

Minuteman Bikeway Extension Project

Bedford, Massachusetts

MassDOT Project No. 607738

PREPARED FOR

Town of Bedford

PREPARED BY



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MARCH 2017



VHB, in coordination with MassDOT and the Town of Bedford, has conducted a traffic control evaluation for the proposed Minuteman Commuter Bikeway Extension. As shown in Figure 1, the proposed path extension is from the termination of the existing Minuteman Commuter Bikeway at Depot Park to the Concord town line. The path follows Railroad Ave. and the existing unpaved Reformatory Branch Trail. The evaluation includes a review of existing traffic volumes, sight distance, traffic signal control warrants (in compliance with the 2009 Manual on Uniform Traffic Control Devices (MUTCD)¹) and of crash data on roadways the path crosses or travels along.

The proposed path crosses four roadway locations. A review of existing conditions was completed at each location to determine the appropriate traffic control treatment. Three of the crossing locations will be at-grade and are discussed in detail in this report.

The fourth location, Concord Road (Route 62) will be a grade separated crossing. The former rail bed at this location is below the existing roadway level, the former wooden bridge structure was removed and backfilled back in the early 1960's. The crossing evaluation was discussed with MassDOT and the Town of Bedford and it was determined the grade separated crossing was the best fit for this location. As shown on the 25% plans prepared with this report, the proposed path will run through a culvert beneath the roadway providing uninterrupted passage for both vehicles and path users. Installation of the proposed culvert will require staging plans and temporary roadway alignments during construction, as discussed in the Traffic Management Strategy section of this report.

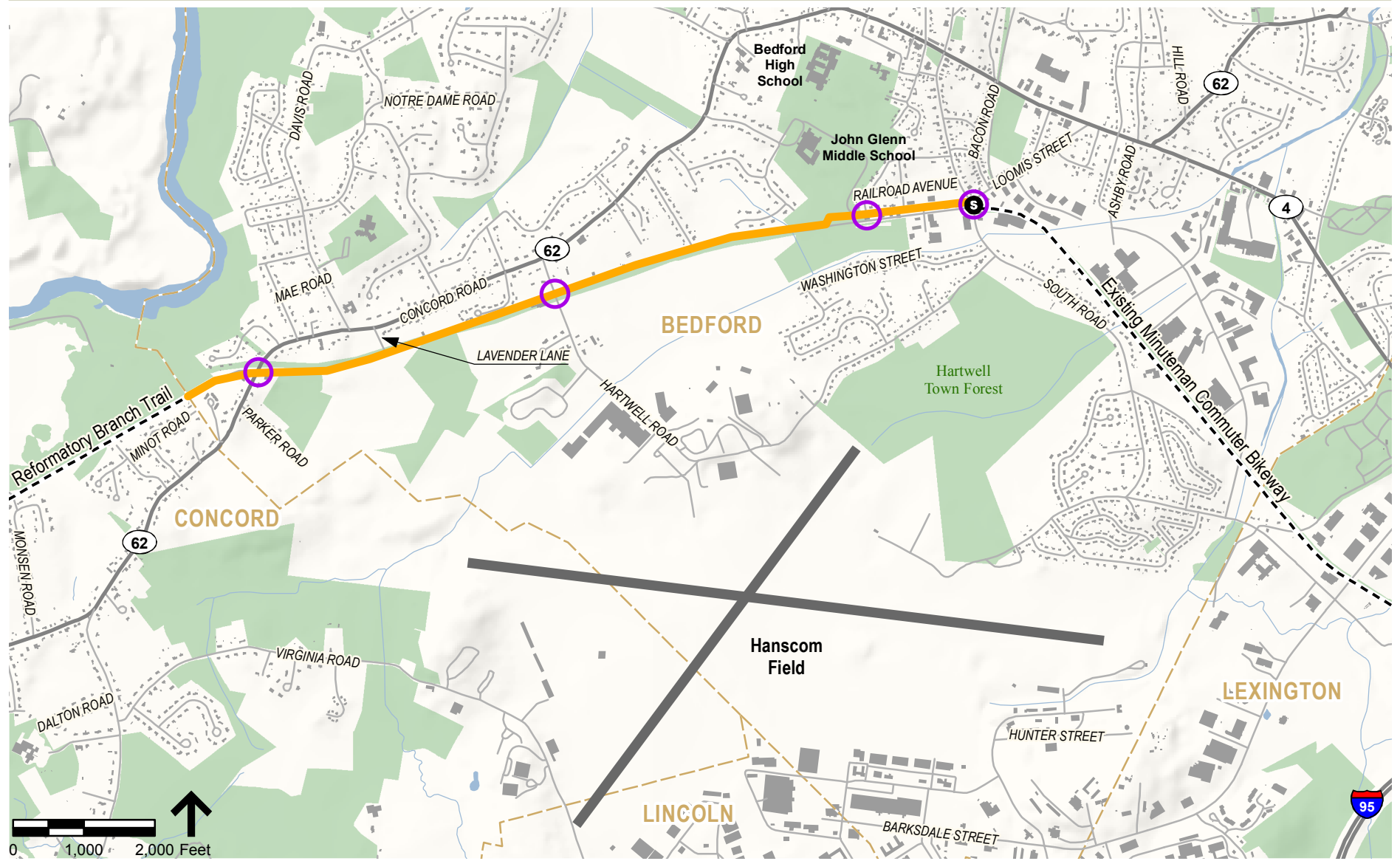
Study Area

The study area for the project includes the following at-grade roadway crossings:

- South Road at the signalized intersection with Railroad Avenue and Loomis Street
- Railroad Avenue – 690'± west of Highland Avenue
- Hartwell Road – 550'± south of Concord Road (Route 62)

Table 1 summarizes the Functional Classification and Jurisdiction of each roadway crossing.

▼
¹ Manual on Uniform Traffic Control Devices, U.S. Department of Transportation/Federal Highway Administration; 2009 Edition.






-  Proposed Minuteman Commuter Bikeway Extension
-  Signalized Intersection
-  Crossing Location



Figure 1-1

Locus Map
Minuteman Commuter Bikeway Extension
Bedford, Massachusetts



Table 1: Roadway Functional Classification and Jurisdiction

Roadway Crossing	State Functional Classification	Jurisdiction
South Road	Urban Minor Arterial	Town of Bedford
Railroad Avenue	Local	Town of Bedford
Hartwell Road	Urban Minor Arterial	Town of Bedford

Source: MassDOT

Existing Conditions

Leaving the existing portion of the Minuteman Commuter Bikeway and heading west, the first crossing will be South Road at the signalized intersection with Railroad Avenue and Loomis Street. The existing bikeway ends at the Bedford Depot in the southeast corner of the intersection. The existing traffic signal operates fully actuated with permissive left-turn movements on all approaches. Pedestrians cross during an exclusive pedestrian phase serving all four legs of the intersection.

The second bikeway crossing will be at the start of the existing Reformatory Branch Trail. The existing trailhead is located on the west side of Railroad Avenue just west of Highland Avenue. Railroad Avenue runs east-west from the South Road/Loomis Street intersection and turns sharply north just at the trailhead. In this area, there is sidewalk along the north and east side of Railroad Avenue. There is no marked crosswalk across Railroad Avenue. The existing Reformatory Branch Trail is narrow and unpaved. There is a small gravel parking lot provided. Note, this would not be a crossing location for users who are exclusively following the Minuteman Bikeway, as the proposed designated bike route travels along the south side of Railroad Avenue. A crossing is proposed here to provide a connected off-road route to the schools just to the north by meeting with existing sidewalk along the north and east side of Railroad Avenue.

The John Glenn Middle School is located on Railroad Avenue north of the proposed crossing location. Bedford High School's main access is on Mudge Way, however a paved sidewalk from the high school and adjacent athletic fields comes out to Railroad Avenue across from the middle school.

The third crossing will be on Hartwell Road. To the east of Hartwell Road, there is a paved access road to the Town of Bedford well water treatment plant. The Reformatory Branch Trail makes use of the paved access road. There are bollards delineating where the path changes from unpaved to paved. The well water treatment plant is located just north of the trail in a fenced area. At the intersection with



Hartwell Road, there is a gate across the paved access road that is left open. Based on discussions with the Town, this access road is used by Town vehicles on a daily basis and the fenced area around the treatment plant is occasionally used as a staging area for water and sewer projects in town. There is no marked crosswalk at Hartwell Road, however there are advance trail crossing warning signs and signs at the crossing location. To the west of Hartwell Road, the Reformatory Branch Trail continues unpaved.

Traffic Volumes

To identify current traffic flow characteristics and speed profiles, daily traffic volumes and vehicle speeds were collected using 48-hour weekday automatic traffic recorders (ATRs) at five locations:

- South Road – north of Railroad Avenue
- Loomis Street east of South Road
- Railroad Avenue – at the existing start of the Reformatory Branch Trail
- Hartwell Road - at the existing Reformatory Branch Trail crossing

The ATR data is presented in Table 2.

Table 2: Existing Weekday Traffic Volume Summary

Location	ADT ^a	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
		Volume	K Factor ^b	Dir. Dist. ^c	Volume	K Factor	Dir. Dist.
South Road north of Railroad Avenue	6,280	715	11%	83% SB	750	12%	84% NB
Loomis Street east of South Road	5,900	440	14%	61% EB	605	10%	53% WB
Railroad Avenue west of Highland Avenue	2,445	400	16%	57% EB	300	12%	54% EB
Hartwell Road south of Concord Road	3,280	330	10%	76% SB	385	12%	69% NB

Source: VHB based on automatic traffic recorder counts conducted in October 13, 2016.

Note: Peak hours do not necessarily coincide with the peak hours of turning movement counts.

- a. Average Daily Traffic volume expressed in vehicles per day.
- b. Represents the percent of daily traffic that occurs during the peak hour.
- c. Directional distribution of peak hour traffic.

In addition to the ATRs, turning movement counts (TMCs) were collected at the intersection of South Road at Loomis Street and Railroad Avenue. Peak hour TMCs were collected at the study area intersection during the weekday morning peak period from 7:00 AM to 9:00 AM and weekday evening peak period from 4:00 PM to 6:00 PM.



ATR and TMC data is provided in Appendix A.

Roadway Crossing Speeds

On roadways with proposed bikeway crossings, the regulated speeds and the 85th percentile speeds were reviewed for use in the sight distance evaluation and traffic signal warrants. Each of the roadways the Minuteman Extension is proposed to cross have a special speed regulation on file. Travel speed data, shown in Table 3, indicates the 85th percentile speed along the majority of the study area roadways ranges between 32 to 42 mph. Copies of the speed regulations are provided in Appendix B.

Table 3: Travel Speed Data Summary

Location	85 th Percentile Speed		Regulation No.	Regulated Speed
	by Direction			
South Road	NB	SB	710-A	25 mph
	32 mph	34 mph		
Railroad Avenue	EB	WB	5088	30 mph
	32 mph	34 mph		
Hartwell Road	NB	SB	710	30 mph
	35-42 mph	38-42 mph		

Source: VHB based on automatic traffic recorder counts conducted in October 11-15, 2016.
WB = westbound; EB = eastbound; SB = southbound; NB = northbound

Sight Distance

A sight distance analysis, in conformance with guidelines of the American Association of State Highway and Transportation Officials (AASHTO) was performed for the midblock crossing locations. Stopping Sight Distance (SSD) is the distance required for a vehicle to perceive, react and come to a complete stop before colliding with an object in the road, in this case a bicycle or pedestrian crossing the roadway. In this respect, SSD can be considered as the minimum visibility criterion for the safe operation of an unsignalized intersection. To calculate the required SSD at the roadway crossings, the 85th percentile speeds were used.

As shown in Table 4, the available stopping sight distance at the midblock roadway crossings meet or exceed AASHTO requirements under existing conditions with the exception of westbound vehicles on Railroad Avenue. Along the north side of Railroad Avenue to the east of the crossing location, there is existing dense vegetation that reduces the available sight distance. As shown on the 25% design plans, there is proposed widening and sidewalk on the north side of Railroad Avenue. This modification would move the vegetation line further from the roadway and sight distance would be expected to improve to meet AASHTO requirements.



Table 4: Stopping Sight Distance Summary

Roadway Crossing	Traveling	Required ^a	Existing Measured	Required SSD met?	Estimated with Improvements	Required SSD met?
Railroad Avenue	eastbound	250'	265'	Yes	265'	Yes
	westbound	250'	115'	No	250'	Yes
Hartwell Road	northbound	360'	500'+	Yes	500'+	Yes
	southbound	360'	500'+	Yes	500'+	Yes

Based on AASHTO guidelines

a required sight distance in feet, based on an 85th percentile speed, round up to the nearest 5 mph

Crash Data

To identify potential crash trends and/or roadway deficiencies in the vicinity of the proposed crossings, the most current vehicle crash data available were obtained from MassDOT (2012 through 2014). It should be noted that not all crashes are reported in the database; those with property damage only, totaling less than \$1,000 are often not reported. The crash data is presented in Table 5 and included in the Appendix.

For the crossing at South Road, the bikeway crosses through an existing signalized intersection. In this case, crashes within the intersection and on each approach that could be considered related to the signal operations were reviewed. Intersection crash rates represent the number of reported crashes for every million vehicles that pass through a given intersection. According to MassDOT, as of February 9, 2016, MassDOT District 4 average crash rate is 0.73 and the Statewide crash rate is 0.77 for signalized intersections. The crash rate worksheets for the intersection is included in Appendix C.

For each of the other crossing locations, the crossing will take place at a midblock location away from an intersection. For these locations, segment crashes were reviewed. Segment crash rates are calculated based on the number of crashes, per million vehicle miles traveled, by functional classification. MassDOT average segment crash rates that apply to the project area include: minor arterial 3.70 and local road 2.08. A crash rate higher than these factors may indicate a higher than average crash tendency for a particular roadway segment. The crash rate worksheets for the study area road segments are included in Appendix C.



As shown in Table 5, all locations are below the MassDOT average crash rate except Railroad Avenue. Railroad Avenue had a higher than average crash rate because although only three crashes were reported over the five years reviewed, the volume along the roadway is quite low.

Table 5: Crash Data Summary (2010-2014)

Location	South Road at Railroad Avenue/Loomis Street	Railroad Avenue	Hartwell Road
Type	Intersection	Segment	Segment
MassDOT Average Crash Rate	0.73	2.08	3.70
Calculated Crash Rate	0.40	2.32	1.52
Exceeds Average?	No	Yes	No
Year			
2010	1	0	0
2011	1	1	0
2012	2	0	0
2013	4	2	0
<u>2014</u>	<u>1</u>	<u>0</u>	<u>2</u>
Total	9	3	2
Collision Type			
Angle	5	0	1
Head-on	2	1	0
Rear-end	1	0	0
Sideswipe, opposite direction	0	0	0
Sideswipe, same direction	0	0	0
Single vehicle crash	1	2	1
Crash Severity			
Fatal injury	0	0	0
Non-fatal injury	4	0	1
Property damage only (none injured)	5	3	1
Time of Day			
Weekday, 7:00 AM - 9:00 AM	1	0	0
Weekday, 4:00 PM - 6:00 PM	0	0	0
Saturday, 11:00 AM - 2:00 PM	0	0	0
Weekday, other time	7	0	1
Weekend, other time	1	3	1
Pavement Conditions			
Dry	7	1	2
Wet	2	0	0
Snow	0	3	0
Non-Motorist (Bike, Pedestrian)			
Total	2	0	1

Source: MassDOT



Traffic Signal Warrant Analysis

Using the traffic data, traffic signal warrant analyses were conducted to determine if the traffic volumes along study area roadway segments are significant enough to consider traffic control at the proposed bikeway crossings. Even if these warrants are satisfied, other considerations such as traffic flow progression, sight distance, and physical constraints must be considered before recommending the installation of traffic control. Traffic signal warrants were performed at the bikeway crossing locations on Railroad Avenue and Hartwell Road using 2017 existing volumes.

The methodology used in the traffic signal warrant analysis is based on the criteria provided in the MUTCD². Nine warrants are defined in the MUTCD along with a separate warrant for installation of a pedestrian hybrid beacon. The warrants consider the roadway geometry, traffic and pedestrian volumes entering the intersection, speeds, and crashes. The three warrants applicable to this evaluation include Warrant 4- Pedestrian Volume, Warrant 7-Crash Experience, and the pedestrian hybrid beacon warrant.

Full Signal Warrants for Pedestrians and Crash History

The minimum requirements for traffic control based on Warrant 4 and Warrant 7 are as follows:

- Warrant 4 -Pedestrian Volume: Pedestrian volumes would need to exceed 107 persons per hour for four hours or 133 persons in a single hour to meet criteria for this warrant. Corresponding traffic volumes would need to exceed 1,000 or 1,450 vehicles, respectively. If the roadway has 85th percentile speeds in excess of 35 mph, these thresholds are reduced to 75 persons per hour for four hours or 93 persons in a single hour, with corresponding traffic volumes of 750 and 1,000 vehicles, respectively.
- Warrant 7 – Crash Experience: There would need to be 5 or more crashes within a 12-month period that are correctable by traffic signal control.

Based on the collected traffic, pedestrian, bicycle, and crash data, these minimum warrant criteria are not met for the proposed bikeway crossings.

Pedestrian Hybrid Beacon Warrant

Table 6 presents the requirements for traffic control based on the pedestrian hybrid beacon warrant for a crosswalk length of 34 feet or less (the applicable case for this

² [Manual on Uniform Traffic Control Devices; Part 4 – Highway Traffic Signals; U.S. Department of Transportation/Federal Highway Administration; 2009 Edition.](#)



assessment). Table 7 presents the current volumes, and the pedestrian and bicycle demands necessary to meet warrants. Based on the roadway volume along roadways where crossings will be provided, warrants for pedestrian hybrid beacons are not met for the Railroad Avenue and Hartwell Road crossings.

Table 6: Pedestrian Hybrid Beacon Warrant Requirements

VPH ¹ on major street (total both directions)	PPH ² crossing major street (speed ≤35 mph ³)	PPH crossing major street (speed >35 mph)
2,000	20	20
1,750	20	20
1,500	40	20
1,250	90	20
1,000	190	50
750	400	150
500	NA	NA
250	NA	NA
225	NA	NA

Source: 2009 MUTCD

- 1 Vehicles per hour
- 2 Pedestrians (or bicycles) per hour
- 3 85th percentile travel speed

Table 7: Traffic Signal Warrants Analysis Summary

Roadway Segment	2017 Peak Hour Vehicle Volume	85 th Percentile Speed	Crossing Width	Pedestrian and Bicycle volume required to meet warrant	HAWK Warrant Met?
Railroad Avenue	603 (PM)	≤ 35 mph	< 34'	N/A	No
Hartwell Road	348 (PM)	>35 mph	< 34'	N/A	No

Based on the above, Rectangular Rapid Flashing Beacons (RRFBs) are recommended at the Railroad Avenue and Hartwell Road bikeway crossings to enhance safety at unsignalized roadway crossing by increasing driver awareness of potential pedestrian/bicycle conflicts. The Federal Highway Association (FHWA) has issued interim approval for the use of RRFBs, however there are no quantitative warrants for their installation put forth by the FHWA or described in the MUTCD.



Proposed Improvements

The Minuteman Commuter Bikeway Extension is proposed to begin at the termination of the existing bikeway at Bedford Depot and continue west 1700 feet on a newly constructed shared use path adjacent to Railroad Ave. The path will then follow the Reformatory Branch Trail, an existing unpaved path to the Concord town line. The proposed bikeway will be ten feet wide with a marked centerline and has been designed for a bicycle travel speed of 20 mph. The majority of the bikeway extension will be in wooded areas with four roadway crossings with proposed treatments as described below.

At the signalized intersection of South Road and Railroad Avenue/Loomis Street, the bikeway will utilize the crosswalk on the South Road northbound approach and the existing exclusive pedestrian phase. The utilized crosswalk will be widened from eight feet to fifteen feet and the adjacent wheelchair ramps will be reconstructed to meet current standards and provide wider openings and level landing areas for the bicycles. The existing pedestrian signal heads at the entire intersection will be replaced with new pedestrian signal heads with countdown displays. The exclusive pedestrian phase will be re-timed to comply with current MUTCD standards. Capacity analysis at the intersection was reviewed using Synchro. Based on this analysis, the intersection operates well under existing conditions and would be expected to continue to operate well with an increased number of exclusive pedestrian phase actuations associated with the bikeway crossing. Implementation of dynamic max times is proposed at this location to accommodate the influx of traffic to the intersection that can result during school release times and at the end of sporting events and other activities at the school. The capacity analysis results and a summary table are provided in Appendix D.

The proposed bikeway will be constructed along the south side of Railroad Avenue separated from the roadway by curbing and a grass strip. Just past Highland Avenue where Railroad Avenue curves to the north, the wooded section of the bikeway begins. At this location, a crosswalk will be provided to connect the proposed bikeway with existing sidewalks leading to the John Glenn Middle School and Bedford High School. This location does not meet the warrants for the installation of a full pedestrian signal or a pedestrian hybrid beacon. The existing stopping sight distance is inadequate due to landscaping, but is expected to meet AASHTO minimum guidelines with the proposed widening and sidewalk improvements in place. To enhance bicyclist and pedestrian visibility in the crosswalk, a rapid rectangular flashing beacon (RRFB) is proposed at this location. The beacons have been located to maximize visibility around the curve. Advance warning signs and pavement markings are also proposed.

Approaching Hartwell Road, the Reformatory Branch Trail currently utilizes a paved access driveway for the Bedford Well Water Treatment Plant. As shown on the 25%



design plans, the path will be shifted to the south providing a 10' buffer from the drive. At the proposed crossing of Hartwell Road, the existing sight distance exceeded AASHTO requirements. This location does not meet the warrants for installation of a full pedestrian signal or a pedestrian hybrid beacon. To enhance bicyclist and pedestrian visibility in the crosswalk, a rapid rectangular flashing beacon (RRFB) is proposed at this location along with advance warning signs and pavement markings on Hartwell Road.

The final roadway crossing is at Concord Road. Based on discussions with MassDOT and the Town of Bedford, a grade separated crossing is proposed at this location with the bikeway passing below Concord Road in a culvert. As the path will be grade separated and there are no existing sidewalks or formal bicycle facilities on Concord Road, no roadway crossing treatments are proposed. Installation of the culvert will require Temporary Traffic Control Staging plans and construction of a temporary roadway, as discussed in the next section.



Design Designation Data

Table 8 summarizes the average daily roadway usage characteristics of the project area roadways. These characteristics are:

- Average Daily Traffic (ADT), the total volume of motor vehicle traffic using the roadway on any given day for both existing and design years, expressed in vehicles per day (vpd). Design year is projected 10 years;
- Peaking Factor (K), the percentage of daily traffic that occurs during the peak hour travel period;
- Directional Distribution (D), the highest percentage of traffic in a single direction during the peak hour;
- Truck Volume (T), the percentage of heavy vehicles during the peak hour travel period and per-day average;
- Design Hourly Volume (DHV), the bi-directional peak hour volume for the design year, expressed in vehicles per hour (vph); and
- Directional Design Hourly Volume (DDHV), the highest direction volume during the design year peak hour, expressed in vph.

Table 8: Design Data

	Railroad Avenue	Hartwell Road	Concord Road
Design Speed:	30 mph	N/A	40 mph
ADT (2017):	2,444 vpd	3,278 vpd	9,905 vpd
ADT (2027):	2,700 vpd	3,622 vpd	10,944 vpd
K:	16%	12%	11%
D:	57% EB	69% NB	54% EB
T (Peak Hour):	5.7%	0.5%	0.9%
T (Average Day):	2.4 %	1.1%	1.0%
DHV:	443 vph	424 vph	1,191 vph
DDHV:	252 vph	293 vph	643 vph

Calculation worksheets are provided in Appendix E.



Traffic Management Strategy

This project consists of constructing a paved bikeway along an existing abandoned rail line/dirt bike path and providing crossing treatments at all of roadway crossings. At the intersection of South Road and Railroad Avenue/Loomis Street, wheelchair ramp reconstruction will be required. Along Railroad Avenue, there is proposed widening with sidewalk reconstruction along the north side of the roadway and a shared use path along the south side of the roadway. An RRFB is proposed on Railroad Avenue just west of Highland Avenue. On Hartwell Road, an RRFB is also proposed. At Concord Road, the bike path will be grade-separated from the roadway with a culvert under Concord Road. Staging plans have been developed to accommodate the culvert construction while maintaining two travel lanes on Concord Road.

The Traffic Management Plan (TMP) for this project has been developed with a primary goal of preventing unnecessary delays to the motoring public. For the purposes of this Project, regular working hours are expected to be 7:00 AM to 3:00 PM, Monday through Friday. Typically, no work that will impact the travel way is to occur during peak periods. Any work that is to occur during peak traffic hours (7:00 AM to 9:00 AM and 3:00 PM to 6:00 PM) will be coordinated in advance with the Town of Bedford. Finally, the project is expected to be constructed over two construction seasons and work will not occur on Saturdays, Sundays or holidays, or on the day before or the day after a long weekend which involves a holiday without prior approval by the Town of Bedford. Night work (7:00 PM to 6:00 AM) may be permitted for certain elements of the work upon written approval from the engineer and town.

The traffic management plan developed and analyzed for this project addresses the major aspects of construction. The following provides more details on the traffic management plan for the project.

Existing Conditions

Within the project limits each of the roadways provide two travel lanes with one lane in each direction. At the intersection of South Road and Railroad Avenue/Loomis Street, a dedicated right turn lane is provided on South Road northbound and a dedicated left turn lane is provided on Loomis Street westbound. South Road southbound and Railroad Avenue both provide a single multi-purpose approach lane to the intersection.



Pedestrian/Bicycle Facilities

Pedestrian activity through much of the study area is relatively low. At the signalized intersection of South Road at Railroad Avenue/Loomis Street, an exclusive pedestrian phase is provided with crosswalks at each approach. Sidewalks are provided on both sides of each approach roadway with the exception of Railroad Avenue. On Railroad Avenue, there is sidewalk along the south side of the roadway for approximately 250 feet from South Road. Beyond that point, there are no sidewalks along the south side of Railroad Avenue. On the north side of Railroad Avenue, sidewalk begins at Highland Avenue and continues to the school, with a gap between South Road and Highland Avenue. No sidewalks are provided on Hartwell Road or Concord Road in the vicinity of the proposed bikeway. There are no formal on-road bicycle facilities within the project area.

Where existing pedestrian access is provided, that access will be maintained either on the same side of the roadway with temporary wheelchair ramps provided as necessary to ramp the pedestrians from the existing sidewalk to the roadway, or crossed to the other side of the roadway using existing or temporary crosswalks. If pedestrians are ramped into the roadway, they will be separated from the travel lanes as shown in the pedestrian bypass detail on Temporary Traffic Control Plans Typical Details contained in the 25% Design Submission. Bicycles currently share the road and do not have a separate facility for their use. Therefore, bicycles will be accommodated as that of normal vehicular traffic.

Lane Shifts, Closures and Work at Intersections

The work at the intersection of South Road and Railroad Avenue/Loomis Street and along Railroad Avenue and Hartwell Road can be completed with the use of typical details for daily temporary traffic control set-ups. The following traffic management strategies may be utilized in these locations and are shown on Temporary Traffic Control Plans Typical Details contained in the 25% Design Submission

Typical Two-Way Street Lane Closure Alternating Traffic: This detail will be used on Railroad Avenue and Hartwell Road for a majority of the work given the existing and proposed roadway width.

Typical Two-Way Street Lane Shift: This detail can be utilized where the bikeway meets Railroad Avenue or Hartwell Avenue when the work zone can be mostly accommodated within the off-road area of the bikeway and only a small portion of the roadway width is required to be in the work area. Where possible, this detail should be used over the alternating traffic detail.



Work on Near Side of Intersection – Loomis/Railroad at South Road & One Lane Bi-directional Traffic at Intersection – Loomis/Railroad at South Road: These details were customized for the project intersection and will be utilized to construct wheelchair ramps and other work adjacent to the signalized intersection. These details utilize the dedicated turn lanes on South Road and Loomis Street where possible to avoid alternating traffic situations.

Table 9: Work Zone Capacities

Location	Hourly Traffic Range ¹			Commuter Hours ²		Temporary Traffic Control Plan ³						
	Low	High	Average	AM Peak	PM Peak	Lane Shift			Two Way Street Lane Closure Alternating Traffic			
						Lanes ⁴	Ideal Average Lane Capacity ⁵	Meets MassDOT ⁶	Lanes	Ideal Average Lane Capacity	Meets MassDOT	
Railroad Ave												
Eastbound	29	210	96	210	137	1 to 1	1340	Yes	Alternating	585	Yes	
Westbound	31	189	90	189	175	1 to 1	1340	Yes	Alternating	585	Yes	
Hartwell Ave												
Northbound	39	275	110	71	275	1 to 1	1340	Yes	Alternating	585	Yes	
Southbound	43	240	105	240	122	1 to 1	1340	Yes	Alternating	585	Yes	

Source: Hourly traffic volumes were obtained from Automatic Traffic Recorder (ATR) Counts conducted in January 2017. Data was collected by Precision Data Industries, LLC for VHB.

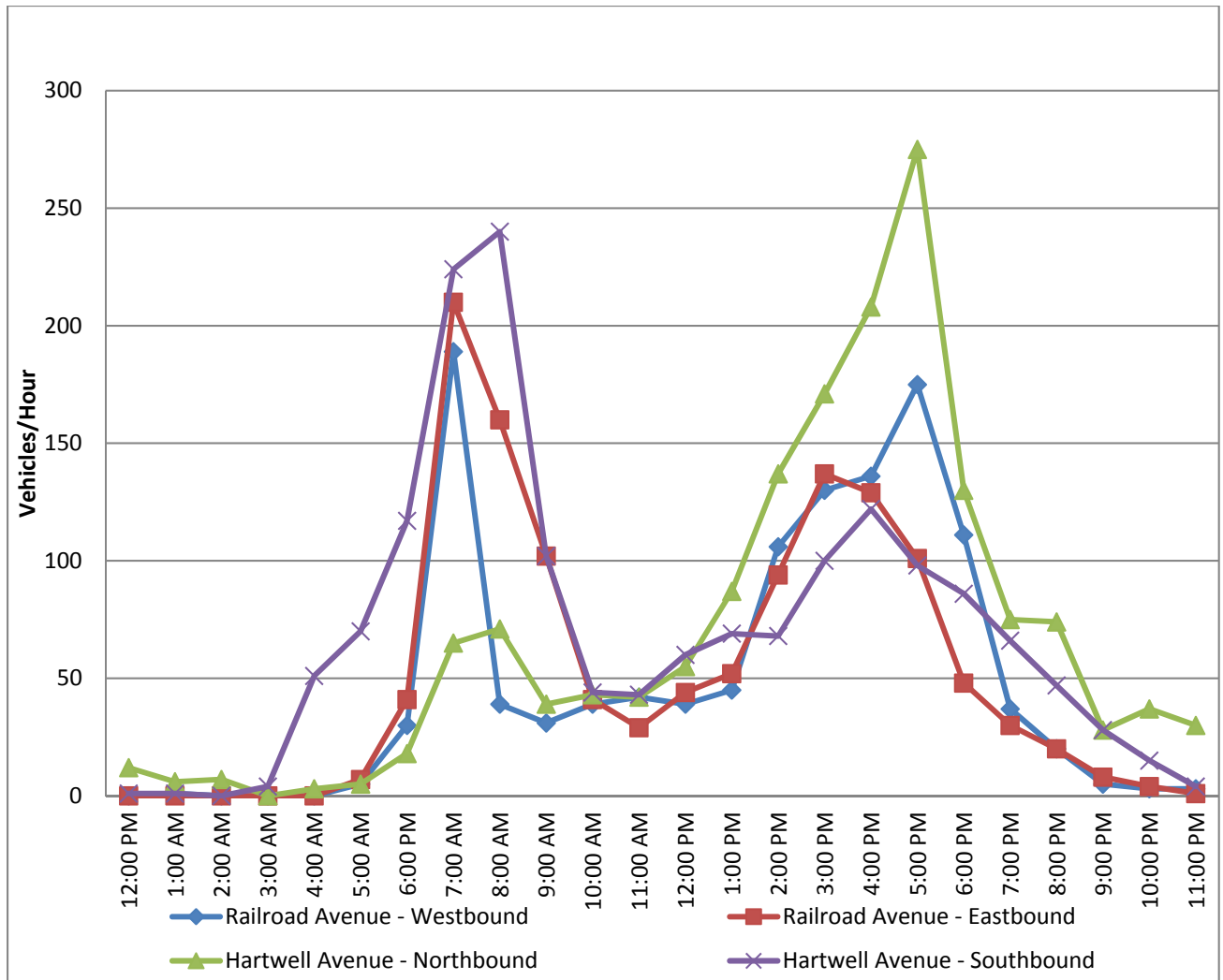
- 1 Volumes expressed in vehicles per hour and report low, high and average hourly traffic volumes between the hours of 7:00 AM and 7:00 PM.
- 2 Commuter hours occur between 7:00-9:00 AM and 3:00-7:00PM
- 3 Temporary Traffic Control Plans are depicted on the Temporary Traffic Control Plans included in the 25% design plans.
- 4 Indicates the cross sectional change for the corridor; i.e. 2 to 1 indicates that 2 travel lanes will be reduced to 1 travel lane during construction
- 5 Ideal Average Lane Capacity values obtained from FIGURE Gen-1, GENERAL GUIDELINES, Standard Details and Drawings for the Development of Traffic Management Plans, prepared by MassDOT/MassHighway.
- 6 Indicates whether this section of the corridor will meet the MassDOT guidelines for Average Lane Capacity in a work zone.

Table 9 presents the existing traffic data collected on Railroad Avenue and Hartwell Road along with the maximum volumes allowed by MassDOT to utilize the lane shift and alternating traffic details. The traffic data indicates the traffic volumes on these two roadways are below the allowable thresholds to use these details during all work hours. On Railroad Avenue, special consideration should be given to the proximity of the John Glenn Middle School when scheduling work during the peak hours during the school year.

Figure 2 illustrates the traffic volume fluctuations over a 24 hour period for Railroad Avenue and Hartwell Road. Both roadways have pronounced volume peaks during the typical commuter periods with significantly lower volumes during the midday hours.



Figure 2: Weekday Traffic Volume Fluctuations



Culvert Staging

The construction of the proposed culvert for the grade-separated crossing at Concord Road will require implementation of three staging plans to construct a temporary roadway and provide longer term shifts in traffic. Existing conditions on Concord Road and the staging plans are discussed below as well as shown on the Temporary Traffic Control Plans – Culvert Staging plans in the 25% design submission.

Concord Road (Route 62) is an Urban Minor Arterial owned and maintained by the Town of Bedford. In the vicinity of the bikeway crossing, the roadway is 35 feet wide with one travel lane in each direction. No sidewalks are provided in this area. The traffic count data indicate an average daily traffic volume of 9,905 vehicles and 85th



percentile speeds of 42 mph in both directions. This section of roadway falls under MassDOT Special Speed Regulation 710-B and is regulated at 35 mph.

The construction related to the culvert installation will be broken into three stages to be completed over one construction season. During each stage, one lane of traffic in each direction will be maintained with 11 foot travel lanes. The lane shifts have been designed to accommodate a 35 mph design speed. For the 25% submission, the staging plans have been laid out to show the general intent and feasibility and will be refined further as the design progresses.

Stage 1: During Stage 1, traffic flow will be maintained on the existing pavement of Concord Road while a temporary roadway is constructed to the east abutting the existing pavement. Traffic will be shifted to the east during this stage with temporary pavement markings, reducing the existing southbound shoulder from 7.5 feet to 1 foot.

Stage 2: During Stage 2, traffic will be shifted to the temporary roadway to allow construction of the majority of the culvert to the west.

Stage 3: During Stage 3, traffic will be shifted back to the west to allow installation of the remaining culvert section on the east side.

Appendix A

Traffic Volume Data

- Turning Movement Counts
- Automatic Traffic Recorder Data

Turning Movement Counts



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

File Name : 175453 A
Site Code : 9393.01
Start Date : 1/26/2017
Page No : 1

N/S: South Road
E/W: Loomis Street/ Railroad Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey

Groups Printed- Cars - Heavy Vehicles

Start Time	South Road From North				Loomis Street From East				South Road From South				Railroad Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	2	152	7	0	2	21	24	0	11	13	5	0	7	22	6	0	272
07:15 AM	15	111	7	0	1	50	17	0	18	31	25	0	21	17	10	0	323
07:30 AM	14	129	13	0	0	29	30	0	34	45	18	0	22	56	10	0	400
07:45 AM	3	125	6	0	2	10	37	0	13	31	2	0	14	32	3	0	278
Total	34	517	33	0	5	110	108	0	76	120	50	0	64	127	29	0	1273
08:00 AM	6	133	6	0	1	10	34	0	26	24	2	0	13	31	2	0	288
08:15 AM	4	117	6	0	7	10	34	0	18	25	2	0	5	31	3	0	262
08:30 AM	3	103	10	0	4	10	23	0	31	15	3	0	8	37	1	0	248
08:45 AM	7	98	8	0	2	8	31	0	20	24	3	0	13	32	2	0	248
Total	20	451	30	0	14	38	122	0	95	88	10	0	39	131	8	0	1046
Grand Total	54	968	63	0	19	148	230	0	171	208	60	0	103	258	37	0	2319
Apprch %	5	89.2	5.8	0	4.8	37.3	57.9	0	39	47.4	13.7	0	25.9	64.8	9.3	0	
Total %	2.3	41.7	2.7	0	0.8	6.4	9.9	0	7.4	9	2.6	0	4.4	11.1	1.6	0	
Cars	45	966	57	0	15	132	222	0	167	198	53	0	94	240	31	0	2220
% Cars	83.3	99.8	90.5	0	78.9	89.2	96.5	0	97.7	95.2	88.3	0	91.3	93	83.8	0	95.7
Heavy Vehicles	9	2	6	0	4	16	8	0	4	10	7	0	9	18	6	0	99
% Heavy Vehicles	16.7	0.2	9.5	0	21.1	10.8	3.5	0	2.3	4.8	11.7	0	8.7	7	16.2	0	4.3

Start Time	South Road From North					Loomis Street From East					South Road From South					Railroad Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	15	111	7	0	133	1	50	17	0	68	18	31	25	0	74	21	17	10	0	48	323
07:30 AM	14	129	13	0	156	0	29	30	0	59	34	45	18	0	97	22	56	10	0	88	400
07:45 AM	3	125	6	0	134	2	10	37	0	49	13	31	2	0	46	14	32	3	0	49	278
08:00 AM	6	133	6	0	145	1	10	34	0	45	26	24	2	0	52	13	31	2	0	46	288
Total Volume	38	498	32	0	568	4	99	118	0	221	91	131	47	0	269	70	136	25	0	231	1289
% App. Total	6.7	87.7	5.6	0		1.8	44.8	53.4	0		33.8	48.7	17.5	0		30.3	58.9	10.8	0		
PHF	.633	.936	.615	.000	.910	.500	.495	.797	.000	.813	.669	.728	.470	.000	.693	.795	.607	.625	.000	.656	.806
Cars	32	498	28	0	558	3	92	115	0	210	89	123	43	0	255	64	126	23	0	213	1236
% Cars	84.2	100	87.5	0	98.2	75.0	92.9	97.5	0	95.0	97.8	93.9	91.5	0	94.8	91.4	92.6	92.0	0	92.2	95.9
Heavy Vehicles	6	0	4	0	10	1	7	3	0	11	2	8	4	0	14	6	10	2	0	18	53
% Heavy Vehicles	15.8	0	12.5	0	1.8	25.0	7.1	2.5	0	5.0	2.2	6.1	8.5	0	5.2	8.6	7.4	8.0	0	7.8	4.1

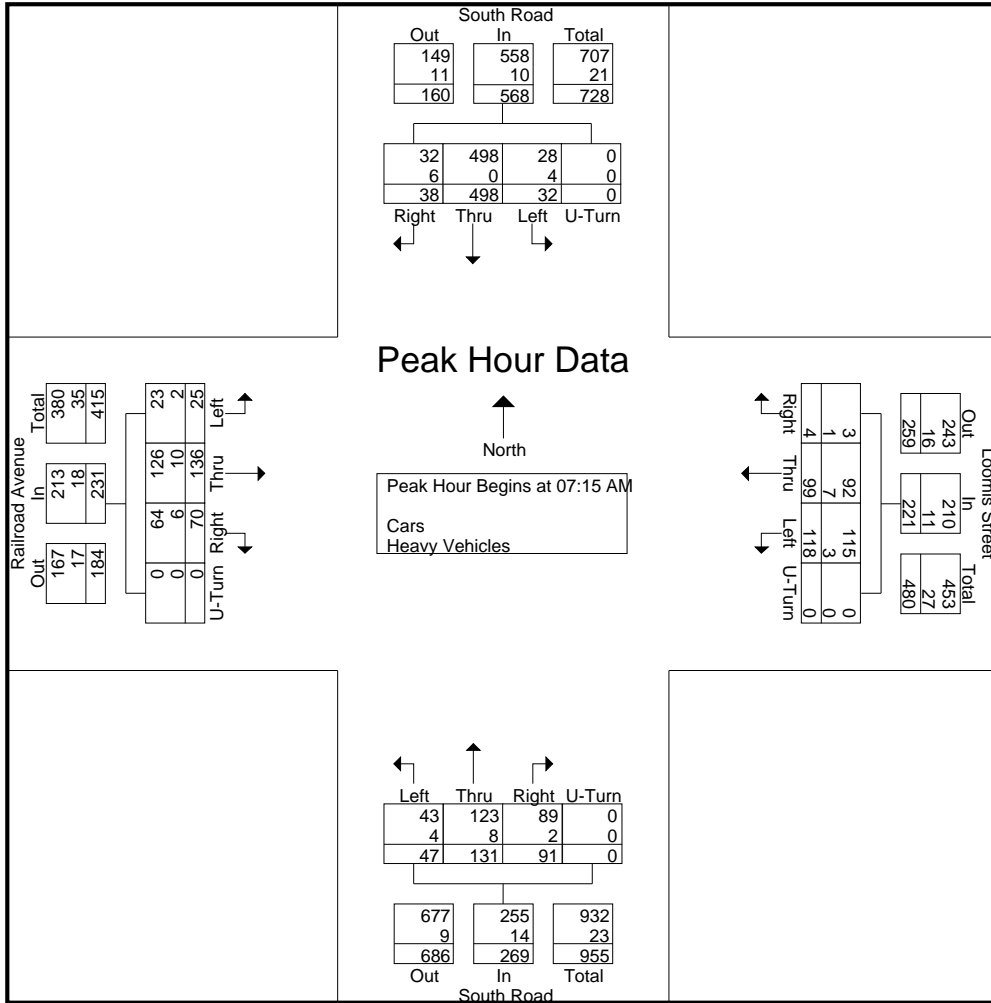


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File Name : 175453 A
Site Code : 9393.01
Start Date : 1/26/2017
Page No : 2

N/S: South Road
E/W: Loomis Street/ Railroad Avenue
City, State: Bedford, MA
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Groups Printed- Cars

Start Time	South Road From North				Loomis Street From East				South Road From South				Railroad Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	2	152	6	0	1	20	23	0	10	13	5	0	5	17	2	0	256
07:15 AM	13	111	4	0	1	44	17	0	17	26	23	0	19	16	10	0	301
07:30 AM	11	129	13	0	0	29	30	0	33	45	18	0	20	49	10	0	387
07:45 AM	3	125	6	0	1	10	36	0	13	30	1	0	13	31	1	0	270
Total	29	517	29	0	3	103	106	0	73	114	47	0	57	113	23	0	1214
08:00 AM	5	133	5	0	1	9	32	0	26	22	1	0	12	30	2	0	278
08:15 AM	3	116	6	0	6	8	33	0	17	25	1	0	5	29	3	0	252
08:30 AM	3	102	9	0	4	7	21	0	31	14	1	0	7	36	1	0	236
08:45 AM	5	98	8	0	1	5	30	0	20	23	3	0	13	32	2	0	240
Total	16	449	28	0	12	29	116	0	94	84	6	0	37	127	8	0	1006
Grand Total	45	966	57	0	15	132	222	0	167	198	53	0	94	240	31	0	2220
Apprch %	4.2	90.4	5.3	0	4.1	35.8	60.2	0	40	47.4	12.7	0	25.8	65.8	8.5	0	
Total %	2	43.5	2.6	0	0.7	5.9	10	0	7.5	8.9	2.4	0	4.2	10.8	1.4	0	

Start Time	South Road From North					Loomis Street From East					South Road From South					Railroad Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	13	111	4	0	128	1	44	17	0	62	17	26	23	0	66	19	16	10	0	45	301
07:30 AM	11	129	13	0	153	0	29	30	0	59	33	45	18	0	96	20	49	10	0	79	387
07:45 AM	3	125	6	0	134	1	10	36	0	47	13	30	1	0	44	13	31	1	0	45	270
08:00 AM	5	133	5	0	143	1	9	32	0	42	26	22	1	0	49	12	30	2	0	44	278
Total Volume	32	498	28	0	558	3	92	115	0	210	89	123	43	0	255	64	126	23	0	213	1236
% App. Total	5.7	89.2	5	0		1.4	43.8	54.8	0		34.9	48.2	16.9	0		30	59.2	10.8	0		
PHF	.615	.936	.538	.000	.912	.750	.523	.799	.000	.847	.674	.683	.467	.000	.664	.800	.643	.575	.000	.674	.798

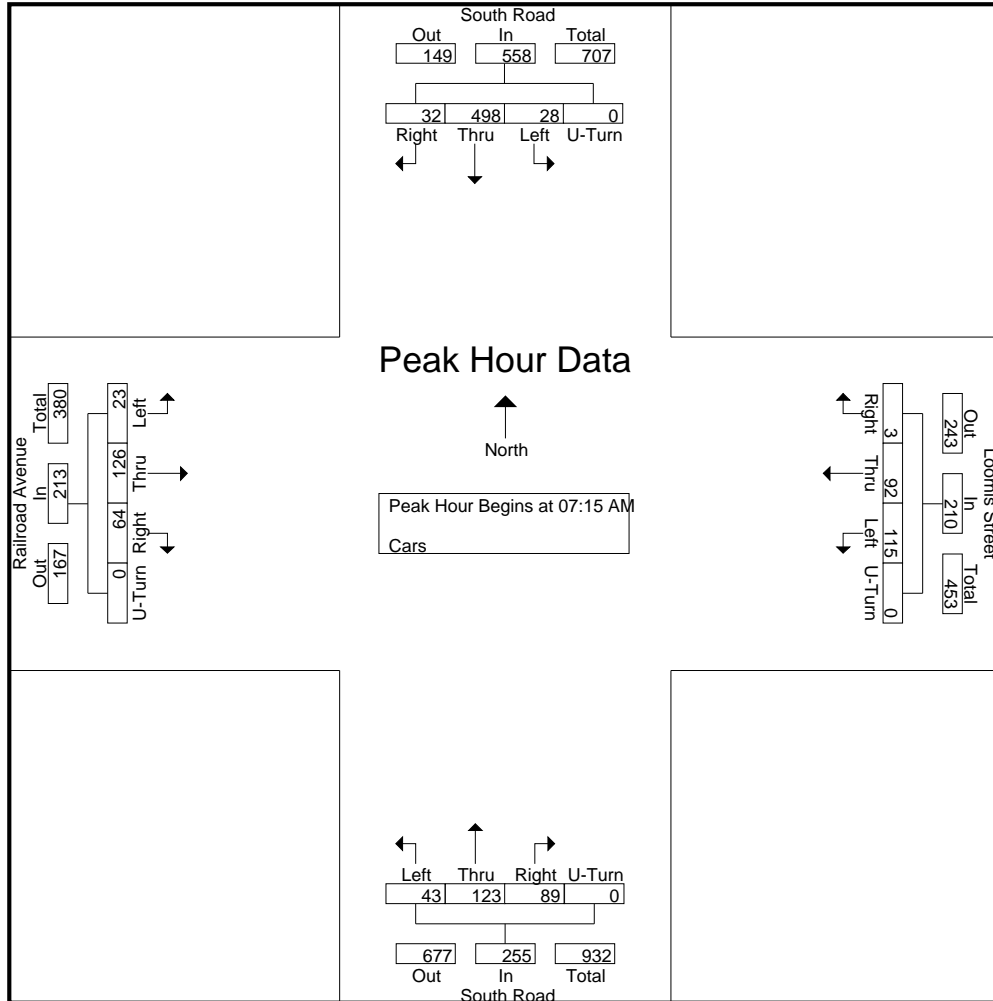
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Groups Printed- Heavy Vehicles

Start Time	South Road From North				Loomis Street From East				South Road From South				Railroad Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	0	0	1	0	1	1	1	0	1	0	0	0	2	5	4	0	16
07:15 AM	2	0	3	0	0	6	0	0	1	5	2	0	2	1	0	0	22
07:30 AM	3	0	0	0	0	0	0	0	1	0	0	0	2	7	0	0	13
07:45 AM	0	0	0	0	1	0	1	0	0	1	1	0	1	1	2	0	8
Total	5	0	4	0	2	7	2	0	3	6	3	0	7	14	6	0	59
08:00 AM	1	0	1	0	0	1	2	0	0	2	1	0	1	1	0	0	10
08:15 AM	1	1	0	0	1	2	1	0	1	0	1	0	0	2	0	0	10
08:30 AM	0	1	1	0	0	3	2	0	0	1	2	0	1	1	0	0	12
08:45 AM	2	0	0	0	1	3	1	0	0	1	0	0	0	0	0	0	8
Total	4	2	2	0	2	9	6	0	1	4	4	0	2	4	0	0	40
Grand Total	9	2	6	0	4	16	8	0	4	10	7	0	9	18	6	0	99
Apprch %	52.9	11.8	35.3	0	14.3	57.1	28.6	0	19	47.6	33.3	0	27.3	54.5	18.2	0	
Total %	9.1	2	6.1	0	4	16.2	8.1	0	4	10.1	7.1	0	9.1	18.2	6.1	0	

Start Time	South Road From North					Loomis Street From East					South Road From South					Railroad Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	1	0	1	1	1	1	0	3	1	0	0	0	1	2	5	4	0	11	16
07:15 AM	2	0	3	0	5	0	6	0	0	6	1	5	2	0	8	2	1	0	0	3	22
07:30 AM	3	0	0	0	3	0	0	0	0	0	1	0	0	0	1	2	7	0	0	9	13
07:45 AM	0	0	0	0	0	1	0	1	0	2	0	1	1	0	2	1	1	2	0	4	8
Total Volume	5	0	4	0	9	2	7	2	0	11	3	6	3	0	12	7	14	6	0	27	59
% App. Total	55.6	0	44.4	0		18.2	63.6	18.2	0		25	50	25	0		25.9	51.9	22.2	0		
PHF	.417	.000	.333	.000	.450	.500	.292	.500	.000	.458	.750	.300	.375	.000	.375	.875	.500	.375	.000	.614	.670

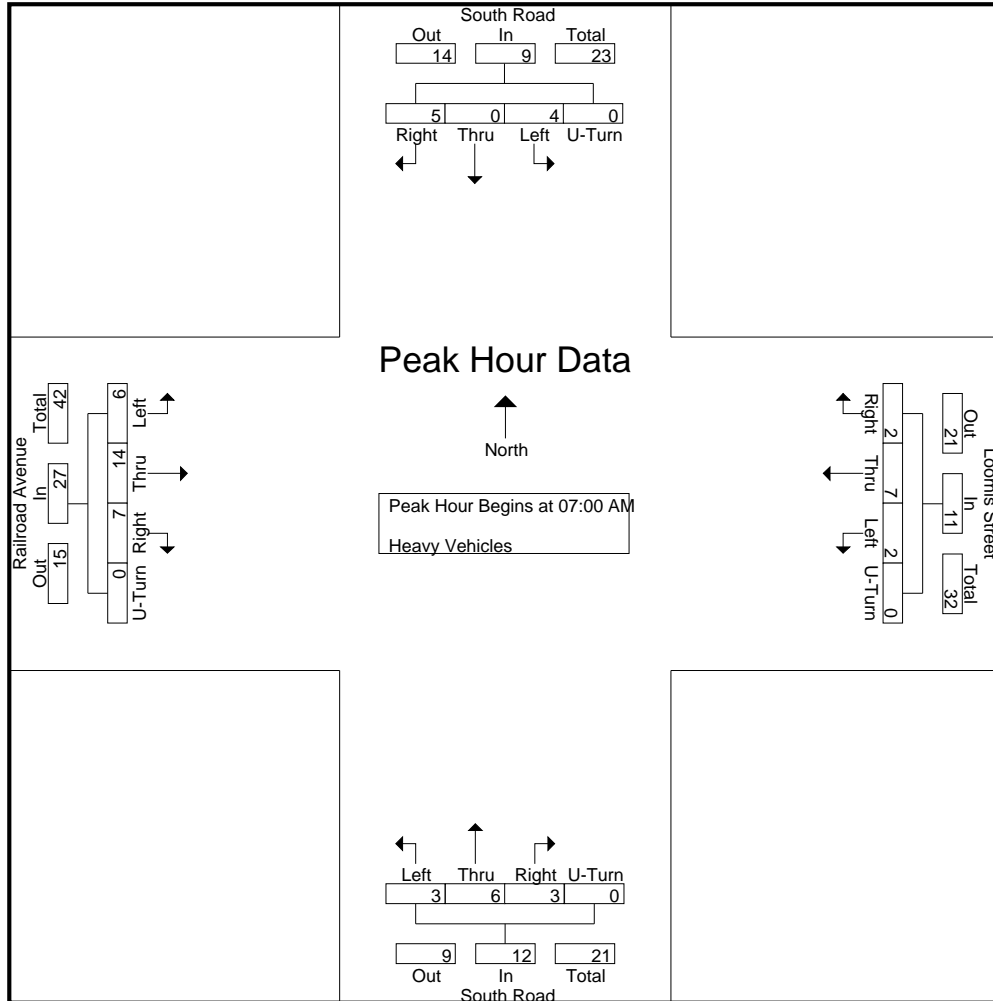
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Groups Printed- Peds and Bicycles

Start Time	South Road From North					Loomis Street From East					South Road From South					Railroad Avenue From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	0	0	0	0	0	6
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	5
Total	0	0	0	1	1	0	0	0	0	0	0	1	2	1	4	0	1	0	0	0	11
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
08:15 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Total	0	0	0	0	1	0	0	0	0	0	0	0	0	4	3	0	0	0	0	1	9
Grand Total	0	0	0	1	2	0	0	0	0	0	0	1	2	5	7	0	1	0	0	1	20
Apprch %	0	0	0	33.3	66.7	0	0	0	0	0	0	6.7	13.3	33.3	46.7	0	50	0	0	50	
Total %	0	0	0	5	10	0	0	0	0	0	0	5	10	25	35	0	5	0	0	5	

Start Time	South Road From North						Loomis Street From East						South Road From South						Railroad Avenue From West						Int. Total
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 07:45 AM																									
07:45 AM	0	0	0	1	1	2	0	0	0	0	0	0	0	0	1	0	1	2	0	1	0	0	0	1	5
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3
08:15 AM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	2
Total Volume	0	0	0	1	2	3	0	0	0	0	0	0	0	0	1	4	2	7	0	1	0	0	1	2	12
% App. Total	0	0	0	33.3	66.7	0	0	0	0	0	0	0	14.3	57.1	28.6	0	50	0	0	50					
PHF	.000	.000	.000	.250	.500	.375	.000	.000	.000	.000	.000	.000	.000	.250	.333	.500	.583	.000	.250	.000	.000	.250	.500	.600	

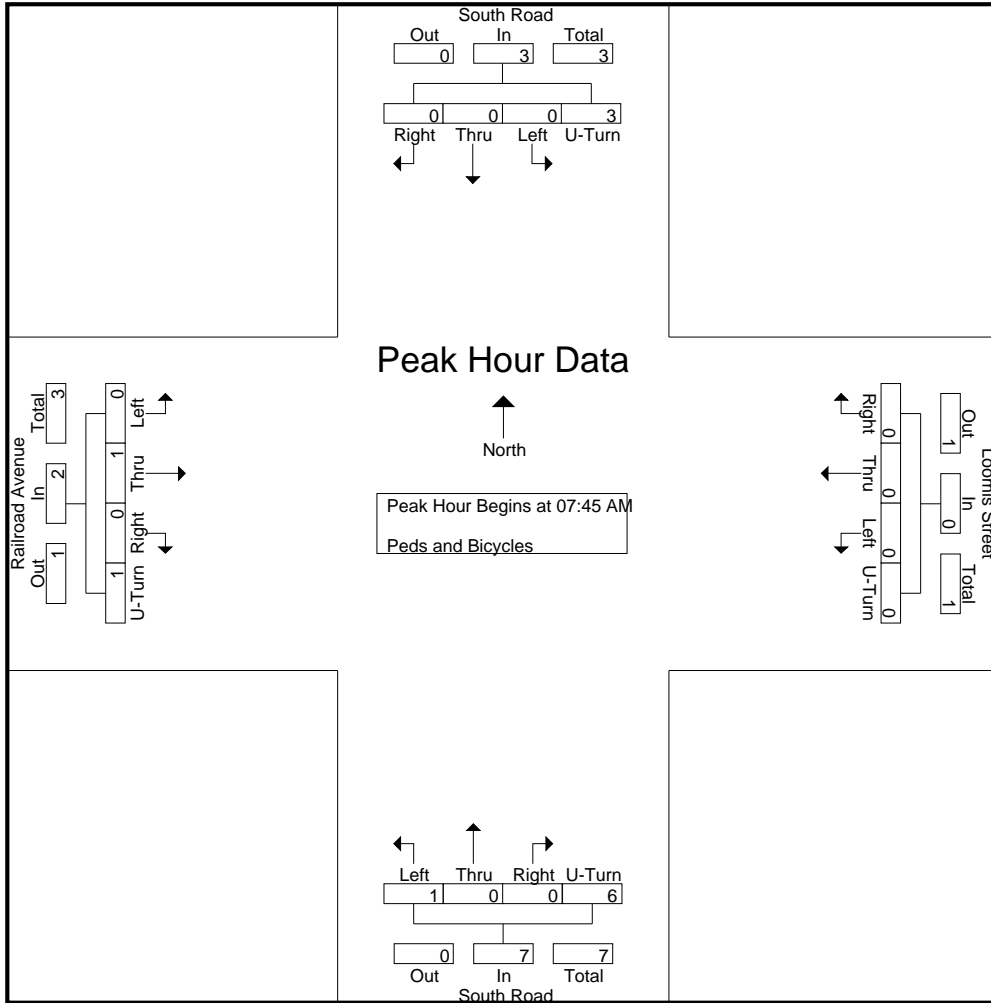


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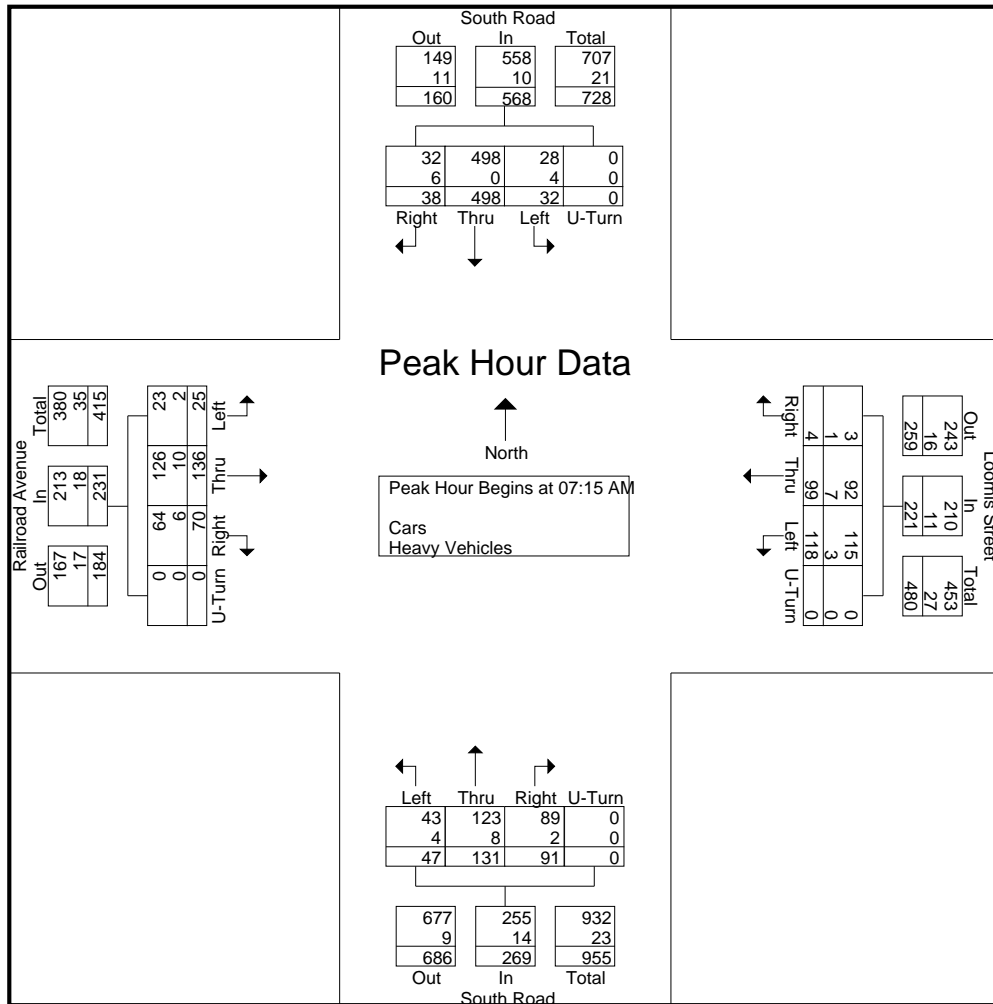
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	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	15	111	7	0	133	1	50	17	0	68	18	31	25	0	74	21	17	10	0	48	323
07:30 AM	14	129	13	0	156	0	29	30	0	59	34	45	18	0	97	22	56	10	0	88	400
07:45 AM	3	125	6	0	134	2	10	37	0	49	13	31	2	0	46	14	32	3	0	49	278
08:00 AM	6	133	6	0	145	1	10	34	0	45	26	24	2	0	52	13	31	2	0	46	288
Total Volume	38	498	32	0	568	4	99	118	0	221	91	131	47	0	269	70	136	25	0	231	1289
% App. Total	6.7	87.7	5.6	0		1.8	44.8	53.4	0		33.8	48.7	17.5	0		30.3	58.9	10.8	0		
PHF	.633	.936	.615	.000	.910	.500	.495	.797	.000	.813	.669	.728	.470	.000	.693	.795	.607	.625	.000	.656	.806
Cars	32	498	28	0	558	3	92	115	0	210	89	123	43	0	255	64	126	23	0	213	1236
% Cars	84.2	100	87.5	0	98.2	75.0	92.9	97.5	0	95.0	97.8	93.9	91.5	0	94.8	91.4	92.6	92.0	0	92.2	95.9
Heavy Vehicles	6	0	4	0	10	1	7	3	0	11	2	8	4	0	14	6	10	2	0	18	53
% Heavy Vehicles	15.8	0	12.5	0	1.8	25.0	7.1	2.5	0	5.0	2.2	6.1	8.5	0	5.2	8.6	7.4	8.0	0	7.8	4.1





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Groups Printed- Cars - Heavy Vehicles

Start Time	South Road From North				Loomis Street From East				South Road From South				Railroad Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	2	31	9	0	7	24	24	0	77	153	8	0	7	26	5	0	373
04:15 PM	3	21	6	0	7	27	37	0	82	131	8	1	5	32	7	0	367
04:30 PM	6	16	5	0	7	18	27	0	90	153	14	0	4	26	3	0	369
04:45 PM	5	21	4	0	8	23	25	0	108	125	13	0	4	41	6	0	383
Total	16	89	24	0	29	92	113	0	357	562	43	1	20	125	21	0	1492
05:00 PM	1	26	8	0	3	25	27	0	114	121	20	0	3	20	2	0	370
05:15 PM	2	16	11	0	8	33	37	0	107	117	18	0	0	28	3	0	380
05:30 PM	3	13	5	0	9	33	26	0	108	107	17	0	5	27	0	0	353
05:45 PM	4	14	9	0	4	34	30	0	54	116	8	0	1	27	3	0	304
Total	10	69	33	0	24	125	120	0	383	461	63	0	9	102	8	0	1407
Grand Total	26	158	57	0	53	217	233	0	740	1023	106	1	29	227	29	0	2899
Apprch %	10.8	65.6	23.7	0	10.5	43.1	46.3	0	39.6	54.7	5.7	0.1	10.2	79.6	10.2	0	
Total %	0.9	5.5	2	0	1.8	7.5	8	0	25.5	35.3	3.7	0	1	7.8	1	0	
Cars	21	156	55	0	50	209	231	0	737	1020	96	1	28	223	29	0	2856
% Cars	80.8	98.7	96.5	0	94.3	96.3	99.1	0	99.6	99.7	90.6	100	96.6	98.2	100	0	98.5
Heavy Vehicles	5	2	2	0	3	8	2	0	3	3	10	0	1	4	0	0	43
% Heavy Vehicles	19.2	1.3	3.5	0	5.7	3.7	0.9	0	0.4	0.3	9.4	0	3.4	1.8	0	0	1.5

Start Time	South Road From North					Loomis Street From East					South Road From South					Railroad Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	6	16	5	0	27	7	18	27	0	52	90	153	14	0	257	4	26	3	0	33	369
04:45 PM	5	21	4	0	30	8	23	25	0	56	108	125	13	0	246	4	41	6	0	51	383
05:00 PM	1	26	8	0	35	3	25	27	0	55	114	121	20	0	255	3	20	2	0	25	370
05:15 PM	2	16	11	0	29	8	33	37	0	78	107	117	18	0	242	0	28	3	0	31	380
Total Volume	14	79	28	0	121	26	99	116	0	241	419	516	65	0	1000	11	115	14	0	140	1502
% App. Total	11.6	65.3	23.1	0		10.8	41.1	48.1	0		41.9	51.6	6.5	0		7.9	82.1	10	0		
PHF	.583	.760	.636	.000	.864	.813	.750	.784	.000	.772	.919	.843	.813	.000	.973	.688	.701	.583	.000	.686	.980
Cars	11	79	26	0	116	25	97	114	0	236	416	515	59	0	990	11	114	14	0	139	1481
% Cars	78.6	100	92.9	0	95.9	96.2	98.0	98.3	0	97.9	99.3	99.8	90.8	0	99.0	100	99.1	100	0	99.3	98.6
Heavy Vehicles	3	0	2	0	5	1	2	2	0	5	3	1	6	0	10	0	1	0	0	1	21
% Heavy Vehicles	21.4	0	7.1	0	4.1	3.8	2.0	1.7	0	2.1	0.7	0.2	9.2	0	1.0	0	0.9	0	0	0.7	1.4



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

File Name : 175453 AA
Site Code : 9393.01
Start Date : 1/26/2017
Page No : 1

N/S: South Road
E/W: Loomis Street/ Railroad Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey

Groups Printed- Cars

Start Time	South Road From North				Loomis Street From East				South Road From South				Railroad Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	1	30	9	0	7	19	24	0	77	153	7	0	7	26	5	0	365
04:15 PM	3	20	6	0	6	26	37	0	82	131	7	1	4	30	7	0	360
04:30 PM	4	16	4	0	7	17	26	0	89	153	10	0	4	26	3	0	359
04:45 PM	5	21	4	0	7	22	25	0	107	124	13	0	4	40	6	0	378
Total	13	87	23	0	27	84	112	0	355	561	37	1	19	122	21	0	1462
05:00 PM	0	26	7	0	3	25	26	0	113	121	19	0	3	20	2	0	365
05:15 PM	2	16	11	0	8	33	37	0	107	117	17	0	0	28	3	0	379
05:30 PM	3	13	5	0	8	33	26	0	108	106	16	0	5	26	0	0	349
05:45 PM	3	14	9	0	4	34	30	0	54	115	7	0	1	27	3	0	301
Total	8	69	32	0	23	125	119	0	382	459	59	0	9	101	8	0	1394
Grand Total	21	156	55	0	50	209	231	0	737	1020	96	1	28	223	29	0	2856
Apprch %	9.1	67.2	23.7	0	10.2	42.7	47.1	0	39.8	55	5.2	0.1	10	79.6	10.4	0	
Total %	0.7	5.5	1.9	0	1.8	7.3	8.1	0	25.8	35.7	3.4	0	1	7.8	1	0	

Start Time	South Road From North					Loomis Street From East					South Road From South					Railroad Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	4	16	4	0	24	7	17	26	0	50	89	153	10	0	252	4	26	3	0	33	359
04:45 PM	5	21	4	0	30	7	22	25	0	54	107	124	13	0	244	4	40	6	0	50	378
05:00 PM	0	26	7	0	33	3	25	26	0	54	113	121	19	0	253	3	20	2	0	25	365
05:15 PM	2	16	11	0	29	8	33	37	0	78	107	117	17	0	241	0	28	3	0	31	379
Total Volume	11	79	26	0	116	25	97	114	0	236	416	515	59	0	990	11	114	14	0	139	1481
% App. Total	9.5	68.1	22.4	0		10.6	41.1	48.3	0		42	52	6	0		7.9	82	10.1	0		
PHF	.550	.760	.591	.000	.879	.781	.735	.770	.000	.756	.920	.842	.776	.000	.978	.688	.713	.583	.000	.695	.977



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

File Name : 175453 AA
Site Code : 9393.01
Start Date : 1/26/2017
Page No : 1

N/S: South Road
E/W: Loomis Street/ Railroad Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey

Groups Printed- Heavy Vehicles

Start Time	South Road From North				Loomis Street From East				South Road From South				Railroad Avenue From West				Int. Total		
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn			
04:00 PM	1	1	0	0	0	5	0	0	0	0	0	1	0	0	0	0	0	0	8
04:15 PM	0	1	0	0	1	1	0	0	0	0	0	1	0	1	2	0	0	0	7
04:30 PM	2	0	1	0	0	1	1	0	0	1	0	4	0	0	0	0	0	0	10
04:45 PM	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	0	0	0	5
Total	3	2	1	0	2	8	1	0	0	2	1	6	0	1	3	0	0	0	30
05:00 PM	1	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	5
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	4
05:45 PM	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	3
Total	2	0	1	0	1	0	1	0	0	1	2	4	0	0	1	0	0	0	13
Grand Total	5	2	2	0	3	8	2	0	0	3	3	10	0	1	4	0	0	0	43
Apprch %	55.6	22.2	22.2	0	23.1	61.5	15.4	0	0	18.8	18.8	62.5	0	20	80	0	0	0	
Total %	11.6	4.7	4.7	0	7	18.6	4.7	0	0	7	7	23.3	0	2.3	9.3	0	0	0	

Start Time	South Road From North					Loomis Street From East					South Road From South					Railroad Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	1	1	0	0	2	0	5	0	0	5	0	0	1	0	1	0	0	0	0	0	8
04:15 PM	0	1	0	0	1	1	1	0	0	2	0	0	1	0	1	1	2	0	0	3	7
04:30 PM	2	0	1	0	3	0	1	1	0	2	1	0	4	0	5	0	0	0	0	0	10
04:45 PM	0	0	0	0	0	1	1	0	0	2	1	1	0	0	2	0	1	0	0	1	5
Total Volume	3	2	1	0	6	2	8	1	0	11	2	1	6	0	9	1	3	0	0	4	30
% App. Total	50	33.3	16.7	0		18.2	72.7	9.1	0		22.2	11.1	66.7	0		25	75	0	0		
PHF	.375	.500	.250	.000	.500	.500	.400	.250	.000	.550	.500	.250	.375	.000	.450	.250	.375	.000	.000	.333	.750



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

File Name : 175453 AA
Site Code : 9393.01
Start Date : 1/26/2017
Page No : 1

N/S: South Road
E/W: Loomis Street/ Railroad Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey

Groups Printed- Peds and Bicycles

Start Time	South Road From North					Loomis Street From East					South Road From South					Railroad Avenue From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	1	0	4
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	1	0	5
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	2	0	11
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	4
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	1	0	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	9
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	3
Total	0	1	0	0	3	0	0	0	0	0	0	0	0	6	2	0	0	0	1	3	16
Grand Total	0	1	0	0	3	0	0	0	0	0	0	0	0	11	6	0	0	0	3	3	27
Apprch %	0	25	0	0	75	0	0	0	0	0	0	0	0	64.7	35.3	0	0	0	50	50	
Total %	0	3.7	0	0	11.1	0	0	0	0	0	0	0	0	40.7	22.2	0	0	0	11.1	11.1	

Start Time	South Road From North						Loomis Street From East						South Road From South						Railroad Avenue From West						Int. Total
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 04:45 PM																									
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4	0	0	0	1	0	1	5
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4	0	0	0	0	0	0	4
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	1	0	0	3	4	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	3	3	9
Total Volume	0	1	0	0	3	4	0	0	0	0	0	0	0	0	0	7	3	10	0	0	0	1	3	4	18
% App. Total	0	25	0	0	75	0	0	0	0	0	0	0	0	70	30	0	0	0	25	75					
PHF	.000	.250	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.583	.375	.625	.000	.000	.000	.250	.250	.333	.500



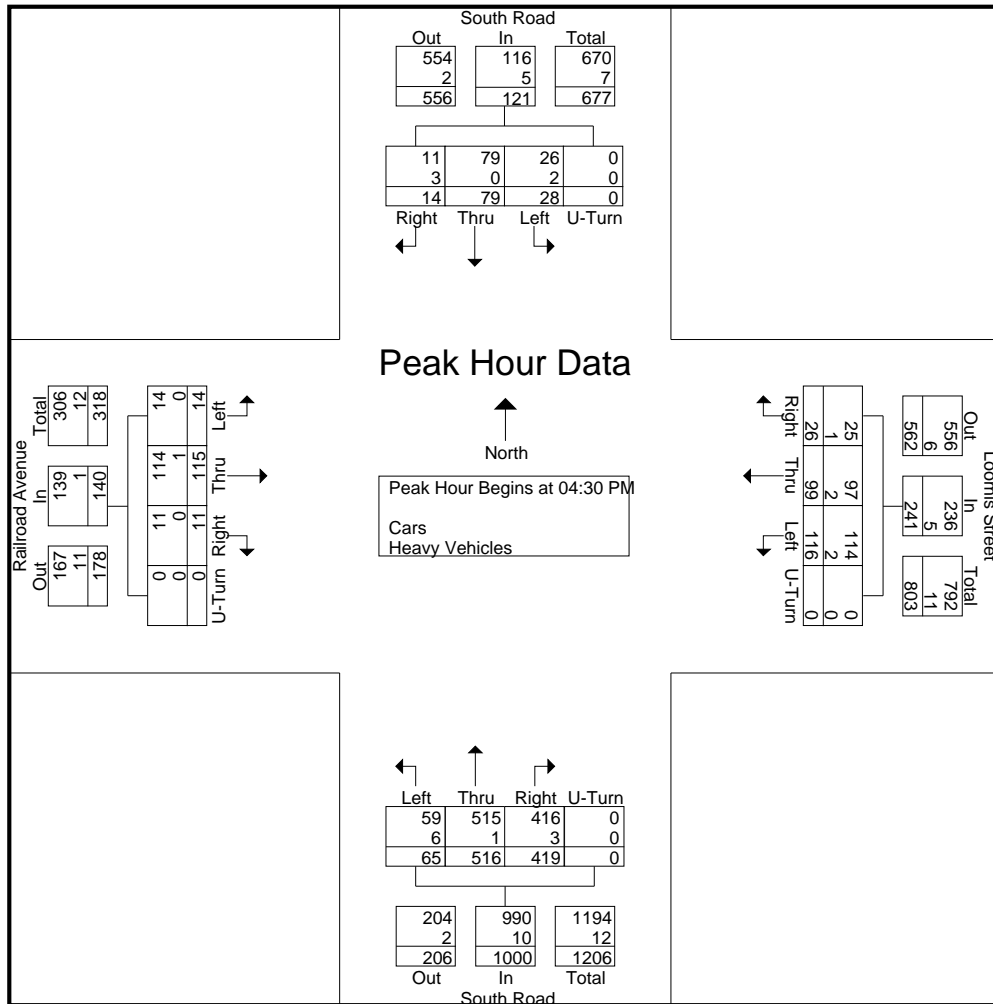
PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

File Name : 175453 AA
Site Code : 9393.01
Start Date : 1/26/2017
Page No : 1

N/S: South Road
E/W: Loomis Street/ Railroad Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey

Start Time	South Road From North					Loomis Street From East					South Road From South					Railroad Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	6	16	5	0	27	7	18	27	0	52	90	153	14	0	257	4	26	3	0	33	369
04:45 PM	5	21	4	0	30	8	23	25	0	56	108	125	13	0	246	4	41	6	0	51	383
05:00 PM	1	26	8	0	35	3	25	27	0	55	114	121	20	0	255	3	20	2	0	25	370
05:15 PM	2	16	11	0	29	8	33	37	0	78	107	117	18	0	242	0	28	3	0	31	380
Total Volume	14	79	28	0	121	26	99	116	0	241	419	516	65	0	1000	11	115	14	0	140	1502
% App. Total	11.6	65.3	23.1	0		10.8	41.1	48.1	0		41.9	51.6	6.5	0		7.9	82.1	10	0		
PHF	.583	.760	.636	.000	.864	.813	.750	.784	.000	.772	.919	.843	.813	.000	.973	.688	.701	.583	.000	.686	.980
Cars	11	79	26	0	116	25	97	114	0	236	416	515	59	0	990	11	114	14	0	139	1481
% Cars	78.6	100	92.9	0	95.9	96.2	98.0	98.3	0	97.9	99.3	99.8	90.8	0	99.0	100	99.1	100	0	99.3	98.6
Heavy Vehicles	3	0	2	0	5	1	2	2	0	5	3	1	6	0	10	0	1	0	0	1	21
% Heavy Vehicles	21.4	0	7.1	0	4.1	3.8	2.0	1.7	0	2.1	0.7	0.2	9.2	0	1.0	0	0.9	0	0	0.7	1.4



Automatic Traffic Recorder Data



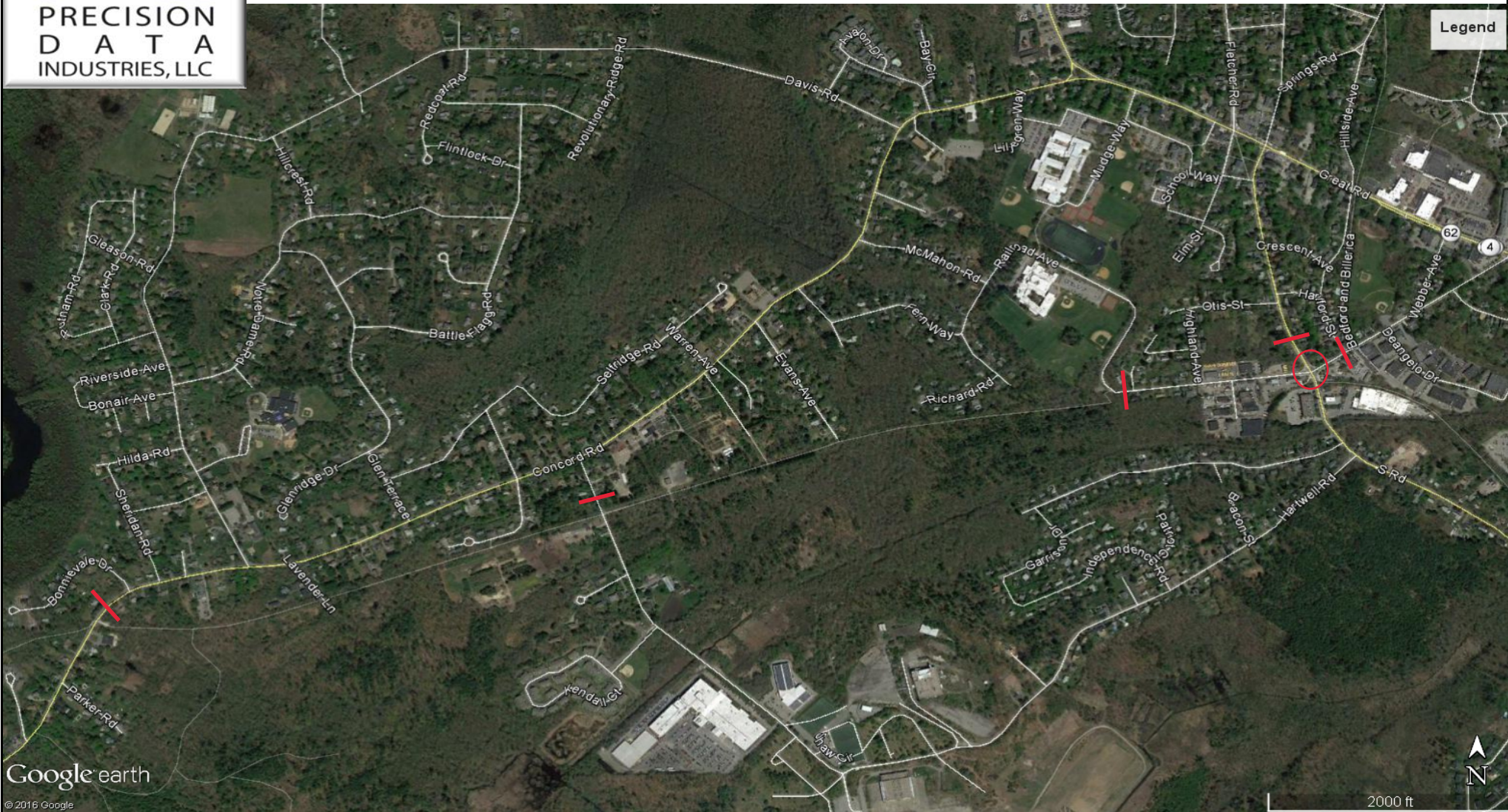
PRECISION
DATA
INDUSTRIES, LLC

PRECISION DATA INDUSTRIES, LLC

Office: 508.875.0100 Fax: 508.875.0118

Email: datarequests@pdillc.com

Traffic Counts with Precision



Client:
VHB

Engineer:
A. Dempsey

Site Code:
9393.01

Date:
Wed 1/25 thru Thurs 1/26/17

PDI Job Number:
175453

City, State:
Bedford, MA

South Road
north of Loomis Street
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

175453 A Volume
Site Code: 9393.01

Start Time	NB		SB		Combin ed		01/25/17 Wed							
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.								
12:00	1	36	0	27	1	63								
12:15	1	26	0	44	1	70								
12:30	1	33	0	33	1	66								
12:45	0	3	47	142	0	0	52 156 3 298							
01:00	0	34	1	60	1	94								
01:15	0	29	0	37	0	66								
01:30	0	40	1	34	1	74								
01:45	0	0	35	138	1	3	31 162 1 3 66 300							
02:00	0	39	0	27	0	66								
02:15	0	44	0	35	0	79								
02:30	1	62	0	33	1	95								
02:45	0	1	62	207	1	1	29 124 1 2 91 331							
03:00	1	107	0	24	1	131								
03:15	0	96	2	29	2	125								
03:30	1	188	3	39	4	227								
03:45	0	2	136	527	0	5	28 120 0 7 164 647							
04:00	0	160	0	36	0	196								
04:15	2	147	0	17	2	164								
04:30	1	158	1	22	2	180								
04:45	0	3	147	612	6	7	22 97 6 10 169 709							
05:00	0	160	16	32	16	192								
05:15	2	150	9	25	11	175								
05:30	3	143	28	23	31	166								
05:45	3	8	121	574	28	81	31 111 31 89 152 685							
06:00	5	116	66	45	71	161								
06:15	9	82	91	15	100	97								
06:30	6	98	103	15	109	113								
06:45	13	33	68	364	158	418	20 95 171 451 88 459							
07:00	20	53	138	12	158	65								
07:15	40	24	150	12	190	36								
07:30	50	28	148	11	198	39								
07:45	29	139	20	125	123	559	7 42 152 698 27 167							
08:00	36	16	119	20	155	36								
08:15	29	7	87	12	116	19								
08:30	25	9	114	8	139	17								
08:45	29	119	4	36	102	422	8 48 131 541 12 84							
09:00	29	6	71	9	100	15								
09:15	28	8	53	7	81	15								
09:30	20	3	49	2	69	5								
09:45	15	92	5	22	48	221	2 20 63 313 7 42							
10:00	20	6	22	3	42	9								
10:15	19	7	26	1	45	8								
10:30	22	2	27	1	49	3								
10:45	20	81	2	17	20	95	5 10 40 176 7 27							
11:00	22	9	19	0	41	9								
11:15	35	6	21	1	56	7								
11:30	35	4	24	2	59	6								
11:45	24	116	1	20	31	95	2 5 55 211 3 25							
Total	597	2784	1907	990	2504	3774								
Percent	23.8%	73.8%	76.2%	26.2%										
Day Total		3381		2897		6278								
Peak	07:15	-	03:30	-	06:45	-	00:15	-	06:45	-	03:30	-	-	-
Vol.	155	-	631	-	594	-	189	-	717	-	751	-	-	-
P.H.F.	0.775		0.839		0.940		0.788		0.905		0.827			

South Road
north of Loomis Street
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
D A T A
INDUSTRIES, LLC

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175453 A Volume
Site Code: 9393.01

Start Time	NB		SB		Combin ed		01/26/17 Thu
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
12:00	1	47	0	23	1	70	
12:15	1	26	0	33	1	59	
12:30	1	29	0	27	1	56	
12:45	2	30	132	0	49	132	264
01:00	2	25	1	36	3	61	
01:15	1	27	0	17	1	44	
01:30	0	25	0	16	0	41	
01:45	0	37	114	1	27	96	210
02:00	0	37	0	26	0	63	
02:15	0	41	0	40	0	81	
02:30	0	44	0	51	0	95	
02:45	0	58	180	1	32	149	329
03:00	0	124	0	32	0	156	
03:15	1	121	0	20	1	141	
03:30	1	156	0	29	1	185	
03:45	0	147	548	0	31	112	660
04:00	0	171	0	38	0	209	
04:15	0	140	0	27	0	167	
04:30	2	159	5	25	7	184	
04:45	0	141	611	6	11	27	728
05:00	0	141	7	30	7	171	
05:15	0	138	6	26	6	164	
05:30	6	131	31	20	37	151	
05:45	4	123	533	26	70	29	638
06:00	6	136	62	43	68	179	
06:15	5	87	93	14	98	101	
06:30	12	80	112	21	124	101	
06:45	20	41	344	151	418	16	438
07:00	20	31	165	6	94	171	37
07:15	47	21	139	22	186	43	
07:30	50	21	148	14	198	35	
07:45	36	153	20	93	128	580	149
08:00	32	18	151	16	183	34	
08:15	31	13	128	10	159	23	
08:30	19	15	108	8	127	23	
08:45	29	111	11	57	110	497	107
09:00	19	14	82	20	101	34	
09:15	23	13	51	13	74	26	
09:30	19	2	57	3	76	5	
09:45	21	82	4	33	32	222	73
10:00	21	8	37	4	58	12	
10:15	13	6	23	2	36	8	
10:30	15	2	17	1	32	3	
10:45	19	68	4	20	27	104	35
11:00	25	5	19	1	44	6	
11:15	25	8	22	1	47	9	
11:30	21	6	29	1	50	7	
11:45	41	112	2	21	28	98	25
Total	591	2686	2003	970	2594	3656	
Percent	22.8%	73.5%	77.2%	26.5%			
Day Total	3277		2973		6250		
Peak	07:15	-	03:45	-	06:45	-	03:30
Vol.	165	-	617	-	603	-	739
P.H.F.	0.825	-	0.902	-	0.914	-	0.884

South Road
north of Loomis Street
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

175453 A Class
Site Code: 9393.01

NB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/25/17	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
05:00	0	7	1	0	0	0	0	0	0	0	0	0	0	0	8
06:00	0	23	2	5	3	0	0	0	0	0	0	0	0	0	33
07:00	2	106	19	8	3	1	0	0	0	0	0	0	0	0	139
08:00	0	90	21	2	4	1	0	0	0	0	0	0	0	1	119
09:00	0	57	26	2	6	1	0	0	0	0	0	0	0	0	92
10:00	0	62	13	1	3	0	0	1	0	0	0	0	0	1	81
11:00	0	93	20	0	3	0	0	0	0	0	0	0	0	0	116
12 PM	0	118	17	4	1	0	0	0	0	0	0	0	0	2	142
13:00	0	112	20	2	1	0	0	0	0	0	0	0	0	3	138
14:00	0	165	30	5	3	0	0	3	0	0	0	0	0	1	207
15:00	1	410	94	1	17	3	0	0	0	0	0	0	0	1	527
16:00	0	513	72	1	8	1	0	0	0	0	0	0	0	17	612
17:00	1	507	48	0	3	3	0	0	0	0	0	0	0	12	574
18:00	1	325	32	1	2	0	0	1	0	0	0	0	0	2	364
19:00	0	110	12	1	2	0	0	0	0	0	0	0	0	0	125
20:00	0	30	6	0	0	0	0	0	0	0	0	0	0	0	36
21:00	0	20	2	0	0	0	0	0	0	0	0	0	0	0	22
22:00	0	15	2	0	0	0	0	0	0	0	0	0	0	0	17
23:00	0	13	7	0	0	0	0	0	0	0	0	0	0	0	20
Total	5	2784	445	33	59	10	0	5	0	0	0	0	0	40	3381
Percent	0.1%	82.3%	13.2%	1.0%	1.7%	0.3%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	
AM Peak	07:00	07:00	09:00	07:00	09:00	07:00		10:00						08:00	07:00
Vol.	2	106	26	8	6	1		1						1	139
PM Peak	15:00	16:00	15:00	14:00	15:00	15:00		14:00						16:00	16:00
Vol.	1	513	94	5	17	3		3						17	612

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NB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/26/17	0	4	0	0	1	0	0	0	0	0	0	0	0	0	5
01:00	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
05:00	0	9	0	0	1	0	0	0	0	0	0	0	0	0	10
06:00	0	28	5	7	2	1	0	0	0	0	0	0	0	0	43
07:00	2	115	22	8	2	3	0	0	0	0	0	0	0	1	153
08:00	2	84	21	1	2	0	0	0	0	0	0	0	0	1	111
09:00	0	58	17	1	6	0	0	0	0	0	0	0	0	0	82
10:00	0	59	9	0	0	0	0	0	0	0	0	0	0	0	68
11:00	0	88	19	1	3	1	0	0	0	0	0	0	0	0	112
12 PM	0	115	14	1	2	0	0	0	0	0	0	0	0	0	132
13:00	0	91	17	0	3	1	0	0	0	0	0	0	0	2	114
14:00	0	137	29	8	4	0	0	0	0	0	0	0	0	2	180
15:00	0	436	96	0	9	0	1	1	0	0	0	0	0	5	548
16:00	0	530	60	2	8	0	0	0	0	0	0	0	0	11	611
17:00	0	464	56	0	2	1	0	1	0	0	0	0	0	9	533
18:00	0	308	29	3	3	0	0	0	0	0	0	0	0	1	344
19:00	0	81	11	0	1	0	0	0	0	0	0	0	0	0	93
20:00	0	50	6	0	1	0	0	0	0	0	0	0	0	0	57
21:00	0	29	3	0	1	0	0	0	0	0	0	0	0	0	33
22:00	0	18	2	0	0	0	0	0	0	0	0	0	0	0	20
23:00	0	14	7	0	0	0	0	0	0	0	0	0	0	0	21
Total	4	2724	424	32	51	7	1	2	0	0	0	0	0	32	3277
Percent	0.1%	83.1%	12.9%	1.0%	1.6%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	
AM Peak	07:00	07:00	07:00	07:00	09:00	07:00								07:00	07:00
Vol.	2	115	22	8	6	3								1	153
PM Peak		16:00	15:00	14:00	15:00	13:00	15:00	15:00						16:00	16:00
Vol.		530	96	8	9	1	1	1						11	611

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SB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/25/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	1	2	1	0	1	0	0	0	0	0	0	0	0	5
04:00	0	5	1	0	1	0	0	0	0	0	0	0	0	0	7
05:00	0	59	18	0	3	0	0	0	0	0	0	0	0	1	81
06:00	0	312	76	2	27	0	0	1	0	0	0	0	0	0	418
07:00	0	453	76	6	24	0	0	0	0	0	0	0	0	0	559
08:00	0	323	74	5	13	1	0	1	0	0	0	0	0	5	422
09:00	0	176	33	3	9	0	0	0	0	0	0	0	0	0	221
10:00	0	67	24	1	3	0	0	0	0	0	0	0	0	0	95
11:00	0	72	16	3	3	0	0	0	0	0	0	0	0	1	95
12 PM	0	115	27	3	10	0	0	0	0	0	0	0	0	1	156
13:00	1	111	27	11	10	0	0	1	0	0	0	0	0	1	162
14:00	1	80	29	6	3	0	0	1	0	0	0	0	0	4	124
15:00	0	76	29	6	6	1	0	0	0	0	0	0	0	2	120
16:00	1	69	15	3	8	1	0	0	0	0	0	0	0	0	97
17:00	1	92	15	2	1	0	0	0	0	0	0	0	0	0	111
18:00	0	66	23	1	4	0	0	1	0	0	0	0	0	0	95
19:00	0	34	5	2	1	0	0	0	0	0	0	0	0	0	42
20:00	0	36	6	1	5	0	0	0	0	0	0	0	0	0	48
21:00	0	18	1	0	1	0	0	0	0	0	0	0	0	0	20
22:00	0	8	2	0	0	0	0	0	0	0	0	0	0	0	10
23:00	0	4	0	0	1	0	0	0	0	0	0	0	0	0	5
Total	4	2181	499	56	133	4	0	5	0	0	0	0	0	15	2897
Percent	0.1%	75.3%	17.2%	1.9%	4.6%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	
AM Peak		07:00	06:00	07:00	06:00	03:00		06:00						08:00	07:00
Vol.		453	76	6	27	1		1						5	559
PM Peak	13:00	12:00	14:00	13:00	12:00	15:00		13:00						14:00	13:00
Vol.	1	115	29	11	10	1		1						4	162

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SB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/26/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	8	2	0	1	0	0	0	0	0	0	0	0	0	11
05:00	0	51	12	0	5	1	0	0	0	0	0	0	0	1	70
06:00	1	299	87	2	27	0	0	0	0	0	0	0	0	2	418
07:00	0	467	85	6	20	0	0	0	0	0	0	0	0	2	580
08:00	1	395	71	6	24	0	0	0	0	0	0	0	0	0	497
09:00	0	167	36	2	15	2	0	0	0	0	0	0	0	0	222
10:00	0	78	18	1	7	0	0	0	0	0	0	0	0	0	104
11:00	0	71	19	0	6	1	0	0	0	0	0	0	0	1	98
12 PM	0	100	17	3	9	1	0	1	0	0	0	0	0	1	132
13:00	0	70	22	2	2	0	0	0	0	0	0	0	0	0	96
14:00	1	92	34	12	9	0	0	0	0	0	0	0	0	1	149
15:00	1	78	18	9	6	0	0	0	0	0	0	0	0	0	112
16:00	1	85	19	3	5	0	0	0	0	0	0	0	0	4	117
17:00	1	82	17	2	1	0	0	0	0	0	0	0	0	2	105
18:00	0	70	18	2	4	0	0	0	0	0	0	0	0	0	94
19:00	1	44	5	2	3	0	0	0	0	0	0	0	0	1	56
20:00	0	41	7	1	1	0	0	0	0	0	0	0	0	0	50
21:00	0	34	5	0	1	0	0	0	0	0	0	0	0	0	40
22:00	0	14	1	0	0	0	0	0	0	0	0	0	0	0	15
23:00	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
Total	7	2253	493	53	146	5	0	1	0	0	0	0	0	15	2973
Percent	0.2%	75.8%	16.6%	1.8%	4.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	
AM Peak	06:00	07:00	06:00	07:00	06:00	09:00								06:00	07:00
Vol.	1	467	87	6	27	2								2	580
PM Peak	14:00	12:00	14:00	14:00	12:00	12:00		12:00						16:00	14:00
Vol.	1	100	34	12	9	1		1						4	149

South Road
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175453 A Speed
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NB	Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
01/25/																	
17	0	0	0	1	1	1	0	0	0	0	0	0	0	0	3	36	32
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	28	27
03:00	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	27	25
04:00	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3	36	34
05:00	0	0	0	0	4	3	1	0	0	0	0	0	0	0	8	38	35
06:00	0	2	5	6	15	5	0	0	0	0	0	0	0	0	33	34	29
07:00	0	1	13	44	60	19	2	0	0	0	0	0	0	0	139	34	30
08:00	2	3	8	40	50	16	0	0	0	0	0	0	0	0	119	33	30
09:00	0	0	3	36	39	13	1	0	0	0	0	0	0	0	92	34	31
10:00	1	0	5	21	41	13	0	0	0	0	0	0	0	0	81	34	31
11:00	0	2	3	33	67	10	1	0	0	0	0	0	0	0	116	33	31
12 PM	2	0	3	39	82	15	1	0	0	0	0	0	0	0	142	33	31
13:00	2	2	7	49	57	21	0	0	0	0	0	0	0	0	138	34	30
14:00	1	1	16	91	76	20	1	1	0	0	0	0	0	0	207	33	29
15:00	30	14	72	199	191	18	3	0	0	0	0	0	0	0	527	32	27
16:00	244	42	145	120	52	9	0	0	0	0	0	0	0	0	612	27	18
17:00	286	33	184	49	20	1	1	0	0	0	0	0	0	0	574	23	15
18:00	25	20	48	121	136	13	1	0	0	0	0	0	0	0	364	32	27
19:00	0	1	12	40	52	15	4	1	0	0	0	0	0	0	125	34	30
20:00	0	0	0	13	16	7	0	0	0	0	0	0	0	0	36	35	31
21:00	0	0	0	5	11	5	0	1	0	0	0	0	0	0	22	36	33
22:00	0	0	0	2	9	4	2	0	0	0	0	0	0	0	17	38	34
23:00	0	0	0	4	9	7	0	0	0	0	0	0	0	0	20	36	33
Total	593	121	525	915	990	216	18	3	0	0	0	0	0	0	3381		
%	17.5%	3.6%	15.5%	27.1%	29.3%	6.4%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	07:00	07:00	11:00	07:00	07:00									07:00	
Vol.	2	3	13	44	67	19	2									139	
PM Peak	17:00	16:00	17:00	15:00	15:00	13:00	19:00	14:00								16:00	
Vol.	286	42	184	199	191	21	4	1								612	

Stats

15th Percentile : 11 MPH
50th Percentile : 26 MPH
85th Percentile : 32 MPH
95th Percentile : 35 MPH

Mean Speed(Average) : 25 MPH
10 MPH Pace Speed : 25-34 MPH
Number in Pace : 1905
Percent in Pace : 56.3%
Number of Vehicles > 30 MPH : 1029
Percent of Vehicles > 30 MPH : 30.4%

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NB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
01/26/																													
17	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	35	31	
01:00	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	31	29	
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
03:00	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	37	32	
04:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	32	30	
05:00	0	0	0	0	4	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	33	32	
06:00	0	1	7	9	20	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	33	30	
07:00	1	2	10	40	78	19	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	153	33	30	
08:00	1	1	2	29	58	18	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	34	31	
09:00	0	0	4	25	39	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	34	31	
10:00	0	0	2	10	37	17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	36	33	
11:00	0	0	6	24	65	14	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	34	31	
12 PM	4	0	3	42	66	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	33	30	
13:00	2	2	4	35	53	14	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	34	30	
14:00	2	1	7	52	95	22	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180	33	30	
15:00	123	25	83	170	135	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	548	31	23	
16:00	230	55	150	121	50	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	611	27	18	
17:00	238	34	114	99	44	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	533	27	17	
18:00	1	4	32	179	114	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	344	32	28	
19:00	0	1	4	32	44	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	33	30	
20:00	1	1	0	11	36	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57	33	31	
21:00	1	1	0	9	13	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	36	31	
22:00	0	1	1	2	9	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	37	33	
23:00	0	0	0	4	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	33	31	
Total	604	129	429	903	981	205	24	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3277			
%	18.4%	3.9%	13.1%	27.6%	29.9%	6.3%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	07:00	07:00	07:00	07:00	07:00	07:00	07:00	07:00	05:00																		07:00		
Vol.	1	2	10	40	78	19	3	1																			153		
PM Peak	17:00	16:00	16:00	18:00	15:00	14:00	13:00	20:00																			16:00		
Vol.	238	55	150	179	135	22	4	1																			611		

Stats

15th Percentile : 11 MPH
50th Percentile : 26 MPH
85th Percentile : 32 MPH
95th Percentile : 35 MPH

Mean Speed(Average) : 25 MPH
10 MPH Pace Speed : 25-34 MPH
Number in Pace : 1884
Percent in Pace : 57.5%
Number of Vehicles > 30 MPH : 1016
Percent of Vehicles > 30 MPH : 31.0%

South Road
north of Loomis Street
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

175453 A Speed
Site Code: 9393.01

SB	Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
01/25/																	
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	1	1	2	0	0	0	0	0	0	0	3	37	35
02:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	28	27
03:00	0	0	0	1	4	0	0	0	0	0	0	0	0	0	5	33	31
04:00	0	0	0	0	5	2	0	0	0	0	0	0	0	0	7	36	33
05:00	0	2	0	13	46	18	2	0	0	0	0	0	0	0	81	36	32
06:00	14	11	44	106	188	54	1	0	0	0	0	0	0	0	418	33	29
07:00	4	18	76	206	220	35	0	0	0	0	0	0	0	0	559	32	28
08:00	5	7	27	132	201	48	2	0	0	0	0	0	0	0	422	33	30
09:00	0	0	14	47	114	42	4	0	0	0	0	0	0	0	221	35	31
10:00	0	0	5	25	49	13	2	1	0	0	0	0	0	0	95	34	31
11:00	1	2	5	24	48	13	2	0	0	0	0	0	0	0	95	34	31
12 PM	0	2	6	28	88	29	3	0	0	0	0	0	0	0	156	35	32
13:00	0	5	10	50	70	22	5	0	0	0	0	0	0	0	162	34	30
14:00	0	11	15	56	34	6	1	1	0	0	0	0	0	0	124	32	28
15:00	3	3	13	32	47	21	1	0	0	0	0	0	0	0	120	34	30
16:00	0	2	18	23	43	10	1	0	0	0	0	0	0	0	97	33	29
17:00	0	0	23	37	38	12	1	0	0	0	0	0	0	0	111	33	29
18:00	2	1	10	23	46	12	1	0	0	0	0	0	0	0	95	33	30
19:00	0	1	2	13	17	8	1	0	0	0	0	0	0	0	42	35	31
20:00	0	0	0	9	33	6	0	0	0	0	0	0	0	0	48	33	32
21:00	0	0	0	1	15	4	0	0	0	0	0	0	0	0	20	35	33
22:00	0	0	0	0	4	4	1	0	1	0	0	0	0	0	10	41	37
23:00	0	0	0	3	1	1	0	0	0	0	0	0	0	0	5	35	30
Total	29	65	268	830	1312	362	28	2	1	0	0	0	0	0	2897		
%	1.0%	2.2%	9.3%	28.7%	45.3%	12.5%	1.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	06:00	07:00	07:00	07:00	07:00	06:00	09:00	10:00							07:00		
Vol.	14	18	76	206	220	54	4	1							559		
PM Peak	15:00	14:00	17:00	14:00	12:00	12:00	13:00	14:00	22:00						13:00		
Vol.	3	11	23	56	88	29	5	1	1						162		

Stats

15th Percentile : 24 MPH
 50th Percentile : 29 MPH
 85th Percentile : 33 MPH
 95th Percentile : 37 MPH

Mean Speed(Average) : 30 MPH
 10 MPH Pace Speed : 25-34 MPH
 Number in Pace : 2142
 Percent in Pace : 73.9%
 Number of Vehicles > 30 MPH : 1443
 Percent of Vehicles > 30 MPH : 49.8%



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

South Road
north of Loomis Street
City, State: Bedford, MA
Client: VHB/ A. Dempsey

175453 A Speed
Site Code: 9393.01

SB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
01/26/	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00		0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	38	37
02:00		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	33	32
03:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00		0	0	0	0	1	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	36	33	
05:00		0	0	3	9	34	21	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	37	33	
06:00		0	7	30	121	201	57	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	418	33	30	
07:00		31	27	55	227	204	35	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	580	32	27	
08:00		9	19	36	125	249	55	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	497	33	30	
09:00		1	1	10	50	99	58	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	222	36	32	
10:00		0	0	3	19	45	33	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	104	37	33	
11:00		0	1	4	19	43	29	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	36	32	
12 PM		1	1	8	26	77	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	33	31	
13:00		1	0	5	30	43	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96	34	31	
14:00		1	2	9	38	70	23	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	149	35	31	
15:00		0	0	11	26	57	17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	34	31	
16:00		3	0	22	37	40	12	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	33	29	
17:00		2	4	26	34	30	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105	32	27	
18:00		1	2	8	33	36	10	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94	33	30	
19:00		2	0	2	12	28	9	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56	35	31	
20:00		0	0	1	18	19	9	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	36	32	
21:00		1	0	0	7	24	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	35	32	
22:00		0	0	0	2	8	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	37	33	
23:00		0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	33	31	
Total		53	64	233	835	1318	425	42	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2973			
%		1.8%	2.2%	7.8%	28.1%	44.3%	14.3%	1.4%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	07:00	07:00	07:00	07:00	08:00	09:00	08:00																				07:00		
Vol.	31	27	55	227	249	58	4																				580		
PM Peak	16:00	17:00	17:00	14:00	12:00	14:00	14:00	20:00	14:00																		14:00		
Vol.	3	4	26	38	77	23	5	1	1																		149		

Stats

15th Percentile : 24 MPH
 50th Percentile : 30 MPH
 85th Percentile : 34 MPH
 95th Percentile : 37 MPH

Mean Speed(Average) : 30 MPH
 10 MPH Pace Speed : 25-34 MPH
 Number in Pace : 2153
 Percent in Pace : 72.4%
 Number of Vehicles > 30 MPH : 1524
 Percent of Vehicles > 30 MPH : 51.3%

Loomis Street
east of South Road
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

175453 B Volume
Site Code: 9393.01

Start Time	WB		EB		Combin ed		01/25/17 Wed
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
12:00	0	53	0	66	0	119	
12:15	0	61	2	50	2	111	
12:30	2	52	1	45	3	97	
12:45	1	56	222	61	222	117	444
01:00	0	45	1	72	1	117	
01:15	1	58	1	46	2	104	
01:30	0	40	0	32	0	72	
01:45	0	37	180	31	181	68	361
02:00	0	44	0	46	0	90	
02:15	0	57	0	55	0	112	
02:30	0	45	0	52	0	97	
02:45	2	49	195	52	205	101	400
03:00	1	54	0	46	1	100	
03:15	0	55	0	48	0	103	
03:30	0	49	1	75	1	124	
03:45	0	49	207	67	236	116	443
04:00	2	52	0	78	2	130	
04:15	0	48	1	64	1	112	
04:30	4	53	0	69	4	122	
04:45	5	63	216	69	280	132	496
05:00	2	68	4	79	6	147	
05:15	6	53	4	59	10	112	
05:30	7	54	5	64	12	118	
05:45	12	71	246	67	269	138	515
06:00	14	70	12	82	26	152	
06:15	17	47	12	61	29	108	
06:30	22	40	27	36	49	76	
06:45	43	47	204	32	211	79	415
07:00	38	38	38	47	76	85	
07:15	86	32	63	28	149	60	
07:30	39	33	85	16	124	49	
07:45	35	26	129	20	111	46	240
08:00	51	15	75	36	126	51	
08:15	50	17	77	29	127	46	
08:30	28	24	62	23	90	47	
08:45	44	27	83	23	111	50	194
09:00	22	20	60	22	82	42	
09:15	35	12	41	7	76	19	
09:30	31	14	40	7	71	21	
09:45	32	4	50	6	42	10	92
10:00	30	7	32	10	62	17	
10:15	23	5	33	4	56	9	
10:30	32	8	28	10	60	18	
10:45	32	4	24	9	33	13	57
11:00	25	0	33	16	58	16	
11:15	41	1	47	5	88	6	
11:30	35	2	50	8	85	10	
11:45	45	2	5	2	100	4	36
Total	895	1761	1144	1932	2039	3693	
Percent	43.9%	47.7%	56.1%	52.3%			
Day Total		2656		3076		5732	
Peak	07:15	- 05:15	- 07:30	- 03:30	- 07:15	- 05:15	- - -
Vol.	211	- 248	- 295	- 284	- 492	- 520	- - -
P.H.F.	0.613	0.873	0.868	0.910	0.826	0.855	

Loomis Street
 east of South Road
 City, State: Bedford, MA
 Client: VHB/ A. Dempsey



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175453 B Volume
 Site Code: 9393.01

Start Time	WB		EB		Combin ed		01/26/17 Thu							
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.								
12:00	2	41	5	69	7	110								
12:15	0	49	1	54	1	103								
12:30	2	60	0	54	2	114								
12:45	0	58	208	1	7	48	225							
01:00	0	62	0	55	0	117								
01:15	0	40	1	31	1	71								
01:30	1	46	1	41	2	87								
01:45	0	43	191	0	2	41	168							
02:00	0	55	0	58	0	113								
02:15	2	31	0	78	2	109								
02:30	0	50	0	48	0	98								
02:45	0	57	193	3	3	53	237							
03:00	0	50	0	64	0	114								
03:15	0	49	0	66	0	115								
03:30	0	67	0	79	0	146								
03:45	0	61	227	0	0	83	292							
04:00	1	53	0	68	1	121								
04:15	1	78	1	67	2	145								
04:30	3	53	1	93	4	146								
04:45	4	50	234	2	4	78	306							
05:00	6	65	4	83	10	148								
05:15	5	71	4	85	9	156								
05:30	7	71	6	87	13	158								
05:45	13	76	283	9	23	65	320							
06:00	18	80	10	58	28	138								
06:15	16	51	8	48	24	99								
06:30	16	41	24	45	40	86								
06:45	38	38	210	28	70	32	183							
07:00	48	44	0	27	89	71								
07:15	67	29	0	52	25	54								
07:30	42	19	0	87	40	59								
07:45	37	25	117	48	228	21	113							
08:00	37	29	0	70	12	41								
08:15	49	24	0	57	20	44								
08:30	43	24	0	75	18	42								
08:45	43	30	107	68	270	14	64							
09:00	29	17	0	76	17	34								
09:15	33	14	0	51	8	22								
09:30	26	11	0	47	15	26								
09:45	23	13	55	46	220	3	43							
10:00	26	12	0	31	3	15								
10:15	31	8	0	27	13	21								
10:30	27	5	0	27	15	20								
10:45	31	6	31	34	119	13	44							
11:00	42	3	0	31	12	15								
11:15	35	2	0	27	4	6								
11:30	39	3	0	62	12	15								
11:45	47	0	8	57	177	2	30							
Total	890	1864	1123	2025	2013	3889								
Percent	44.2%	47.9%	55.8%	52.1%										
Day Total		2754		3148		5902								
Peak	06:45	-	05:15	-	08:15	-	04:30	-	08:00	-	05:00	-	-	-
Vol.	195	-	298	-	276	-	339	-	442	-	603	-	-	-
P.H.F.	0.728		0.931		0.908		0.911		0.857		0.954			

Loomis Street
east of South Road
City, State: Bedford, MA
Client: VHB/ A. Dempsey



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175453 B Class
Site Code: 9393.01

WB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/25/															
17	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	7	2	0	0	0	0	0	0	0	0	0	0	2	11
05:00	0	17	8	0	1	0	0	0	1	0	0	0	0	0	27
06:00	0	70	16	3	4	1	0	1	0	0	0	0	0	1	96
07:00	1	145	29	10	5	1	0	0	0	0	0	0	0	7	198
08:00	1	122	31	7	8	2	0	0	0	0	0	0	1	1	173
09:00	0	79	22	3	8	1	1	2	0	0	0	0	0	4	120
10:00	0	73	20	4	8	3	0	3	2	0	1	0	0	3	117
11:00	2	107	28	3	3	1	0	0	0	0	0	0	0	2	146
12 PM	0	172	37	4	4	2	0	0	0	0	0	0	0	3	222
13:00	2	128	34	7	5	1	0	1	1	0	0	0	0	1	180
14:00	0	143	36	5	8	0	0	0	0	0	0	0	0	3	195
15:00	0	157	34	4	6	0	0	1	0	0	0	0	0	5	207
16:00	3	163	30	2	10	0	0	1	0	0	0	0	0	7	216
17:00	0	197	40	1	3	0	0	0	0	0	0	0	0	5	246
18:00	1	168	25	3	2	0	0	0	0	0	0	0	0	5	204
19:00	2	106	13	2	1	0	0	0	0	0	0	0	0	5	129
20:00	0	67	13	1	2	0	0	0	0	0	0	0	0	0	83
21:00	0	42	5	0	0	0	0	0	0	0	0	0	0	3	50
22:00	0	21	1	0	0	0	0	0	0	0	0	0	0	2	24
23:00	0	3	2	0	0	0	0	0	0	0	0	0	0	0	5
Total	12	1994	426	59	78	12	1	9	4	0	1	0	1	59	2656
Percent	0.5%	75.1%	16.0%	2.2%	2.9%	0.5%	0.0%	0.3%	0.2%	0.0%	0.0%	0.0%	0.0%	2.2%	
AM Peak	11:00	07:00	08:00	07:00	08:00	10:00	09:00	10:00	10:00		10:00		08:00	07:00	07:00
Vol.	2	145	31	10	8	3	1	3	2		1		1	7	198
PM Peak	16:00	17:00	17:00	13:00	16:00	12:00		13:00	13:00					16:00	17:00
Vol.	3	197	40	7	10	2		1	1					7	246

Loomis Street
 east of South Road
 City, State: Bedford, MA
 Client: VHB/ A. Dempsey



PRECISION
 D A T A
 INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
 Office: 508-875-0100 Fax: 508-875-0118
 Email: datarequests@pdillc.com

175453 B Class
 Site Code: 9393.01

WB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/26/17	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	7	1	0	0	1	0	0	0	0	0	0	0	0	9
05:00	0	20	9	0	2	0	0	0	0	0	0	0	0	0	31
06:00	0	58	19	2	5	1	0	2	0	0	0	0	0	1	88
07:00	1	140	32	8	10	1	0	1	0	0	0	0	0	1	194
08:00	1	124	32	7	6	1	0	0	0	0	0	0	0	1	172
09:00	1	75	21	3	3	1	0	0	0	0	0	0	0	7	111
10:00	0	66	28	5	10	2	0	0	0	1	0	0	0	3	115
11:00	1	120	25	1	5	2	0	1	1	0	0	0	0	7	163
12 PM	1	158	33	1	6	2	0	1	0	0	0	0	0	6	208
13:00	0	132	45	2	4	1	0	2	0	0	0	0	0	5	191
14:00	1	151	30	1	7	0	0	0	0	0	0	0	0	3	193
15:00	2	167	37	6	8	0	0	1	0	0	0	0	0	6	227
16:00	4	171	38	7	5	2	0	0	0	0	0	0	0	7	234
17:00	4	229	38	2	4	3	0	0	0	0	0	0	0	3	283
18:00	4	162	26	4	5	0	0	0	0	0	0	0	0	9	210
19:00	1	94	18	1	2	0	0	0	0	0	0	0	0	1	117
20:00	2	84	20	0	1	0	0	0	0	0	0	0	0	0	107
21:00	0	45	8	0	1	0	0	0	0	0	0	0	0	1	55
22:00	0	27	4	0	0	0	0	0	0	0	0	0	0	0	31
23:00	0	7	1	0	0	0	0	0	0	0	0	0	0	0	8
Total	23	2043	466	50	84	17	0	8	1	1	0	0	0	61	2754
Percent	0.8%	74.2%	16.9%	1.8%	3.1%	0.6%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	
AM Peak	07:00	07:00	07:00	07:00	07:00	10:00		06:00	11:00	10:00				09:00	07:00
Vol.	1	140	32	8	10	2		2	1	1				7	194
PM Peak	16:00	17:00	13:00	16:00	15:00	17:00		13:00						18:00	17:00
Vol.	4	229	45	7	8	3		2						9	283

Loomis Street
 east of South Road
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 Email: datarequests@pdillc.com

175453 B Class
 Site Code: 9393.01

EB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/25/17	0	1	1	0	1	0	0	0	0	0	0	0	0	0	3
01:00	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
02:00	0	1	1	0	0	0	0	0	0	0	0	0	0	1	3
03:00	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
04:00	0	1	0	1	2	0	0	0	0	0	0	0	0	0	4
05:00	2	10	6	2	3	2	0	0	0	0	0	0	0	0	25
06:00	1	40	27	10	9	2	0	0	0	0	0	0	0	0	89
07:00	0	152	65	8	15	2	0	1	0	0	0	0	0	1	244
08:00	1	199	59	2	16	2	0	2	0	0	0	0	0	4	285
09:00	0	99	57	2	14	2	0	2	0	0	0	0	0	1	177
10:00	0	72	32	4	10	2	0	3	1	0	0	0	0	1	125
11:00	0	112	52	3	11	4	0	1	0	0	0	0	0	2	185
12 PM	0	140	55	4	22	1	0	0	0	0	0	0	0	0	222
13:00	0	110	43	10	13	3	0	0	0	0	0	0	0	2	181
14:00	1	127	60	1	10	4	0	1	0	0	0	0	0	1	205
15:00	1	145	61	4	21	3	0	0	0	0	0	0	0	1	236
16:00	0	179	70	0	25	0	0	2	0	0	0	0	0	4	280
17:00	0	183	59	3	19	1	0	2	0	0	0	0	0	2	269
18:00	2	139	50	3	15	0	0	0	0	0	0	0	0	2	211
19:00	0	73	30	3	2	1	0	0	0	0	0	0	0	2	111
20:00	0	68	33	2	6	1	0	0	0	0	0	0	0	1	111
21:00	0	30	8	0	4	0	0	0	0	0	0	0	0	0	42
22:00	0	26	4	0	3	0	0	0	0	0	0	0	0	0	33
23:00	0	25	4	0	2	0	0	0	0	0	0	0	0	0	31
Total	8	1933	777	63	225	30	0	14	1	0	0	0	0	25	3076
Percent	0.3%	62.8%	25.3%	2.0%	7.3%	1.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	
AM Peak	05:00	08:00	07:00	06:00	08:00	11:00		10:00	10:00					08:00	08:00
Vol.	2	199	65	10	16	4		3	1					4	285
PM Peak	18:00	17:00	16:00	13:00	16:00	14:00		16:00						16:00	16:00
Vol.	2	183	70	10	25	4		2						4	280

Loomis Street
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175453 B Class
Site Code: 9393.01

EB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/26/17	0	4	2	0	1	0	0	0	0	0	0	0	0	0	7
01:00	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
02:00	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	2	0	2	0	0	0	0	0	0	0	0	0	0	4
05:00	0	9	9	2	2	1	0	0	0	0	0	0	0	0	23
06:00	0	36	20	10	4	0	0	0	0	0	0	0	0	0	70
07:00	1	132	65	10	14	1	0	2	0	0	0	0	0	3	228
08:00	0	172	79	1	16	0	0	0	0	0	0	0	0	2	270
09:00	0	139	53	3	16	4	0	0	0	0	0	0	0	5	220
10:00	0	60	36	3	15	0	0	1	0	0	0	0	0	4	119
11:00	0	112	42	1	18	1	0	0	0	0	0	0	0	3	177
12 PM	1	134	62	6	15	4	0	1	0	0	0	0	0	2	225
13:00	0	90	56	5	12	3	0	2	0	0	0	0	0	0	168
14:00	1	137	73	2	19	0	0	0	0	0	0	0	0	5	237
15:00	0	176	87	2	24	2	0	1	0	0	0	0	0	0	292
16:00	1	203	76	2	22	1	0	0	0	0	0	0	0	1	306
17:00	1	226	71	0	20	1	0	0	0	0	0	0	0	1	320
18:00	0	118	54	2	9	0	0	0	0	0	0	0	0	0	183
19:00	0	80	24	1	8	0	0	0	0	0	0	0	0	0	113
20:00	0	49	12	0	3	0	0	0	0	0	0	0	0	0	64
21:00	0	29	12	0	2	0	0	0	0	0	0	0	0	0	43
22:00	0	25	15	0	3	1	0	0	0	0	0	0	0	0	44
23:00	0	24	4	0	2	0	0	0	0	0	0	0	0	0	30
Total	5	1957	855	52	227	19	0	7	0	0	0	0	0	26	3148
Percent	0.2%	62.2%	27.2%	1.7%	7.2%	0.6%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	
AM Peak	07:00	08:00	08:00	06:00	11:00	09:00		07:00						09:00	08:00
Vol.	1	172	79	10	18	4		2						5	270
PM Peak	12:00	17:00	15:00	12:00	15:00	12:00		13:00						14:00	17:00
Vol.	1	226	87	6	24	4		2						5	320

Loomis Street
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175453 B SPEED
Site Code: 9393.01

WB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
01/25/	17	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	32	30
	01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	33	32
	02:00	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33	32
	03:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	23	22
	04:00	2	0	0	4	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	33	26	
	05:00	0	0	1	9	12	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	35	31	
	06:00	1	0	6	32	45	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96	33	30	
	07:00	12	8	10	71	78	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	198	33	28	
	08:00	6	8	24	57	62	14	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	173	33	28	
	09:00	3	6	13	44	45	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	32	28	
	10:00	4	4	11	42	46	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	33	28	
	11:00	3	7	9	50	55	20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	146	34	29	
	12 PM	9	13	17	64	88	30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	222	33	29	
	13:00	6	13	13	66	69	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180	32	28	
	14:00	5	12	22	63	74	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	195	33	28	
	15:00	12	8	21	62	76	26	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	207	33	28	
	16:00	17	16	33	88	56	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	216	31	26	
	17:00	16	31	63	94	40	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	246	29	24	
	18:00	8	9	32	84	61	9	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	204	32	27	
	19:00	9	3	9	49	53	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	129	32	28	
	20:00	1	0	6	35	35	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83	33	29	
	21:00	4	2	5	15	20	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	33	27	
	22:00	2	0	4	4	9	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	35	29	
	23:00	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	30	28	
	Total	120	140	300	938	934	206	17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2656			
	%	4.5%	5.3%	11.3%	35.3%	35.2%	7.8%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	07:00	07:00	08:00	07:00	07:00	11:00	05:00																				07:00		
Vol.	12	8	24	71	78	20	2																				198		
PM Peak	16:00	17:00	17:00	17:00	12:00	12:00	15:00	18:00																			17:00		
Vol.	17	31	63	94	88	30	2	1																			246		

Stats

15th Percentile : 21 MPH
50th Percentile : 28 MPH
85th Percentile : 33 MPH
95th Percentile : 36 MPH

Mean Speed(Average) : 28 MPH
10 MPH Pace Speed : 25-34 MPH
Number in Pace : 1872
Percent in Pace : 70.5%
Number of Vehicles > 30 MPH : 971
Percent of Vehicles > 30 MPH : 36.6%

Loomis Street
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175453 B SPEED
 Site Code: 9393.01

WB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
01/26/																
17	0	0	2	0	2	0	0	0	0	0	0	0	0	4	32	27
01:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
02:00	0	0	1	1	0	0	0	0	0	0	0	0	0	2	27	25
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	1	0	2	5	1	0	0	0	0	0	0	0	9	33	30
05:00	0	0	1	11	16	3	0	0	0	0	0	0	0	31	33	30
06:00	0	0	3	33	36	14	2	0	0	0	0	0	0	88	35	31
07:00	2	5	19	72	76	19	1	0	0	0	0	0	0	194	33	29
08:00	5	7	36	54	56	12	2	0	0	0	0	0	0	172	32	27
09:00	4	3	16	34	43	10	1	0	0	0	0	0	0	111	33	28
10:00	3	3	13	43	44	9	0	0	0	0	0	0	0	115	33	28
11:00	6	13	27	53	55	9	0	0	0	0	0	0	0	163	32	27
12 PM	6	6	21	76	78	21	0	0	0	0	0	0	0	208	33	29
13:00	3	7	37	75	62	6	1	0	0	0	0	0	0	191	32	27
14:00	3	8	17	79	65	17	4	0	0	0	0	0	0	193	33	29
15:00	6	10	36	87	74	13	1	0	0	0	0	0	0	227	32	28
16:00	15	20	44	95	51	9	0	0	0	0	0	0	0	234	31	25
17:00	13	23	72	91	75	9	0	0	0	0	0	0	0	283	31	26
18:00	12	12	31	86	58	10	1	0	0	0	0	0	0	210	32	27
19:00	7	3	12	37	44	13	1	0	0	0	0	0	0	117	33	28
20:00	3	3	6	40	48	6	0	1	0	0	0	0	0	107	33	29
21:00	2	3	6	22	18	3	1	0	0	0	0	0	0	55	32	28
22:00	3	0	1	7	15	3	1	0	1	0	0	0	0	31	34	30
23:00	0	0	1	3	3	0	1	0	0	0	0	0	0	8	33	30
Total	93	127	402	1001	925	187	17	1	1	0	0	0	0	2754		
%	3.4%	4.6%	14.6%	36.3%	33.6%	6.8%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	11:00	08:00	07:00	07:00	07:00	06:00							07:00		
Vol.	6	13	36	72	76	19	2							194		
PM Peak	16:00	17:00	17:00	16:00	12:00	12:00	14:00	20:00	22:00					17:00		
Vol.	15	23	72	95	78	21	4	1	1					283		

Stats

15th Percentile : 21 MPH
 50th Percentile : 27 MPH
 85th Percentile : 32 MPH
 95th Percentile : 35 MPH

Mean Speed(Average) : 28 MPH
 10 MPH Pace Speed : 25-34 MPH
 Number in Pace : 1926
 Percent in Pace : 69.9%
 Number of Vehicles > 30 MPH : 946
 Percent of Vehicles > 30 MPH : 34.4%

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175453 B SPEED
 Site Code: 9393.01

EB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
01/25/																
17	0	0	0	2	0	1	0	0	0	0	0	0	0	3	36	30
01:00	0	0	0	0	1	1	0	0	0	0	0	0	0	2	37	35
02:00	0	0	0	1	2	0	0	0	0	0	0	0	0	3	32	30
03:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2	32	30
04:00	0	0	0	3	0	1	0	0	0	0	0	0	0	4	36	30
05:00	0	0	5	3	13	3	0	1	0	0	0	0	0	25	34	31
06:00	1	2	2	17	44	17	5	1	0	0	0	0	0	89	36	32
07:00	10	7	12	66	98	49	2	0	0	0	0	0	0	244	35	30
08:00	11	18	8	71	117	55	5	0	0	0	0	0	0	285	35	30
09:00	4	4	7	41	82	35	4	0	0	0	0	0	0	177	35	31
10:00	5	5	5	36	51	20	2	1	0	0	0	0	0	125	35	30
11:00	6	13	9	43	72	40	2	0	0	0	0	0	0	185	35	30
12 PM	4	9	15	61	93	36	4	0	0	0	0	0	0	222	34	30
13:00	1	13	16	55	70	22	4	0	0	0	0	0	0	181	33	29
14:00	4	12	6	53	94	30	6	0	0	0	0	0	0	205	34	30
15:00	12	9	8	47	109	45	5	1	0	0	0	0	0	236	35	30
16:00	14	7	34	99	88	36	2	0	0	0	0	0	0	280	33	28
17:00	9	5	42	117	81	13	2	0	0	0	0	0	0	269	32	27
18:00	5	9	11	59	90	34	3	0	0	0	0	0	0	211	34	30
19:00	4	3	7	32	42	18	5	0	0	0	0	0	0	111	35	30
20:00	2	0	6	27	47	26	3	0	0	0	0	0	0	111	36	31
21:00	0	1	2	2	22	14	1	0	0	0	0	0	0	42	37	33
22:00	0	0	1	7	10	14	1	0	0	0	0	0	0	33	37	33
23:00	1	0	2	5	15	7	1	0	0	0	0	0	0	31	36	31
Total	93	117	198	848	1242	517	57	4	0	0	0	0	0	3076		
%	3.0%	3.8%	6.4%	27.6%	40.4%	16.8%	1.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	07:00	08:00	08:00	08:00	06:00	05:00						08:00		
Vol.	11	18	12	71	117	55	5	1						285		
PM Peak	16:00	13:00	17:00	17:00	15:00	15:00	14:00	15:00						16:00		
Vol.	14	13	42	117	109	45	6	1						280		

Stats

15th Percentile : 24 MPH
 50th Percentile : 30 MPH
 85th Percentile : 35 MPH
 95th Percentile : 38 MPH

Mean Speed(Average) : 30 MPH
 10 MPH Pace Speed : 25-34 MPH
 Number in Pace : 2090
 Percent in Pace : 67.9%
 Number of Vehicles > 30 MPH : 1572
 Percent of Vehicles > 30 MPH : 51.1%

Loomis Street
 east of South Road
 City, State: Bedford, MA
 Client: VHB/ A. Dempsey



PRECISION
 D A T A
 INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
 Office: 508-875-0100 Fax: 508-875-0118
 Email: datarequests@pdillc.com

175453 B SPEED
 Site Code: 9393.01

EB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
01/26/																
17	0	0	1	2	2	2	0	0	0	0	0	0	0	7	36	31
01:00	0	0	0	0	2	0	0	0	0	0	0	0	0	2	33	32
02:00	0	0	0	0	1	2	0	0	0	0	0	0	0	3	37	35
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	2	2	0	0	0	0	0	0	0	0	4	32	30
05:00	0	1	0	8	8	5	1	0	0	0	0	0	0	23	36	31
06:00	1	2	1	12	41	8	5	0	0	0	0	0	0	70	35	32
07:00	2	5	16	80	96	27	2	0	0	0	0	0	0	228	33	30
08:00	8	16	17	58	122	44	5	0	0	0	0	0	0	270	34	30
09:00	8	10	16	58	90	33	4	0	1	0	0	0	0	220	34	29
10:00	8	5	6	23	53	22	2	0	0	0	0	0	0	119	35	29
11:00	7	7	12	50	69	29	3	0	0	0	0	0	0	177	34	29
12 PM	5	17	8	66	86	40	2	1	0	0	0	0	0	225	35	30
13:00	6	10	13	49	59	27	3	1	0	0	0	0	0	168	35	29
14:00	10	9	12	54	108	41	3	0	0	0	0	0	0	237	35	30
15:00	5	9	31	84	115	38	10	0	0	0	0	0	0	292	34	30
16:00	6	10	32	96	121	37	3	1	0	0	0	0	0	306	33	29
17:00	5	10	57	121	105	21	1	0	0	0	0	0	0	320	32	28
18:00	4	8	12	52	72	32	3	0	0	0	0	0	0	183	35	30
19:00	1	4	3	24	57	21	2	1	0	0	0	0	0	113	35	31
20:00	0	1	3	17	32	9	2	0	0	0	0	0	0	64	34	31
21:00	0	0	1	10	17	14	1	0	0	0	0	0	0	43	37	32
22:00	0	1	2	10	17	12	1	0	1	0	0	0	0	44	37	32
23:00	0	0	1	4	11	12	1	0	1	0	0	0	0	30	37	34
Total	76	125	244	880	1286	476	54	4	3	0	0	0	0	3148		
%	2.4%	4.0%	7.8%	28.0%	40.9%	15.1%	1.7%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	08:00	07:00	08:00	08:00	06:00		09:00					08:00		
Vol.	8	16	17	80	122	44	5		1					270		
PM Peak	14:00	12:00	17:00	17:00	16:00	14:00	15:00	12:00	22:00					17:00		
Vol.	10	17	57	121	121	41	10	1	1					320		

Stats

15th Percentile : 24 MPH
 50th Percentile : 29 MPH
 85th Percentile : 34 MPH
 95th Percentile : 37 MPH

Mean Speed(Average) : 30 MPH
 10 MPH Pace Speed : 25-34 MPH
 Number in Pace : 2166
 Percent in Pace : 68.8%
 Number of Vehicles > 30 MPH : 1566
 Percent of Vehicles > 30 MPH : 49.7%

Railroad Avenue
west of Highland Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

175453 C Volume
Site Code: 9393.01

Start Time	EB		WB		Combin ed		01/25/17 Wed
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
12:00	0	20	0	20	0	40	
12:15	0	6	0	17	0	23	
12:30	1	10	1	46	2	56	
12:45	0	1 37	73	0 1 9	92	0 2 46	165
01:00	1	24	0	13	1	37	
01:15	0	11	0	28	0	39	
01:30	0	8	0	8	0	16	
01:45	0	1 7	50	0 0 18	67	0 1 25	117
02:00	0	23	0	14	0	37	
02:15	0	23	0	17	0	40	
02:30	0	35	0	13	0	48	
02:45	0	0 21	102	0 0 14	58	0 0 35	160
03:00	0	22	0	21	0	43	
03:15	0	17	0	20	0	37	
03:30	0	27	0	15	0	42	
03:45	0	0 36	102	0 0 26	82	0 0 62	184
04:00	0	26	0	25	0	51	
04:15	0	19	0	29	0	48	
04:30	0	23	0	25	0	48	
04:45	1	1 27	95	0 0 32	111	1 1 59	206
05:00	1	36	0	34	1	70	
05:15	0	24	0	37	0	61	
05:30	4	25	0	34	4	59	
05:45	1	6 19	104	2 2 48	153	3 8 67	257
06:00	6	21	3	39	9	60	
06:15	8	14	1	32	9	46	
06:30	11	6	6	13	17	19	
06:45	16	41 7	48	14 24 16	100	30 65 23	148
07:00	29	12	25	7	54	19	
07:15	56	6	88	13	144	19	
07:30	86	8	56	8	142	16	
07:45	39	210 10	36	10 179 14	42	49 389 24	78
08:00	34	2	10	5	44	7	
08:15	46	1	12	4	58	5	
08:30	41	5	6	4	47	9	
08:45	36	157 3	11	9 37 7	20	45 194 10	31
09:00	43	5	11	4	54	9	
09:15	25	3	8	4	33	7	
09:30	12	3	7	7	19	10	
09:45	9	89 0	11	8 34 1	16	17 123 1	27
10:00	11	0	7	1	18	1	
10:15	16	0	6	1	22	1	
10:30	7	1	7	0	14	1	
10:45	5	39 0	1	4 24 1	3	9 63 1	4
11:00	13	1	8	0	21	1	
11:15	6	0	9	0	15	0	
11:30	9	1	10	1	19	2	
11:45	15	43 0	2	11 38 0	1	26 81 0	3
Total	588	635	339	745	927	1380	
Percent	63.4%	46.0%	36.6%	54.0%			
Day Total		1223		1084		2307	
Peak	07:15	- 04:45	- 06:45	- 05:15	- 07:00	- 05:00	- - -
Vol.	215	- 112	- 183	- 158	- 389	- 257	- - -
P.H.F.	0.625	0.778	0.520	0.823	0.675	0.918	

Railroad Avenue
west of Highland Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
D A T A
INDUSTRIES, LLC

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Email: datarequests@pdillc.com

175453 C Volume
Site Code: 9393.01

Start Time	EB		WB		Combin ed		01/26/17 Thu						
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.							
12:00	0	14	0	6	0	20							
12:15	0	11	0	8	0	19							
12:30	0	7	0	9	0	16							
12:45	0	12	44	0	0	16	83						
01:00	0	16	0	12	0	28							
01:15	0	9	0	11	0	20							
01:30	0	13	1	9	1	22							
01:45	0	14	52	0	1	13	45	0	1	27	97		
02:00	0	11	0	50	0	61							
02:15	0	40	0	17	0	57							
02:30	0	27	0	23	0	50							
02:45	0	16	94	0	0	16	106	0	0	32	200		
03:00	0	15	0	29	0	44							
03:15	0	23	0	27	0	50							
03:30	0	37	0	34	0	71							
03:45	0	62	137	0	0	40	130	0	0	102	267		
04:00	0	31	0	29	0	60							
04:15	0	29	0	35	0	64							
04:30	0	30	0	32	0	62							
04:45	0	39	129	0	0	40	136	0	0	79	265		
05:00	0	19	2	40	2	59							
05:15	1	25	0	45	1	70							
05:30	2	30	0	46	2	76							
05:45	4	7	27	101	3	5	44	175	7	12	71	276	
06:00	5	10	4	41	9	51							
06:15	5	13	5	26	10	39							
06:30	12	18	3	24	15	42							
06:45	19	41	7	48	18	30	20	111	37	71	27	159	
07:00	24	6	27	13	51	19							
07:15	51	4	95	14	146	18							
07:30	90	18	55	6	145	24							
07:45	45	210	2	30	12	189	4	37	57	399	6	67	
08:00	42	4	11	2	53	6							
08:15	32	10	10	10	42	20							
08:30	37	6	4	1	41	7							
08:45	49	160	0	20	14	39	7	20	63	199	7	40	
09:00	55	3	14	3	69	6							
09:15	21	5	5	0	26	5							
09:30	12	0	6	2	18	2							
09:45	14	102	0	8	6	31	0	5	20	133	0	13	
10:00	13	0	11	0	24	0							
10:15	15	1	7	1	22	2							
10:30	3	2	7	1	10	3							
10:45	10	41	1	4	14	39	1	3	24	80	2	7	
11:00	8	1	11	1	19	2							
11:15	5	0	10	0	15	0							
11:30	3	0	9	2	12	2							
11:45	13	29	0	1	12	42	0	3	25	71	0	4	
Total	590	668	376	810	966	1478							
Percent	61.1%	45.2%	38.9%	54.8%									
Day Total		1258		1186		2444							
Peak	07:15	-	03:30	-	06:45	-	05:15	-	07:15	-	03:30	-	-
Vol.	228	-	159	-	195	-	176	-	401	-	297	-	-
P.H.F.	0.633	-	0.641	-	0.513	-	0.957	-	0.687	-	0.728	-	-

Railroad Avenue
west of Highland Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

175453 C Class
Site Code: 9393.01

EB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/25/17	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	6	0	0	0	0	0	0	0	0	0	0	0	0	6
06:00	0	30	7	0	2	0	0	0	0	0	0	0	0	2	41
07:00	0	164	27	8	6	1	0	0	0	0	0	0	0	4	210
08:00	0	141	11	4	1	0	0	0	0	0	0	0	0	0	157
09:00	1	73	8	6	1	0	0	0	0	0	0	0	0	0	89
10:00	1	33	2	0	1	0	0	0	0	0	0	0	0	2	39
11:00	0	33	8	0	0	0	0	0	0	0	0	0	0	2	43
12 PM	0	63	5	0	3	0	0	0	0	0	0	0	0	2	73
13:00	0	44	4	0	0	2	0	0	0	0	0	0	0	0	50
14:00	0	91	6	1	2	0	0	0	0	0	0	0	0	2	102
15:00	0	95	4	0	1	0	0	0	0	0	0	0	0	2	102
16:00	0	83	9	0	1	0	0	0	0	0	0	0	0	2	95
17:00	0	97	4	0	2	0	0	0	0	0	0	0	0	1	104
18:00	0	37	7	0	2	0	0	0	0	0	0	0	0	2	48
19:00	0	28	7	0	0	0	0	0	0	0	0	0	0	1	36
20:00	0	9	2	0	0	0	0	0	0	0	0	0	0	0	11
21:00	0	7	4	0	0	0	0	0	0	0	0	0	0	0	11
22:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
23:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	2	1038	116	19	23	3	0	0	0	0	0	0	0	22	1223
Percent	0.2%	84.9%	9.5%	1.6%	1.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	
AM Peak	09:00	07:00	07:00	07:00	07:00	07:00								07:00	07:00
Vol.	1	164	27	8	6	1								4	210
PM Peak		17:00	16:00	14:00	12:00	13:00								12:00	17:00
Vol.		97	9	1	3	2								2	104

Railroad Avenue
west of Highland Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey



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175453 C Class
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EB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/26/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	5	2	0	0	0	0	0	0	0	0	0	0	0	7
06:00	0	31	5	0	2	1	0	0	0	0	0	0	0	2	41
07:00	0	178	18	8	2	0	0	0	0	0	0	0	0	4	210
08:00	0	144	11	3	2	0	0	0	0	0	0	0	0	0	160
09:00	0	88	9	3	1	0	0	0	0	0	0	0	0	1	102
10:00	0	37	3	0	1	0	0	0	0	0	0	0	0	0	41
11:00	0	26	2	0	0	0	0	0	0	0	0	0	0	1	29
12 PM	0	41	1	0	0	0	0	0	0	0	0	0	0	2	44
13:00	0	50	1	0	1	0	0	0	0	0	0	0	0	0	52
14:00	0	81	7	0	3	1	0	0	0	0	0	0	0	2	94
15:00	0	128	4	0	0	0	0	0	0	0	0	0	0	5	137
16:00	0	114	9	1	1	0	0	0	0	0	0	0	0	4	129
17:00	0	90	5	0	3	0	0	0	0	0	0	0	0	3	101
18:00	0	44	4	0	0	0	0	0	0	0	0	0	0	0	48
19:00	0	28	1	0	0	0	0	0	0	0	0	0	0	1	30
20:00	0	17	2	1	0	0	0	0	0	0	0	0	0	0	20
21:00	0	5	2	0	0	0	0	0	0	0	0	0	0	1	8
22:00	0	3	0	0	1	0	0	0	0	0	0	0	0	0	4
23:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1110	87	16	17	2	0	0	0	0	0	0	0	26	1258
Percent	0.0%	88.2%	6.9%	1.3%	1.4%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	
AM Peak		07:00	07:00	07:00	06:00	06:00								07:00	07:00
Vol.		178	18	8	2	1								4	210
PM Peak		15:00	16:00	16:00	14:00	14:00								15:00	15:00
Vol.		128	9	1	3	1								5	137

Railroad Avenue
west of Highland Avenue
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WB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/25/17	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
06:00	0	16	2	1	5	0	0	0	0	0	0	0	0	0	24
07:00	0	120	40	10	8	0	0	0	0	0	0	0	0	1	179
08:00	0	25	8	1	3	0	0	0	0	0	0	0	0	0	37
09:00	0	22	8	0	3	0	0	0	0	0	0	0	0	1	34
10:00	0	18	2	0	3	0	0	0	0	0	0	0	0	1	24
11:00	0	27	8	0	3	0	0	0	0	0	0	0	0	0	38
12 PM	0	53	18	18	3	0	0	0	0	0	0	0	0	0	92
13:00	1	45	13	5	0	0	0	0	0	0	0	0	0	3	67
14:00	0	45	9	1	2	0	0	0	0	0	0	0	0	1	58
15:00	0	63	13	0	5	0	0	0	0	0	0	0	0	1	82
16:00	0	87	14	1	8	0	0	0	0	0	0	0	0	1	111
17:00	0	121	27	0	4	1	0	0	0	0	0	0	0	0	153
18:00	0	84	15	0	1	0	0	0	0	0	0	0	0	0	100
19:00	0	37	4	0	0	0	0	0	0	0	0	0	0	1	42
20:00	0	16	4	0	0	0	0	0	0	0	0	0	0	0	20
21:00	0	12	4	0	0	0	0	0	0	0	0	0	0	0	16
22:00	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	1	797	190	37	48	1	0	0	0	0	0	0	0	10	1084
Percent	0.1%	73.5%	17.5%	3.4%	4.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	
AM Peak		07:00	07:00	07:00	07:00									07:00	07:00
Vol.		120	40	10	8									1	179
PM Peak	13:00	17:00	17:00	12:00	16:00	17:00								13:00	17:00
Vol.	1	121	27	18	8	1								3	153

Railroad Avenue
west of Highland Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

175453 C Class
Site Code: 9393.01

WB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/26/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	3	1	0	0	1	0	0	0	0	0	0	0	0	5
06:00	0	20	3	2	5	0	0	0	0	0	0	0	0	0	30
07:00	1	134	37	9	4	1	0	0	0	0	0	0	0	3	189
08:00	0	27	8	1	3	0	0	0	0	0	0	0	0	0	39
09:00	0	19	7	1	2	0	0	0	0	0	0	0	0	2	31
10:00	0	27	8	0	3	1	0	0	0	0	0	0	0	0	39
11:00	0	34	7	0	1	0	0	0	0	0	0	0	0	0	42
12 PM	0	32	6	0	1	0	0	0	0	0	0	0	0	0	39
13:00	0	29	13	0	2	0	0	0	0	0	0	0	0	1	45
14:00	1	71	13	17	3	0	0	0	0	0	0	0	0	1	106
15:00	0	102	21	4	3	0	0	0	0	0	0	0	0	0	130
16:00	0	108	22	3	3	0	0	0	0	0	0	0	0	0	136
17:00	1	145	24	0	3	0	0	0	0	0	0	0	0	2	175
18:00	0	91	15	0	4	0	0	0	0	0	0	0	0	1	111
19:00	0	25	9	0	1	0	0	0	0	0	0	0	0	2	37
20:00	0	15	5	0	0	0	0	0	0	0	0	0	0	0	20
21:00	0	3	1	0	1	0	0	0	0	0	0	0	0	0	5
22:00	0	1	1	0	1	0	0	0	0	0	0	0	0	0	3
23:00	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
Total	3	889	202	37	40	3	0	0	0	0	0	0	0	12	1186
Percent	0.3%	75.0%	17.0%	3.1%	3.4%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	
AM Peak	07:00	07:00	07:00	07:00	06:00	05:00								07:00	07:00
Vol.	1	134	37	9	5	1								3	189
PM Peak	14:00	17:00	17:00	14:00	18:00									17:00	17:00
Vol.	1	145	24	17	4									2	175

Railroad Avenue
west of Highland Avenue
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175453 C Speed
Site Code: 9393.01

EB	Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed	
01/25/																		
17	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	28	27	
01:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	38	37	
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	23	22	
05:00	0	1	0	3	1	1	0	0	0	0	0	0	0	0	6	34	28	
06:00	1	2	2	20	14	2	0	0	0	0	0	0	0	0	41	32	28	
07:00	14	12	38	86	57	3	0	0	0	0	0	0	0	0	210	31	26	
08:00	0	1	7	59	82	7	1	0	0	0	0	0	0	0	157	33	30	
09:00	0	2	4	39	42	2	0	0	0	0	0	0	0	0	89	32	29	
10:00	0	3	2	10	21	3	0	0	0	0	0	0	0	0	39	33	29	
11:00	0	2	4	17	18	2	0	0	0	0	0	0	0	0	43	32	29	
12 PM	5	0	6	17	42	3	0	0	0	0	0	0	0	0	73	33	29	
13:00	1	2	14	16	17	0	0	0	0	0	0	0	0	0	50	31	27	
14:00	0	1	10	28	62	1	0	0	0	0	0	0	0	0	102	32	30	
15:00	0	2	9	55	34	2	0	0	0	0	0	0	0	0	102	32	28	
16:00	0	2	5	38	48	2	0	0	0	0	0	0	0	0	95	32	29	
17:00	0	2	13	51	36	2	0	0	0	0	0	0	0	0	104	32	28	
18:00	0	1	1	22	20	4	0	0	0	0	0	0	0	0	48	33	30	
19:00	1	1	4	20	10	0	0	0	0	0	0	0	0	0	36	31	27	
20:00	0	0	3	5	3	0	0	0	0	0	0	0	0	0	11	31	27	
21:00	1	0	1	4	4	1	0	0	0	0	0	0	0	0	11	33	28	
22:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	28	27	
23:00	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	32	30	
Total	23	34	124	493	512	36	1	0	0	0	0	0	0	0	1223			
%	1.9%	2.8%	10.1%	40.3%	41.9%	2.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	07:00	07:00	07:00	07:00	08:00	08:00	08:00									07:00		
Vol.	14	12	38	86	82	7	1									210		
PM Peak	12:00	13:00	13:00	15:00	14:00	18:00									17:00			
Vol.	5	2	14	55	62	4									104			

Stats

15th Percentile : 24 MPH
50th Percentile : 28 MPH
85th Percentile : 32 MPH
95th Percentile : 33 MPH

Mean Speed(Average) : 28 MPH
10 MPH Pace Speed : 25-34 MPH
Number in Pace : 1005
Percent in Pace : 82.2%
Number of Vehicles > 25 MPH : 943
Percent of Vehicles > 25 MPH : 77.1%

Railroad Avenue
west of Highland Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey



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175453 C Speed
Site Code: 9393.01

EB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
01/26/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	1	0	2	2	1	1	0	0	0	0	0	0	0	7	33	25
06:00	1	2	7	19	10	2	0	0	0	0	0	0	0	41	31	27
07:00	1	11	31	102	62	3	0	0	0	0	0	0	0	210	31	27
08:00	1	2	10	84	58	5	0	0	0	0	0	0	0	160	32	29
09:00	0	4	19	59	20	0	0	0	0	0	0	0	0	102	30	27
10:00	0	5	2	20	13	1	0	0	0	0	0	0	0	41	32	27
11:00	1	0	1	8	19	0	0	0	0	0	0	0	0	29	32	29
12 PM	1	0	3	24	15	1	0	0	0	0	0	0	0	44	32	28
13:00	0	0	4	30	13	4	1	0	0	0	0	0	0	52	32	29
14:00	0	2	5	57	28	2	0	0	0	0	0	0	0	94	31	28
15:00	3	1	13	53	67	0	0	0	0	0	0	0	0	137	32	28
16:00	8	7	20	49	45	0	0	0	0	0	0	0	0	129	31	26
17:00	1	0	14	40	45	1	0	0	0	0	0	0	0	101	32	28
18:00	1	0	0	26	21	0	0	0	0	0	0	0	0	48	32	29
19:00	0	0	4	17	9	0	0	0	0	0	0	0	0	30	31	28
20:00	0	1	3	9	6	0	1	0	0	0	0	0	0	20	32	28
21:00	1	0	0	4	3	0	0	0	0	0	0	0	0	8	32	26
22:00	0	0	0	3	1	0	0	0	0	0	0	0	0	4	31	28
23:00	0	0	0	0	0	1	0	0	0	0	0	0	0	1	38	37
Total	20	35	138	606	436	21	2	0	0	0	0	0	0	1258		
%	1.6%	2.8%	11.0%	48.2%	34.7%	1.7%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	05:00	07:00	07:00	07:00	07:00	08:00								07:00		
Vol.	1	11	31	102	62	5								210		
PM Peak	16:00	16:00	16:00	14:00	15:00	13:00	13:00							15:00		
Vol.	8	7	20	57	67	4	1							137		

Stats

15th Percentile : 23 MPH
50th Percentile : 27 MPH
85th Percentile : 32 MPH
95th Percentile : 33 MPH

Mean Speed(Average) : 28 MPH
10 MPH Pace Speed : 25-34 MPH
Number in Pace : 1042
Percent in Pace : 82.8%
Number of Vehicles > 25 MPH : 944
Percent of Vehicles > 25 MPH : 75.0%

Railroad Avenue
west of Highland Avenue
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
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INDUSTRIES, LLC

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175453 C Speed
Site Code: 9393.01

WB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
01/25/17	0	0	0	1	0	0	0	0	0	0	0	0	0	1	28	27
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	0	0	0	0	2	0	0	0	0	0	0	0	0	2	33	32
06:00	0	0	1	8	13	2	0	0	0	0	0	0	0	24	33	30
07:00	3	2	8	70	75	21	0	0	0	0	0	0	0	179	33	30
08:00	0	1	1	6	15	11	3	0	0	0	0	0	0	37	37	33
09:00	0	1	6	5	15	6	1	0	0	0	0	0	0	34	35	30
10:00	2	0	0	7	8	7	0	0	0	0	0	0	0	24	36	30
11:00	2	0	4	5	15	12	0	0	0	0	0	0	0	38	36	31
12 PM	0	0	6	26	39	19	2	0	0	0	0	0	0	92	35	31
13:00	2	6	6	29	22	2	0	0	0	0	0	0	0	67	32	27
14:00	1	0	2	13	31	8	3	0	0	0	0	0	0	58	35	31
15:00	0	1	7	16	41	16	1	0	0	0	0	0	0	82	35	31
16:00	1	0	4	30	56	18	2	0	0	0	0	0	0	111	34	31
17:00	0	0	3	55	80	14	1	0	0	0	0	0	0	153	33	31
18:00	0	1	4	52	36	6	1	0	0	0	0	0	0	100	32	29
19:00	0	1	4	16	17	4	0	0	0	0	0	0	0	42	33	29
20:00	0	1	3	7	8	1	0	0	0	0	0	0	0	20	32	28
21:00	0	1	2	4	7	2	0	0	0	0	0	0	0	16	33	29
22:00	0	1	0	1	1	0	0	0	0	0	0	0	0	3	31	25
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18	17
Total	11	17	61	351	481	149	14	0	0	0	0	0	0	1084		
%	1.0%	1.6%	5.6%	32.4%	44.4%	13.7%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	07:00	07:00	07:00	07:00	07:00	08:00							07:00		
Vol.	3	2	8	70	75	21	3							179		
PM Peak	13:00	13:00	15:00	17:00	17:00	12:00	14:00							17:00		
Vol.	2	6	7	55	80	19	3							153		

Stats

15th Percentile : 25 MPH
50th Percentile : 30 MPH
85th Percentile : 34 MPH
95th Percentile : 37 MPH

Mean Speed(Average) : 30 MPH
10 MPH Pace Speed : 25-34 MPH
Number in Pace : 832
Percent in Pace : 76.8%
Number of Vehicles > 25 MPH : 925
Percent of Vehicles > 25 MPH : 85.3%

Railroad Avenue
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175453 C Speed
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WB

Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed		
01/26/																														
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	33	32		
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
05:00	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	35	28		
06:00	0	0	2	12	13	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	33	30		
07:00	1	2	15	92	63	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	189	33	29		
08:00	0	1	0	13	20	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	33	31		
09:00	1	2	6	9	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	32	27		
10:00	1	0	1	9	21	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	34	31		
11:00	0	0	1	9	19	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	37	32		
12 PM	0	0	3	8	16	10	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	37	32		
13:00	0	1	3	18	19	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	33	29		
14:00	2	0	8	42	42	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	106	33	29		
15:00	0	1	4	35	71	15	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	130	33	31		
16:00	0	1	8	50	66	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136	33	30		
17:00	2	0	18	63	76	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	175	33	29		
18:00	1	0	1	45	47	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	34	30		
19:00	2	0	3	9	21	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	33	29		
20:00	0	0	3	5	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	35	30		
21:00	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	32	30		
22:00	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	33	32		
23:00	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	31	25		
Total	10	9	78	423	522	131	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1186				
%	0.8%	0.8%	6.6%	35.7%	44.0%	11.0%	0.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%					
AM Peak	07:00	07:00	07:00	07:00	07:00	07:00	11:00																				07:00			
Vol.	1	2	15	92	63	15	2																				189			
PM Peak	14:00	13:00	17:00	17:00	17:00	18:00	15:00	12:00																				17:00		
Vol.	2	1	18	63	76	17	3	1																				175		

Stats

15th Percentile : 24 MPH
50th Percentile : 29 MPH
85th Percentile : 33 MPH
95th Percentile : 37 MPH

Mean Speed(Average) : 30 MPH
10 MPH Pace Speed : 25-34 MPH
Number in Pace : 945
Percent in Pace : 79.7%
Number of Vehicles > 25 MPH : 1004
Percent of Vehicles > 25 MPH : 84.7%

Hartwell Road
 south of Concord Road (Route 62)
 City, State: Bedford, MA
 Client: VHB/ A. Dempsey



PRECISION
 D A T A
 INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
 Office: 508-875-0100 Fax: 508-875-0118
 Email: datarequests@pdillc.com

175453 D Volume
 Site Code: 9393.01

Start Time	NB		SB		Combin ed		01/25/17 Wed					
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.						
12:00	8	14	0	9	8	23						
12:15	2	12	1	6	3	18						
12:30	0	15	0	17	0	32						
12:45	2	14	55	0	1	28	60	13	42	115		
01:00	5	12	0	17	5	29						
01:15	1	24	1	21	2	45						
01:30	0	40	0	12	0	52						
01:45	0	6	11	87	0	1	19	69	0	7	30	156
02:00	7	24	0	25	7	49						
02:15	0	35	0	19	0	54						
02:30	0	49	0	11	0	60						
02:45	0	7	29	137	0	0	13	68	0	7	42	205
03:00	0	27	0	19	0	46						
03:15	0	38	0	26	0	64						
03:30	0	72	1	29	1	101						
03:45	0	0	34	171	3	4	26	100	3	4	60	271
04:00	0	48	3	20	3	68						
04:15	2	49	2	26	4	75						
04:30	0	67	9	32	9	99						
04:45	1	3	44	208	37	51	44	122	38	54	88	330
05:00	1	95	14	19	15	114						
05:15	0	59	8	24	8	83						
05:30	2	47	13	24	15	71						
05:45	2	5	74	275	35	70	31	98	37	75	105	373
06:00	1	53	33	28	34	81						
06:15	1	41	24	15	25	56						
06:30	8	17	25	22	33	39						
06:45	8	18	19	130	35	117	21	86	43	135	40	216
07:00	7	20	44	14	51	34						
07:15	18	17	53	9	71	26						
07:30	26	13	66	14	92	27						
07:45	14	65	25	75	61	224	29	66	75	289	54	141
08:00	19	37	61	14	80	51						
08:15	19	23	64	9	83	32						
08:30	15	13	60	6	75	19						
08:45	18	71	1	74	55	240	18	47	73	311	19	121
09:00	15	20	43	9	58	29						
09:15	6	4	23	3	29	7						
09:30	10	2	23	6	33	8						
09:45	8	39	2	28	13	102	10	28	21	141	12	56
10:00	11	9	14	8	25	17						
10:15	7	8	12	3	19	11						
10:30	12	16	7	3	19	19						
10:45	13	43	4	37	11	44	1	15	24	87	5	52
11:00	7	10	8	2	15	12						
11:15	7	4	7	1	14	5						
11:30	19	1	13	0	32	1						
11:45	9	42	15	30	15	43	1	4	24	85	16	34
Total	311		1307		897		763		1208		2070	
Percent	25.7%		63.1%		74.3%		36.9%					
Day Total		1618		1660		3278						
Peak	07:30	-	05:00	-	07:30	-	04:00	-	07:30	-	04:30	-
Vol.	78	-	275	-	252	-	122	-	330	-	384	-
P.H.F.	0.750		0.724		0.955		0.693		0.897		0.842	

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175453 D Volume
 Site Code: 9393.01

Start Time	NB		SB		Combin ed		01/26/17 Thu
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
12:00	6	14	0	14	6	28	
12:15	0	21	0	8	0	29	
12:30	0	10	0	10	0	20	
12:45	0	6 15	60	1 17	49	32	109
01:00	11	16	0	15	11	31	
01:15	1	29	1	17	2	46	
01:30	1	29	0	17	1	46	
01:45	1	14 17	91	0 1 24	73	1 41	164
02:00	0	16	0	22	0	38	
02:15	0	31	0	37	0	68	
02:30	0	47	0	23	0	70	
02:45	0	0 33	127	0 0 16	98	0 49	225
03:00	0	28	0	9	0	37	
03:15	0	35	0	20	0	55	
03:30	1	51	3	8	4	59	
03:45	1	2 45	159	2 5 18	55	3 63	214
04:00	0	62	3	19	3	81	
04:15	1	50	2	18	3	68	
04:30	0	61	11	22	11	83	
04:45	1	2 47	220	35 51 28	87	36 75	307
05:00	1	76	14	16	15	92	
05:15	6	64	19	24	25	88	
05:30	2	70	13	28	15	98	
05:45	3	12 42	252	35 81 43	111	38 85	363
06:00	1	59	33	19	34	78	
06:15	3	38	11	11	14	49	
06:30	5	23	32	15	37	38	
06:45	12	21 18	138	42 118 23	68	54 41	206
07:00	11	22	38	20	49	42	
07:15	21	28	45	18	66	46	
07:30	21	33	61	15	82	48	
07:45	7	60 15	98	72 216 7	60	79 22	158
08:00	28	7	57	15	85	22	
08:15	13	22	69	10	82	32	
08:30	14	17	46	8	60	25	
08:45	25	80 5	51	64 236 8	41	89 13	92
09:00	15	5	42	8	57	13	
09:15	8	7	25	12	33	19	
09:30	7	12	18	3	25	15	
09:45	6	36 4	28	13 98 2	25	19 6	53
10:00	12	4	11	2	23	6	
10:15	4	3	10	12	14	15	
10:30	11	15	12	5	23	20	
10:45	7	34 5	27	13 46 1	20	20 6	47
11:00	7	7	7	2	14	9	
11:15	16	0	8	3	24	3	
11:30	14	18	12	0	26	18	
11:45	12	49 2	27	5 32 2	7	17 4	34
Total	316	1278	885	694	1201	1972	
Percent	26.3%	64.8%	73.7%	35.2%			
Day Total		1594		1579		3173	
Peak	08:00	- 04:45	- 07:30	- 05:15	- 07:30	- 05:00	- - -
Vol.	80	- 257	- 259	- 114	- 328	- 363	- - -
P.H.F.	0.714	0.845	0.899	0.663	0.965	0.926	

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175453 D Class
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NB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/25/17	0	11	0	0	1	0	0	0	0	0	0	0	0	0	12
01:00	0	6	0	0	0	0	0	0	0	0	0	0	0	0	6
02:00	0	6	1	0	0	0	0	0	0	0	0	0	0	0	7
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
05:00	0	4	1	0	0	0	0	0	0	0	0	0	0	0	5
06:00	0	10	8	0	0	0	0	0	0	0	0	0	0	0	18
07:00	1	49	9	2	3	0	0	0	0	0	0	0	0	1	65
08:00	0	56	8	2	5	0	0	0	0	0	0	0	0	0	71
09:00	0	28	8	0	1	0	0	1	0	0	0	0	0	1	39
10:00	0	38	3	0	2	0	0	0	0	0	0	0	0	0	43
11:00	0	34	8	0	0	0	0	0	0	0	0	0	0	0	42
12 PM	0	48	6	0	1	0	0	0	0	0	0	0	0	0	55
13:00	0	76	8	1	1	0	0	0	0	0	0	0	0	1	87
14:00	0	121	10	2	3	0	0	0	0	0	0	0	0	1	137
15:00	0	147	18	2	3	0	0	0	0	0	0	0	0	1	171
16:00	0	172	29	2	5	0	0	0	0	0	0	0	0	0	208
17:00	0	257	18	0	0	0	0	0	0	0	0	0	0	0	275
18:00	0	107	21	1	1	0	0	0	0	0	0	0	0	0	130
19:00	0	56	18	0	1	0	0	0	0	0	0	0	0	0	75
20:00	0	52	20	0	2	0	0	0	0	0	0	0	0	0	74
21:00	0	26	1	1	0	0	0	0	0	0	0	0	0	0	28
22:00	0	31	5	0	1	0	0	0	0	0	0	0	0	0	37
23:00	0	25	4	0	1	0	0	0	0	0	0	0	0	0	30
Total	1	1362	205	13	31	0	0	1	0	0	0	0	0	5	1618
Percent	0.1%	84.2%	12.7%	0.8%	1.9%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	
AM Peak	07:00	08:00	07:00	07:00	08:00			09:00						07:00	08:00
Vol.	1	56	9	2	5			1						1	71
PM Peak		17:00	16:00	14:00	16:00									13:00	17:00
Vol.		257	29	2	5									1	275

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175453 D Class
 Site Code: 9393.01

NB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/26/17	0	4	2	0	0	0	0	0	0	0	0	0	0	0	6
01:00	0	12	2	0	0	0	0	0	0	0	0	0	0	0	14
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
05:00	0	9	2	0	1	0	0	0	0	0	0	0	0	0	12
06:00	0	14	7	0	0	0	0	0	0	0	0	0	0	0	21
07:00	0	43	9	3	4	0	0	0	0	0	0	0	0	1	60
08:00	1	59	11	2	5	1	0	0	0	0	0	0	0	1	80
09:00	0	29	6	0	0	0	0	0	0	0	0	0	0	1	36
10:00	0	27	2	1	4	0	0	0	0	0	0	0	0	0	34
11:00	0	36	12	1	0	0	0	0	0	0	0	0	0	0	49
12 PM	0	47	7	0	3	1	0	0	0	0	0	0	0	2	60
13:00	0	79	9	1	2	0	0	0	0	0	0	0	0	0	91
14:00	0	111	11	1	4	0	0	0	0	0	0	0	0	0	127
15:00	0	132	22	1	4	0	0	0	0	0	0	0	0	0	159
16:00	1	191	26	0	2	0	0	0	0	0	0	0	0	0	220
17:00	0	229	21	0	2	0	0	0	0	0	0	0	0	0	252
18:00	0	122	15	0	1	0	0	0	0	0	0	0	0	0	138
19:00	0	81	16	0	1	0	0	0	0	0	0	0	0	0	98
20:00	0	42	7	0	2	0	0	0	0	0	0	0	0	0	51
21:00	0	23	4	0	1	0	0	0	0	0	0	0	0	0	28
22:00	0	26	1	0	0	0	0	0	0	0	0	0	0	0	27
23:00	0	26	1	0	0	0	0	0	0	0	0	0	0	0	27
Total	2	1345	194	10	36	2	0	0	0	0	0	0	0	5	1594
Percent	0.1%	84.4%	12.2%	0.6%	2.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	
AM Peak	08:00	08:00	11:00	07:00	08:00	08:00								07:00	08:00
Vol.	1	59	12	3	5	1								1	80
PM Peak	16:00	17:00	16:00	13:00	14:00	12:00								12:00	17:00
Vol.	1	229	26	1	4	1								2	252

Hartwell Road
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SB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/25/17	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	3	0	0	1	0	0	0	0	0	0	0	0	0	4
04:00	0	35	13	0	3	0	0	0	0	0	0	0	0	0	51
05:00	0	47	16	1	6	0	0	0	0	0	0	0	0	0	70
06:00	2	80	24	2	7	2	0	0	0	0	0	0	0	0	117
07:00	0	148	60	0	15	0	0	1	0	0	0	0	0	0	224
08:00	0	173	59	1	7	0	0	0	0	0	0	0	0	0	240
09:00	0	77	19	0	5	0	0	0	0	0	0	0	0	1	102
10:00	1	31	7	3	2	0	0	0	0	0	0	0	0	0	44
11:00	0	32	8	0	3	0	0	0	0	0	0	0	0	0	43
12 PM	0	42	11	0	5	0	0	1	0	0	0	0	0	1	60
13:00	1	50	12	0	4	0	0	0	0	0	0	0	0	2	69
14:00	0	46	14	3	4	0	0	1	0	0	0	0	0	0	68
15:00	0	56	32	5	6	0	0	0	0	0	0	0	0	1	100
16:00	0	80	36	0	6	0	0	0	0	0	0	0	0	0	122
17:00	0	54	36	0	8	0	0	0	0	0	0	0	0	0	98
18:00	0	50	31	0	5	0	0	0	0	0	0	0	0	0	86
19:00	0	41	21	1	3	0	0	0	0	0	0	0	0	0	66
20:00	0	27	17	1	2	0	0	0	0	0	0	0	0	0	47
21:00	0	16	9	0	3	0	0	0	0	0	0	0	0	0	28
22:00	0	8	5	0	2	0	0	0	0	0	0	0	0	0	15
23:00	0	3	1	0	0	0	0	0	0	0	0	0	0	0	4
Total	4	1100	432	17	97	2	0	3	0	0	0	0	0	5	1660
Percent	0.2%	66.3%	26.0%	1.0%	5.8%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	
AM Peak	06:00	08:00	07:00	10:00	07:00	06:00		07:00						09:00	08:00
Vol.	2	173	60	3	15	2		1						1	240
PM Peak	13:00	16:00	16:00	15:00	17:00			12:00						13:00	16:00
Vol.	1	80	36	5	8			1						2	122

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SB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/26/17	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	4	1	0	0	0	0	0	0	0	0	0	0	0	5
04:00	0	37	12	0	2	0	0	0	0	0	0	0	0	0	51
05:00	0	55	20	0	6	0	0	0	0	0	0	0	0	0	81
06:00	2	77	25	1	11	1	0	1	0	0	0	0	0	0	118
07:00	0	152	54	0	9	1	0	0	0	0	0	0	0	0	216
08:00	0	176	54	0	6	0	0	0	0	0	0	0	0	0	236
09:00	0	71	21	3	3	0	0	0	0	0	0	0	0	0	98
10:00	0	28	8	0	3	0	0	2	1	0	0	0	0	0	46
11:00	0	24	7	0	1	0	0	0	0	0	0	0	0	0	32
12 PM	0	34	9	0	5	1	0	0	0	0	0	0	0	0	49
13:00	0	47	17	1	8	0	0	0	0	0	0	0	0	0	73
14:00	0	74	18	0	5	0	0	0	0	0	0	0	0	1	98
15:00	0	28	21	1	5	0	0	0	0	0	0	0	0	0	55
16:00	0	48	36	0	3	0	0	0	0	0	0	0	0	0	87
17:00	0	64	42	0	5	0	0	0	0	0	0	0	0	0	111
18:00	0	38	23	0	7	0	0	0	0	0	0	0	0	0	68
19:00	0	45	10	0	5	0	0	0	0	0	0	0	0	0	60
20:00	0	32	6	0	3	0	0	0	0	0	0	0	0	0	41
21:00	0	18	6	0	1	0	0	0	0	0	0	0	0	0	25
22:00	0	13	6	0	1	0	0	0	0	0	0	0	0	0	20
23:00	0	4	3	0	0	0	0	0	0	0	0	0	0	0	7
Total	2	1071	399	6	89	3	0	3	1	0	0	0	0	5	1579
Percent	0.1%	67.8%	25.3%	0.4%	5.6%	0.2%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.3%	
AM Peak	06:00	08:00	07:00	09:00	06:00	06:00		10:00	10:00					10:00	08:00
Vol.	2	176	54	3	11	1		2	1					4	236
PM Peak		14:00	17:00	13:00	13:00	12:00								14:00	17:00
Vol.		74	42	1	8	1								1	111

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175453 D Speed
 Site Code: 9393.01

NB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
01/25/	17	0	0	0	2	0	0	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	36	32
01:00	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	33	28
02:00	0	0	0	0	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	37	33
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
04:00	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	36	32	
05:00	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	30	28	
06:00	0	0	0	1	8	7	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	33	30	
07:00	0	3	5	16	28	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	35	30	
08:00	2	2	3	15	33	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	35	31	
09:00	2	1	1	6	15	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	37	31	
10:00	0	1	2	6	25	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	35	32	
11:00	2	0	2	9	25	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	33	30	
12 PM	1	3	4	13	26	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	33	30	
13:00	3	0	5	20	53	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	87	33	30	
14:00	1	3	3	26	85	17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137	33	31	
15:00	2	3	4	32	100	29	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	34	31	
16:00	0	5	14	57	88	39	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	208	35	31	
17:00	0	1	7	75	163	28	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	275	33	31	
18:00	0	0	3	41	68	17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	130	33	31	
19:00	1	1	2	14	35	18	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	36	32	
20:00	3	0	9	16	32	12	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74	35	30	
21:00	0	0	0	9	11	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	37	32	
22:00	0	1	0	4	13	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	37	34	
23:00	1	0	1	5	8	14	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	37	33	
Total	19	24	68	378	832	268	27	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1618			
%	1.2%	1.5%	4.2%	23.4%	51.4%	16.6%	1.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	08:00	07:00	07:00	07:00	08:00	08:00	06:00																				08:00		
Vol.	2	3	5	16	33	15	1																				71		
PM Peak	13:00	16:00	16:00	17:00	17:00	16:00	16:00	19:00																			17:00		
Vol.	3	5	14	75	163	39	5	1																			275		

Stats

15th Percentile : 25 MPH
 50th Percentile : 30 MPH
 85th Percentile : 35 MPH
 95th Percentile : 38 MPH

Mean Speed(Average) : 31 MPH
 10 MPH Pace Speed : 25-34 MPH
 Number in Pace : 1210
 Percent in Pace : 74.8%
 Number of Vehicles > 30 MPH : 963
 Percent of Vehicles > 30 MPH : 59.5%

Hartwell Road
 south of Concord Road (Route 62)
 City, State: Bedford, MA
 Client: VHB/ A. Dempsey



PRECISION
 D A T A
 INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
 Office: 508-875-0100 Fax: 508-875-0118
 Email: datarequests@pdillc.com

175453 D Speed
 Site Code: 9393.01

NB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
01/26/	17	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	34	33
01:00		0	0	1	1	4	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	37	34
02:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33	32	
04:00		0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	32	30	
05:00		0	0	1	3	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	33	30	
06:00		0	0	0	3	12	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	36	33	
07:00		1	0	4	13	33	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	33	31	
08:00		5	5	6	17	32	11	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	35	29	
09:00		4	0	2	5	11	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	37	30	
10:00		5	2	5	8	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	32	25	
11:00		3	1	3	13	21	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	34	29	
12 PM		2	2	4	14	18	19	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	36	31	
13:00		0	4	4	23	43	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91	35	31	
14:00		1	8	5	23	58	30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	127	36	31	
15:00		1	6	11	31	77	27	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159	35	31	
16:00		3	3	10	39	134	29	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	220	33	31	
17:00		1	1	9	91	129	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	252	33	30	
18:00		0	1	1	44	74	17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	138	33	31	
19:00		1	0	4	19	58	12	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	34	31	
20:00		0	2	0	6	24	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	36	33	
21:00		0	0	1	6	13	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	36	32	
22:00		0	1	0	3	9	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	37	33	
23:00		0	3	0	1	12	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	37	32	
Total		27	39	71	364	789	281	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1594			
%		1.7%	2.4%	4.5%	22.8%	49.5%	17.6%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	08:00	08:00	08:00	08:00	07:00	09:00	08:00																				08:00		
Vol.	5	5	6	17	33	13	4																				80		
PM Peak	16:00	14:00	15:00	17:00	16:00	14:00	15:00																				17:00		
Vol.	3	8	11	91	134	30	6																				252		

Stats

15th Percentile : 25 MPH
 50th Percentile : 30 MPH
 85th Percentile : 35 MPH
 95th Percentile : 37 MPH

Mean Speed(Average) : 31 MPH
 10 MPH Pace Speed : 25-34 MPH
 Number in Pace : 1153
 Percent in Pace : 72.3%
 Number of Vehicles > 30 MPH : 935
 Percent of Vehicles > 30 MPH : 58.7%



PRECISION
D A T A
INDUSTRIES, LLC

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Hartwell Road
south of Concord Road (Route 62)
City, State: Bedford, MA
Client: VHB/ A. Dempsey

175453 D Speed
Site Code: 9393.01

SB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
01/25/	17	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	33	32
01:00		0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	33	32
02:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00		0	0	1	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	42	36	
04:00		0	0	0	3	16	20	11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	40	36	
05:00		0	0	0	5	23	30	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	39	35	
06:00		0	0	3	22	45	31	13	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	38	34	
07:00		1	0	2	32	94	77	17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	224	37	34	
08:00		0	2	1	18	99	98	21	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	240	38	34	
09:00		2	0	1	12	39	36	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	38	34	
10:00		2	1	5	8	16	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	36	30	
11:00		0	0	1	4	24	13	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	36	33	
12 PM		1	0	4	11	28	13	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	36	32	
13:00		1	3	4	13	23	19	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69	37	32	
14:00		0	5	2	14	23	17	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	38	32	
15:00		2	1	1	15	50	21	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	100	37	32	
16:00		2	2	5	23	52	32	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	122	37	32	
17:00		0	1	2	17	45	27	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	37	33	
18:00		0	1	5	16	34	23	4	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	37	33	
19:00		0	0	1	12	27	21	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	37	33	
20:00		0	1	0	11	16	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	37	33	
21:00		0	1	1	2	16	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	37	33	
22:00		0	0	0	0	6	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	40	36	
23:00		0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	32	28	
Total		11	18	40	239	680	520	138	10	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1660			
%		0.7%	1.1%	2.4%	14.4%	41.0%	31.3%	8.3%	0.6%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%				
AM Peak	09:00	08:00	10:00	07:00	08:00	08:00	08:00	06:00	04:00																		08:00		
Vol.	2	2	5	32	99	98	21	2	1																		240		
PM Peak	15:00	14:00	16:00	16:00	16:00	16:00	15:00	18:00					18:00													15:00	16:00		
Vol.	2	5	5	23	52	32	9	2					1													1	122		

Stats

15th Percentile : 27 MPH
 50th Percentile : 32 MPH
 85th Percentile : 38 MPH
 95th Percentile : 41 MPH

Mean Speed(Average) : 33 MPH
 10 MPH Pace Speed : 30-39 MPH
 Number in Pace : 1200
 Percent in Pace : 72.3%
 Number of Vehicles > 30 MPH : 1216
 Percent of Vehicles > 30 MPH : 73.3%



PRECISION
D A T A
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Hartwell Road
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175453 D Speed
Site Code: 9393.01

SB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed	
01/26/	17	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	38	37	
01:00		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	28	27	
02:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
03:00		0	1	0	0	0	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	40	32		
04:00		0	0	0	3	23	14	8	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	41	36		
05:00		0	0	0	4	26	40	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	38	36		
06:00		0	1	1	20	45	36	11	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	38	34		
07:00		1	0	1	21	84	93	14	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	216	38	34		
08:00		0	7	4	18	83	95	26	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	38	34		
09:00		4	2	8	16	34	22	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	38	31		
10:00		4	2	3	12	13	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	36	29		
11:00		0	0	0	8	13	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	36	32		
12 PM		0	0	1	13	20	11	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	37	32		
13:00		2	4	3	12	26	21	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	37	31		
14:00		0	3	3	18	27	31	9	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	39	34		
15:00		0	2	1	14	18	17	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	37	32		
16:00		0	1	4	15	51	13	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	87	35	32		
17:00		1	0	4	18	48	30	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	37	33		
18:00		0	0	1	13	36	15	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	36	32		
19:00		0	0	0	13	30	14	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	36	33		
20:00		0	4	0	9	13	12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	37	32		
21:00		0	1	0	3	12	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	36	33		
22:00		0	1	0	3	7	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	38	33		
23:00		0	0	0	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	38	32		
Total		12	29	34	237	613	505	125	21	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1579				
%		0.8%	1.8%	2.2%	15.0%	38.8%	32.0%	7.9%	1.3%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%					
AM Peak	09:00	08:00	09:00	07:00	07:00	08:00	08:00	06:00	04:00																		08:00			
Vol.	4	7	8	21	84	95	26	4	1																		236			
PM Peak	13:00	13:00	16:00	14:00	16:00	14:00	14:00	14:00	14:00						14:00													17:00		
Vol.	2	4	4	18	51	31	9	6	1																		111			

Stats

15th Percentile : 27 MPH
 50th Percentile : 32 MPH
 85th Percentile : 38 MPH
 95th Percentile : 41 MPH

Mean Speed(Average) : 33 MPH
 10 MPH Pace Speed : 30-39 MPH
 Number in Pace : 1118
 Percent in Pace : 70.8%
 Number of Vehicles > 30 MPH : 1144
 Percent of Vehicles > 30 MPH : 72.5%

Concord Road (Route 62)
 between Bonnievale Drive and Parker Road
 City, State: Bedford, MA
 Client: VHB/ A. Dempsey



PRECISION
 D A T A
 INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
 Office: 508-875-0100 Fax: 508-875-0118
 Email: datarequests@pdillc.com

175453 E Volume
 Site Code: 9393.01

Start Time	WB		EB		Combin ed		25-Jan-17 Wed
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
12:00	7	55	5	63	12	118	
12:15	7	57	4	68	11	125	
12:30	3	69	1	62	4	131	
12:45	0	17 75	256	5 15 68	261	5 32 143	517
01:00	1	51	1	55	2	106	
01:15	0	82	2	56	2	138	
01:30	1	60	0	58	1	118	
01:45	0	2 60	253	1 4 75	244	1 6 135	497
02:00	0	88	0	68	0	156	
02:15	0	82	0	77	0	159	
02:30	0	88	2	57	2	145	
02:45	2	2 83	341	1 3 58	260	3 5 141	601
03:00	1	93	0	124	1	217	
03:15	3	94	0	118	3	212	
03:30	1	106	3	101	4	207	
03:45	0	5 89	382	3 6 110	453	3 11 199	835
04:00	3	97	1	125	4	222	
04:15	1	90	3	105	4	195	
04:30	5	103	6	127	11	230	
04:45	3	12 105	395	9 19 121	478	12 31 226	873
05:00	5	122	8	94	13	216	
05:15	16	94	9	109	25	203	
05:30	18	104	20	91	38	195	
05:45	22	61 115	435	38 75 94	388	60 136 209	823
06:00	29	98	33	102	62	200	
06:15	57	89	35	89	92	178	
06:30	81	70	40	84	121	154	
06:45	88	255 43	300	52 160 69	344	140 415 112	644
07:00	112	59	109	44	221	103	
07:15	134	36	106	42	240	78	
07:30	141	53	131	37	272	90	
07:45	124	511 47	195	122 468 36	159	246 979 83	354
08:00	154	36	124	36	278	72	
08:15	163	35	119	24	282	59	
08:30	138	30	116	27	254	57	
08:45	103	558 17	118	120 479 28	115	223 1037 45	233
09:00	100	31	112	22	212	53	
09:15	73	17	82	13	155	30	
09:30	62	10	86	20	148	30	
09:45	61	296 12	70	63 343 17	72	124 639 29	142
10:00	54	12	63	24	117	36	
10:15	46	10	58	12	104	22	
10:30	51	9	60	10	111	19	
10:45	66	217 6	37	55 236 6	52	121 453 12	89
11:00	56	5	53	11	109	16	
11:15	59	12	69	14	128	26	
11:30	64	3	60	13	124	16	
11:45	54	233 8	28	65 247 7	45	119 480 15	73
Total	2169	2810	2055	2871	4224	5681	
Percent	51.3%	49.5%	48.7%	50.5%			
Day Total		4979		4926		9905	
Peak	07:30	- 05:00	- 07:30	- 04:00	- 07:30	- 04:30	- - -
Vol.	582	- 435	- 496	- 478	- 1078	- 875	- - -
P.H.F.	0.893	0.891	0.947	0.941	0.956	0.951	

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175453 E Volume
 Site Code: 9393.01

Start Time	WB		EB		Combin ed		26-Jan-17 Thu	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		
12:00	6	58	5	62	11	120		
12:15	3	63	4	46	7	109		
12:30	1	81	2	57	3	138		
12:45	1	67	4	67	5	134	501	
01:00	3	86	1	57	4	143		
01:15	1	60	1	66	2	126		
01:30	1	57	0	63	1	120		
01:45	3	50	0	69	3	119	508	
02:00	1	69	2	67	3	136		
02:15	0	73	0	71	0	144		
02:30	0	87	1	101	1	188		
02:45	2	87	1	73	3	160	628	
03:00	1	65	0	107	1	172		
03:15	0	117	0	94	0	211		
03:30	4	96	1	97	5	193		
03:45	1	84	3	125	4	209	785	
04:00	0	106	1	126	1	232		
04:15	2	110	3	101	5	211		
04:30	5	107	6	100	11	207		
04:45	4	94	7	113	11	207	857	
05:00	4	126	11	116	15	242		
05:15	19	113	21	122	40	235		
05:30	17	111	22	112	39	223		
05:45	25	96	39	116	64	212	912	
06:00	29	103	23	85	52	188		
06:15	50	102	34	68	84	170		
06:30	85	75	52	71	137	146		
06:45	90	53	71	72	161	125	629	
07:00	118	56	90	58	208	114		
07:15	134	50	96	53	230	103		
07:30	122	37	107	34	229	71		
07:45	129	35	122	29	251	64	352	
08:00	132	28	118	37	250	65		
08:15	164	37	138	24	302	61		
08:30	120	34	107	24	227	58		
08:45	116	35	126	489	25	110	244	
09:00	108	34	96	26	204	60		
09:15	83	28	83	29	166	57		
09:30	67	18	70	29	137	47		
09:45	49	12	62	311	20	104	196	
10:00	56	11	43	8	99	19		
10:15	47	9	43	18	90	27		
10:30	36	12	47	15	83	27		
10:45	49	6	54	187	17	58	96	
11:00	64	8	65	8	129	16		
11:15	42	2	47	13	89	15		
11:30	66	15	58	9	124	24		
11:45	57	1	68	238	6	36	62	
Total	2117	2864	1955	2906	4072	5770		
Percent	52.0%	49.6%	48.0%	50.4%				
Day Total		4981		4861		9842		
Peak	07:30	-	05:00	-	08:00	-	05:00	-
Vol.	547	-	446	-	489	-	466	-
P.H.F.	0.834	-	0.885	-	0.886	-	0.955	-



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Concord Road (Route 62)
between Bonnievale Drive and Parker Road
City, State: Bedford, MA
Client: VHB/ A. Dempsey

175453 E Class
Site Code: 9393.01

WB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/25/17	0	14	2	0	1	0	0	0	0	0	0	0	0	0	17
01:00	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	4	0	0	1	0	0	0	0	0	0	0	0	0	5
04:00	0	4	6	0	1	0	0	0	1	0	0	0	0	0	12
05:00	0	37	14	1	8	1	0	0	0	0	0	0	0	0	61
06:00	1	174	57	2	20	0	0	0	0	0	0	0	0	1	255
07:00	8	389	75	3	32	2	0	1	1	0	0	0	0	0	511
08:00	9	427	98	2	15	1	0	2	0	0	0	0	0	4	558
09:00	8	206	59	3	15	2	1	2	0	0	0	0	0	0	296
10:00	0	159	41	0	14	0	0	1	0	0	0	0	0	2	217
11:00	2	165	50	1	14	1	0	0	0	0	0	0	0	0	233
12 PM	1	199	39	1	15	0	0	0	0	0	0	0	0	1	256
13:00	3	183	49	4	8	0	0	1	1	0	0	0	0	4	253
14:00	7	259	54	5	16	0	0	0	0	0	0	0	0	0	341
15:00	12	278	71	1	17	2	0	0	1	0	0	0	0	0	382
16:00	4	311	54	1	22	1	1	0	0	0	0	0	0	1	395
17:00	8	356	57	0	11	0	1	0	0	0	0	0	0	2	435
18:00	5	249	36	1	8	1	0	0	0	0	0	0	0	0	300
19:00	2	164	24	1	4	0	0	0	0	0	0	0	0	0	195
20:00	0	91	22	0	5	0	0	0	0	0	0	0	0	0	118
21:00	0	61	7	0	2	0	0	0	0	0	0	0	0	0	70
22:00	0	28	6	0	2	0	0	0	1	0	0	0	0	0	37
23:00	0	23	2	0	3	0	0	0	0	0	0	0	0	0	28
Total	70	3783	824	26	235	11	3	7	5	0	0	0	0	15	4979
Percent	1.4%	76.0%	16.5%	0.5%	4.7%	0.2%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.3%	
AM Peak	08:00	08:00	08:00	07:00	07:00	07:00	09:00	08:00	04:00					08:00	08:00
Vol.	9	427	98	3	32	2	1	2	1					4	558
PM Peak	15:00	17:00	15:00	14:00	16:00	15:00	16:00	13:00	13:00					13:00	17:00
Vol.	12	356	71	5	22	2	1	1	1					4	435



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Concord Road (Route 62)
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City, State: Bedford, MA
Client: VHB/ A. Dempsey

175453 E Class
Site Code: 9393.01

WB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/26/17	0	7	4	0	0	0	0	0	0	0	0	0	0	0	11
01:00	0	6	1	0	1	0	0	0	0	0	0	0	0	0	8
02:00	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	4	2	0	0	0	0	0	0	0	0	0	0	0	6
04:00	0	6	4	0	0	1	0	0	0	0	0	0	0	0	11
05:00	0	39	14	0	11	0	0	0	0	0	0	0	0	1	65
06:00	1	182	52	1	17	1	0	0	0	0	0	0	0	0	254
07:00	6	381	71	3	29	3	0	5	0	0	0	0	0	5	503
08:00	10	389	101	3	26	1	0	0	0	0	0	0	0	2	532
09:00	4	226	58	1	13	1	0	1	0	0	0	0	0	3	307
10:00	2	130	36	1	15	1	0	1	1	0	0	0	0	1	188
11:00	1	170	44	6	6	1	0	0	0	0	0	0	0	1	229
12 PM	4	204	51	0	8	0	0	0	0	0	0	0	0	2	269
13:00	1	175	56	1	16	1	0	0	1	0	0	0	0	2	253
14:00	3	231	56	2	18	0	0	0	1	0	0	0	0	5	316
15:00	7	268	69	3	14	1	0	0	0	0	0	0	0	0	362
16:00	7	318	67	1	23	0	0	0	0	0	0	0	0	1	417
17:00	13	359	60	0	9	2	0	1	0	0	0	0	0	2	446
18:00	6	256	59	1	9	0	0	0	0	0	0	0	0	2	333
19:00	2	134	34	0	8	0	0	0	0	0	0	0	0	0	178
20:00	1	108	21	0	4	0	0	0	0	0	0	0	0	0	134
21:00	0	80	9	0	3	0	0	0	0	0	0	0	0	0	92
22:00	0	31	7	0	0	0	0	0	0	0	0	0	0	0	38
23:00	0	21	4	0	1	0	0	0	0	0	0	0	0	0	26
Total	68	3727	881	23	231	13	0	8	3	0	0	0	0	27	4981
Percent	1.4%	74.8%	17.7%	0.5%	4.6%	0.3%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.5%	
AM Peak	08:00	08:00	08:00	11:00	07:00	07:00		07:00	10:00					07:00	08:00
Vol.	10	389	101	6	29	3		5	1					5	532
PM Peak	17:00	17:00	15:00	15:00	16:00	17:00		17:00	13:00					14:00	17:00
Vol.	13	359	69	3	23	2		1	1					5	446

Concord Road (Route 62)
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175453 E Class
 Site Code: 9393.01

EB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/25/17	0	12	3	0	0	0	0	0	0	0	0	0	0	0	15
01:00	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
02:00	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	3	2	1	0	0	0	0	0	0	0	0	0	0	6
04:00	0	13	5	0	1	0	0	0	0	0	0	0	0	0	19
05:00	1	62	8	1	3	0	0	0	0	0	0	0	0	0	75
06:00	1	122	31	1	4	0	0	1	0	0	0	0	0	0	160
07:00	10	385	60	2	9	1	0	0	0	0	0	0	0	1	468
08:00	11	387	63	6	7	2	0	0	0	0	0	0	0	3	479
09:00	6	273	56	2	5	0	0	0	0	0	0	0	0	1	343
10:00	1	186	37	2	3	2	0	2	0	0	0	0	0	3	236
11:00	2	187	48	1	7	1	0	0	0	0	0	0	0	1	247
12 PM	1	205	42	2	10	0	0	0	1	0	0	0	0	0	261
13:00	0	185	45	5	7	0	0	1	0	0	0	0	0	1	244
14:00	6	193	45	3	13	0	0	0	0	0	0	0	0	0	260
15:00	12	332	88	1	12	1	0	6	0	0	0	0	0	1	453
16:00	9	378	77	1	11	0	0	0	0	0	0	0	0	2	478
17:00	7	333	36	1	9	0	0	1	0	0	0	0	0	1	388
18:00	7	283	44	0	9	0	0	0	0	0	0	0	0	1	344
19:00	2	130	24	0	2	1	0	0	0	0	0	0	0	0	159
20:00	1	103	10	0	1	0	0	0	0	0	0	0	0	0	115
21:00	0	59	11	0	2	0	0	0	0	0	0	0	0	0	72
22:00	0	47	4	0	1	0	0	0	0	0	0	0	0	0	52
23:00	0	40	3	0	2	0	0	0	0	0	0	0	0	0	45
Total	77	3924	743	29	118	8	0	11	1	0	0	0	0	15	4926
Percent	1.6%	79.7%	15.1%	0.6%	2.4%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	
AM Peak	08:00	08:00	08:00	08:00	07:00	08:00		10:00						08:00	08:00
Vol.	11	387	63	6	9	2		2						3	479
PM Peak	15:00	16:00	15:00	13:00	14:00	15:00		15:00	12:00					16:00	16:00
Vol.	12	378	88	5	13	1		6	1					2	478

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EB

Start Time	Motorc	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycle	Total
01/26/17	0	11	2	0	1	0	0	1	0	0	0	0	0	0	15
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
03:00	0	3	1	0	0	0	0	0	0	0	0	0	0	0	4
04:00	0	12	4	0	1	0	0	0	0	0	0	0	0	0	17
05:00	0	69	21	0	3	0	0	0	0	0	0	0	0	0	93
06:00	2	144	27	0	4	0	1	1	0	0	0	0	0	1	180
07:00	10	338	50	3	12	2	0	0	0	0	0	0	0	0	415
08:00	8	402	59	6	11	2	0	0	0	0	0	0	0	1	489
09:00	3	239	57	3	9	0	0	0	0	0	0	0	0	0	311
10:00	3	141	30	2	9	0	0	2	0	0	0	0	0	0	187
11:00	3	182	42	1	8	1	0	0	1	0	0	0	0	0	238
12 PM	0	182	46	1	1	0	0	1	1	0	0	0	0	0	232
13:00	0	187	51	2	12	1	0	1	0	0	0	0	0	1	255
14:00	2	240	56	3	9	1	0	0	0	0	0	0	0	1	312
15:00	7	314	84	3	14	0	0	1	0	0	0	0	0	0	423
16:00	6	344	72	3	11	3	0	0	0	0	0	0	0	1	440
17:00	9	379	67	1	7	2	0	0	0	0	0	0	0	1	466
18:00	3	244	42	1	5	0	0	1	0	0	0	0	0	0	296
19:00	1	151	21	0	1	0	0	0	0	0	0	0	0	0	174
20:00	1	97	10	1	1	0	0	0	0	0	0	0	0	0	110
21:00	0	89	12	0	3	0	0	0	0	0	0	0	0	0	104
22:00	0	50	8	0	0	0	0	0	0	0	0	0	0	0	58
23:00	0	32	4	0	0	0	0	0	0	0	0	0	0	0	36
Total	58	3856	766	30	122	12	1	8	2	0	0	0	0	6	4861
Percent	1.2%	79.3%	15.8%	0.6%	2.5%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	
AM Peak	07:00	08:00	08:00	08:00	07:00	07:00	06:00	10:00	11:00					06:00	08:00
Vol.	10	402	59	6	12	2	1	2	1					1	489
PM Peak	17:00	17:00	15:00	14:00	15:00	16:00		12:00	12:00					13:00	17:00
Vol.	9	379	84	3	14	3		1	1					1	466



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Concord Road (Route 62)
between Bonnievale Drive and Parker Road
City, State: Bedford, MA
Client: VHB/ A. Dempsey

175453 E Speed
Site Code: 9393.01

WB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
01/25/	17	0	0	0	0	0	0	2	9	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	41	38
01:00		0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	42	40
02:00		0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	42	40
03:00		0	0	0	0	0	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	42	38	
04:00		0	0	0	0	0	2	4	4	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	12	44	40	
05:00		0	0	0	0	1	5	30	18	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	43	39	
06:00		1	0	0	0	21	118	100	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255	42	39	
07:00		18	7	31	33	68	195	134	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	511	42	35	
08:00		2	7	21	43	85	201	170	26	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	558	42	37	
09:00		0	1	2	7	22	91	139	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	296	43	40	
10:00		2	0	0	0	6	64	97	44	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	217	45	41	
11:00		0	0	6	1	9	82	109	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	233	43	40	
12 PM		2	0	1	3	20	90	115	23	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	256	43	39	
13:00		5	9	8	9	19	103	86	12	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	253	42	37	
14:00		0	0	3	8	33	150	126	19	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	341	42	39	
15:00		0	0	2	4	30	160	149	36	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	382	43	39	
16:00		9	6	11	12	26	152	149	27	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	395	43	38	
17:00		59	47	51	58	68	100	46	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	435	38	28	
18:00		0	1	1	2	49	152	78	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300	42	38	
19:00		2	1	2	5	14	98	61	9	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	195	42	38	
20:00		0	0	0	0	7	45	54	9	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	43	40	
21:00		0	0	0	0	3	36	25	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	43	39	
22:00		0	0	0	0	3	7	19	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	46	42	
23:00		0	0	0	0	3	6	12	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	45	41	
Total		100	79	139	186	496	1897	1701	354	25	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4979			
%		2.0%	1.6%	2.8%	3.7%	10.0%	38.1%	34.2%	7.1%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	07:00	07:00	07:00	08:00	08:00	08:00	08:00	08:00	10:00	10:00																	08:00		
Vol.	18	7	31	43	85	201	170	44	4																		558		
PM Peak	17:00	17:00	17:00	17:00	17:00	15:00	15:00	15:00	19:00	13:00																	17:00		
Vol.	59	47	51	58	68	160	149	36	3	1																	435		

Stats

15th Percentile : 31 MPH
 50th Percentile : 37 MPH
 85th Percentile : 42 MPH
 95th Percentile : 45 MPH

Mean Speed(Average) : 37 MPH
 10 MPH Pace Speed : 35-44 MPH
 Number in Pace : 3598
 Percent in Pace : 72.3%
 Number of Vehicles > 35 MPH : 3600
 Percent of Vehicles > 35 MPH : 72.3%



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Concord Road (Route 62)
between Bonnievale Drive and Parker Road
City, State: Bedford, MA
Client: VHB/ A. Dempsey

175453 E Speed
Site Code: 9393.01

WB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
01/26/	17	0	0	0	0	0	1	3	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	44	41	
	01:00	0	0	0	1	3	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	42	36	
	02:00	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	46	39	
	03:00	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	44	40	
	04:00	0	0	0	0	0	0	2	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	47	43	
	05:00	0	1	0	1	4	21	25	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	45	40	
	06:00	0	0	0	1	23	121	94	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	254	42	39	
	07:00	9	12	29	23	44	218	154	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	503	42	36	
	08:00	4	6	17	23	65	184	206	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	532	42	37	
	09:00	1	3	4	6	34	104	133	19	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	307	43	39	
	10:00	1	0	0	3	10	68	80	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188	43	40	
	11:00	0	3	0	1	12	102	94	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	229	43	39	
	12 PM	2	2	5	7	17	94	125	13	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	269	43	39	
	13:00	1	1	1	3	27	123	82	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	253	42	38	
	14:00	8	7	8	10	35	106	117	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	316	43	37	
	15:00	4	7	21	11	45	134	120	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	362	42	37	
	16:00	1	1	0	4	45	190	156	19	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	417	42	39	
	17:00	0	3	7	20	101	216	87	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	446	40	36	
	18:00	2	3	2	3	33	182	95	10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	333	42	38	
	19:00	0	0	0	0	12	87	64	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	178	43	39	
	20:00	0	0	1	0	8	60	57	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	134	42	39	
	21:00	0	0	1	0	10	38	33	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	92	43	39	
	22:00	0	0	0	0	7	13	13	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	43	39	
	23:00	0	0	0	0	2	8	12	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	44	41	
	Total	33	49	96	117	540	2078	1763	283	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4981			
	%	0.7%	1.0%	1.9%	2.3%	10.8%	41.7%	35.4%	5.7%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
	AM Peak	07:00	07:00	07:00	07:00	08:00	07:00	08:00	08:00	09:00																	08:00		
	Vol.	9	12	29	23	65	218	206	27	3																	532		
	PM Peak	14:00	14:00	15:00	17:00	17:00	17:00	16:00	14:00	12:00																	17:00		
	Vol.	8	7	21	20	101	216	156	25	4																	446		

Stats

15th Percentile : 33 MPH
 50th Percentile : 37 MPH
 85th Percentile : 42 MPH
 95th Percentile : 44 MPH

Mean Speed(Average) : 38 MPH
 10 MPH Pace Speed : 35-44 MPH
 Number in Pace : 3841
 Percent in Pace : 77.1%
 Number of Vehicles > 35 MPH : 3730
 Percent of Vehicles > 35 MPH : 74.9%

Concord Road (Route 62)
 between Bonnievale Drive and Parker Road
 City, State: Bedford, MA
 Client: VHB/ A. Dempsey



PRECISION
 D A T A
 INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
 Office: 508-875-0100 Fax: 508-875-0118
 Email: datarequests@pdillc.com

175453 E Speed
 Site Code: 9393.01

EB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
01/25/	17	0	0	0	0	0	6	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	43	38	
01:00		0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	38	34	
02:00		0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	46	44	
03:00		0	0	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	39	36	
04:00		0	0	0	0	1	8	9	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	42	40	
05:00		0	1	1	1	7	35	23	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	43	38	
06:00		1	0	0	0	12	96	47	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	41	38	
07:00		2	5	10	8	44	235	150	12	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	468	42	38	
08:00		7	2	7	9	24	231	187	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	479	42	38	
09:00		1	2	2	4	26	154	130	23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	343	42	39	
10:00		2	0	2	2	18	110	94	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	42	39	
11:00		0	1	3	3	26	108	89	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	247	42	39	
12 PM		0	0	3	0	18	140	87	11	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	261	42	39	
13:00		0	1	4	4	25	132	69	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	244	42	38	
14:00		2	1	4	8	22	109	101	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	260	42	38	
15:00		1	2	6	3	36	247	143	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	453	42	38	
16:00		2	2	2	4	64	244	152	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	478	41	38	
17:00		1	1	9	27	138	175	34	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	388	38	35	
18:00		0	2	3	1	39	207	85	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	344	41	38	
19:00		0	0	0	2	22	75	54	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159	42	38	
20:00		0	1	0	0	8	64	40	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	115	42	38	
21:00		0	0	0	2	6	39	23	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	42	38	
22:00		0	0	0	0	6	24	19	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52	42	39	
23:00		0	0	0	1	3	18	18	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	43	40	
Total		19	21	56	80	553	2460	1561	165	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4926			
%		0.4%	0.4%	1.1%	1.6%	11.2%	49.9%	31.7%	3.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	08:00	07:00	07:00	08:00	07:00	07:00	08:00	09:00	04:00	07:00																	08:00		
Vol.	7	5	10	9	44	235	187	23	1	1																	479		
PM Peak	14:00	15:00	17:00	17:00	17:00	15:00	16:00	15:00	12:00	12:00																	16:00		
Vol.	2	2	9	27	138	247	152	15	1	1																	478		

Stats

15th Percentile : 34 MPH
 50th Percentile : 37 MPH
 85th Percentile : 42 MPH
 95th Percentile : 43 MPH

Mean Speed(Average) : 38 MPH
 10 MPH Pace Speed : 35-44 MPH
 Number in Pace : 4021
 Percent in Pace : 81.6%
 Number of Vehicles > 35 MPH : 3705
 Percent of Vehicles > 35 MPH : 75.2%

Concord Road (Route 62)
between Bonnievale Drive and Parker Road
City, State: Bedford, MA
Client: VHB/ A. Dempsey



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

175453 E Speed
Site Code: 9393.01

EB	Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
01/26/	17	0	0	0	0	0	2	7	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	45	39	
	01:00	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33	32	
	02:00	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	46	41	
	03:00	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	41	38	
	04:00	0	0	0	0	2	9	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	43	39	
	05:00	0	0	0	0	3	35	44	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	43	40	
	06:00	0	1	0	5	11	108	52	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180	41	38	
	07:00	3	1	7	3	29	240	122	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	415	41	38	
	08:00	4	4	8	7	41	241	170	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	489	42	38	
	09:00	0	1	1	0	22	144	126	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	311	42	39	
	10:00	0	0	2	2	9	87	68	17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	187	43	39	
	11:00	0	2	2	2	25	130	67	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	238	42	38	
	12 PM	0	0	0	3	20	115	72	21	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	232	43	39	
	13:00	2	1	2	2	23	115	96	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255	42	38	
	14:00	0	1	3	1	39	151	110	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	312	42	38	
	15:00	4	2	9	10	47	219	124	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	423	41	37	
	16:00	4	3	3	2	76	226	118	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	440	41	37	
	17:00	1	5	5	5	93	258	94	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	466	40	37	
	18:00	0	2	2	5	39	144	97	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	296	42	38	
	19:00	0	0	1	1	14	101	49	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	174	42	38	
	20:00	0	0	0	0	21	50	33	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	110	42	38	
	21:00	0	0	0	0	17	59	25	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	104	41	38	
	22:00	0	0	0	0	10	26	14	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	43	39	
	23:00	0	0	0	0	1	15	14	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	44	41	
	Total	18	23	45	48	546	2485	1504	174	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4861			
	%	0.4%	0.5%	0.9%	1.0%	11.2%	51.1%	30.9%	3.6%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
	AM Peak	08:00	08:00	08:00	08:00	08:00	08:00	08:00	10:00	05:00																	08:00		
	Vol.	4	4	8	7	41	241	170	17	2																	489		
	PM Peak	15:00	17:00	15:00	15:00	17:00	17:00	15:00	12:00	12:00	23:00															16:00	17:00		
	Vol.	4	5	9	10	93	258	124	21	1	1															1	466		

Stats

15th Percentile : 34 MPH
50th Percentile : 37 MPH
85th Percentile : 42 MPH
95th Percentile : 43 MPH

Mean Speed(Average) : 38 MPH
10 MPH Pace Speed : 35-44 MPH
Number in Pace : 3989
Percent in Pace : 82.1%
Number of Vehicles > 35 MPH : 3684
Percent of Vehicles > 35 MPH : 75.8%

Appendix B

Special Speed Regulations

Mr. Sullivan
DEC 03 1979

TOWN OF BEDFORD
SPECIAL SPEED REGULATION NO. 5088

Highway Location: BEDFORD
Authority In Control: TOWN OF BEDFORD
Name of Highway: RAIL ROAD AVENUE
MCMAHON AVENUE

In accordance with the provisions of Chapter 90, Section 18, of the General Laws (Ter. Ed.) as amended, the following Special Speed Regulation is

hereby Adopted
by the Board of Selectmen
of the Town of Bedford

That the following speed limits are established at which motor vehicles may be operated in the areas described:

RAILROAD AVENUE-EASTBOUND

Beginning at the end of School Property
Thence easterly on Railroad Avenue
0.32 miles at 30 miles per hour ending at South Road;
the total distance being 0.32 miles.

RAILROAD AVENUE-WESTBOUND

Beginning at South Road
Thence westerly on Railroad Avenue
0.32 miles at 30 miles per hour ending at the beginning
of School Property; the total distance being 0.32 miles.

MCMAHON AVENUE-EASTBOUND

Beginning at Concord Road, (Route 62)
Thence easterly on McMahon Avenue
0.22 miles at 25 miles per hour ending at Winchester
Drive; the total distance being 0.22 miles.

MCMAHON AVENUE-WESTBOUND

Beginning at Winchester Drive
Thence westerly on McMahon Avenue
0.22 miles at 25 miles per hour ending at Concord Road,
(Route 62); the total distance being 0.22 miles.

Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The Provisions of this regulation shall not, however, abrogate in any sense Chapter 90, Section 14, of the General Laws (Ter. Ed).

Date of Passage

James Maguire
R. J. Dolan
C. E. O'Connell
Board of Selectmen

Attest Donald P. Gifford
Town Clerk

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

SPECIAL SPEED REGULATION NO. 5088

The Department of Public Works and the Registrar of Motor Vehicles, acting jointly, do hereby certify that this regulation is consistent with the public interests.

Standard signs must be erected at the beginning of each zone.

DATE: DEC 03 1979

FOR THE DEPARTMENT OF PUBLIC WORKS

BY: [Signature]
Traffic Engineer

[Signature]
Chief Deputy Registrar

THE COMMONWEALTH OF MASSACHUSETTS
HIGHWAY DEPARTMENT
TOWN OF BEDFORD
SPECIAL SPEED REGULATION # 710-B

Highway Location: BEDFORD
Authority In Control: TOWN OF BEDFORD
Name of Highway (s): ROUTE 62

In accordance with the provisions of Chapter 90, Section 18, of the General Laws (Ter. Ed.) as amended, the following Special Speed Regulation is

Hereby Adopted

by the Board of Selectmen

of the Town of Bedford

Special Speed Regulation number 710, dated June 27, 1972 is hereby amended on Route 62 as follows:

That the following speed limits are established at which motor vehicles may be operated in the areas described:

ROUTE 62 - EASTBOUND

By striking out the clauses reading:

Beginning at the Concord-Bedford line
Thence easterly on Route 62
1.80 miles at 40 miles per hour

And inserting in place thereof:

Beginning at the Concord-Bedford line
Thence easterly on Route 62
0.65 miles at 35 miles per hour
1.15 miles at 40 miles per hour

ROUTE 62 - WESTBOUND

By striking out the clauses reading:

1.80 miles at 40 miles per hour ending at the Bedford-Concord line; the total distance being 4.50 miles.

And inserting in place thereof:

1.15 miles at 40 miles per hour
0.65 miles at 35 miles per hour ending at the Bedford-Concord line; the total distance being 4.50 miles.

Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The provisions of this regulation shall not, however, abrogate in any sense Chapter 90, Section 14, of the General Laws (Ter. Ed.).

Date of Passage: _____

[Signature]
[Signature]

[Signature]
[Signature]
[Signature]

BOARD OF SELECTMEN

Attest [Signature]
TOWN CLERK

COMMONWEALTH OF MASSACHUSETTS
HIGHWAY DEPARTMENT

SPECIAL SPEED REGULATION NO.710-B

The Highway Department and the Registry of Motor Vehicles, acting jointly, do hereby certify that this regulation is consistent with the public interest.

Standard signs must be erected at the beginning of each zone.

DATE: MAR 07 2006

FOR THE HIGHWAY DEPARTMENT

BY: 
for State Traffic Engineer

FOR THE REGISTRY OF MOTOR VEHICLES

BY: 
Registrar

Mr. Sullivan

JAN 21 1976

TOWN OF BEDFORD
SPECIAL SPEED REGULATION NO. 710-A

Highway Location: BEDFORD
Authority In Control: TOWN OF BEDFORD
Name of Highway: SOUTH ROAD

In accordance with the provisions of Chapter 90, Section 18, of the General Laws (Ter. Ed.) as amended, the following Special Speed Regulation is

hereby Adopted
by the Board of Selectmen
of the Town of Bedford

Special Speed Regulation number 710 dated June 27, 1972 is hereby amended by striking out all clauses pertaining to South Road and inserting in place thereof the following revision and addenda.

That the following speed limits are established at which motor vehicles may be operated in the areas described:

SOUTH ROAD-NORTHBOUND

Beginning at Tilden Street
Thence northerly on South Road
2430 0.46 miles at 25 miles per hour
0.67 " " 30 " " "
0.26 " " 25 " " "
0.27 " " 30 " " "
0.08 " " 25 " " " ending at Great
Road; the total distance being 1.74 miles.

SOUTH ROAD-SOUTHBOUND

Beginning at a point 400 feet south of Great Road
Thence southerly on South Road
1430 0.27 miles at 30 miles per hour
1380 0.26 " " 25 " " "
3540 0.67 " " 30 " " "
0.46 " " 25 " " " ending at Tilden
Street; the total distance being 1.66 miles.

Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The provisions of this regulation shall not, however, abrogate in any sense Chapter 90, Section 14, of the General Laws (Ter. Ed).

NOV 24 1975

Date of Passage

Donald J. Corey
Blair C. Fisher
Harold T. Palmer
 Board of Selectmen
Louis Maglione

Attest *Donald W. Pfeiffer*
 Town Clerk

COMMONWEALTH OF MASSACHUSETTS
 DEPARTMENT OF PUBLIC WORKS

SPECIAL SPEED REGULATION NO. 710-A

The Department of Public Works and the Registrar of Motor Vehicles, acting jointly, do hereby certify that this regulation is consistent with the public interests.

Standard signs must be erected at the beginning of each zone.

DATE: JAN 21 1976

FOR THE DEPARTMENT OF PUBLIC WORKS

BY: *L. T. Perkins*
 Traffic Engineer

Robert A. Parson
 Registrar of Motor Vehicles

June 27, 1972

TOWN OF BEDFORD
SPECIAL SPEED REGULATION NO. 710

Mr. Sullivan

Highway Location: TOWN OF BEDFORD . . .

Authority In Control: TOWN OF BEDFORD

Name of Highway: North Road
 Pine Hill Rd. and Page Road
 Hillside Avenue
 Loomis Street
 Hartwell Road
 Summer Street
 Springs Road
 Old Billerica Road
 Route 225
 Route 4
 Route 62
 South Road *0.10 Replaced by 7504*

In accordance with the provisions of Chapter 90, Section 18, of the General Laws (Ter. Ed.) as amended, the following Special Speed Regulation is

hereby Adopted
by the Board of Selectmen
of the Town of Bedford

Special Speed Regulation numbered 102 and 276 dated September 28, 1954 and September 23, 1964 respectively are hereby amended by striking out the Regulations in their entireties and inserting in place thereof the following revision and addenda.

That the following speed limits are established at which motor vehicles may be operated in the areas described.

NORTH ROAD-NORTHBOUND

Beginning at Route 4 thence northerly on North Road

0.10 miles at 25 miles per hour
0.20 " " 35 " " " ending at the
Bedford-Billerica line; the total distance being 0.30 miles.

NORTH ROAD-SOUTHBOUND

Beginning at the Billerica-Bedford line thence southerly on North Road

0.20 miles at 35 miles per hour
0.10 " " 25 " " " ending at Route 4;
the total distance being 0.30 miles.

PINE HILL ROAD AND PAGE ROAD-EASTBOUND

Beginning at Route 4

Thence easterly on Pine Hill Road and Page Road

0.73 miles at 30 miles per hour
 0.79 " " 25 " " " ending west
 of Route 62

And beginning again east of Route 62

Thence easterly on Page Road

0.65 miles at 25 miles per hour ending at
 the Bedford-Lexington line; the total distance being 2.37 miles.

PAGE ROAD AND PINE HILL ROAD-WESTBOUND

Beginning at the Lexington-Bedford line

Thence westerly on Page Road and Pine Hill Road

0.65 miles at 25 miles per hour ending east
 of Route 62.

And beginning again West of Route 62

Thence westerly on Page Road

0.79 miles at 25 miles per hour
 0.73 " " 30 " " " ending at
 Route 4; the total distance being 2.37 miles.

HILLSIDE AVENUE-NORTHBOUND

Beginning at Great Road

Thence northerly on Hillside Avenue

0.26 miles at 25 miles per hour ending at
 Springs Road; the total distance being 0.26 miles.

HILLSIDE AVENUE-SOUTHBOUND

Beginning at Springs Road

Thence southerly on Hill side Avenue

0.26 miles at 25 miles per hour ending at
Great Road; the total distance being 0.26 miles.

LOOMIS STREET-EASTBOUND

Beginning at South Road

Thence easterly on Loomis Street

0.37 miles at 30 miles per hour ending at
Great Road; the total distance being 0.37 miles.

LOOMIS STREET-WESTBOUND

Beginning at Great Road

Thence westerly on Loomis Street

0.37 miles at 30 miles per hour ending at
South Road; the total distance being 0.37 miles.

HARTWELL ROAD-EASTBOUND

Beginning at Concord Road

Thence easterly on Hartwell Road

0.66 miles at 30 miles per hour
0.10 " " 20 " " "
0.96 " " 25 " " " ending at
South Road; the total distance being 1.72 miles.

HARTWELL ROAD-WESTBOUND

Beginning at South Road

Thence westerly on Hartwell Road

0.96 miles at 25 miles per hour
0.10 " " 20 " " "
0.66 " " 30 " " " ending at
Concord Road; the total distance being 1.72 miles.

SUMMER STREET-EASTBOUND

Beginning at South Road

Thence easterly on Summer Street

0.32 miles at 30 miles per hour ending at the Bedford-Lexington line; the total distance being 0.32 miles.

SUMMER STREET-WESTBOUND

Beginning at Lexington-Bedford line

Thence westerly on Summer Street

0.32 miles at 30 miles per hour ending at South Road; the total distance being 0.32 miles.

SOUTH ROAD-NORTHBOUND

Beginning at Tilden Street

Thence northerly on South Road

	0.29 miles at 30 miles per hour				
	0.17 " " 25 " " "				
	0.07 " " 25 " " "				
	0.26 " " 25 " " "				
	0.27 " " 35 " " "				
	0.08 " " 25 " " "				

Great Road; the total distance being 1.74 miles.

*VOID
See Reg # 710-A*

SOUTH ROAD-SOUTHBOUND

Beginning at Great Road

Thence southerly on South Road

	0.08 miles at 25 miles per hour				
	0.27 " " 35 " " "				
	0.26 " " 25 " " "				
	0.07 " " 35 " " "				
	0.17 " " 25 " " "				
	0.29 " " 30 " " "				

Tilden Street; the total distance being 1.74 miles.

*VOID
See Reg # 710-A*

SPRINGS ROAD-NORTHBOUND

Beginning at Great Road

Thence northerly on Springs Road

0.30 miles at	25 miles per hour			
0.33	" "	30	" "	" "
0.81	" "	20	" "	" "
1.13	" "	25	" "	" "
0.11	" "	20	" "	" "
0.22	" "	25	" "	" "

ending at the Bedford-Billerica line; the total distance being 2.90 miles.

SPRINGS ROAD-SOUTHBOUND

Beginning at the Billerica-Bedford line

Thence southerly on Springs Road

0.22 miles at	25 miles per hour			
0.11	" "	20	" "	" "
1.13	" "	25	" "	" "
0.81	" "	20	" "	" "
0.33	" "	30	" "	" "
0.30	" "	25	" "	" "

ending at Great Road; the total distance being 2.90 miles.

OLD BILLERICA ROAD-NORTHBOUND

Beginning at a point 100 feet north of Route 62

Thence northerly on Old Billerica Road

0.93 miles at	30 miles per hour			
0.20	" "	20	" "	" "
0.76	" "	35	" "	" "

ending at the Bedford-Old Billerica Road; the total distance being 1.89 miles.

OLD BILLERICA ROAD-SOUTHBOUND

Beginning at the Billerica-Bedford line

Thence southerly on Old Billerica Road

0.76 miles at	35 miles per hour			
0.20	" "	20	" "	" "
0.95	" "	30	" "	" "

ending at Route 62; the total distance being 1.91 miles.

ROUTE 225-EASTBOUND

Beginning at the end of State Highway

Thence easterly on Route 225

1.11 miles at 40 miles per hour

0.07 " " 25 " " " ending at

North Road; the total distance being 1.18 miles.

ROUTE 225-WESTBOUND

Beginning at a point 350 feet west of North Road

Thence westerly on Route 225

1.11 miles at 40 miles per hour ending at

the beginning of State Highway; the total distance being 1.11 miles.

ROUTE 4-NORTHBOUND

Beginning at Great Road

Thence northerly on Route 4

0.27 miles at 35 miles per hour

1.60 " " 40 " " "

0.32 " " 35 " " " ending at

the Bedford-Billerica line; the total distance being 2.19 miles.

ROUTE 4-SOUTHBOUND

Beginning at the Billerica-Bedford line

Thence southerly on Route 4

0.32 miles at 35 miles per hour

1.60 " " 40 " " "

0.27 " " 25 " " " ending at

Great Road; the total distance being 2.19 miles.

ROUTE 62-EASTBOUND

Beginning at the Concord-Bedford line

Thence easterly on Route 62

1.80 miles at 40 miles per hour

0.30 " " 30 " " "

0.10 " " 25 " " "

0.73 " " 30 " " " ending at

the beginning of State Highway;

And beginning again at the end of State Highway

Thence easterly on Route 62

0.09	miles	at	25	miles	per	hour	✓
0.29	"	"	30	"	"	"	
0.62	"	"	25	"	"	"	
0.34	"	"	35	"	"	"	

*Missin & Peterson
Sept 3 Public work*

ending at the beginning of State Highway west of Route 3

And beginning again at the end of State Highway east of Route 3

Thence easterly on Route 62

0.23 miles at 40 miles per hour ending at the Bedford-Burlington line; the total distance being 4.50 miles.

ROUTE 62-WESTBOUND

Beginning at the Burlington-Bedford line

Thence westerly on Route 62

0.23 miles at 40 miles per hour ending at the beginning of State Highway east of Route 3.

Missin a

*(Supportation
Missin 90*

And beginning again at the end of State Highway west of Route 3

Thence westerly on Route 62

0.34	miles	at	35	miles	per	hour	✓
0.62	"	"	25	"	"	"	
0.29	"	"	30	"	"	"	
0.09	"	"	25	"	"	"	

MISSIN G

MISSIN

ending at the beginning of State Highway;

And beginning again at the end of State Highway

Thence westerly on Route 62

0.73	miles	at	30	miles	per	hour	✓
0.10	"	"	25	"	"	"	
0.30	"	"	30	"	"	"	
1.80	"	"	40	"	"	"	

ending at the Bedford-Concord line; the total distance being 4.50 miles.

Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The provisions of this regulation shall not, however, abrogate any sense Chapter 90, Section 14, of the General Laws (Ter. Ed.).

Date of Passage JUN -5 1972

Robert Butler
James J. Brown
Thomas K. Curran
William J. DeLoach
Richard H. Friedman
Board of Selectmen

Attest Donald W. Pfeiffer
TOWN CLERK

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

SPECIAL SPEED REGULATION NO. 710

The Department of Public Works and the Registrar of Motor Vehicles, acting jointly, do hereby certify that this regulation is consistent with public interest.

Standard signs must be erected at the beginning of each zone.

Date: June 27, 1972

By: Bruce Campbell
BRUCE CAMPBELL
COMMISSIONER

David J. Lucey
Registrar of Motor Vehicles

for Highway Engineering

Appendix C

Crash Data

- Raw Crash Data
- MassDOT Crashrate Worksheets

Raw Crash Data

Crash Number	Crash Date	Crash Time	City/Town	Crash Severity	Number of Fatal Injuries	Number of Vehicles	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Non Motorist Type	Road Surface	Ambient Light	Weather Condition
South Road at Railroad Avenue/Loomis Street													
2652947	Monday, September 13, 2010	6:47 PM	BEDFORD	Property damage only (none injured)	0	2	Head-on	V1: Turning left / V2:Travelling straight ahead	V1:N / V2:S		Wet	Dusk	Rain/Cloudy
3370880	Thursday, January 10, 2013	2:39 PM	BEDFORD	Non-fatal injury	0	1	Rear-end	V1: Slowing or stopped in traffic	V1:N		Dry	Daylight	Clear
2729304	Tuesday, May 10, 2011	10:47 AM	BEDFORD	Property damage only (none injured)	0	1	Single vehicle crash	V1: Making U-turn	V1:W		Dry	Daylight	Cloudy
3248376	Saturday, June 02, 2012	7:30 PM	BEDFORD	Property damage only (none injured)	0	2	Angle	V1: Turning left / V2:Travelling straight ahead	V1:S / V2:N		Wet	Dusk	Cloudy/Rain
3290010	Wednesday, September 26, 2012	12:15 AM	BEDFORD	Non-fatal injury	0	2	Angle	V1: Travelling straight ahead / V2:Travelling straight ahead	V1:S / V2:N		Dry	Daylight	Cloudy
3530433	Monday, June 24, 2013	6:38 PM	BEDFORD	Non-fatal injury	0	1	Angle	V1: Turning right	V1:W	P2:Pedalcyclist	Dry	Daylight	Clear
3457716	Wednesday, May 08, 2013	9:21 AM	BEDFORD	Property damage only (none injured)	0	2	Head-on	V1: Turning left / V2:Travelling straight ahead	V1:W / V2:E		Dry	Daylight	Clear
3713950	Tuesday, October 29, 2013	2:36 PM	BEDFORD	Non-fatal injury	0	1	Angle	V1: Travelling straight ahead	V1:E	P2:Pedalcyclist	Dry	Daylight	Clear
3884535	Wednesday, June 18, 2014	7:52 AM	BEDFORD	Property damage only (none injured)	0	2	Angle	V1: Turning left / V2:Travelling straight ahead	V1:S / V2:N		Dry	Daylight	Clear
Railroad Avenue between Highland Avenue and NE corner of school property													
2701552	Sunday, February 27, 2011	9:07 AM	BEDFORD	Property damage only (none injured)	0	3	Head-on	V1: Travelling straight ahead / V2:Travelling straight ahead / V3:Travelling straight ahead	V1:S / V2:W / V3:W		Snow	Daylight	Snow/Cloudy
3374978	Saturday, February 02, 2013	10:52 PM	BEDFORD	Property damage only (none injured)	0	1	Single vehicle crash	V1: Travelling straight ahead	V1:W		Dry	Dark - lighted roadway	Cloudy
3389324	Sunday, February 17, 2013	8:05 PM	BEDFORD	Property damage only (none injured)	0	1	Single vehicle crash	V1: Travelling straight ahead	V1:E		Snow	Dark - lighted roadway	Blowing sand, snow
Hartwell Road between Concord Road and Sorens Way													
3982382	Thursday, October 09, 2014	10:52 AM	BEDFORD	Non-fatal injury	0	1	Angle	V1: Travelling straight ahead	V1:S	P2:Pedalcyclist	Dry	Daylight	Clear
4018507	Saturday, December 27, 2014	10:45 PM	BEDFORD	Property damage only (none injured)	0	1	Single vehicle crash	V1: Travelling straight ahead	V1:N		Dry	Dark - lighted roadway	Clear
Concord Road between Parker Road and Lavender Lane													
2707383	Friday, March 04, 2011	5:36 PM	CONCORD	Non-fatal injury	0	2	Angle	V1: Turning left / V2:Travelling straight ahead	V1:E / V2:E		Dry	Dark - lighted roadway	Clear
3789404	Tuesday, February 04, 2014	9:24 AM	BEDFORD	Non-fatal injury	0	2	Sideswipe, same direction	V1: Overtaking/passing / V2:Slowing or stopped in traffic	V1:W / V2:W		Dry	Daylight	Clear
2885579	Monday, December 19, 2011	12:39 PM	BEDFORD	Property damage only (none injured)	0	2	Angle	V1: Travelling straight ahead / V2:Backing	V1:W / V2:S		Dry	Daylight	Clear
2743158	Sunday, June 19, 2011	3:11 PM	CONCORD	Non-fatal injury	0	2	Sideswipe, opposite direction	V1: Travelling straight ahead / V2:Turning left	V1:N / V2:S		Dry	Daylight	Clear
3714287	Tuesday, September 03, 2013	6:14 AM	BEDFORD	Non-fatal injury	0	1	Sideswipe, same direction	V1: Travelling straight ahead	V1:W	P2:Pedalcyclist	Dry	Daylight	Clear
2711667	Sunday, February 27, 2011	11:52 AM	BEDFORD	Non-fatal injury	0	2	Rear-end	V1: Backing / V2:Backing	V1:N / V2:E		Snow	Daylight	Cloudy/Snow
3396270	Friday, March 08, 2013	10:19 AM	BEDFORD	Property damage only (none injured)	0	1	Single vehicle crash	V1: Travelling straight ahead	V1:E		Snow	Daylight	Snow
3251915	Sunday, July 08, 2012	10:04 AM	BEDFORD	Non-fatal injury	0	1	Single vehicle crash	V1: Slowing or stopped in traffic	V1:S	P3:Pedalcyclist	Dry	Daylight	Clear
3111732	Monday, February 13, 2012	7:26 AM	BEDFORD	Non-fatal injury	0	2	Rear-end	V1: Slowing or stopped in traffic / V2:Travelling straight ahead	V1:W / V2:W		Dry	Daylight	Clear
3855335	Wednesday, May 07, 2014	6:59 PM	BEDFORD	Property damage only (none injured)	0	2	Rear-end	V1: Travelling straight ahead / V2:Slowing or stopped in traffic	V1:E / V2:E		Dry	Daylight	Clear
2589656	Wednesday, March 17, 2010	8:11 AM	BEDFORD	Property damage only (none injured)	0	2	Rear-end	V1: Slowing or stopped in traffic / V2:Slowing or stopped in traffic	V1:W / V2:W		Dry	Daylight	Clear
3321527	Sunday, October 14, 2012	7:36 PM	BEDFORD	Property damage only (none injured)	0	1	Single vehicle crash	V1: Travelling straight ahead	V1:W		Dry	Dark - lighted roadway	Clear
3793142	Monday, March 31, 2014	1:54 PM	BEDFORD	Property damage only (none injured)	0	2	Sideswipe, opposite direction	V1: Travelling straight ahead / V2:Travelling straight ahead	V1:E / V2:W		Wet	Daylight	Cloudy

MassDOT Crashrate Worksheets

SEGMENT CRASH RATE WORKSHEET

CITY/TOWN : Bedford COUNT DATE : Jan-17

DISTRICT : 4

~ SEGMENT DATA ~

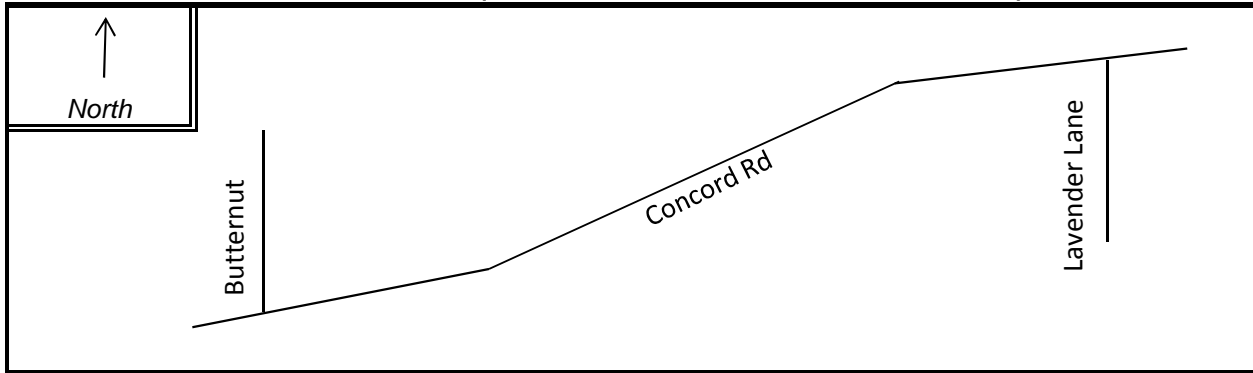
ROADWAY NAME: Concord Rd

START POINT: Butternut Circle

END POINT: Lavender Lane

FUNCTIONAL CLASSIFICATION OF ROADWAY: Urban Minor Arterial

ROADWAY DIAGRAM (LABEL ROADWAY AND CROSS STREETS)



AVERAGE DAILY TRAFFIC

SEGMENT LENGTH IN MILES (L): 0.77

AVERAGE DAILY TRAFFIC VOLUME (V): 9,905

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

CRASH RATE CALCULATION : 0.93

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

Comments : _____

Project Title & Date: _____

SEGMENT CRASH RATE WORKSHEET

CITY/TOWN : Bedford COUNT DATE : Jan-17

DISTRICT : 4

~ SEGMENT DATA ~

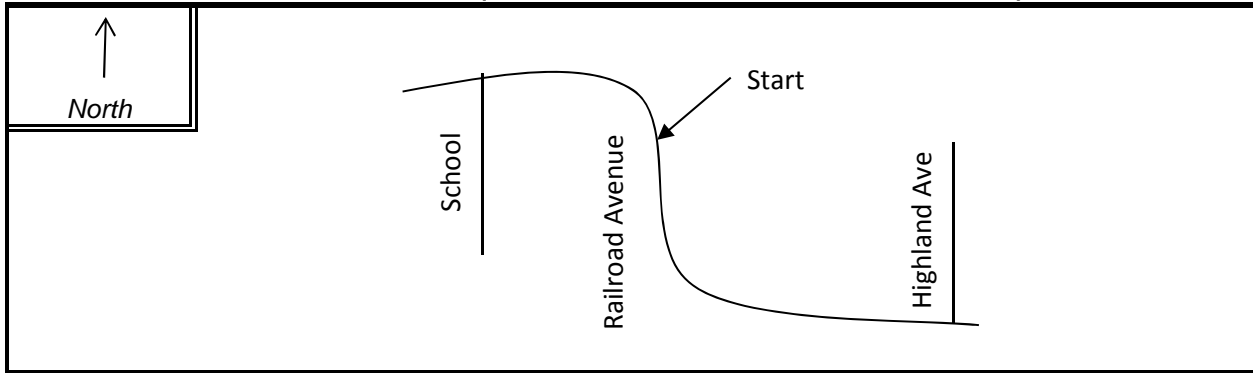
ROADWAY NAME: Railroad Avenue

START POINT: NE corner of baseball field

END POINT: Highland Avenue

FUNCTIONAL CLASSIFICATION OF ROADWAY: Local

ROADWAY DIAGRAM (LABEL ROADWAY AND CROSS STREETS)



AVERAGE DAILY TRAFFIC

SEGMENT LENGTH IN MILES (L): **0.29**

AVERAGE DAILY TRAFFIC VOLUME (V): 2,445

TOTAL # OF CRASHES: **3** # OF YEARS: **5** AVERAGE # OF CRASHES PER YEAR (A): **0.60**

CRASH RATE CALCULATION :

2.32

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

Comments : _____

Project Title & Date: _____

SEGMENT CRASH RATE WORKSHEET

CITY/TOWN : Bedford COUNT DATE : Jan-17

DISTRICT : 4

~ SEGMENT DATA ~

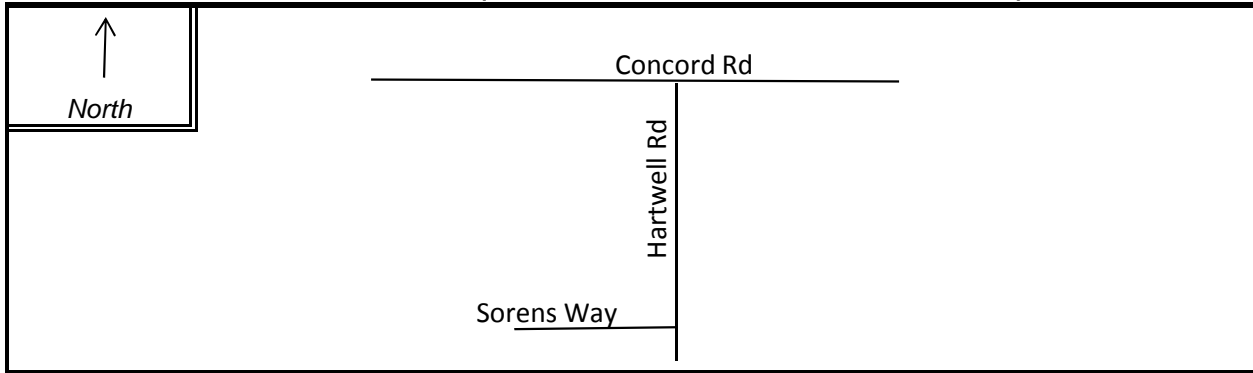
ROADWAY NAME: Hartwell Road

START POINT: Concord Road

END POINT: Sorens Way

FUNCTIONAL CLASSIFICATION OF ROADWAY: Urban Minor Arterial

ROADWAY DIAGRAM (LABEL ROADWAY AND CROSS STREETS)



AVERAGE DAILY TRAFFIC

SEGMENT LENGTH IN MILES (L): 0.22

AVERAGE DAILY TRAFFIC VOLUME (V): 3,280

TOTAL # OF CRASHES: 2 # OF YEARS: 5 AVERAGE # OF CRASHES PER YEAR (A): 0.40

CRASH RATE CALCULATION :

1.52

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

Comments : _____

Project Title & Date: _____

Appendix D

Traffic Signal Capacity Analysis

- Level-of-Service Analysis Procedures
- Capacity Analysis Summary
- Capacity Analysis Reports

Level-of-Service Analysis Procedures

In the HCM approach, capacity at intersections is defined for lane groups rather than for approaches or the intersection as a whole. A lane group may be a single movement, a group of movements, or an entire approach and is defined by the geometry of the intersection and the distribution of movements over the various lanes. Capacity of a lane group is calculated as the maximum rate of flow that may pass through the intersection under prevailing traffic, roadway, and signalization conditions. The rate of flow is generally measured or projected for a 15-minute period and capacity is stated in vehicles per hour. Capacity analysis of intersections involves the computation of volume-to-capacity (v/c) ratio for each lane group, from which an overall intersection v/c ratio may be derived.

Generally, when two opposing flows are moving during a signal phase, one of the lane groups will require more green time than another to process all of its volume. This would be defined as the "critical" lane group for the subject signal phase. The concept of a critical v/c ratio is used to evaluate the intersection as a whole, considering only the critical lane groups or those with the greatest demand for green time within each signal phase. This procedure assumes that green time has been appropriately allocated. Thus it is possible to have an overall intersection v/c of less than 1.00 (under capacity), but still have individual movements be over saturated within the signal cycle if the green time has not been appropriately allocated to the various approaches.

The other major concept in signalized intersection analysis is level of service, which is an index used to grade intersection operations. Level of service is defined in terms of delay and ranges from LOS A (free-flow conditions) to LOS F (long delays). Delay represents a measure of driver discomfort and frustration, fuel consumption, and lost time. Specifically, level of service delay criteria are stated in terms of average stopped delay per vehicle for a 15-minute analysis period. The criteria are represented in Table A-1.

Table A-1: Level-of-Service Criteria for Signalized Intersections

<u>Level of Service</u>	<u>Control Delay (sec/veh)</u>
A	≤10
B	> 10 - 20
C	> 20 - 35
D	> 35 - 55
E	> 55 - 80
F	>80

Source: Highway Capacity Manual 2010, Transportation Research Board, Washington, DC, 2010.

Delay is a complex measure that depends upon a number of variables such as quality of signal progression, cycle length, allocation of green time, and v/c ratio. Of all the factors cited, v/c ratios have the least effect on delay. Thus, for any given v/c ratio, a

range of delay values (and, therefore, level of service) may result. Conversely, for a given level of service, the v/c ratio may lie anywhere within a broad range.

The base saturation flow rate used in the signalized intersection analysis model varies from 1,800 to 1,900 passenger cars per hour of green per lane (pcphgpl). This value is adjusted for prevailing traffic conditions such as lane width, left turns, right turns, heavy vehicles, grades, parking, area type, bus blockage, and left-turn blockage.

Adjustments were made to the Synchro model to include characteristics of the study area such as heavy vehicles, bus blockages, and pedestrian crossings. The model was then calibrated to match field observations of vehicle queuing by approach during the peak hours analyzed. Primary adjustments were made to ideal saturation flow rates (decreased) until field observed queues were reflected in the existing condition Synchro output.

Capacity Analysis Summary

The capacity analysis results for the intersection of South Road and Railroad Avenue/Loomis Street are summarized in Table D-1 below. The analysis compares the existing peak hour traffic volumes and traffic signal timing with zero pedestrian phase actuations versus 30 pedestrian phase actuations per hours. Thirty pedestrian phase calls per hour would result in the exclusive pedestrian phase being utilized in 40-75% of signal cycles during the peak hour, depending on the actuated cycle length.

Under existing conditions, the intersection operates with an overall LOS B during both the morning and evening peak hours (v/c 0.85 and 0.70 respectively). If the pedestrian phase actuations were to increase to occur in 40-75% of cycles with the construction of the bikeway, the overall intersection would operate with an overall LOS C (v/c=0.81) during the morning peak, and overall LOS B during the evening peak.

Given the fluctuations that can occur in the number of pedestrian calls by time of day, time of year and the weather, modifications to the basic timings are not proposed at this time. However, implementation of a "Dynamic Max" setting is proposed to accommodate changes in traffic demand. The dynamic max works by increasing the max time for a particular phase by a preset increment after the phase has maxed out for two consecutive cycles. If the phase continues to max out, the dynamic max will continue to increase each cycle until the preset maximum time is reached. Once the phase beings to gap out, the max time will decrease each cycle back to the traditional Max 1/Max 2 timings.

Table D-1: Signalized Intersection Analysis Summary

	Movement	No Pedestrian Actuations					30 Pedestrian Actuations Per Hour				
		v/c ¹	Delay ²	LOS ³	50th Queue ⁴	95th Queue ⁵	v/c	Delay	LOS	50th Queue	95th Queue
Weekday Morning											
Railroad Avenue	EB L/T/R	0.73	20.9	C	92	140	0.88	43.6	D	93	#266
Loomis Street	WB L	0.58	16.9	B	38	#112	0.90	65.2	E	41	#201
	WB T/R	0.25	13.5	B	29	71	0.30	20.5	C	30	109
South Road	NB L/T	0.43	9.3	A	49	64	0.54	15.7	B	51	125
	NB R	0.09	7.6	A	1	10	0.10	12.2	B	1	16
	SB L/T/R	0.79	16.0	B	150	252	0.89	31.6	C	150	#517
	OVERALL	0.85	15.2	B	--	--	0.81	32.2	C	--	--
Weekday Evening											
Railroad Avenue	EB L/T/R	0.44	14.4	B	55	99	0.52	21.3	C	55	153
Loomis Street	WB L	0.41	14.3	B	34	90	0.55	22.4	C	35	#148
	WB T/R	0.27	13.5	B	31	73	0.32	19.7	B	31	112
South Road	NB L/T	0.75	14.4	B	139	230	0.83	24.2	C	139	433
	NB R	0.39	9.1	A	36	78	0.42	13.7	B	36	151
	SB L/T/R	0.21	8.2	A	23	44	0.27	12.7	B	23	85
	OVERALL	0.70	12.6	B	--	--	0.64	19.9	B	--	--

1 V/C – Volume-to-capacity ratio
 2 Delay – Control delay per vehicle
 3 LOS – Level-of-Service
 4 50th – 50th percentile queue length estimate, in feet

5 95th – 95th percentile queue length estimate, in feet
 NB = Northbound; SB = Southbound; EB = Eastbound;
 WB = Westbound,
 L = left-turn; T = through; R = right-turn

Capacity Analysis Reports

Lanes, Volumes, Timings
 3: South Road & Railroad Avenue/Loomis Street

Existing Volumes Existing Timing
 3/15/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations		↕		↕	↕			↕	↕		↕		
Volume (vph)	26	143	74	124	104	4	49	138	96	34	523	40	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	165		0	0		65	0		0	
Storage Lanes	0		0	1		0	0		1	0		0	
Taper Length (ft)	25			25			25			25			
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1289			1403			1053			799		
Travel Time (s)		29.3			31.9			23.9			18.2		
Peak Hour Factor	0.66	0.66	0.66	0.81	0.81	0.81	0.69	0.69	0.69	0.91	0.91	0.91	
Heavy Vehicles (%)	8%	7%	9%	3%	7%	25%	9%	6%	2%	13%	0%	16%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	368	0	153	133	0	0	271	139	0	656	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		4			8			2			6		9
Permitted Phases	4			8			2		2	6			
Detector Phase	4	4		8	8		2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0	10.0	10.0	10.0		4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		16.0	16.0	16.0	16.0	16.0		23.0
Total Split (s)	21.0	21.0		21.0	21.0		46.0	46.0	46.0	46.0	46.0		23.0
Total Split (%)	23.3%	23.3%		23.3%	23.3%		51.1%	51.1%	51.1%	51.1%	51.1%		26%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		1.0
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0		
Lead/Lag													
Lead-Lag Optimize?													
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min		None
v/c Ratio		0.74		0.58	0.25			0.43	0.17		0.79		
Control Delay		29.8		30.4	17.4			11.1	2.3		19.0		
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0		
Total Delay		29.8		30.4	17.4			11.1	2.3		19.0		
Queue Length 50th (ft)		92		38	29			49	1		150		
Queue Length 95th (ft)		140		#112	71			64	10		252		
Internal Link Dist (ft)		1209			1323			973			719		
Turn Bay Length (ft)				165					65				
Base Capacity (vph)		495		264	526			1083	1289		1429		
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		0.74		0.58	0.25			0.25	0.11		0.46		

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 51

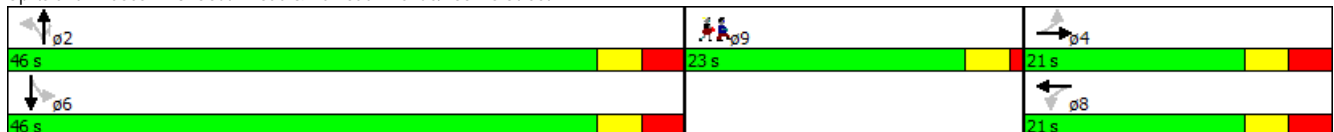
Natural Cycle: 90

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: South Road & Railroad Avenue/Loomis Street



HCM Signalized Intersection Capacity Analysis
 3: South Road & Railroad Avenue/Loomis Street

Existing Volumes Existing Timing
 3/15/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Volume (vph)	26	143	74	124	104	4	49	138	96	34	523	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.96		1.00	0.99			1.00	0.85		0.99	
Flt Protected		0.99		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)		1683		1752	1755			1756	1583		1844	
Flt Permitted		0.95		0.48	1.00			0.76	1.00		0.97	
Satd. Flow (perm)		1609		884	1755			1360	1583		1793	
Peak-hour factor, PHF	0.66	0.66	0.66	0.81	0.81	0.81	0.69	0.69	0.69	0.91	0.91	0.91
Adj. Flow (vph)	39	217	112	153	128	5	71	200	139	37	575	44
RTOR Reduction (vph)	0	15	0	0	1	0	0	0	71	0	3	0
Lane Group Flow (vph)	0	353	0	153	132	0	0	271	68	0	653	0
Heavy Vehicles (%)	8%	7%	9%	3%	7%	25%	9%	6%	2%	13%	0%	16%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		15.2		15.2	15.2			23.5	23.5		23.5	
Effective Green, g (s)		15.2		15.2	15.2			23.5	23.5		23.5	
Actuated g/C Ratio		0.30		0.30	0.30			0.46	0.46		0.46	
Clearance Time (s)		6.0		6.0	6.0			6.0	6.0		6.0	
Vehicle Extension (s)		2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)		482		265	526			630	733		831	
v/s Ratio Prot					0.08							
v/s Ratio Perm		c0.22		0.17				0.20	0.04		c0.36	
v/c Ratio		0.73		0.58	0.25			0.43	0.09		0.79	
Uniform Delay, d1		15.9		15.0	13.4			9.1	7.6		11.5	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		4.9		1.9	0.1			0.2	0.0		4.6	
Delay (s)		20.9		16.9	13.5			9.3	7.6		16.0	
Level of Service		C		B	B			A	A		B	
Approach Delay (s)		20.9			15.3			8.7			16.0	
Approach LOS		C			B			A			B	

Intersection Summary		
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.85	B
Actuated Cycle Length (s)	50.7	Sum of lost time (s)
Intersection Capacity Utilization	82.1%	16.0
Analysis Period (min)	15	E

c Critical Lane Group

Lanes, Volumes, Timings
 3: South Road & Railroad Avenue/Loomis Street

Existing Volume Existing Timing PM
 3/15/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations		↕		↕	↕			↕	↕		↕		
Volume (vph)	21	125	20	113	92	29	43	562	357	24	89	16	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	165		0	0		65	0		0	
Storage Lanes	0		0	1		0	0		1	0		0	
Taper Length (ft)	25			25			25			25			
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1289			1403			1053			799		
Travel Time (s)		29.3			31.9			23.9			18.2		
Peak Hour Factor	0.69	0.69	0.69	0.77	0.77	0.77	0.97	0.97	0.97	0.86	0.86	0.86	
Heavy Vehicles (%)	0%	1%	0%	2%	2%	4%	9%	1%	1%	7%	0%	21%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	240	0	147	157	0	0	623	368	0	150	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		4			8			2			6		9
Permitted Phases	4			8			2		2	6			
Detector Phase	4	4		8	8		2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0	10.0	10.0	10.0		4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		16.0	16.0	16.0	16.0	16.0		23.0
Total Split (s)	21.0	21.0		21.0	21.0		46.0	46.0	46.0	46.0	46.0		23.0
Total Split (%)	23.3%	23.3%		23.3%	23.3%		51.1%	51.1%	51.1%	51.1%	51.1%		26%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		1.0
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0		
Lead/Lag													
Lead-Lag Optimize?													
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min		None
v/c Ratio		0.45		0.41	0.29			0.75	0.45		0.21		
Control Delay		19.5		21.2	16.5			17.2	6.7		7.8		
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0		
Total Delay		19.5		21.2	16.5			17.2	6.7		7.8		
Queue Length 50th (ft)		55		34	31			139	36		23		
Queue Length 95th (ft)		99		80	73			230	78		44		
Internal Link Dist (ft)		1209			1323			973			719		
Turn Bay Length (ft)				165					65				
Base Capacity (vph)		530		359	547			1453	1311		1228		
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		0.45		0.41	0.29			0.43	0.28		0.12		

Intersection Summary

Area Type: Other

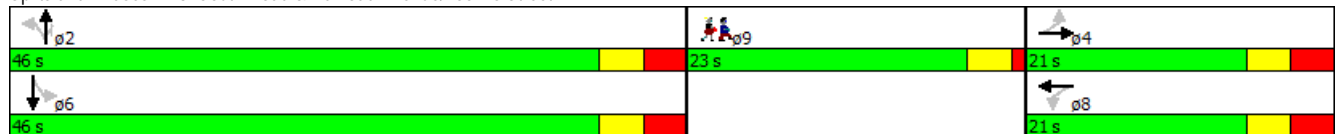
Cycle Length: 90

Actuated Cycle Length: 50.8

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Splits and Phases: 3: South Road & Railroad Avenue/Loomis Street



HCM Signalized Intersection Capacity Analysis
 3: South Road & Railroad Avenue/Loomis Street

Existing Volume Existing Timing PM
 3/15/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Volume (vph)	21	125	20	113	92	29	43	562	357	24	89	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.96			1.00	0.85		0.98	
Flt Protected		0.99		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)		1843		1770	1787			1864	1599		1780	
Flt Permitted		0.94		0.64	1.00			0.97	1.00		0.85	
Satd. Flow (perm)		1750		1196	1787			1814	1599		1533	
Peak-hour factor, PHF	0.69	0.69	0.69	0.77	0.77	0.77	0.97	0.97	0.97	0.86	0.86	0.86
Adj. Flow (vph)	30	181	29	147	119	38	44	579	368	28	103	19
RTOR Reduction (vph)	0	5	0	0	10	0	0	0	83	0	5	0
Lane Group Flow (vph)	0	235	0	147	147	0	0	623	285	0	145	0
Heavy Vehicles (%)	0%	1%	0%	2%	2%	4%	9%	1%	1%	7%	0%	21%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		15.3		15.3	15.3			23.3	23.3		23.3	
Effective Green, g (s)		15.3		15.3	15.3			23.3	23.3		23.3	
Actuated g/C Ratio		0.30		0.30	0.30			0.46	0.46		0.46	
Clearance Time (s)		6.0		6.0	6.0			6.0	6.0		6.0	
Vehicle Extension (s)		2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)		529		361	540			835	736		705	
v/s Ratio Prot					0.08							
v/s Ratio Perm		c0.13		0.12				c0.34	0.18		0.09	
v/c Ratio		0.44		0.41	0.27			0.75	0.39		0.21	
Uniform Delay, d1		14.2		14.0	13.4			11.2	9.0		8.1	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.2		0.3	0.1			3.2	0.1		0.1	
Delay (s)		14.4		14.3	13.5			14.4	9.1		8.2	
Level of Service		B		B	B			B	A		A	
Approach Delay (s)		14.4			13.9			12.4			8.2	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			12.6			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			50.6			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			65.9%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
3: South Road & Railroad Avenue/Loomis Street

Future Volumes Existing Timing
3/15/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations		↕		↕	↕			↕	↕		↕		
Volume (vph)	26	143	74	124	104	4	49	138	96	34	523	40	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	165		0	0		65	0		0	
Storage Lanes	0		0	1		0	0		1	0		0	
Taper Length (ft)	25			25			25			25			
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1289			1403			1053			799		
Travel Time (s)		29.3			31.9			23.9			18.2		
Peak Hour Factor	0.66	0.66	0.66	0.81	0.81	0.81	0.69	0.69	0.69	0.91	0.91	0.91	
Heavy Vehicles (%)	8%	7%	9%	3%	7%	25%	9%	6%	2%	13%	0%	16%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	368	0	153	133	0	0	271	139	0	656	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		4			8			2			6		9
Permitted Phases	4			8			2		2	6			
Detector Phase	4	4		8	8		2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0	10.0	10.0	10.0		4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		16.0	16.0	16.0	16.0	16.0		24.0
Total Split (s)	21.0	21.0		21.0	21.0		45.0	45.0	45.0	45.0	45.0		24.0
Total Split (%)	23.3%	23.3%		23.3%	23.3%		50.0%	50.0%	50.0%	50.0%	50.0%		27%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0		
Total Lost Time (s)		6.0		6.0	6.0			6.0	6.0		6.0		
Lead/Lag													
Lead-Lag Optimize?													
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min		None
v/c Ratio		0.85		0.86	0.29			0.52	0.19		0.86		
Control Delay		48.4		74.1	28.4			19.1	4.2		30.4		
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0		
Total Delay		48.4		74.1	28.4			19.1	4.2		30.4		
Queue Length 50th (ft)		93		41	30			51	1		150		
Queue Length 95th (ft)		#266		#201	109			125	16		#517		
Internal Link Dist (ft)		1209			1323			973			719		
Turn Bay Length (ft)				165					65				
Base Capacity (vph)		434		178	458			828	1115		1215		
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		0.85		0.86	0.29			0.33	0.12		0.54		

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 63.7

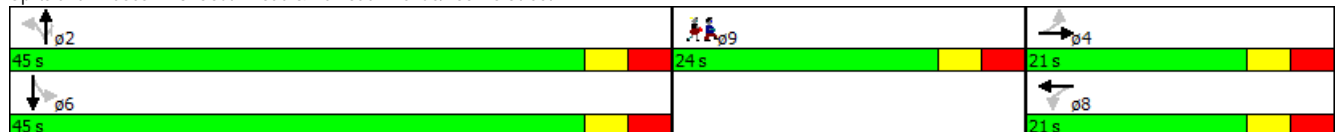
Natural Cycle: 90

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: South Road & Railroad Avenue/Loomis Street



HCM Signalized Intersection Capacity Analysis
 3: South Road & Railroad Avenue/Loomis Street

Future Volumes Existing Timing
 3/15/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Volume (vph)	26	143	74	124	104	4	49	138	96	34	523	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Flt		0.96		1.00	0.99			1.00	0.85		0.99	
Flt Protected		0.99		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)		1683		1752	1755			1756	1583		1844	
Flt Permitted		0.95		0.37	1.00			0.69	1.00		0.97	
Satd. Flow (perm)		1606		685	1755			1222	1583		1791	
Peak-hour factor, PHF	0.66	0.66	0.66	0.81	0.81	0.81	0.69	0.69	0.69	0.91	0.91	0.91
Adj. Flow (vph)	39	217	112	153	128	5	71	200	139	37	575	44
RTOR Reduction (vph)	0	16	0	0	2	0	0	0	77	0	3	0
Lane Group Flow (vph)	0	352	0	153	131	0	0	271	62	0	653	0
Heavy Vehicles (%)	8%	7%	9%	3%	7%	25%	9%	6%	2%	13%	0%	16%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		16.6		16.6	16.6			27.2	27.2		27.2	
Effective Green, g (s)		16.6		16.6	16.6			27.2	27.2		27.2	
Actuated g/C Ratio		0.25		0.25	0.25			0.41	0.41		0.41	
Clearance Time (s)		6.0		6.0	6.0			6.0	6.0		6.0	
Vehicle Extension (s)		2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)		399		170	436			498	645		730	
v/s Ratio Prot					0.07							
v/s Ratio Perm		0.22		c0.22				0.22	0.04		c0.36	
v/c Ratio		0.88		0.90	0.30			0.54	0.10		0.89	
Uniform Delay, d1		24.1		24.2	20.3			15.0	12.2		18.4	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		19.5		40.9	0.1			0.7	0.0		13.1	
Delay (s)		43.6		65.2	20.5			15.7	12.2		31.6	
Level of Service		D		E	C			B	B		C	
Approach Delay (s)		43.6			44.4			14.5			31.6	
Approach LOS		D			D			B			C	

Intersection Summary		
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.81	
Actuated Cycle Length (s)	66.7	Sum of lost time (s) 18.0
Intersection Capacity Utilization	82.1%	ICU Level of Service E
Analysis Period (min)	15	

c Critical Lane Group

Lanes, Volumes, Timings
 3: South Road & Railroad Avenue/Loomis Street

Future Volume Existing Timing PM
 3/15/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations		↕		↕	↕			↕	↕		↕		
Volume (vph)	21	125	20	113	92	29	43	562	357	24	89	16	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	165		0	0		65	0		0	
Storage Lanes	0		0	1		0	0		1	0		0	
Taper Length (ft)	25			25			25			25			
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1289			1403			1053			799		
Travel Time (s)		29.3			31.9			23.9			18.2		
Peak Hour Factor	0.69	0.69	0.69	0.77	0.77	0.77	0.97	0.97	0.97	0.86	0.86	0.86	
Heavy Vehicles (%)	0%	1%	0%	2%	2%	4%	9%	1%	1%	7%	0%	21%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	240	0	147	157	0	0	623	368	0	150	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		4			8			2			6		9
Permitted Phases	4			8			2		2	6			
Detector Phase	4	4		8	8		2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0	10.0	10.0	10.0		4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		16.0	16.0	16.0	16.0	16.0		23.0
Total Split (s)	21.0	21.0		21.0	21.0		46.0	46.0	46.0	46.0	46.0		23.0
Total Split (%)	23.3%	23.3%		23.3%	23.3%		51.1%	51.1%	51.1%	51.1%	51.1%		26%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		1.0
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0		
Lead/Lag													
Lead-Lag Optimize?													
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min		None
v/c Ratio		0.52		0.54	0.33			0.81	0.48		0.27		
Control Delay		31.9		39.2	26.9			26.9	10.6		14.1		
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0		
Total Delay		31.9		39.2	26.9			26.9	10.6		14.1		
Queue Length 50th (ft)		55		35	31			139	36		23		
Queue Length 95th (ft)		153		#148	112			433	151		85		
Internal Link Dist (ft)		1209			1323			973			719		
Turn Bay Length (ft)				165					65				
Base Capacity (vph)		465		273	481			1271	1167		903		
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		0.52		0.54	0.33			0.49	0.32		0.17		

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 63.7

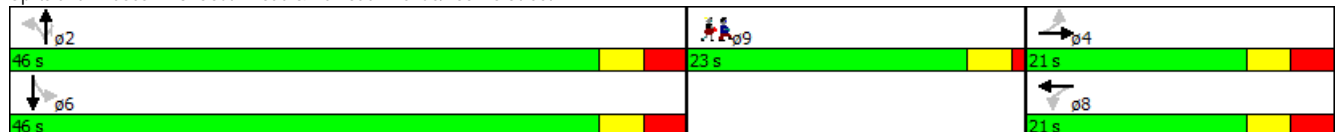
Natural Cycle: 90

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: South Road & Railroad Avenue/Loomis Street



HCM Signalized Intersection Capacity Analysis
 3: South Road & Railroad Avenue/Loomis Street

Future Volume Existing Timing PM
 3/15/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Volume (vph)	21	125	20	113	92	29	43	562	357	24	89	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.96			1.00	0.85		0.98	
Flt Protected		0.99		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)		1843		1770	1787			1864	1599		1780	
Flt Permitted		0.94		0.56	1.00			0.97	1.00		0.71	
Satd. Flow (perm)		1747		1038	1787			1813	1599		1284	
Peak-hour factor, PHF	0.69	0.69	0.69	0.77	0.77	0.77	0.97	0.97	0.97	0.86	0.86	0.86
Adj. Flow (vph)	30	181	29	147	119	38	44	579	368	28	103	19
RTOR Reduction (vph)	0	5	0	0	11	0	0	0	90	0	6	0
Lane Group Flow (vph)	0	235	0	147	146	0	0	623	278	0	144	0
Heavy Vehicles (%)	0%	1%	0%	2%	2%	4%	9%	1%	1%	7%	0%	21%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		16.7		16.7	16.7			27.0	27.0		27.0	
Effective Green, g (s)		16.7		16.7	16.7			27.0	27.0		27.0	
Actuated g/C Ratio		0.26		0.26	0.26			0.41	0.41		0.41	
Clearance Time (s)		6.0		6.0	6.0			6.0	6.0		6.0	
Vehicle Extension (s)		2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)		448		266	458			751	663		532	
v/s Ratio Prot					0.08							
v/s Ratio Perm		0.13		c0.14				c0.34	0.17		0.11	
v/c Ratio		0.52		0.55	0.32			0.83	0.42		0.27	
Uniform Delay, d1		20.8		21.0	19.6			17.0	13.5		12.6	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.5		1.4	0.1			7.2	0.2		0.1	
Delay (s)		21.3		22.4	19.7			24.2	13.7		12.7	
Level of Service		C		C	B			C	B		B	
Approach Delay (s)		21.3			21.0			20.3			12.7	
Approach LOS		C			C			C			B	

Intersection Summary		
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.64	B
Actuated Cycle Length (s)	65.1	Sum of lost time (s)
Intersection Capacity Utilization	65.9%	16.0
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

Appendix E

Design Designation Calculations

Project:	<u>Minuteman Extension</u>	Project #:	<u>09393.01</u>
Location:	<u>Bedford, MA</u>	Sheet:	<u>1 of 1</u>
Calculated by:	<u>AED</u>	Date:	<u>3/6/2017</u>
Checked by:	<u>PTN</u>	Date:	<u>3/6/2017</u>
Title:	<u>Design Designation Data - Railroad Avenue</u>		

$$2017 \text{ Average Daily Traffic (ADT)} = 1,258 + 1,186 = \boxed{2,444 \text{ vpd}}$$

Thurs 1-26-17

$$\text{Seasonally Adjusted ADT} = 2,444 * 0.00\% = \boxed{2,444 \text{ vpd}}$$

$$K \text{ Factor} = \frac{228 + 173}{2,444} = \boxed{0.16}$$

7:15 AM

$$D = \frac{228}{228 + 173} = \boxed{56.9\% \text{ EB}}$$

$$\text{Peak Hour \% Trucks} = \frac{10 + 13}{401} = \boxed{5.7\%}$$

$$\text{Daily \% Trucks} = \frac{18 + 40}{2,444} = \boxed{2.4\%}$$

2037 Design Year ADT =	Background:	2,444	*	(1+.005)^20	=	2,700
	Project:					
	Other Specific Projects:					
				Total:		$\boxed{2,700 \text{ vpd}}$

$$DHV = 2,700 * 0.16 = \boxed{443 \text{ vph}}$$

$$DDHV = 443 * 56.9\% = \boxed{252 \text{ vph}}$$

Project:	<u>Minuteman Extension</u>	Project #:	<u>09393.01</u>
Location:	<u>Bedford, MA</u>	Sheet:	<u>1 of 1</u>
Calculated by:	<u>AED</u>	Date:	<u>3/6/2017</u>
Checked by:	<u>PTN</u>	Date:	<u>3/6/2017</u>
Title:	<u>Design Designation Data - Concord Road</u>		

$$2017 \text{ Average Daily Traffic (ADT)} = \frac{4,926 + 4,979}{2} = \boxed{9,905 \text{ vpd}}$$

Thurs 1-26-17

$$\text{Seasonally Adjusted ADT} = 9,905 * 0.00\% = \boxed{9,905 \text{ vpd}}$$

$$\text{K Factor} = \frac{496 + 582}{9,905} = \boxed{0.11}$$

7:15 AM

$$D = \frac{582}{496 + 582} = \boxed{54.0\% \text{ WB}}$$

$$\text{Peak Hour \% Trucks} = \frac{3 + 7}{1,078} = \boxed{0.9\%}$$

$$\text{Daily \% Trucks} = \frac{49 + 52}{9,905} = \boxed{1.0\%}$$

2027 Design Year ADT =	Background:	9,905	*	(1+.005) ²⁰	=	10,944
	Project:					
	Other Specific Projects:					
				Total:		10,944 vpd

$$\text{DHV} = 10,944 * 0.11 = \boxed{1,191 \text{ vph}}$$

$$\text{DDHV} = 1,191 * 54.0\% = \boxed{643 \text{ vph}}$$

Project:	<u>Minuteman Extension</u>	Project #:	<u>09393.01</u>
Location:	<u>Bedford, MA</u>	Sheet:	<u>1 of 1</u>
Calculated by:	<u>AED</u>	Date:	<u>3/6/2017</u>
Checked by:	<u>PTN</u>	Date:	<u>3/6/2017</u>
Title:	<u>Design Designation Data - Hartwell Road</u>		

$$2017 \text{ Average Daily Traffic (ADT)} = 1,618 + 1,660 = \boxed{3,278 \text{ vpd}}$$

Wed 1-25-17

$$\text{Seasonally Adjusted ADT} = 3,278 * 0.00\% = \boxed{3,278 \text{ vpd}}$$

$$\text{K Factor} = \frac{265 + 119}{3,278} = \boxed{0.12}$$

4:30 PM

$$D = \frac{265}{265 + 119} = \boxed{69.0\% \text{ NB}}$$

$$\text{Peak Hour \% Trucks} = \frac{2 + 0}{384} = \boxed{0.5\%}$$

$$\text{Daily \% Trucks} = \frac{14 + 22}{3,278} = \boxed{1.1\%}$$

2027 Design Year ADT =	Background:	3,278	*	(1+.005) ²⁰	=	3,622
	Project:					
	Other Specific Projects:					
				Total:		$\boxed{3,622 \text{ vpd}}$

$$\text{DHV} = 3,622 * 0.12 = \boxed{424 \text{ vph}}$$

$$\text{DDHV} = 424 * 69.0\% = \boxed{293 \text{ vph}}$$