

# **Florence Road Traffic Study**



**Draft Report**

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Prepared under the direction of the Pioneer Valley Metropolitan Planning Organization for:  
City of Northampton

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## **I. INTRODUCTION**

Upon a request by the Northampton Transportation and Parking Committee, the Pioneer Valley Planning Commission (PVPC) identified the Dingle neighborhood in Florence - Northampton as a candidate for further study to identify the impacts of recent changes to traffic flow in this area. This report studies portions of Florence Road, Scanlon Avenue, Ryan Road, Pine Street and Bliss Street in the City of Northampton. This study was included as part of the federal fiscal year 2007 Unified Planning Work Program (UPWP) for the Pioneer Valley Metropolitan Planning Organization.

### **A. STUDY AREA**

Traffic in the study area had been impacted by roadway changes over the past ten years. Traffic flows are affected by a newly opened bridge on Bliss Street and a one-way street designation from an original two-way street on Scanlon Avenue. Figure I-1 presents an aerial map of the study area and the data collection locations. Located on the northwest part of the city, a mile to the west of Cooley Dickinson Hospital, the Dingle neighborhood serves as a connector between the new residential development at the outskirts of the city and roads leading to downtown Northampton. It is a predominantly residential neighborhood bordered by industrial and commercial uses to the north in addition to the Florence Community Center. All intersections in this study area operate under "STOP" sign control.

One travel lane is provided for all approaches with a posted speed limit of 30 miles per hour (mph) except for two locations on Florence Road where the speed limit is reduced to 20 mph. This occurs for Southbound traffic after its intersection with Pine Street and in the Northbound direction before its intersection with Cross Street. Sidewalks are limited to certain parts of Ryan Road, Florence Road and Pine Street. The 50 foot long pedestrian crosswalk from Ryan Road across Florence Road can be dangerous due to the length of the crossing with no refuge island and the exiting sight distance problem at that intersection. At the time of the field inventory, pavement conditions were observed to be good, and curbing was granite.

The unsignalized intersection of Florence Road with Ryan Road is a three-way intersection with Ryan Road operating under stop sign control. About 420 feet away from this intersection is the unsignalized four-way intersection of Florence Road and Pine Street through which most traffic travels from and to downtown Northampton. This creates congestion and long queues for vehicles attempting to make a left turn from Ryan Road onto Florence Road Northbound.

### **B. PUBLIC PARTICIPATION**

The Pioneer Valley Planning Commission in conjunction with the Parking and Transportation Committee of Northampton, held a public meeting to discuss the study area and the scope of the project. The goal of the meeting was to hear the residents' first hand experience with traffic in their neighborhood. In this meeting, residents shared their

concerns, observations, and suggestions for traffic improvements at this location. Traffic problem locations and optimal placement of traffic counters were discussed with the residents. After the initial site visit, traffic counts were gathered to determine the volume, speed, and vehicle types traversing this area at each of the seven locations.

Traffic counts prior to the opening of the bridge and the designation of Scanlon Ave as a one way street were obtained for a comparison of the before and after conditions. Also, crash data was gathered to determine the safety of the current intersections in the study area. The Pioneer Valley Planning Commission collected the necessary traffic data in the vicinity of the study area to analyze existing traffic operations and propose recommendations as appropriate to improve traffic flow and increase safety.

**Figure I-1 Florence - Northampton Study Area**



- ① Turning Movement Count Location
- A Daily Volume Count Location

## II. EXISTING TRANSPORTATION CONDITIONS

This section provides a technical evaluation of the transportation components of the study area. It includes a presentation of the data collected, crash experience and operations analyses to the overall performance and safety of these intersections.

### A. DATA COLLECTION

Comprehensive data collection was conducted for this study to identify existing deficiencies. This activity consisted of obtaining traffic volumes, crash experience, and observations of traffic patterns in the study area.

#### 1. *Hourly Vehicle Volume*

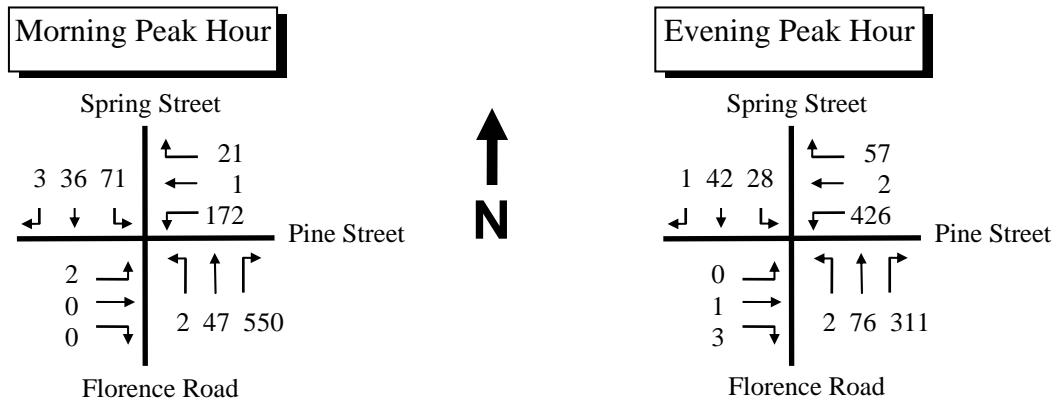
Manual Turning Movement Counts (TMC's) were conducted at each intersection in the study area. The TMC's were conducted during the peak commuter periods. The peak periods occurs during the morning hours of 7:00 AM to 9:00 AM and the afternoon hours of 4:00 PM to 6:00 PM. At each location the TMC's were conducted to identify the highest four consecutive 15-minute periods of traffic through the intersection. These consecutive peak 15-minute periods constitute a location's "Peak Hour Volume". The peak hour of traffic volume represents the most critical period for operations and will be the focus for some of the analyses conducted in this study.

As traffic volumes tend to fluctuate over the course of the year, the Massachusetts Highway Department (MassHighway) develops traffic volume adjustment factors to reflect monthly variations. These factors were examined to determine how traffic conditions in the study area compare to average month conditions in accordance with the month that this intersection was studied.

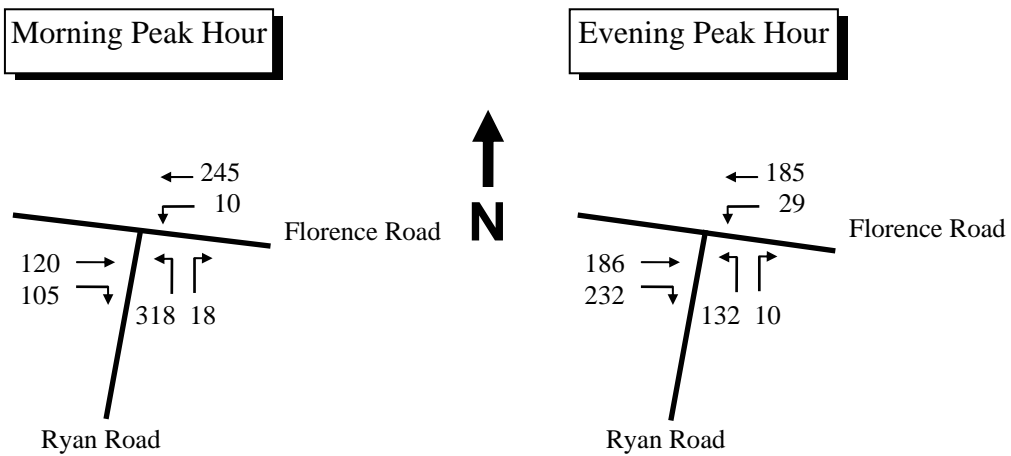
Based on the MassHighway data, traffic volumes collected during the months of April, May, and June are estimated to be higher than the annual average. Therefore, the traffic count data was adjusted to reflect average month conditions. Turning movement count data for the morning and afternoon peak hours are summarized on Figures II-1 to II-7 for the seven intersections in this study. These seven intersections include:

1. Florence Road at Pine Street
2. Florence Road at Ryan Road
3. Florence Road at Cross Street
4. Florence Road at Scanlon Avenue
5. Bliss Street at Scanlon Avenue
6. Bliss Street at Cross Street
7. Bliss Street at Nonotuck Street

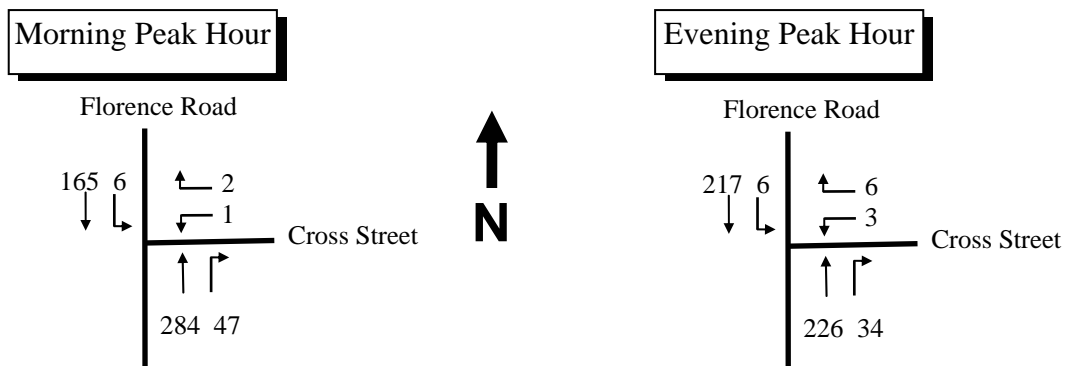
**Figure II-1 Florence Road and Pine Street Morning and Afternoon Peak Hour Traffic Volumes**



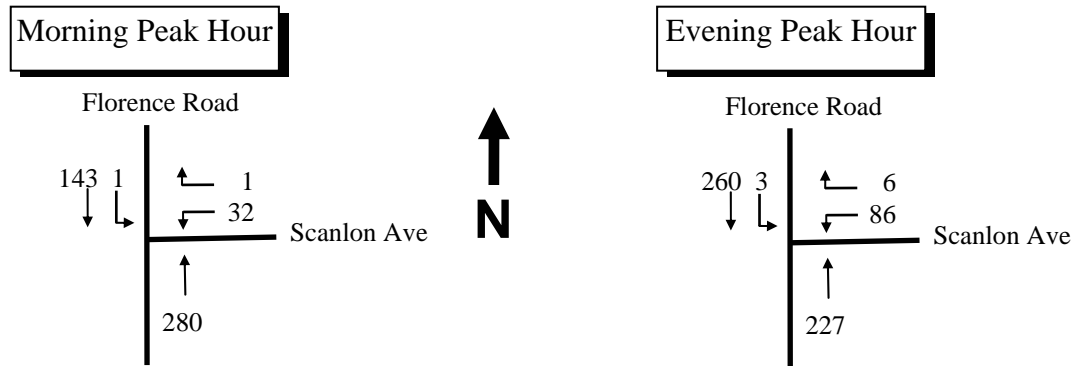
**Figure II-2 Florence Road and Ryan Road Morning and Afternoon Peak Hour Traffic Volumes**



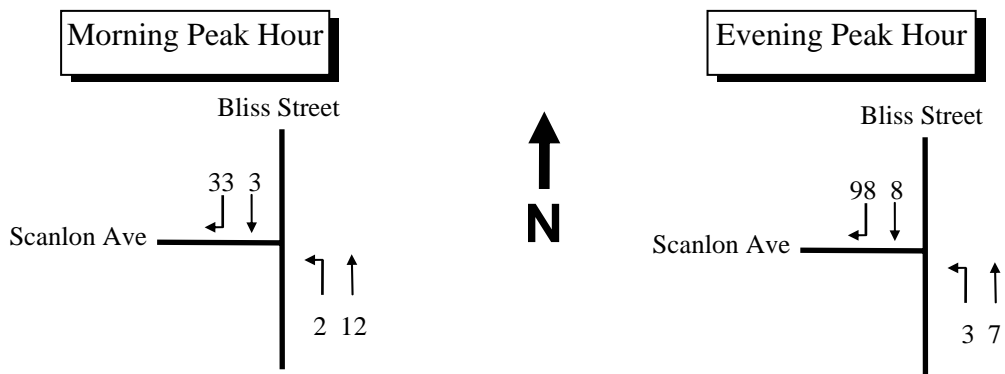
**Figure II-3 Florence Road and Cross Street Morning and Afternoon Peak Hour Traffic Volumes**



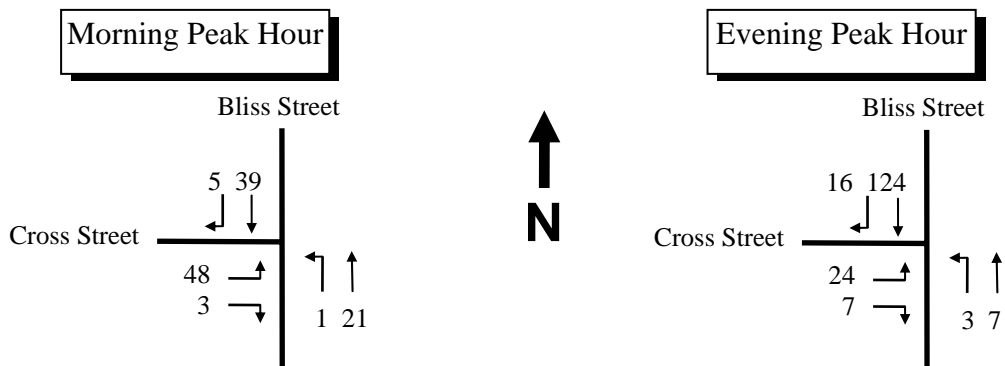
**Figure II-4 Florence Road and Scanlon Avenue Morning and Afternoon Peak Hour Traffic Volumes**



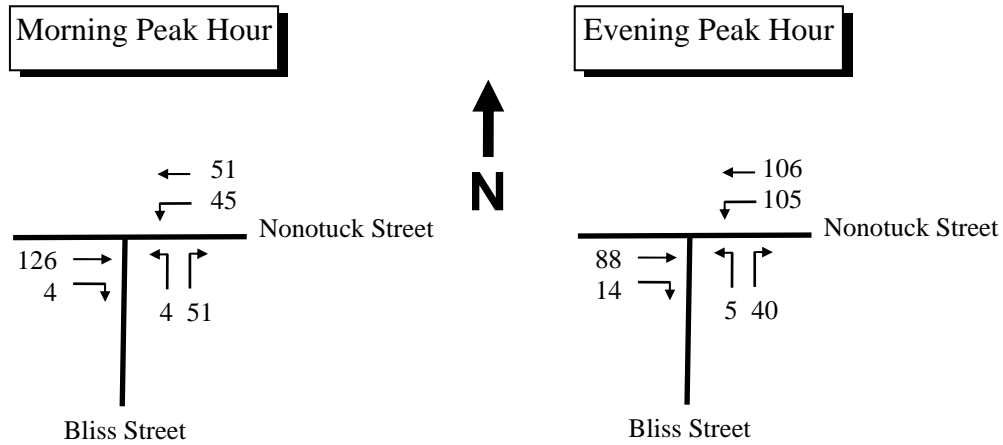
**Figure II-5 Bliss Street and Scanlon Avenue Morning and Afternoon Peak Hour Traffic Volumes**



**Figure II-6 Bliss Street and Cross Street Morning and Afternoon Peak Hour Traffic Volumes**



**Figure II-7 Bliss Street and Nonotuck Street Morning and Afternoon Peak Hour Traffic Volumes**



*2. Daily Vehicle Volume*

Daily vehicle volumes were gathered for eight key locations in the study area that were agreed upon between neighborhood residents and planning staff. Current Annual Average Daily Traffic (AADT) volumes were calculated for these locations and compared to traffic volumes in 2000 before the major traffic changes were implemented (Table II-1). In general, an increase in traffic volume over the span of seven years reflects the expected population growth. A decrease in traffic volumes on Scanlon Avenue reflects its designation into a one-way street in the Westbound direction. It also explains the reduction in traffic volumes on Bliss Street Northbound due to the elimination of eastbound traffic on Scanlon Avenue, which would have fed into Bliss Street previously. A high increase in traffic on Pine Street in both directions may be due to the elimination of cut through traffic heading into downtown Northampton through the eastbound direction of Scanlon Avenue.

**Table II-1 Annual Average Daily Traffic**

<b>Label</b>	<b>Location</b>	<b>Direction</b>	<b>2000 Volume</b>	<b>2007 Volume</b>	<b>Increase/Decrease</b>
<b>A</b>	<b>Florence Road</b>	NB	4464	5236	+
	(Between Florence Pond Road and Ryan Road)	SB	4760	4301	-
<b>B</b>	<b>Florence Road</b>	NB	2172	3523	+
	(Between Cross Street and Scanlon Avenue)	SB	2126	2582	+
<b>C</b>	<b>Florence Road</b>	NB	3179	2956	-
	(South of Scanlon Avenue)	SB	3172	2883	-
<b>D</b>	<b>Scanlon Avenue</b>	EB	1077	9	-
	(Between Florence Road and Bliss Street)	WB	1067	805	-
<b>E</b>	<b>Bliss Street</b> (North of Cross Street, 2007)	NB	1085	574	-
<b>E</b>	<b>Bliss Street</b> (North of Scanlon Avenue, 2000)	SB	1100	1033	-
<b>F</b>	<b>Pine Street</b> (East of Spring Street, 2007)	EB	1924	5150	+
<b>F</b>	<b>Pine Street</b> (West of Maple Street, 2000)	WB	1536	4763	+
<b>G</b>	<b>Cross Street</b>	EB	-	351	
	(Between Florence Road and Bliss Street)	WB	-	239	
<b>H</b>	<b>Ryan Road</b>	EB	2730	2776	+
	(Between Florence Road and Clark Street)	WB	2814	2746	-

*Volumes are adjusted using 2007 Weekday Seasonal Factors provided by MassHighway Department.*

### 3. Vehicle Classification

Classification counts were conducted at all of the daily traffic count locations. Vehicles are classified based on the number of axles and the distance between each axle. Two axle, six tire vehicles and vehicles with three or more axles are classified as a “truck” or heavy vehicle. The percentage of heavy vehicle traffic on a roadway is important, as large vehicles have different operating characteristics than normal passenger vehicles. This information is also an important factor in the pavement design of a roadway. This information is shown in Table II-2.

While potentially there are some trucks on the roads of the study area, in general, they are the smaller type and not tractor trailers. According to our counting equipment, the percentage of heavy vehicles falls below the threshold of 5% and thus it does not warrant action. In this study, heavy vehicles are defined as buses, 2 Axle 6 Tire, and three or more axle vehicles. This does not include smaller trucks such as the ones used by postal services. It is interesting to note that 8% of the vehicles traveling west on Scanlon Avenue are two axle six tire vehicles.

**Table II-2 Vehicle Classification Data**

	Location and Direction		Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	> 3 Axles	% Heavy Vehicles
<b>A</b>	<b>Florence Road</b>	NB	2%	86%	10%	0%	1%	1%	0%	2%
	(Between Florence Pond Road and Ryan Road)	SB	2%	76%	17%	0%	2%	1%	1%	5%
<b>B</b>	<b>Florence Road</b>	NB	1%	76%	19%	1%	3%	0%	0%	4%
	(Between Cross Street and Scanlon Avenue)	SB	2%	75%	19%	1%	2%	1%	0%	4%
<b>C</b>	<b>Florence Road</b>	NB	1%	82%	14%	0%	2%	0%	0%	3%
	(South of Scanlon Avenue)	SB	1%	67%	26%	1%	5%	0%	0%	6%
<b>D</b>	<b>Scanlon Avenue</b>	EB	0%	92%	4%	0%	4%	0%	0%	4%
	(Between Florence Road and Bliss Street)	WB	2%	62%	28%	0%	8%	0%	0%	8%
<b>E</b>	<b>Bliss Street</b>	NB	0%	88%	11%	0%	1%	0%	0%	1%
	(North of Cross Street)	SB	0%	86%	12%	0%	1%	0%	0%	1%
<b>F</b>	<b>Pine Street</b>	EB	2%	83%	12%	0%	2%	1%	1%	3%
	(East of Spring Street)	WB	2%	80%	14%	0%	2%	1%	0%	3%
<b>G</b>	<b>Cross Street</b>	EB	0%	61%	33%	0%	6%	0%	0%	6%
	(Between Florence Road and Bliss Street)	WB	1%	86%	12%	0%	1%	0%	0%	1%
<b>H</b>	<b>Ryan Road</b>	EB	1%	63%	29%	0%	6%	1%	0%	7%
	(Between Florence Road and Clark Street)	WB	1%	84%	13%	0%	1%	1%	0%	2%

#### 4. Vehicle Travel Speeds

Travel Speed data was collected at all of the daily traffic count locations. This data was used to establish “bins” of data to summarize the ranges in which vehicles were measured to be traveling. Speed data was also used to calculate the “85<sup>th</sup> Percentile” Speed for each direction on the roadway. The 85<sup>th</sup> Percentile Speed is defined as the speed that 85 percent of all traffic is traveling at or below. This method is typically used to establish the posted speed limit on a roadway. By comparing the 85<sup>th</sup> Percentile Speed to the posted speed limit a community can determine how well traffic is complying with the current posted speed limits and if increased enforcement of the posted speed limits is necessary. Speed data is summarized in Tables II-3 and II-4. Based on the speed data, most vehicles appear to be driving faster than the posted speed limits.

The highest travel speeds occurred along Ryan Road where 71% of vehicles were recorded to travel between 36-45 mph in the eastbound direction. A total of 61% of vehicles on Florence Road both south of Cross Street and south of Scanlon Avenue were recorded to travel between 36-45 mph in the southbound direction. Travel speeds for vehicles on Scanlon Avenue in the Eastbound direction are the result of vehicles traveling the wrong way. A total of 53 vehicles were recorded to drive in the wrong direction on Scanlon Avenue during the duration of the count over a one-week period.

**Table II-3 Travel Speed Breakdown**

Location and Direction		0-15 mph	16-20 mph	21-25 mph	26-30 mph	31-35 mph	36-40 mph	41-45 mph	46-50 mph	51-55 mph	> 55 mph
<b>A</b>	<b>Florence Road</b>	NB	7%	17%	53%	22%	1%	0%	0%	0%	0%
	(Between Florence Pond Road and Ryan Road)	SB	24%	20%	48%	8%	0%	0%	0%	0%	0%
<b>B</b>	<b>Florence Road</b>	NB	12%	1%	2%	10%	32%	34%	8%	1%	0%
	(Between Cross Street and Scanlon Avenue)	SB	8%	0%	1%	4%	22%	44%	18%	2%	0%
<b>C</b>	<b>Florence Road</b>	NB	5%	0%	1%	9%	46%	35%	4%	0%	0%
	(South of Scanlon Avenue)	SB	4%	0%	1%	5%	25%	44%	18%	2%	0%
<b>D</b>	<b>Scanlon Avenue</b>	EB	74%	9%	6%	8%	0%	4%	0%	0%	0%
	(Between Florence Road and Bliss Street)	WB	5%	5%	24%	38%	18%	7%	2%	1%	0%
<b>E</b>	<b>Bliss Street</b>	NB	38%	22%	33%	7%	0%	0%	0%	0%	0%
	(North of Cross Street)	SB	5%	25%	57%	12%	0%	0%	0%	0%	0%
<b>F</b>	<b>Pine Street</b>	EB	5%	1%	14%	53%	25%	2%	0%	0%	0%
	(East of Spring Street)	WB	6%	3%	13%	39%	33%	6%	0%	0%	0%
<b>G</b>	<b>Cross Street</b>	EB	12%	9%	23%	34%	18%	3%	1%	0%	0%
	(Between Florence Road and Bliss Street)	WB	44%	7%	23%	21%	5%	1%	0%	0%	0%
<b>H</b>	<b>Ryan Road</b>	EB	3%	0%	1%	3%	16%	43%	28%	5%	1%
	(Between Florence Road and Clark Street)	WB	7%	0%	2%	10%	44%	31%	5%	0%	0%

**Table II-4 85<sup>th</sup> Percentile Speeds (in mph)**

Location and Direction			Posted Speed	85 <sup>th</sup> Percentile
<b>A</b>	<b>Florence Road</b>	NB	20	30
	(Between Florence Pond Road and Ryan Road)	SB	20	30
<b>B</b>	<b>Florence Road</b>	NB	20	40
	(Between Cross Street and Scanlon Avenue)	SB	30	42
<b>C</b>	<b>Florence Road</b>	NB	30	39
	(South of Scanlon Avenue)	SB	30	42
<b>D</b>	<b>Scanlon Avenue</b>	EB	30	23
	(Between Florence Road and Bliss Street)	WB	30	34
<b>E</b>	<b>Bliss Street</b> (North of Cross Street, 2007)	NB	30	30
	<b>Bliss Street</b> (North of Scanlon Avenue, 2000)	SB	30	30
<b>F</b>	<b>Pine Street</b> (East of Spring Street, 2007)	EB	30	33
	<b>Pine Street</b> (West of Maple Street, 2000)	WB	30	34
<b>G</b>	<b>Cross Street</b>	EB	30	31
	(Between Florence Road and Bliss Street)	WB	30	30
<b>H</b>	<b>Ryan Road</b>	EB	30	44
	(Between Florence Road and Clark Street)	WB	30	39

## B. CRASH EXPERIENCE

To identify any existing safety problems, crash information was gathered for the intersection based on data provided by the Northampton Police Department for the period from January 2004 through December 2006. Table II-5 summarizes the number of crashes by type for this period to identify any common conditions and possible causes.

The crash rate per million entering vehicles was calculated. In theory, crash rates can increase as the traffic volume along the roadway increases or as the potential for conflict is increased. The crash rate per million entering vehicles takes into consideration the number of crashes at an intersection and the number of vehicles that enter the intersection over the course of an average day. Based on MassHighway data, the average crash rate for an unsignalized intersection in the MassHighway District 2 region is 0.85. The crash rates for the five intersections of the Dingle neighborhood were calculated in Table II-5 and show that all had a lower crash rate than the state average.

**Table II-5 Crash History Summary**

Intersection	Year	Number of Crashes	Type of Crash		Severity		Road Condition		Crash Rate
<b>Florence Road</b>	2006	1	Angle	4	Property	6	Wet		0.61
<b>with</b>	2005	2	Sideswipe		Injury	1	Dry		
<b>Ryan Road</b>	2004	3	Rear End	1			Ice		
	<b>Total</b>	6	Fixed object				Sand, mud		
			Head On	1			Unknown	6	
<b>Florence Road</b>	2006	1	Angle		Property	2	Wet		0.28
<b>with</b>	2005		Sideswipe		Injury	1	Dry		
<b>Scanlon Ave</b>	2004	1	Rear End	1			Ice		
	<b>Total</b>	2	Fixed object	1			Sand, mud		
			Head On				Unknown	6	
<b>Cross Street</b>	2006	1	Angle	1	Property	1	Wet		0.43
<b>with</b>	2005		Sideswipe		Injury	1	Dry		
<b>Bliss Street</b>	2004		Rear End				Ice		
	<b>Total</b>	1	Fixed object				Sand, mud		
			Head On				Unknown	1	
<b>Scanlon Ave</b>	2006		Angle	1	Property	1	Wet		0.71
<b>with</b>	2005	1	Sideswipe		Injury		Dry		
<b>Bliss Street</b>	2004		Rear End				Ice		
	<b>Total</b>	1	Fixed object				Sand, mud		
			Head On				Unknown	1	
<b>Nonotuck Street</b>	2006		Angle	1	Property	1	Wet		0.23
<b>with</b>	2005		Sideswipe		Injury	1	Dry		
<b>Bliss Street</b>	2004	1	Rear End				Ice		
	<b>Total</b>	1	Fixed object				Sand, mud		
			Head On				Unknown	1	

Source: Northampton Police Department 2004-2006.

The majority of the crashes at these intersections were angle-type crashes that occurred during mostly during daylight. No fatalities were reported at these intersections within the study period from 2004 to 2006.

A number of factors can contribute to the crashes that have occurred in the study area. The heavy traffic volume on Florence Road may not allow traffic on Ryan Road to enter the intersection. This creates a traffic queue on Ryan Road and potentially on Florence Road as well. This congestion situation can increase driver anxiety and impatience which may result in them taking higher risks to merge into traffic. On the other hand, drivers in a rush towards downtown Northampton may not slow down enough to assess the conditions of a clear intersection before passing the intersection. Left turning vehicles from Ryan Road have sight distance restrictions to the south due to roadway design which may contribute to safety hazards. This problem becomes worse during peak hour congestion.

### C. ANALYSIS PROCEDURES

#### 1. Capacity Analysis

The study area was examined with regard to capacity and delay characteristics to determine the existing Level of Service (LOS). LOS is an indicator of the operating conditions which occur on a roadway under different volumes of traffic and is defined in the 2003 Highway Capacity Manual by six levels, “A” through “F”. A number of operational factors can influence the LOS including geometry, travel speeds, and delay. Table II-6 presents a summary of the LOS at an unsignalized intersection.

Depending on the time of day and year, a roadway may operate at varying levels of service. Level of Service “A” represents the best operating conditions and is an indicator of ideal travel conditions with vehicles operating at or above posted speed limits with little or no delays. Conversely, LOS “F”, or failure, generally indicates forced flow conditions illustrated by long delays and vehicle queues. Level of Service “C” indicates a condition of stable flow and is generally considered satisfactory in rural areas. Under LOS “D” conditions, delays are considerably longer than under LOS “C”, but are considered acceptable in urban areas. At LOS “E” the roadway begins to operate at unstable flow conditions as the facility is operating at or near its capacity.

**Table II-6 Level of Service (LOS) Designations - Unsignalized Intersections**

Average Control Delay (s/veh)	LOS	Expected Delay To Minor Street
0.0 to 10.0	A	Little or no delay
>10.0 to 15.0	B	Short traffic delays
>15.0 to 25.0	C	Average traffic delays
>25.0 to 35.0	D	Long traffic delays
>35.0 to 50.0	E	Very long delays
>50.0	F	Extreme delays

The basic assumption at an unsignalized intersection is that through moving traffic on the major street is not hindered by other movements. In reality, as minor street delays increase, vehicles are more likely to accept smaller gaps in the traffic stream causing through-moving vehicles to reduce speed and suffer some delay. The left turn movement off the minor street approach is the most heavily opposed movement and typically suffers the greatest delay. Therefore, this movement is used as a gauge to determine the overall operations at an unsignalized intersection. Table II-7 presents a summary of the Level of Service for the unsignalized intersections in this study.

**Table II-7 Level of Service of the Unsignalized Intersections**

Intersection Label	Location	AM Peak Hour		PM Peak Hour	
		LOS**	Delay*	LOS**	Delay*
1	<b>Florence Road at Pine Street</b>				
	Florence Road NB (Left Turn)	A	7.3	A	7.3
	Spring Street SB (Left Turn)	A	9.4	A	8.2
	Florence Pond Road EB (All Moves)	C	15.3	A	10.0
	Pine Street WB (All Moves)	C	24.7	E	45.6
2	<b>Florence Road at Ryan Road</b>				
	Florence Road NB (Left Turn)	A	7.8	A	8.5
	Ryan Road EB (All Moves)	D	27.9	C	18.5
3	<b>Florence Road at Cross Street</b>				
	Florence Road SB (Left Turn)	A	8.1	A	7.9
	Cross Street WB (All Moves)	B	11.1	B	10.5
4	<b>Florence Road at Scanlon Avenue</b>				
	Scanlon Avenue WB (All Moves)	B	11.9	B	13.6
5	<b>Bliss Street at Scanlon Avenue</b>				
	Bliss Street NB (Left Turn)	A	7.3	A	7.6
6	<b>Bliss Street at Cross Street</b>				
	Bliss Street NB (Left Turn)	A	7.3	A	7.6
	Cross Street EB (All Moves)	A	9.3	A	9.6
7	<b>Bliss Street at Nonotuck Street</b>				
	Bliss Street NB (Left Turn)	A	9.4	A	9.7
	Nonotuck WB (All Moves)	A	7.7	A	7.8

\* = Delay Measured in Seconds per Vehicle

\*\* = Level of Service

EB = Eastbound

SB = Southbound

Based on the results of the analysis, there is significantly more delay in the study area in the afternoon peak hour, particularly on Pine Street when it operates at a Level of Service (LOS) “E”. Traffic on Ryan Road operates under a LOS “D” during the morning peak hour period due to the high volume of traffic on Florence Road. The remaining approaches in the study area operate with fewer delays under LOS “A”, “B”, and “C”. Delays on Pine Street and Ryan Road maybe due to higher number trips to work and school in the morning, and back from work or school in the evening by the residents in this neighborhood and surrounding residential areas.

## *2. Multiway Stop Analysis*

The traffic capacity analysis identified the first two intersections as candidates for further study to improve their existing level of service (LOS). This analysis includes the intersections of Florence Road at Pine Street and Florence Road at Ryan Road. Implementing a multiway stop could improve the level of service on Pine Street in the westbound direction during the afternoon peak hour, currently at LOS E. It may also help improve traffic on Ryan Road in the eastbound direction during the morning peak hour, currently at LOS D. Therefore, the following analyses are conducted to determine whether a multiway stop is warranted at either of these two intersections.

According to the Manual on Uniform Control Devices (MUTCD) Section 2B.07, a multiway stop control can be useful as a safety measure at intersections under certain conditions especially when the volumes of the intersecting streets are almost equal. The first two criteria for considering a multiway stop sign control are not met at these two intersections because a traffic signal is not justified and reported crashes do not amount to 5 or more per year. The third criterion involves meeting minimum volumes. Under this criterion, there needs to be at least 300 vehicles per hour average on both approaches for a major street during any 8 hours on an average day. The combined vehicular, pedestrian and bicycle entering traffic from the minor street approaches need to be at least 200 for the same eight hours with delays on the minor street of at least 30 seconds per vehicle during highest hour. Should the 85<sup>th</sup> percentile approach speed of the major street traffic exceeds 40 miles per hour, current values need to be within 70% of the above values.

Currently, the minor street volumes do not meet the multiway stop sign warrant for Ryan Road, since volumes on Ryan Road do not exceed the 200 vehicle requirement for an 8 hour period. On the other hand, traffic volumes at the Pine Street and Florence Road intersection meet this warrant. Other criteria that need to be considered when evaluating the effectiveness of a multiway stop at this intersection include the need to control left-turn conflicts and vehicle/pedestrian conflicts.

## *3. Roundabout Analysis*

The intersection of Pine Street with Florence Road was also analyzed to see if it can benefit from the introduction of a roundabout to manage its traffic volume, especially during peak hours. According to the “Roundabouts Informational Guide”, an intersection with volumes smaller than 20,000 vehicles per day can benefit from the construction of a single-lane roundabout. Construction of a roundabout at this intersection would likely require the acquisition of private land. A roundabout would assist in reducing delays on the Pine Street approach to the intersection while effectively managing travel speeds through the intersection. It is recommended that the City of Northampton consult with a licensed professional engineer to determine the feasibility of constructing a roundabout at this location.

### III. TRANSPORTATION RECOMMENDATIONS

Based on the analysis of the existing conditions and observations from visiting the site, the following recommendations were developed to address existing traffic deficiencies and improve safety at the selected seven intersections in the Dingle neighborhood.

- At the time of the field inventory, the lane markings were slightly faded at the various intersections. Re-painting these lines can direct traffic more efficiently and safely.
- Improvements to existing signage in the study area are highly recommended. In addition to replacement of worn out signs, It is recommended that the height of the signs to be raised to a more visible location, and foliage covering signs be pruned. In the vicinity of the intersections of Florence Road with Pine Street and Florence Road with Ryan Road, signs were noted to be deteriorating as well as being installed at a lower height that could pose safety problems for pedestrians as well as interfere with their visibility. In addition, some of the speed signs are worn out and need replacing.
- The Speed Limit sign on Florence Road south of Florence Pond Road in the southbound direction is almost entirely concealed by heavy foliage and is peeling off the metal plate. It is also recommended that trees around the intersection of Florence Road and Pine Street be pruned to allow clear visibility of signs and provide enough head clearance for pedestrians on the sidewalk on Pine Street Westbound abutting the Elk's lodge parking lot. Tree branches at this location have grown too low and pedestrian have to bend down to avoid hitting them. A recent visit to the location showed that this issue has been addressed and that the trees have been pruned to ensure visibility.
- It is recommended that proper advance warning signs of upcoming intersections on Florence Road be installed. A warning sign indicating an intersection ahead placed before Scanlon Avenue and Cross Street on Florence Road Northbound is needed. Also, a second pair of ONE WAY and DO NOT ENTER signs should be installed on the Westbound approach of Scanlon Avenue at the intersection with Florence Road. This could assist in preventing traffic from traveling in the wrong direction on Scanlon Avenue. The current "No Right Turn" sign before Scanlon Avenue on Florence Road Northbound is too small and thus does not give enough prior warning of the upcoming intersection. A clearly visible sign is needed before the crosswalk on Florence Road such as with a flashing feature to indicate the need to slow down before the "Crosswalk Ahead".
- During the site visit it was noted that there is a lack of connectivity of sidewalks on Florence Road and Bliss Street. The sidewalk on Florence Road Southbound between Pine Street and Ryan Road should be continued down to Ryan Road. Currently there is a wheel chair ramp at the intersection of Florence Road with Ryan Road that does not lead to any sidewalk. This also applies to Bliss Street Southbound between Cross Street and Scanlon Avenue where a pedestrian trail is currently visible

in the grass and would provide a natural continuation to the sidewalk on the west side of the bridge along Bliss Street.

- Traffic calming of vehicular speeds on both Ryan and Florence Roads can potentially be addressed by reducing the existing travel lane width. The City of Northampton should consider painting a 6 inch wide edge line to delineate an 11 foot travel lane in each direction. This reduced lane width can be very effective in reducing travel speeds. The city should also consider placement of radar speed signs along Florence Road and Ryan Road. These solar powered signs are similar in size to an existing speed limit sign, but instead use a LED display to make motorists aware of their actual speed.
- It is recommended that the existing unsignalized intersection of Ryan Road with Florence Road be included in a future design project to redesign the intersection. Field observations by PVPC noted that vehicles tend to cross the centerlines of this intersection while turning. It is noted that the radius of Ryan Road that is closer to Pine Street is problematic for larger vehicles. Such vehicles often have to cross the centerline on Ryan Road to achieve this turn while veering away from the right side of the lane. Implementation of a new centerline on Ryan Road to allow larger vehicles to turn safely from Florence onto Ryan by increasing the width of the Westbound lane by one foot and decreasing the width of the Eastbound lane could improve the efficiency of traffic operations in this area. On Ryan Road, currently the Eastbound lane is 16 feet wide, while the Westbound lane is only 14 feet wide. As a short term solution, moving the centerline one foot south could possibly solve this problem and allow for better vehicular turns at a 15 foot lane width from the centerline.

In addition, vehicles were noted to pass the stop line on Ryan Road eastbound to establish a clear line of sight before turning. It is recommended that the City of Northampton consider advancing an engineering study to determine whether the existing alignment can be modified to provide a reduced turning radius for larger vehicles from Ryan Road onto Florence Road southbound. A redesign of the turning radius for Ryan Road onto Florence Road will allow the existing STOP line to be moved closer to the roadway and provide better sight distance. It also reduces the length of the existing pedestrian crosswalk by approximately 10 – 15 feet.

- The intersection of Florence Road and Spring Street, with Pine Street and Florence Pond Road currently meets the minimum volume requirements for a multiway “STOP” sign installation. It is recommended that the City of Northampton consider the installation of multiway “STOP” signs at this intersection on a trial basis. If traffic congestion improves as a result of the multiway “STOP” signs, it is recommended they be retained on a permanent basis. In the long term, the City should consider obtaining the services of a licensed professional engineer to determine the feasibility of constructing a single-lane roundabout at this intersection. This may require the acquisition of private land. A roundabout could improve traffic

flow and safety at this intersection, assist in controlling travel speeds through the intersection, and reduce the need for vehicles to stop at the intersection.

- Some of the residents suggested the design of a new connector road between Ryan Road and Florence Pond Road to alleviate some of the existing traffic delays. This endeavor can be cost prohibitive due to design, construction, and property acquisition costs. An existing utility easement exists between Ryan Road and Florence Pond Road that could potentially accommodate this proposed connector roadway. The PVPC does not recommend advancement of this recommendation due the high cost of construction and potential issues regarding slope and impacts to the environment.

## IV. APPENDIX

April 24, 2007 Public Meeting Summary

### List of Problems:

- Too much traffic (Can't enter on Ryan Road from residences)
- Type of traffic
- Speed of traffic
- Landfill traffic
- Narrowness of Scanlon Ave (Not appropriate for trucks)
- Lower Florence Road problems
- Shortage of sidewalks
- Limited visibility from cross street
- Pedestrian safety issues
- Cross Street cut-throughs
- Not accessible for disabled
- Ryan Road STOP sign too far back
- Utility pole locations
- Truck traffic on Ryan Road
- Speed around corner at Florence/Ryan
- Noise
- Enforcement
  - Two local day care (Scanlon and Bliss)
  - Lot of pedestrian traffic
- Traffic from Burts Pitt Road (new development impacts)
- 34-40 on Bliss Street
- Safety issues of two-way traffic on Scanlon (many children)
- Recent traffic problems due to flooding
- Loading dock issues (block traffic)
- Wrong way traffic on Scanlon

### Data Needed:

- Chief Siekiewicz counts (talk to chief)
- Count by State in 1980's (what is the count history)
- Check Florence/Burts Study speeds
- Do sidewalk inventory
- Check Functional Class

**Suggested Solutions:**

- New connection from Ryan Road? (Less traffic on Florence Pond Road)
- Is the intersection the problem?
- Check proposed new development
- Widen Scanlon Road
- Sidewalk on Bliss
- Change curves on Florence Road (connect Pine to Ryan)
- Restrict Traffic (truck exclusion)
- Enforcement
- Development impact fees
- Divert traffic to cross street
- Fix Stopping Sight Distance (SSD)
- Fix sidewalks (maintain brush)
- Speed trailers
- Traffic light at Florence/Ryan

**Questions Raised:**

- Appropriateness of one way on Scanlon
- Can you reverse one-way traffic on Florence (Scanlon) Road? (Some residents are apposed)