shattuck Road. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE)[1], the Project is expected to generate approximately 2,502 vehicle trips on an average weekday (two-way, 24-hour volume), with 211 vehicle trips expected during the weekday morning peak-hour and 246 vehicle trips expected during the Saturday midday peak-hour;

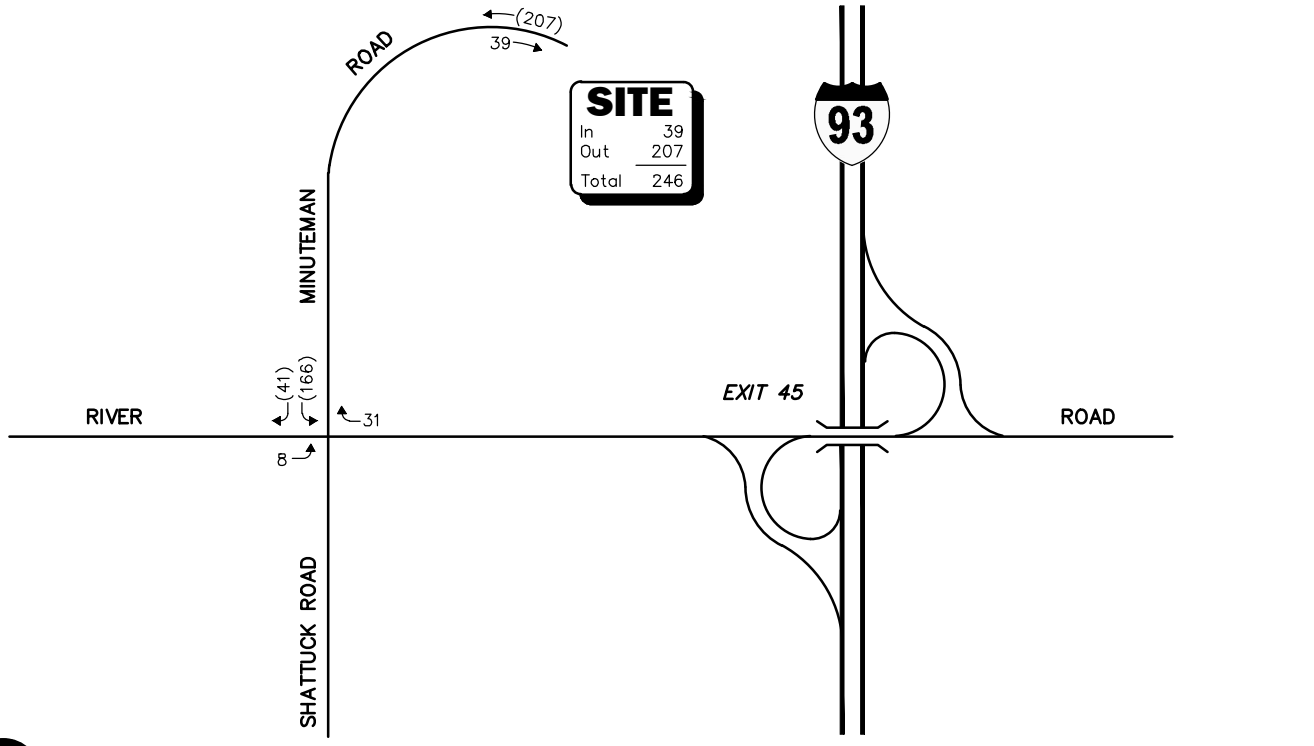
2. In comparison the office use that was approved for the Project site, the Project is expected to generate approximately 778 fewer vehicle trips on an average weekday, with 116 fewer vehicle trips expected during the weekday morning peak-hour and 98 fewer vehicle trips expected during the weekday evening peak-hour;

[1] *Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.

WEEKDAY MORNING PEAK HOUR (7:30 - 8:30 AM)



WEEKDAY EVENING PEAK HOUR (4:30 - 5:30 PM)



Not To Scale

Figure 6

Project-Generated Peak-Hour Traffic Volumes

Vanasse & Associates inc

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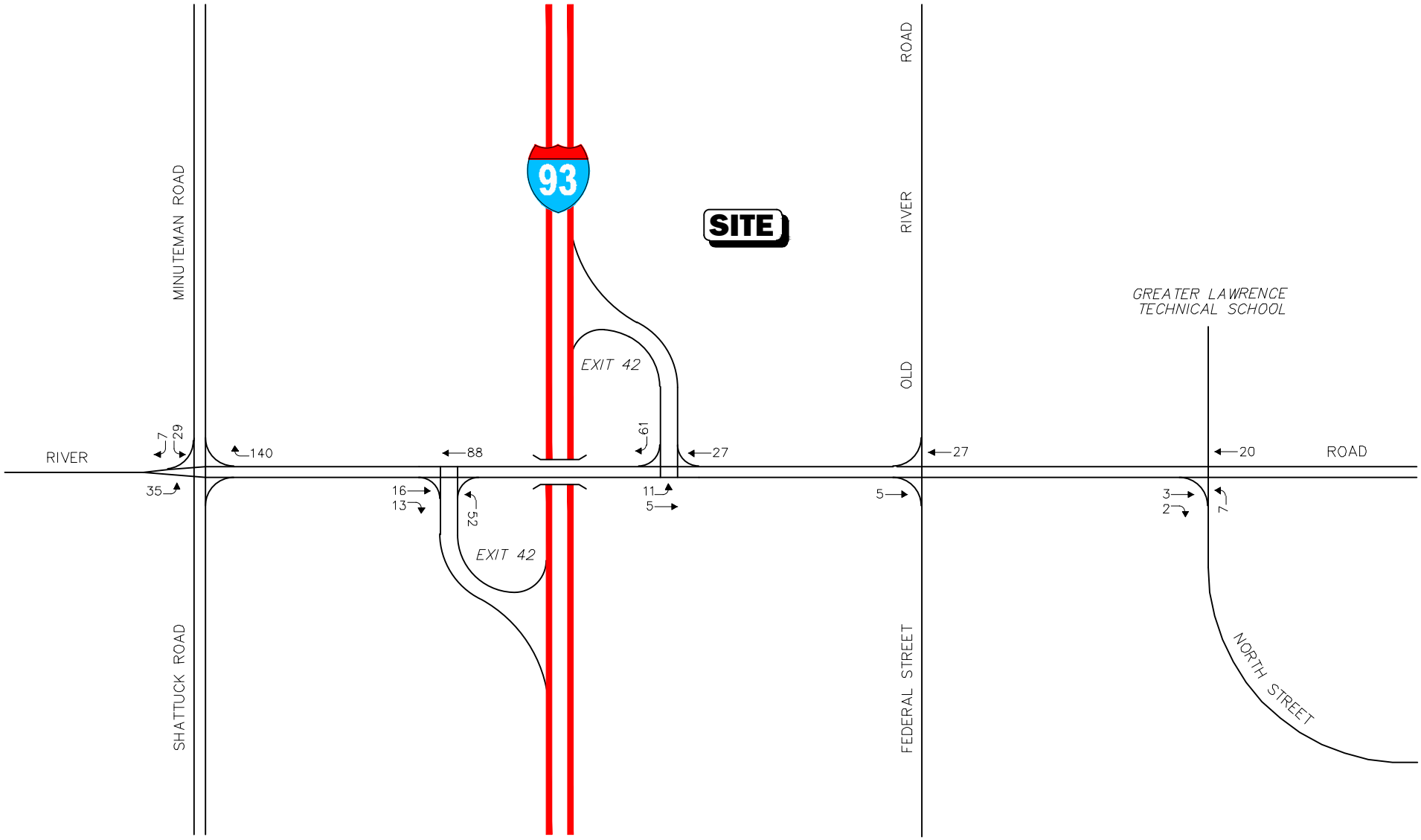

Not to Scale

Figure A-1

Proposed Medical/cGMP Facility
300 Minuteman Road
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc

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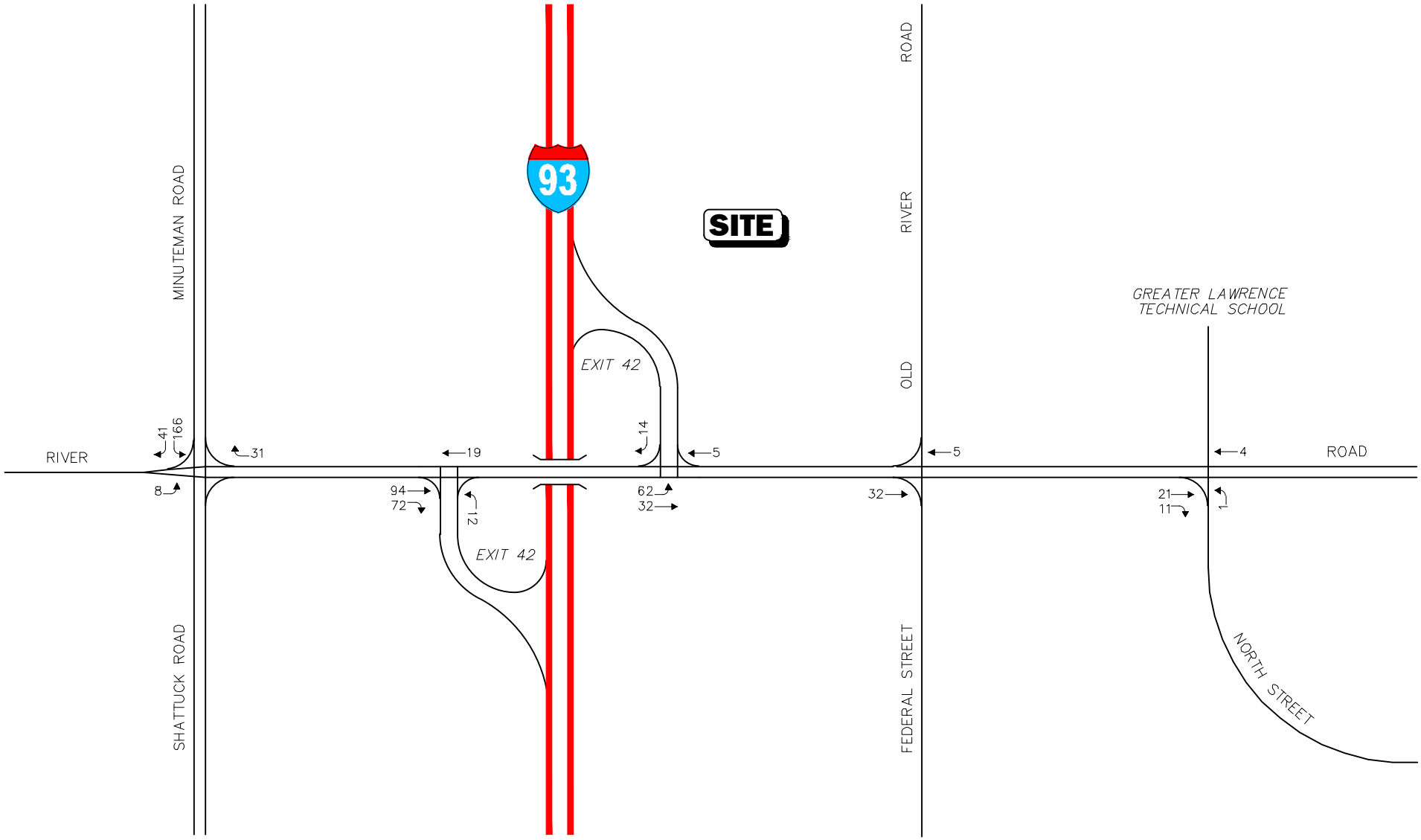

Not to Scale

Figure A-2

Proposed Medical/cGMP Facility
300 Minuteman Road
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

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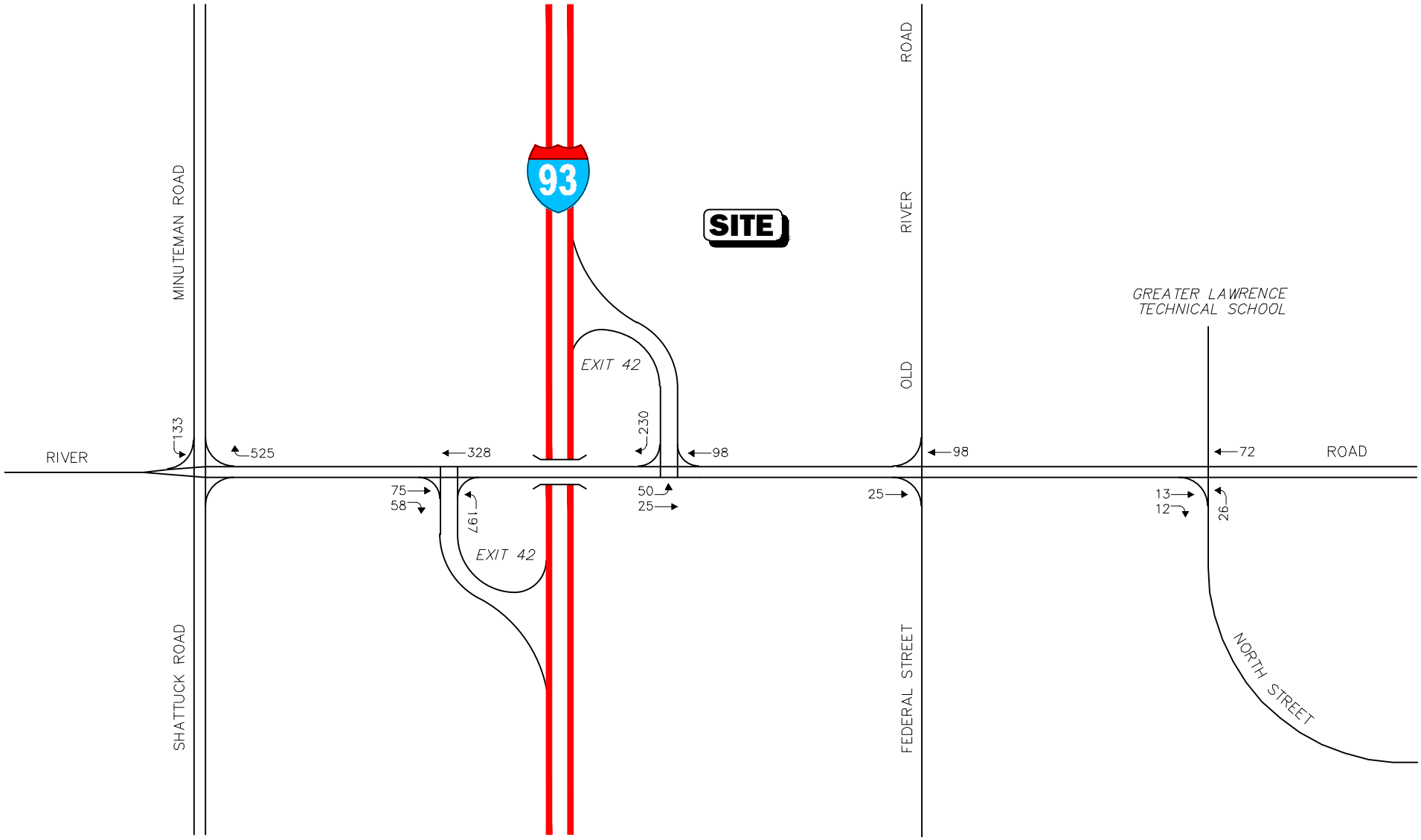

Not to Scale

Figure A-3

Phillips Healthcare Campus
Redevelopment
3000 Minuteman Road
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc

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Transportation Impact Assessment

Philips Healthcare Campus Redevelopment
3000 Minuteman Road
Andover, Massachusetts

Prepared for:

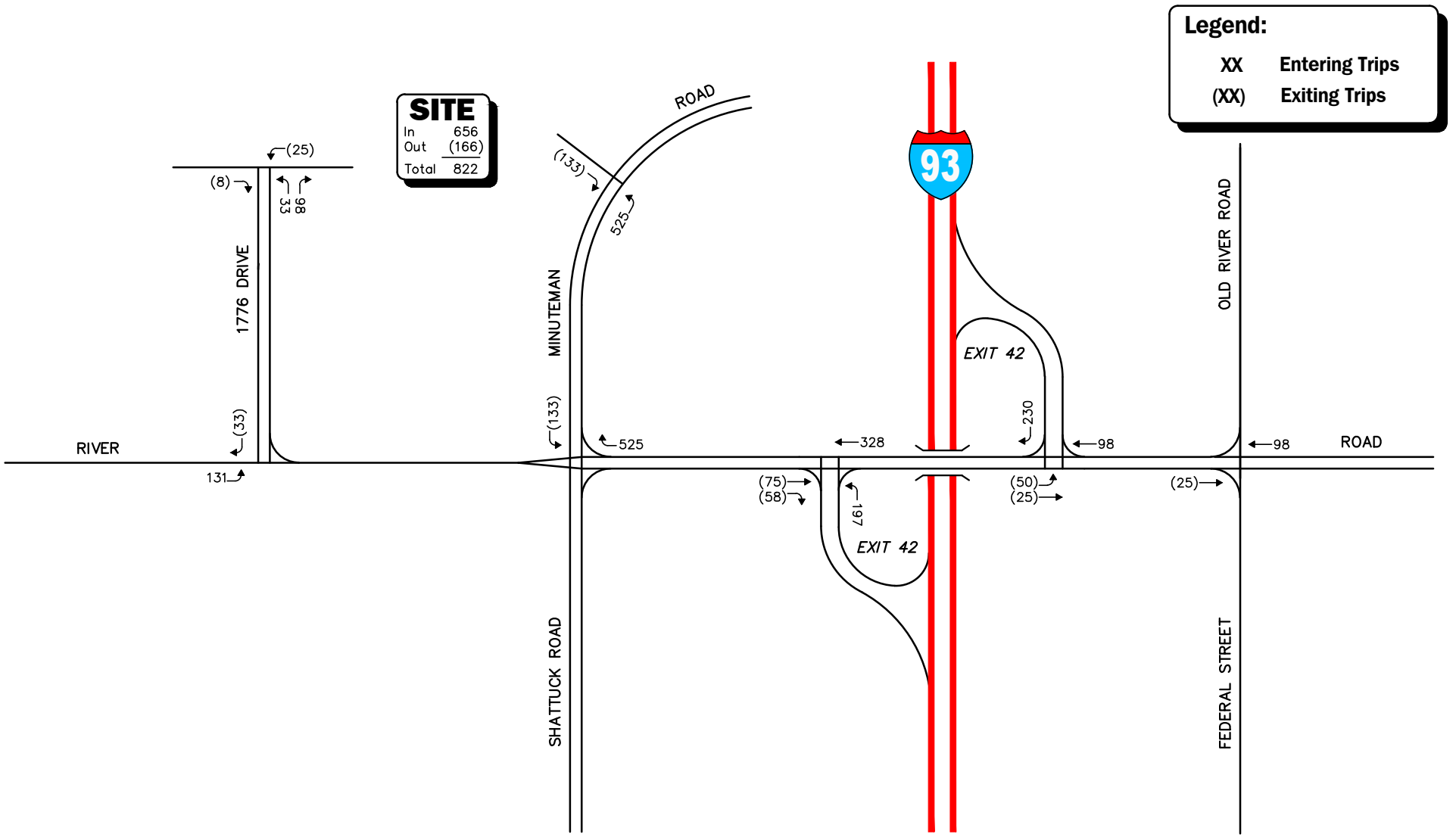
ALEXANDRIA®
Cambridge, Massachusetts

July 2022

Prepared by:

Vanasse & Associates inc
Transportation Engineers & Planners

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



Not to Scale

Figure 8

Project Generated
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc

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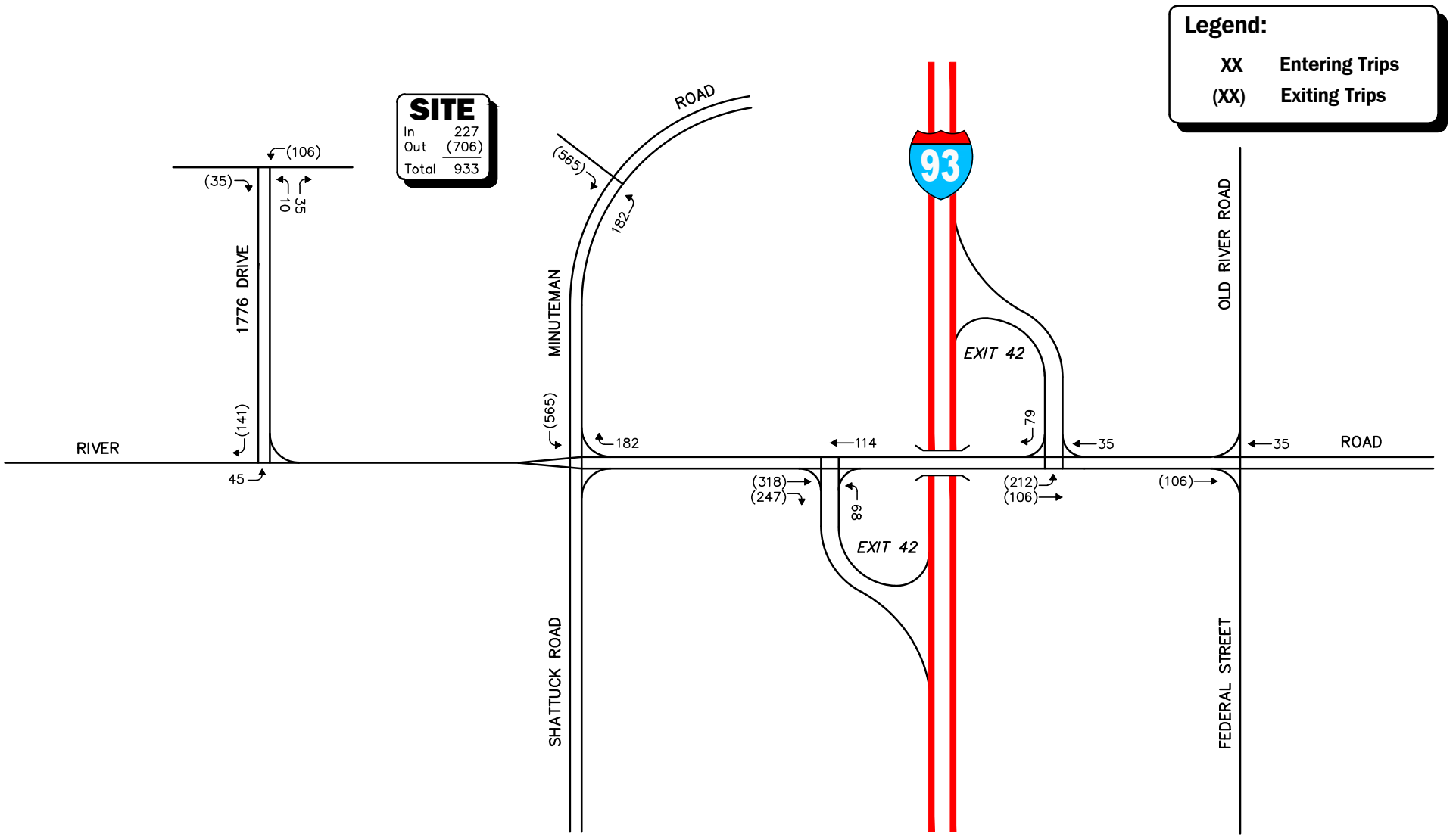

Not to Scale

Figure 9

Project Generated
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

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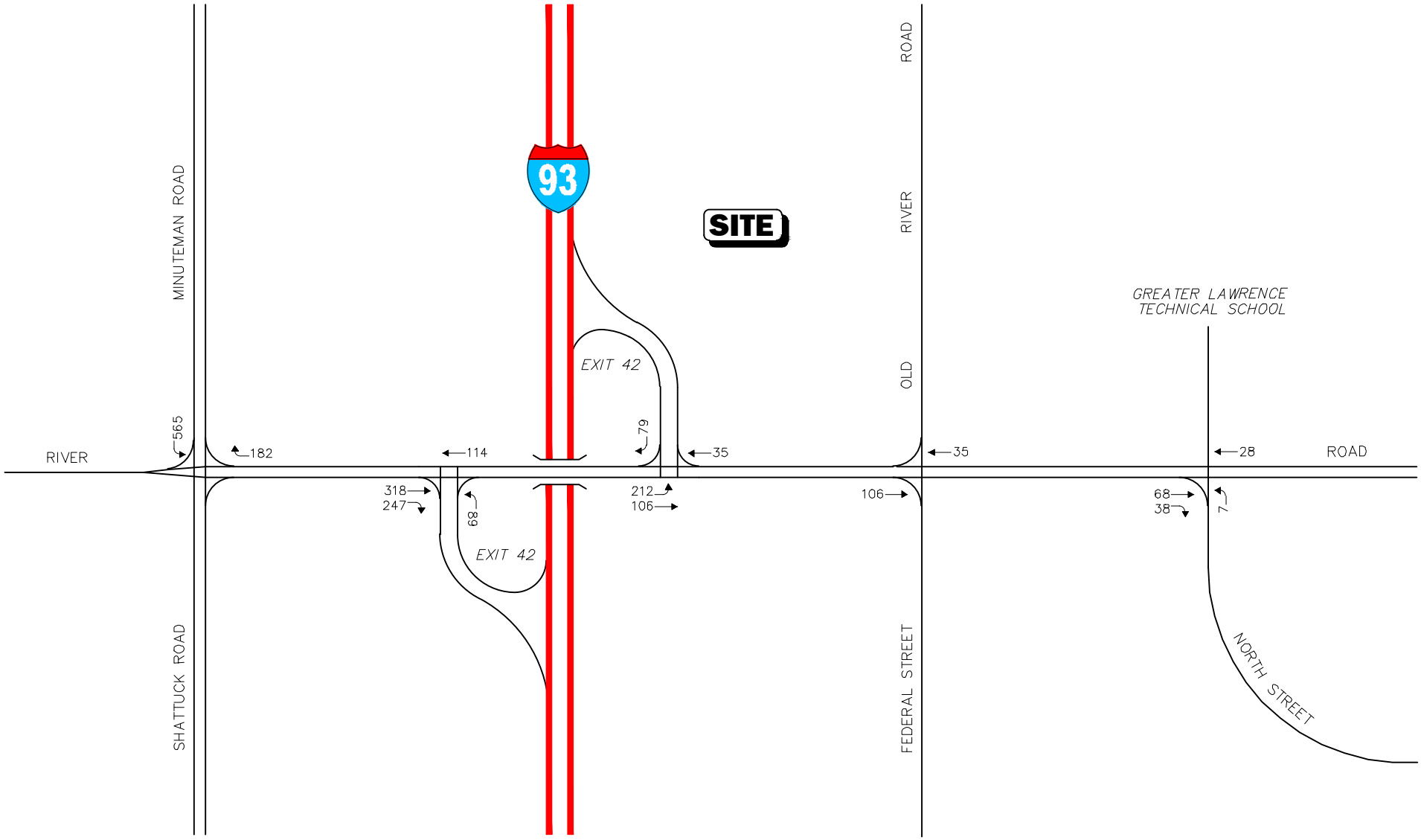

Not to Scale

Figure A-4

Phillips Healthcare Campus Redevelopment
3000 Minuteman Road
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

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R:\10397\Graphics\TIA\November 2025\10397NT1.dwg, 11/18/2025 12:13:42 PM

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
710

LAND USE GROUP:
(700-799) Office

LAND USE :
710 - General Office Building

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

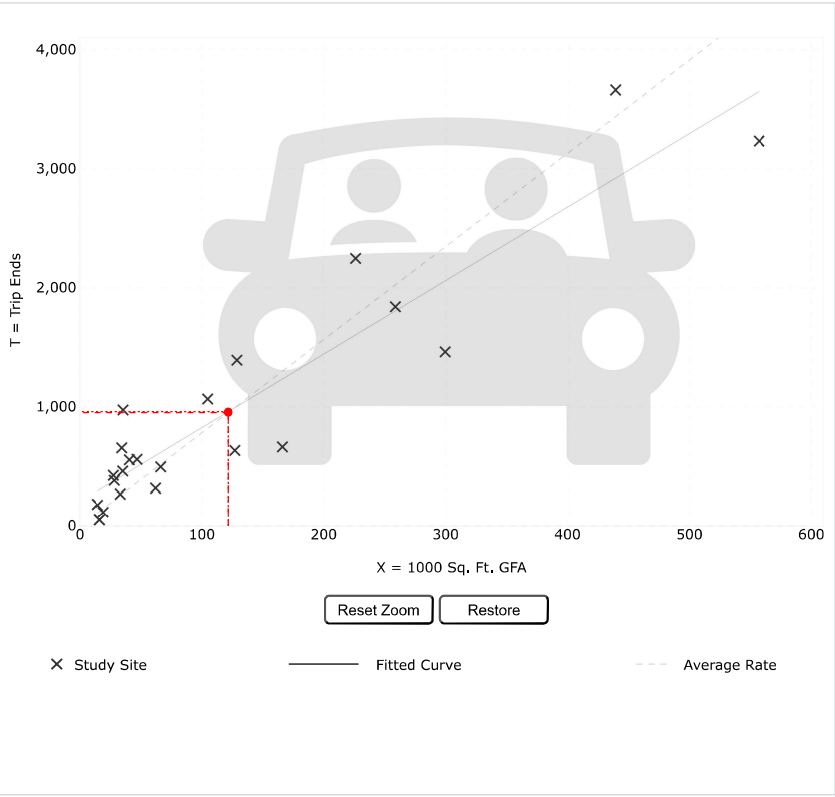
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
121.62 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
General Office Building (710) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
22

Avg. 1000 Sq. Ft. GFA:
126

Average Rate:
7.83

Range of Rates:
3.27 - 27.56

Standard Deviation:
3.71

Fitted Curve Equation:
T = 6.18(X) + 207.96

R^2:
0.86

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 952 (Total), 476 (Entry), 476 (Exit)
Fitted Curve: 960 (Total), 480 (Entry), 480 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
710

LAND USE GROUP:
(700-799) Office

LAND USE :
710 - General Office Building

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

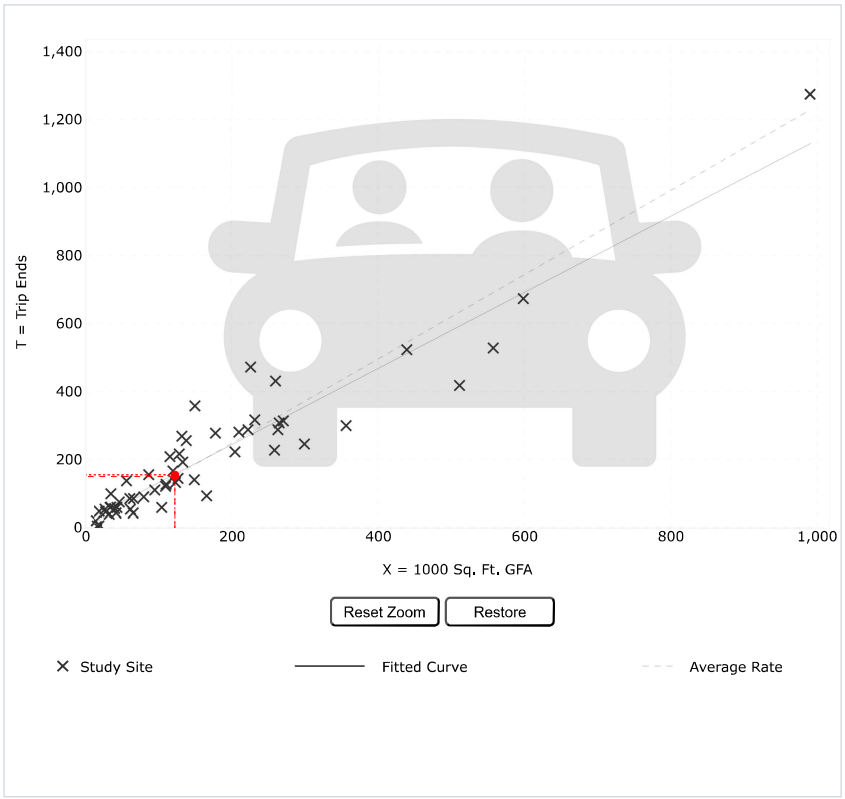
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stre

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
121.62 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
General Office Building (710) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
54

Avg. 1000 Sq. Ft. GFA:
170

Average Rate:
1.24

Range of Rates:
0.32 - 2.83

Standard Deviation:
0.40

Fitted Curve Equation:
T = 1.12(X) + 19.95

R^2:
0.89

Directional Distribution:
88% entering, 12% exiting

Calculated Trip Ends:
Average Rate: 151 (Total), 133 (Entry), 18 (Exit)
Fitted Curve: 156 (Total), 137 (Entry), 19 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
710

LAND USE GROUP:
(700-799) Office

LAND USE :
710 - General Office Building

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

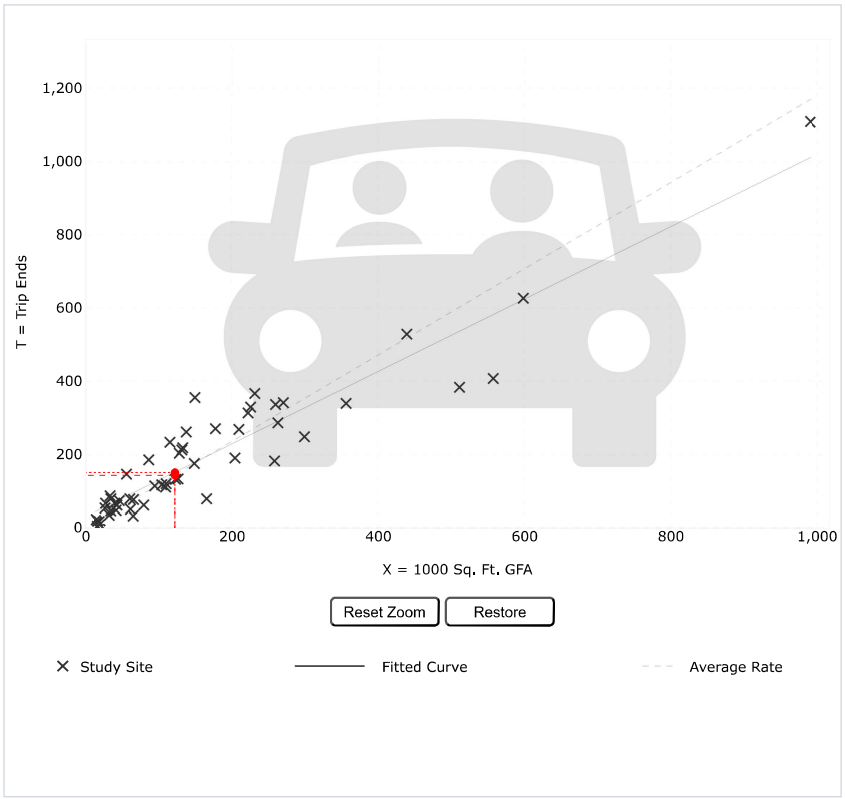
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stre

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
121.62 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
General Office Building (710) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
53

Avg. 1000 Sq. Ft. GFA:
166

Average Rate:
1.18

Range of Rates:
0.26 - 2.59

Standard Deviation:
0.41

Fitted Curve Equation:
T = 0.99(X) + 31.14

R^2:
0.89

Directional Distribution:
16% entering, 84% exiting

Calculated Trip Ends:
Average Rate: 144 (Total), 23 (Entry), 121 (Exit)
Fitted Curve: 152 (Total), 24 (Entry), 128 (Exit)

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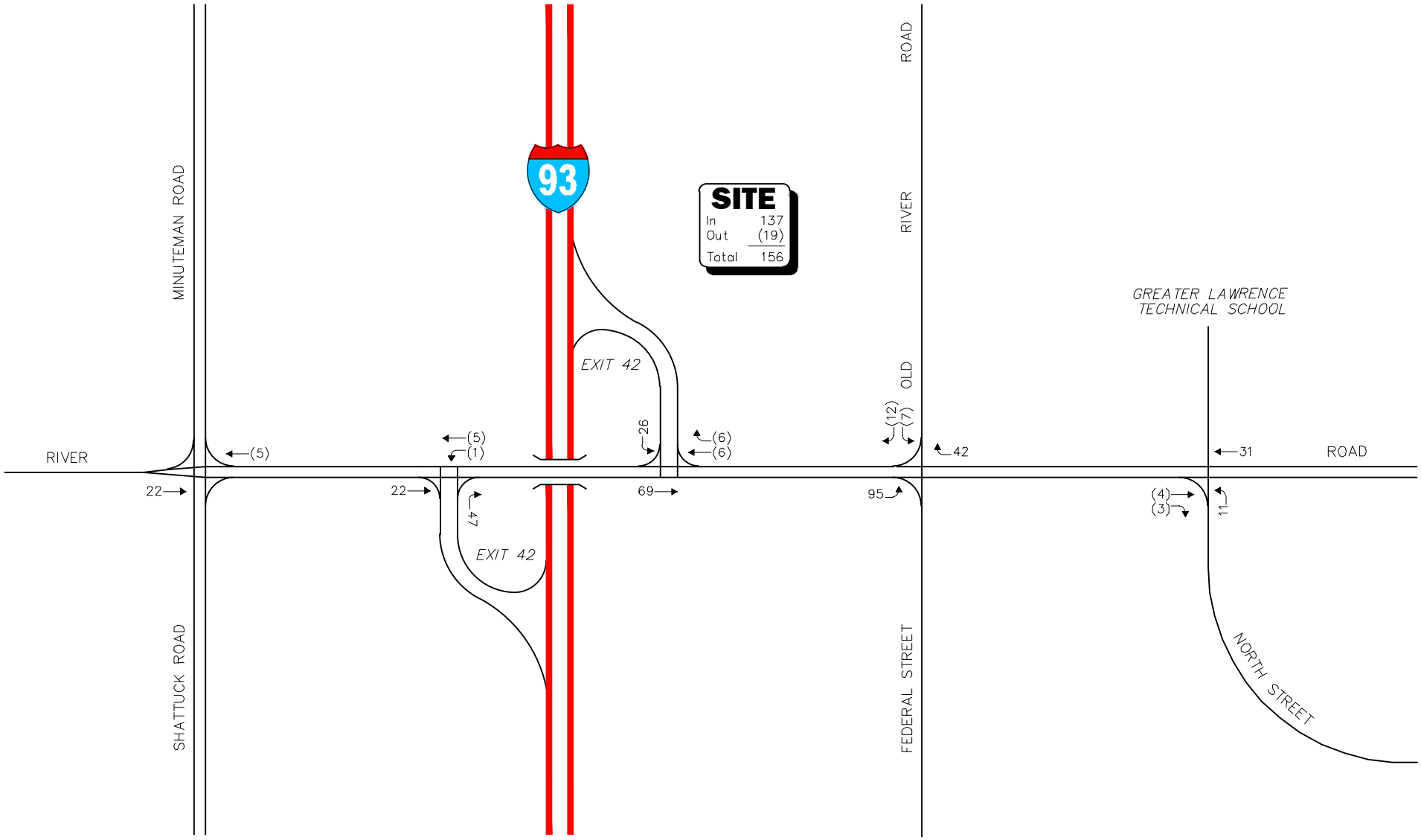

Not to Scale

Figure A-5

Existing Office Building Reoccupancy Weekday Morning Peak-Hour Traffic Volumes

Vanasse & Associates inc

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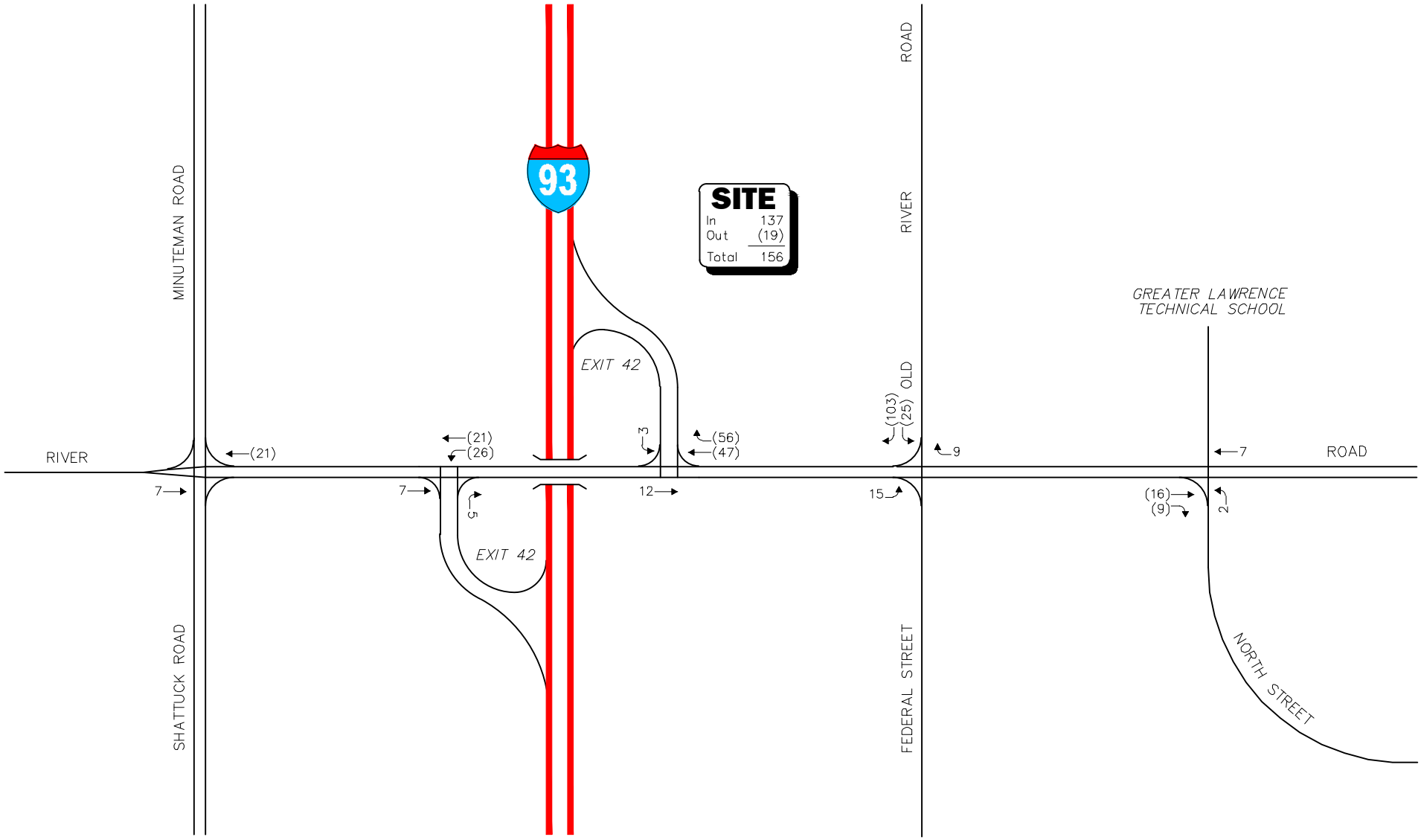

Not to Scale

Figure A-6

Existing Office Building Reoccupancy Weekday Evening Peak-Hour Traffic Volumes

Vanasse & Associates inc

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R:\10397\Graphics\TIA\November 2025\10397NT1.dwg, 11/18/2025 12:17:03 PM

TRIP-GENERATION CALCULATIONS

With 2,950 sf of commercial space
With 2,750 sf of commercial space

With 2,950 sf of Commercial Space

Table A1
INTERNAL TRIP TRIP-GENERATION SUMMARY

	Vehicle Trips					
	Residential Component			Retail Component		
Time Period/Direction	(A) Proposed Multifamily Residential Development (432 units)[a]	(B) Internal Trips	(C = A-B) Net Trips	(D) Proposed Commercial Space (2,950 sf)[b]	(E) Internal Trips	(F = D-E) Net Trips
Average Weekday Daily:						
Entering	964	8	956	81	8	73
Exiting	964	8	956	81	8	73
Total	1,928	16	1,912	162	16	146
Weekday Morning Peak Hour:						
Entering	40	1	39	6	1	5
Exiting	134	1	133	6	1	5
Total	174	2	172	12	2	10
Weekday Evening Peak Hour:						
Entering	101	4	97	17	2	15
Exiting	58	2	56	16	4	12
Total	159	6	153	33	6	27

[a]Based on ITE LUC 221, *Multifamily Housing (Mid-Rise).*
[b]Based on ITE LUC 822, *Strip Retail Plaza (<40k)*.

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
221

LAND USE GROUP:
(200-299) Residential

LAND USE :
221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

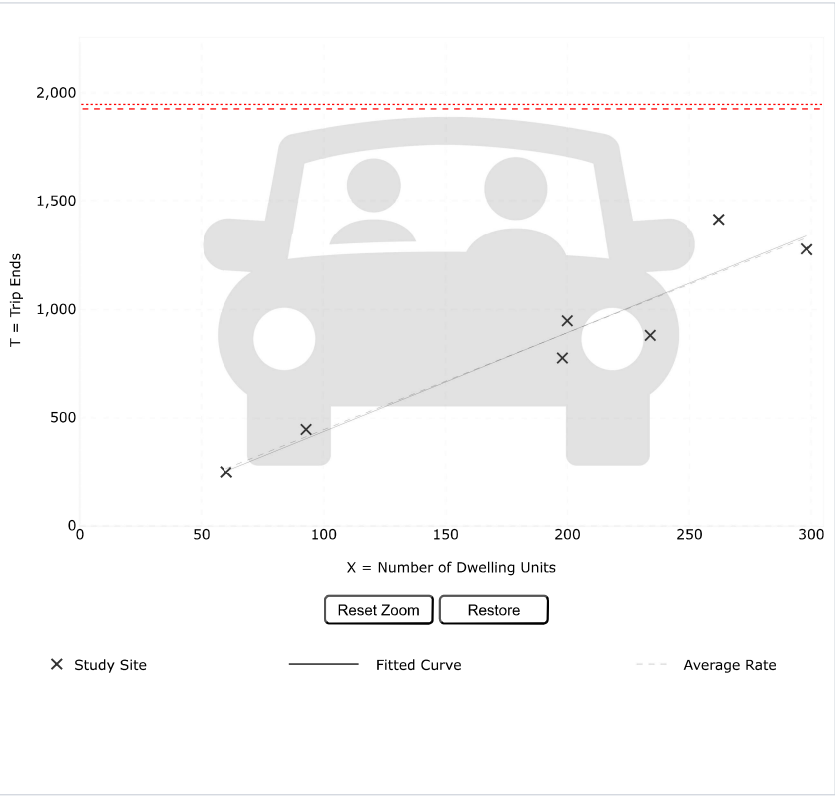
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
432 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Mid-Rise) - Not Close to Rail Transit (221) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
7

Avg. Num. of Dwelling Units:
192

Average Rate:
4.46

Range of Rates:
3.76 - 5.40

Standard Deviation:
0.62

Fitted Curve Equation:
T = 4.55(X) - 17.52

R^2:
0.90

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 1927 (Total), 963 (Entry), 964 (Exit)
Fitted Curve: 1948 (Total), 974 (Entry), 974 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
221

LAND USE GROUP:
(200-299) Residential

LAND USE :
221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

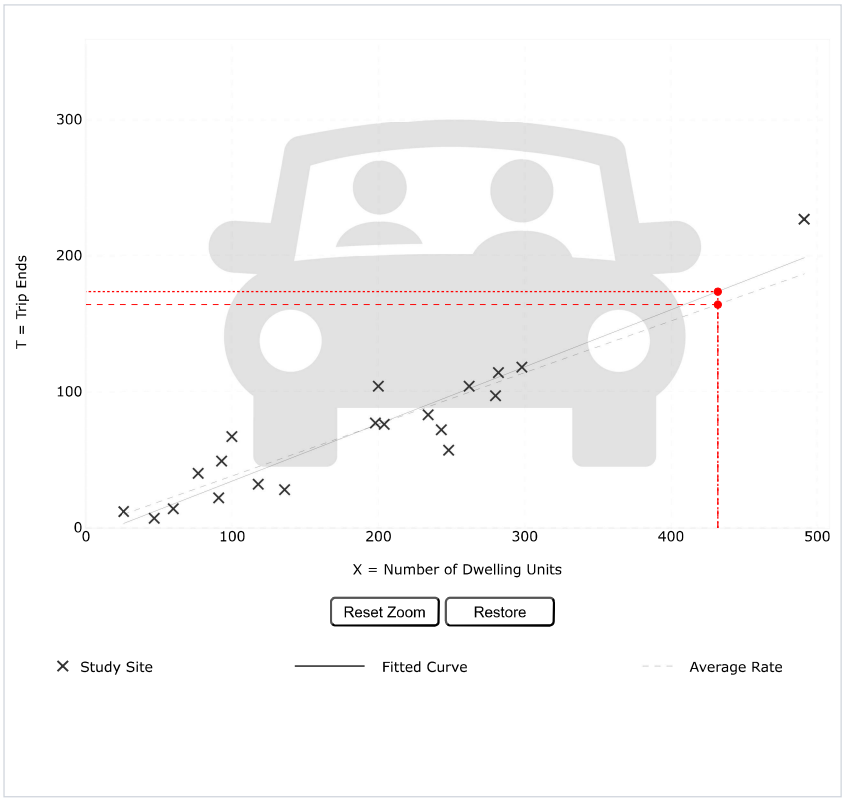
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stre

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
432 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Mid-Rise) - Not Close to Rail Transit (221) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
20

Avg. Num. of Dwelling Units:
184

Average Rate:
0.38

Range of Rates:
0.15 - 0.67

Standard Deviation:
0.10

Fitted Curve Equation:
T = 0.42(X) - 7.77

R^2:
0.87

Directional Distribution:
23% entering, 77% exiting

Calculated Trip Ends:
Average Rate: 164 (Total), 38 (Entry), 126 (Exit)
Fitted Curve: 174 (Total), 40 (Entry), 134 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
221

LAND USE GROUP:
(200-299) Residential

LAND USE :
221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

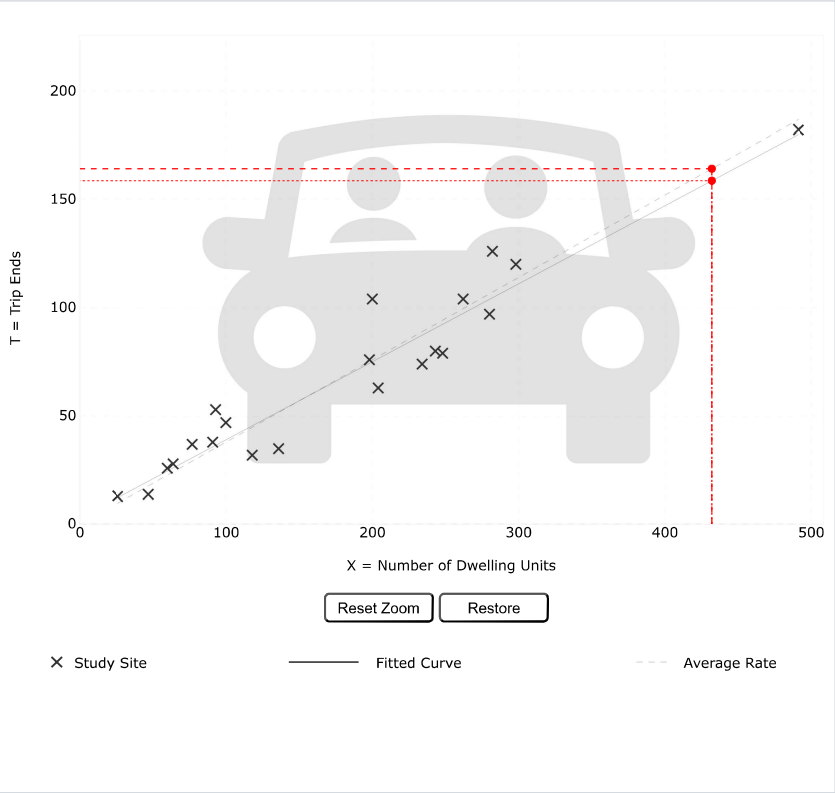
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stre

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
432 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Mid-Rise) - Not Close to Rail Transit (221) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
21

Avg. Num. of Dwelling Units:
179

Average Rate:
0.38

Range of Rates:
0.26 - 0.57

Standard Deviation:
0.07

Fitted Curve Equation:
T = 0.36(X) + 3.07

R^2:
0.92

Directional Distribution:
64% entering, 36% exiting

Calculated Trip Ends:
Average Rate: 164 (Total), 105 (Entry), 59 (Exit)
Fitted Curve: 159 (Total), 101 (Entry), 58 (Exit)

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Graph Look Up

ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Add-ons to do more

Try OTISS Pro

Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 822

LAND USE GROUP: (800-899) Retail

LAND USE : 822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): 1000 Sq. Ft. GLA

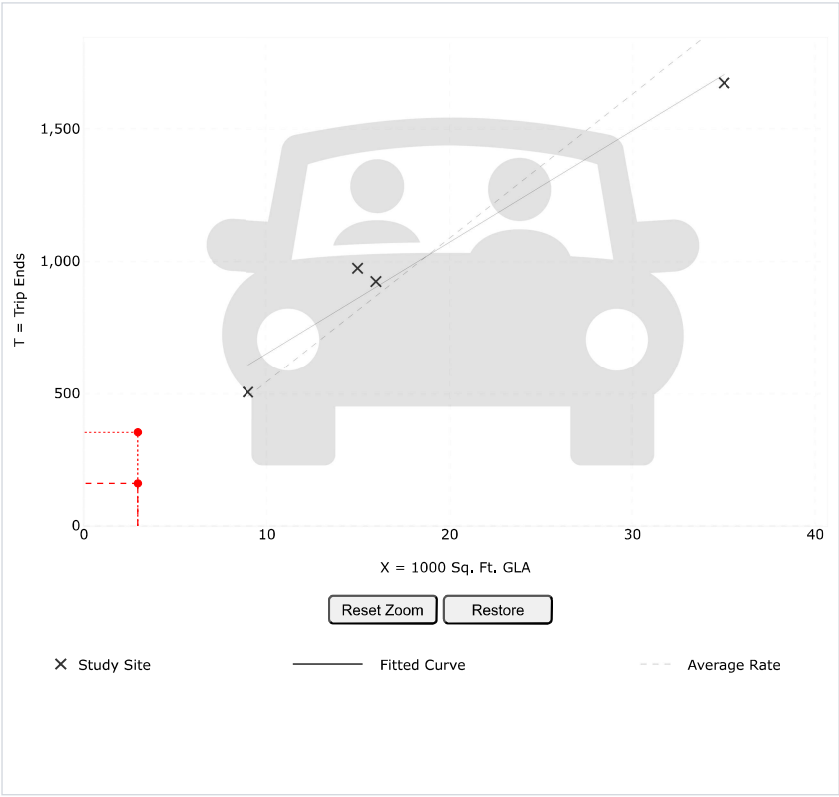
TIME PERIOD: Weekday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 2.95 Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
4

Avg. 1000 Sq. Ft. GLA:
19

Average Rate:
54.45

Range of Rates:
47.86 - 65.07

Standard Deviation:
7.81

Fitted Curve Equation:
T = 42.20(X) + 229.68

R^2:
0.96

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 161 (Total), 80 (Entry), 81 (Exit)
Fitted Curve: 354 (Total), 177 (Entry), 177 (Exit)

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Graph Look Up

ITETripGen Web-based App

- Graph Look Up
- How to Use ITETripGen
- TGM Desk Reference
- TGM Appendices
- Support Documents
- Add Users
- Comments

Add-ons to do more

Try OTISS Pro

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
822

LAND USE GROUP:
(800-899) Retail

LAND USE :
822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

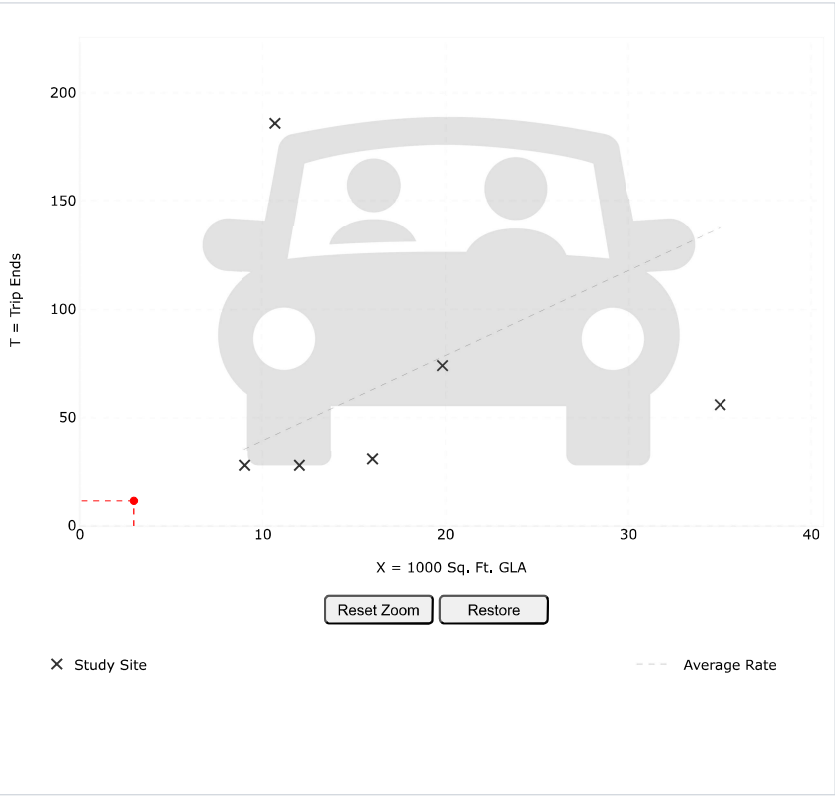
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stre

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
2.95 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
6

Avg. 1000 Sq. Ft. GLA:
17

Average Rate:
3.93

Range of Rates:
1.60 - 17.44

Standard Deviation:
5.12

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
55% entering, 45% exiting

Calculated Trip Ends:
Average Rate: 12 (Total), 6 (Entry), 6 (Exit)

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Graph Look Up

ITETripGen Web-based App

- Graph Look Up
- How to Use ITETripGen
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- TGM Appendices
- Support Documents
- Add Users
- Comments

Add-ons to do more

Try OTISS Pro

Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 822

LAND USE GROUP: (800-899) Retail

LAND USE : 822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

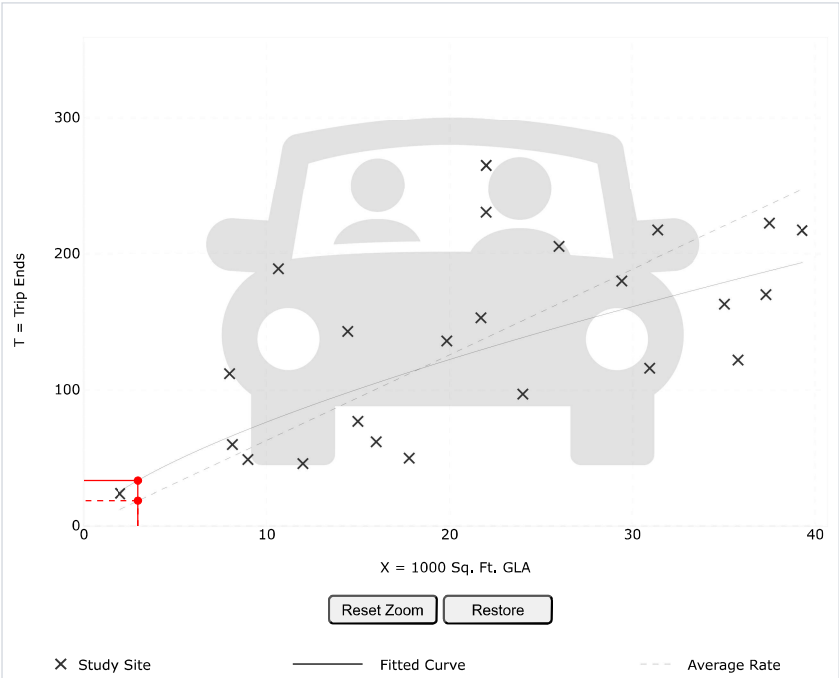
INDEPENDENT VARIABLE (IV): 1000 Sq. Ft. GLA

TIME PERIOD: Weekday, Peak Hour of Adjacent Stree

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 2.95 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
24

Avg. 1000 Sq. Ft. GLA:
22

Average Rate:
6.29

Range of Rates:
2.81 - 17.72

Standard Deviation:
3.02

Fitted Curve Equation:
Ln(T) = 0.68 Ln(X) + 2.77

R^2:
0.54

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 19 (Total), 9 (Entry), 10 (Exit)
Fitted Curve: 33 (Total), 17 (Entry), 16 (Exit)

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Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual* , 12th Edition

Land Use Code	821
Land Use	Shopping Plaza (40 - 150k)
Setting	General Urban/Suburban
Time Period	Weekday PM Peak Period
# Data Sites	15
Average Pass-By Rate	40%

Pass-By Characteristics for Individual Sites

GLA (000)	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak Hour Volume	Source
					Primary (%)	Diverted (%)	Total (%)		
45	Florida	1992	844	56	24	20	44	—	30
50	Florida	1992	555	41	41	18	59	—	30
52	Florida	1995	665	42	33	25	58	—	30
53	Florida	1993	162	59	—	—	41	—	30
57.23	Kentucky	1993	247	31	53	16	69	2659	34
60	Florida	1995	1583	40	38	22	60	—	30
69.4	Kentucky	1993	109	25	42	33	75	1559	34
77	Florida	1992	365	46	—	—	54	—	30
78	Florida	1991	702	55	23	22	45	—	30
82	Florida	1992	336	34	—	—	66	—	30
92.857	Kentucky	1993	133	22	50	28	78	3555	34
100.888	Kentucky	1993	281	28	50	22	72	2111	34
121.54	Kentucky	1993	210	53	30	17	47	2636	34
144	New Jersey	1990	176	32	44	24	68	—	24
146.8	Kentucky	1993	—	36	39	25	64	—	34

Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual* , 12th Edition

Land Use Code	821								
Land Use	Shopping Plaza (40 - 150k)								
Setting	General Urban/Suburban								
Time Period	Saturday Midday								
# Data Sites	1								
Average Pass-By Rate	31%								
	Pass-By Characteristics for Individual Sites								
	State or	Survey		Pass-By	Non-Pass-By Trips			Adjacent Street	
GLA (000)	Province	Year	# Interviews	Trip (%)	Primary (%)	Diverted (%)	Total (%)	Daily Volume	Source
144	New Jersey	1990	264	31	47	22	69	63362	24

Proposed Multifamily Residential Development

Analyst: DCL
Date: 11/14.25

Job No. 10397
Time Period: Average Weekday Daily

Land Use A	Office		
ITE LUC			
Size		ksf	
	Total	Internal	External
Enter		0	0
Exit		0	0
Total	0	0	0

A to B

% Demand	Trips	Balanced
22%	0	0
% Demand	Trips	
4%	3.24	

B to A

% Demand	Trips	Balanced
3%	0	0
% Demand	Trips	
15%	12.15	

A to C

% Demand	Trips	Balanced
2%	0	0
% Demand	Trips	
3%	28.92	

C to A

% Demand	Trips	Balanced
0%	0	0
% Demand	Trips	
0%	0	

B to C

% Demand	Trips	Balanced
11%	8.91	9
% Demand	Trips	
33%	318.12	

C to B

% Demand	Trips	Balanced
38%	366.32	7
% Demand	Trips	
9%	7.29	

Land Use B	Retail		
ITE LUC	822		
Size	2.95	ksf	
		Internal	External
Enter	81	7	74
Exit	81	9	72
Total	162	16	146

Land Use C	Residential		
ITE LUC	221		
Size	432	units	
	Total	Internal	External
Enter	964	9	955
Exit	964	7	957
Total	1928	16	1912

Net External Trips for Multi-Use Development

	Land Use A	Land Use B	Land Use C	Total	
Enter	0	74	955	1029	
Exit	0	72	957	1029	
Total	0	146	1912	2058	Internal Capture Rate
Single-Use Trip Gen Est.	0	162	1928	2090	2%

* from ITE Trip Generation Handbook, 9th Edition, 2012.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Proposed Multifamily Residential	**Organization:**	VAI
Project Location:	100 River Road, Andover, MA	**Performed By:**	DCL
Scenario Description:		**Date:**	11/14/2025
Analysis Year:		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	822	2,950	sf	12	6	6
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	432	units	174	40	134
Hotel				0		
All Other Land Uses[2]				0		
				186	46	140

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	1	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	186	46	140
Internal Capture Percentage	2%	4%	1%
External Vehicle-Trips[5]	182	44	138
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	17%	17%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	3%	1%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Proposed Multifamily Residential
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	6	6	1.00	6	6
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	40	40	1.00	134	134
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	2		1	0	1	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	1	27	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	0	0	0	0
Retail	0		0	0	1	0
Restaurant	0	0		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	5	6	5	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	39	40	39	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	5	6	5	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	133	134	133	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Proposed Multifamily Residential	**Organization:**	VAI
Project Location:	100 River Road, Andover, MA	**Performed By:**	DCL
Scenario Description:		**Date:**	11/14/2025
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	822	2,950	sf	33	17	16
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	432	units	159	101	58
Hotel				0		
All Other Land Uses[2]				0		
				192	118	74

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	4	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	2	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	192	118	74
Internal Capture Percentage	6%	5%	8%
External Vehicle-Trips[5]	180	112	68
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	12%	25%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	4%	3%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Proposed Multifamily Residential
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	17	17	1.00	16	16
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	101	101	1.00	58	58
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		5	1	4	1
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	24	12	0		2
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	4	0
Retail	0		0	0	46	0
Restaurant	0	9		0	16	0
Cinema/Entertainment	0	1	0		4	0
Residential	0	2	0	0		0
Hotel	0	0	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	2	15	17	15	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	4	97	101	97	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	4	12	16	12	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	2	56	58	56	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

With 2,750 sf of Commercial Space

Table A2
INTERNAL TRIP TRIP-GENERATION SUMMARY

	Vehicle Trips					
	Residential Component			Retail Component		
Time Period/Direction	(A) Proposed Multifamily Residential Development (432 units)[a]	(B) Internal Trips	(C = A-B) Net Trips	(D) Proposed Commercial Space (2,750 sf)[b]	(E) Internal Trips	(F = D-E) Net Trips
Average Weekday Daily:						
Entering	964	7	957	75	7	68
Exiting	964	7	957	75	7	68
Total	1,928	14	1,914	150	14	136
Weekday Morning Peak Hour:						
Entering	40	1	39	6	1	5
Exiting	134	1	133	5	1	4
Total	174	2	172	11	2	9
Weekday Evening Peak Hour:						
Entering	101	4	97	16	2	14
Exiting	58	2	56	16	4	12
Total	159	6	153	32	6	26

[a]Based on ITE LUC 221, *Multifamily Housing (Mid-Rise).*
[b]Based on ITE LUC 822, *Strip Retail Plaza (<40k)*.

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
822

LAND USE GROUP:
(800-899) Retail

LAND USE :
822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

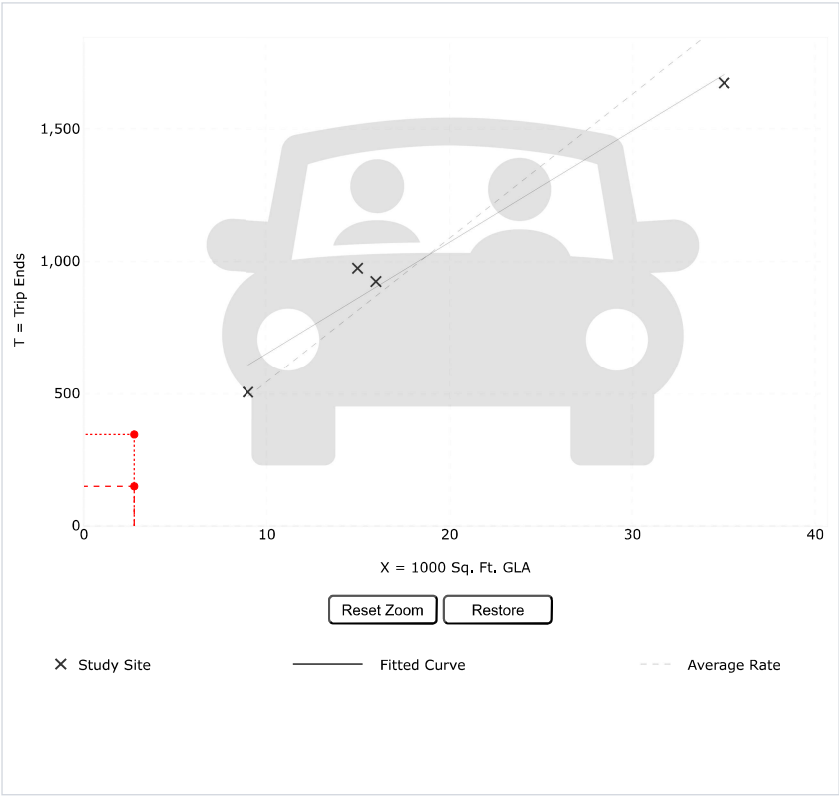
TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
2.75 Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
4

Avg. 1000 Sq. Ft. GLA:
19

Average Rate:
54.45

Range of Rates:
47.86 - 65.07

Standard Deviation:
7.81

Fitted Curve Equation:
T = 42.20(X) + 229.68

R^2:
0.96

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 150 (Total), 75 (Entry), 75 (Exit)
Fitted Curve: 346 (Total), 173 (Entry), 173 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
822

LAND USE GROUP:
(800-899) Retail

LAND USE :
822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

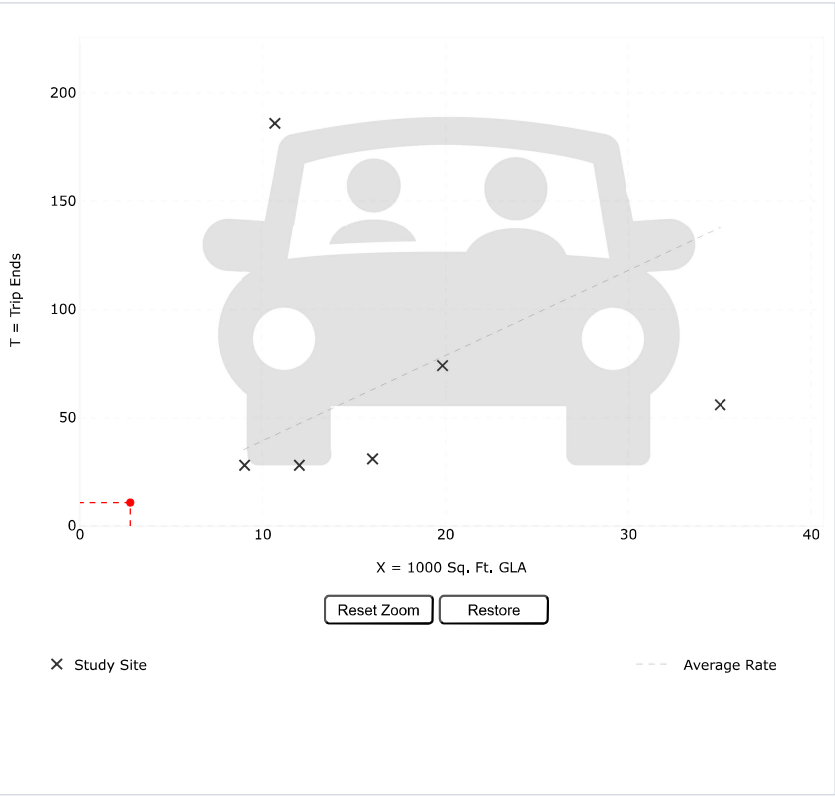
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stre

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
2.75 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
6

Avg. 1000 Sq. Ft. GLA:
17

Average Rate:
3.93

Range of Rates:
1.60 - 17.44

Standard Deviation:
5.12

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
55% entering, 45% exiting

Calculated Trip Ends:
Average Rate: 11 (Total), 6 (Entry), 5 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
822

LAND USE GROUP:
(800-899) Retail

LAND USE :
822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

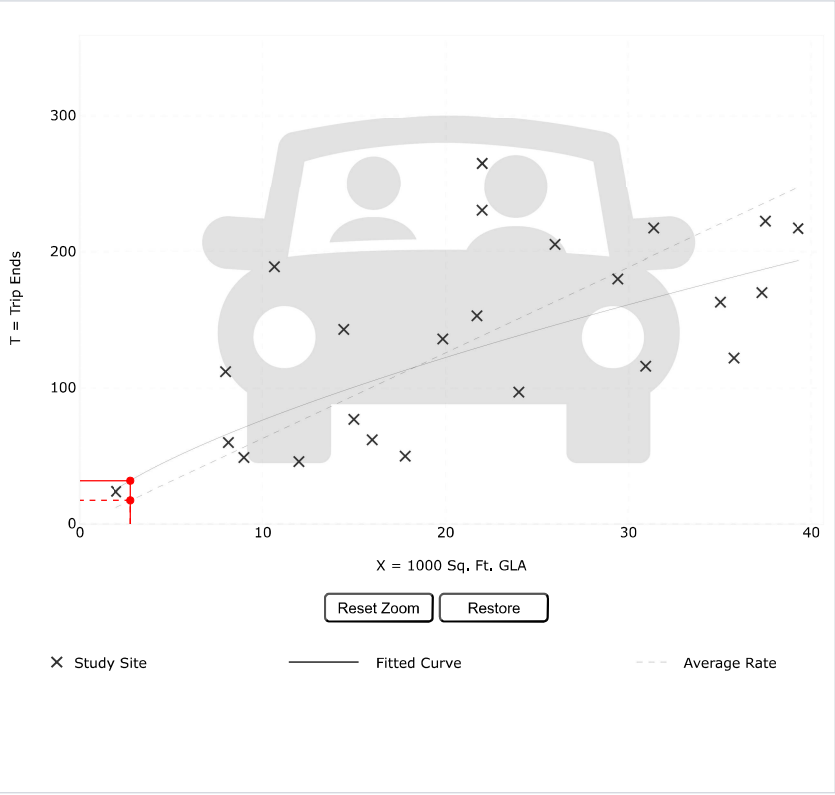
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stre

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
2.75 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
24

Avg. 1000 Sq. Ft. GLA:
22

Average Rate:
6.29

Range of Rates:
2.81 - 17.72

Standard Deviation:
3.02

Fitted Curve Equation:
Ln(T) = 0.68 Ln(X) + 2.77

R^2:
0.54

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 17 (Total), 9 (Entry), 8 (Exit)
Fitted Curve: 32 (Total), 16 (Entry), 16 (Exit)

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Proposed Multifamily Residential Development

Analyst: DCL
Date: 11/14.25

Job No. 10397
Time Period: Average Weekday Daily

Land Use A	Office		
ITE LUC			
Size		ksf	
	Total	Internal	External
Enter		0	0
Exit		0	0
Total	0	0	0

A to B

% Demand	Trips	Balanced
22%	0	0
% Demand	Trips	
4%	3	

B to A

% Demand	Trips	Balanced
3%	0	0
% Demand	Trips	
15%	11.25	

A to C

% Demand	Trips	Balanced
2%	0	0
% Demand	Trips	
3%	28.92	

C to A

% Demand	Trips	Balanced
0%	0	0
% Demand	Trips	
0%	0	

B to C

% Demand	Trips	Balanced
11%	8.25	8
% Demand	Trips	
33%	318.12	

C to B

% Demand	Trips	Balanced
38%	366.32	7
% Demand	Trips	
9%	6.75	

Land Use B	Retail		
ITE LUC	822		
Size	2.75	ksf	
		Internal	External
Enter	75	7	68
Exit	75	8	67
Total	150	15	135

Land Use C	Residential		
ITE LUC	221		
Size	432	units	
	Total	Internal	External
Enter	964	8	956
Exit	964	7	957
Total	1928	15	1913

Net External Trips for Multi-Use Development

	Land Use A	Land Use B	Land Use C	Total	
Enter	0	68	956	1024	
Exit	0	67	957	1024	
Total	0	135	1913	2048	Internal Capture Rate
Single-Use Trip Gen Est.	0	150	1928	2078	1%

* from ITE Trip Generation Handbook, 9th Edition, 2012.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Proposed Multifamily Residential	**Organization:**	VAI
Project Location:	100 River Road, Andover, MA	**Performed By:**	DCL
Scenario Description:		**Date:**	11/14/2025
Analysis Year:		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	822	2,750	sf	11	6	5
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	432	units	174	40	134
Hotel				0		
All Other Land Uses[2]				0		
				185	46	139

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	1	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	185	46	139
Internal Capture Percentage	2%	4%	1%
External Vehicle-Trips[5]	181	44	137
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	17%	20%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	3%	1%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Proposed Multifamily Residential
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	6	6	1.00	5	5
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	40	40	1.00	134	134
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	1		1	0	1	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	1	27	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	0	0	0	0
Retail	0		0	0	1	0
Restaurant	0	0		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	5	6	5	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	39	40	39	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	4	5	4	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	133	134	133	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Proposed Multifamily Residential	**Organization:**	VAI
Project Location:	100 River Road, Andover, MA	**Performed By:**	DCL
Scenario Description:		**Date:**	11/14/2025
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	822	2,750	sf	32	16	16
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	432	units	159	101	58
Hotel				0		
All Other Land Uses[2]				0		
				191	117	74

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	4	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	2	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	191	117	74
Internal Capture Percentage	6%	5%	8%
External Vehicle-Trips[5]	179	111	68
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	13%	25%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	4%	3%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Proposed Multifamily Residential
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	16	16	1.00	16	16
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	101	101	1.00	58	58
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		5	1	4	1
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	24	12	0		2
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	4	0
Retail	0		0	0	46	0
Restaurant	0	8		0	16	0
Cinema/Entertainment	0	1	0		4	0
Residential	0	2	0	0		0
Hotel	0	0	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	2	14	16	14	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	4	97	101	97	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	4	12	16	12	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	2	56	58	56	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

TRIP DISTRIBUTION DATA

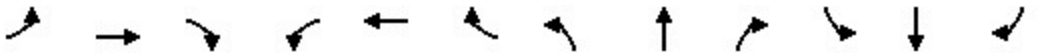
Proposed Mutlifamily Residential Development
Andover, Massachusetts

Residence	Workplace	Number	River Road (East)		River Road (West)		I-93 (North)		I-93 (South)		North Street		Minuteman Road (North)		Shattuch Road (South)		Federal Street (South)	
Andover, MA	Andover town (Essex, MA)	2,843	10%	284	30%	853		0	10%	284	20%	569	10%	284	10%	284	10%	284
Andover, MA	Boston city (Suffolk, MA)	1,837		0		0		0	100%	1837		0		0		0		0
Andover, MA	Burlington town (Middlesex, MA)	593		0		0		0	100%	593		0		0		0		0
Andover, MA	Woburn city (Middlesex, MA)	557		0		0		0	100%	557		0		0		0		0
Andover, MA	Lawrence city (Essex, MA)	544	80%	435		0	20%	109		0		0		0		0		0
Andover, MA	Cambridge city (Middlesex, MA)	507		0		0		0	100%	507		0		0		0		0
Andover, MA	Lowell city (Middlesex, MA)	461		0	50%	231	50%	231		0		0		0		0		0
Andover, MA	North Andover town (Essex, MA)	448	30%	134		0	30%	134	20%	90	20%	90		0		0		0
Andover, MA	Wilmington town (Middlesex, MA)	425		0		0		0	100%	425		0		0		0		0
Andover, MA	Tewksbury town (Middlesex, MA)	311		0	80%	249		0	20%	62		0		0		0		0
Andover, MA	Billerica town (Middlesex, MA)	262		0	20%	52		0	80%	210		0		0		0		0
Andover, MA	Methuen Town city (Essex, MA)	257		0		0	100%	257		0		0		0		0		0
Andover, MA	Waltham city (Middlesex, MA)	233		0		0		0	100%	233		0		0		0		0
Andover, MA	Haverhill city (Essex, MA)	213		0		0	60%	128	40%	85		0		0		0		0
Andover, MA	Chelmsford town (Middlesex, MA)	197		0	20%	39		0	80%	158		0		0		0		0
Andover, MA	Danvers town (Essex, MA)	188		0		0		0	60%	113	40%	75		0		0		0
Andover, MA	North Reading town (Middlesex, MA)	182		0		0		0	100%	182		0		0		0		0
Andover, MA	Bedford town (Middlesex, MA)	173		0		0		0	100%	173		0		0		0		0
Andover, MA	Worcester city (Worcester, MA)	167		0	20%	33		0	80%	134		0		0		0		0
Andover, MA	Nashua city (Hillsborough, NH)	157		0		0	100%	157		0		0		0		0		0
Andover, MA	Somerville city (Middlesex, MA)	152		0		0		0	100%	152		0		0		0		0
Andover, MA	Reading town (Middlesex, MA)	151		0		0		0	100%	151		0		0		0		0
Andover, MA	Salem town (Rockingham, NH)	149		0		0	100%	149		0		0		0		0		0
Andover, MA	Lexington town (Middlesex, MA)	146		0		0		0	100%	146		0		0		0		0
Andover, MA	Newburyport city (Essex, MA)	140		0		0	80%	112	20%	28		0		0		0		0
Andover, MA	Peabody city (Essex, MA)	129		0		0		0	100%	129		0		0		0		0
Andover, MA	Wakefield town (Middlesex, MA)	126		0		0		0	100%	126		0		0		0		0
Andover, MA	Beverly city (Essex, MA)	125		0		0		0	60%	75	40%	50		0		0		0
Andover, MA	Manchester city (Hillsborough, NH)	124		0		0	100%	124		0		0		0		0		0
Andover, MA	Newton city (Middlesex, MA)	122		0		0		0	100%	122		0		0		0		0
Andover, MA	Westford town (Middlesex, MA)	121		0	20%	24		0	80%	97		0		0		0		0
Andover, MA	Medford city (Middlesex, MA)	109		0		0		0	100%	109		0		0		0		0
Andover, MA	Quincy city (Norfolk, MA)	105		0		0		0	100%	105		0		0		0		0
Andover, MA	Lynn city (Essex, MA)	102		0		0		0	100%	102		0		0		0		0
Andover, MA	Marlborough city (Middlesex, MA)	102		0		0		0	100%	102		0		0		0		0
		12,458		854		1,482		1,401		7,086		783		284		284		284
				6.9%		11.9%		11.2%		56.9%		6.3%		2.3%		2.3%		2.3%
		SAY		**7%**		**12%**		**11%**		**57%**		**6%**		**3%**		**2%**		**2%**

CAPACITY ANALYSIS WORKSHEETS

2025 Existing
2032 No-Build
2032 Build
2032 Build Mitigated

2025 Existing



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	562	531	25	625	113	226	79	14	92	48	13
Future Volume (vph)	204	562	531	25	625	113	226	79	14	92	48	13
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.977			0.978			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1685	3355	1531	1678	3219	0	1694	1763	0	1728	1778	0
Flt Permitted	0.950			0.950			0.658			0.677		
Satd. Flow (perm)	1685	3355	1531	1678	3219	0	1173	1763	0	1231	1778	0
Satd. Flow (RTOR)			534		19			7			11	
Adj. Flow (vph)	258	711	672	27	665	120	260	91	16	177	92	25
Lane Group Flow (vph)	258	711	672	27	785	0	260	107	0	177	117	0
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	16.0		11.0	16.0		10.0	10.0		10.0	10.0	
Total Split (s)	25.0	49.0		12.0	36.0		25.0	25.0		25.0	25.0	
Total Split (%)	22.9%	45.0%		11.0%	33.0%		22.9%	22.9%		22.9%	22.9%	
Maximum Green (s)	19.0	43.0		6.0	30.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		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	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.67	0.38	0.44	0.17	0.74		0.86	0.23		0.56	0.25	
Control Delay (s/veh)	41.6	13.7	0.9	43.2	30.7		61.6	29.0		39.3	28.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	41.6	13.7	0.9	43.2	30.7		61.6	29.0		39.3	28.3	
Queue Length 50th (ft)	117	78	0	13	186		131	41		80	43	
Queue Length 95th (ft)	228	215	0	48	358		#366	109		104	62	
Internal Link Dist (ft)		1435			1194			1039			1055	
Turn Bay Length (ft)	150		200	130						100		
Base Capacity (vph)	432	1928	1531	164	1271		301	458		316	464	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.60	0.37	0.44	0.16	0.62		0.86	0.23		0.56	0.25	

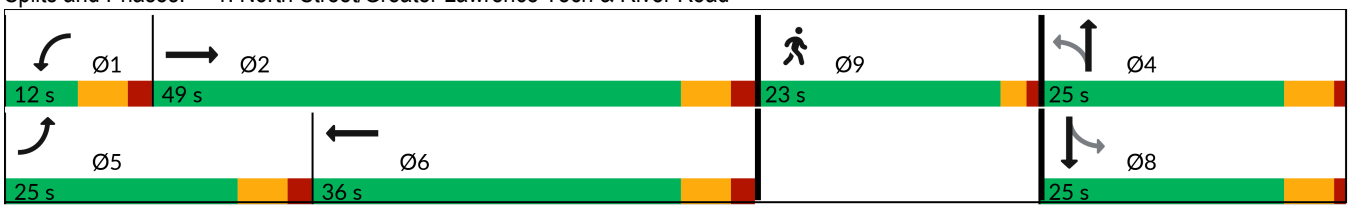
Intersection Summary
Cycle Length: 109

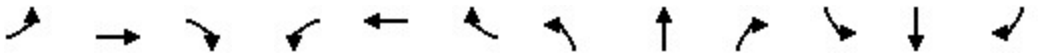
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	21%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Don't Walk (s)	13.0
Pedestrian Calls (#/hr)	4
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Actuated Cycle Length: 83.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Street/Greater Lawrence Tech & River Road

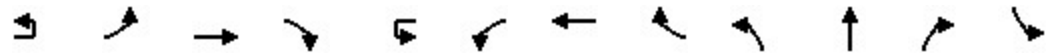




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	562	531	25	625	113	226	79	14	92	48	13
Future Volume (vph)	204	562	531	25	625	113	226	79	14	92	48	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1685	3355	1531	1678	3219		1694	1762		1728	1778	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.66	1.00		0.68	1.00	
Satd. Flow (perm)	1685	3355	1531	1678	3219		1173	1762		1232	1778	
Peak-hour factor, PHF	0.79	0.79	0.79	0.94	0.94	0.94	0.87	0.87	0.87	0.52	0.52	0.52
Adj. Flow (vph)	258	711	672	27	665	120	260	91	16	177	92	25
RTOR Reduction (vph)	0	0	0	0	12	0	0	5	0	0	8	0
Lane Group Flow (vph)	258	711	672	27	773	0	260	102	0	177	109	0
Heavy Vehicles (%)	0%	4%	2%	4%	7%	0%	3%	1%	7%	1%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Actuated Green, G (s)	17.1	44.3	90.0	2.1	29.3		20.5	20.5		20.5	20.5	
Effective Green, g (s)	19.1	46.3	90.0	4.1	31.3		21.5	21.5		21.5	21.5	
Actuated g/C Ratio	0.21	0.51	1.00	0.05	0.35		0.24	0.24		0.24	0.24	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	357	1725	1531	76	1119		280	420		294	424	
v/s Ratio Prot	c0.15	0.21		0.02	c0.24			0.06			0.06	
v/s Ratio Perm			c0.44				c0.22			0.14		
v/c Ratio	0.72	0.41	0.44	0.36	0.69		0.93	0.24		0.60	0.26	
Uniform Delay, d1	33.0	13.5	0.0	41.7	25.2		33.5	27.7		30.4	27.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.1	0.2	0.9	2.8	1.9		34.9	0.3		3.5	0.3	
Delay (s)	40.0	13.6	0.9	44.5	27.0		68.4	28.0		33.9	28.1	
Level of Service	D	B	A	D	C		E	C		C	C	
Approach Delay (s/veh)		12.6			27.6			56.6			31.6	
Approach LOS		B			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	1	248	1189	266	6	49	852	111	57	1	11	62
Future Volume (vph)	1	248	1189	266	6	49	852	111	57	1	11	62
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.973				0.983				0.850	
Flt Protected		0.950				0.950				0.953		
Satd. Flow (prot)	0	3502	3428	0	0	1685	3230	0	0	1835	1615	0
Flt Permitted		0.950				0.950				0.660		
Satd. Flow (perm)	0	3502	3428	0	0	1685	3230	0	0	1271	1615	0
Satd. Flow (RTOR)			49				23				164	
Adj. Flow (vph)	1	288	1383	309	7	55	957	125	76	1	15	75
Lane Group Flow (vph)	0	289	1692	0	0	62	1082	0	0	77	15	0
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Perm	NA	Perm	Perm
Protected Phases	5	5	2		1	1	6			8		
Permitted Phases									8		8	3
Detector Phase	5	5	2		1	1	6		8	8	8	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0		6.0	6.0	6.0		6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	11.0		11.0	11.0	11.0		11.0	11.0	11.0	11.0
Total Split (s)	26.0	26.0	45.0		20.0	20.0	39.0		15.0	15.0	15.0	15.0
Total Split (%)	32.5%	32.5%	56.3%		25.0%	25.0%	48.8%		18.8%	18.8%	18.8%	18.8%
Maximum Green (s)	21.0	21.0	40.0		15.0	15.0	34.0		10.0	10.0	10.0	10.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0	-1.0			-1.0	-1.0			-1.0	-1.0	
Total Lost Time (s)		4.0	4.0			4.0	4.0			4.0	4.0	
Lead/Lag	Lead	Lead	Lead		Lag	Lag	Lag					
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None	None	C-Min		None	None	C-Min		None	None	None	None
v/c Ratio		0.55	0.75			0.27	0.56			0.48	0.04	
Control Delay (s/veh)		34.3	16.7			32.7	12.3			42.0	0.3	
Queue Delay		0.0	0.0			0.0	0.0			0.0	0.0	
Total Delay (s/veh)		34.3	16.7			32.7	12.3			42.0	0.3	
Queue Length 50th (ft)		76	224			29	177			36	0	
Queue Length 95th (ft)		86	#552			58	261			64	0	
Internal Link Dist (ft)			654				1435			1094		
Turn Bay Length (ft)		500				170					165	
Base Capacity (vph)		963	2243			337	1947			181	371	
Starvation Cap Reductn		0	0			0	0			0	0	
Spillback Cap Reductn		0	0			0	0			0	0	
Storage Cap Reductn		0	0			0	0			0	0	
Reduced v/c Ratio		0.30	0.75			0.18	0.56			0.43	0.04	

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 9 (11%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 60

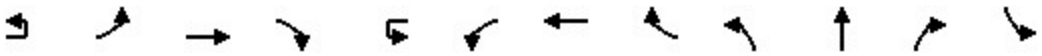
Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	17	120
Future Volume (vph)	17	120
Lane Util. Factor	1.00	1.00
Frt		0.850
Flt Protected	0.962	
Satd. Flow (prot)	1799	1812
Flt Permitted	0.720	
Satd. Flow (perm)	1347	1812
Satd. Flow (RTOR)		232
Adj. Flow (vph)	20	145
Lane Group Flow (vph)	95	145
Turn Type	NA	Free
Protected Phases	3	
Permitted Phases		Free
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	6.0	
Minimum Split (s)	11.0	
Total Split (s)	15.0	
Total Split (%)	18.8%	
Maximum Green (s)	10.0	
Yellow Time (s)	4.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)	-1.0	
Total Lost Time (s)	4.0	
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	
Recall Mode	None	
v/c Ratio	0.55	0.08
Control Delay (s/veh)	45.0	0.1
Queue Delay	0.0	0.0
Total Delay (s/veh)	45.0	0.1
Queue Length 50th (ft)	45	0
Queue Length 95th (ft)	84	0
Internal Link Dist (ft)	310	
Turn Bay Length (ft)		100
Base Capacity (vph)	192	1812
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.49	0.08

Intersection Summary

Control Type: Actuated-Coordinated

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

Splits and Phases: 2: Federal Street/Old River Road & River Road



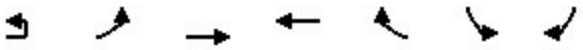
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	1	248	1189	266	6	49	852	111	57	1	11	62
Future Volume (vph)	1	248	1189	266	6	49	852	111	57	1	11	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10	11	11	13	13	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0			4.0	4.0	
Lane Util. Factor		0.97	0.95			1.00	0.95			1.00	1.00	
Frt		1.00	0.97			1.00	0.98			1.00	0.85	
Flt Protected		0.95	1.00			0.95	1.00			0.95	1.00	
Satd. Flow (prot)		3502	3427			1685	3229			1835	1615	
Flt Permitted		0.95	1.00			0.95	1.00			0.66	1.00	
Satd. Flow (perm)		3502	3427			1685	3229			1271	1615	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.89	0.89	0.89	0.89	0.75	0.75	0.75	0.83
Adj. Flow (vph)	1	288	1383	309	7	55	957	125	76	1	15	75
RTOR Reduction (vph)	0	0	19	0	0	0	9	0	0	0	13	0
Lane Group Flow (vph)	0	289	1673	0	0	62	1073	0	0	77	2	0
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	7%	0%	2%	0%	0%	2%
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Perm	NA	Perm	Perm
Protected Phases	5	5	2		1	1	6			8		
Permitted Phases									8		8	3
Actuated Green, G (s)		11.0	48.2			8.8	46.0			8.0	8.0	
Effective Green, g (s)		12.0	49.2			9.8	47.0			9.0	9.0	
Actuated g/C Ratio		0.15	0.62			0.12	0.59			0.11	0.11	
Clearance Time (s)		5.0	5.0			5.0	5.0			5.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)		525	2107			206	1897			142	181	
v/s Ratio Prot		0.08	c0.49			0.04	c0.33					
v/s Ratio Perm										0.06	0.00	
v/c Ratio		0.55	0.79			0.30	0.57			0.54	0.01	
Uniform Delay, d1		31.5	11.6			32.0	10.2			33.6	31.5	
Progression Factor		0.99	1.05			1.00	1.00			1.00	1.00	
Incremental Delay, d2		0.6	2.7			0.3	1.2			2.3	0.0	
Delay (s)		31.9	14.8			32.3	11.4			35.8	31.5	
Level of Service		C	B			C	B			D	C	
Approach Delay (s/veh)			17.3				12.5			35.1		
Approach LOS			B				B			D		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	17	120
Future Volume (vph)	17	120
Ideal Flow (vphpl)	1900	1900
Lane Width	12	16
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1799	1812
Flt Permitted	0.72	1.00
Satd. Flow (perm)	1346	1812
Peak-hour factor, PHF	0.83	0.83
Adj. Flow (vph)	20	145
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	95	145
Heavy Vehicles (%)	0%	1%
Turn Type	NA	Free
Protected Phases	3	
Permitted Phases		Free
Actuated Green, G (s)	8.0	80.0
Effective Green, g (s)	9.0	80.0
Actuated g/C Ratio	0.11	1.00
Clearance Time (s)	5.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	151	1812
v/s Ratio Prot		
v/s Ratio Perm	c0.07	0.08
v/c Ratio	0.63	0.08
Uniform Delay, d1	33.9	0.0
Progression Factor	1.00	1.00
Incremental Delay, d2	5.8	0.1
Delay (s)	39.7	0.1
Level of Service	D	A
Approach Delay (s/veh)	15.8	
Approach LOS	B	

Intersection Summary



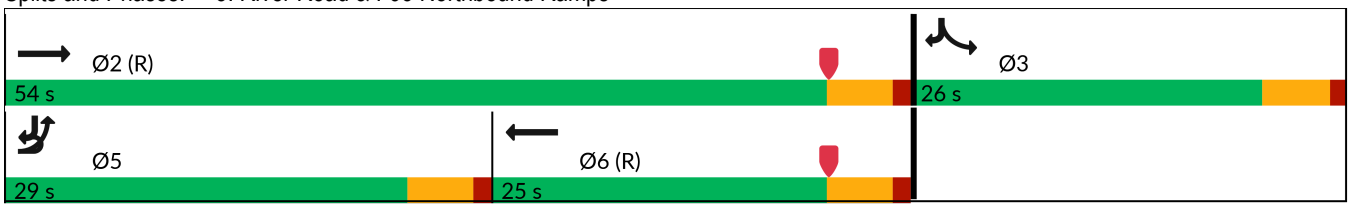
Lane Group	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	6	227	1236	513	515	466	333
Future Volume (vph)	6	227	1236	513	515	466	333
Lane Util. Factor	0.95	0.97	0.95	0.95	1.00	0.97	0.88
Frt					0.850		0.850
Flt Protected		0.950				0.950	
Satd. Flow (prot)	0	3289	3539	3406	1553	3400	2787
Flt Permitted		0.950				0.950	
Satd. Flow (perm)	0	3289	3539	3406	1553	3400	2787
Satd. Flow (RTOR)					560		
Adj. Flow (vph)	7	255	1389	558	560	536	383
Lane Group Flow (vph)	0	262	1389	558	560	536	383
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Detector Phase	5	5	2	6		3	3 5
Switch Phase							
Minimum Initial (s)	6.0	6.0	6.0	6.0		6.0	
Minimum Split (s)	11.0	11.0	11.0	11.0		11.0	
Total Split (s)	29.0	29.0	54.0	25.0		26.0	
Total Split (%)	36.3%	36.3%	67.5%	31.3%		32.5%	
Maximum Green (s)	24.0	24.0	49.0	20.0		21.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0	-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead		Lag			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0	2.0	2.0	2.0		2.0	
Recall Mode	None	None	C-Min	C-Min		Min	
v/c Ratio		0.54	0.58	0.34	0.36	0.70	0.33
Control Delay (s/veh)		42.3	4.8	25.0	0.6	33.6	15.4
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)		42.3	4.8	25.0	0.6	33.6	15.4
Queue Length 50th (ft)		69	88	130	0	130	71
Queue Length 95th (ft)		96	130	217	0	164	84
Internal Link Dist (ft)			1040	654		885	
Turn Bay Length (ft)		650					650
Base Capacity (vph)		1027	2391	1629	1553	935	1617
Starvation Cap Reductn		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0
Reduced v/c Ratio		0.26	0.58	0.34	0.36	0.57	0.24

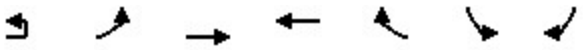
Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 40

Control Type: Actuated-Coordinated

! Phase conflict between lane groups.

Splits and Phases: 3: River Road & I-93 Northbound Ramps





Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	6	227	1236	513	515	466	333
Future Volume (vph)	6	227	1236	513	515	466	333
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	12	12	12
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.97	0.95	0.95	1.00	0.97	0.88
Frt		1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3289	3539	3406	1553	3400	2787
Flt Permitted		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3289	3539	3406	1553	3400	2787
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.87	0.87
Adj. Flow (vph)	7	255	1389	558	560	536	383
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	262	1389	558	560	536	383
Heavy Vehicles (%)	0%	3%	2%	6%	4%	3%	2%
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Actuated Green, G (s)		10.8	53.1	37.3	80.0	16.9	32.7
Effective Green, g (s)		11.8	54.1	38.3	80.0	17.9	33.7
Actuated g/C Ratio		0.15	0.68	0.48	1.00	0.22	0.42
Clearance Time (s)		5.0	5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)		485	2393	1630	1553	760	1174
v/s Ratio Prot		0.08	c0.39	0.16		c0.16	0.14
v/s Ratio Perm					0.36		
v/c Ratio		0.54	0.58	0.34	0.36	0.71	0.33
Uniform Delay, d1		31.6	6.9	13.0	0.0	28.6	15.5
Progression Factor		1.24	0.52	1.69	1.00	1.00	1.00
Incremental Delay, d2		0.6	0.9	0.5	0.6	2.4	0.1
Delay (s)		39.8	4.5	22.5	0.6	31.1	15.6
Level of Service		D	A	C	A	C	B
Approach Delay (s/veh)			10.1	11.5		24.6	
Approach LOS			B	B		C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

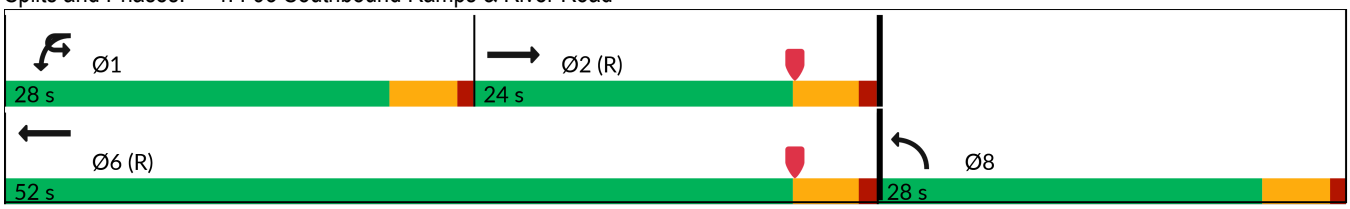
! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	467	123	2	202	646	829	1000
Future Volume (vph)	467	123	2	202	646	829	1000
Lane Util. Factor	0.95	1.00	0.95	0.97	0.95	0.97	1.00
Frt		0.850					0.850
Flt Protected				0.950		0.950	
Satd. Flow (prot)	3438	1711	0	3136	3505	3433	1812
Flt Permitted				0.950		0.950	
Satd. Flow (perm)	3438	1711	0	3136	3505	3433	1812
Satd. Flow (RTOR)		162					780
Adj. Flow (vph)	614	162	2	224	718	921	1111
Lane Group Flow (vph)	614	162	0	226	718	921	1111
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Detector Phase	2		1	1	6	8	
Switch Phase							
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0		11.0	11.0	11.0	27.0	
Total Split (s)	24.0		28.0	28.0	52.0	28.0	
Total Split (%)	30.0%		35.0%	35.0%	65.0%	35.0%	
Maximum Green (s)	19.0		23.0	23.0	47.0	23.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0			4.0	4.0	4.0	
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0	
Recall Mode	C-Min		None	None	C-Min	Min	
Walk Time (s)						6.0	
Flash Don't Walk (s)						16.0	
Pedestrian Calls (#/hr)						0	
v/c Ratio	0.44	0.09		0.52	0.35	0.87	0.61
Control Delay (s/veh)	13.7	0.1		38.8	12.3	37.2	1.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	13.7	0.1		38.8	12.3	37.2	1.6
Queue Length 50th (ft)	73	0		62	110	212	0
Queue Length 95th (ft)	80	0		106	174	#340	0
Internal Link Dist (ft)	1168				1040	800	
Turn Bay Length (ft)		430		250			480
Base Capacity (vph)	1386	1711		940	2122	1073	1812
Starvation Cap Reductn	0	0		0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0
Reduced v/c Ratio	0.44	0.09		0.24	0.34	0.86	0.61

Intersection Summary
Cycle Length: 80

Actuated Cycle Length: 80
Offset: 53 (66%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 55
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: I-93 Southbound Ramps & River Road



Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	467	123	2	202	646	829	1000
Future Volume (vph)	467	123	2	202	646	829	1000
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	11	11	12	12	16
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00		0.97	0.95	0.97	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3438	1711		3136	3505	3433	1812
Flt Permitted	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3438	1711		3136	3505	3433	1812
Peak-hour factor, PHF	0.76	0.76	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	614	162	2	224	718	921	1111
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	614	162	0	226	718	921	1111
Heavy Vehicles (%)	5%	7%	0%	8%	3%	2%	1%
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Actuated Green, G (s)	31.2	80.0		10.2	46.4	23.6	80.0
Effective Green, g (s)	32.2	80.0		11.2	47.4	24.6	80.0
Actuated g/C Ratio	0.40	1.00		0.14	0.59	0.31	1.00
Clearance Time (s)	5.0			5.0	5.0	5.0	
Vehicle Extension (s)	2.0			2.0	2.0	2.0	
Lane Grp Cap (vph)	1383	1711		439	2076	1055	1812
v/s Ratio Prot	0.18			0.07	0.20	c0.27	
v/s Ratio Perm		0.09					c0.61
v/c Ratio	0.44	0.09		0.51	0.35	0.87	0.61
Uniform Delay, d1	17.4	0.0		31.9	8.4	26.2	0.0
Progression Factor	0.70	1.00		1.10	1.39	1.00	1.00
Incremental Delay, d2	1.0	0.1		0.4	0.4	7.9	1.6
Delay (s)	13.1	0.1		35.5	12.0	34.1	1.6
Level of Service	B	A		D	B	C	A
Approach Delay (s/veh)	10.4				17.6	16.3	
Approach LOS	B				B	B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

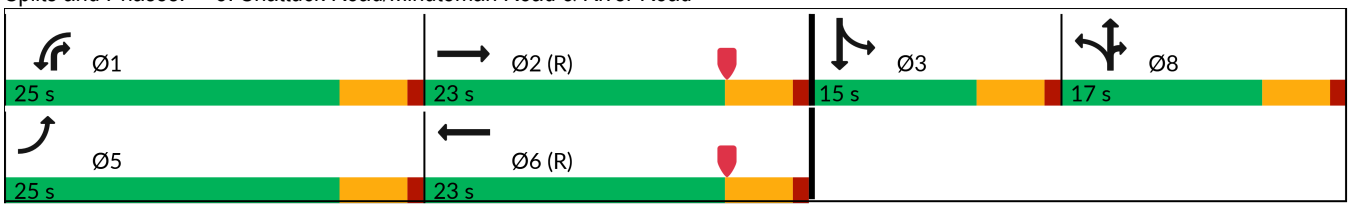
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	377	75	436	633	276	20	3	93	65	2	9
Future Volume (vph)	12	377	75	436	633	276	20	3	93	65	2	9
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	0.88	0.95	0.95	1.00
Frt		0.975				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.959		0.950	0.955	
Satd. Flow (prot)	1805	3434	0	3351	1863	1599	0	1701	2668	1573	1588	1615
Flt Permitted	0.950			0.950				0.959		0.950	0.955	
Satd. Flow (perm)	1805	3434	0	3351	1863	1599	0	1701	2668	1573	1588	1615
Satd. Flow (RTOR)		27				232						232
Adj. Flow (vph)	17	524	104	490	711	310	24	4	109	78	2	11
Lane Group Flow (vph)	17	628	0	490	711	310	0	28	109	40	40	11
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Detector Phase	5	2		1	6		8	8	8 1	3	3	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	25.0	23.0		25.0	23.0		17.0	17.0		15.0	15.0	
Total Split (%)	31.3%	28.8%		31.3%	28.8%		21.3%	21.3%		18.8%	18.8%	
Maximum Green (s)	20.0	18.0		20.0	18.0		12.0	12.0		10.0	10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
v/c Ratio	0.11	0.41		0.69	0.56	0.19		0.17	0.12	0.25	0.25	0.01
Control Delay (s/veh)	35.0	18.4		39.2	7.2	0.2		35.2	16.5	36.9	36.8	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.0	18.4		39.2	7.2	0.2		35.2	16.5	36.9	36.8	0.0
Queue Length 50th (ft)	8	115		109	55	0		13	21	21	20	0
Queue Length 95th (ft)	21	144		m121	m360	m0		34	32	48	45	0
Internal Link Dist (ft)		1189			1168			1114			744	
Turn Bay Length (ft)	80			350					200			150
Base Capacity (vph)	473	1543		882	1281	1599		276	1023	216	218	1615
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.04	0.41		0.56	0.56	0.19		0.10	0.11	0.19	0.18	0.01

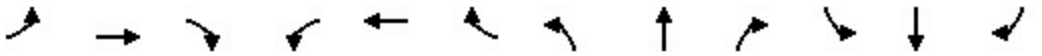
Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 39 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 5: Shattuck Road/Minuteman Road & River Road



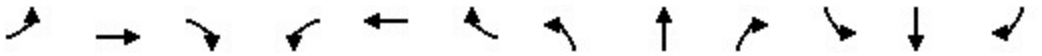


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	377	75	436	633	276	20	3	93	65	2	9
Future Volume (vph)	12	377	75	436	633	276	20	3	93	65	2	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	10	10	11	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		1.00	0.88	0.95	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1805	3434		3351	1863	1599		1700	2668	1573	1587	1615
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1805	3434		3351	1863	1599		1700	2668	1573	1587	1615
Peak-hour factor, PHF	0.72	0.72	0.72	0.89	0.89	0.89	0.85	0.85	0.85	0.83	0.83	0.83
Adj. Flow (vph)	17	524	104	490	711	310	24	4	109	78	2	11
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	612	0	490	711	310	0	28	109	40	40	11
Heavy Vehicles (%)	0%	3%	0%	1%	2%	1%	0%	0%	3%	9%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Actuated Green, G (s)	1.3	32.6		16.0	47.3	80.0		5.6	26.6	5.8	5.8	80.0
Effective Green, g (s)	2.3	33.6		17.0	48.3	80.0		6.6	27.6	6.8	6.8	80.0
Actuated g/C Ratio	0.03	0.42		0.21	0.60	1.00		0.08	0.35	0.09	0.09	1.00
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	51	1442		712	1124	1599		140	920	133	134	1615
v/s Ratio Prot	0.01	0.18		c0.15	c0.38			0.02	0.04	0.03	0.03	
v/s Ratio Perm						c0.19						0.01
v/c Ratio	0.33	0.42		0.69	0.63	0.19		0.20	0.12	0.30	0.30	0.01
Uniform Delay, d1	38.1	16.4		29.1	10.2	0.0		34.2	17.9	34.4	34.4	0.0
Progression Factor	1.00	1.00		1.22	0.46	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.9		1.7	2.1	0.2		0.3	0.0	0.5	0.5	0.0
Delay (s)	39.5	17.3		37.2	6.8	0.2		34.5	17.9	34.8	34.8	0.0
Level of Service	D	B		D	A	A		C	B	C	C	A
Approach Delay (s/veh)		17.9			15.3			21.3			30.6	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2032 No-Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	644	606	28	817	113	295	79	16	92	48	13
Future Volume (vph)	204	644	606	28	817	113	295	79	16	92	48	13
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.982			0.975			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1685	3355	1531	1678	3228	0	1694	1756	0	1728	1778	0
Flt Permitted	0.950			0.950			0.659			0.673		
Satd. Flow (perm)	1685	3355	1531	1678	3228	0	1175	1756	0	1224	1778	0
Satd. Flow (RTOR)			531		13			8			12	
Adj. Flow (vph)	258	815	767	30	869	120	339	91	18	177	92	25
Lane Group Flow (vph)	258	815	767	30	989	0	339	109	0	177	117	0
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	16.0		11.0	16.0		10.0	10.0		10.0	10.0	
Total Split (s)	25.0	45.0		12.0	32.0		29.0	29.0		29.0	29.0	
Total Split (%)	22.9%	41.3%		11.0%	29.4%		26.6%	26.6%		26.6%	26.6%	
Maximum Green (s)	19.0	39.0		6.0	26.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		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	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.71	0.46	0.50	0.20	0.95		1.01	0.22		0.51	0.23	
Control Delay (s/veh)	45.3	16.6	1.2	44.5	49.8		87.9	26.4		35.3	25.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	45.3	16.6	1.2	44.5	49.8		87.9	26.4		35.3	25.7	
Queue Length 50th (ft)	125	109	0	16	282		186	41		80	43	
Queue Length 95th (ft)	228	269	0	53	#598		#465	105		99	59	
Internal Link Dist (ft)		1435			1194			1039			1055	
Turn Bay Length (ft)	150		200	130						100		
Base Capacity (vph)	403	1783	1531	153	1038		334	506		348	515	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.64	0.46	0.50	0.20	0.95		1.01	0.22		0.51	0.23	

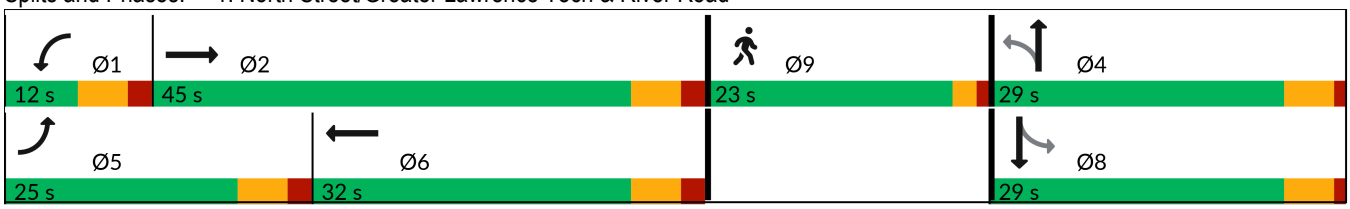
Intersection Summary
Cycle Length: 109

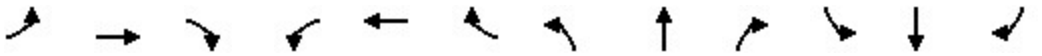
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	21%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Don't Walk (s)	13.0
Pedestrian Calls (#/hr)	4
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Actuated Cycle Length: 88.8
Natural Cycle: 140
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Street/Greater Lawrence Tech & River Road





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	644	606	28	817	113	295	79	16	92	48	13
Future Volume (vph)	204	644	606	28	817	113	295	79	16	92	48	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1685	3355	1531	1678	3228		1694	1756		1728	1778	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.66	1.00		0.67	1.00	
Satd. Flow (perm)	1685	3355	1531	1678	3228		1175	1756		1224	1778	
Peak-hour factor, PHF	0.79	0.79	0.79	0.94	0.94	0.94	0.87	0.87	0.87	0.52	0.52	0.52
Adj. Flow (vph)	258	815	767	30	869	120	339	91	18	177	92	25
RTOR Reduction (vph)	0	0	0	0	9	0	0	6	0	0	9	0
Lane Group Flow (vph)	258	815	767	30	980	0	339	103	0	177	108	0
Heavy Vehicles (%)	0%	4%	2%	4%	7%	0%	3%	1%	7%	1%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Actuated Green, G (s)	17.2	45.2	95.0	2.2	30.2		24.3	24.3		24.3	24.3	
Effective Green, g (s)	19.2	47.2	95.0	4.2	32.2		25.3	25.3		25.3	25.3	
Actuated g/C Ratio	0.20	0.50	1.00	0.04	0.34		0.27	0.27		0.27	0.27	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	340	1666	1531	74	1094		312	467		325	473	
v/s Ratio Prot	c0.15	0.24		0.02	c0.30			0.06			0.06	
v/s Ratio Perm			c0.50				c0.29			0.14		
v/c Ratio	0.76	0.49	0.50	0.41	0.90		1.09	0.22		0.54	0.23	
Uniform Delay, d1	35.7	15.9	0.0	44.2	29.8		34.8	27.2		29.9	27.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.4	0.2	1.2	3.6	9.7		76.0	0.2		1.9	0.2	
Delay (s)	45.1	16.1	1.2	47.8	39.5		110.9	27.4		31.8	27.5	
Level of Service	D	B	A	D	D		F	C		C	C	
Approach Delay (s/veh)		13.9			39.7			90.6			30.1	
Approach LOS		B			D			F			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	1	343	1406	266	7	49	1090	153	57	1	11	69
Future Volume (vph)	1	343	1406	266	7	49	1090	153	57	1	11	69
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.976				0.982				0.850	
Flt Protected		0.950				0.950				0.953		
Satd. Flow (prot)	0	3502	3437	0	0	1685	3229	0	0	1835	1615	0
Flt Permitted		0.950				0.950				0.655		
Satd. Flow (perm)	0	3502	3437	0	0	1685	3229	0	0	1261	1615	0
Satd. Flow (RTOR)			58				37				187	
Adj. Flow (vph)	1	399	1635	309	8	55	1225	172	76	1	15	83
Lane Group Flow (vph)	0	400	1944	0	0	63	1397	0	0	77	15	0
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Perm	NA	Perm	Perm
Protected Phases	5	5	2		1	1	6			8		
Permitted Phases									8		8	3
Detector Phase	5	5	2		1	1	6		8	8	8	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0		6.0	6.0	6.0		6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	11.0		11.0	11.0	11.0		11.0	11.0	11.0	11.0
Total Split (s)	14.0	14.0	47.0		11.0	11.0	44.0		12.0	12.0	12.0	12.0
Total Split (%)	20.0%	20.0%	67.1%		15.7%	15.7%	62.9%		17.1%	17.1%	17.1%	17.1%
Maximum Green (s)	9.0	9.0	42.0		6.0	6.0	39.0		7.0	7.0	7.0	7.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0	-1.0			-1.0	-1.0			-1.0	-1.0	
Total Lost Time (s)		4.0	4.0			4.0	4.0			4.0	4.0	
Lead/Lag	Lead	Lead	Lead		Lag	Lag	Lag					
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None	None	C-Min		None	None	C-Min		None	None	None	None
v/c Ratio		0.76	0.78			0.38	0.72			0.53	0.04	
Control Delay (s/veh)		37.7	10.1			36.4	13.3			44.2	0.3	
Queue Delay		0.0	0.0			0.0	0.0			0.0	0.0	
Total Delay (s/veh)		37.7	10.1			36.4	13.3			44.2	0.3	
Queue Length 50th (ft)		88	84			26	221			32	0	
Queue Length 95th (ft)		m#138	344			61	298			59	0	
Internal Link Dist (ft)			654				1435			1094		
Turn Bay Length (ft)		500				170					165	
Base Capacity (vph)		523	2487			168	1969			149	355	
Starvation Cap Reductn		0	0			0	0			0	0	
Spillback Cap Reductn		0	0			0	0			0	0	
Storage Cap Reductn		0	0			0	0			0	0	
Reduced v/c Ratio		0.76	0.78			0.38	0.71			0.52	0.04	

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 60 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	17	132
Future Volume (vph)	17	132
Lane Util. Factor	1.00	1.00
Frt		0.850
Flt Protected	0.961	
Satd. Flow (prot)	1797	1812
Flt Permitted	0.716	
Satd. Flow (perm)	1339	1812
Satd. Flow (RTOR)		265
Adj. Flow (vph)	20	159
Lane Group Flow (vph)	103	159
Turn Type	NA	Free
Protected Phases	3	
Permitted Phases		Free
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	6.0	
Minimum Split (s)	11.0	
Total Split (s)	12.0	
Total Split (%)	17.1%	
Maximum Green (s)	7.0	
Yellow Time (s)	4.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)	-1.0	
Total Lost Time (s)	4.0	
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	
Recall Mode	None	
v/c Ratio	0.67	0.09
Control Delay (s/veh)	53.4	0.1
Queue Delay	0.0	0.0
Total Delay (s/veh)	53.4	0.1
Queue Length 50th (ft)	43	0
Queue Length 95th (ft)	#100	0
Internal Link Dist (ft)	310	
Turn Bay Length (ft)		100
Base Capacity (vph)	158	1812
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.65	0.09

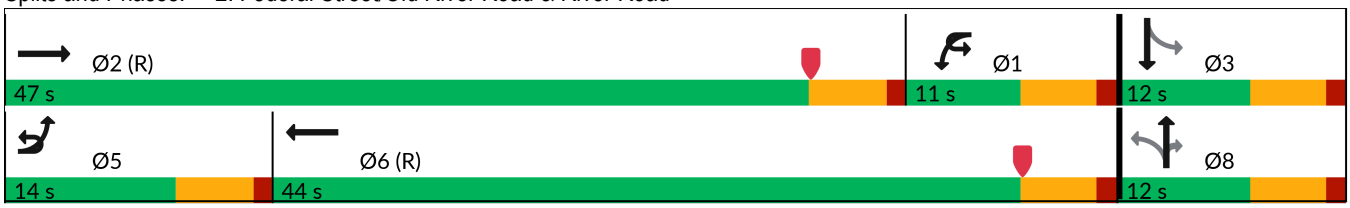
Intersection Summary

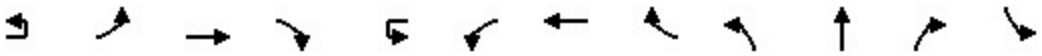
Control Type: Actuated-Coordinated

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

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

Splits and Phases: 2: Federal Street/Old River Road & River Road





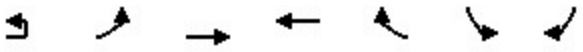
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	1	343	1406	266	7	49	1090	153	57	1	11	69
Future Volume (vph)	1	343	1406	266	7	49	1090	153	57	1	11	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10	11	11	13	13	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0			4.0	4.0	
Lane Util. Factor		0.97	0.95			1.00	0.95			1.00	1.00	
Frt		1.00	0.98			1.00	0.98			1.00	0.85	
Flt Protected		0.95	1.00			0.95	1.00			0.95	1.00	
Satd. Flow (prot)		3502	3437			1685	3227			1835	1615	
Flt Permitted		0.95	1.00			0.95	1.00			0.65	1.00	
Satd. Flow (perm)		3502	3437			1685	3227			1260	1615	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.89	0.89	0.89	0.89	0.75	0.75	0.75	0.83
Adj. Flow (vph)	1	399	1635	309	8	55	1225	172	76	1	15	83
RTOR Reduction (vph)	0	0	19	0	0	0	16	0	0	0	14	0
Lane Group Flow (vph)	0	400	1925	0	0	63	1381	0	0	77	1	0
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	7%	0%	2%	0%	0%	2%
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Perm	NA	Perm	Perm
Protected Phases	5	5	2		1	1	6			8		
Permitted Phases									8		8	3
Actuated Green, G (s)		9.5	45.5			3.6	39.6			5.9	5.9	
Effective Green, g (s)		10.5	46.5			4.6	40.6			6.9	6.9	
Actuated g/C Ratio		0.15	0.66			0.07	0.58			0.10	0.10	
Clearance Time (s)		5.0	5.0			5.0	5.0			5.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)		525	2283			110	1871			124	159	
v/s Ratio Prot		0.11	c0.56			0.04	c0.43					
v/s Ratio Perm										0.06	0.00	
v/c Ratio		0.76	0.84			0.57	0.74			0.62	0.01	
Uniform Delay, d1		28.6	9.0			31.7	10.8			30.3	28.5	
Progression Factor		1.01	0.80			1.00	1.00			1.00	1.00	
Incremental Delay, d2		4.1	2.8			4.4	2.7			6.8	0.0	
Delay (s)		33.0	10.0			36.2	13.5			37.1	28.5	
Level of Service		C	B			D	B			D	C	
Approach Delay (s/veh)			13.9				14.4			35.7		
Approach LOS			B				B			D		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	17	132
Future Volume (vph)	17	132
Ideal Flow (vphpl)	1900	1900
Lane Width	12	16
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1797	1812
Flt Permitted	0.72	1.00
Satd. Flow (perm)	1338	1812
Peak-hour factor, PHF	0.83	0.83
Adj. Flow (vph)	20	159
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	103	159
Heavy Vehicles (%)	0%	1%
Turn Type	NA	Free
Protected Phases	3	
Permitted Phases		Free
Actuated Green, G (s)	5.9	70.0
Effective Green, g (s)	6.9	70.0
Actuated g/C Ratio	0.10	1.00
Clearance Time (s)	5.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	131	1812
v/s Ratio Prot		
v/s Ratio Perm	c0.08	0.09
v/c Ratio	0.79	0.09
Uniform Delay, d1	30.8	0.0
Progression Factor	1.00	1.00
Incremental Delay, d2	24.2	0.1
Delay (s)	55.1	0.1
Level of Service	E	A
Approach Delay (s/veh)	21.7	
Approach LOS	C	

Intersection Summary



Lane Group	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	7	313	1471	700	578	543	661
Future Volume (vph)	7	313	1471	700	578	543	661
Lane Util. Factor	0.95	0.97	0.95	0.95	1.00	0.97	0.88
Frt					0.850		0.850
Flt Protected		0.950				0.950	
Satd. Flow (prot)	0	3289	3539	3406	1553	3400	2787
Flt Permitted		0.950				0.950	
Satd. Flow (perm)	0	3289	3539	3406	1553	3400	2787
Satd. Flow (RTOR)					628		
Adj. Flow (vph)	8	352	1653	761	628	624	760
Lane Group Flow (vph)	0	360	1653	761	628	624	760
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Detector Phase	5	5	2	6		3	3 5
Switch Phase							
Minimum Initial (s)	6.0	6.0	6.0	6.0		6.0	
Minimum Split (s)	11.0	11.0	11.0	11.0		11.0	
Total Split (s)	17.0	17.0	47.0	30.0		23.0	
Total Split (%)	24.3%	24.3%	67.1%	42.9%		32.9%	
Maximum Green (s)	12.0	12.0	42.0	25.0		18.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0	-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead		Lag			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0	2.0	2.0	2.0		2.0	
Recall Mode	None	None	C-Min	C-Min		Min	
v/c Ratio		0.64	0.74	0.56	0.40	0.72	0.56
Control Delay (s/veh)		35.7	7.3	12.8	0.6	29.0	14.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)		35.7	7.3	12.8	0.6	29.0	14.3
Queue Length 50th (ft)		76	108	74	0	126	114
Queue Length 95th (ft)		m94	420	120	0	172	160
Internal Link Dist (ft)			1040	654		885	
Turn Bay Length (ft)		650					650
Base Capacity (vph)		618	2233	1375	1553	922	1338
Starvation Cap Reductn		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0
Reduced v/c Ratio		0.58	0.74	0.55	0.40	0.68	0.57

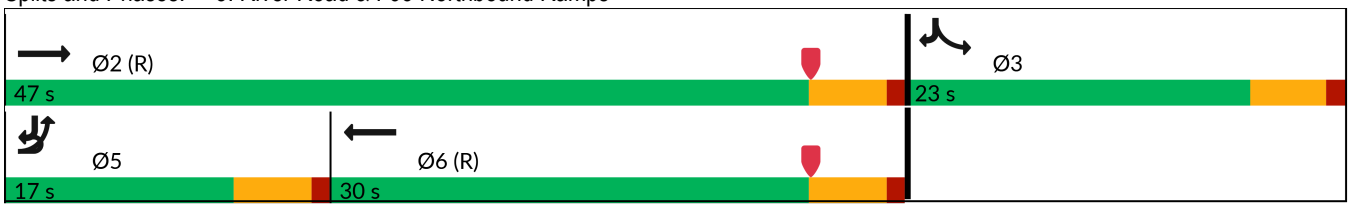
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 45

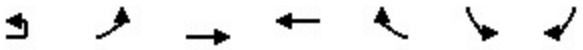
Control Type: Actuated-Coordinated

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

! Phase conflict between lane groups.

Splits and Phases: 3: River Road & I-93 Northbound Ramps





Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	7	313	1471	700	578	543	661
Future Volume (vph)	7	313	1471	700	578	543	661
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	12	12	12
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.97	0.95	0.95	1.00	0.97	0.88
Frt		1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3289	3539	3406	1553	3400	2787
Flt Permitted		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3289	3539	3406	1553	3400	2787
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.87	0.87
Adj. Flow (vph)	8	352	1653	761	628	624	760
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	360	1653	761	628	624	760
Heavy Vehicles (%)	0%	3%	2%	6%	4%	3%	2%
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Actuated Green, G (s)		11.1	43.2	27.1	70.0	16.8	32.9
Effective Green, g (s)		12.1	44.2	28.1	70.0	17.8	33.9
Actuated g/C Ratio		0.17	0.63	0.40	1.00	0.25	0.48
Clearance Time (s)		5.0	5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)		568	2234	1367	1553	864	1349
v/s Ratio Prot		0.11	c0.47	0.22		c0.18	0.27
v/s Ratio Perm					0.40		
v/c Ratio		0.63	0.74	0.56	0.40	0.72	0.56
Uniform Delay, d1		26.9	8.9	16.1	0.0	23.8	12.8
Progression Factor		1.20	0.61	0.67	1.00	1.00	1.00
Incremental Delay, d2		1.1	1.5	1.3	0.6	2.5	0.3
Delay (s)		33.3	6.9	12.1	0.6	26.4	13.1
Level of Service		C	A	B	A	C	B
Approach Delay (s/veh)			11.6	6.9		19.1	
Approach LOS			B	A		B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	631	208	2	226	1146	1169	1158
Future Volume (vph)	631	208	2	226	1146	1169	1158
Lane Util. Factor	0.95	1.00	0.95	0.97	0.95	0.97	1.00
Frt		0.850					0.850
Flt Protected				0.950		0.950	
Satd. Flow (prot)	3438	1711	0	3136	3505	3433	1812
Flt Permitted				0.950		0.950	
Satd. Flow (perm)	3438	1711	0	3136	3505	3433	1812
Satd. Flow (RTOR)		274					718
Adj. Flow (vph)	830	274	2	251	1273	1299	1287
Lane Group Flow (vph)	830	274	0	253	1273	1299	1287
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Detector Phase	2		1	1	6	8	
Switch Phase							
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0		11.0	11.0	11.0	27.0	
Total Split (s)	24.0		12.0	12.0	36.0	34.0	
Total Split (%)	34.3%		17.1%	17.1%	51.4%	48.6%	
Maximum Green (s)	19.0		7.0	7.0	31.0	29.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0			4.0	4.0	4.0	
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0	
Recall Mode	C-Min		None	None	C-Min	Min	
Walk Time (s)						6.0	
Flash Don't Walk (s)						16.0	
Pedestrian Calls (#/hr)						0	
v/c Ratio	0.81	0.16		0.71	0.78	0.91	0.71
Control Delay (s/veh)	22.9	0.2		39.9	16.4	29.8	2.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.9	0.2		39.9	16.4	29.8	2.4
Queue Length 50th (ft)	155	0		58	205	258	0
Queue Length 95th (ft)	171	0		#107	314	#392	0
Internal Link Dist (ft)	1168				1040	800	
Turn Bay Length (ft)		430		250			480
Base Capacity (vph)	1019	1711		358	1640	1471	1812
Starvation Cap Reductn	0	0		0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0
Reduced v/c Ratio	0.81	0.16		0.71	0.78	0.88	0.71

Intersection Summary
Cycle Length: 70

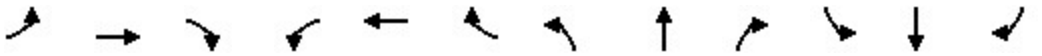
Actuated Cycle Length: 70
Offset: 34 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: I-93 Southbound Ramps & River Road

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	631	208	2	226	1146	1169	1158
Future Volume (vph)	631	208	2	226	1146	1169	1158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	11	11	12	12	16
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00		0.97	0.95	0.97	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3438	1711		3136	3505	3433	1812
Flt Permitted	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3438	1711		3136	3505	3433	1812
Peak-hour factor, PHF	0.76	0.76	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	830	274	2	251	1273	1299	1287
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	830	274	0	253	1273	1299	1287
Heavy Vehicles (%)	5%	7%	0%	8%	3%	2%	1%
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Actuated Green, G (s)	19.8	70.0		7.0	31.8	28.2	70.0
Effective Green, g (s)	20.8	70.0		8.0	32.8	29.2	70.0
Actuated g/C Ratio	0.30	1.00		0.11	0.47	0.42	1.00
Clearance Time (s)	5.0			5.0	5.0	5.0	
Vehicle Extension (s)	2.0			2.0	2.0	2.0	
Lane Grp Cap (vph)	1021	1711		358	1642	1432	1812
v/s Ratio Prot	0.24			0.08	c0.36	c0.38	
v/s Ratio Perm		0.16					c0.71
v/c Ratio	0.81	0.16		0.71	0.78	0.91	0.71
Uniform Delay, d1	22.8	0.0		29.9	15.5	19.1	0.0
Progression Factor	0.66	1.00		0.98	0.82	1.00	1.00
Incremental Delay, d2	6.3	0.2		4.3	3.1	8.4	2.4
Delay (s)	21.4	0.2		33.5	15.8	27.5	2.4
Level of Service	C	A		C	B	C	A
Approach Delay (s/veh)	16.1				18.8	15.0	
Approach LOS	B				B	B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	440	75	436	708	941	20	3	93	227	2	16
Future Volume (vph)	47	440	75	436	708	941	20	3	93	227	2	16
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	0.88	0.95	0.95	1.00
Frt		0.978				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.959		0.950	0.953	
Satd. Flow (prot)	1805	3442	0	3351	1863	1599	0	1701	2668	1573	1580	1615
Flt Permitted	0.950			0.950				0.959		0.950	0.953	
Satd. Flow (perm)	1805	3442	0	3351	1863	1599	0	1701	2668	1573	1580	1615
Satd. Flow (RTOR)		30				751						343
Adj. Flow (vph)	65	611	104	490	796	1057	24	4	109	273	2	19
Lane Group Flow (vph)	65	715	0	490	796	1057	0	28	109	136	139	19
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Detector Phase	5	2		1	6		8	8	8 1	3	3	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	11.0	28.0		20.0	37.0		11.0	11.0		11.0	11.0	
Total Split (%)	15.7%	40.0%		28.6%	52.9%		15.7%	15.7%		15.7%	15.7%	
Maximum Green (s)	6.0	23.0		15.0	32.0		6.0	6.0		6.0	6.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
v/c Ratio	0.36	0.54		0.71	0.78	0.66		0.16	0.12	0.73	0.74	0.01
Control Delay (s/veh)	35.6	19.3		27.1	21.3	1.2		31.4	14.8	56.6	57.7	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.6	19.3		27.1	21.3	1.2		31.4	14.8	56.6	57.7	0.0
Queue Length 50th (ft)	27	126		92	298	0		11	17	66	63	0
Queue Length 95th (ft)	49	135		m122	m#476	m0		32	31	#153	#146	0
Internal Link Dist (ft)		1189			1168			1114			744	
Turn Bay Length (ft)	80			350					200			150
Base Capacity (vph)	180	1340		765	1017	1599		170	945	187	188	1615
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.36	0.53		0.64	0.78	0.66		0.16	0.12	0.73	0.74	0.01

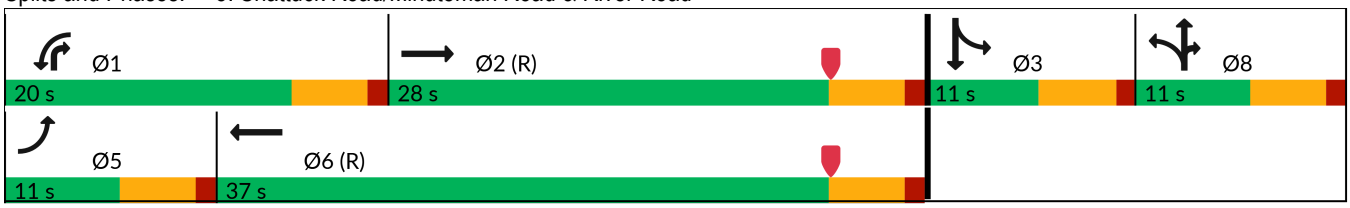
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 2 (3%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 75

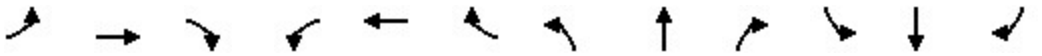
Control Type: Actuated-Coordinated

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

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

Splits and Phases: 5: Shattuck Road/Minuteman Road & River Road

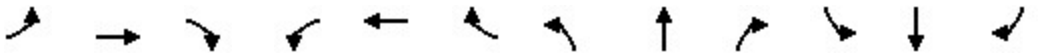




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	440	75	436	708	941	20	3	93	227	2	16
Future Volume (vph)	47	440	75	436	708	941	20	3	93	227	2	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	10	10	11	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		1.00	0.88	0.95	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1805	3443		3351	1863	1599		1700	2668	1573	1580	1615
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1805	3443		3351	1863	1599		1700	2668	1573	1580	1615
Peak-hour factor, PHF	0.72	0.72	0.72	0.89	0.89	0.89	0.85	0.85	0.85	0.83	0.83	0.83
Adj. Flow (vph)	65	611	104	490	796	1057	24	4	109	273	2	19
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	696	0	490	796	1057	0	28	109	136	139	19
Heavy Vehicles (%)	0%	3%	0%	1%	2%	1%	0%	0%	3%	9%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Actuated Green, G (s)	3.6	24.3		13.5	34.2	70.0		4.8	23.3	7.4	7.4	70.0
Effective Green, g (s)	4.6	25.3		14.5	35.2	70.0		5.8	24.3	8.4	8.4	70.0
Actuated g/C Ratio	0.07	0.36		0.21	0.50	1.00		0.08	0.35	0.12	0.12	1.00
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	118	1244		694	936	1599		140	926	188	189	1615
v/s Ratio Prot	0.04	0.20		0.15	c0.43			0.02	0.04	0.09	0.09	
v/s Ratio Perm						c0.66						0.01
v/c Ratio	0.55	0.56		0.71	0.85	0.66		0.20	0.12	0.72	0.74	0.01
Uniform Delay, d1	31.7	17.9		25.8	15.1	0.0		29.9	15.6	29.7	29.7	0.0
Progression Factor	1.00	1.00		0.93	1.08	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	1.8		1.4	5.4	1.2		0.3	0.0	11.0	12.0	0.0
Delay (s)	34.8	19.7		25.4	21.7	1.2		30.2	15.6	40.7	41.8	0.0
Level of Service	C	B		C	C	A		C	B	D	D	A
Approach Delay (s/veh)		21.0			13.2			18.6			38.6	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	623	345	24	835	12	215	21	27	16	14	14
Future Volume (vph)	29	623	345	24	835	12	215	21	27	16	14	14
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.915			0.925	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1532	3355	1546	1745	3415	0	1711	1609	0	1745	1699	0
Flt Permitted	0.950			0.950			0.738			0.719		
Satd. Flow (perm)	1532	3355	1546	1745	3415	0	1329	1609	0	1321	1699	0
Satd. Flow (RTOR)			312		1			33			15	
Adj. Flow (vph)	30	649	359	28	982	14	259	25	33	17	15	15
Lane Group Flow (vph)	30	649	359	28	996	0	259	58	0	17	30	0
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	16.0		11.0	16.0		10.0	10.0		10.0	10.0	
Total Split (s)	11.0	43.0		11.0	43.0		32.0	32.0		32.0	32.0	
Total Split (%)	10.1%	39.4%		10.1%	39.4%		29.4%	29.4%		29.4%	29.4%	
Maximum Green (s)	5.0	37.0		5.0	37.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		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	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.17	0.42	0.23	0.14	0.64		0.61	0.11		0.04	0.05	
Control Delay (s/veh)	41.2	16.6	0.4	40.5	19.7		31.9	14.3		24.1	16.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	41.2	16.6	0.4	40.5	19.7		31.9	14.3		24.1	16.7	
Queue Length 50th (ft)	11	73	0	10	126		76	6		4	4	
Queue Length 95th (ft)	56	254	0	46	385		243	43		27	32	
Internal Link Dist (ft)		1435			1194			1039			1055	
Turn Bay Length (ft)	150		200	130						100		
Base Capacity (vph)	178	2180	1546	203	2219		620	768		616	800	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.30	0.23	0.14	0.45		0.42	0.08		0.03	0.04	

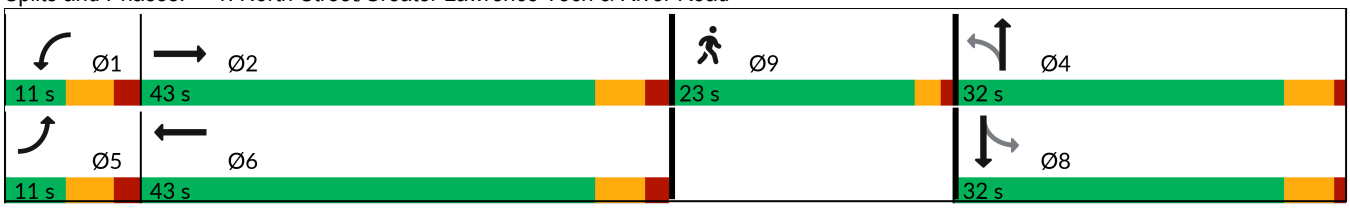
Intersection Summary
Cycle Length: 109

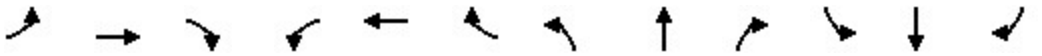
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	21%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Don't Walk (s)	13.0
Pedestrian Calls (#/hr)	4
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Actuated Cycle Length: 68
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: North Street/Greater Lawrence Tech & River Road





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	623	345	24	835	12	215	21	27	16	14	14
Future Volume (vph)	29	623	345	24	835	12	215	21	27	16	14	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1532	3355	1546	1745	3415		1711	1609		1745	1699	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	1.00		0.72	1.00	
Satd. Flow (perm)	1532	3355	1546	1745	3415		1328	1609		1321	1699	
Peak-hour factor, PHF	0.96	0.96	0.96	0.85	0.85	0.85	0.83	0.83	0.83	0.92	0.92	0.92
Adj. Flow (vph)	30	649	359	28	982	14	259	25	33	17	15	15
RTOR Reduction (vph)	0	0	0	0	1	0	0	23	0	0	11	0
Lane Group Flow (vph)	30	649	359	28	995	0	259	35	0	17	19	0
Heavy Vehicles (%)	10%	4%	1%	0%	2%	0%	2%	5%	4%	0%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Actuated Green, G (s)	1.5	28.9	73.4	1.5	28.9		20.5	20.5		20.5	20.5	
Effective Green, g (s)	3.5	30.9	73.4	3.5	30.9		21.5	21.5		21.5	21.5	
Actuated g/C Ratio	0.05	0.42	1.00	0.05	0.42		0.29	0.29		0.29	0.29	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	73	1412	1546	83	1437		388	471		386	497	
v/s Ratio Prot	0.02	0.19		0.02	c0.29			0.02			0.01	
v/s Ratio Perm			c0.23				c0.19			0.01		
v/c Ratio	0.41	0.46	0.23	0.34	0.69		0.67	0.07		0.04	0.04	
Uniform Delay, d1	33.9	15.3	0.0	33.8	17.4		22.8	18.8		18.6	18.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.7	0.2	0.4	2.4	1.5		4.3	0.1		0.0	0.0	
Delay (s)	37.7	15.5	0.4	36.2	18.8		27.1	18.8		18.6	18.6	
Level of Service	D	B	A	D	B		C	B		B	B	
Approach Delay (s/veh)		10.9			19.3			25.6			18.6	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	3	91	915	46	5	999	56	280	5	58	101	1
Future Volume (vph)	3	91	915	46	5	999	56	280	5	58	101	1
Lane Util. Factor	0.95	0.97	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Frt			0.993			0.992				0.850		
Flt Protected		0.950			0.950				0.953			0.953
Satd. Flow (prot)	0	3403	3453	0	1685	3397	0	0	1871	1615	0	1758
Flt Permitted		0.950			0.950				0.598			0.357
Satd. Flow (perm)	0	3403	3453	0	1685	3397	0	0	1174	1615	0	659
Satd. Flow (RTOR)			7			8				164		
Adj. Flow (vph)	3	96	963	48	5	1052	59	318	6	66	151	1
Lane Group Flow (vph)	0	99	1011	0	5	1111	0	0	324	66	0	152
Turn Type	Prot	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA
Protected Phases	5	5	2		1	6			8			3
Permitted Phases								8		8	3	
Detector Phase	5	5	2		1	6		8	8	8	3	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0
Total Split (s)	11.0	11.0	36.0		11.0	36.0		33.0	33.0	33.0	33.0	33.0
Total Split (%)	13.8%	13.8%	45.0%		13.8%	45.0%		41.3%	41.3%	41.3%	41.3%	41.3%
Maximum Green (s)	6.0	6.0	31.0		6.0	31.0		28.0	28.0	28.0	28.0	28.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0	-1.0		-1.0	-1.0			-1.0	-1.0		-1.0
Total Lost Time (s)		4.0	4.0		4.0	4.0			4.0	4.0		4.0
Lead/Lag	Lead	Lead	Lead		Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	C-Min		None	C-Min		None	None	None	None	None
v/c Ratio		0.33	0.53		0.03	0.69			0.87	0.11		0.73
Control Delay (s/veh)		43.9	5.8		34.0	21.4			49.6	0.3		44.9
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0		0.0
Total Delay (s/veh)		43.9	5.8		34.0	21.4			49.6	0.3		44.9
Queue Length 50th (ft)		24	71		2	251			144	0		64
Queue Length 95th (ft)		m45	101		13	339			#261	0		85
Internal Link Dist (ft)			654			1435			1094			310
Turn Bay Length (ft)		500			170					165		
Base Capacity (vph)		303	1920		147	1604			425	689		238
Starvation Cap Reductn		0	0		0	0			0	0		0
Spillback Cap Reductn		0	0		0	0			0	0		0
Storage Cap Reductn		0	0		0	0			0	0		0
Reduced v/c Ratio		0.33	0.53		0.03	0.69			0.76	0.10		0.64

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 58 (73%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 60

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	415
Future Volume (vph)	415
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1830
Flt Permitted	
Satd. Flow (perm)	1830
Satd. Flow (RTOR)	281
Adj. Flow (vph)	619
Lane Group Flow (vph)	619
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Recall Mode	
v/c Ratio	0.34
Control Delay (s/veh)	0.5
Queue Delay	0.0
Total Delay (s/veh)	0.5
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	100
Base Capacity (vph)	1830
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.34

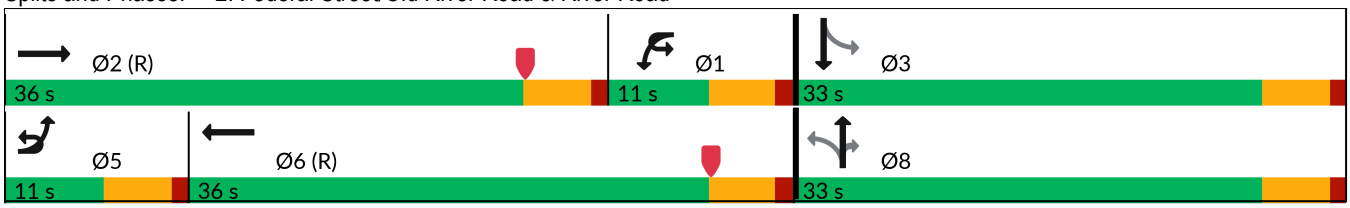
Intersection Summary

Control Type: Actuated-Coordinated

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

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

Splits and Phases: 2: Federal Street/Old River Road & River Road



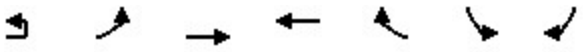
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	3	91	915	46	5	999	56	280	5	58	101	1
Future Volume (vph)	3	91	915	46	5	999	56	280	5	58	101	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	11	11	13	13	12	12	12
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.97	0.95		1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.99		1.00	0.99			1.00	0.85		1.00
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		0.95
Satd. Flow (prot)		3403	3453		1685	3398			1871	1615		1758
Flt Permitted		0.95	1.00		0.95	1.00			0.60	1.00		0.36
Satd. Flow (perm)		3403	3453		1685	3398			1174	1615		658
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.88	0.88	0.88	0.67	0.67
Adj. Flow (vph)	3	96	963	48	5	1052	59	318	6	66	151	1
RTOR Reduction (vph)	0	0	3	0	0	4	0	0	0	45	0	0
Lane Group Flow (vph)	0	99	1008	0	5	1107	0	0	324	21	0	152
Heavy Vehicles (%)	0%	3%	4%	0%	0%	2%	0%	0%	0%	0%	3%	0%
Turn Type	Prot	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA
Protected Phases	5	5	2		1	6			8			3
Permitted Phases								8		8	3	
Actuated Green, G (s)		4.9	39.4		1.2	35.7			24.4	24.4		24.4
Effective Green, g (s)		5.9	40.4		2.2	36.7			25.4	25.4		25.4
Actuated g/C Ratio		0.07	0.51		0.03	0.46			0.32	0.32		0.32
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		5.0
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lane Grp Cap (vph)		250	1743		46	1558			372	512		208
v/s Ratio Prot		0.03	c0.29		0.00	c0.33						
v/s Ratio Perm									c0.28	0.01		0.23
v/c Ratio		0.40	0.58		0.11	0.71			0.87	0.04		0.73
Uniform Delay, d1		35.3	13.8		37.9	17.4			25.8	18.9		24.3
Progression Factor		1.20	0.37		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2		0.4	1.3		0.4	2.8			18.9	0.0		10.8
Delay (s)		42.6	6.4		38.3	20.2			44.6	18.9		35.0
Level of Service		D	A		D	C			D	B		D
Approach Delay (s/veh)			9.7			20.2			40.3			7.3
Approach LOS			A			C			D			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	415
Future Volume (vph)	415
Ideal Flow (vphpl)	1900
Lane Width	16
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1830
Flt Permitted	1.00
Satd. Flow (perm)	1830
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	619
RTOR Reduction (vph)	0
Lane Group Flow (vph)	619
Heavy Vehicles (%)	0%
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Actuated Green, G (s)	80.0
Effective Green, g (s)	80.0
Actuated g/C Ratio	1.00
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1830
v/s Ratio Prot	
v/s Ratio Perm	0.34
v/c Ratio	0.34
Uniform Delay, d1	0.0
Progression Factor	1.00
Incremental Delay, d2	0.5
Delay (s)	0.5
Level of Service	A
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary



Lane Group	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	1	882	897	844	852	157	216
Future Volume (vph)	1	882	897	844	852	157	216
Lane Util. Factor	0.95	0.97	0.95	0.95	1.00	0.97	0.88
Frt					0.850		0.850
Flt Protected		0.950				0.950	
Satd. Flow (prot)	0	3319	3505	3539	1599	3367	2733
Flt Permitted		0.950				0.950	
Satd. Flow (perm)	0	3319	3505	3539	1599	3367	2733
Satd. Flow (RTOR)					616		
Adj. Flow (vph)	1	1038	1055	1082	1092	185	254
Lane Group Flow (vph)	0	1039	1055	1082	1092	185	254
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Detector Phase	5	5	2	6		3	3 5
Switch Phase							
Minimum Initial (s)	6.0	6.0	6.0	6.0		6.0	
Minimum Split (s)	11.0	11.0	11.0	11.0		11.0	
Total Split (s)	34.0	34.0	69.0	35.0		11.0	
Total Split (%)	42.5%	42.5%	86.3%	43.8%		13.8%	
Maximum Green (s)	29.0	29.0	64.0	30.0		6.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0	-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead		Lag			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0	2.0	2.0	2.0		2.0	
Recall Mode	None	None	C-Min	C-Min		Min	
v/c Ratio		0.88	0.37	0.77	0.68	0.59	0.19
Control Delay (s/veh)		18.4	1.3	19.9	4.5	43.3	11.1
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)		18.4	1.3	19.9	4.5	43.3	11.1
Queue Length 50th (ft)		95	14	187	68	48	37
Queue Length 95th (ft)		m124	m15	183	32	77	56
Internal Link Dist (ft)			1040	654		885	
Turn Bay Length (ft)		650					650
Base Capacity (vph)		1244	2847	1418	1599	314	1416
Starvation Cap Reductn		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0
Reduced v/c Ratio		0.84	0.37	0.76	0.68	0.59	0.18

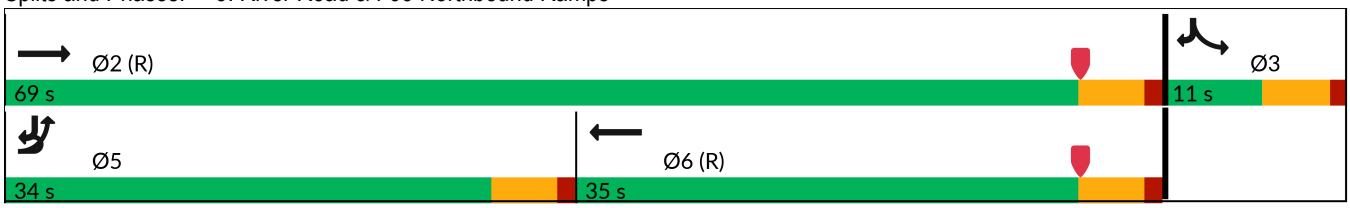
Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 60

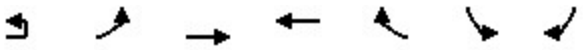
Control Type: Actuated-Coordinated

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

! Phase conflict between lane groups.

Splits and Phases: 3: River Road & I-93 Northbound Ramps





Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	1	882	897	844	852	157	216
Future Volume (vph)	1	882	897	844	852	157	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	12	12	12
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.97	0.95	0.95	1.00	0.97	0.88
Frt		1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3319	3505	3539	1599	3367	2733
Flt Permitted		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3319	3505	3539	1599	3367	2733
Peak-hour factor, PHF	0.85	0.85	0.85	0.78	0.78	0.85	0.85
Adj. Flow (vph)	1	1038	1055	1082	1092	185	254
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1039	1055	1082	1092	185	254
Heavy Vehicles (%)	0%	2%	3%	2%	1%	4%	4%
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Actuated Green, G (s)		27.6	63.5	30.9	80.0	6.5	39.1
Effective Green, g (s)		28.6	64.5	31.9	80.0	7.5	40.1
Actuated g/C Ratio		0.36	0.81	0.40	1.00	0.09	0.50
Clearance Time (s)		5.0	5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)		1186	2825	1411	1599	315	1369
v/s Ratio Prot		c0.31	0.30	0.31		0.05	0.09
v/s Ratio Perm					c0.68		
v/c Ratio		0.88	0.37	0.77	0.68	0.59	0.19
Uniform Delay, d1		24.0	2.1	20.8	0.0	34.8	11.0
Progression Factor		0.46	0.46	0.76	1.00	1.00	1.00
Incremental Delay, d2		5.1	0.3	3.4	2.0	1.8	0.0
Delay (s)		16.3	1.2	19.4	2.0	36.6	11.0
Level of Service		B	A	B	A	D	B
Approach Delay (s/veh)			8.7	10.7		21.8	
Approach LOS			A	B		C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

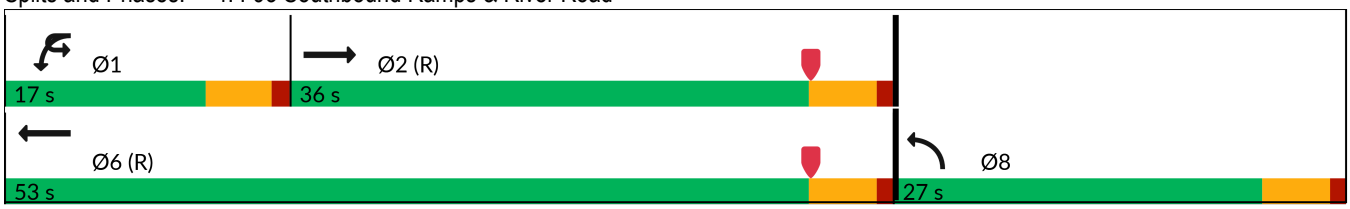
! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1197	768	3	508	551	374	580
Future Volume (vph)	1197	768	3	508	551	374	580
Lane Util. Factor	0.95	1.00	0.95	0.97	0.95	0.97	1.00
Frt		0.850					0.850
Flt Protected				0.950		0.950	
Satd. Flow (prot)	3574	1830	0	3352	3574	3467	1794
Flt Permitted				0.950		0.950	
Satd. Flow (perm)	3574	1830	0	3352	3574	3467	1794
Satd. Flow (RTOR)		873					571
Adj. Flow (vph)	1360	873	3	535	580	456	707
Lane Group Flow (vph)	1360	873	0	538	580	456	707
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Detector Phase	2		1	1	6	8	
Switch Phase							
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0		11.0	11.0	11.0	27.0	
Total Split (s)	36.0		17.0	17.0	53.0	27.0	
Total Split (%)	45.0%		21.3%	21.3%	66.3%	33.8%	
Maximum Green (s)	31.0		12.0	12.0	48.0	22.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0			4.0	4.0	4.0	
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0	
Recall Mode	C-Min		None	None	C-Min	Min	
Walk Time (s)						6.0	
Flash Don't Walk (s)						16.0	
Pedestrian Calls (#/hr)						0	
v/c Ratio	0.90	0.48		0.71	0.23	0.66	0.39
Control Delay (s/veh)	22.2	0.1		48.3	1.6	34.2	0.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.2	0.1		48.3	1.6	34.2	0.7
Queue Length 50th (ft)	293	0		143	10	110	0
Queue Length 95th (ft)	m284	m0		m#205	m24	131	0
Internal Link Dist (ft)	1168				1040	800	
Turn Bay Length (ft)		430		250			480
Base Capacity (vph)	1517	1830		760	2507	996	1794
Starvation Cap Reductn	0	0		0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0
Reduced v/c Ratio	0.90	0.48		0.71	0.23	0.46	0.39

Intersection Summary
Cycle Length: 80

Actuated Cycle Length: 80
Offset: 26 (33%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

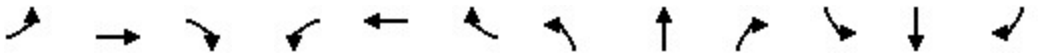
Splits and Phases: 4: I-93 Southbound Ramps & River Road



Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1197	768	3	508	551	374	580
Future Volume (vph)	1197	768	3	508	551	374	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	11	11	12	12	16
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00		0.97	0.95	0.97	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3574	1830		3352	3574	3467	1794
Flt Permitted	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3574	1830		3352	3574	3467	1794
Peak-hour factor, PHF	0.88	0.88	0.95	0.95	0.95	0.82	0.82
Adj. Flow (vph)	1360	873	3	535	580	456	707
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	1360	873	0	538	580	456	707
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%	2%
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Actuated Green, G (s)	32.9	80.0		17.2	55.1	14.9	80.0
Effective Green, g (s)	33.9	80.0		18.2	56.1	15.9	80.0
Actuated g/C Ratio	0.42	1.00		0.23	0.70	0.20	1.00
Clearance Time (s)	5.0			5.0	5.0	5.0	
Vehicle Extension (s)	2.0			2.0	2.0	2.0	
Lane Grp Cap (vph)	1514	1830		762	2506	689	1794
v/s Ratio Prot	c0.38			c0.16	0.16	c0.13	
v/s Ratio Perm		0.48					0.39
v/c Ratio	0.90	0.48		0.71	0.23	0.66	0.39
Uniform Delay, d1	21.4	0.0		28.4	4.3	29.6	0.0
Progression Factor	0.90	1.00		1.52	0.31	1.00	1.00
Incremental Delay, d2	0.9	0.1		1.9	0.2	1.9	0.7
Delay (s)	20.3	0.1		45.1	1.5	31.4	0.7
Level of Service	C	A		D	A	C	A
Approach Delay (s/veh)	12.4				22.5	12.7	
Approach LOS	B				C	B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	462	38	106	371	250	51	2	487	881	4	49
Future Volume (vph)	17	462	38	106	371	250	51	2	487	881	4	49
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	0.88	0.95	0.95	1.00
Frt		0.989				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.954		0.950	0.953	
Satd. Flow (prot)	1805	3506	0	3351	1863	1417	0	1692	2748	1665	1671	1615
Flt Permitted	0.950			0.950				0.954		0.950	0.953	
Satd. Flow (perm)	1805	3506	0	3351	1863	1417	0	1692	2748	1665	1671	1615
Satd. Flow (RTOR)		10				313						232
Adj. Flow (vph)	21	570	47	133	464	313	85	3	812	1241	6	69
Lane Group Flow (vph)	21	617	0	133	464	313	0	88	812	620	627	69
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Detector Phase	5	2		1	6		8	8	8 1	3	3	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	11.0	22.0		11.0	22.0		15.0	15.0		32.0	32.0	
Total Split (%)	13.8%	27.5%		13.8%	27.5%		18.8%	18.8%		40.0%	40.0%	
Maximum Green (s)	6.0	17.0		6.0	17.0		10.0	10.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
v/c Ratio	0.13	0.78		0.45	0.81	0.22		0.38	1.08	1.07	1.07	0.04
Control Delay (s/veh)	35.9	36.5		40.8	36.3	0.3		36.8	85.1	83.9	86.5	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.9	36.5		40.8	36.3	0.3		36.8	85.1	83.9	86.5	0.0
Queue Length 50th (ft)	10	153		34	150	0		41	~260	~373	~371	0
Queue Length 95th (ft)	28	186		52	#361	0		54	184	#391	#387	0
Internal Link Dist (ft)		1189			1168			1114			744	
Turn Bay Length (ft)	80			350					200			150
Base Capacity (vph)	157	796		293	573	1417		232	755	582	584	1615
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.13	0.78		0.45	0.81	0.22		0.38	1.08	1.07	1.07	0.04

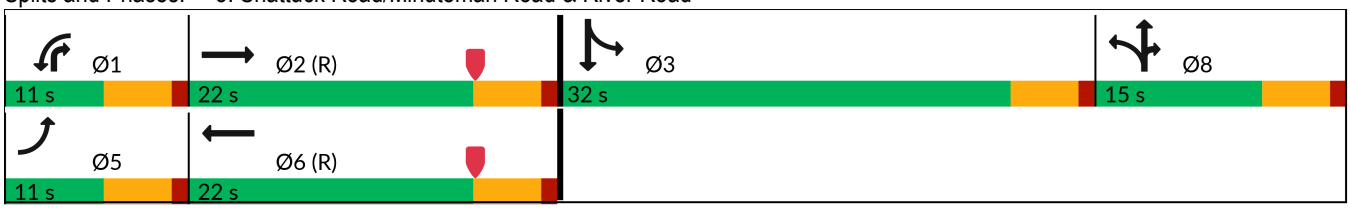
Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 60 (75%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 100

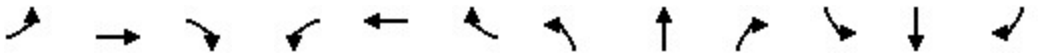
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Shattuck Road/Minuteman Road & River Road



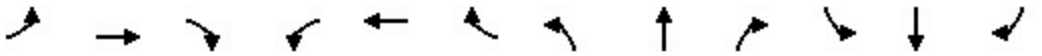


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	462	38	106	371	250	51	2	487	881	4	49
Future Volume (vph)	17	462	38	106	371	250	51	2	487	881	4	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	10	10	11	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		1.00	0.88	0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1805	3504		3351	1863	1417		1692	2748	1665	1670	1615
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1805	3504		3351	1863	1417		1692	2748	1665	1670	1615
Peak-hour factor, PHF	0.81	0.81	0.81	0.80	0.80	0.80	0.60	0.60	0.60	0.71	0.71	0.71
Adj. Flow (vph)	21	570	47	132	464	312	85	3	812	1241	6	69
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	21	609	0	133	464	313	0	88	812	620	627	69
Heavy Vehicles (%)	0%	2%	0%	1%	2%	14%	0%	0%	0%	3%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Actuated Green, G (s)	2.4	17.0		6.0	20.6	80.0		10.0	21.0	27.0	27.0	80.0
Effective Green, g (s)	3.4	18.0		7.0	21.6	80.0		11.0	22.0	28.0	28.0	80.0
Actuated g/C Ratio	0.04	0.23		0.09	0.27	1.00		0.14	0.28	0.35	0.35	1.00
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	76	788		293	503	1417		232	755	582	584	1615
v/s Ratio Prot	0.01	0.17		0.04	c0.25			0.05	c0.30	0.37	c0.38	
v/s Ratio Perm						0.22						0.04
v/c Ratio	0.28	0.77		0.45	0.92	0.22		0.38	1.08	1.07	1.07	0.04
Uniform Delay, d1	37.1	29.1		34.7	28.4	0.0		31.4	29.0	26.0	26.0	0.0
Progression Factor	1.00	1.00		1.03	0.75	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	7.3		0.4	24.2	0.3		0.4	55.0	55.9	58.6	0.0
Delay (s)	37.8	36.4		36.0	45.3	0.3		31.8	84.0	81.9	84.6	0.0
Level of Service	D	D		D	D	A		C	F	F	F	A
Approach Delay (s/veh)		36.4			28.5			78.9			78.9	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	59.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2032 Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	649	611	28	789	113	287	79	16	92	48	13
Future Volume (vph)	204	649	611	28	789	113	287	79	16	92	48	13
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.981			0.975			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1685	3355	1531	1678	3226	0	1694	1756	0	1728	1778	0
Flt Permitted	0.950			0.950			0.659			0.673		
Satd. Flow (perm)	1685	3355	1531	1678	3226	0	1175	1756	0	1224	1778	0
Satd. Flow (RTOR)			531		14			8			12	
Adj. Flow (vph)	258	822	773	30	839	120	330	91	18	177	92	25
Lane Group Flow (vph)	258	822	773	30	959	0	330	109	0	177	117	0
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	16.0		11.0	16.0		10.0	10.0		10.0	10.0	
Total Split (s)	25.0	45.0		12.0	32.0		29.0	29.0		29.0	29.0	
Total Split (%)	22.9%	41.3%		11.0%	29.4%		26.6%	26.6%		26.6%	26.6%	
Maximum Green (s)	19.0	39.0		6.0	26.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		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	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.71	0.46	0.50	0.20	0.92		0.99	0.22		0.51	0.23	
Control Delay (s/veh)	45.3	16.6	1.2	44.5	45.4		81.4	26.4		35.3	25.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	45.3	16.6	1.2	44.5	45.4		81.4	26.4		35.3	25.7	
Queue Length 50th (ft)	125	111	0	16	269		180	41		80	43	
Queue Length 95th (ft)	228	271	0	53	#573		#452	105		99	59	
Internal Link Dist (ft)		1435			1194			1039			1055	
Turn Bay Length (ft)	150		200	130						100		
Base Capacity (vph)	403	1783	1531	153	1038		334	506		348	515	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.64	0.46	0.50	0.20	0.92		0.99	0.22		0.51	0.23	

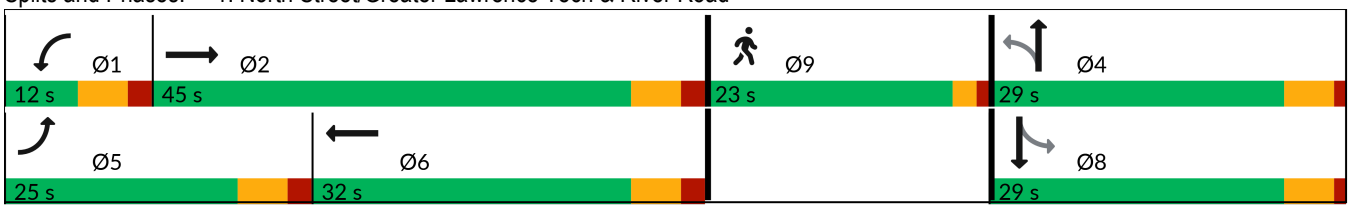
Intersection Summary
Cycle Length: 109

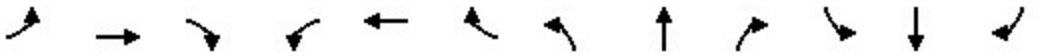
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	21%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Don't Walk (s)	13.0
Pedestrian Calls (#/hr)	4
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Actuated Cycle Length: 88.8
Natural Cycle: 130
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Street/Greater Lawrence Tech & River Road

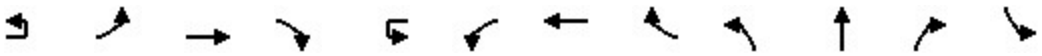




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	649	611	28	789	113	287	79	16	92	48	13
Future Volume (vph)	204	649	611	28	789	113	287	79	16	92	48	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1685	3355	1531	1678	3227		1694	1756		1728	1778	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.66	1.00		0.67	1.00	
Satd. Flow (perm)	1685	3355	1531	1678	3227		1175	1756		1224	1778	
Peak-hour factor, PHF	0.79	0.79	0.79	0.94	0.94	0.94	0.87	0.87	0.87	0.52	0.52	0.52
Adj. Flow (vph)	258	822	773	30	839	120	330	91	18	177	92	25
RTOR Reduction (vph)	0	0	0	0	9	0	0	6	0	0	9	0
Lane Group Flow (vph)	258	822	773	30	950	0	330	103	0	177	108	0
Heavy Vehicles (%)	0%	4%	2%	4%	7%	0%	3%	1%	7%	1%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Actuated Green, G (s)	17.2	45.2	95.0	2.2	30.2		24.3	24.3		24.3	24.3	
Effective Green, g (s)	19.2	47.2	95.0	4.2	32.2		25.3	25.3		25.3	25.3	
Actuated g/C Ratio	0.20	0.50	1.00	0.04	0.34		0.27	0.27		0.27	0.27	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	340	1666	1531	74	1093		312	467		325	473	
v/s Ratio Prot	c0.15	0.24		0.02	c0.29			0.06			0.06	
v/s Ratio Perm			c0.51				c0.28			0.14		
v/c Ratio	0.76	0.49	0.50	0.41	0.87		1.06	0.22		0.54	0.23	
Uniform Delay, d1	35.7	15.9	0.0	44.2	29.4		34.8	27.2		29.9	27.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.4	0.2	1.2	3.6	7.5		67.0	0.2		1.9	0.2	
Delay (s)	45.1	16.2	1.2	47.8	36.9		101.8	27.4		31.8	27.5	
Level of Service	D	B	A	D	D		F	C		C	C	
Approach Delay (s/veh)		13.9			37.3			83.3			30.1	
Approach LOS		B			D			F			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	1	286	1405	266	7	49	1090	117	57	1	11	80
Future Volume (vph)	1	286	1405	266	7	49	1090	117	57	1	11	80
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.976				0.986				0.850	
Flt Protected		0.950				0.950				0.953		
Satd. Flow (prot)	0	3502	3437	0	0	1685	3236	0	0	1835	1615	0
Flt Permitted		0.950				0.950				0.613		
Satd. Flow (perm)	0	3502	3437	0	0	1685	3236	0	0	1180	1615	0
Satd. Flow (RTOR)			58				27				187	
Adj. Flow (vph)	1	333	1634	309	8	55	1225	131	76	1	15	96
Lane Group Flow (vph)	0	334	1943	0	0	63	1356	0	0	77	15	0
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Perm	NA	Perm	Perm
Protected Phases	5	5	2		1	1	6			8		
Permitted Phases									8		8	3
Detector Phase	5	5	2		1	1	6		8	8	8	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0		6.0	6.0	6.0		6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	11.0		11.0	11.0	11.0		11.0	11.0	11.0	11.0
Total Split (s)	14.0	14.0	47.0		11.0	11.0	44.0		12.0	12.0	12.0	12.0
Total Split (%)	20.0%	20.0%	67.1%		15.7%	15.7%	62.9%		17.1%	17.1%	17.1%	17.1%
Maximum Green (s)	9.0	9.0	42.0		6.0	6.0	39.0		7.0	7.0	7.0	7.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0	-1.0			-1.0	-1.0			-1.0	-1.0	
Total Lost Time (s)		4.0	4.0			4.0	4.0			4.0	4.0	
Lead/Lag	Lead	Lead	Lead		Lag	Lag	Lag					
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None	None	C-Min		None	None	C-Min		None	None	None	None
v/c Ratio		0.68	0.84			0.38	0.74			0.54	0.04	
Control Delay (s/veh)		34.4	11.0			36.4	14.1			45.6	0.2	
Queue Delay		0.0	0.0			0.0	0.0			0.0	0.0	
Total Delay (s/veh)		34.4	11.0			36.4	14.1			45.6	0.2	
Queue Length 50th (ft)		68	90			26	211			32	0	
Queue Length 95th (ft)		m102	338			61	284			#60	0	
Internal Link Dist (ft)			654				1435			1094		
Turn Bay Length (ft)		500				170					165	
Base Capacity (vph)		506	2321			168	1875			144	361	
Starvation Cap Reductn		0	0			0	0			0	0	
Spillback Cap Reductn		0	0			0	0			0	0	
Storage Cap Reductn		0	0			0	0			0	0	
Reduced v/c Ratio		0.66	0.84			0.38	0.72			0.53	0.04	

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 60 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	20	236
Future Volume (vph)	20	236
Lane Util. Factor	1.00	1.00
Frt		0.850
Flt Protected	0.962	
Satd. Flow (prot)	1799	1812
Flt Permitted	0.717	
Satd. Flow (perm)	1341	1812
Satd. Flow (RTOR)		284
Adj. Flow (vph)	24	284
Lane Group Flow (vph)	120	284
Turn Type	NA	Free
Protected Phases	3	
Permitted Phases		Free
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	6.0	
Minimum Split (s)	11.0	
Total Split (s)	12.0	
Total Split (%)	17.1%	
Maximum Green (s)	7.0	
Yellow Time (s)	4.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)	-1.0	
Total Lost Time (s)	4.0	
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	
Recall Mode	None	
v/c Ratio	0.74	0.16
Control Delay (s/veh)	59.5	0.2
Queue Delay	0.0	0.0
Total Delay (s/veh)	59.5	0.2
Queue Length 50th (ft)	51	0
Queue Length 95th (ft)	#120	0
Internal Link Dist (ft)	310	
Turn Bay Length (ft)		100
Base Capacity (vph)	164	1812
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.73	0.16

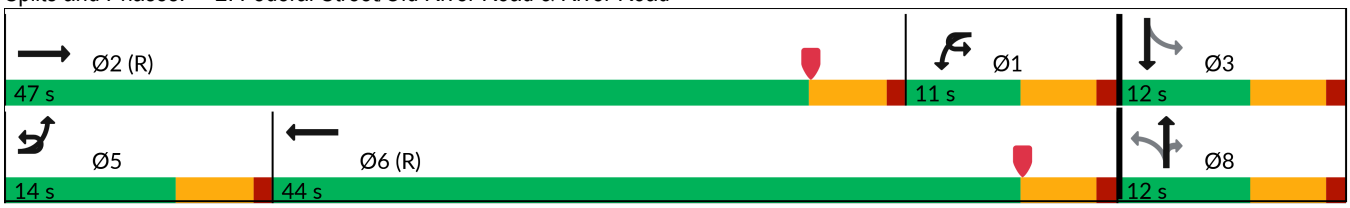
Intersection Summary

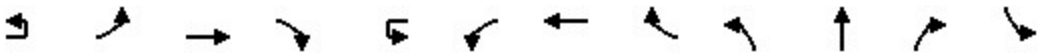
Control Type: Actuated-Coordinated

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

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

Splits and Phases: 2: Federal Street/Old River Road & River Road





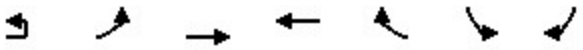
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	1	286	1405	266	7	49	1090	117	57	1	11	80
Future Volume (vph)	1	286	1405	266	7	49	1090	117	57	1	11	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10	11	11	13	13	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0			4.0	4.0	
Lane Util. Factor		0.97	0.95			1.00	0.95			1.00	1.00	
Frt		1.00	0.98			1.00	0.99			1.00	0.85	
Flt Protected		0.95	1.00			0.95	1.00			0.95	1.00	
Satd. Flow (prot)		3502	3437			1685	3235			1835	1615	
Flt Permitted		0.95	1.00			0.95	1.00			0.61	1.00	
Satd. Flow (perm)		3502	3437			1685	3235			1181	1615	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.89	0.89	0.89	0.89	0.75	0.75	0.75	0.83
Adj. Flow (vph)	1	333	1634	309	8	55	1225	131	76	1	15	96
RTOR Reduction (vph)	0	0	21	0	0	0	12	0	0	0	13	0
Lane Group Flow (vph)	0	334	1922	0	0	63	1344	0	0	77	2	0
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	7%	0%	2%	0%	0%	2%
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Perm	NA	Perm	Perm
Protected Phases	5	5	2		1	1	6			8		
Permitted Phases									8		8	3
Actuated Green, G (s)		8.9	43.9			3.6	38.6			7.5	7.5	
Effective Green, g (s)		9.9	44.9			4.6	39.6			8.5	8.5	
Actuated g/C Ratio		0.14	0.64			0.07	0.57			0.12	0.12	
Clearance Time (s)		5.0	5.0			5.0	5.0			5.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)		495	2204			110	1830			143	196	
v/s Ratio Prot		0.10	c0.56			0.04	c0.42					
v/s Ratio Perm										0.07	0.00	
v/c Ratio		0.67	0.87			0.57	0.73			0.54	0.01	
Uniform Delay, d1		28.5	10.2			31.7	11.3			28.9	27.0	
Progression Factor		1.01	0.74			1.00	1.00			1.00	1.00	
Incremental Delay, d2		2.1	3.8			4.4	2.7			1.9	0.0	
Delay (s)		30.8	11.4			36.2	14.0			30.9	27.1	
Level of Service		C	B			D	B			C	C	
Approach Delay (s/veh)			14.2				14.9			30.2		
Approach LOS			B				B			C		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	20	236
Future Volume (vph)	20	236
Ideal Flow (vphpl)	1900	1900
Lane Width	12	16
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1798	1812
Flt Permitted	0.72	1.00
Satd. Flow (perm)	1341	1812
Peak-hour factor, PHF	0.83	0.83
Adj. Flow (vph)	24	284
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	120	284
Heavy Vehicles (%)	0%	1%
Turn Type	NA	Free
Protected Phases	3	
Permitted Phases		Free
Actuated Green, G (s)	7.5	70.0
Effective Green, g (s)	8.5	70.0
Actuated g/C Ratio	0.12	1.00
Clearance Time (s)	5.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	162	1812
v/s Ratio Prot		
v/s Ratio Perm	c0.09	0.16
v/c Ratio	0.74	0.16
Uniform Delay, d1	29.7	0.0
Progression Factor	1.00	1.00
Incremental Delay, d2	14.7	0.2
Delay (s)	44.4	0.2
Level of Service	D	A
Approach Delay (s/veh)	13.3	
Approach LOS	B	

Intersection Summary



Lane Group	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	7	313	1414	795	587	542	661
Future Volume (vph)	7	313	1414	795	587	542	661
Lane Util. Factor	0.95	0.97	0.95	0.95	1.00	0.97	0.88
Frt					0.850		0.850
Flt Protected		0.950				0.950	
Satd. Flow (prot)	0	3289	3539	3406	1553	3400	2787
Flt Permitted		0.950				0.950	
Satd. Flow (perm)	0	3289	3539	3406	1553	3400	2787
Satd. Flow (RTOR)					638		
Adj. Flow (vph)	8	352	1589	864	638	623	760
Lane Group Flow (vph)	0	360	1589	864	638	623	760
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Detector Phase	5	5	2	6		3	3 5
Switch Phase							
Minimum Initial (s)	6.0	6.0	6.0	6.0		6.0	
Minimum Split (s)	11.0	11.0	11.0	11.0		11.0	
Total Split (s)	17.0	17.0	47.0	30.0		23.0	
Total Split (%)	24.3%	24.3%	67.1%	42.9%		32.9%	
Maximum Green (s)	12.0	12.0	42.0	25.0		18.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0	-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead		Lag			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0	2.0	2.0	2.0		2.0	
Recall Mode	None	None	C-Min	C-Min		Min	
v/c Ratio		0.63	0.71	0.63	0.41	0.72	0.56
Control Delay (s/veh)		35.4	6.9	13.1	0.6	28.9	14.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)		35.4	6.9	13.1	0.6	28.9	14.3
Queue Length 50th (ft)		71	103	82	0	125	114
Queue Length 95th (ft)		m96	126	151	0	172	160
Internal Link Dist (ft)			1040	654		885	
Turn Bay Length (ft)		650					650
Base Capacity (vph)		618	2231	1373	1553	922	1372
Starvation Cap Reductn		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0
Reduced v/c Ratio		0.58	0.71	0.63	0.41	0.68	0.55

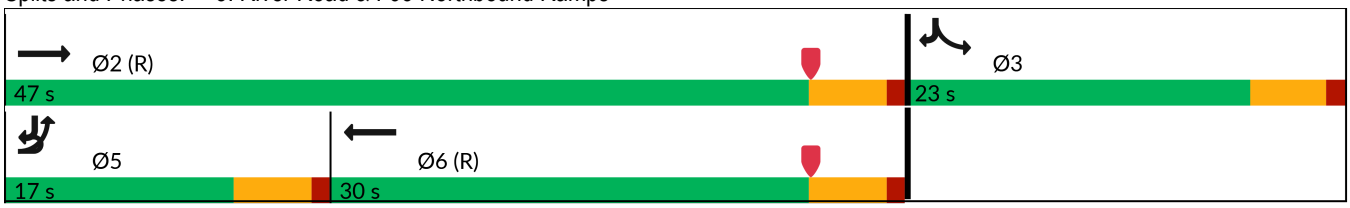
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 50

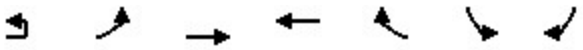
Control Type: Actuated-Coordinated

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

! Phase conflict between lane groups.

Splits and Phases: 3: River Road & I-93 Northbound Ramps





Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	7	313	1414	795	587	542	661
Future Volume (vph)	7	313	1414	795	587	542	661
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	12	12	12
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.97	0.95	0.95	1.00	0.97	0.88
Frt		1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3289	3539	3406	1553	3400	2787
Flt Permitted		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3289	3539	3406	1553	3400	2787
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.87	0.87
Adj. Flow (vph)	8	352	1589	864	638	623	760
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	360	1589	864	638	623	760
Heavy Vehicles (%)	0%	3%	2%	6%	4%	3%	2%
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Actuated Green, G (s)		11.1	43.1	27.0	70.0	16.9	33.0
Effective Green, g (s)		12.1	44.1	28.0	70.0	17.9	34.0
Actuated g/C Ratio		0.17	0.63	0.40	1.00	0.26	0.49
Clearance Time (s)		5.0	5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)		568	2229	1362	1553	869	1353
v/s Ratio Prot		0.11	c0.45	0.25		c0.18	0.27
v/s Ratio Perm					0.41		
v/c Ratio		0.63	0.71	0.63	0.41	0.72	0.56
Uniform Delay, d1		26.9	8.7	16.9	0.0	23.7	12.7
Progression Factor		1.19	0.60	0.63	1.00	1.00	1.00
Incremental Delay, d2		1.1	1.3	1.8	0.6	2.4	0.3
Delay (s)		33.0	6.5	12.5	0.6	26.1	13.1
Level of Service		C	A	B	A	C	B
Approach Delay (s/veh)			11.4	7.5		18.9	
Approach LOS			B	A		B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	616	208	2	303	1158	1169	1116
Future Volume (vph)	616	208	2	303	1158	1169	1116
Lane Util. Factor	0.95	1.00	0.95	0.97	0.95	0.97	1.00
Frt		0.850					0.850
Flt Protected				0.950		0.950	
Satd. Flow (prot)	3438	1711	0	3136	3505	3433	1812
Flt Permitted				0.950		0.950	
Satd. Flow (perm)	3438	1711	0	3136	3505	3433	1812
Satd. Flow (RTOR)		274					719
Adj. Flow (vph)	811	274	2	337	1287	1299	1240
Lane Group Flow (vph)	811	274	0	339	1287	1299	1240
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Detector Phase	2		1	1	6	8	
Switch Phase							
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0		11.0	11.0	11.0	27.0	
Total Split (s)	24.0		12.0	12.0	36.0	34.0	
Total Split (%)	34.3%		17.1%	17.1%	51.4%	48.6%	
Maximum Green (s)	19.0		7.0	7.0	31.0	29.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0			4.0	4.0	4.0	
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0	
Recall Mode	C-Min		None	None	C-Min	Min	
Walk Time (s)						6.0	
Flash Don't Walk (s)						16.0	
Pedestrian Calls (#/hr)						0	
v/c Ratio	0.82	0.16		0.88	0.78	0.91	0.68
Control Delay (s/veh)	23.4	0.2		52.2	16.4	29.8	2.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.4	0.2		52.2	16.4	29.8	2.1
Queue Length 50th (ft)	149	0		80	221	258	0
Queue Length 95th (ft)	165	0		#158	322	#392	0
Internal Link Dist (ft)	1168				1040	800	
Turn Bay Length (ft)		430		250			480
Base Capacity (vph)	988	1711		387	1640	1471	1812
Starvation Cap Reductn	0	0		0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0
Reduced v/c Ratio	0.82	0.16		0.88	0.78	0.88	0.68

Intersection Summary
Cycle Length: 70

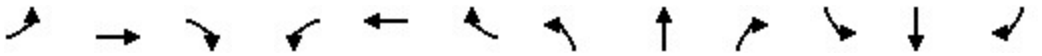
Actuated Cycle Length: 70
Offset: 34 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: I-93 Southbound Ramps & River Road

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	616	208	2	303	1158	1169	1116
Future Volume (vph)	616	208	2	303	1158	1169	1116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	11	11	12	12	16
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00		0.97	0.95	0.97	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3438	1711		3136	3505	3433	1812
Flt Permitted	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3438	1711		3136	3505	3433	1812
Peak-hour factor, PHF	0.76	0.76	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	811	274	2	337	1287	1299	1240
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	811	274	0	339	1287	1299	1240
Heavy Vehicles (%)	5%	7%	0%	8%	3%	2%	1%
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Actuated Green, G (s)	19.2	70.0		7.6	31.8	28.2	70.0
Effective Green, g (s)	20.2	70.0		8.6	32.8	29.2	70.0
Actuated g/C Ratio	0.29	1.00		0.12	0.47	0.42	1.00
Clearance Time (s)	5.0			5.0	5.0	5.0	
Vehicle Extension (s)	2.0			2.0	2.0	2.0	
Lane Grp Cap (vph)	992	1711		385	1642	1432	1812
v/s Ratio Prot	0.24			0.11	c0.37	c0.38	
v/s Ratio Perm		0.16					c0.68
v/c Ratio	0.82	0.16		0.88	0.78	0.91	0.68
Uniform Delay, d1	23.2	0.0		30.2	15.6	19.1	0.0
Progression Factor	0.66	1.00		0.95	0.81	1.00	1.00
Incremental Delay, d2	6.7	0.2		16.7	3.1	8.4	2.1
Delay (s)	22.1	0.2		45.5	15.7	27.5	2.1
Level of Service	C	A		D	B	C	A
Approach Delay (s/veh)	16.5				21.9	15.1	
Approach LOS	B				C	B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	423	75	439	719	945	20	3	94	228	2	16
Future Volume (vph)	47	423	75	439	719	945	20	3	94	228	2	16
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	0.88	0.95	0.95	1.00
Frt		0.977				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.959		0.950	0.953	
Satd. Flow (prot)	1805	3439	0	3351	1863	1599	0	1701	2668	1573	1580	1615
Flt Permitted	0.950			0.950				0.959		0.950	0.953	
Satd. Flow (perm)	1805	3439	0	3351	1863	1599	0	1701	2668	1573	1580	1615
Satd. Flow (RTOR)		31				744						343
Adj. Flow (vph)	65	588	104	493	808	1062	24	4	111	275	2	19
Lane Group Flow (vph)	65	692	0	493	808	1062	0	28	111	137	140	19
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Detector Phase	5	2		1	6		8	8	8 1	3	3	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	11.0	28.0		20.0	37.0		11.0	11.0		11.0	11.0	
Total Split (%)	15.7%	40.0%		28.6%	52.9%		15.7%	15.7%		15.7%	15.7%	
Maximum Green (s)	6.0	23.0		15.0	32.0		6.0	6.0		6.0	6.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
v/c Ratio	0.36	0.52		0.71	0.79	0.66		0.16	0.12	0.74	0.76	0.01
Control Delay (s/veh)	35.6	18.8		27.5	21.4	1.2		31.4	14.8	58.8	60.0	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.6	18.8		27.5	21.4	1.2		31.4	14.8	58.8	60.0	0.0
Queue Length 50th (ft)	27	121		94	303	0		11	17	67	64	0
Queue Length 95th (ft)	49	129		m122	m#489	m0		32	32	#154	#147	0
Internal Link Dist (ft)		1189			1168			1114			744	
Turn Bay Length (ft)	80			350					200			150
Base Capacity (vph)	180	1336		765	1022	1599		170	945	184	185	1615
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.36	0.52		0.64	0.79	0.66		0.16	0.12	0.74	0.76	0.01

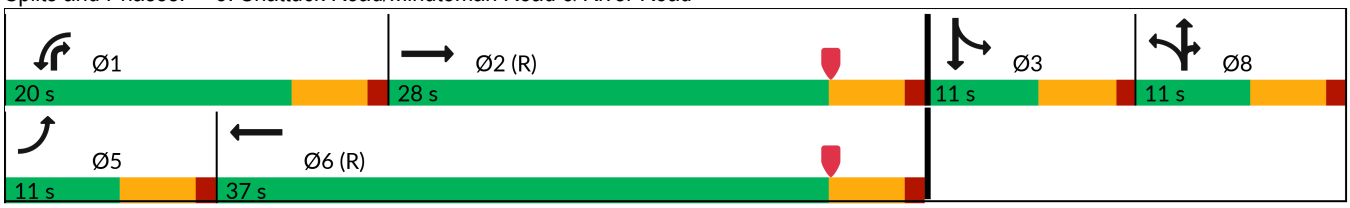
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 2 (3%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 75

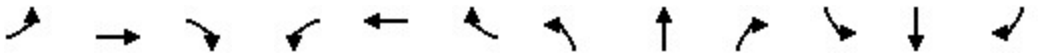
Control Type: Actuated-Coordinated

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

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

Splits and Phases: 5: Shattuck Road/Minuteman Road & River Road





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	423	75	439	719	945	20	3	94	228	2	16
Future Volume (vph)	47	423	75	439	719	945	20	3	94	228	2	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	10	10	11	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		1.00	0.88	0.95	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1805	3441		3351	1863	1599		1700	2668	1573	1580	1615
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1805	3441		3351	1863	1599		1700	2668	1573	1580	1615
Peak-hour factor, PHF	0.72	0.72	0.72	0.89	0.89	0.89	0.85	0.85	0.85	0.83	0.83	0.83
Adj. Flow (vph)	65	588	104	493	808	1062	24	4	111	275	2	19
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	672	0	493	808	1062	0	28	111	137	140	19
Heavy Vehicles (%)	0%	3%	0%	1%	2%	1%	0%	0%	3%	9%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Actuated Green, G (s)	3.6	24.5		13.5	34.4	70.0		4.8	23.3	7.2	7.2	70.0
Effective Green, g (s)	4.6	25.5		14.5	35.4	70.0		5.8	24.3	8.2	8.2	70.0
Actuated g/C Ratio	0.07	0.36		0.21	0.51	1.00		0.08	0.35	0.12	0.12	1.00
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	118	1253		694	942	1599		140	926	184	185	1615
v/s Ratio Prot	0.04	0.20		0.15	c0.43			0.02	0.04	0.09	0.09	
v/s Ratio Perm						c0.66						0.01
v/c Ratio	0.55	0.54		0.71	0.86	0.66		0.20	0.12	0.74	0.76	0.01
Uniform Delay, d1	31.7	17.6		25.8	15.1	0.0		29.9	15.6	29.9	29.9	0.0
Progression Factor	1.00	1.00		0.94	1.07	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	1.7		1.5	5.5	1.2		0.3	0.0	13.3	14.4	0.0
Delay (s)	34.8	19.2		25.9	21.8	1.2		30.2	15.6	43.2	44.4	0.0
Level of Service	C	B		C	C	A		C	B	D	D	A
Approach Delay (s/veh)		20.6			13.4			18.5			41.0	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	103	33	371	223	0
Future Vol, veh/h	0	103	33	371	223	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	112	36	403	242	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	717	242	242	0	-	0
Stage 1	242	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	396	796	1324	-	-	-
Stage 1	798	-	-	-	-	-
Stage 2	626	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	382	796	1324	-	-	-
Mov Cap-2 Maneuver	382	-	-	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	626	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	10.26	0.64	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	147	-	796	-	-
HCM Lane V/C Ratio	0.027	-	0.141	-	-
HCM Ctrl Dly (s/v)	7.8	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

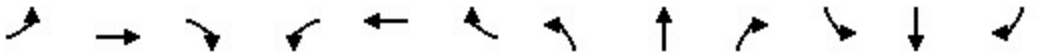
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	34	11	360	189	0
Future Vol, veh/h	0	34	11	360	189	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	37	12	391	205	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	621	205	205	0	-	0
Stage 1	205	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	451	835	1366	-	-	-
Stage 1	829	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	446	835	1366	-	-	-
Mov Cap-2 Maneuver	446	-	-	-	-	-
Stage 1	820	-	-	-	-	-
Stage 2	666	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	9.51	0.23	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	53	-	835	-	-
HCM Lane V/C Ratio	0.009	-	0.044	-	-
HCM Ctrl Dly (s/v)	7.7	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	611	340	24	835	12	220	21	27	16	14	14
Future Volume (vph)	29	611	340	24	835	12	220	21	27	16	14	14
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.915			0.925	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1532	3355	1546	1745	3415	0	1711	1609	0	1745	1699	0
Flt Permitted	0.950			0.950			0.738			0.719		
Satd. Flow (perm)	1532	3355	1546	1745	3415	0	1329	1609	0	1321	1699	0
Satd. Flow (RTOR)			314		1			33			15	
Adj. Flow (vph)	30	636	354	28	982	14	265	25	33	17	15	15
Lane Group Flow (vph)	30	636	354	28	996	0	265	58	0	17	30	0
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	16.0		11.0	16.0		10.0	10.0		10.0	10.0	
Total Split (s)	11.0	43.0		11.0	43.0		32.0	32.0		32.0	32.0	
Total Split (%)	10.1%	39.4%		10.1%	39.4%		29.4%	29.4%		29.4%	29.4%	
Maximum Green (s)	5.0	37.0		5.0	37.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		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	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.17	0.42	0.23	0.14	0.64		0.62	0.11		0.04	0.05	
Control Delay (s/veh)	41.4	16.7	0.3	40.8	20.0		32.0	14.2		24.0	16.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	41.4	16.7	0.3	40.8	20.0		32.0	14.2		24.0	16.6	
Queue Length 50th (ft)	11	73	0	10	130		79	6		4	4	
Queue Length 95th (ft)	56	248	0	46	385		#256	43		27	32	
Internal Link Dist (ft)		1435			1194			1039			1055	
Turn Bay Length (ft)	150		200	130						100		
Base Capacity (vph)	177	2167	1546	202	2206		616	763		612	796	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.29	0.23	0.14	0.45		0.43	0.08		0.03	0.04	

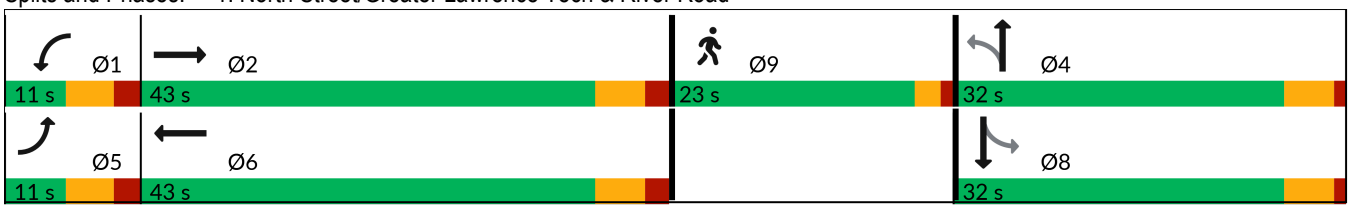
Intersection Summary
Cycle Length: 109

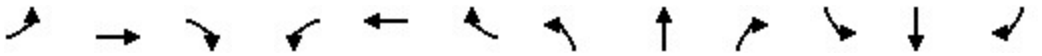
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	21%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Don't Walk (s)	13.0
Pedestrian Calls (#/hr)	4
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Actuated Cycle Length: 68.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Street/Greater Lawrence Tech & River Road

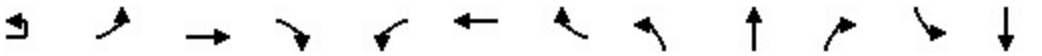




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	611	340	24	835	12	220	21	27	16	14	14
Future Volume (vph)	29	611	340	24	835	12	220	21	27	16	14	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1532	3355	1546	1745	3415		1711	1609		1745	1699	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	1.00		0.72	1.00	
Satd. Flow (perm)	1532	3355	1546	1745	3415		1328	1609		1321	1699	
Peak-hour factor, PHF	0.96	0.96	0.96	0.85	0.85	0.85	0.83	0.83	0.83	0.92	0.92	0.92
Adj. Flow (vph)	30	636	354	28	982	14	265	25	33	17	15	15
RTOR Reduction (vph)	0	0	0	0	1	0	0	23	0	0	11	0
Lane Group Flow (vph)	30	636	354	28	995	0	265	35	0	17	19	0
Heavy Vehicles (%)	10%	4%	1%	0%	2%	0%	2%	5%	4%	0%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Actuated Green, G (s)	1.5	28.8	73.8	1.5	28.8		21.0	21.0		21.0	21.0	
Effective Green, g (s)	3.5	30.8	73.8	3.5	30.8		22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.05	0.42	1.00	0.05	0.42		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	72	1400	1546	82	1425		395	479		393	506	
v/s Ratio Prot	0.02	0.19		0.02	c0.29			0.02			0.01	
v/s Ratio Perm			c0.23				c0.20			0.01		
v/c Ratio	0.42	0.45	0.23	0.34	0.70		0.67	0.07		0.04	0.04	
Uniform Delay, d1	34.2	15.5	0.0	34.0	17.7		22.7	18.6		18.4	18.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	0.2	0.3	2.5	1.5		4.4	0.1		0.0	0.0	
Delay (s)	38.0	15.7	0.3	36.5	19.2		27.2	18.6		18.5	18.4	
Level of Service	D	B	A	D	B		C	B		B	B	
Approach Delay (s/veh)		11.0			19.7			25.6			18.4	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	3	170	911	46	5	998	62	280	7	58	88	2
Future Volume (vph)	3	170	911	46	5	998	62	280	7	58	88	2
Lane Util. Factor	0.95	0.97	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Frt			0.993			0.991				0.850		
Flt Protected		0.950			0.950				0.953			0.953
Satd. Flow (prot)	0	3401	3453	0	1685	3394	0	0	1871	1615	0	1759
Flt Permitted		0.950			0.950				0.625			0.369
Satd. Flow (perm)	0	3401	3453	0	1685	3394	0	0	1227	1615	0	681
Satd. Flow (RTOR)			7			9				164		
Adj. Flow (vph)	3	179	959	48	5	1051	65	318	8	66	131	3
Lane Group Flow (vph)	0	182	1007	0	5	1116	0	0	326	66	0	134
Turn Type	Prot	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA
Protected Phases	5	5	2		1	6			8			3
Permitted Phases								8		8	3	
Detector Phase	5	5	2		1	6		8	8	8	3	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0
Total Split (s)	11.0	11.0	36.0		11.0	36.0		33.0	33.0	33.0	33.0	33.0
Total Split (%)	13.8%	13.8%	45.0%		13.8%	45.0%		41.3%	41.3%	41.3%	41.3%	41.3%
Maximum Green (s)	6.0	6.0	31.0		6.0	31.0		28.0	28.0	28.0	28.0	28.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0	-1.0		-1.0	-1.0			-1.0	-1.0		-1.0
Total Lost Time (s)		4.0	4.0		4.0	4.0			4.0	4.0		4.0
Lead/Lag	Lead	Lead	Lead		Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	C-Min		None	C-Min		None	None	None	None	None
v/c Ratio		0.55	0.52		0.03	0.74			0.86	0.11		0.64
Control Delay (s/veh)		45.5	5.8		34.0	23.3			47.1	0.3		37.0
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0		0.0
Total Delay (s/veh)		45.5	5.8		34.0	23.3			47.1	0.3		37.0
Queue Length 50th (ft)		42	82		2	257			146	0		55
Queue Length 95th (ft)		m72	114		13	341			#253	0		74
Internal Link Dist (ft)			654			1435			1094			310
Turn Bay Length (ft)		500			170					165		
Base Capacity (vph)		329	1941		147	1504			444	689		246
Starvation Cap Reductn		0	0		0	0			0	0		0
Spillback Cap Reductn		0	0		0	0			0	0		0
Storage Cap Reductn		0	0		0	0			0	0		0
Reduced v/c Ratio		0.55	0.52		0.03	0.74			0.73	0.10		0.54

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 58 (73%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 60

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	367
Future Volume (vph)	367
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1830
Flt Permitted	
Satd. Flow (perm)	1830
Satd. Flow (RTOR)	281
Adj. Flow (vph)	548
Lane Group Flow (vph)	548
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Recall Mode	
v/c Ratio	0.30
Control Delay (s/veh)	0.4
Queue Delay	0.0
Total Delay (s/veh)	0.4
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	100
Base Capacity (vph)	1830
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.30

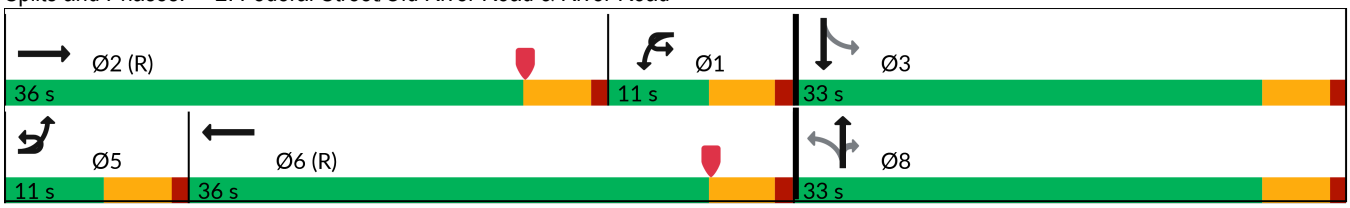
Intersection Summary

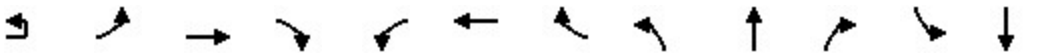
Control Type: Actuated-Coordinated

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

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

Splits and Phases: 2: Federal Street/Old River Road & River Road





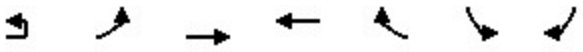
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	3	170	911	46	5	998	62	280	7	58	88	2
Future Volume (vph)	3	170	911	46	5	998	62	280	7	58	88	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	11	11	13	13	12	12	12
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.97	0.95		1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.99		1.00	0.99			1.00	0.85		1.00
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		0.95
Satd. Flow (prot)		3401	3453		1685	3395			1872	1615		1760
Flt Permitted		0.95	1.00		0.95	1.00			0.63	1.00		0.37
Satd. Flow (perm)		3401	3453		1685	3395			1228	1615		681
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.88	0.88	0.88	0.67	0.67
Adj. Flow (vph)	3	179	959	48	5	1051	65	318	8	66	131	3
RTOR Reduction (vph)	0	0	3	0	0	5	0	0	0	45	0	0
Lane Group Flow (vph)	0	182	1004	0	5	1111	0	0	326	21	0	134
Heavy Vehicles (%)	0%	3%	4%	0%	0%	2%	0%	0%	0%	0%	3%	0%
Turn Type	Prot	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA
Protected Phases	5	5	2		1	6			8			3
Permitted Phases								8		8	3	
Actuated Green, G (s)		6.8	39.9		1.2	34.3			23.9	23.9		23.9
Effective Green, g (s)		7.8	40.9		2.2	35.3			24.9	24.9		24.9
Actuated g/C Ratio		0.10	0.51		0.03	0.44			0.31	0.31		0.31
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		5.0
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lane Grp Cap (vph)		331	1765		46	1498			382	502		211
v/s Ratio Prot		0.05	c0.29		0.00	c0.33						
v/s Ratio Perm									c0.27	0.01		0.20
v/c Ratio		0.55	0.57		0.11	0.74			0.85	0.04		0.64
Uniform Delay, d1		34.4	13.5		37.9	18.6			25.8	19.2		23.6
Progression Factor		1.13	0.38		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2		0.9	1.2		0.4	3.4			16.1	0.0		4.5
Delay (s)		39.9	6.3		38.3	21.9			41.9	19.2		28.2
Level of Service		D	A		D	C			D	B		C
Approach Delay (s/veh)			11.5			22.0			38.1			5.9
Approach LOS			B			C			D			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	367
Future Volume (vph)	367
Ideal Flow (vphpl)	1900
Lane Width	16
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1830
Flt Permitted	1.00
Satd. Flow (perm)	1830
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	548
RTOR Reduction (vph)	0
Lane Group Flow (vph)	548
Heavy Vehicles (%)	0%
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Actuated Green, G (s)	80.0
Effective Green, g (s)	80.0
Actuated g/C Ratio	1.00
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1830
v/s Ratio Prot	
v/s Ratio Perm	0.30
v/c Ratio	0.30
Uniform Delay, d1	0.0
Progression Factor	1.00
Incremental Delay, d2	0.4
Delay (s)	0.4
Level of Service	A
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary



Lane Group	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	1	882	915	844	803	214	216
Future Volume (vph)	1	882	915	844	803	214	216
Lane Util. Factor	0.95	0.97	0.95	0.95	1.00	0.97	0.88
Frt					0.850		0.850
Flt Protected		0.950				0.950	
Satd. Flow (prot)	0	3319	3505	3539	1599	3367	2733
Flt Permitted		0.950				0.950	
Satd. Flow (perm)	0	3319	3505	3539	1599	3367	2733
Satd. Flow (RTOR)					616		
Adj. Flow (vph)	1	1038	1076	1082	1029	252	254
Lane Group Flow (vph)	0	1039	1076	1082	1029	252	254
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Detector Phase	5	5	2	6		3	3 5
Switch Phase							
Minimum Initial (s)	6.0	6.0	6.0	6.0		6.0	
Minimum Split (s)	11.0	11.0	11.0	11.0		11.0	
Total Split (s)	34.0	34.0	69.0	35.0		11.0	
Total Split (%)	42.5%	42.5%	86.3%	43.8%		13.8%	
Maximum Green (s)	29.0	29.0	64.0	30.0		6.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0	-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead		Lag			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0	2.0	2.0	2.0		2.0	
Recall Mode	None	None	C-Min	C-Min		Min	
v/c Ratio		0.88	0.38	0.78	0.64	0.74	0.18
Control Delay (s/veh)		17.7	1.4	19.9	3.6	50.7	10.9
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)		17.7	1.4	19.9	3.6	50.7	10.9
Queue Length 50th (ft)		90	14	174	49	67	37
Queue Length 95th (ft)		m121	m16	180	19	#121	56
Internal Link Dist (ft)			1040	654		885	
Turn Bay Length (ft)		650					650
Base Capacity (vph)		1244	2847	1404	1599	341	1438
Starvation Cap Reductn		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0
Reduced v/c Ratio		0.84	0.38	0.77	0.64	0.74	0.18

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 60

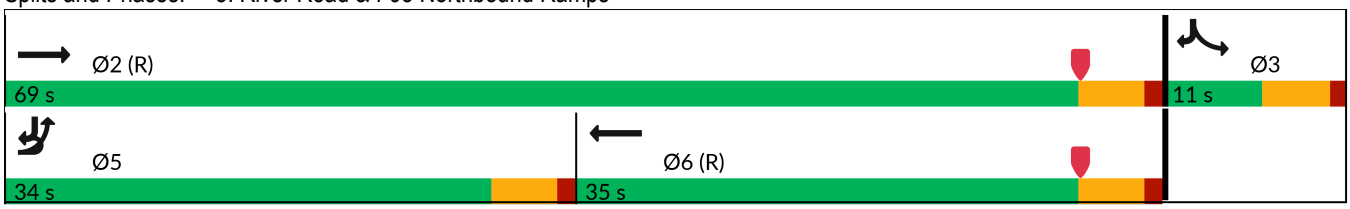
Control Type: Actuated-Coordinated

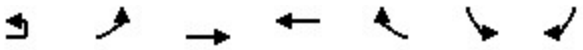
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

! Phase conflict between lane groups.

Splits and Phases: 3: River Road & I-93 Northbound Ramps





Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	1	882	915	844	803	214	216
Future Volume (vph)	1	882	915	844	803	214	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	12	12	12
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.97	0.95	0.95	1.00	0.97	0.88
Frt		1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3319	3505	3539	1599	3367	2733
Flt Permitted		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3319	3505	3539	1599	3367	2733
Peak-hour factor, PHF	0.85	0.85	0.85	0.78	0.78	0.85	0.85
Adj. Flow (vph)	1	1038	1076	1082	1029	252	254
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1039	1076	1082	1029	252	254
Heavy Vehicles (%)	0%	2%	3%	2%	1%	4%	4%
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Actuated Green, G (s)		27.6	62.9	30.3	80.0	7.1	39.7
Effective Green, g (s)		28.6	63.9	31.3	80.0	8.1	40.7
Actuated g/C Ratio		0.36	0.80	0.39	1.00	0.10	0.51
Clearance Time (s)		5.0	5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)		1186	2799	1384	1599	340	1390
v/s Ratio Prot		c0.31	0.31	c0.31		0.07	0.09
v/s Ratio Perm					c0.64		
v/c Ratio		0.88	0.38	0.78	0.64	0.74	0.18
Uniform Delay, d1		24.0	2.3	21.4	0.0	34.9	10.6
Progression Factor		0.44	0.49	0.73	1.00	1.00	1.00
Incremental Delay, d2		5.0	0.3	3.8	1.7	7.4	0.0
Delay (s)		15.7	1.4	19.4	1.7	42.3	10.7
Level of Service		B	A	B	A	D	B
Approach Delay (s/veh)			8.4	10.8		26.4	
Approach LOS			A	B		C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

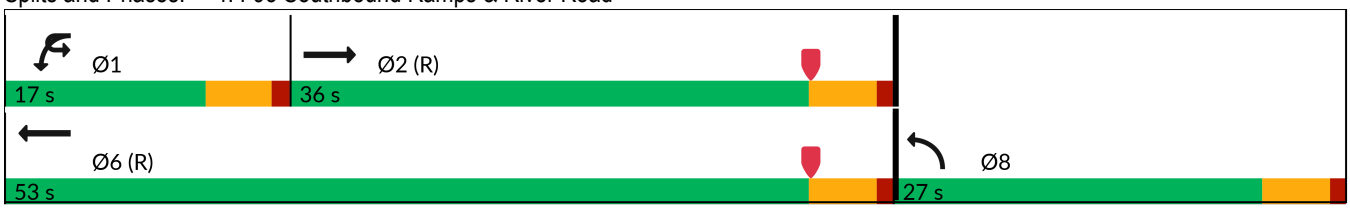
! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1208	768	3	517	541	374	587
Future Volume (vph)	1208	768	3	517	541	374	587
Lane Util. Factor	0.95	1.00	0.95	0.97	0.95	0.97	1.00
Frt		0.850					0.850
Flt Protected				0.950		0.950	
Satd. Flow (prot)	3574	1830	0	3352	3574	3467	1794
Flt Permitted				0.950		0.950	
Satd. Flow (perm)	3574	1830	0	3352	3574	3467	1794
Satd. Flow (RTOR)		873					571
Adj. Flow (vph)	1373	873	3	544	569	456	716
Lane Group Flow (vph)	1373	873	0	547	569	456	716
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Detector Phase	2		1	1	6	8	
Switch Phase							
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0		11.0	11.0	11.0	27.0	
Total Split (s)	36.0		17.0	17.0	53.0	27.0	
Total Split (%)	45.0%		21.3%	21.3%	66.3%	33.8%	
Maximum Green (s)	31.0		12.0	12.0	48.0	22.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0			4.0	4.0	4.0	
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0	
Recall Mode	C-Min		None	None	C-Min	Min	
Walk Time (s)						6.0	
Flash Don't Walk (s)						16.0	
Pedestrian Calls (#/hr)						0	
v/c Ratio	0.92	0.48		0.70	0.23	0.66	0.40
Control Delay (s/veh)	22.8	0.1		48.5	1.6	34.2	0.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.8	0.1		48.5	1.6	34.2	0.7
Queue Length 50th (ft)	302	0		144	10	110	0
Queue Length 95th (ft)	m288	m0		m#207	m23	131	0
Internal Link Dist (ft)	1168				1040	800	
Turn Bay Length (ft)		430		250			480
Base Capacity (vph)	1500	1830		776	2507	996	1794
Starvation Cap Reductn	0	0		0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0
Reduced v/c Ratio	0.92	0.48		0.70	0.23	0.46	0.40

Intersection Summary
Cycle Length: 80

Actuated Cycle Length: 80
Offset: 26 (33%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

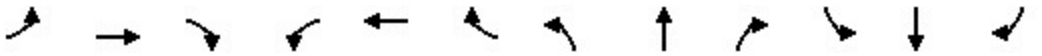
Splits and Phases: 4: I-93 Southbound Ramps & River Road



Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1208	768	3	517	541	374	587
Future Volume (vph)	1208	768	3	517	541	374	587
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	11	11	12	12	16
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00		0.97	0.95	0.97	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3574	1830		3352	3574	3467	1794
Flt Permitted	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3574	1830		3352	3574	3467	1794
Peak-hour factor, PHF	0.88	0.88	0.95	0.95	0.95	0.82	0.82
Adj. Flow (vph)	1373	873	3	544	569	456	716
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	1373	873	0	547	569	456	716
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%	2%
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Actuated Green, G (s)	32.6	80.0		17.5	55.1	14.9	80.0
Effective Green, g (s)	33.6	80.0		18.5	56.1	15.9	80.0
Actuated g/C Ratio	0.42	1.00		0.23	0.70	0.20	1.00
Clearance Time (s)	5.0			5.0	5.0	5.0	
Vehicle Extension (s)	2.0			2.0	2.0	2.0	
Lane Grp Cap (vph)	1501	1830		775	2506	689	1794
v/s Ratio Prot	c0.38			c0.16	0.16	c0.13	
v/s Ratio Perm		0.48					0.40
v/c Ratio	0.91	0.48		0.71	0.23	0.66	0.40
Uniform Delay, d1	21.9	0.0		28.2	4.2	29.6	0.0
Progression Factor	0.91	1.00		1.54	0.31	1.00	1.00
Incremental Delay, d2	1.1	0.1		1.8	0.2	1.9	0.7
Delay (s)	20.9	0.1		45.3	1.5	31.4	0.7
Level of Service	C	A		D	A	C	A
Approach Delay (s/veh)	12.8				23.0	12.6	
Approach LOS	B				C	B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	468	38	107	358	252	51	2	489	884	4	49
Future Volume (vph)	17	468	38	107	358	252	51	2	489	884	4	49
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	0.88	0.95	0.95	1.00
Frt		0.989				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.954		0.950	0.953	
Satd. Flow (prot)	1805	3505	0	3351	1863	1417	0	1692	2748	1665	1671	1615
Flt Permitted	0.950			0.950				0.954		0.950	0.953	
Satd. Flow (perm)	1805	3505	0	3351	1863	1417	0	1692	2748	1665	1671	1615
Satd. Flow (RTOR)		10				315						232
Adj. Flow (vph)	21	578	47	134	448	315	85	3	815	1245	6	69
Lane Group Flow (vph)	21	625	0	134	448	315	0	88	815	622	629	69
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Detector Phase	5	2		1	6		8	8	8 1	3	3	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	11.0	22.0		11.0	22.0		15.0	15.0		32.0	32.0	
Total Split (%)	13.8%	27.5%		13.8%	27.5%		18.8%	18.8%		40.0%	40.0%	
Maximum Green (s)	6.0	17.0		6.0	17.0		10.0	10.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
v/c Ratio	0.13	0.79		0.46	0.78	0.22		0.38	1.08	1.07	1.08	0.04
Control Delay (s/veh)	35.9	37.0		40.8	34.1	0.3		36.8	86.5	85.0	87.6	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.9	37.0		40.8	34.1	0.3		36.8	86.5	85.0	87.6	0.0
Queue Length 50th (ft)	10	155		35	143	0		41	~262	~376	~374	0
Queue Length 95th (ft)	28	188		53	#343	0		54	184	#393	#389	0
Internal Link Dist (ft)		1189			1168			1114			744	
Turn Bay Length (ft)	80			350					200			150
Base Capacity (vph)	157	796		293	573	1417		232	755	582	584	1615
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.13	0.79		0.46	0.78	0.22		0.38	1.08	1.07	1.08	0.04

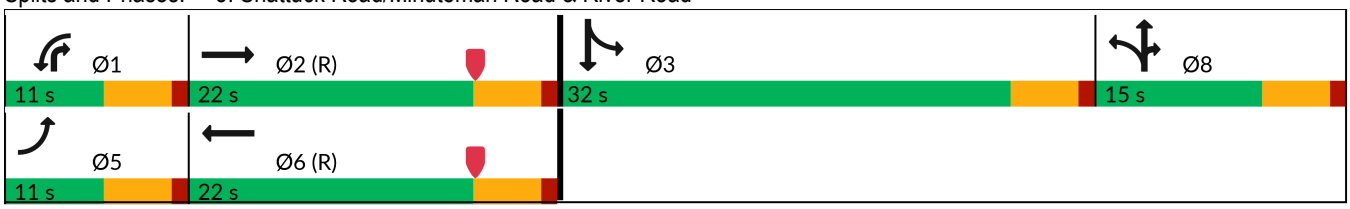
Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 60 (75%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90

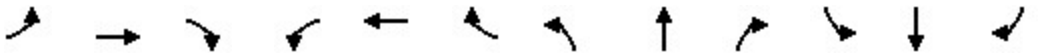
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Shattuck Road/Minuteman Road & River Road





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	468	38	107	358	252	51	2	489	884	4	49
Future Volume (vph)	17	468	38	107	358	252	51	2	489	884	4	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	10	10	11	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		1.00	0.88	0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1805	3504		3351	1863	1417		1692	2748	1665	1670	1615
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1805	3504		3351	1863	1417		1692	2748	1665	1670	1615
Peak-hour factor, PHF	0.81	0.81	0.81	0.80	0.80	0.80	0.60	0.60	0.60	0.71	0.71	0.71
Adj. Flow (vph)	21	578	47	134	448	315	85	3	815	1245	6	69
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	21	617	0	134	448	315	0	88	815	622	629	69
Heavy Vehicles (%)	0%	2%	0%	1%	2%	14%	0%	0%	0%	3%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Actuated Green, G (s)	2.4	17.0		6.0	20.6	80.0		10.0	21.0	27.0	27.0	80.0
Effective Green, g (s)	3.4	18.0		7.0	21.6	80.0		11.0	22.0	28.0	28.0	80.0
Actuated g/C Ratio	0.04	0.23		0.09	0.27	1.00		0.14	0.28	0.35	0.35	1.00
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	76	788		293	503	1417		232	755	582	584	1615
v/s Ratio Prot	0.01	0.18		0.04	c0.24			0.05	c0.30	0.37	c0.38	
v/s Ratio Perm						0.22						0.04
v/c Ratio	0.28	0.78		0.46	0.89	0.22		0.38	1.08	1.07	1.08	0.04
Uniform Delay, d1	37.1	29.2		34.7	28.1	0.0		31.4	29.0	26.0	26.0	0.0
Progression Factor	1.00	1.00		1.02	0.73	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	7.7		0.4	19.9	0.3		0.4	56.3	57.0	59.7	0.0
Delay (s)	37.8	36.8		35.9	40.5	0.3		31.8	85.3	83.0	85.7	0.0
Level of Service	D	D		D	D	A		C	F	F	F	A
Approach Delay (s/veh)		36.9			25.7			80.1			80.0	
Approach LOS		D			C			F			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	59.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	51	83	156	406	0
Future Vol, veh/h	0	51	83	156	406	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	55	90	170	441	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	791	441	441	0	-	0
Stage 1	441	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	358	616	1119	-	-	-
Stage 1	648	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	326	616	1119	-	-	-
Mov Cap-2 Maneuver	326	-	-	-	-	-
Stage 1	591	-	-	-	-	-
Stage 2	713	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.42	2.95	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	625	-	616	-	-
HCM Lane V/C Ratio	0.081	-	0.09	-	-
HCM Ctrl Dly (s/v)	8.5	0	11.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.7

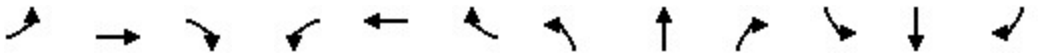
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	17	28	128	389	0
Future Vol, veh/h	0	17	28	128	389	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	18	30	139	423	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	623	423	423	0	-	0
Stage 1	423	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	450	631	1136	-	-	-
Stage 1	661	-	-	-	-	-
Stage 2	834	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	437	631	1136	-	-	-
Mov Cap-2 Maneuver	437	-	-	-	-	-
Stage 1	642	-	-	-	-	-
Stage 2	834	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	10.88	1.48	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	323	-	631	-	-
HCM Lane V/C Ratio	0.027	-	0.029	-	-
HCM Ctrl Dly (s/v)	8.3	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

2032 Build Mitigated



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	649	611	28	789	113	287	79	16	92	48	13
Future Volume (vph)	204	649	611	28	789	113	287	79	16	92	48	13
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.981			0.975			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1685	3355	1531	1678	3226	0	1694	1756	0	1728	1778	0
Flt Permitted	0.950			0.950			0.659			0.673		
Satd. Flow (perm)	1685	3355	1531	1678	3226	0	1175	1756	0	1224	1778	0
Satd. Flow (RTOR)			531		14			8			12	
Adj. Flow (vph)	258	822	773	30	839	120	330	91	18	177	92	25
Lane Group Flow (vph)	258	822	773	30	959	0	330	109	0	177	117	0
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	16.0		11.0	16.0		10.0	10.0		10.0	10.0	
Total Split (s)	25.0	45.0		12.0	32.0		29.0	29.0		29.0	29.0	
Total Split (%)	22.9%	41.3%		11.0%	29.4%		26.6%	26.6%		26.6%	26.6%	
Maximum Green (s)	19.0	39.0		6.0	26.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		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	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.71	0.46	0.50	0.20	0.92		0.99	0.22		0.51	0.23	
Control Delay (s/veh)	45.3	16.6	1.2	44.5	45.4		81.4	26.4		35.3	25.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	45.3	16.6	1.2	44.5	45.4		81.4	26.4		35.3	25.7	
Queue Length 50th (ft)	125	111	0	16	269		180	41		80	43	
Queue Length 95th (ft)	228	271	0	53	#573		#452	105		99	59	
Internal Link Dist (ft)		1435			1194			1039			1055	
Turn Bay Length (ft)	150		200	130						100		
Base Capacity (vph)	403	1783	1531	153	1038		334	506		348	515	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.64	0.46	0.50	0.20	0.92		0.99	0.22		0.51	0.23	

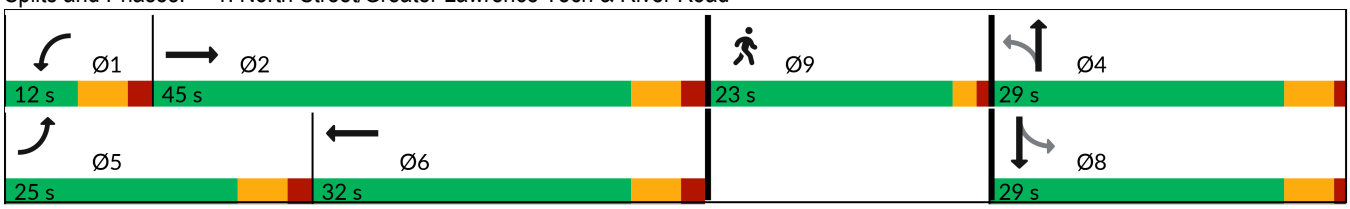
Intersection Summary
Cycle Length: 109

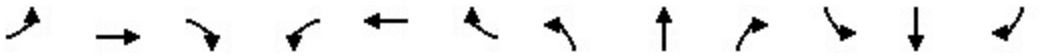
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	21%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Don't Walk (s)	13.0
Pedestrian Calls (#/hr)	4
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Actuated Cycle Length: 88.8
Natural Cycle: 130
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Street/Greater Lawrence Tech & River Road

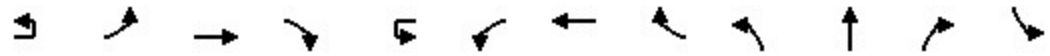




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	649	611	28	789	113	287	79	16	92	48	13
Future Volume (vph)	204	649	611	28	789	113	287	79	16	92	48	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1685	3355	1531	1678	3227		1694	1756		1728	1778	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.66	1.00		0.67	1.00	
Satd. Flow (perm)	1685	3355	1531	1678	3227		1175	1756		1224	1778	
Peak-hour factor, PHF	0.79	0.79	0.79	0.94	0.94	0.94	0.87	0.87	0.87	0.52	0.52	0.52
Adj. Flow (vph)	258	822	773	30	839	120	330	91	18	177	92	25
RTOR Reduction (vph)	0	0	0	0	9	0	0	6	0	0	9	0
Lane Group Flow (vph)	258	822	773	30	950	0	330	103	0	177	108	0
Heavy Vehicles (%)	0%	4%	2%	4%	7%	0%	3%	1%	7%	1%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Actuated Green, G (s)	17.2	45.2	95.0	2.2	30.2		24.3	24.3		24.3	24.3	
Effective Green, g (s)	19.2	47.2	95.0	4.2	32.2		25.3	25.3		25.3	25.3	
Actuated g/C Ratio	0.20	0.50	1.00	0.04	0.34		0.27	0.27		0.27	0.27	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	340	1666	1531	74	1093		312	467		325	473	
v/s Ratio Prot	c0.15	0.24		0.02	c0.29			0.06			0.06	
v/s Ratio Perm			c0.51				c0.28			0.14		
v/c Ratio	0.76	0.49	0.50	0.41	0.87		1.06	0.22		0.54	0.23	
Uniform Delay, d1	35.7	15.9	0.0	44.2	29.4		34.8	27.2		29.9	27.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.4	0.2	1.2	3.6	7.5		67.0	0.2		1.9	0.2	
Delay (s)	45.1	16.2	1.2	47.8	36.9		101.8	27.4		31.8	27.5	
Level of Service	D	B	A	D	D		F	C		C	C	
Approach Delay (s/veh)		13.9			37.3			83.3			30.1	
Approach LOS		B			D			F			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	1	286	1405	266	7	49	1090	117	57	1	11	80
Future Volume (vph)	1	286	1405	266	7	49	1090	117	57	1	11	80
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.976				0.986				0.850	
Flt Protected		0.950				0.950				0.953		
Satd. Flow (prot)	0	3502	3437	0	0	1685	3236	0	0	1835	1615	0
Flt Permitted		0.950				0.950				0.613		
Satd. Flow (perm)	0	3502	3437	0	0	1685	3236	0	0	1180	1615	0
Satd. Flow (RTOR)			58				30				187	
Adj. Flow (vph)	1	333	1634	309	8	55	1225	131	76	1	15	96
Lane Group Flow (vph)	0	334	1943	0	0	63	1356	0	0	77	15	0
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Perm	NA	Perm	Perm
Protected Phases	5	5	2		1	1	6			8		
Permitted Phases									8		8	3
Detector Phase	5	5	2		1	1	6		8	8	8	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0		6.0	6.0	6.0		6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	11.0		11.0	11.0	11.0		11.0	11.0	11.0	11.0
Total Split (s)	11.0	11.0	47.0		11.0	11.0	47.0		12.0	12.0	12.0	12.0
Total Split (%)	15.7%	15.7%	67.1%		15.7%	15.7%	67.1%		17.1%	17.1%	17.1%	17.1%
Maximum Green (s)	6.0	6.0	42.0		6.0	6.0	42.0		7.0	7.0	7.0	7.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0	-1.0			-1.0	-1.0			-1.0	-1.0	
Total Lost Time (s)		4.0	4.0			4.0	4.0			4.0	4.0	
Lead/Lag	Lead	Lead	Lead		Lag	Lag	Lag					
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None	None	C-Min		None	None	C-Min		None	None	None	None
v/c Ratio		0.76	0.84			0.38	0.72			0.54	0.04	
Control Delay (s/veh)		42.2	11.0			36.4	12.7			45.6	0.2	
Queue Delay		0.0	0.0			0.0	0.0			0.0	0.0	
Total Delay (s/veh)		42.2	11.0			36.4	12.7			45.6	0.2	
Queue Length 50th (ft)		70	90			26	184			32	0	
Queue Length 95th (ft)		m#139	338			61	248			#60	0	
Internal Link Dist (ft)			654				1435			1094		
Turn Bay Length (ft)		500				170					165	
Base Capacity (vph)		442	2321			168	1999			144	361	
Starvation Cap Reductn		0	0			0	0			0	0	
Spillback Cap Reductn		0	0			0	0			0	0	
Storage Cap Reductn		0	0			0	0			0	0	
Reduced v/c Ratio		0.76	0.84			0.38	0.68			0.53	0.04	

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 60 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	20	236
Future Volume (vph)	20	236
Lane Util. Factor	1.00	1.00
Frt		0.850
Flt Protected	0.962	
Satd. Flow (prot)	1799	1812
Flt Permitted	0.717	
Satd. Flow (perm)	1341	1812
Satd. Flow (RTOR)		265
Adj. Flow (vph)	24	284
Lane Group Flow (vph)	120	284
Turn Type	NA	Free
Protected Phases	3	
Permitted Phases		Free
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	6.0	
Minimum Split (s)	11.0	
Total Split (s)	12.0	
Total Split (%)	17.1%	
Maximum Green (s)	7.0	
Yellow Time (s)	4.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)	-1.0	
Total Lost Time (s)	4.0	
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	
Recall Mode	None	
v/c Ratio	0.74	0.16
Control Delay (s/veh)	59.5	0.2
Queue Delay	0.0	0.0
Total Delay (s/veh)	59.5	0.2
Queue Length 50th (ft)	51	0
Queue Length 95th (ft)	#120	0
Internal Link Dist (ft)	310	
Turn Bay Length (ft)		100
Base Capacity (vph)	164	1812
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.73	0.16

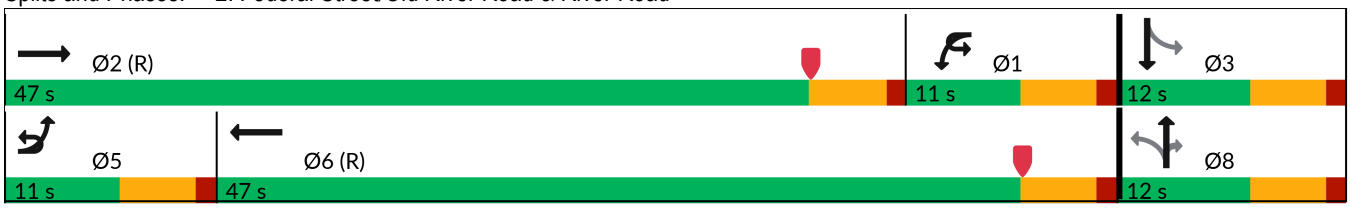
Intersection Summary

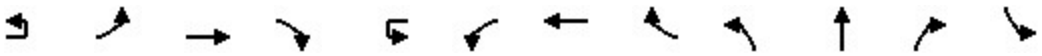
Control Type: Actuated-Coordinated

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

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

Splits and Phases: 2: Federal Street/Old River Road & River Road





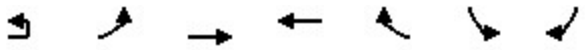
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	1	286	1405	266	7	49	1090	117	57	1	11	80
Future Volume (vph)	1	286	1405	266	7	49	1090	117	57	1	11	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10	11	11	13	13	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0			4.0	4.0	
Lane Util. Factor		0.97	0.95			1.00	0.95			1.00	1.00	
Frt		1.00	0.98			1.00	0.99			1.00	0.85	
Flt Protected		0.95	1.00			0.95	1.00			0.95	1.00	
Satd. Flow (prot)		3502	3437			1685	3235			1835	1615	
Flt Permitted		0.95	1.00			0.95	1.00			0.61	1.00	
Satd. Flow (perm)		3502	3437			1685	3235			1181	1615	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.89	0.89	0.89	0.89	0.75	0.75	0.75	0.83
Adj. Flow (vph)	1	333	1634	309	8	55	1225	131	76	1	15	96
RTOR Reduction (vph)	0	0	21	0	0	0	13	0	0	0	13	0
Lane Group Flow (vph)	0	334	1922	0	0	63	1343	0	0	77	2	0
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	7%	0%	2%	0%	0%	2%
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Perm	NA	Perm	Perm
Protected Phases	5	5	2		1	1	6			8		
Permitted Phases									8		8	3
Actuated Green, G (s)		7.8	43.9			3.6	39.7			7.5	7.5	
Effective Green, g (s)		8.8	44.9			4.6	40.7			8.5	8.5	
Actuated g/C Ratio		0.13	0.64			0.07	0.58			0.12	0.12	
Clearance Time (s)		5.0	5.0			5.0	5.0			5.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)		440	2204			110	1880			143	196	
v/s Ratio Prot		0.10	c0.56			0.04	c0.42					
v/s Ratio Perm										0.07	0.00	
v/c Ratio		0.76	0.87			0.57	0.71			0.54	0.01	
Uniform Delay, d1		29.6	10.2			31.7	10.5			28.9	27.0	
Progression Factor		1.01	0.74			1.00	1.00			1.00	1.00	
Incremental Delay, d2		4.8	3.8			4.4	2.4			1.9	0.0	
Delay (s)		34.7	11.4			36.2	12.8			30.9	27.1	
Level of Service		C	B			D	B			C	C	
Approach Delay (s/veh)			14.8				13.9			30.2		
Approach LOS			B				B			C		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	20	236
Future Volume (vph)	20	236
Ideal Flow (vphpl)	1900	1900
Lane Width	12	16
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1798	1812
Flt Permitted	0.72	1.00
Satd. Flow (perm)	1341	1812
Peak-hour factor, PHF	0.83	0.83
Adj. Flow (vph)	24	284
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	120	284
Heavy Vehicles (%)	0%	1%
Turn Type	NA	Free
Protected Phases	3	
Permitted Phases		Free
Actuated Green, G (s)	7.5	70.0
Effective Green, g (s)	8.5	70.0
Actuated g/C Ratio	0.12	1.00
Clearance Time (s)	5.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	162	1812
v/s Ratio Prot		
v/s Ratio Perm	c0.09	0.16
v/c Ratio	0.74	0.16
Uniform Delay, d1	29.7	0.0
Progression Factor	1.00	1.00
Incremental Delay, d2	14.7	0.2
Delay (s)	44.4	0.2
Level of Service	D	A
Approach Delay (s/veh)	13.3	
Approach LOS	B	

Intersection Summary



Lane Group	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	7	313	1414	795	587	542	661
Future Volume (vph)	7	313	1414	795	587	542	661
Lane Util. Factor	0.95	0.97	0.95	0.95	1.00	0.97	0.88
Frt					0.850		0.850
Flt Protected		0.950				0.950	
Satd. Flow (prot)	0	3289	3539	3406	1553	3400	2787
Flt Permitted		0.950				0.950	
Satd. Flow (perm)	0	3289	3539	3406	1553	3400	2787
Satd. Flow (RTOR)					638		
Adj. Flow (vph)	8	352	1589	864	638	623	760
Lane Group Flow (vph)	0	360	1589	864	638	623	760
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Detector Phase	5	5	2	6		3	3 5
Switch Phase							
Minimum Initial (s)	6.0	6.0	6.0	6.0		6.0	
Minimum Split (s)	11.0	11.0	11.0	11.0		11.0	
Total Split (s)	17.0	17.0	47.0	30.0		23.0	
Total Split (%)	24.3%	24.3%	67.1%	42.9%		32.9%	
Maximum Green (s)	12.0	12.0	42.0	25.0		18.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0	-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead		Lag			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0	2.0	2.0	2.0		2.0	
Recall Mode	None	None	C-Min	C-Min		Min	
v/c Ratio		0.63	0.71	0.63	0.41	0.72	0.56
Control Delay (s/veh)		35.5	6.9	12.9	0.7	28.9	14.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)		35.5	6.9	12.9	0.7	28.9	14.3
Queue Length 50th (ft)		71	103	100	0	125	114
Queue Length 95th (ft)		m96	126	154	0	172	160
Internal Link Dist (ft)			1040	654		885	
Turn Bay Length (ft)		650					650
Base Capacity (vph)		618	2231	1373	1553	922	1372
Starvation Cap Reductn		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0
Reduced v/c Ratio		0.58	0.71	0.63	0.41	0.68	0.55

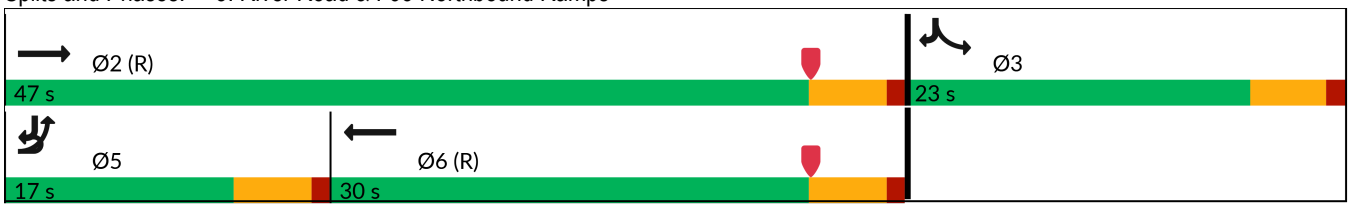
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 50

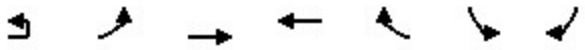
Control Type: Actuated-Coordinated

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

! Phase conflict between lane groups.

Splits and Phases: 3: River Road & I-93 Northbound Ramps





Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	7	313	1414	795	587	542	661
Future Volume (vph)	7	313	1414	795	587	542	661
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	12	12	12
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.97	0.95	0.95	1.00	0.97	0.88
Frt		1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3289	3539	3406	1553	3400	2787
Flt Permitted		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3289	3539	3406	1553	3400	2787
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.87	0.87
Adj. Flow (vph)	8	352	1589	864	638	623	760
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	360	1589	864	638	623	760
Heavy Vehicles (%)	0%	3%	2%	6%	4%	3%	2%
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Actuated Green, G (s)		11.1	43.1	27.0	70.0	16.9	33.0
Effective Green, g (s)		12.1	44.1	28.0	70.0	17.9	34.0
Actuated g/C Ratio		0.17	0.63	0.40	1.00	0.26	0.49
Clearance Time (s)		5.0	5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)		568	2229	1362	1553	869	1353
v/s Ratio Prot		0.11	c0.45	0.25		c0.18	0.27
v/s Ratio Perm					0.41		
v/c Ratio		0.63	0.71	0.63	0.41	0.72	0.56
Uniform Delay, d1		26.9	8.7	16.9	0.0	23.7	12.7
Progression Factor		1.19	0.60	0.62	1.00	1.00	1.00
Incremental Delay, d2		1.1	1.3	1.9	0.7	2.4	0.3
Delay (s)		33.0	6.5	12.3	0.7	26.1	13.1
Level of Service		C	A	B	A	C	B
Approach Delay (s/veh)			11.4	7.3		18.9	
Approach LOS			B	A		B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

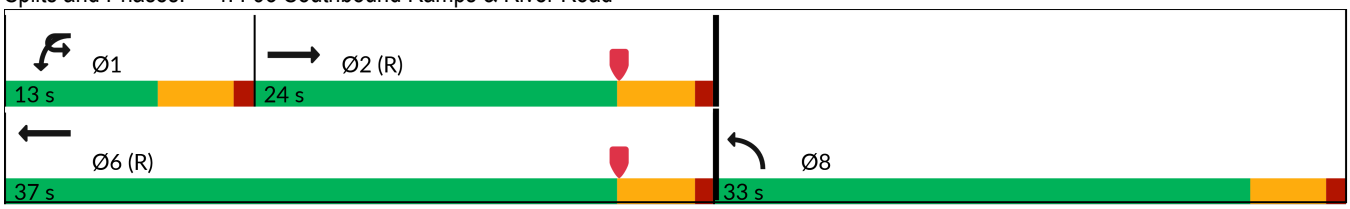
! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	616	208	2	303	1158	1169	1116
Future Volume (vph)	616	208	2	303	1158	1169	1116
Lane Util. Factor	0.95	1.00	0.95	0.97	0.95	0.97	1.00
Frt		0.850					0.850
Flt Protected				0.950		0.950	
Satd. Flow (prot)	3438	1711	0	3136	3505	3433	1812
Flt Permitted				0.950		0.950	
Satd. Flow (perm)	3438	1711	0	3136	3505	3433	1812
Satd. Flow (RTOR)		274					719
Adj. Flow (vph)	811	274	2	337	1287	1299	1240
Lane Group Flow (vph)	811	274	0	339	1287	1299	1240
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Detector Phase	2		1	1	6	8	
Switch Phase							
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0		11.0	11.0	11.0	27.0	
Total Split (s)	24.0		13.0	13.0	37.0	33.0	
Total Split (%)	34.3%		18.6%	18.6%	52.9%	47.1%	
Maximum Green (s)	19.0		8.0	8.0	32.0	28.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0			4.0	4.0	4.0	
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0	
Recall Mode	C-Min		None	None	C-Min	Min	
Walk Time (s)						6.0	
Flash Don't Walk (s)						16.0	
Pedestrian Calls (#/hr)						0	
v/c Ratio	0.81	0.16		0.82	0.77	0.93	0.68
Control Delay (s/veh)	23.0	0.2		43.3	15.4	33.1	2.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.0	0.2		43.3	15.4	33.1	2.1
Queue Length 50th (ft)	149	0		74	221	265	0
Queue Length 95th (ft)	165	0		#146	323	#404	0
Internal Link Dist (ft)	1168				1040	800	
Turn Bay Length (ft)		430		250			480
Base Capacity (vph)	996	1711		412	1676	1422	1812
Starvation Cap Reductn	0	0		0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0
Reduced v/c Ratio	0.81	0.16		0.82	0.77	0.91	0.68

Intersection Summary
Cycle Length: 70

Actuated Cycle Length: 70
Offset: 34 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: I-93 Southbound Ramps & River Road



Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	616	208	2	303	1158	1169	1116
Future Volume (vph)	616	208	2	303	1158	1169	1116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	11	11	12	12	16
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00		0.97	0.95	0.97	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3438	1711		3136	3505	3433	1812
Flt Permitted	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3438	1711		3136	3505	3433	1812
Peak-hour factor, PHF	0.76	0.76	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	811	274	2	337	1287	1299	1240
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	811	274	0	339	1287	1299	1240
Heavy Vehicles (%)	5%	7%	0%	8%	3%	2%	1%
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Actuated Green, G (s)	19.3	70.0		8.2	32.5	27.5	70.0
Effective Green, g (s)	20.3	70.0		9.2	33.5	28.5	70.0
Actuated g/C Ratio	0.29	1.00		0.13	0.48	0.41	1.00
Clearance Time (s)	5.0			5.0	5.0	5.0	
Vehicle Extension (s)	2.0			2.0	2.0	2.0	
Lane Grp Cap (vph)	997	1711		412	1677	1397	1812
v/s Ratio Prot	0.24			0.11	c0.37	c0.38	
v/s Ratio Perm		0.16					c0.68
v/c Ratio	0.81	0.16		0.82	0.77	0.93	0.68
Uniform Delay, d1	23.1	0.0		29.6	15.0	19.8	0.0
Progression Factor	0.66	1.00		0.92	0.81	1.00	1.00
Incremental Delay, d2	6.5	0.2		9.9	2.8	10.9	2.1
Delay (s)	21.8	0.2		37.0	15.0	30.7	2.1
Level of Service	C	A		D	B	C	A
Approach Delay (s/veh)	16.3				19.5	16.7	
Approach LOS	B				B	B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	423	75	439	719	945	20	3	94	228	2	16
Future Volume (vph)	47	423	75	439	719	945	20	3	94	228	2	16
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	0.88	0.95	0.95	1.00
Frt		0.977				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.959		0.950	0.953	
Satd. Flow (prot)	1805	3439	0	3351	1863	1599	0	1701	2668	1573	1580	1615
Flt Permitted	0.950			0.950				0.959		0.950	0.953	
Satd. Flow (perm)	1805	3439	0	3351	1863	1599	0	1701	2668	1573	1580	1615
Satd. Flow (RTOR)		31				744						343
Adj. Flow (vph)	65	588	104	493	808	1062	24	4	111	275	2	19
Lane Group Flow (vph)	65	692	0	493	808	1062	0	28	111	137	140	19
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Detector Phase	5	2		1	6		8	8	8 1	3	3	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	11.0	28.0		20.0	37.0		11.0	11.0		11.0	11.0	
Total Split (%)	15.7%	40.0%		28.6%	52.9%		15.7%	15.7%		15.7%	15.7%	
Maximum Green (s)	6.0	23.0		15.0	32.0		6.0	6.0		6.0	6.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
v/c Ratio	0.36	0.52		0.71	0.79	0.66		0.16	0.12	0.74	0.76	0.01
Control Delay (s/veh)	35.6	18.8		27.4	21.6	1.2		31.4	14.8	58.8	60.0	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.6	18.8		27.4	21.6	1.2		31.4	14.8	58.8	60.0	0.0
Queue Length 50th (ft)	27	121		97	303	0		11	17	67	64	0
Queue Length 95th (ft)	49	129		m121	m#473	m0		32	32	#154	#147	0
Internal Link Dist (ft)		1189			1168			1114			744	
Turn Bay Length (ft)	80			350					200			150
Base Capacity (vph)	180	1336		765	1022	1599		170	945	184	185	1615
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.36	0.52		0.64	0.79	0.66		0.16	0.12	0.74	0.76	0.01

Intersection Summary

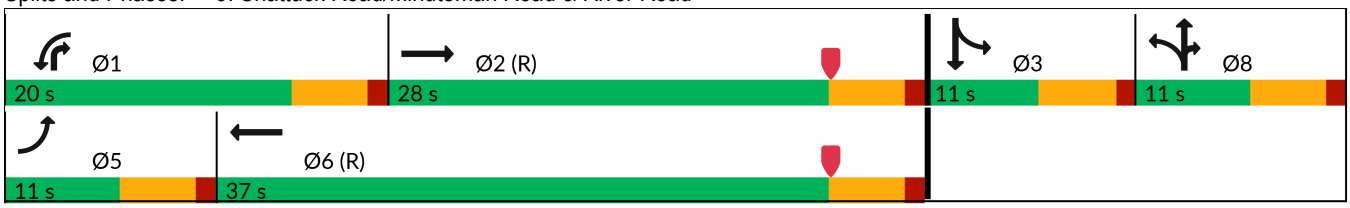
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 2 (3%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 75

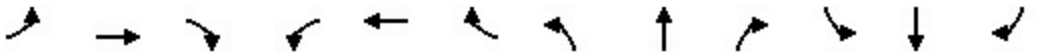
Control Type: Actuated-Coordinated

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

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

Splits and Phases: 5: Shattuck Road/Minuteman Road & River Road

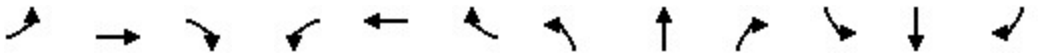




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	423	75	439	719	945	20	3	94	228	2	16
Future Volume (vph)	47	423	75	439	719	945	20	3	94	228	2	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	10	10	11	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		1.00	0.88	0.95	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1805	3441		3351	1863	1599		1700	2668	1573	1580	1615
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1805	3441		3351	1863	1599		1700	2668	1573	1580	1615
Peak-hour factor, PHF	0.72	0.72	0.72	0.89	0.89	0.89	0.85	0.85	0.85	0.83	0.83	0.83
Adj. Flow (vph)	65	588	104	493	808	1062	24	4	111	275	2	19
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	672	0	493	808	1062	0	28	111	137	140	19
Heavy Vehicles (%)	0%	3%	0%	1%	2%	1%	0%	0%	3%	9%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Actuated Green, G (s)	3.6	24.5		13.5	34.4	70.0		4.8	23.3	7.2	7.2	70.0
Effective Green, g (s)	4.6	25.5		14.5	35.4	70.0		5.8	24.3	8.2	8.2	70.0
Actuated g/C Ratio	0.07	0.36		0.21	0.51	1.00		0.08	0.35	0.12	0.12	1.00
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	118	1253		694	942	1599		140	926	184	185	1615
v/s Ratio Prot	0.04	0.20		0.15	c0.43			0.02	0.04	0.09	0.09	
v/s Ratio Perm						c0.66						0.01
v/c Ratio	0.55	0.54		0.71	0.86	0.66		0.20	0.12	0.74	0.76	0.01
Uniform Delay, d1	31.7	17.6		25.8	15.1	0.0		29.9	15.6	29.9	29.9	0.0
Progression Factor	1.00	1.00		0.94	1.09	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	1.7		1.5	5.4	1.1		0.3	0.0	13.3	14.4	0.0
Delay (s)	34.8	19.2		25.8	21.9	1.1		30.2	15.6	43.2	44.4	0.0
Level of Service	C	B		C	C	A		C	B	D	D	A
Approach Delay (s/veh)		20.6			13.4			18.5			41.0	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	611	340	24	835	12	220	21	27	16	14	14
Future Volume (vph)	29	611	340	24	835	12	220	21	27	16	14	14
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.915			0.925	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1532	3355	1546	1745	3415	0	1711	1609	0	1745	1699	0
Flt Permitted	0.950			0.950			0.738			0.719		
Satd. Flow (perm)	1532	3355	1546	1745	3415	0	1329	1609	0	1321	1699	0
Satd. Flow (RTOR)			314		1			33			15	
Adj. Flow (vph)	30	636	354	28	982	14	265	25	33	17	15	15
Lane Group Flow (vph)	30	636	354	28	996	0	265	58	0	17	30	0
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	16.0		11.0	16.0		10.0	10.0		10.0	10.0	
Total Split (s)	11.0	43.0		11.0	43.0		32.0	32.0		32.0	32.0	
Total Split (%)	10.1%	39.4%		10.1%	39.4%		29.4%	29.4%		29.4%	29.4%	
Maximum Green (s)	5.0	37.0		5.0	37.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		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	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.17	0.42	0.23	0.14	0.64		0.62	0.11		0.04	0.05	
Control Delay (s/veh)	41.4	16.7	0.3	40.8	20.0		32.0	14.2		24.0	16.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	41.4	16.7	0.3	40.8	20.0		32.0	14.2		24.0	16.6	
Queue Length 50th (ft)	11	73	0	10	130		79	6		4	4	
Queue Length 95th (ft)	56	248	0	46	385		#256	43		27	32	
Internal Link Dist (ft)		1435			1194			1039			1055	
Turn Bay Length (ft)	150		200	130						100		
Base Capacity (vph)	177	2167	1546	202	2206		616	763		612	796	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.29	0.23	0.14	0.45		0.43	0.08		0.03	0.04	

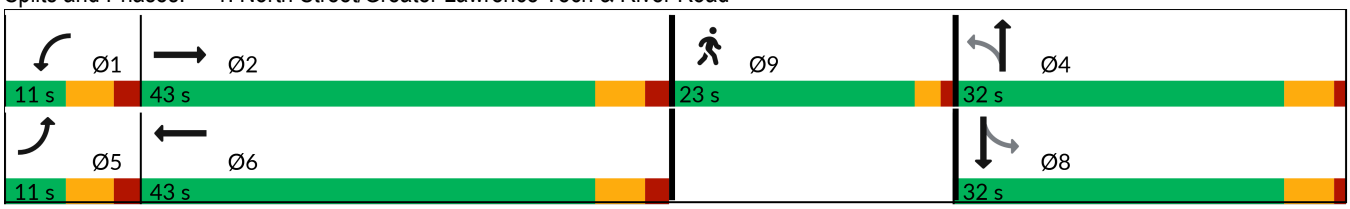
Intersection Summary
Cycle Length: 109

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	21%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Don't Walk (s)	13.0
Pedestrian Calls (#/hr)	4
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Actuated Cycle Length: 68.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

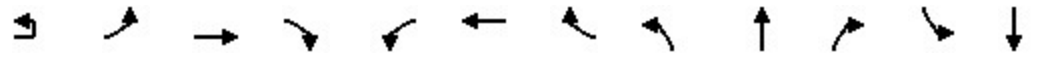
Splits and Phases: 1: North Street/Greater Lawrence Tech & River Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	611	340	24	835	12	220	21	27	16	14	14
Future Volume (vph)	29	611	340	24	835	12	220	21	27	16	14	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1532	3355	1546	1745	3415		1711	1609		1745	1699	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	1.00		0.72	1.00	
Satd. Flow (perm)	1532	3355	1546	1745	3415		1328	1609		1321	1699	
Peak-hour factor, PHF	0.96	0.96	0.96	0.85	0.85	0.85	0.83	0.83	0.83	0.92	0.92	0.92
Adj. Flow (vph)	30	636	354	28	982	14	265	25	33	17	15	15
RTOR Reduction (vph)	0	0	0	0	1	0	0	23	0	0	11	0
Lane Group Flow (vph)	30	636	354	28	995	0	265	35	0	17	19	0
Heavy Vehicles (%)	10%	4%	1%	0%	2%	0%	2%	5%	4%	0%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases			Free				4			8		
Actuated Green, G (s)	1.5	28.8	73.8	1.5	28.8		21.0	21.0		21.0	21.0	
Effective Green, g (s)	3.5	30.8	73.8	3.5	30.8		22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.05	0.42	1.00	0.05	0.42		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	72	1400	1546	82	1425		395	479		393	506	
v/s Ratio Prot	0.02	0.19		0.02	c0.29			0.02			0.01	
v/s Ratio Perm			c0.23				c0.20			0.01		
v/c Ratio	0.42	0.45	0.23	0.34	0.70		0.67	0.07		0.04	0.04	
Uniform Delay, d1	34.2	15.5	0.0	34.0	17.7		22.7	18.6		18.4	18.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	0.2	0.3	2.5	1.5		4.4	0.1		0.0	0.0	
Delay (s)	38.0	15.7	0.3	36.5	19.2		27.2	18.6		18.5	18.4	
Level of Service	D	B	A	D	B		C	B		B	B	
Approach Delay (s/veh)		11.0			19.7			25.6			18.4	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	3	170	911	46	5	998	62	280	7	58	88	2
Future Volume (vph)	3	170	911	46	5	998	62	280	7	58	88	2
Lane Util. Factor	0.95	0.97	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Frt			0.993			0.991				0.850		
Flt Protected		0.950			0.950				0.953			0.953
Satd. Flow (prot)	0	3401	3453	0	1685	3394	0	0	1871	1615	0	1759
Flt Permitted		0.950			0.950				0.625			0.369
Satd. Flow (perm)	0	3401	3453	0	1685	3394	0	0	1227	1615	0	681
Satd. Flow (RTOR)			7			9				164		
Adj. Flow (vph)	3	179	959	48	5	1051	65	318	8	66	131	3
Lane Group Flow (vph)	0	182	1007	0	5	1116	0	0	326	66	0	134
Turn Type	Prot	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA
Protected Phases	5	5	2		1	6			8			3
Permitted Phases								8		8	3	
Detector Phase	5	5	2		1	6		8	8	8	3	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0
Total Split (s)	11.0	11.0	36.0		11.0	36.0		33.0	33.0	33.0	33.0	33.0
Total Split (%)	13.8%	13.8%	45.0%		13.8%	45.0%		41.3%	41.3%	41.3%	41.3%	41.3%
Maximum Green (s)	6.0	6.0	31.0		6.0	31.0		28.0	28.0	28.0	28.0	28.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0	-1.0		-1.0	-1.0			-1.0	-1.0		-1.0
Total Lost Time (s)		4.0	4.0		4.0	4.0			4.0	4.0		4.0
Lead/Lag	Lead	Lead	Lead		Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	C-Min		None	C-Min		None	None	None	None	None
v/c Ratio		0.55	0.52		0.03	0.74			0.86	0.11		0.64
Control Delay (s/veh)		47.4	5.5		34.0	23.3			47.1	0.3		37.0
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0		0.0
Total Delay (s/veh)		47.4	5.5		34.0	23.3			47.1	0.3		37.0
Queue Length 50th (ft)		43	81		2	257			146	0		55
Queue Length 95th (ft)		m75	114		13	341			#253	0		74
Internal Link Dist (ft)			654			1435			1094			310
Turn Bay Length (ft)		500			170					165		
Base Capacity (vph)		329	1941		147	1504			444	689		246
Starvation Cap Reductn		0	0		0	0			0	0		0
Spillback Cap Reductn		0	0		0	0			0	0		0
Storage Cap Reductn		0	0		0	0			0	0		0
Reduced v/c Ratio		0.55	0.52		0.03	0.74			0.73	0.10		0.54

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 58 (73%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 60

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	367
Future Volume (vph)	367
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1830
Flt Permitted	
Satd. Flow (perm)	1830
Satd. Flow (RTOR)	281
Adj. Flow (vph)	548
Lane Group Flow (vph)	548
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Recall Mode	
v/c Ratio	0.30
Control Delay (s/veh)	0.4
Queue Delay	0.0
Total Delay (s/veh)	0.4
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	100
Base Capacity (vph)	1830
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.30

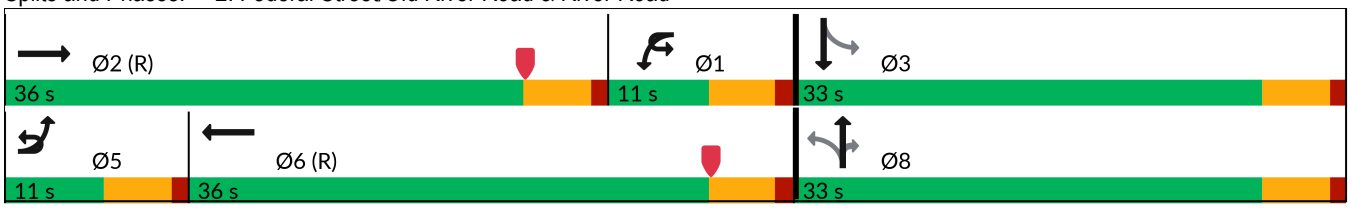
Intersection Summary

Control Type: Actuated-Coordinated

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

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

Splits and Phases: 2: Federal Street/Old River Road & River Road

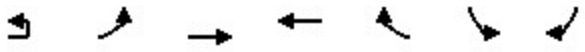


Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	3	170	911	46	5	998	62	280	7	58	88	2
Future Volume (vph)	3	170	911	46	5	998	62	280	7	58	88	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	11	11	13	13	12	12	12
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.97	0.95		1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.99		1.00	0.99			1.00	0.85		1.00
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		0.95
Satd. Flow (prot)		3401	3453		1685	3395			1872	1615		1760
Flt Permitted		0.95	1.00		0.95	1.00			0.63	1.00		0.37
Satd. Flow (perm)		3401	3453		1685	3395			1228	1615		681
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.88	0.88	0.88	0.67	0.67
Adj. Flow (vph)	3	179	959	48	5	1051	65	318	8	66	131	3
RTOR Reduction (vph)	0	0	3	0	0	5	0	0	0	45	0	0
Lane Group Flow (vph)	0	182	1004	0	5	1111	0	0	326	21	0	134
Heavy Vehicles (%)	0%	3%	4%	0%	0%	2%	0%	0%	0%	0%	3%	0%
Turn Type	Prot	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA
Protected Phases	5	5	2		1	6			8			3
Permitted Phases								8		8	3	
Actuated Green, G (s)		6.8	39.9		1.2	34.3			23.9	23.9		23.9
Effective Green, g (s)		7.8	40.9		2.2	35.3			24.9	24.9		24.9
Actuated g/C Ratio		0.10	0.51		0.03	0.44			0.31	0.31		0.31
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		5.0
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lane Grp Cap (vph)		331	1765		46	1498			382	502		211
v/s Ratio Prot		0.05	c0.29		0.00	c0.33						
v/s Ratio Perm									c0.27	0.01		0.20
v/c Ratio		0.55	0.57		0.11	0.74			0.85	0.04		0.64
Uniform Delay, d1		34.4	13.5		37.9	18.6			25.8	19.2		23.6
Progression Factor		1.19	0.36		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2		0.9	1.2		0.4	3.4			16.1	0.0		4.5
Delay (s)		41.7	6.0		38.3	21.9			41.9	19.2		28.2
Level of Service		D	A		D	C			D	B		C
Approach Delay (s/veh)			11.5			22.0			38.1			5.9
Approach LOS			B			C			D			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	367
Future Volume (vph)	367
Ideal Flow (vphpl)	1900
Lane Width	16
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1830
Flt Permitted	1.00
Satd. Flow (perm)	1830
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	548
RTOR Reduction (vph)	0
Lane Group Flow (vph)	548
Heavy Vehicles (%)	0%
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Actuated Green, G (s)	80.0
Effective Green, g (s)	80.0
Actuated g/C Ratio	1.00
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1830
v/s Ratio Prot	
v/s Ratio Perm	0.30
v/c Ratio	0.30
Uniform Delay, d1	0.0
Progression Factor	1.00
Incremental Delay, d2	0.4
Delay (s)	0.4
Level of Service	A
Approach Delay (s/veh)	
Approach LOS	
Intersection Summary	



Lane Group	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	1	882	915	844	803	214	216
Future Volume (vph)	1	882	915	844	803	214	216
Lane Util. Factor	0.95	0.97	0.95	0.95	1.00	0.97	0.88
Frt					0.850		0.850
Flt Protected		0.950				0.950	
Satd. Flow (prot)	0	3319	3505	3539	1599	3367	2733
Flt Permitted		0.950				0.950	
Satd. Flow (perm)	0	3319	3505	3539	1599	3367	2733
Satd. Flow (RTOR)					616		
Adj. Flow (vph)	1	1038	1076	1082	1029	252	254
Lane Group Flow (vph)	0	1039	1076	1082	1029	252	254
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Detector Phase	5	5	2	6		3	3 5
Switch Phase							
Minimum Initial (s)	6.0	6.0	6.0	6.0		6.0	
Minimum Split (s)	11.0	11.0	11.0	11.0		11.0	
Total Split (s)	34.0	34.0	68.0	34.0		12.0	
Total Split (%)	42.5%	42.5%	85.0%	42.5%		15.0%	
Maximum Green (s)	29.0	29.0	63.0	29.0		7.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0	-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead		Lag			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0	2.0	2.0	2.0		2.0	
Recall Mode	None	None	C-Min	C-Min		Min	
v/c Ratio		0.88	0.39	0.79	0.64	0.70	0.18
Control Delay (s/veh)		18.2	1.8	21.0	3.6	46.9	10.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)		18.2	1.8	21.0	3.6	46.9	10.6
Queue Length 50th (ft)		117	15	188	49	66	36
Queue Length 95th (ft)		m127	m17	193	19	#109	55
Internal Link Dist (ft)			1040	654		885	
Turn Bay Length (ft)		650					650
Base Capacity (vph)		1244	2804	1374	1599	358	1452
Starvation Cap Reductn		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0
Reduced v/c Ratio		0.84	0.38	0.79	0.64	0.70	0.17

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 60

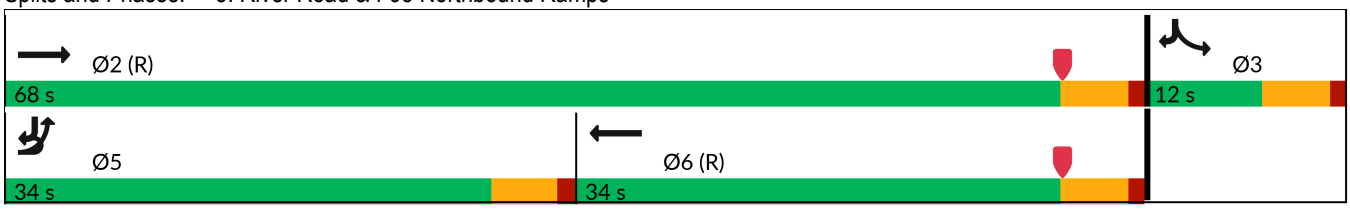
Control Type: Actuated-Coordinated

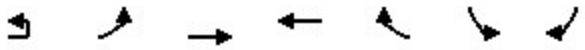
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

! Phase conflict between lane groups.

Splits and Phases: 3: River Road & I-93 Northbound Ramps





Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	1	882	915	844	803	214	216
Future Volume (vph)	1	882	915	844	803	214	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	12	12	12
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.97	0.95	0.95	1.00	0.97	0.88
Frt		1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3319	3505	3539	1599	3367	2733
Flt Permitted		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3319	3505	3539	1599	3367	2733
Peak-hour factor, PHF	0.85	0.85	0.85	0.78	0.78	0.85	0.85
Adj. Flow (vph)	1	1038	1076	1082	1029	252	254
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1039	1076	1082	1029	252	254
Heavy Vehicles (%)	0%	2%	3%	2%	1%	4%	4%
Turn Type	Prot	Prot	NA	NA	Free	Prot	pt+ov
Protected Phases	5!	5	2	6		3	3 5!
Permitted Phases					Free		
Actuated Green, G (s)		27.6	62.5	29.9	80.0	7.5	40.1
Effective Green, g (s)		28.6	63.5	30.9	80.0	8.5	41.1
Actuated g/C Ratio		0.36	0.79	0.39	1.00	0.11	0.51
Clearance Time (s)		5.0	5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)		1186	2782	1366	1599	357	1404
v/s Ratio Prot		c0.31	0.31	c0.31		0.07	0.09
v/s Ratio Perm					c0.64		
v/c Ratio		0.88	0.39	0.79	0.64	0.71	0.18
Uniform Delay, d1		24.0	2.5	21.7	0.0	34.5	10.4
Progression Factor		0.46	0.62	0.75	1.00	1.00	1.00
Incremental Delay, d2		5.1	0.3	4.0	1.7	5.1	0.0
Delay (s)		16.1	1.8	20.3	1.7	39.7	10.4
Level of Service		B	A	C	A	D	B
Approach Delay (s/veh)			8.8	11.2		25.0	
Approach LOS			A	B		C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

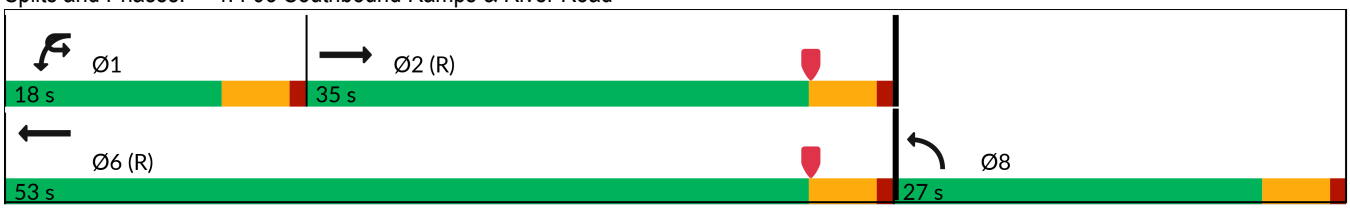
! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1208	768	3	517	541	374	587
Future Volume (vph)	1208	768	3	517	541	374	587
Lane Util. Factor	0.95	1.00	0.95	0.97	0.95	0.97	1.00
Frt		0.850					0.850
Flt Protected				0.950		0.950	
Satd. Flow (prot)	3574	1830	0	3352	3574	3467	1794
Flt Permitted				0.950		0.950	
Satd. Flow (perm)	3574	1830	0	3352	3574	3467	1794
Satd. Flow (RTOR)		873					587
Adj. Flow (vph)	1373	873	3	544	569	456	716
Lane Group Flow (vph)	1373	873	0	547	569	456	716
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Detector Phase	2		1	1	6	8	
Switch Phase							
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0		11.0	11.0	11.0	27.0	
Total Split (s)	35.0		18.0	18.0	53.0	27.0	
Total Split (%)	43.8%		22.5%	22.5%	66.3%	33.8%	
Maximum Green (s)	30.0		13.0	13.0	48.0	22.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0			4.0	4.0	4.0	
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0	
Recall Mode	C-Min		None	None	C-Min	Min	
Walk Time (s)						6.0	
Flash Don't Walk (s)						16.0	
Pedestrian Calls (#/hr)						0	
v/c Ratio	0.90	0.48		0.73	0.23	0.66	0.40
Control Delay (s/veh)	22.8	0.1		50.4	1.6	34.2	0.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.8	0.1		50.4	1.6	34.2	0.7
Queue Length 50th (ft)	295	0		152	11	110	0
Queue Length 95th (ft)	m303	m0		m191	m22	131	0
Internal Link Dist (ft)	1168				1040	800	
Turn Bay Length (ft)		430		250			480
Base Capacity (vph)	1526	1830		751	2507	996	1794
Starvation Cap Reductn	0	0		0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0
Reduced v/c Ratio	0.90	0.48		0.73	0.23	0.46	0.40

Intersection Summary
Cycle Length: 80

Actuated Cycle Length: 80
Offset: 26 (33%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

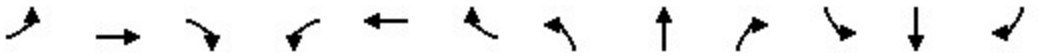
Splits and Phases: 4: I-93 Southbound Ramps & River Road



Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1208	768	3	517	541	374	587
Future Volume (vph)	1208	768	3	517	541	374	587
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	11	11	12	12	16
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00		0.97	0.95	0.97	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3574	1830		3352	3574	3467	1794
Flt Permitted	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3574	1830		3352	3574	3467	1794
Peak-hour factor, PHF	0.88	0.88	0.95	0.95	0.95	0.82	0.82
Adj. Flow (vph)	1373	873	3	544	569	456	716
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	1373	873	0	547	569	456	716
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%	2%
Turn Type	NA	Free	Prot	Prot	NA	Prot	Free
Protected Phases	2		1	1	6	8	
Permitted Phases		Free					Free
Actuated Green, G (s)	33.2	80.0		16.9	55.1	14.9	80.0
Effective Green, g (s)	34.2	80.0		17.9	56.1	15.9	80.0
Actuated g/C Ratio	0.43	1.00		0.22	0.70	0.20	1.00
Clearance Time (s)	5.0			5.0	5.0	5.0	
Vehicle Extension (s)	2.0			2.0	2.0	2.0	
Lane Grp Cap (vph)	1527	1830		750	2506	689	1794
v/s Ratio Prot	c0.38			c0.16	0.16	c0.13	
v/s Ratio Perm		0.48					0.40
v/c Ratio	0.90	0.48		0.73	0.23	0.66	0.40
Uniform Delay, d1	21.3	0.0		28.8	4.2	29.6	0.0
Progression Factor	0.91	1.00		1.58	0.31	1.00	1.00
Incremental Delay, d2	0.9	0.1		2.2	0.2	1.9	0.7
Delay (s)	20.3	0.1		47.8	1.5	31.4	0.7
Level of Service	C	A		D	A	C	A
Approach Delay (s/veh)	12.5				24.2	12.6	
Approach LOS	B				C	B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	468	38	107	358	252	51	2	489	884	4	49
Future Volume (vph)	17	468	38	107	358	252	51	2	489	884	4	49
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	0.88	0.95	0.95	1.00
Frt		0.989				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.954		0.950	0.953	
Satd. Flow (prot)	1805	3505	0	3351	1863	1417	0	1692	2748	1665	1671	1615
Flt Permitted	0.950			0.950				0.954		0.950	0.953	
Satd. Flow (perm)	1805	3505	0	3351	1863	1417	0	1692	2748	1665	1671	1615
Satd. Flow (RTOR)		10				315						232
Adj. Flow (vph)	21	578	47	134	448	315	85	3	815	1245	6	69
Lane Group Flow (vph)	21	625	0	134	448	315	0	88	815	622	629	69
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Detector Phase	5	2		1	6		8	8	8 1	3	3	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	11.0	22.0		11.0	22.0		15.0	15.0		32.0	32.0	
Total Split (%)	13.8%	27.5%		13.8%	27.5%		18.8%	18.8%		40.0%	40.0%	
Maximum Green (s)	6.0	17.0		6.0	17.0		10.0	10.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
v/c Ratio	0.13	0.79		0.46	0.78	0.22		0.38	1.08	1.07	1.08	0.04
Control Delay (s/veh)	35.9	37.0		40.5	33.8	0.3		36.8	86.5	85.0	87.6	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.9	37.0		40.5	33.8	0.3		36.8	86.5	85.0	87.6	0.0
Queue Length 50th (ft)	10	155		34	144	0		41	~262	~376	~374	0
Queue Length 95th (ft)	28	188		52	#343	0		54	184	#393	#389	0
Internal Link Dist (ft)		1189			1168			1114			744	
Turn Bay Length (ft)	80			350					200			150
Base Capacity (vph)	157	796		293	573	1417		232	755	582	584	1615
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.13	0.79		0.46	0.78	0.22		0.38	1.08	1.07	1.08	0.04

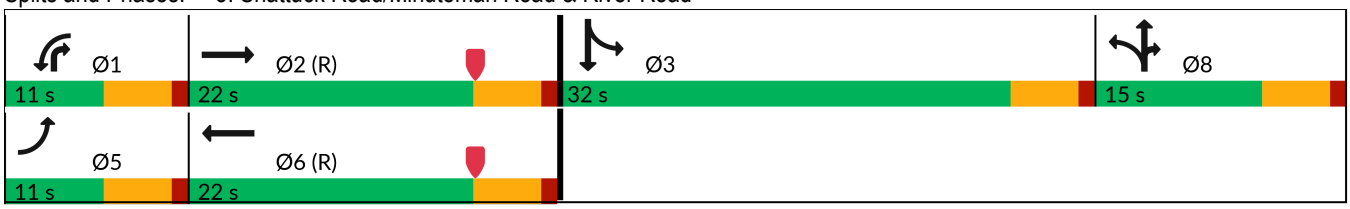
Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 60 (75%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90

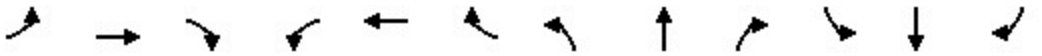
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Shattuck Road/Minuteman Road & River Road





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	468	38	107	358	252	51	2	489	884	4	49
Future Volume (vph)	17	468	38	107	358	252	51	2	489	884	4	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	10	10	11	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		1.00	0.88	0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1805	3504		3351	1863	1417		1692	2748	1665	1670	1615
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1805	3504		3351	1863	1417		1692	2748	1665	1670	1615
Peak-hour factor, PHF	0.81	0.81	0.81	0.80	0.80	0.80	0.60	0.60	0.60	0.71	0.71	0.71
Adj. Flow (vph)	21	578	47	134	448	315	85	3	815	1245	6	69
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	21	617	0	134	448	315	0	88	815	622	629	69
Heavy Vehicles (%)	0%	2%	0%	1%	2%	14%	0%	0%	0%	3%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	5	2		1	6		8	8	8 1	3	3	
Permitted Phases						Free						Free
Actuated Green, G (s)	2.4	17.0		6.0	20.6	80.0		10.0	21.0	27.0	27.0	80.0
Effective Green, g (s)	3.4	18.0		7.0	21.6	80.0		11.0	22.0	28.0	28.0	80.0
Actuated g/C Ratio	0.04	0.23		0.09	0.27	1.00		0.14	0.28	0.35	0.35	1.00
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	76	788		293	503	1417		232	755	582	584	1615
v/s Ratio Prot	0.01	0.18		0.04	c0.24			0.05	c0.30	0.37	c0.38	
v/s Ratio Perm						0.22						0.04
v/c Ratio	0.28	0.78		0.46	0.89	0.22		0.38	1.08	1.07	1.08	0.04
Uniform Delay, d1	37.1	29.2		34.7	28.1	0.0		31.4	29.0	26.0	26.0	0.0
Progression Factor	1.00	1.00		1.02	0.72	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	7.7		0.4	19.9	0.3		0.4	56.3	57.0	59.7	0.0
Delay (s)	37.8	36.8		35.7	40.2	0.3		31.8	85.3	83.0	85.7	0.0
Level of Service	D	D		D	D	A		C	F	F	F	A
Approach Delay (s/veh)		36.9			25.5			80.1			80.0	
Approach LOS		D			C			F			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	59.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group