



# McCall Middle School Expansion Project Transportation Safety Study

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The Town of  
Winchester, MA

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## Introduction

In conjunction with the McCall Middle School Expansion project, the Town of Winchester retained Toole Design to prepare a traffic study with the goal of enhancing safety for the student population. Toole Design has prepared this multimodal transportation report to inform recommendations and conceptual roadway design plans for the McCall Middle School Expansion project. This report documents the existing data collection effort, the evaluation of safety, school-related activity, traffic analysis under existing and future build conditions, public and stakeholder outreach efforts, recommended alignments and treatments for bicycle and pedestrian facilities, and rationale for proposed modifications.

The study includes the areas around both the McCall Middle School and the adjacent Lincoln Elementary School. There are approximately 1,100 students enrolled at McCall Middle School in 6<sup>th</sup> through 8<sup>th</sup> grade, and approximately 400 students enrolled at Lincoln Elementary School in Kindergarten through 5<sup>th</sup> grade.



Figure 1: Students Crossing with Crossing Guard - Mystic Valley Parkway at Main Street

## Project Purpose and Need

As the sole middle school serving the Town of Winchester, McCall Middle School has experienced a critical shortage of space for the student population. The Town of Winchester is currently in the design phase for the McCall Middle School Expansion Project which is expected to be constructed by the fall of 2020. The project includes a three-story addition to the existing E-wing of the school. This addition incorporates an expansion of the cafeteria, an addition of athletic team rooms and public restrooms, a conversion of storage space into a teachers'

room, and an additional six classrooms. Additional staff and/or pupils will not be generated due to the expansion project, beyond the projected five-year enrollment estimates.

At the start of the 2018-2019 academic year, the School Board voted to shift the start time for the Middle and High School academic day from 7:45 am to 8:30 am, as studies demonstrate this is beneficial to the learning. Along with this change, the start time for all elementary schools in Winchester was shifted from 8:45 am to 8:10 am. This adjustment has been cited as influencing increased traffic congestion and pedestrian safety concerns in and around McCall Middle School and the adjacent Lincoln Elementary School. With the start time of the two schools now coinciding, there has been a marked increase in vehicular congestion aligning with parents and school-aged children walking to school. This trend is likely reinforced by the Commuter Rail train schedule.

With the adoption of the Complete Streets Policy in 2016, the Town has continued to keep pedestrian and bicycle safety the priority. The McCall Middle School traffic study focuses on universal access and safety of all circulation routes and modes of transportation. In addition to cars and buses, the school generates a high level of pedestrian activity and moderate bicycle traffic. Traffic calming, particularly during the morning drop-off and afternoon pick-up hours, is a primary objective of the recommendations.

### **Stakeholder Meetings**

Two stakeholder meetings were held in early November 2018 to gather input and listen to concerns of key stakeholders involved in the project. The stakeholders attending the meetings included principals and staff from both the Lincoln and McCall schools, members of the Traffic and Transportation Advisory Committee (TTAC), and Town staff. A list of the attendees is provided within the Appendix.

The major themes raised during the meetings include:

- Increase pedestrian safety during the morning drop-off and afternoon pick-up periods;
- Encourage more walking and biking to school;
- Provide better/safer bike path connections;
- Increase public/driver awareness of the safety issues to change driving behavior;
- Establish remote drop-off areas for McCall students; and
- Focus design solutions at the Main Street/ Washington Street intersection and Mystic Valley Parkway/ Waterfield Road intersection areas.

The recommendations and conceptual design associated with this report incorporate feedback gathered during the stakeholder meetings.

## **McCall Middle School Transportation Operations**

Toole Design conducted field observations during pick-up and drop-off hours in October 2018. Special attention was paid to interactions between distinct modes, parent and student movement patterns, school bus activity, vehicular traffic operations, school crossing guard activity, desire lines of travel, and general safety features. The study area is presented within Figure 2.

### **Pick-Up and Drop-Off Observations**

McCall Middle School and Lincoln Elementary School generate noted activity by students, teachers, and parents traveling to and from the area, via all modes of transportation. The front entrance of McCall Middle School abuts Main Street at Washington Street, experiencing significant congestion, particularly in the morning drop-off period. As a neighborhood school, many of the Lincoln School students walk to school, accompanied by an adult.

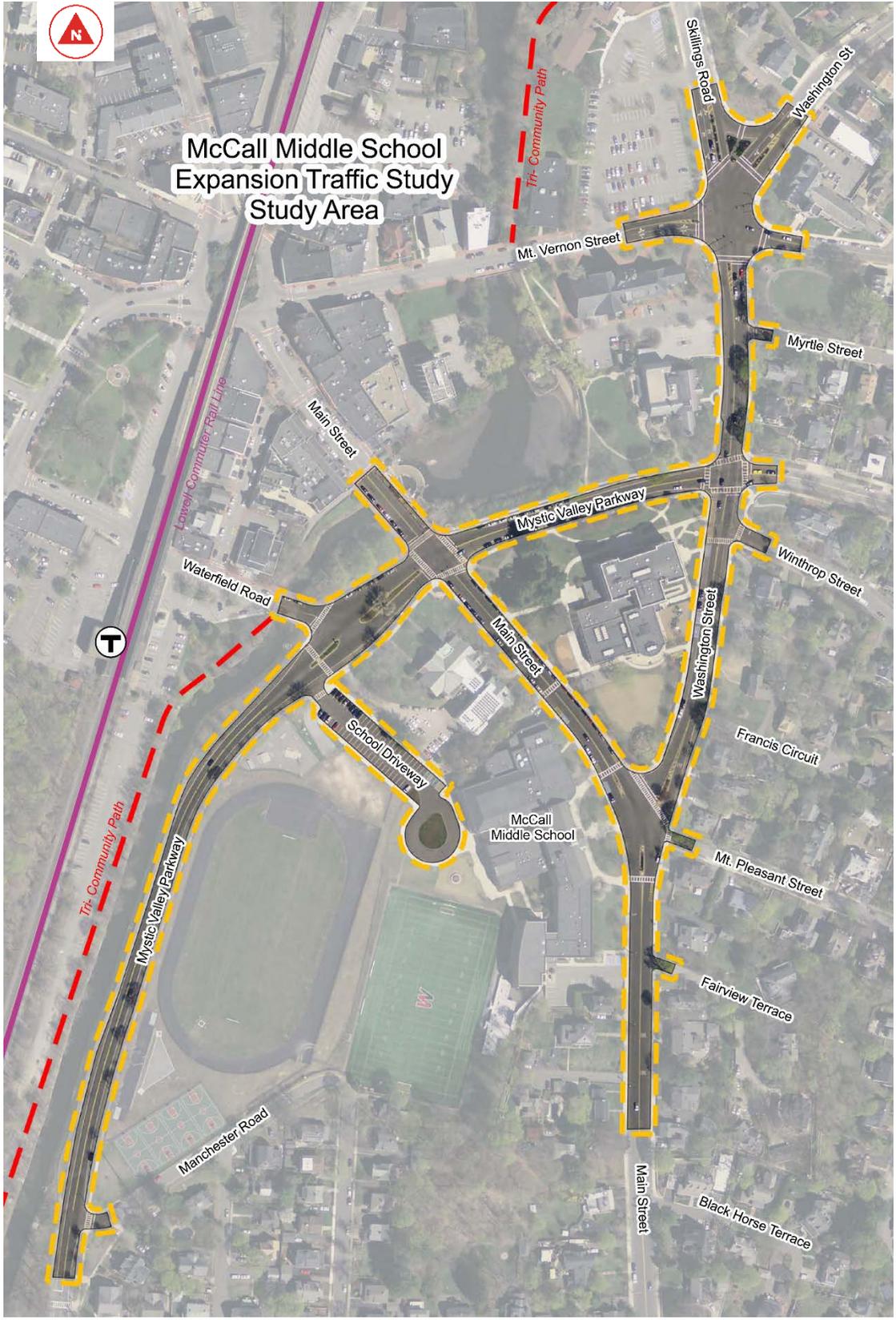


Figure 2: Study Area

Students access McCall Middle School directly on Main Street and at the back of the school on Mystic Valley Parkway, via a school bus driveway. Pick-up via personal vehicle is not permitted within the driveway. Despite dedicated pick-up and drop-off zones for parents, double parking and idling at restricted locations was frequently observed. In the front of the school, double parking was observed to impede vehicular throughput along Main Street. In the back of the school, drivers were observed pulling curbside on Mystic Valley Parkway near the school driveway, blocking sight lines of pedestrians in the crosswalk on Mystic Valley Parkway. Prior to dismissal, drivers idle at the pick-up and drop-off zones in the front of the school, and along Main Street and Washington Street. Vehicles were observed idling within the intersection field, again blocking sight lines of the crosswalks. A significant portion of pick-up and drop-off activity occurs over a fifteen-minute time span.



**Figure 3: Students Crossing Mystic Valley Parkway at Waterfield Road**

In the front of the school, strong desire lines were observed within the crosswalks on Main Street where school crossing guards were posted. With the ability to cross Main Street on both sides of Washington Street, few students were noted to use the crosswalk across Washington Street, likely due to the excessive length of the crosswalk and lack of school crossing guard. When students did use the crosswalk, the median functioned as a refuge island.

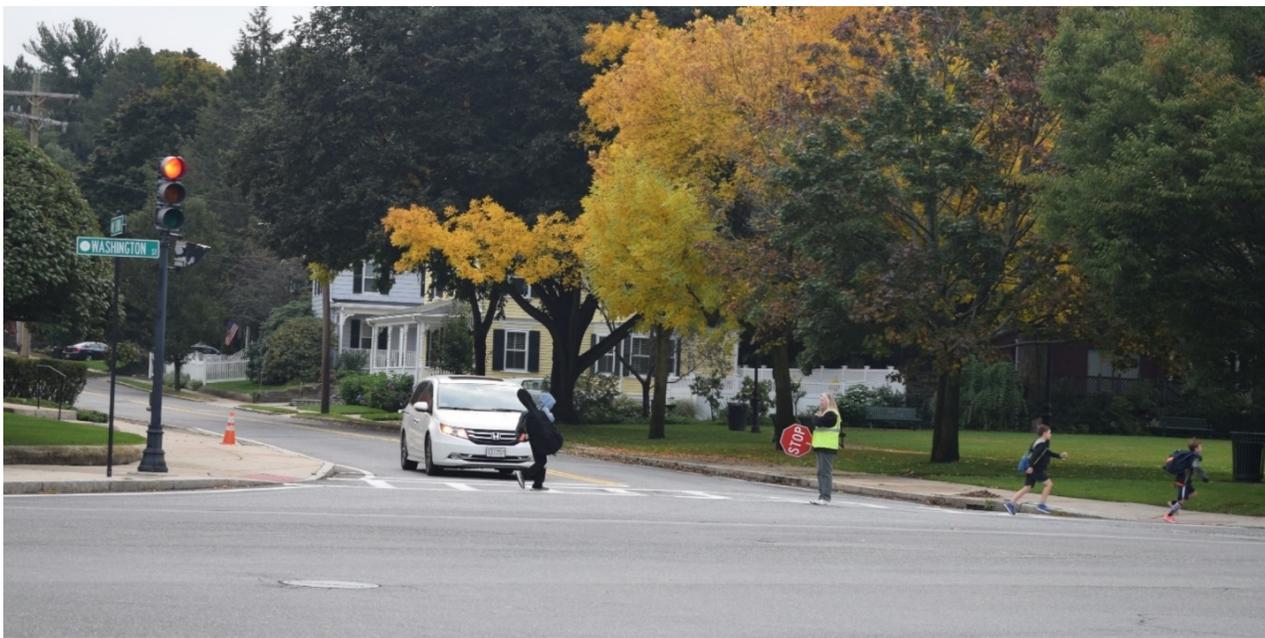
Strong desire lines at the back of the school were observed across the Mystic Valley Parkway crosswalk between Waterfield Road and the school driveway. Fewer students were observed to travel southbound on Mystic Valley Parkway when leaving from the back of the school. Student were often observed to travel in groups or on bicycles. More students were observed on bicycles at the back of the school due to the proximity of the Tri-Community Greenway and the location of bicycle parking at the end of the school driveway. Most students left the vicinity of the school at dismissal time for home or afterschool activities. The bulk of pedestrian activity also occurs over a fifteen-minute time span, with most students walking without an accompanying adult.



**Figure 4: Students often dismount their bikes at signalized intersections ; Bike Racks are Over Capacity at School**

### **Crossing Guard Observations**

Crossing guards are employed to assist students accessing McCall Middle School and Lincoln Elementary School on foot. Crossing guards were observed at the three signalized intersections within the study area, utilizing STOP paddles and the all WALK phase of the signals. In addition, the midblock crossing on Main Street employed a crossing guard. Drivers were generally noted to comply with yielding to students in the crosswalks with the presence of the crossing guard. However, drivers were observed executing right turns on red during the all WALK phase, while a crossing guard was in the intersection field of Mystic Valley Parkway at Main Street. While this behavior is challenging to correct with design, the lack of No Turn on Red signs is noted.



**Figure 5: School Crossing Guard Stopping Vehicle Traffic for Students**

### School Bus Observations

According to stakeholders, eight school buses serve McCall Middle School. First pick-ups in the morning vary between 7:00 AM to 7:10 AM. By Winchester Public School requirements, students in grades K-6 who live outside a 2-mile radius are provided the service free of charge, while students in grades 7-12 pay a bus fee regardless of living distance. Buses are not considered a prevalent mode of transportation for the student population.

Bus activity for McCall Middle School is limited to the driveway loop for McCall Middle School, and along Main Street for Lincoln School students. School buses arrive up to twenty minutes prior to dismissal time and queue at the end of the school driveway. Bus travel patterns appeared split between traveling north on Waterfield Road or east on Mystic Valley Parkway. Vehicle drivers generally yielded the right-of-way to buses accessing the school driveway. Afterschool, the recreational area behind McCall Middle School were utilized by Winchester High School athletic teams. Buses arrived with football team members, while the Winchester High School soccer team were observed on foot as a team via Waterfield Road.



Figure 6: School Buses serving the back of McCall Middle School



Figure 7: Buses along Main Street serving Lincoln Elementary School Students

## Study Area Existing Conditions

### Study Area

The McCall Middle School study area encompasses several roadways and intersections surrounding the McCall Middle School campus. This area includes: Mystic Valley Parkway between Washington Street and Manchester Road; Main Street between Mystic Valley Parkway and Black Horse Terrace; and Washington Street between Mystic Valley Parkway and Black Horse Terrace. Three signalized intersections are included within the study area.

### Land Use

The McCall Middle School is located within Winchester Center, the central business and community services district. The land use around and within the study area is primarily a mix of residential, commercial, and institutional. Within a short walking distance of the school is the commercial core, the Winchester Center commuter rail station, Winchester Town Hall, Winchester Public Library, Lincoln Elementary School, and the Winchester High School. Residential neighborhoods are located adjacent to the school campus, primarily to the west and south. The Town of Winchester zoning map for the area is provided in the Appendix.

## Roadways

### Main Street

McCall Middle School's front entrance is situated on Main Street, which is the main corridor through the central business district of Winchester Center. Main Street, south of Washington Street, is a two-way urban principal arterial under local jurisdiction traveling in a general north-south direction. Main Street, north of Washington Street, is a two-way local roadway under local jurisdiction traveling in a general northwest-southeast direction. Within the study area, Main Street is approximately 43 feet wide with one 13.5-foot wide vehicle travel lane in each direction and unmarked 8-foot curbside parking on both sides of the street. Main Street carries approximately 7,700 vehicles per day south of Washington Street and approximately 3,800 vehicles per day directly north of Washington Street.

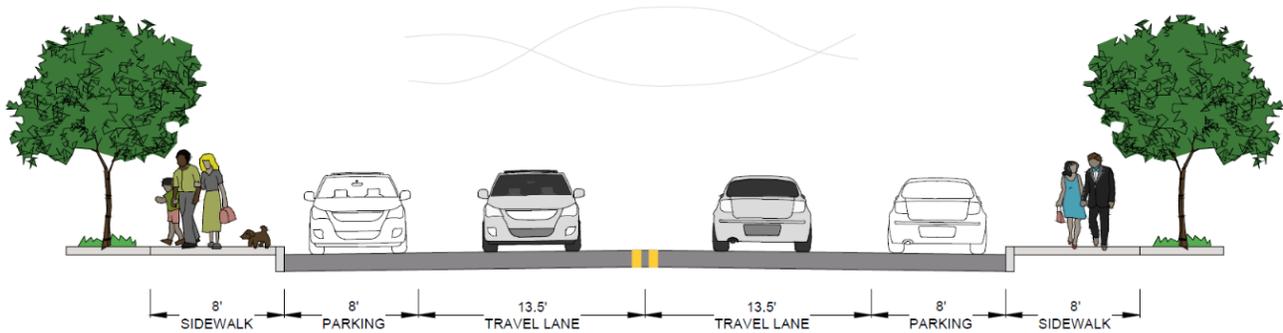


Figure 8: General cross section of Main Street

### Washington Street

Washington Street intersects Main Street between McCall Middle School and Lincoln Elementary School. Washington Street is a two-way urban principal arterial under local jurisdiction traveling in a general north-south direction, beginning at Main Street and extending to the Woburn town line. The roadway has an approximate width of 44-feet, widening at intersections. There is a 12-foot wide vehicle travel lane in each direction and marked 10-foot wide curbside parking on both sides of the street. Washington Street carries approximately 6,100 vehicles per day within the study area.

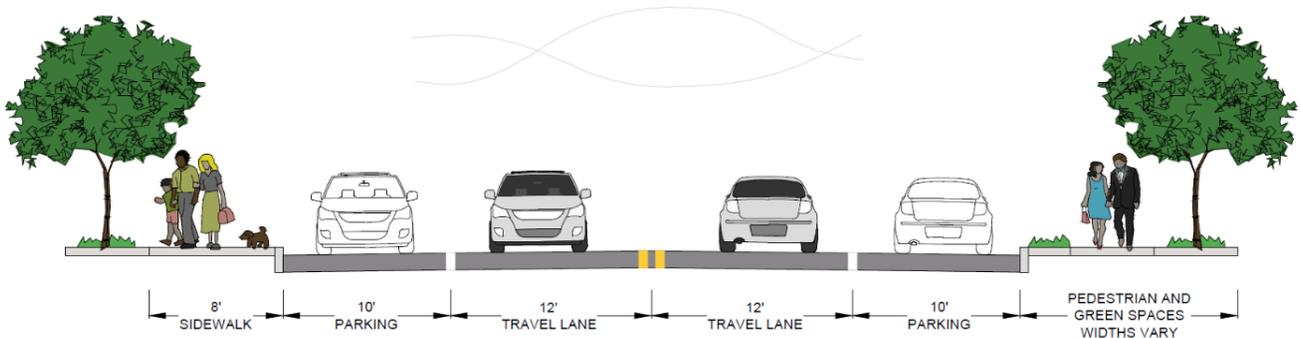
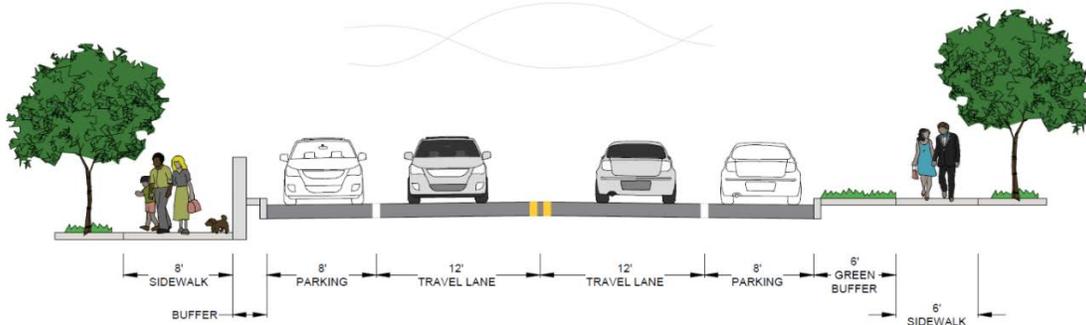


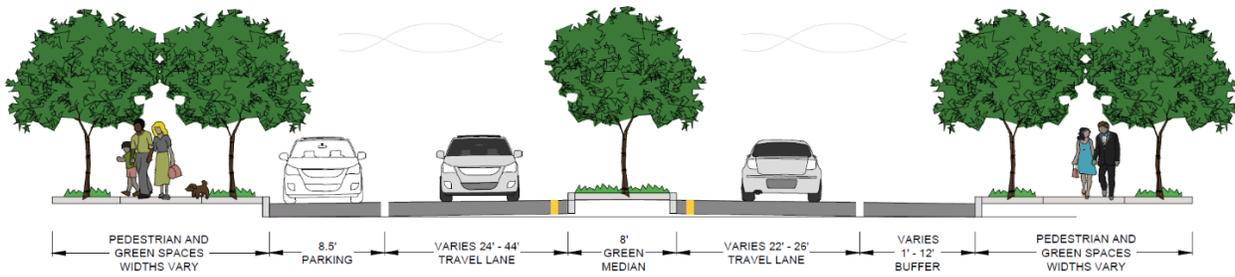
Figure 9: General cross section of Washington Street

*Mystic Valley Parkway*

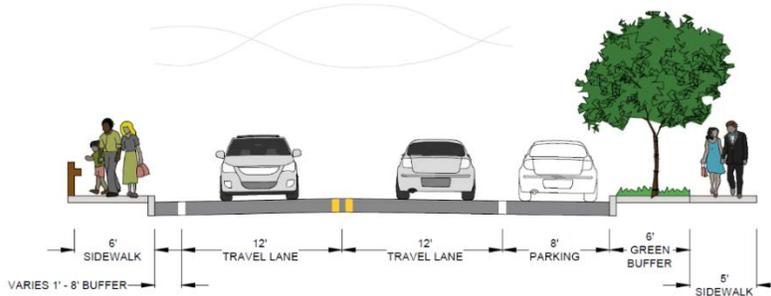
Mystic Valley Parkway is a two-way urban minor arterial under the Department of Conservation and Recreation (DCR) jurisdiction and intersects with Main Street within the study area. Mystic Valley Parkway travels in the north-south direction south of Main Street and in an east-west direction, east of Waterfield Road. The roadway width varies between approximately 32-feet and 42-feet, while the widest portion of the roadway is 105-feet wide at the Waterfield Road intersection where the lanes are divided by median islands. Southwest of Waterfield Road, parking is on the east side of the street. Between Waterfield Road and Main Street, parking is on the west side of the street. East of Main Street, parking is on both sides of the street. Travel lanes through the corridor are generally between 12-feet and 12.5-feet. Mystic Valley Parkway carries approximately 6,400 vehicle per day.



**Figure 10: General cross section of Mystic Valley Parkway (Main Street to Washington Street)**



**Figure 11: General cross section of Mystic Valley Parkway (Waterfield Road to Main Street)**



**Figure 12: General Cross section of Mystic Valley Parkway (Manchester Road to Waterfield Road)**

### Key Intersections

Within the study area, there are three signalized intersections and four minor street, stop-controlled intersections. The intersections under signal control are Skillings Road at Washington Street/ Mt. Vernon Street; Mystic Valley Parkway and Washington Street; and Mystic Valley Parkway and Main Street. These intersections are in the northern part of the study area immediately adjacent to principle community facilities such as Winchester Town Hall, Winchester Public Library, Lincoln Elementary School, and McCall Middle School. The stop-controlled intersections are in the southern portion of the study area where the surrounding neighborhoods are primarily residential in nature. The existing intersections and traffic controls within the study area are shown in Figure 13. Discussion of operations and in-field observations at key study area intersections are listed in the next section.

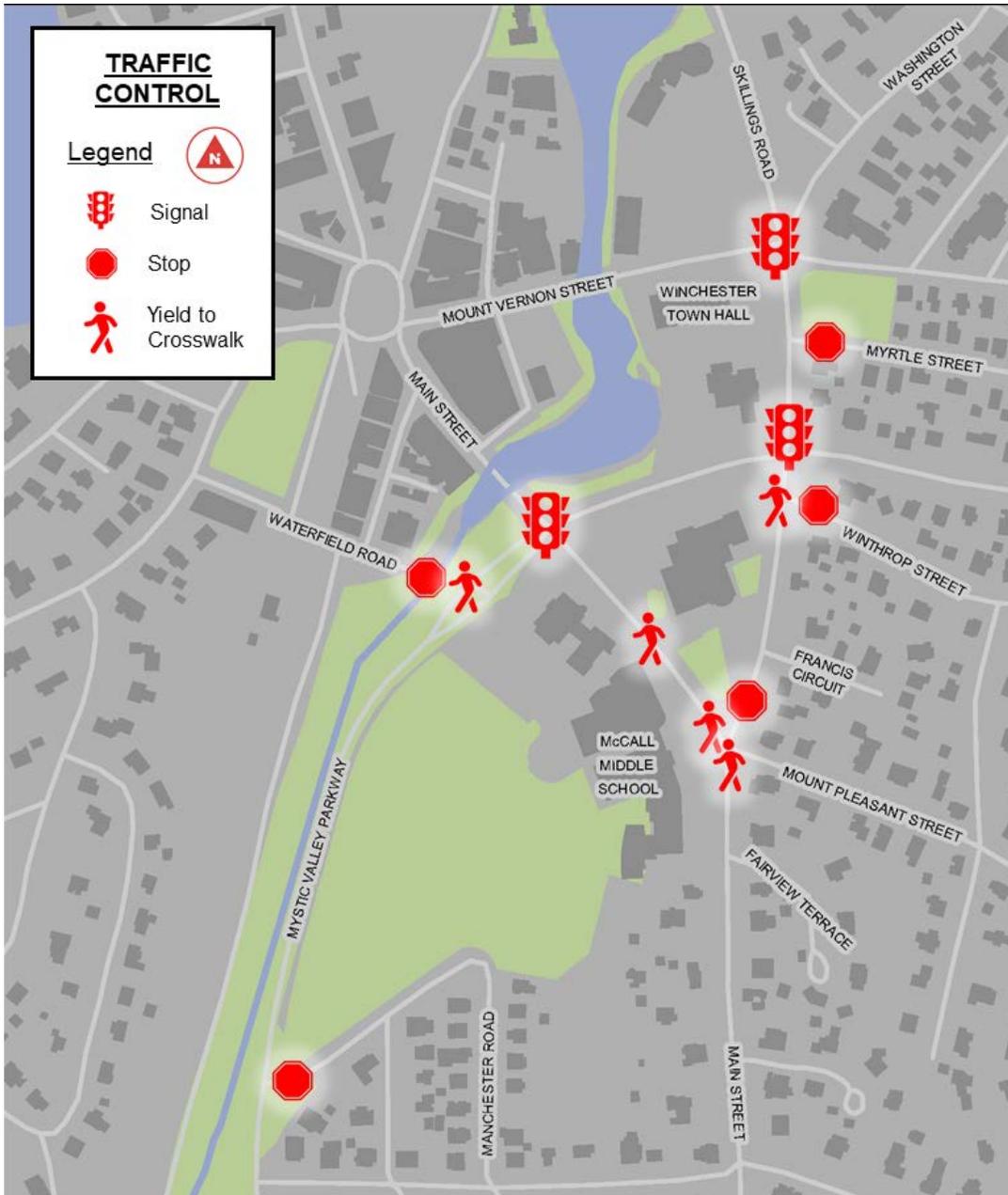


Figure 13: Study Area Intersection Control

## Unsignalized Intersections

### *Main Street at Washington Street and Mt. Pleasant Street*

Main Street at Washington Street and Mt. Pleasant Street is a four-legged unsignalized intersection at the front entrance to McCall Middle School. Washington Street and Mt. Pleasant Street are the controlled approaches to the intersection, while Main Street is only required to yield to pedestrians in the crosswalks. Main Street is a two-lane street with parking on both sides of the street. Washington street is also a two-lane street with parking on both sides of the street. Mt. Pleasant Street is a one-lane two-way street with parking permitted on the north side of the street. There are median islands on every approach of the intersection. Parking is allowed within the intersection on Main Street in front of McCall Middle School after 9:00 am. Accessible pick-up and drop-off spaces are provided for students with disabilities. A Massachusetts Bay Transportation Authority (MBTA) bus stop is located on the southwest section of the intersection adjacent to the crosswalk that spans the southern leg of the intersection. No bicycle facilities are provided along the approaches to, or through the intersection. Sidewalks are provided along both sides throughout. Crosswalks with curb ramps are provided across each leg, but not all meet ADA standards. Stormwater puddling is present and observed at the bottom of the ramps. Detectable warning panels are not provided on the curb ramps.



Figure 14: Main Street at Washington Street and Mt. Pleasant Street

### *Mystic Valley Parkway at Waterfield Road*

Mystic Valley Parkway at Waterfield Road is a three-legged unsignalized intersection under DCR jurisdiction. Mystic Valley Parkway is a two-lane street with parking on both sides of the street, with the exception of south of the McCall Middle School driveway where parking is restricted on the south side of the street. Adjacent to the driveway is an access driveway to Winchester Co-op Nursery. Waterfield Road is a two-lane street with parking on both sides of the street, crossing a bridge over Aberjona River and providing a connection to the Tri-Community Greenway multi-use path and the commuter rail Winchester Center Station.



**Figure 15: Mystic Valley Parkway at Waterfield Road**

The McCall Middle School driveway provides a two-way access to the rear of the school and the athletic facilities. This access is also used by the school busses for student drop off and pick up. Perpendicular parking for faculty is aligned on both sides of the driveway. Curb extensions tighten the mouth of the driveway. There is a pedestrian refuge crossing island for the crosswalk on Mystic Valley Parkway and flashing indications. No bicycle facilities are provided along the approaches to, or through the intersection. Sidewalks are provided along both sides of each leg. Crosswalks with curb ramps are provided across each minor leg and through the pedestrian crossing island. Detectable warning panels are provided on some of the curb ramps.

## Signalized Intersections

### *Washington Street at Skillings Road and Mt. Vernon Street*

Washington Street at Skillings Road and Mt. Vernon Street is a five-legged signalized intersection under Town jurisdiction. Mt. Vernon Street intersects the intersection from the east and west while Washington Street intersects from the south and northeast and Skillings Road intersects from the northwest. A right turn slip lane provides free operations for right turns between Washington Street and Skillings Road. Parking on both sides of the street is restricted at the approaches to create space for the turn lanes on all legs except the westbound Mt. Vernon Street leg. No parking is allowed on either side of westbound Mt. Vernon Street. There are restrictions for turning on red on every leg. No bicycle facilities are provided along the approaches of or through the intersection. Sidewalks are provided along both sides of each leg. Crosswalks with curb ramps and detectable warning panels are provided across each leg.



Figure 16: Washington Street at Skillings Road and Mt. Vernon Street

The existing signal operates on a five-phase cycle, with an exclusive pedestrian phase. The Washington Street northbound, Washington Street southwest bound, and Skillings Road southbound movements each have their own phase within the cycle. The Mt. Vernon Street eastbound approach has its own phase before also running concurrently with the Mt. Vernon Street westbound approach. The exclusive pedestrian phase is actuated and well utilized by school-aged children. High school students were noted to cross concurrently.

While conducting a site visit on Thursday, October 4, 2018, Toole Design observed that various pedestrian signal equipment were not functioning properly, and no pedestrian signal equipment were updated to the latest accessible pedestrian signal (APS) and pedestrian pushbuttons. The following is an inventory of observed noted pedestrian signal equipment issues:

- Eastbound facing pedestrian “Don’t Walk” hand is out on pedestrian island
- Eastbound facing pedestrian “Don’t Walk” hand is out on south leg of intersection
- Westbound facing pedestrian “Don’t Walk” hand is out on south leg of intersection



**Figure 17: Pedestrian Signal Equipment Deficiencies**

Additionally, the Mt. Vernon Street eastbound approach has a leading phase before the westbound approach is released with a green phase. During a site visit it was noted that the eastbound approach traffic signal heads are indicated with green globe indications, with no left turn arrow to signify priority in the lead phase. This existing equipment structure does not provide any clarification to the eastbound traffic that they have a protected leading phase. Furthermore, the signal heads do not give any indication to the eastbound approach when the westbound approach phase begins.

### *Main Street at Mystic Valley Parkway*

Main Street at Mystic Valley Parkway is a four-legged signalized intersection under DCR jurisdiction. Main Street is a two-lane street traveling in the northwest-southeast direction. Mystic Valley Parkway is a two-lane street traveling in the northeast-west direction. On the southwest leg, there is a median that separates the direction of travel. There are no lane assignments for any of the approaches. Parking is permitted on both sides of the street on Main Street northwest of the intersection and Mystic Valley Parkway northeast of the intersection. Parking is also permitted on the northwest side of Mystic Valley Parkway southwest of the intersection and on the southwest side of Main Street southeast of the intersection. Parking is not permitted on the southeast side of Mystic Valley Parkway southwest of the intersection or the northeast side of Main Street southeast of the intersection. A few

spaces are reserved for pick-up and drop-off during school hours on the northeast side of Main Street southeast of the intersection. No bicycle facilities are provided along the approaches of or through the intersection. Sidewalks are provided along both sides of each leg. Crosswalks with curb ramps are provided across each leg. Detectable warning panels are not provided on the curb ramps.

The existing signal operates on a two-phase cycle, with an exclusive pedestrian phase. The Mystic Valley Parkway eastbound and westbound movements run simultaneously, then Main Street northbound and southbound movements run simultaneously. All turning movements are permissive. The exclusive pedestrian phase is actuated, and no pedestrian signal equipment were updated to the latest accessible pedestrian signal (APS) and pedestrian pushbuttons.



### *Washington Street at Mystic Valley Parkway*

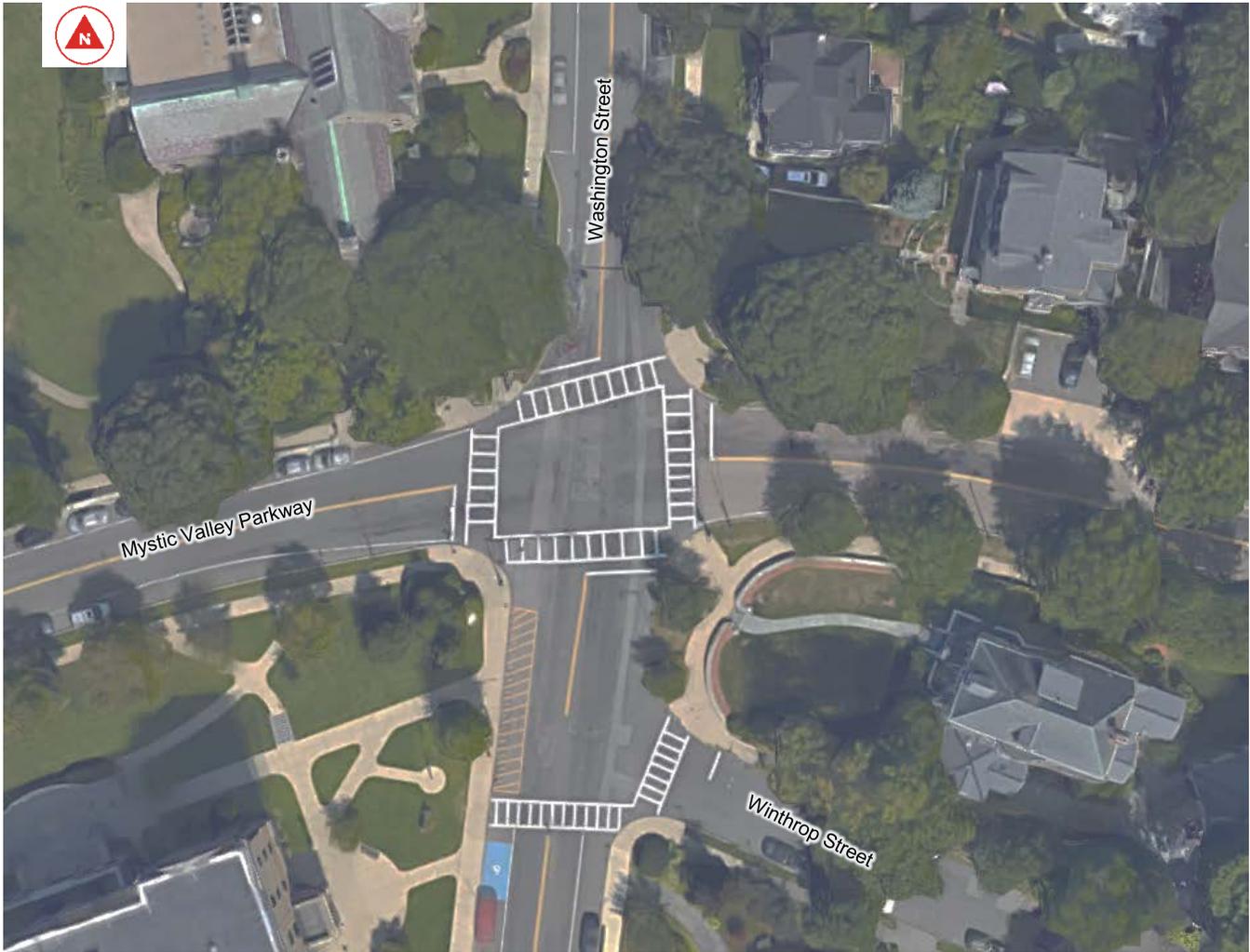
Washington Street at Mystic Valley Parkway is a four-legged signalized intersection under DCR jurisdiction. Washington Street is a two-lane street traveling in the north-south direction. Mystic Valley Parkway is a two-lane street traveling in the east-west direction. There are no lane assignments for any of the approaches. About 50' south of the intersection, Winthrop Street intersects Washington Street on the east side of the street. Parking is restricted between the intersection and Winthrop Street. Formalized parking is provided on Washington Street north of the intersection and Mystic Valley Parkway west of the intersection. Informal parking is observed on Mystic Valley Parkway east of the intersection. No bicycle facilities are provided along the approaches of or through the intersection. Sidewalks are provided along both sides of each leg. Crosswalks with curb ramps are provided across each leg. Detectable warning panels are not provided on the curb ramps.

The existing signal operates on a two-phase cycle, with an exclusive pedestrian phase. The Mystic Valley Parkway eastbound and westbound movements run simultaneously, then Washington Street northbound and southbound movements run simultaneously. All turning movements are permissive. The exclusive pedestrian

phase is actuated, and no pedestrian signal equipment were updated to the latest accessible pedestrian signal (APS) and pedestrian pushbuttons.

The following is a noted pedestrian signal equipment issue:

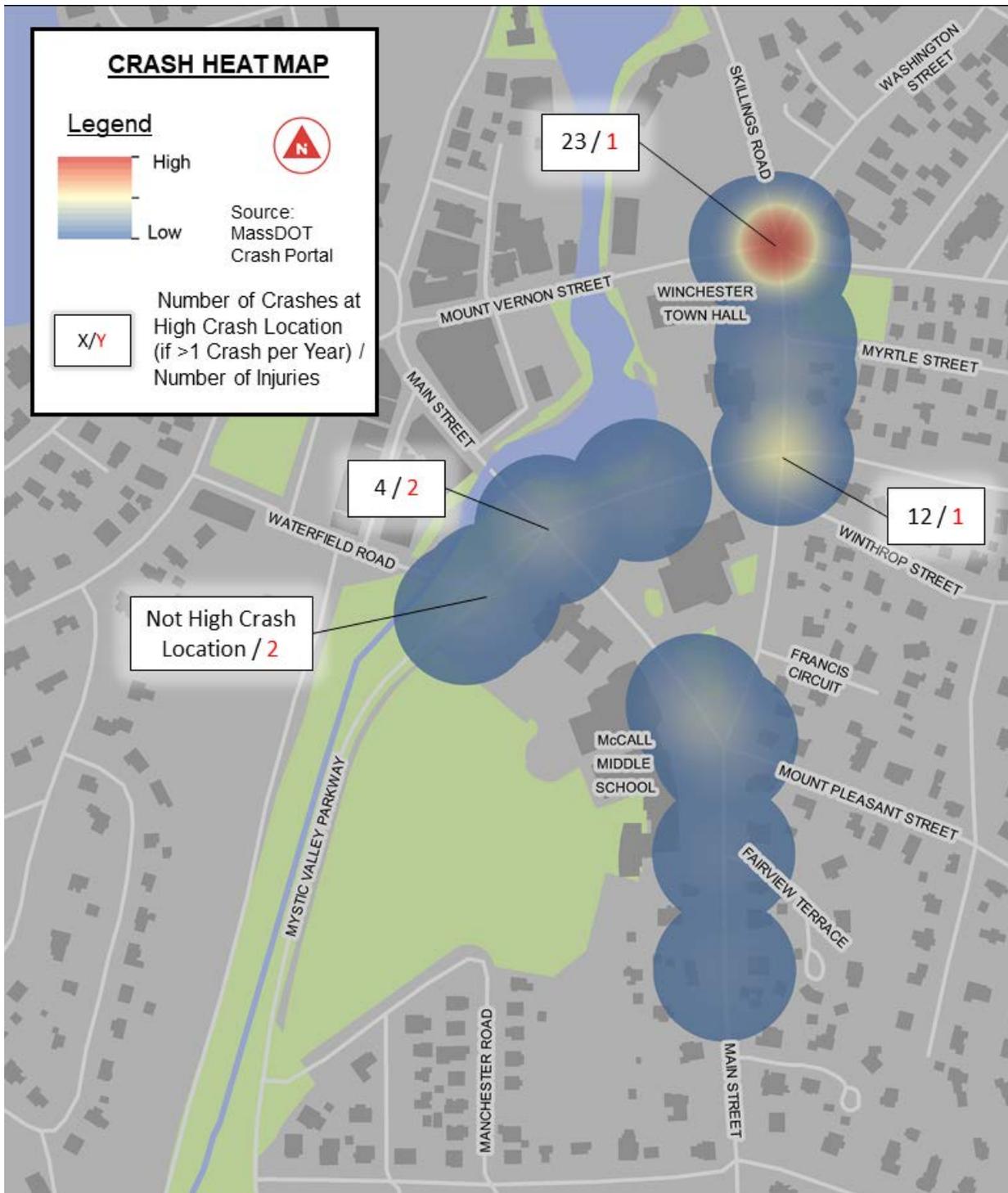
- Southbound facing pedestrian “Don’t Walk” hand is not functional on east leg of intersection



**Figure 19: Washington Street at Mystic Valley Parkway**

### **Crash Analysis**

Crash history data for the study area were obtained from the Massachusetts Department of Transportation Crash Portal database for the most recent complete five-year period available (2012 through 2016). Figure 20 demonstrates the concentrations of these crashes and the number of injury crashes at the intersections. Note that this analysis is limited to reported crashes only, therefore unreported crashes and near misses are not accounted for.



**Figure 20: Study Area Crash Heat Map and Number of Injuries**

Within the study area, a total of 60 crashes were reported between 2012 and 2016. The crashes are separated by corridor and tabulated in Table 1 through 3 below, organized by corridor. Of these crashes, two (3%) involved vulnerable roadway users (pedestrians and bicyclists), both on Mystic Valley Parkway. The crash with the pedestrian occurred in January 2013 when an elderly motorist failed to yield the right of way to a pedestrian in the crosswalk due to solar glare. The pedestrian suffered non-fatal injuries. The crash with the bicyclist occurred in

May 2014 when a motorist entering the travel lane failed to yield the right of way to a bicyclist in the roadway. The bicyclist suffered non-fatal injuries.

The intersection of Washington Street at Skillings Road and Mt. Vernon Street had the most crashes of any intersection within the study area with 23 crashes. Of the 23 crashes, nine (39%) were angle crashes and eight (35%) were rear-end crashes. There were six crashes for the rest of the Washington Street corridor and intersections. Five crashes did not occur at an intersection. One crash resulted in a potential injury and the remaining resulted in property damage only. No reported crashes involved a vulnerable roadway user on the Washington Street corridor.

**Table 1: Washington Street Collision Summary**

	Washington Street at:					Total
	Skillings Road and Mt Vernon Street	Myrtle Street	Winthrop Street	Francis Circuit	Midblock Location	
2012	9	0	0	0	2	11
2013	5	0	0	0	0	5
2014	4	0	0	0	3	7
2015	3	1	0	0	0	4
<u>2016</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>
<b>Total</b>	<b>23</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>29</b>
<u>Collision Type</u>						
Angle	9	1	0	0	1	11
Rear End	8	0	0	0	2	10
Sideswipe, same direction	3	0	0	0	1	4
Sideswipe, opposite direction	1	0	0	0	0	1
Single Vehicle	2	0	0	0	0	2
<u>Other/Unknown</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
<b>Total</b>	<b>23</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>29</b>
<u>Vulnerable Users</u>						
Bicyclist Involved	0	0	0	0	0	0
<u>Pedestrian Involved</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<u>Severity</u>						
Fatality	0	0	0	0	0	0
Incapacitating Injury	0	0	0	0	0	0
Non- incapacitating Injury	0	0	0	0	0	0
Possible Injury	1	0	0	0	0	1
<u>Property Damage Only</u>	<u>22</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>5</u>	<u>28</u>
<b>Total</b>	<b>23</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>29</b>
<b>Percent Injury</b>	<b>4%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>3%</b>

The intersection of Mystic Valley Parkway and Washington Street had the most crashes of any intersection along the Mystic Valley Parkway corridor with 12 crashes. Of the 12 crashes, 9 (75%) were angle crashes and two (17%) were rear-end crashes. There were eight crashes for the rest of the Mystic Valley Parkway corridor and intersections. Two crashes did not occur at an intersection. One crash resulted in injury, four crashes resulted in possible injury, and the remaining resulted in property damage only. Two crashes involved a vulnerable roadway user for reasons such as sun glare and failure to yield. Out of all the corridors in the study area, Mystic Valley Parkway experienced the most crashes resulting in injury, and the most crashes involving vulnerable users.

**Table 2: Mystic Valley Parkway Collision Summary**

	<b>Mystic Valley Parkway at:</b>					
	Washington Street	Main Street	Waterfield Road / School Driveway	Manchester Road	Midblock Location	<b>Total</b>
2012	1	1	0	0	0	<b>2</b>
2013	4	2	1	0	1	<b>8</b>
2014	4	1	0	0	0	<b>5</b>
2015	2	0	1	0	1	<b>4</b>
<u>2016</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u><b>1</b></u>
<b>Total</b>	<b>12</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>20</b>
<b>Collision Type</b>						
Angle	9	1	0	0	0	10
Rear End	2	0	0	0	0	2
Sideswipe, same direction	0	2	0	0	1	3
Sideswipe, opposite direction	0	0	0	0	0	0
Single Vehicle	0	1	1	0	0	2
Head-On	1	0	1	0	1	3
<u>Other/Unknown</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>Total</b>	<b>12</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>20</b>
<b>Vulnerable Users</b>						
Bicyclist Involved	0	1	0	0	0	1
<u>Pedestrian Involved</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>
<b>Total</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Severity</b>						
Fatality	0	0	0	0	0	0
Incapacitating Injury	0	0	0	0	0	0
Non- incapacitating Injury	0	1	0	0	0	1
Possible Injury	1	1	2	0	0	4
<u>Property Damage Only</u>	<u>11</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>15</u>
<b>Total</b>	<b>12</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>20</b>
<b>Percent Injury</b>	<b>8%</b>	<b>50%</b>	<b>100%</b>	<b>0%</b>	<b>0%</b>	<b>25%</b>

The intersection of Main Street at Mt Pleasant Street and Washington Street had the most crashes of any intersection along the Main Street corridor with 3 crashes. Of the 3 crashes, 1 (33%) was an angle crash, 1 was a sideswipe (33%), and 1 (33%) was a single vehicle crash. There were 8 crashes for the rest of the Main Street corridor and intersections. All 8 crashes did not occur at an intersection. All crashes resulted in property damage only. Out of all the corridors in the intersection, Main Street had the most crashes outside of intersections.

**Table 3: Main Street Collision Summary**

	Main Street at:				Total
	Mt Pleasant Street and Washington Street	Fairview Terrace and Warwick Place	Black Horse Terrace	Midblock Location	
2012	1	0	0	1	2
2013	1	0	0	2	3
2014	0	0	0	1	1
2015	1	0	0	2	3
<u>2016</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>2</u>
<b>Total</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>11</b>
<u>Collision Type</u>					
Angle	0	0	0	1	1
Rear End	1	0	0	1	2
Sideswipe, same direction	1	0	0	5	6
Sideswipe, opposite direction	0	0	0	0	0
Single Vehicle	1	0	0	0	1
<u>Other/Unknown</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
<b>Total</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>11</b>
<u>Vulnerable Users</u>					
Bicyclist Involved	0	0	0	0	0
<u>Pedestrian Involved</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<u>Severity</u>					
Fatality	0	0	0	0	0
Incapacitating Injury	0	0	0	0	0
Non- incapacitating Injury	0	0	0	0	0
Possible Injury	0	0	0	0	0
<u>Property Damage Only</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>8</u>	<u>11</u>
<b>Total</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>11</b>
<b>Percent Injury</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>

## Traffic Count Data

Existing vehicular, pedestrian, and bicycle volumes within the study area were collected in October 2018 to establish a baseline school-year condition for analyses. Daily vehicular volume and speeds were collected utilizing 72-hour Automatic Traffic Recorder (ATR) counts at the following four locations:

- Washington Street, south of Myrtle Street
- Main Street, south of Fairview Terrace
- Main Street, south of Mystic Valley Parkway
- Mystic Valley Parkway, south of Waterfield Road

Peak hour Turning Movement Counts (TMCs) were also collected from 7:00 AM to 9:00 AM and 1:00 PM to 6:00 PM for key intersections within the study area on Thursday, October 18, 2018, capturing the weekday morning drop-off period, afternoon dismissal period, and evening commuter period. TMCs were performed at the following locations:

- Washington Street at Skillings Road and Mt. Vernon Street
- Washington Street at Mystic Valley Parkway
- Main Street at Mystic Valley Parkway
- Mystic Valley Parkway at Waterfield Road
- Main Street at Fairview Terrace
- Main Street at Washington Street and Mt. Pleasant Street
- Mystic Valley Parkway at Manchester Road
- Washington Street at Winthrop Street

Figure 21 below shows the ATR and TMC collection locations. Peak vehicular activity levels were determined to occur from 7:30 AM – 8:30 AM, 2:45 PM – 3:45 PM, and 5:00 PM – 6:00 PM. These data are included within the Appendix.

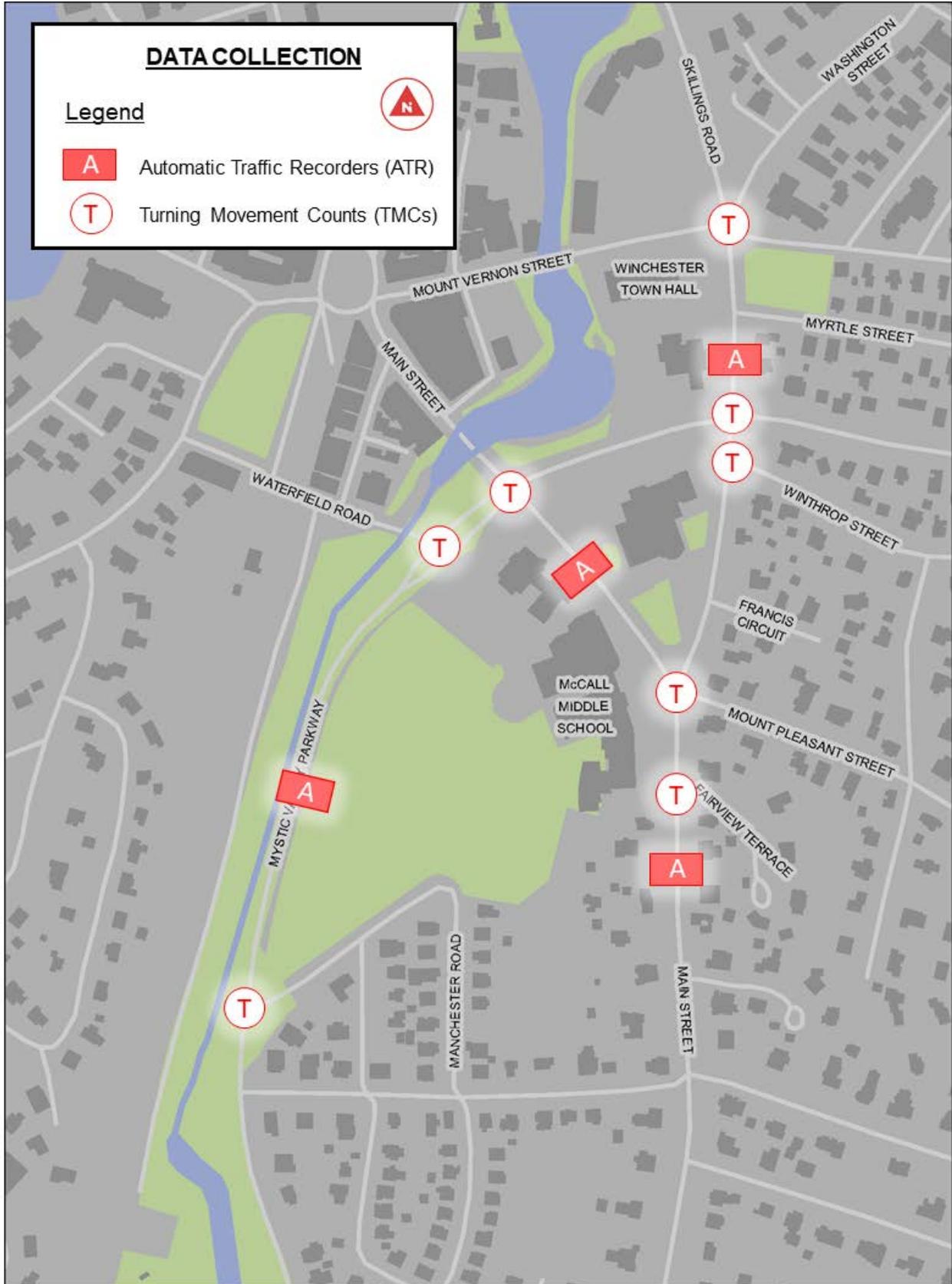


Figure 21: Study Area Count Collection Locations

Table 4 summarizes the 2018 daily and peak hour traffic volumes at ATR installation locations. Figure 22 through 24 graphically depict the existing weekday morning, school dismissal, and evening peak hour traffic volumes, respectively.

**Table 4: Traffic Volume Summary**

Location/Time Period	Daily Volume (vpd) <sup>a</sup>	Peak Hour Volume (vph) <sup>b</sup>	K Factor <sup>c</sup>	Directional Distribution <sup>d</sup>
<b>Washington Street</b>				
<b>South of Myrtle Street</b>	6,096			
Weekday AM Peak Hour	-	472	7.7%	60% SB
Weekday Dismissal Hour	-	439	7.2%	52% NB
Weekday PM Peak Hour	-	360	5.9%	50% NB
<b>Main Street</b>				
<b>South of Fairview Terrace</b>	7,616			
Weekday AM Peak Hour	-	784	10.3%	58% SB
Weekday Dismissal Hour	-	557	7.3%	52% SB
Weekday PM Peak Hour	-	737	9.7%	56% SB
<b>Main Street</b>				
<b>South of Mystic Valley Parkway *</b>	3,783			
Weekday AM Peak Hour	-	430	11.4%	51% SB
Weekday Dismissal Hour	-	298	7.9%	50% SB
Weekday PM Peak Hour	-	359	9.5%	69% SB
<b>Mystic Valley Parkway</b>				
<b>South of Waterfield Road</b>	6,380			
Weekday AM Peak Hour	-	631	9.9%	51% NB
Weekday Dismissal Hour	-	519	8.1%	52% NB
Weekday PM Peak Hour	-	547	8.6%	51% NB

<sup>a</sup> Vehicles per day.

<sup>b</sup> In vehicles per hour.

<sup>c</sup> Percentage of daily traffic occurring during the peak hour.

<sup>d</sup> SB = southbound, NB = northbound

\* ATR was recollected on November 1, 2018 due to damaged data collection equipment.

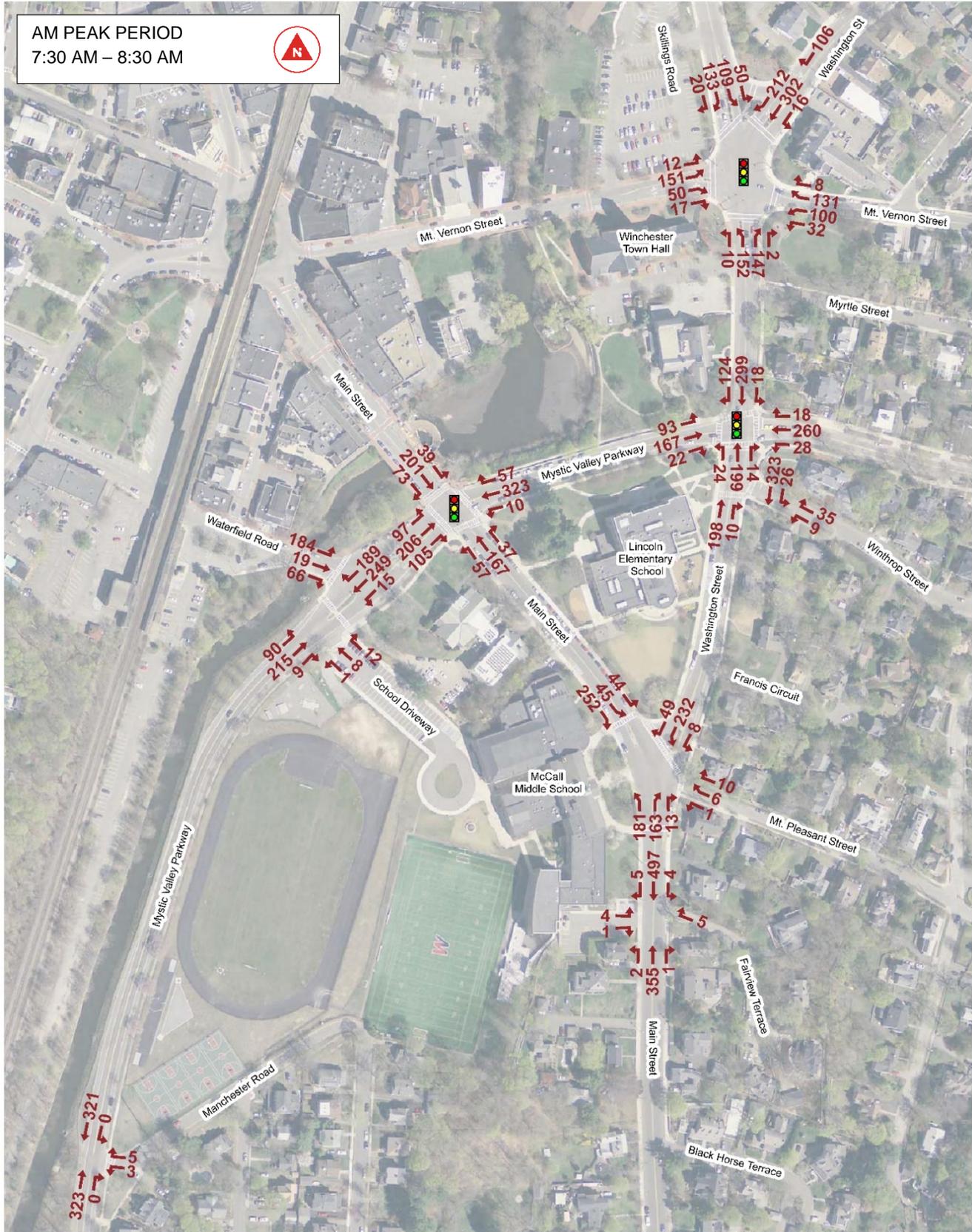


Figure 22: Weekday Morning Peak Hour Traffic Volumes

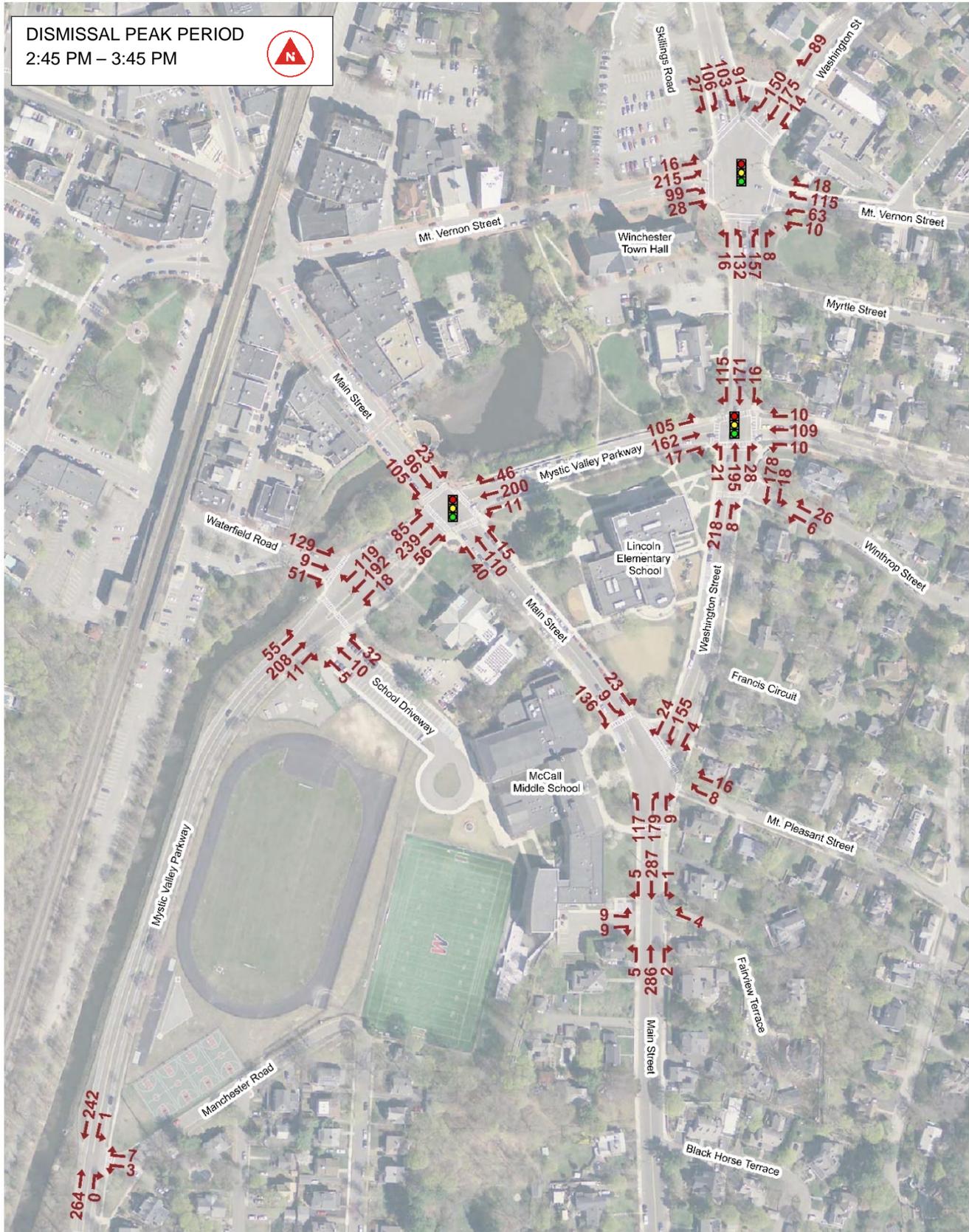


Figure 23: Weekday Dismissal Period Peak Hour Traffic Volumes

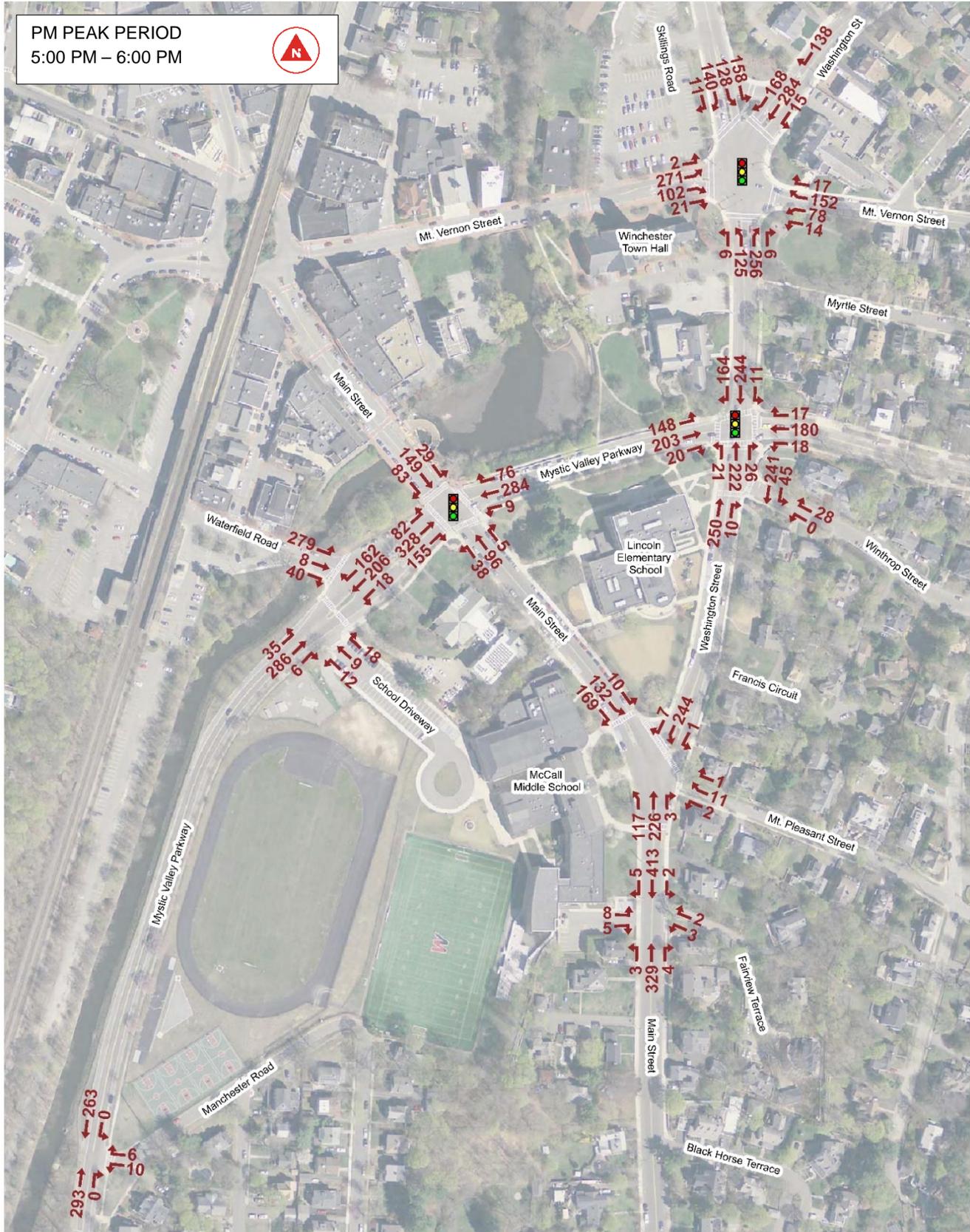


Figure 24: Weekday Evening Peak Hour Traffic Volumes

## Vehicular Speeds

### Existing Speed Limit Signage

With the study area the speed limit is generally 30 mph, supplemented by School Zone speed limit signage. The following is an accounting of the existing speed limits and regulations:

- Main Street, north of Black Horse Terrace – 30 mph, regulated
- Main Street, south of Black Horse Terrace – 35 mph, regulated
- Washington Street, between Main Street and Skillings Road – 30 mph (prime facie), unregulated
- Mystic Valley Parkway, between Manchester Road and Highland Avenue - 30 mph, unregulated

During school days the speed limit is 20 mph on Mystic Valley Parkway, signed between Main Street and Washington Street. The hours of this regulation are posted as 7:45 AM – 9:15 AM and 2:15 PM – 3:45 PM are appropriate, however these signs are not supplemented by flashers.

Main Street northbound between Black Horse Terrace and Fairview Terrace provides a School Zone speed limit sign supplemented by flashers and in-road pavement markings. Main Street southbound provides in-road pavement markings but no signage.

Washington Street southbound at the Town Library provided a School Zone speed limit sign supplemented by flashers and in-road SCHOOL pavement markings. However, the signage is currently missing, as shown in Figure 25. Washington Street northbound provides in-road pavement markings but no signage.

Existing speed related signage is presented within Figure 26.



**Figure 25: Existing School Zone Signage on Main Street and Washington Street**

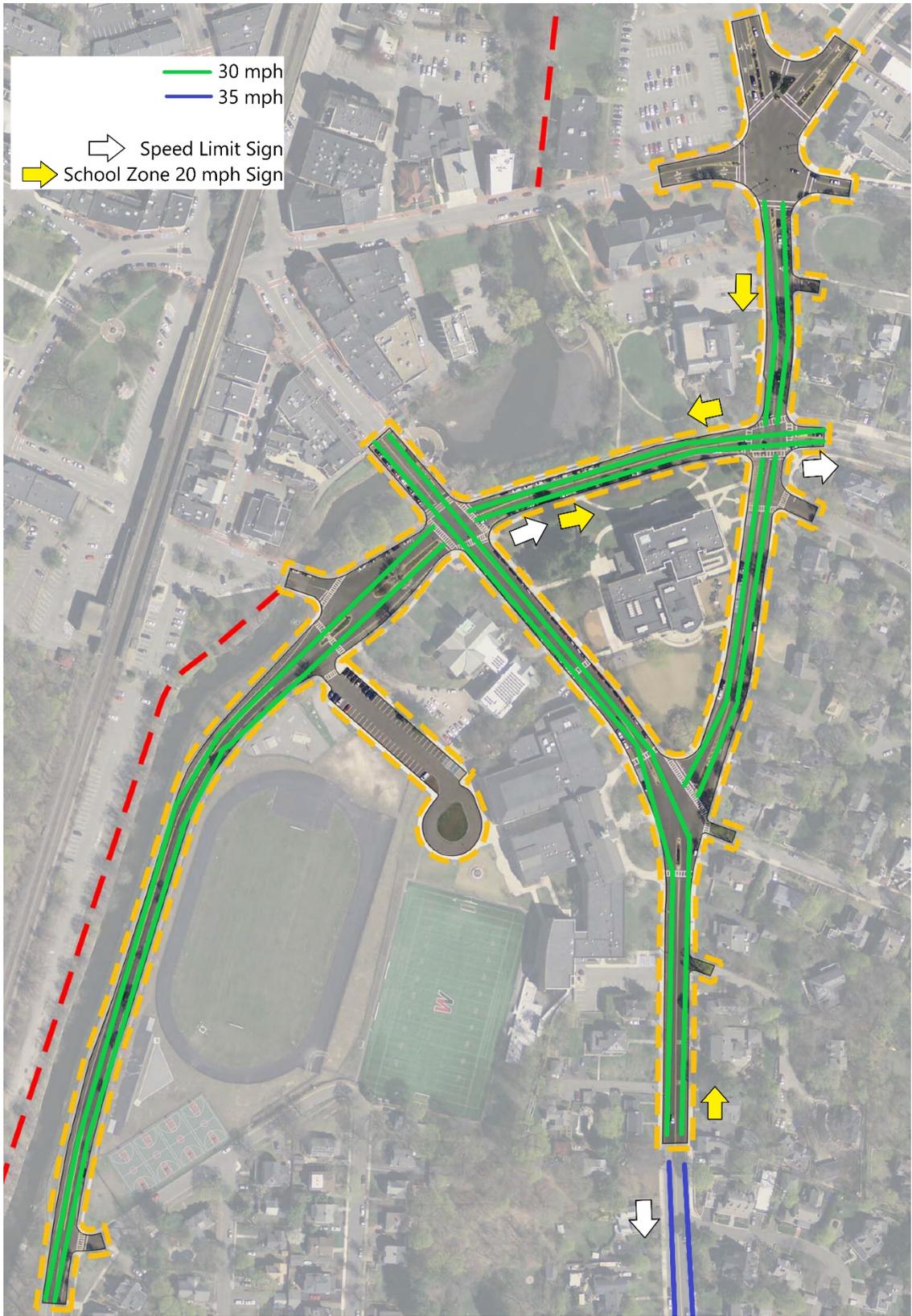


Figure 26: Existing speed limits and associated signage

*Speed Data*

Speed measurements were collected by the 72-hour ATRs in October 2018 at the four locations within the study area. The results of the speed measurements are summarized below in Table 5, separated by daily and school zone hours, with speeds exceeding the enforceable speed limit shown in **bold red**.

**Table 5: Observed Vehicle Speeds**

Location/Direction	Speed Limit <sup>a</sup>	Average Daily Speed	85 <sup>th</sup> Percentile Daily Speed <sup>b</sup>	School Zone Speed Limit <sup>c</sup>	Average Speed 8AM-9AM (Arrival)	Average Speed 2PM-3PM (Dismissal)
<b>Washington Street, south of Myrtle Street</b>						
Northbound	30	18	22	30	16	17
Southbound	30	12	18	20	13	11
<b>Main Street, south of Fairview Terrace</b>						
Northbound	30	<b>32</b>	<b>37</b>	20	<b>28</b>	<b>30</b>
Southbound	35	30	35	30	28	30
<b>Main Street, south of Mystic Valley Parkway</b>						
Northbound	30	20	26	30	15	17
Southbound	30	21	26	30	15	19
<b>Mystic Valley Parkway, south of Waterfield Road</b>						
Northbound	30	<b>34</b>	<b>38</b>	30	<b>34</b>	<b>35</b>
Southbound	30	<b>34</b>	<b>38</b>	30	<b>35</b>	<b>33</b>

<sup>a</sup> In miles per hour (mph)

<sup>b</sup> Speed at, or below which, 85 percent of all observed vehicles travel

<sup>c</sup> During the hours of 7:45 AM – 9:15 AM and 2:15 PM – 3:45 PM on MVP, and during flashing mode on Washington Street and Main Street

As shown in Table 5, average vehicle speeds along Washington Street, south of Myrtle Street, were captured between 12 and 18 mph, with 85<sup>th</sup> percentile speeds between 18 and 22 mph, which are below the enforceable speed limit of 30 mph. Average speeds during school arrival and dismissal hours were captured at lower speeds, likely due to the 20 mph zone and congestion associated with the school. It is notable that average speeds in the southbound direction approaching the Lincoln Elementary School are lower than the average speeds in the northbound direction, leaving the area of the schools.

Average vehicle speeds along Main Street, south of Fairview Terrace, were between 30 and 32 mph, with 85<sup>th</sup> percentile speeds between 35 and 37 mph, demonstrating a slightly higher than the enforceable speed limit in the northbound direction, approaching McCall Middle School and Lincoln Elementary School. Average speeds during school arrival and dismissal hours were captured at approximately 28 mph to 30 mph in both directions, both of which exceed the 20 mph school zone regulation.

Average vehicle speeds along Main Street, south of Mystic Valley Parkway, were between 20 and 21 mph, with 85<sup>th</sup> percentile speeds at 26 mph in both directions. Observed speeds are generally lower than the enforceable speed limit, including during school arrival and dismissal hours.

Average vehicle speeds along Mystic Valley Parkway, south of Waterfield Road, were captured at 34 mph, with 85<sup>th</sup> percentile speeds at 38 mph, in both directions of travel. Observed speeds are generally higher than the enforceable speed limit. Speeds during school arrival and dismissal hours are comparable to average daily speeds in both directions.

### Pedestrian Environment

Pedestrian activity is a prominent feature of the study area. Winchester High School, McCall Middle School, and Lincoln Elementary School generate a significant amount of pedestrian activity during morning arrival and afternoon dismissal time periods. This area is highly active with people walking between where they live, work, play, study, and connect to transit in the Winchester Center neighborhood. Pedestrian volume diagrams by peak period are provided in Figures 27 through 29.

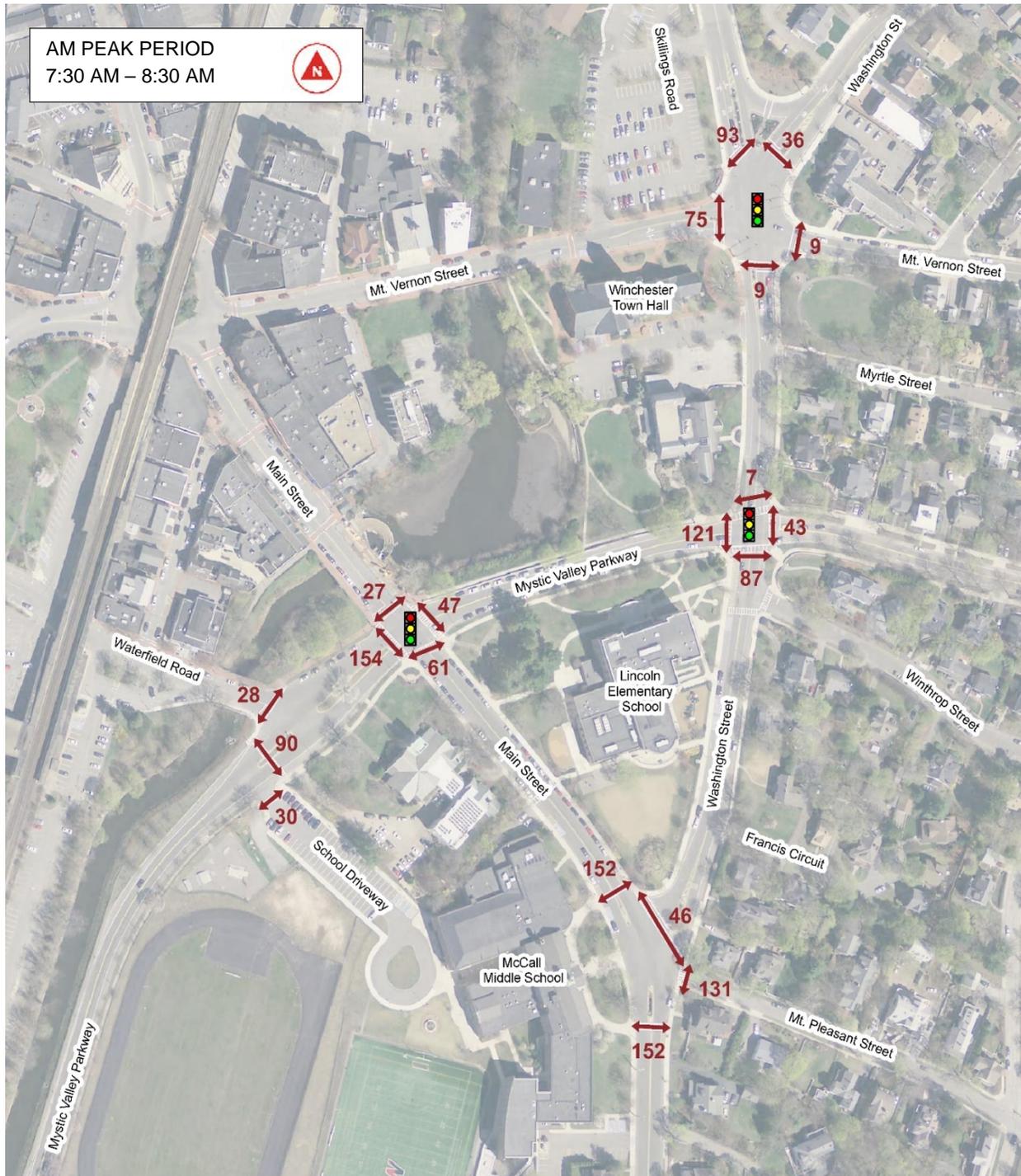


Figure 27: Weekday Morning Pedestrian Volumes



Figure 28: Weekday Dismissal Period Pedestrian Volumes



Sidewalks with curbing are provided along both sides of the study area corridors, in a mix of materials (brick, concrete and bituminous concrete), some with a landscaped buffer where space affords. The exception is Manchester Road which does not provide a sidewalk along the north side of the street along the athletic fields. Throughout the study area, sidewalk conditions were generally in good condition and meet Americans with Disabilities Act (ADA) standards.



Figure 30: Sidewalk conditions within the study area

There are, however, specific locations where the sidewalk is slightly uprooted and therefore in need of repair, as shown in Figure 31. Some more deficiencies for the pedestrian realm are shown in Figure 32. Mystic Valley Parkway on the west side of the street has some locations where sidewalks are narrow adjacent to a travel lane. In addition, there is a misalignment between the crosswalk and the ramp at the mid-block crosswalk across Main Street between the McCall Middle School and Lincoln Elementary School. Aside from this location, crosswalks with curb ramps and detectable warning panels are generally provided throughout across intersection approaches. All signalized intersections have concurrent pedestrian phasing upon actuation only.

Based on a draft DCR study to improve its roadways, there are overlap between the goals of this project and the goals on the study for Mystic Valley Parkway and its intersections. Mystic Valley Parkway at Waterfield Road is recommended to have geometric changes to narrow the intersection and shorten the pedestrian crossing distance. This will reduce pedestrian exposure to vehicular traffic, as well as reduce impervious surfaces and restore parkland. Mystic Valley Parkway at Main Street is recommended to modify intersection geometry and shorten pedestrian crossing distances. Pedestrian push buttons are also recommended to be upgraded.



**Figure 31: Spot locations of tripping hazards along Mystic Valley Parkway**



**Figure 32: Narrow passable width and offset ADA ramp**

## Bicyclist Environment

Bicycling is a viable means of mobility for the students of McCall Middle School and Winchester High School, with bicyclist volume and activity being notable during arrival and dismissal periods. Numerous student-aged bicyclists were observed arriving and departing the McCall Middle School riding their bicycles on the sidewalks and utilizing the pedestrian crossing phase at signalized intersections. The majority of bicyclists were observed wearing helmets. Adult bicyclists were observed to ride with vehicular traffic within the roadway. Apart from the Tri-Community Greenway, there are no bicycle accommodations provided within the study area. The Tri-Community Greenway is a multi-use path that connects the neighborhoods of Stoneham, Woburn, and Winchester, though a missing connection of the path is present within the study area, as shown on Figure 2. Pictures of these occurrences and bicyclists on the roadway with vehicles are shown in Figure 33.



**Figure 33: Bicyclists utilizing the roadway and sidewalks**

Based on the draft DCR study to improve its roadways, Mystic Valley Parkway between Main Street and Bacon Street is recommended to have a continuous bicycle facility. The study calls for further analysis of parking demand along the roadway shoulder to choose the facility type.

## Public Transportation Services

McCall Middle School is conveniently located next to the Lowell Commuter Rail Line and the MBTA Bus Route 134. The school is about a 2-minute walk from the Winchester Center commuter rail station and a 15-minute walk from the Wedgemere commuter rail station. The MBTA Bus Route 134 has a stop directly in front of the school entrance on Main Street at Washington Street and Mt. Pleasant Street. Figure 34 shows the public transportation options around the McCall Middle School.

The Lowell Commuter Rail Line provides connections between North Station and Lowell. At arrival and dismissal times, the train arrives at the Winchester Station at 7:33 AM and 8:33 AM in the outbound direction and 7:48 AM and 8:19 AM in the inbound direction.

The MBTA Bus Route 134 provides connection between North Woburn and Wellington Station in the general north-south direction. The bus passes through the City of Medford, Town of Winchester, and City of Woburn. It services relevant destinations and connections such as the Lowell/Haverhill Commuter Rail Line stop at Winchester Center, the Orange Line stop at Wellington Station, Winchester Center, and McCall Middle School. McCall Middle School students along this route can easily arrive to school via this route. Buses are scheduled to run every 15 to 20 minutes during rush hours and around every half hour during off-peak hours. The northbound bus stop is located at the intersection of Main Street and Fairview Terrace. The southbound bus stop is in front of McCall Middle School, north of the intersection of Main Street and Warwick Place.

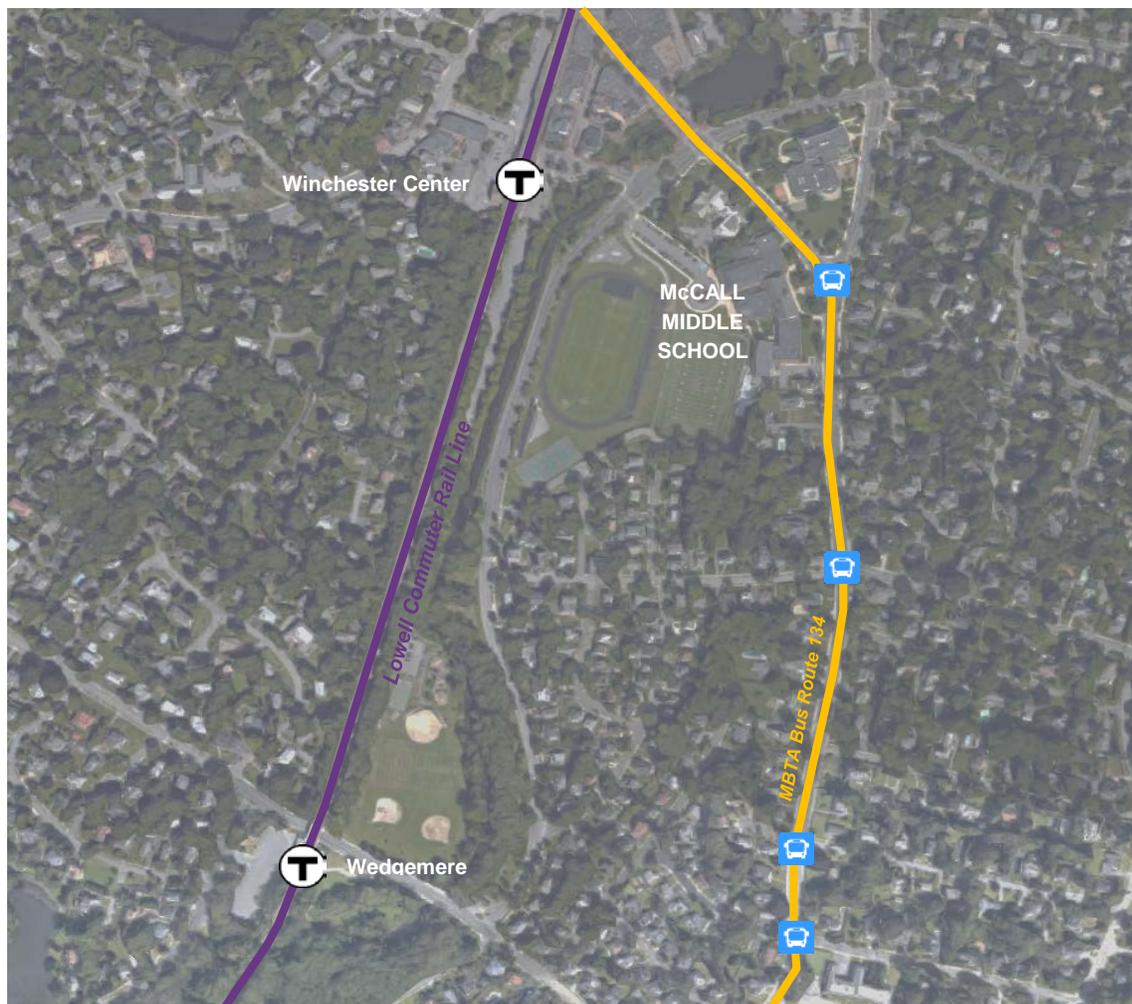


Figure 34: Nearby Public Transportation Services

## Recommendations

At the outset of this project, Town staff and stakeholders made it clear that pedestrian safety is the number one goal of the McCall Middle School transportation improvements. Below is a restatement of takeaways from the stakeholder meetings:

- Increase pedestrian safety during the morning drop-off and afternoon pick-up periods;
- Encourage more walking and biking to school;
- Provide better/safer bike path connections;
- Increase public/driver awareness of the safety issues to change driving behavior;
- Establish remote drop-off areas for McCall students; and
- Focus design solutions at the Main Street/ Washington Street intersection and Mystic Valley Parkway/ Waterfield Road intersection areas.

Informed by field observations, stakeholder input, and data collection, recommendations for improvements include three strategy approaches. If implemented together these strategies will support the goal of improving safety conditions for pedestrians within the study area, particularly during school drop-off and dismissal times. These strategies include:

- Roadway geometric changes
- Equipment, signage, and pavement marking updates
- Programmatic changes and initiatives

### Roadway Geometric Changes

Geometric engineering design concepts were explored to improve safety and functional conditions at two primary locations; Main Street at Washington Street and Mystic Valley Parkway at Waterfield Road. An overview of these recommendations is provided in Figure 35.

The proposed geometric concepts will greatly enhance pedestrian comfort and improve safety in the vicinity of the school. At both the front and back entrances of the school, the design changes will provide curb extensions and shorter pedestrian crossing distances, narrowed vehicular travel lanes to decrease speeds, and wider sidewalks. These improvements will increase visibility of pedestrians at crosswalks, slow traffic speeds and provide more space for pedestrian use.

As a result of the curb alignment changes more area is created for green infrastructure and additional street trees, which also have traffic calming effect. Narrower vehicles travel lanes and elements such as street trees to create “edge friction” will cause drivers to move more slowly through the area, increase awareness of pedestrian activity and behave more cautiously. The overall environment will create a more comfortable environment for pedestrians and bicyclists, specifically for school-aged children.

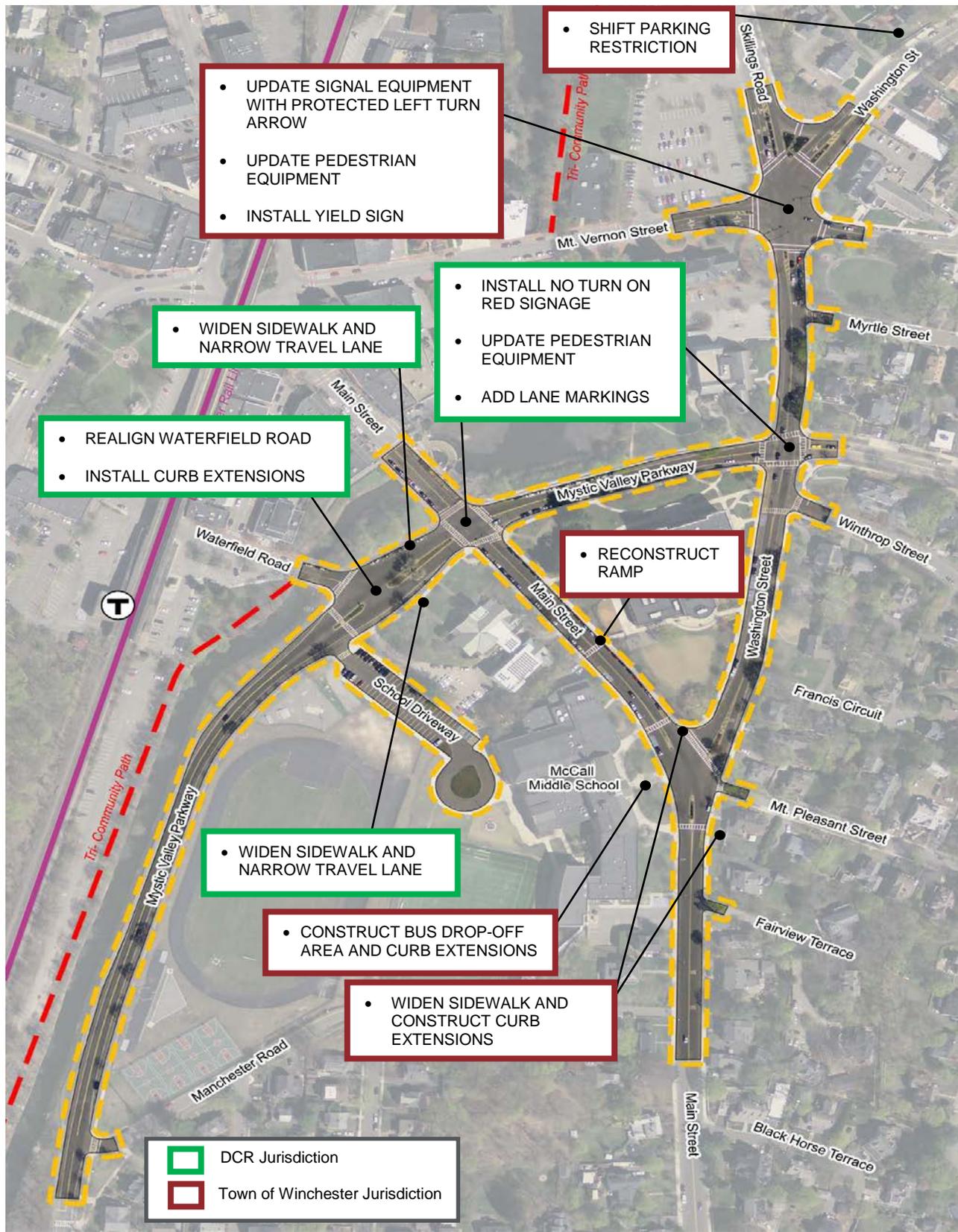


Figure 35: Recommended Project Area Improvements

### *Main Street at Washington Street and Mt. Pleasant Street*

The concept shown in Figure 36 realigns the intersections of Washington Street and Mt. Pleasant Street with Main Street to form two separate, perpendicular intersections. The traffic medians along Main Street and at Washington Street approach are proposed to be removed and the intersection area narrowed by extending the curbs along the east and west side of Main Street. The two intersections will provide one travel lane in each direction for all approaches. Bicycle lanes are proposed along both sides of Main Street, though discussion will be needed to determine the extents. This configuration will dramatically shorten the crosswalk distances and create a more visible crossing area at the main school entrance. The vehicular operational changes associated with this design are within the Appendix of this report.

Curb extensions along the west side of Main Street, in front of McCall, and on both corners on either side of Washington Street and Mt. Pleasant Street will significantly shorten the crosswalks across Washington Street and both Main Street approaches. The crosswalk immediately north of Washington Street is recommended to be relocated slightly south to align with the new extended curb line. In addition, the crosswalk south of Mt. Pleasant Street is recommended to be relocated between the realigned Washington Street and Mt. Pleasant Street intersections. Proximity of these crosswalks will increase driver expectancy of pedestrian activity, while easing operations for crossing guards. ADA-compliant curb ramps with detectable warning panels are proposed for the new crosswalks at all intersections. The opportunity to incorporate a gateway pavement treatment within the intersection field will further enhance the traffic calming and placemaking nature of this design. Stormwater management for the proposed alignment will be directed to bioswales and planting areas within the newly created green infrastructure.

The concept provides additional dedicated drop-off space along Main Street, with an option to provide this space along the front of School's existing green space, or as a streetside pull-off zone. This dedicated space may serve passenger vehicles or school buses. The bicycle facility along the drop-off zone is recommended to be sidewalk level asphalt to protect bicyclists from the frequent door-zone activity associated with a drop-off zone. This area will require existing ADA spaces to be replaced, and the MBTA bus stop signage to be shifted further south on Main Street. Further discussion is provided within the *Programmatic Initiatives*.

### *Mystic Valley Parkway at Waterfield Road*

The intersection at Mystic Valley Parkway and Waterfield Road is used by many students walking to school, busses, and parents dropping off students at the rear entrance of McCall. The intersection is excessively wide and visibility for drivers approaching from Waterfield Road and from the McCall Middle School driveway is poor. Toole Design recommends extending the curbs at all corners of the intersection, and along both sides of Mystic Valley Parkway to the intersection of Main Street. This would provide the opportunity to realign the Waterfield Road approach to intersect Mystic Valley Parkway at a 90-degree angle, as shown in Figure 37. The vehicular operational changes associated with this design are within the Appendix of this report.

The landscapes islands along Mystic Valley Parkway are proposed to be removed to accommodate an 11-foot travel lane, 5-foot bike lane on both sides, and 8-foot parking lane in both directions along Mystic Valley Parkway. The reconfiguration of Mystic Valley Parkway will provide an additional 12 on-street parallel parking spaces between Main Street and Waterfield Road; five along the north side and seven along the south side.

The proposed realignments would create shorter crossing distances for pedestrians, better visibility for drivers pulling into the intersection from Waterfield Road and the McCall Middle School driveway and additional green space along the Aberjona River and opposite side of Mystic Valley Parkway. The additional greenspace would create opportunities for green infrastructure for stormwater management.

Coordination with DCR will be required to make these changes on Mystic Valley Parkway.

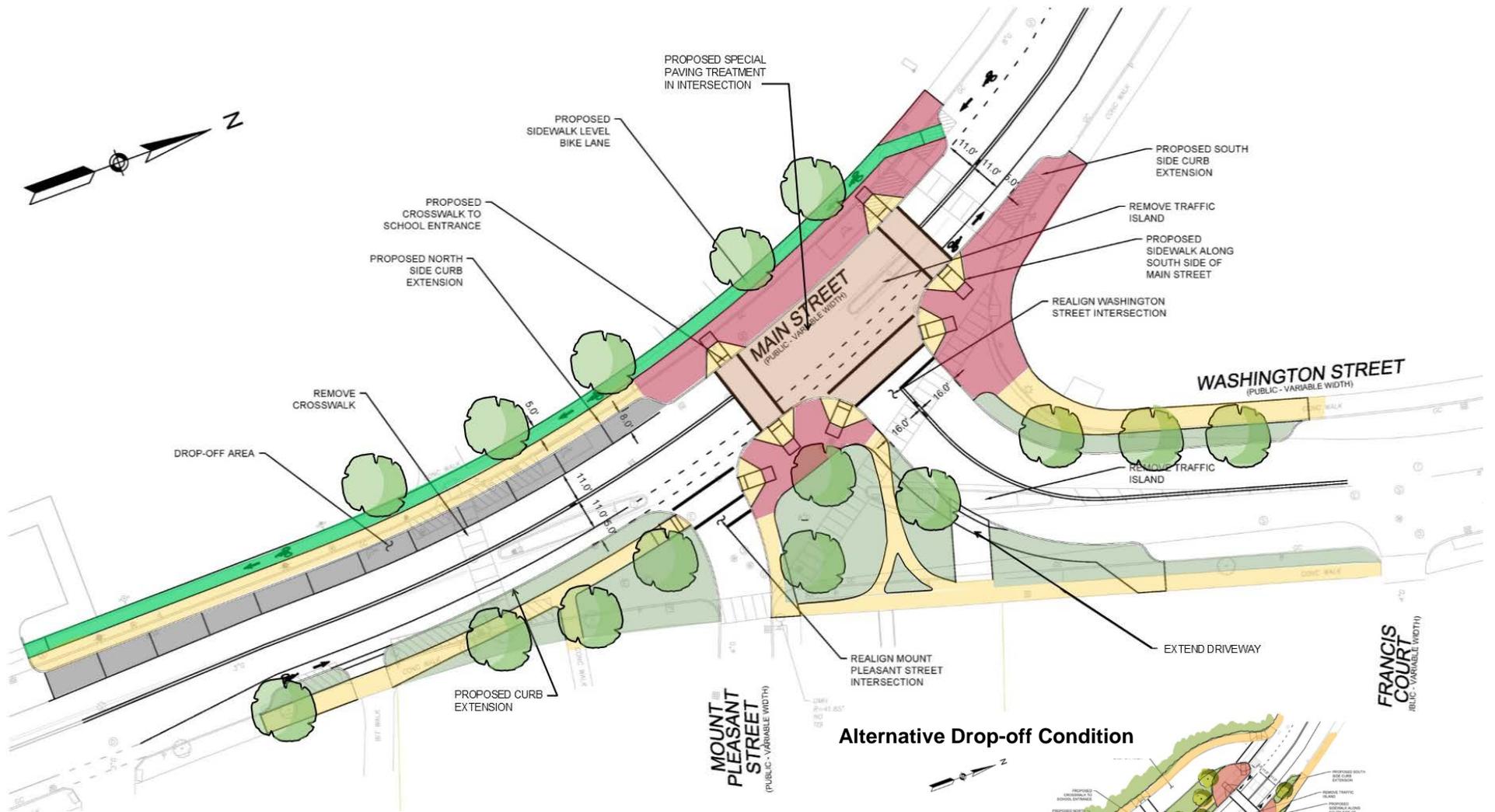


Figure 36: Proposed Main Street/ Washington Street Intersection

Alternative Drop-off Condition





Figure 37: Proposed Mystic Valley Parkway/ Waterfield Road Intersection

### Washington Street at Mt. Vernon Street and Skillings Road

The five-approach intersection of Washington Street at Mt. Vernon Street and Skillings Road experiences noted crash occurrences, and pedestrian, bicyclist and vehicular delays in all directions. This is due to the challenging geometric layout of the intersection field, requiring split phasing, long cycle lengths, and long clearance intervals (loss time). It is recommended that further consideration be given to the conceptual design presented in Figure 38, presenting a potential roundabout in place of the existing traffic signal. Initial capacity analyses conducted in SIDRA software suggests the roundabout traffic control at this location will reduce vehicular delays during the peak hours, providing pedestrians with the right of way at all crosswalks. Off-peak will also experience reduced delays, as vehicles approaching the intersection will not be required to stop at red signal indications during times of lower volume. A noted benefit of this design is the removal of vehicle approach lanes on all approaches, which allows for shortened crosswalks and generally reduced crashes and travel speeds. Further evaluation of the operational advantages and trade-offs of this design is recommended, with special consideration being given to school-aged children experiencing the intersection as pedestrians and bicyclists<sup>1</sup>. The existing exclusive pedestrian phase will not be provided with a roundabout design, which may be considered a disadvantage to some users. Off-peak will also experience reduced delays, as vehicles approaching the intersection will not be required to stop at red signal indications during times of lower volume. The SIDRA output sheets are provided in the Appendix for reference.

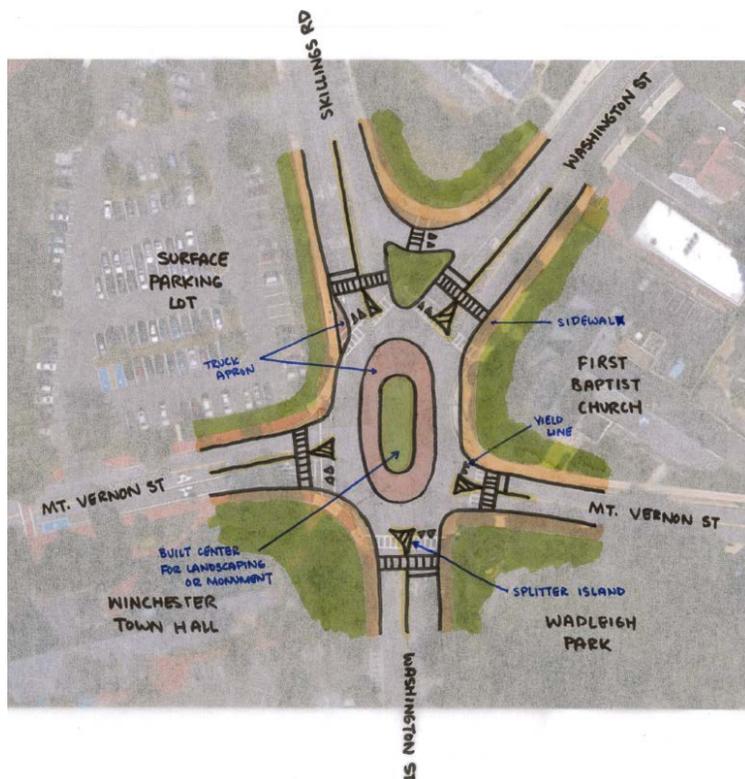


Figure 38: Roundabout Conceptual Design

<sup>1</sup> [https://safety.fhwa.dot.gov/intersection/innovative/roundabouts/case\\_studies/rounds4peds.pdf](https://safety.fhwa.dot.gov/intersection/innovative/roundabouts/case_studies/rounds4peds.pdf)

## Equipment, Signage, and Pavement Marking Updates

### *Washington Street at Mt. Vernon Street and Skillings Road*

The existing signal operates on a five-phase cycle, with the Mt. Vernon Street eastbound approach being provided a leading protected phase before the westbound approach is permitted with the eastbound traffic. The eastbound approach traffic signal heads is provided traditional globe indication, with no green and yellow arrows, which indicate the lead protected phase. This existing equipment structure does not provide any clarification to the eastbound traffic that they have a protected leading phase. The signal heads do not give any indication to the eastbound approach when the westbound approach phase begins. This is potentially a safety issue since eastbound left-turning vehicles may think their movement is still protected, while the westbound vehicles are permitted to proceed into the intersection. The vehicular operational changes associated with this design are within the Appendix of this report.

Pedestrian signal equipment at the intersection is recommended to be updated to the latest accessible pedestrian signal (APS), with associated pushbuttons and countdown indications. During a site visit, numerous pedestrian signal heads were not functioning properly:

- Eastbound facing pedestrian “Don’t Walk” hand is out on pedestrian island
- Eastbound facing pedestrian “Don’t Walk” hand is out on south leg of intersection
- Westbound facing pedestrian “Don’t Walk” hand is out on south leg of intersection

The Washington Street southwestbound approach is currently striped as two lanes for approximately 125’ approaching the intersection, however queues dictate the demand for this two lane condition to extend further north. The existing double yellow centerline is marked with an approximately 5’ median that may be removed, allowing for the roadway width to extend the second approach lane for an additional 175’. On-street parking restrictions may be considered to extend this lane further. The existing channelized right-turn lane from Washington Street to Skillings Road provides no signage or pavement markings to inform drivers of the yielding condition required to merge into a single lane on Skillings Road. It is recommended that a yield sign be installed at the merge point on the north side of channelized right-turn lane. This signage is recommended to be supplemented with yield line pavement markings. In addition, the vegetation within the traffic island is recommended to be maintained for sight line restrictions for this yielding condition.

The signal phasing splits can potentially be adjusted to reduce delay for bicyclists and vehicles. Further discussion is provided in Appendix A – Level of Service Discussion. Coordination with the signal at Mystic Valley Parkway is not currently recommended. The following provides details on this decision:

- The split signal phasing is inherently inefficient, however necessary due to the unique geometry of the intersection. This phasing scheme dictates an approximately 140 second cycle length.
- The phasing scheme at Washington Street at Mystic Valley Parkway is a simple three phase cycle running an approximately 90 second cycle, which cannot be coordinated with the Skillings Road intersection without increasing the cycle length to match. Long cycle lengths generally increase vehicle queues and increase delays for pedestrians.
- Coordination requires the prioritization of one corridor, at the detriment of the others approaches. In the case of this intersection, volumes are generally balanced on all approaches and therefore coordination is not recommended as the solution to congestion.
- The existing exclusive pedestrian phases inherently ‘break’ the coordination of a signal system by stopping all vehicular movements at an intersection.
- Coordination will require equipment to allow the intersection signals to communicate, as well as possible upgrades to signal controllers. Both these elements involve an upfront and maintenance cost.

*Washington Street at Mystic Valley Parkway and Main Street at Mystic Valley Parkway*

Pedestrians are permitted to cross at both intersections upon actuating the exclusive pedestrian phase. Currently, vehicles are permitted to turn right on red which increases potential pedestrian-vehicle conflicts. No Turn on Red signage is recommended for installation on all approaches to the Mystic Valley Parkway at Washington Street and Mystic Valley Parkway at Main Street intersections. Vehicles at this location were observed to frequently turn right on red without properly scanning the intersection for pedestrians, especially of concern during the exclusive pedestrian phases. Restricting the right turn on red will reduce this potential conflict. Coordination with DCR will be required to this change. The vehicular operational changes associated with this design are within the Appendix of this report.

The cycle lengths are recommended to be reduced at both locations to reduce delay for pedestrians, bicyclists, and vehicles. Further discussion is provided in Appendix A – Level of Service Discussion.

Pedestrian signal equipment was observed to be outdated. It should be noted that the southbound facing pedestrian “Don’t Walk” hand on the east leg of the Washington Street at Mystic Valley Parkway intersection is malfunctioning. Toole Design recommends replacing the pedestrian signal equipment with audible pushbuttons and APS with countdown. Crosswalks with curb ramps are provided across each approach, however there are no detectable warning panels provided on the curb ramps. Toole Design recommends installing detectable warning panels within each of the accessible ramps to indicate to those visually impaired that they are entering or exiting the crosswalk.

Currently the intersections at Mystic Valley Parkway have wide, undefined approaches. It is recommended that the lane designations and on-street parking regulations be marked, to provide a safety benefit to all roadway users. The following lane designations are recommended for pavement markings:

- **Mystic Valley Parkway Eastbound at Main Street** – Left turn only /Shared through-right turn lane.
- **Mystic Valley Parkway Westbound at Main Street** – Permit on-street parking up to 20-feet prior to intersection with Main Street, north side, to discourage right turns on red/remove the right turn lane.
- **Washington Street Northbound at Mystic Valley Parkway** – utilize pavement markings to discourage on-street parking and use of the right turn lane by marking the east side of Washington Street to match the west side.



**Figure 39: Proposed Pavement Markings at Mystic Valley Parkway**

### School Speed Limit Signage

The School Zone speed limit signage on Mystic Valley Parkway is recommended to be relocated prior to areas school children activity. The School Zone sign at the intersection of Mystic Valley Parkway and Main Street is recommended to be relocated closer to the northbound approach to Waterfield Road. The School Zone sign at the intersection of Mystic Valley Parkway and Washington Street is recommended to be relocated to the southbound approach prior to the intersection. Flashers are recommended to be added to these School Zone signs for added reinforcement and awareness for drivers.

The missing signage on the Washington Street School Zone assembly is recommended for replacement. Consideration may be given to installing at School Zone signage assembly on Main Street southbound, prior to the Lincoln Elementary School and McCall Middle School, though speeds were notably compliant in this direction of travel.

### On-Street Parking

With the proposed geometric design of Main Street at Washington Street and Mt. Pleasant Street and Mystic Valley Parkway at Waterfield Road outlined in Figure 36 and Figure 37, on-street parking will require modifications. Table 6 summarizes the net changes in on-street parking spaces by parking type and location.

**Table 6: On-Street Parking Modifications**

Design Location	Parking Type	Lost Spaces	Gained Spaces	Net Change in Spaces
<b>Main Street at Washington Street and Mt. Pleasant Street</b>	School Permit	-4		
	Accessible	-2		
	1 Hour	-4	+4	-11
	Unrestricted	-5		
<b>Mystic Valley Parkway at Waterfield Road</b>	Pick-up/Drop-off (7-8am and 2-3pm)	-1	+7	+6
	<b>Total</b>	-	<b>+11</b>	<b>-5</b>

Main Street and Washington Street near the front of McCall Middle School will experience a net loss of 11 parking spaces, while Mystic Valley Parkway at the rear of McCall Middle School will experience a net gain of six parking spaces. Toole Design recommends that the two accessible parking spaces along Main Street be relocated to the new drop-off zone shown within Figure 36. The remaining nine gained spaces may be utilized for school permit parking or pick-up and drop-off activity during school hours and 1-hour parking at other times. A summary of where parking spaces are lost and gained can be found in the Appendix.

## Programmatic Initiatives

### Bicycle Facility Enhancements

With the proposed recommendations, bicycle safety and comfort will be improved. Much of the current bicycle activity observed within the study area consists of school-aged bicyclists who utilized the sidewalk to get to and from the School entrances, the athletic fields, or skate park. For those users, the proposed recommendations to create shorter crossings and wider sidewalks, and to restrict right turns on red will reduce potential conflict between vehicles and both pedestrian and school-ages bicyclists who are traveling along the sidewalk as a pedestrian. The geometric changes along Main Street and Mystic Valley Parkway include the space for a dedicated bicycle lane in both directions of travel for people who are comfortable to travel within the roadway.

It is recommended that additional bicycle racks be installed on the McCall Middle School campus. During a site visit, the bicycle racks were noted to be exceeding capacity. Numerous bicycles were seen parked against trees or sign posts. Toole Design also recommends installing bicycle racks at the front of the building as well for students who are accessing the school from the east.

#### *Traffic Safety Awareness Education*

An education campaign to heighten awareness of pedestrian safety issues was suggested by stakeholders and staff associated with the McCall Middle School. Toole Design observed several dangerous driver behaviors during site observations at school drop-off and pick-up times. This proposed education campaign would be directed at drivers, bicyclists, and pedestrians aimed at slowing traffic, promoting safe driver behavior, and pedestrian and bicycle rider alertness.

#### *Promote Walking and Bicycling to School*

While our team observed many students and accompanying parents walking to school, and many bicycles filling the racks provided at the rear entrance of McCall, promoting more walking and biking would decrease parent drop-off and pick-up vehicle traffic, as well as promote healthy activity for students.

Providing safer, more extensive bicycle routes connecting to McCall Middle School should be part of this effort. This would include separated bicycle facilities along major access routes including Main Street, Washington Street, Mystic Valley Parkway, Shore Road and Church Street and safer connections to the existing Tri-Community Greenway.

#### *Remote Student Drop-off/Pick-up Locations*

At the stakeholder meetings, Toole Design listened to discussion exploring designated remote drop-off and pick-up locations within short walking distance to McCall Middle School. This option would decrease to volume of vehicles at the school entrances in the mornings and afternoons. Possible locations include Jenks Center Parking lot, Mystic School parking lot and Waterfield Road parking lot. The remote locations would provide temporary stopping and pick-up/drop-off during designated morning and afternoon times during the school year. A similar program is currently being utilized at the Vincent Owen School.

#### *School Bus Ridership Study*

Currently school bus service is offered at no cost to K-6 students who live more than two-miles from school, However, McCall Middle School and Winchester High School students must pay a fee regardless of home distance. Stakeholder groups report feedback from parents citing high bus fees as a reason for not taking advantage of bus services. Increasing bus ridership will decrease vehicle congestion issues at McCall Middle School, and within Town in general, during peak morning and afternoon hours. Toole Design recommends investigating the ability to decrease or remove bus service fees. This process may include surveying parents and exploring options for funding, such as increasing personal vehicle parking fees at the schools and in Town.

#### *Alternative Bus Drop-off Pick -up Location*

School buses currently drop-off and pick-up students at the rear of McCall Middle School, within the driveway loop off Mystic Valley Parkway. As an alternative, the Toole Design considered the provision of a dedicated drop-off location at the front of the school, requiring passenger vehicles to use the rear entrance as the drop-off. This programmatic change may facilitate the peak hour traffic congestion by:

- Removing parent vehicles from the from the Main Street/ Washington Street intersection, creating a safer pedestrian environment;
- Buses would use the drop-off lanes only twice per day, at scheduled times, leaving the lane available for short-term parking during the day; and

- Mystic Valley McCall driveway provides more vehicle queueing area for passenger vehicle drop-offs.

The bus drop-off lane would require adjusting the curb alignment in front of McCall Middle School at Main Street, as shown in Figure 36.

## **Next Steps**

Toole Design, on behalf of the Town of Winchester, has conducted a Transportation Safety Study and developed associated recommendations to enhance the study area surrounding McCall Middle School. These recommendations include roadway geometric changes, signal equipment enhancements, signage and pavement markings, and programmatic initiatives that the Town and school can apply to encourage transportation options by all modes. This study represents the first step in creating a safer and more comfortable experience for all people accessing McCall Middle School.

This study documents both short-term enhancements, and recommendations that require further study and investment. Toole Design recommends focusing on the pavement marking and signage enhancements, programmatic initiatives, and the geometric redesign of Main Street at Washington Street/Mt. Pleasant Street and Mystic Valley Parkway at Waterfield Road, in the immediate term, enhancing access for the students and faculty of McCall Middle School and Lincoln Elementary School.

**T'OOLE**  
DESIGN

# Appendices