TRAFFIC STUDY

Dedham Public Schools Circulation Study

Dedham, Massachusetts

PREPARED FOR

Dedham Public Schools
100 Whiting Avenue
Dedham, Massachusetts, 02026
781.310.1000

PREPARED BY

101 Walnut Street
PO Box 9151
Watertown, MA 02471
617.924.1770

DECEMBER 2020

Table of Contents

List of Tables

List of Figures

Executive Summary

A traffic study was conducted by VHB on behalf of the Dedham School Committee to determine viable traffic safety and circulation improvements surrounding Dedham High School, Dedham Middle School and Avery Elementary School. Based on existing conditions traffic data collected in the spring, summer, and fall 2019, field observations, and feedback from the School Committee and the public, short-term and long-term alternatives to improve safety and circulation were produced and are presented in this report.

The existing conditions data collection and field observations were conducted in April, July, and October in 2019. Traffic volumes and speeds were collected along major roadway segments (including High Street, Whiting Avenue, East Street, and Mount Vernon Street), at key intersections, and at school access driveways in the vicinity of the three schools. It was determined that the traffic volumes collected in the fall most closely represents typical school traffic patterns and was used to assess traffic impacted by the proposed alternatives. Field observations including drop-off/pick-up activity, school bus activity, parking demand, traffic queues, and crossing guard locations were conducted concurrently with the traffic counts. The existing conditions data and field observations were presented to the School Committee and residents after the spring data collection period. Feedback received helped to shape the summer and fall data collection as well as the alternatives analysis.

Based on the existing conditions traffic data, field observations, and feedback from the School Committee and public, the following issues were noted including:

- The roadways in the vicinity of the three schools are congested during pickup/drop-off times
- Signage at the middle school driveways is unclear
- The location of the accessible parking space in the middle school bus-loop should be improved
- Barrows Street and Charles Street should not be used for cut-through traffic
- There is a lack of safe crossing locations on Mount Vernon Street
- The Avery Elementary School pick-up/drop-off operation is unclear
- There are students who are eligible for a school bus yet do not take the bus to school
- A significant number of motorists drive the wrong-way on the one-way portion of Recreation Road
- There is a lack of bicycle connectivity to the schools
- The school zone signs and pavement markings are inconsistent and do not meet current standards

Based on these issues, improvement alternatives focused on traffic safety and circulation were proposed. For the long-term alternatives that impact traffic flow, volumes were redistributed through the network and a high-level analysis of these impacts is presented. For the short-term alternatives, which typically to not impact traffic flow, no volume redistributing was assumed. The following list includes a description, benefits, impacts, and relative costs of each alternative.

Short-Term Opportunities

Short term opportunities can primarily be achieved for relatively low cost and are not anticipated to require additional planning or design funding. In many cases, these improvements can be implemented by the town as a course of regular maintenance. Short-term opportunities include:

- Clarify signage at the Middle School driveways
- Improve the accessible parking spaces at the Middle School to comply with all accessibility guidelines
- Discourage Barrows Street and Charles Street cut-through traffic
- Provide a safe crossing on Mount Vernon Street
- Do Not Block intersection treatment on Recreation Road
- Clarify the pick-up/drop-off circulation at Avery Elementary School through signage, pavement markings, and communication to parents
- Swap the High School parent/guardian and bus pick-up/drop-off areas
- Update School Zone signage and pavement markings

› Provide new Middle School bus to the Oakdale School neighborhood

Long-Term Alternatives

Long term alternative can provide increased benefits to traffic flow and circulation in and around the school. However, many of these alternatives will require additional consensus building and capital investment by the town, including potentially securing funds through town meeting. As such, this study recognizes some improvements may take several years to fund, design, and implement.

Alternative 1 – One-Way Whiting Avenue

Description: Whiting Avenue is proposed to be one-way westbound between Mount Vernon Street and Walnut Street. A separated bike lane is proposed along the north side of the roadway.

Benefits: Better accommodates cyclists mixing with school-related traffic; discourages U-turn movements during pick-up/drop-off.

Impacts: Eastbound traffic through the school area would be rerouted to High Street and Walnut Street; increased delay at the intersections of High Street at Mount Vernon Street and at High Street at Recreation Road.

Relative Cost: High

Alternative 2 – One-Way Recreation Road

Description: Formalize Recreation Road as one-way southbound by narrowing the roadway from High Street to Whiting Avenue to dissuade wrong-way motorists.

Benefits: Reduced wrong-way driving on Recreation Road; reduced motorist confusion; traffic congestion and delay improvement at the intersection of High Street and Recreation Road; can provide on-road bicycle accommodations with reconfiguration of parking or expanded off-road trail as part of future town efforts.

Impacts: Increased delay at the intersection of Whiting Avenue at Recreation Road; potential loss of parking spaces to accommodate bicycles.

Relative Cost: High

Alternative 3 – Close Segment of Mount Vernon Street

Description: Close the segment of Mount Vernon Street between Mount Vernon Place and Whiting Avenue to create a continuous campus between the high school and the middle school.

Benefits: Opportunity to increase open space by about 10,000 square feet; improved safety for passing between the high school and middle school; may allow for future staffing and educational opportunities.

Impacts: May increase school-related traffic along Barrows Street and Charles Street; increased delay at the intersections of Whiting Avenue at Walnut Street and at Whiting Avenue at East Street.

Relative Cost: High

Alternative 4 – Signalize High Street at Recreation Road

Description: Install a full signal for all approaches and crosswalks at the intersection of High Street and Recreation Road.

Benefits: Increased safety for pedestrian crossings; decreased delay for traffic exiting Recreation Road onto High Street

Impacts: May encourage use of Recreation Road for cut-through traffic between Whiting Avenue and High Street.

Relative Cost: High

Alternative 5 – Middle School Connection to Whiting Avenue

Description: Create a new stop-controlled, exit-only, curb cut from the Dedham Middle School pickup/drop-off area to Whiting Avenue.

Benefits: Reduced traffic volumes on Mount Vernon Street; slight reduction in vehicular delay at the intersection of Whiting Avenue and Mount Vernon Street; reduces circulation patterns for traffic ultimately destined to Route 1 and beyond.

Impacts: Creates an additional pedestrian conflict across the new driveway; middle school pickup/drop-off circulation may need to be reconfigured.

Relative Cost: Medium

Alternative 6 – Connection Through Tennis Courts Parking Lot

Description: Create a one-way eastbound connection between Mount Vernon Streets and Recreation Road using the existing tennis courts parking lot, relocate the tennis courts, and reconfigure the parking lot.

Benefits: Adds 33 new parking spaces; creates opportunity to use tennis courts lot for pickup/drop-off activity.

Impacts: May encourage additional cut-through traffic between Mount Vernon Street and Recreation Road; requires new location for tennis courts.

Relative Cost: High

Combined Alternatives 1, 3, and 5

Description: Make Whiting Avenue one-way westbound between Mount Vernon Street and Walnut Street, close Mount Vernon Street between Mount Vernon Place and Whiting

Avenue and create a new exit-only driveway from the Dedham Middle School pickup/drop-off area to Whiting Avenue.

Benefits: Provides an opportunity to substantially change access and circulation near the school campus, including reducing/eliminating traffic not related to school or residential use.

Impacts: Impacts to various study intersections.

Relative Cost: High

Next Steps

The Dedham School Committee should consider the potential benefits, impacts, and relative costs of the proposed conceptual alternatives. The short-term opportunities can likely be implemented without the need for additional designs and approvals. The longer-term alternatives require additional design, town approvals, and capital funding prior to construction.

1

Introduction

VHB, on behalf of the Dedham School Committee has prepared this traffic study (the "Study") to evaluate the existing traffic conditions in the vicinity of Dedham High School, Dedham Middle School, and Avery Elementary School and to recommend potential traffic safety and circulation improvements.

Project Description

Dedham High School, Dedham Middle School, and Avery Elementary School, three of the seven schools in the Dedham Public School system, are located in within a half-mile of each other in a neighborhood that experiences substantial school-related congestion during peak school pickup and drop-off times. This neighborhood is generally bound by High Street to the north, Whiting Street to the south, Walnut Street to the east, and East Street to the west.

Avery Elementary School is located at 336 High Street. In the 2018-2019 school year Avery Elementary School enrolled 305 students from first through fifth grade. The school day at Avery Elementary School starts at 8:45 AM and ends at 3:00 PM each day. The school is served by three school buses.

Dedham Middle School is located at 70 Whiting Avenue and enrolled 647 students from sixth through eighth grade in the 2018-2019 school year. The school day at Dedham Middle School starts at 8:05 AM and ends at 2:35 PM each day. The school is served by 10 school buses.

Dedham High School is located at 140 Whiting Avenue and enrolled 748 students from ninth through twelfth grade in the 2018-2019 school year. The school day at Dedham High School starts at 7:35 AM and ends at 2:10 PM each day. The school is served by nine school buses.

On a typical school day, vehicular and pedestrian volumes peak during morning drop-off and afternoon dismissal in the vicinity of the three schools. An assessment of safety, circulation, and congestion was determined based on data collection efforts and field observations during peak school activity times. Assessments were conducted during the spring (April), summer (July), and fall (October) of 2019.

Based on the existing conditions data collection and field observations, alternatives were suggested to improve driver confusion, reduce cut-through traffic on neighborhood streets, prevent illegal vehicle maneuvers, reduce traffic congestion, promote campus connectivity, and better accommodate pedestrians and bicyclists. These alternatives were focused on improving safety and alleviating congestion within the study area. It is recognized that eliminating congestion on the area during arrival and dismissal time is not practical.

Study Methodology

VHB prepared the traffic assessment in four stages. The first stage involved an evaluation of existing transportation conditions within the project study area including an inventory of existing roadway geometry and traffic control, observations of traffic flow at the three schools and the surrounding area roadway network, including daily and peak period traffic counts, vehicle speeds, review of vehicular crash data, pick-up/drop-off operations, vehicular queueing, pedestrian flow characteristics, analysis of current modes of travel and vehicular capacity analysis at the site driveways and study intersections. The existing vehicular, pedestrian, and bicycle traffic volumes were modeled and analyzed and used as a baseline for testing alternatives.

The second stage of the Study involved developing recommendations for improving safety and traffic circulation based on the existing conditions data and field observations determined in the first stage. Each alternative was tested and compared to the existing baseline traffic conditions.

The third stage of the Study was to conduct an informational open house where the alternatives were presented to the School Committee and the public for feedback.

The fourth stage of the Study was to refine the alternatives based on feedback from the informational open house meeting and present the final alternatives for consideration by the Dedham School Committee.

Dedham Branch of Boston and Providence Railroad

There is currently approximately 1.3 miles of abandoned railway in Dedham between East Street and Readville Station. It is proposed, by a community-led effort, to transform the abandoned Dedham Branch into a rail trail for shared pedestrian and bicycle traffic. A portion of this right-of-way includes the east-west oriented portion of Recreation Road between Avery Elementary School and Dedham High School. Shared use paths can provide

an excellent mode of alternative transportation for both bicyclists and pedestrians. And if implemented, may provide a strong off-road connection to the school campus for some students. Nevertheless, the complexity of planning, permitting and designing a successful rail trail corridor requires a determination of feasibility along the entire rail corridor (including an understanding of environmental constraints and structural elements) and careful coordination, analysis and consideration of construction staging. Having only a small portion of a trail planned and possibly constructed through the campus would not have an effect on the school community or the likelihood of changing travel behavior to/from school, as the connections to/from the campus would not progress along the same timeframe.

Assessing the feasibility of a trail along the right-of-way was not ultimately included as part of the scope of this study. However, it is recognized that a portion of the right-of-way runs through the campus and that alternatives considered may be influenced by whether or not a trail is ultimately constructed. None of the alternatives presented herein would preclude the future transformation of the Dedham Branch. If a trail were constructed, the portion through the campus would require reconstruction including the relocation of landscaping, planters, curb lines, and drainage structures along Recreation Road, all of which appear feasible to accomplish.

From a transportation planning perspective, the possibility of a future trail and its benefits on transportation infrastructure as a town resource are valid. From this planning perspective, and under the lens of reducing traffic to/from the school campus specifically, a review of student addresses from the 2018-2019 school year was completed to determine the potential to alleviate traffic congestion related to school activities. The data show that up to 100 students who did not take the bus may live in the influence area of a proposed trail (while students who take a bus may also live within the influence area, switching from bus to bicycling or walking does not influence traffic congestion due to school activities). Students in this influence area that are dropped off at school currently may be persuaded to shift to an active mode of transportation, reducing the congestion on the school campus during arrival and dismissal. It is not known how many of these students currently walk or bike, in which case, a switch to the trail would not help alleviate congestion.

Based on address data, many students within this influence area would have to travel on-road for some portion of their trip and cross Milton Street, River Street and/or Whiting Avenue to reach the trail, which may limit use by students as a means of transportation to school. It is also noted that a trail likely would not benefit students from East Dedham, who would still travel via Sawmill Lane in order to cross Mother Brook. These students are more likely to continue to use Hill Avenue and the self-made path between Hill Avenue and the practice fields on the high school campus. As part of this project, the Hill Avenue path was evaluated to determine whether a formal path could be considered. However, it was determined that an accessible path could not be constructed without significantly modifying the grades and reducing the slope, an effort that would be of significant cost to the Town.

Influence of COVID-19

The COVID-19 pandemic is changing school activity in real time; with many school districts, including Dedham, choosing remote learning as an initial back to school strategy for the

2020/2021 school year. This report, and the alternatives considered focus on data from 2019, well prior to the pandemic. The data solidly represents typical arrival and departure activities at the Dedham Public Schools included in the study area and it is expected that at some point, these conditions will return to the campus.

In the interim, many communities are concerned about traffic flow related to return to school activity. It is fully anticipated that bus capacity will be reduced and that many parents will feel uncomfortable sending their children to school on the bus. Most hybrid school models being discussed will help alleviate initial concerns about increased parent drop-off and pick-up. Under hybrid schooling, the reduced number of students at school in person will keep the potentially increased drop-off and pick-up activity related to those students below what was observed during the 2019 data collection periods. Non-school related traffic along adjacent roadways is also reduced, as people continue to work from home. An exception to this scenario would be if hybrid learning follows a morning/afternoon pattern, where one-half of the students attend school for a half-day during the morning and the rest attend during the afternoon. This will create two additional time periods during the middle of the day where pick-up of morning students and drop-off of afternoon students add traffic during a time that was previously unaffected. These times will not be simultaneous and overall, they would still be lower than a full in-person school condition.

It is anticipated that there will be a lag between a return to full in-person attendance and a return to full busing activity. Although it is expected that non-school related traffic would still be reduced (compared to 2019), the surrounding roadway network will experience the most stress during this time. Alternatives like swapping bus and parent staging areas at the high school may be very advantageous in facilitating better traffic flow during drop-off and pick-up, even if they are not implemented as a permanent solution. Decisions regarding adding buses to underserved neighborhoods should be delayed. The key to managing congestion will be to plan alternate drop-off and pick-up staging and execution plans that maximize available space for queuing. This will also require partnering with parents, particularly those used to the previous plans, in execution of the new set up.

2

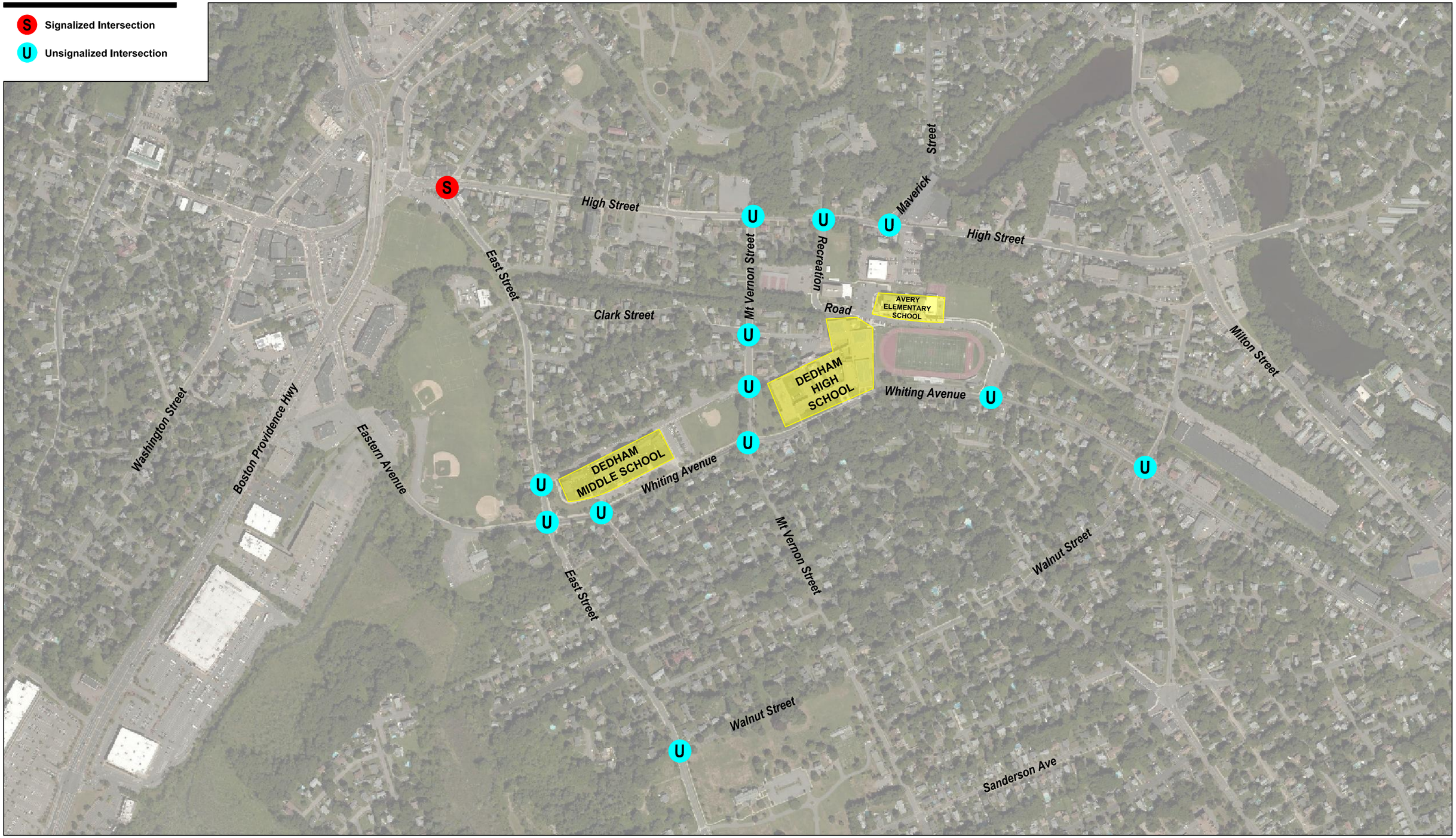
Existing Conditions

Evaluation of transportation impacts associated with proposed alternatives to improve safety or traffic circulation requires a thorough understanding of the existing transportation conditions in the study area including roadway geometry, traffic controls, and daily and peak hour traffic flow. These elements are summarized below and a detailed breakdown of the existing traffic conditions is included in a separate report included in the appendix.

Study Area

A study area encompassing specific intersections and roadways were selected for analysis based upon the Town's request for proposals. A study area map showing the locations of Avery Elementary School, Dedham Middle School, and Dedham High School and the study area intersections are shown in Figure 1. The existing lane geometry and traffic control of the study intersections are identified in Figure 2.

\\vhb\gbl\proj\Wat-TS\14571.00 Traffic Study Dedham\Graphics\FIGURES\LOCUS.dwg

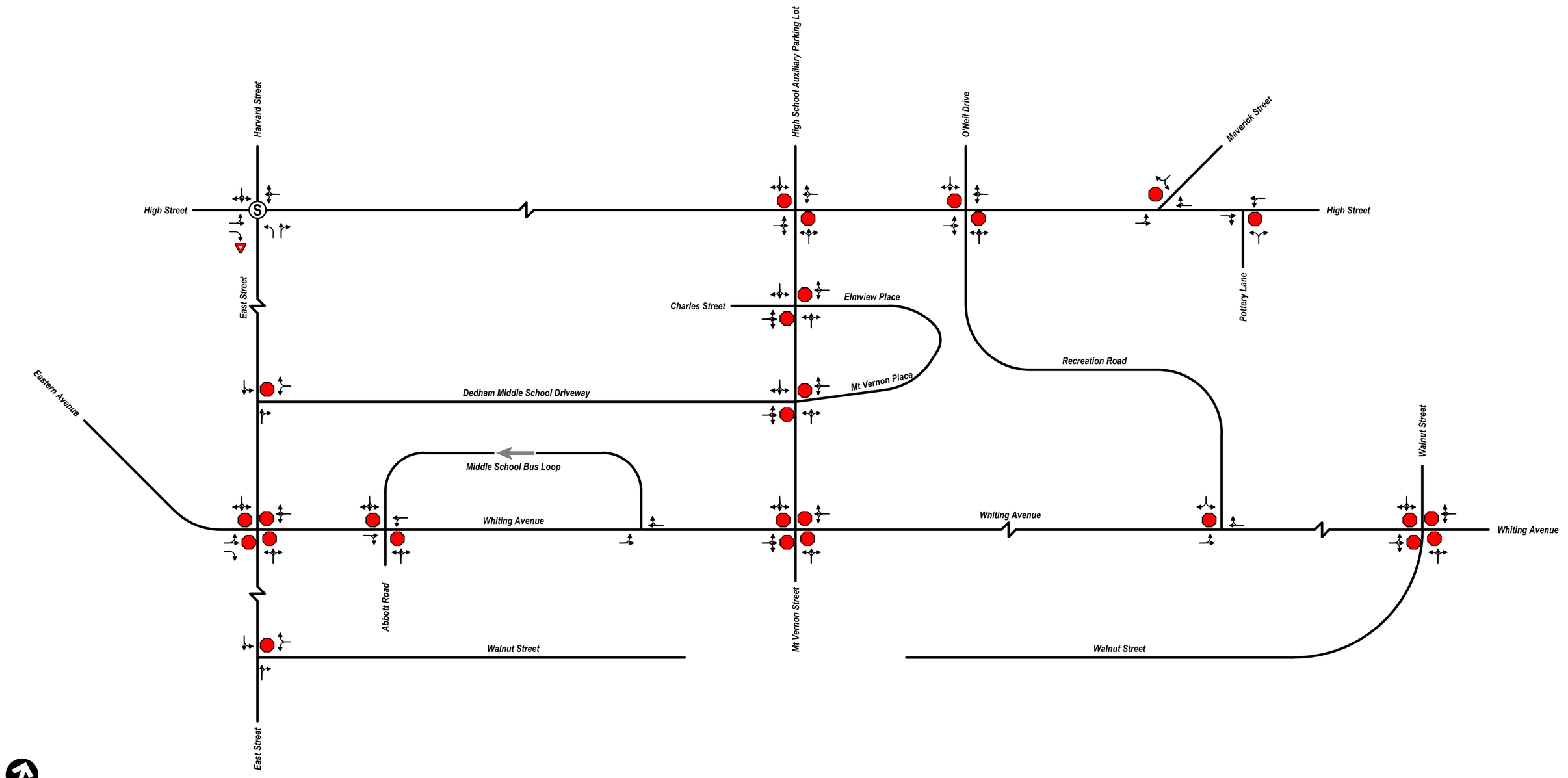


vhb

Study Area Map

Figure 1

Dedham Public Schools
Dedham, Massachusetts



Not to Scale

Figure 2

Lane Geometry & Traffic Control
Study Area Intersections

Dedham Public Schools
Dedham, Massachusetts

Specifically, this study includes the following intersections and roadways that were included in the request for proposals.

- Whiting Avenue from East Street to Walnut Street
- East Street from High Street to Whiting Avenue
- High Street from East Street to Milton Street
- Walnut Street from Milton Street to East Street
- Eastern Avenue from East Street to BJs Shopping Plaza driveway (back entrance)
- Mount Vernon Street from High Street to Walnut Street
- Whiting Avenue/Eastern Avenue at East Street
- Whiting Avenue at Mount Vernon Street
- Whiting Avenue at Walnut Street/Oakdale Street
- Whiting Avenue at Middle School Driveway
- Whiting Avenue at Recreation Road
- East Street at High Street
- East Street at Middle School Driveway
- Mount Vernon at Middle School Driveway
- High Street at Mount Vernon Street
- High Street at School Driveway (Recreation Road)

The existing conditions analysis consisted of an inventory of the traffic control, roadway/driveway, and intersection geometry in the study area, the collection of daily and peak hour traffic volumes, and a review of recent crash history. Following comments received at the first public meeting, traffic data on Barrows Street were also collected and evaluated.

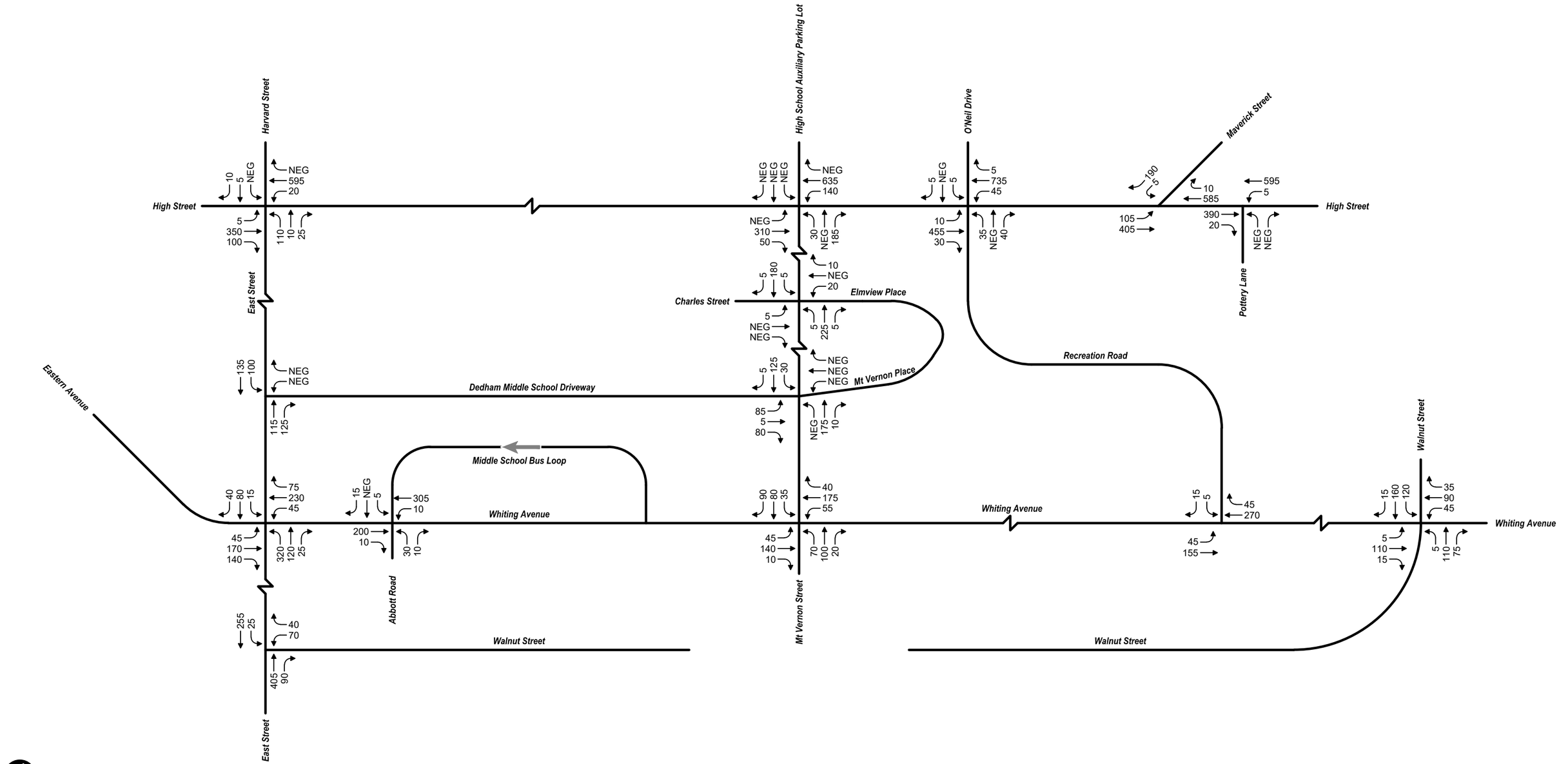
Data Collection

Daily vehicular traffic volumes were collected for the study roadways and peak hour vehicular, pedestrian, and bicycle volumes were collected for the study intersections during the spring, summer, and fall in 2019. After review of the collected data, it was determined that traffic data collected in fall 2019 most closely represents typical school traffic patterns. The traffic data from spring 2019 is similar to that from fall 2019; however, it was noted that there was construction on the Walnut Street bridge northeast of Whiting Avenue. The traffic data from summer 2019 was used to identify any traffic issues attributed to summer activities or regular commuter traffic in the study area. Traffic volumes from the fall 2019 data collection are reported below, and those from the spring 2019 and summer 2019 data collection are included in the appendix.

The turning movements of vehicles, pedestrians, and bicycles were counted during the weekday morning period from 7:00 AM to 9:00 AM and the weekday dismissal and evening periods from 2:00 PM to 7:00 PM. The TMC data indicates that the weekday morning peak hour generally occurs between 7:15 AM and 8:15 AM, the weekday afternoon dismissal peak

hour occurs between 3:00 PM and 4:00 PM, and the weekday evening peak hour occurs between 4:30 PM and 5:30 PM.

Figures 2, 3, and 4 show the existing peak hour vehicular traffic volume networks for the weekday morning, weekday midday, and weekday evening peak hours, respectively. Figures 5, 6, and 7 show the existing peak hour pedestrian traffic volume networks for the weekday morning, weekday midday, and weekday evening peak hours, respectively. Figures 8, 9, and 10 show the existing peak hour bicycle traffic volume networks for the weekday morning, weekday midday, and weekday evening peak hours, respectively.

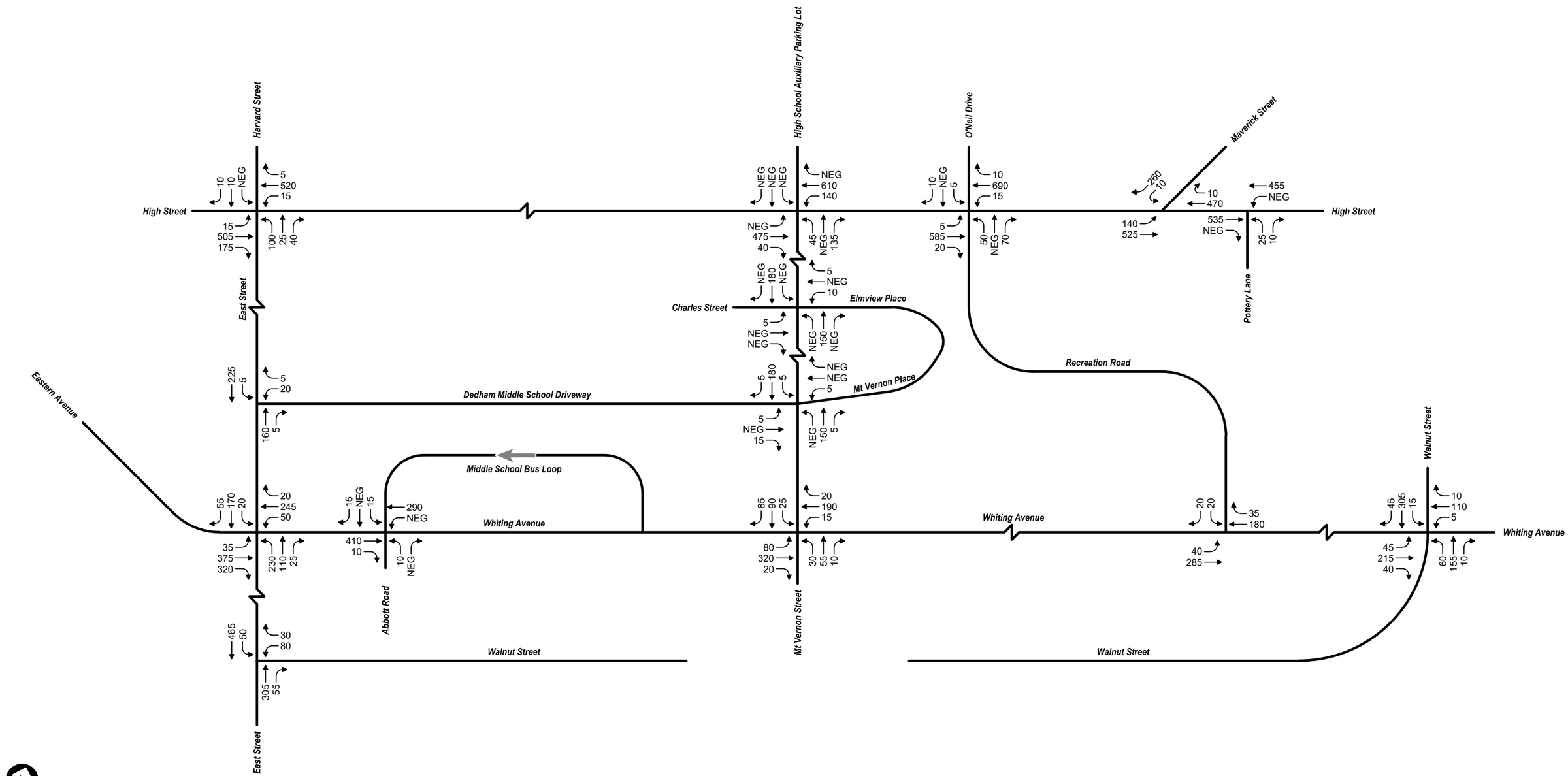


Not to Scale

Figure 3

2019 Existing Conditions - Fall
Weekday Morning Peak Hr Traffic Volumes

Dedham Public Schools
Dedham, Massachusetts

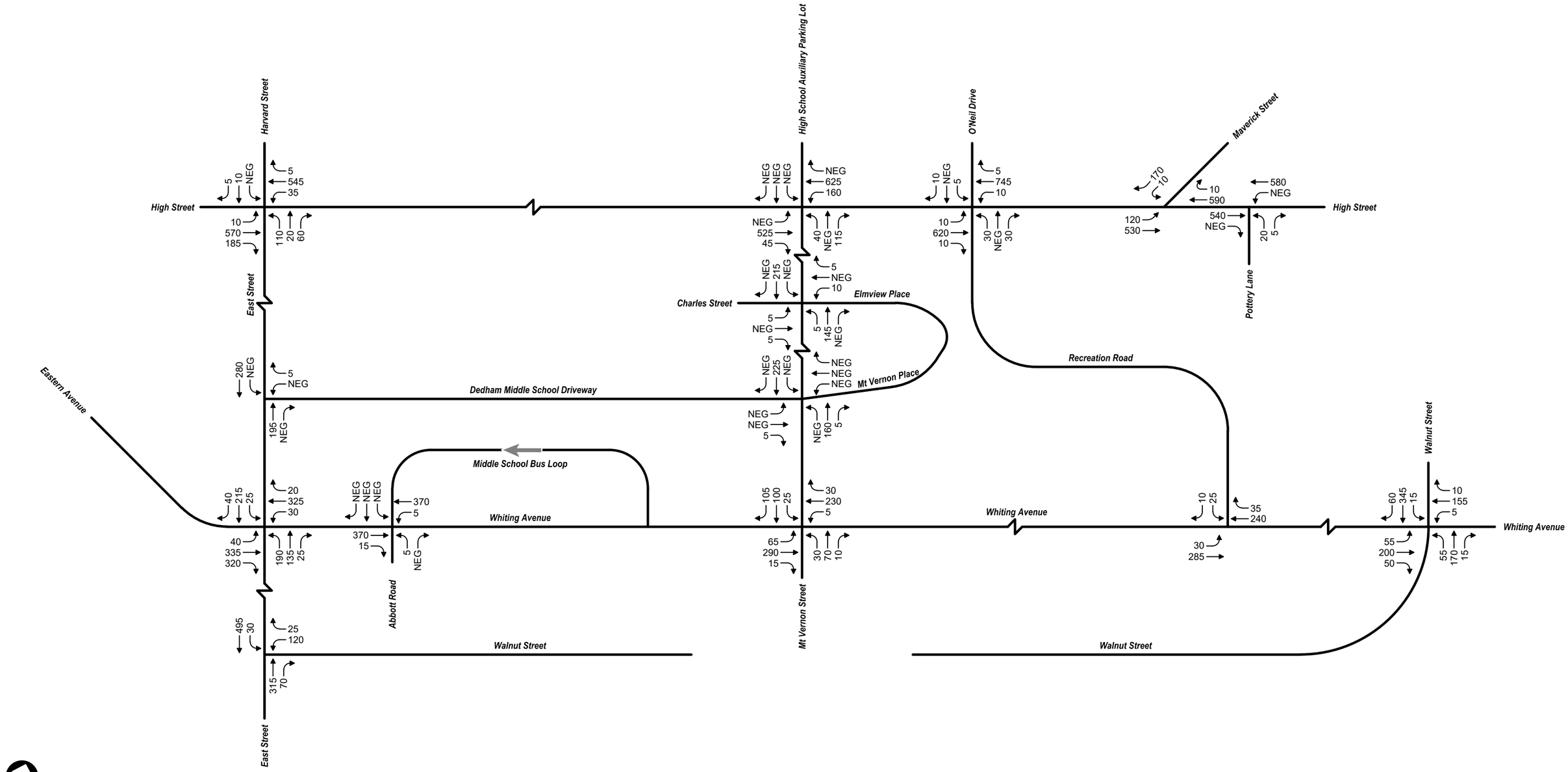


Not to Scale

Figure 4

2019 Existing Conditions - Fall
Weekday Dismissal Peak Hr Traffic Volumes

Dedham Public Schools
Dedham, Massachusetts

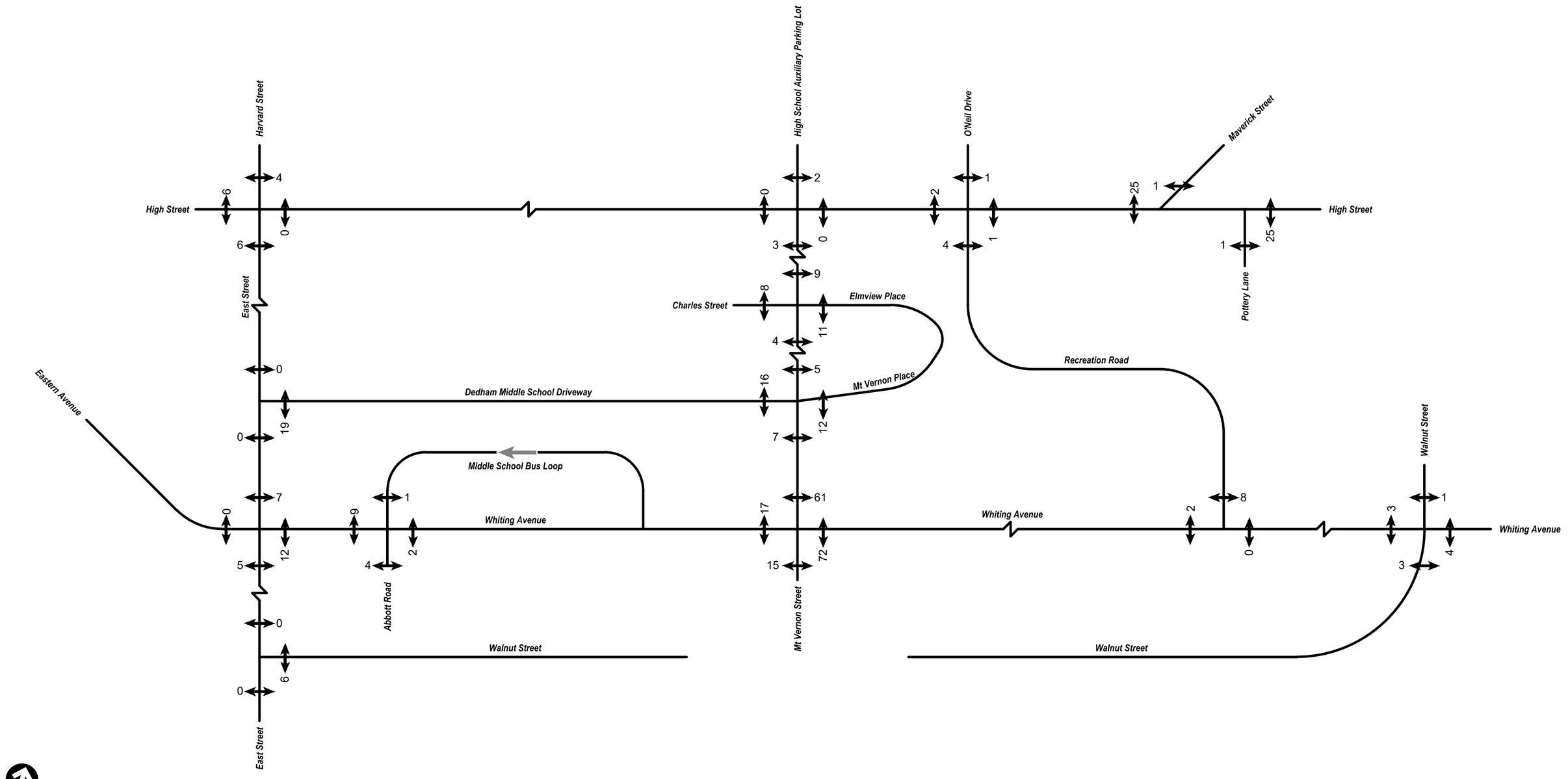


Not to Scale

Figure 5

2019 Existing Conditions - Fall
Weekday Evening Peak Hr Traffic Volumes

Dedham Public Schools
Dedham, Massachusetts

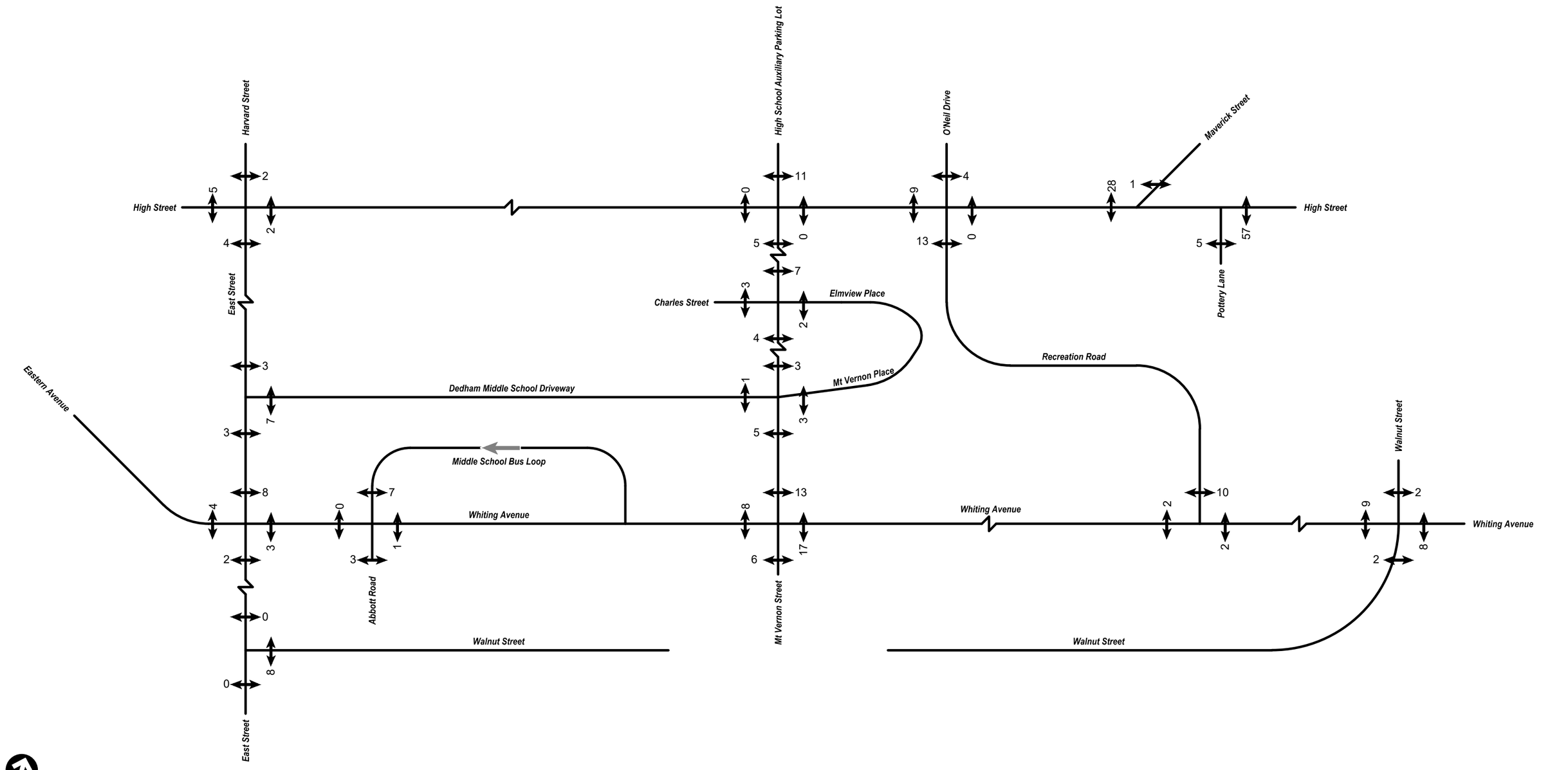


Not to Scale

Figure 6

2019 Existing Conditions - Fall
Weekday Morning Peak Hr Pedestrians

Dedham Public Schools
Dedham, Massachusetts

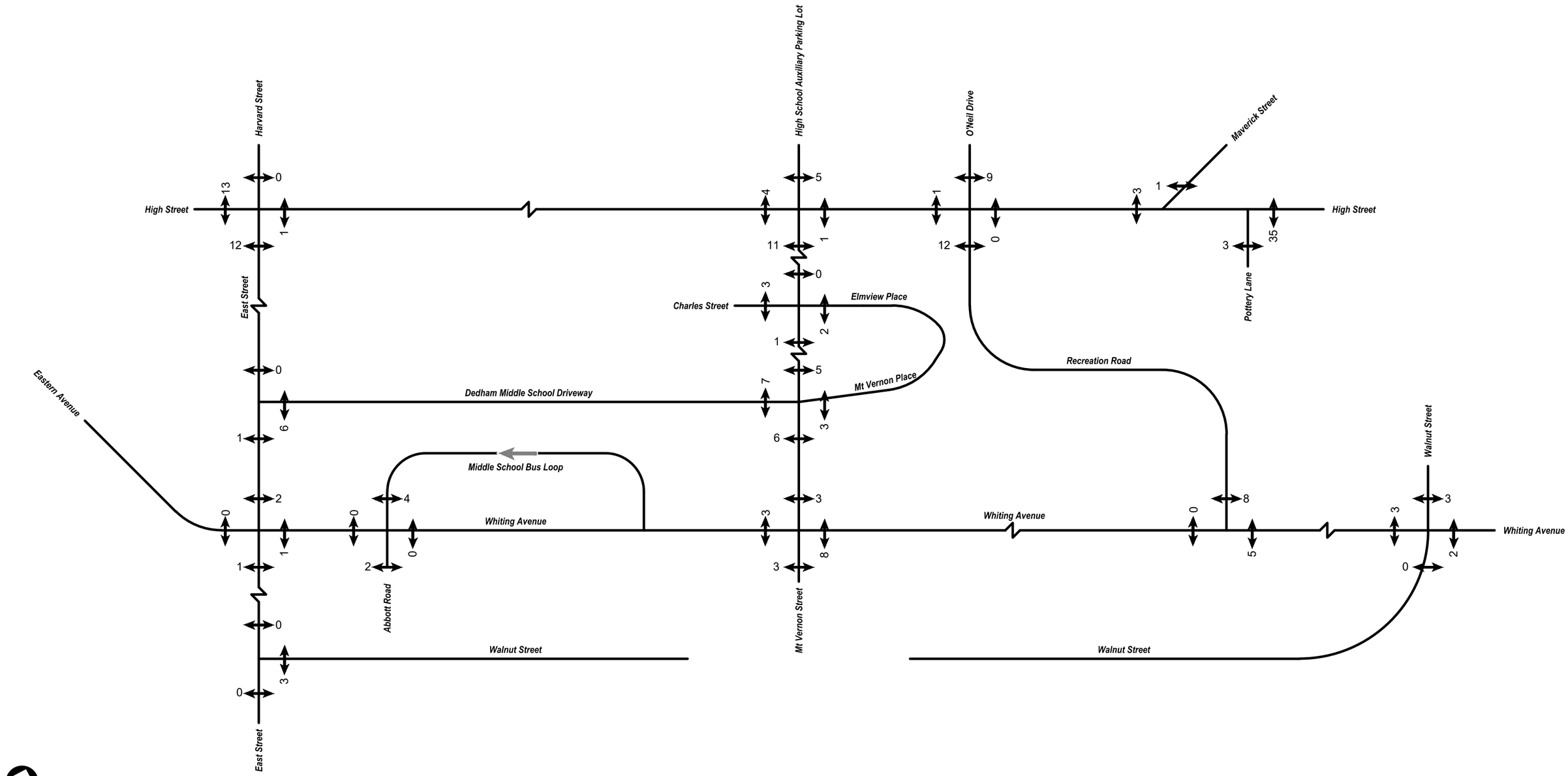


Not to Scale

Figure 7

2019 Existing Conditions - Fall
Weekday Dismissal Peak Hr Pedestrians

Dedham Public Schools
Dedham, Massachusetts

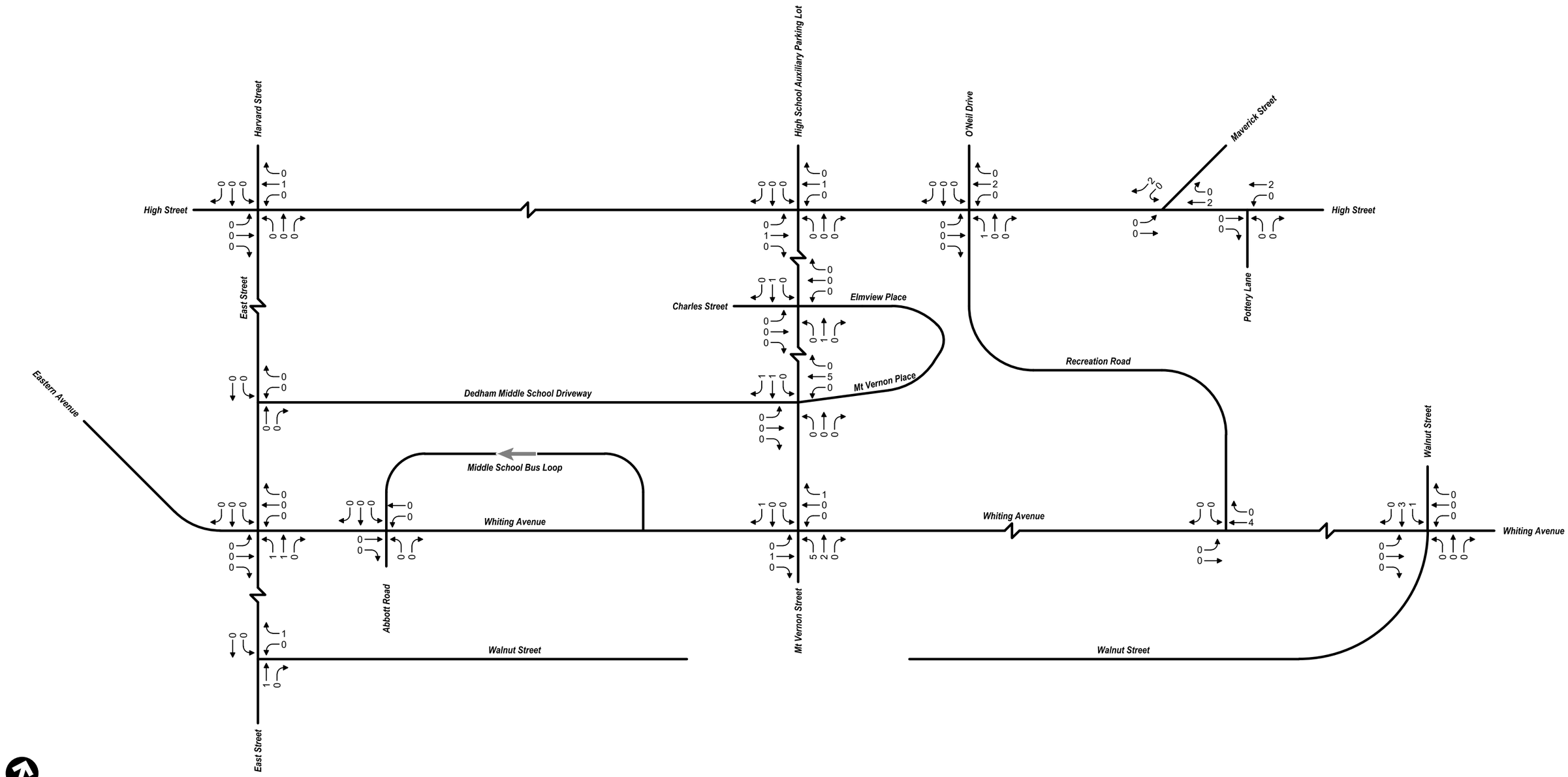


Not to Scale

Figure 8

2019 Existing Conditions - Fall
Weekday Evening Peak Hr Pedestrians

Dedham Public Schools
Dedham, Massachusetts

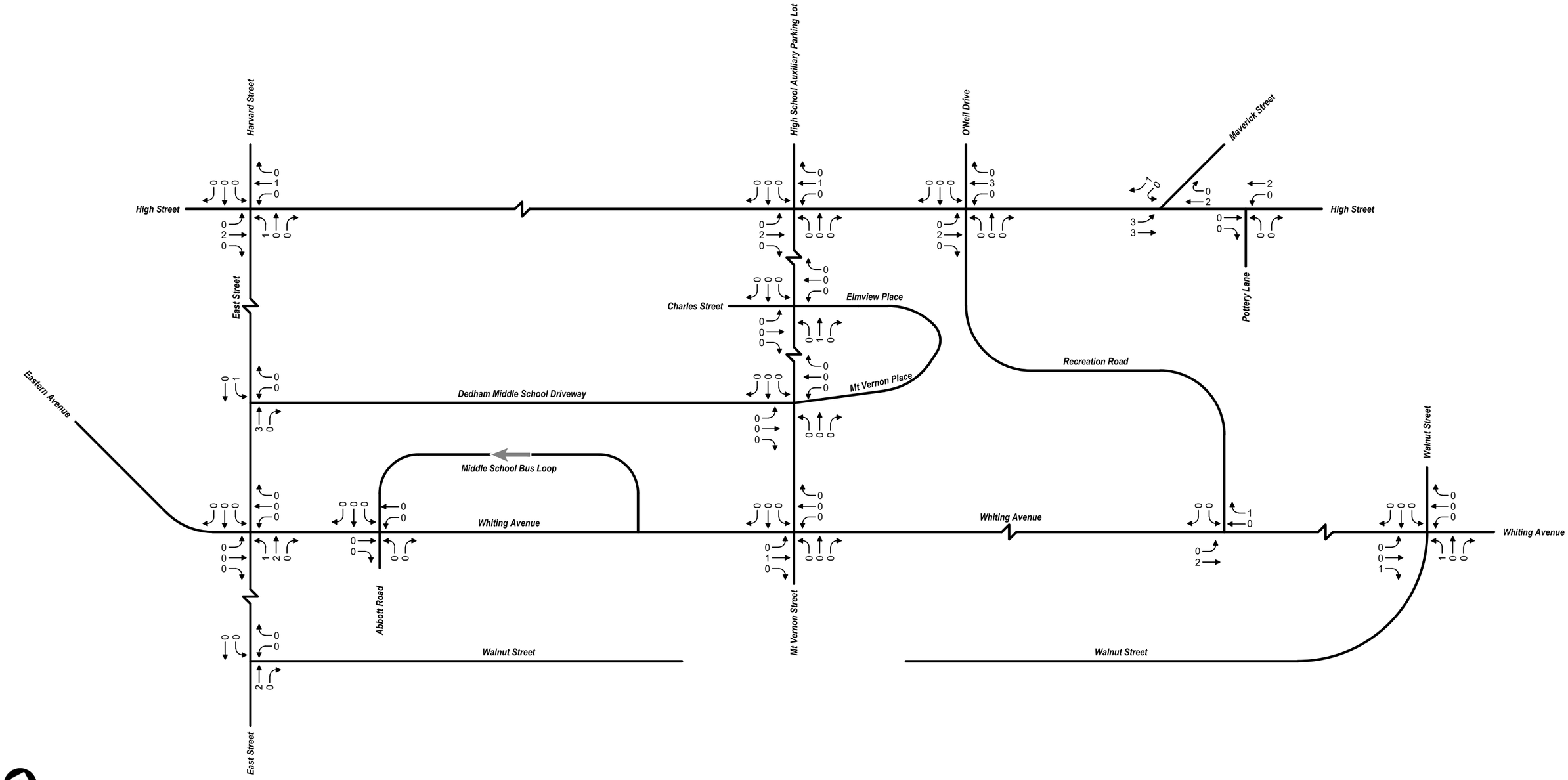


Not to Scale

Figure 9

2019 Existing Conditions - Fall
Weekday Morning Peak Hr Bicycles

Dedham Public Schools
Dedham, Massachusetts

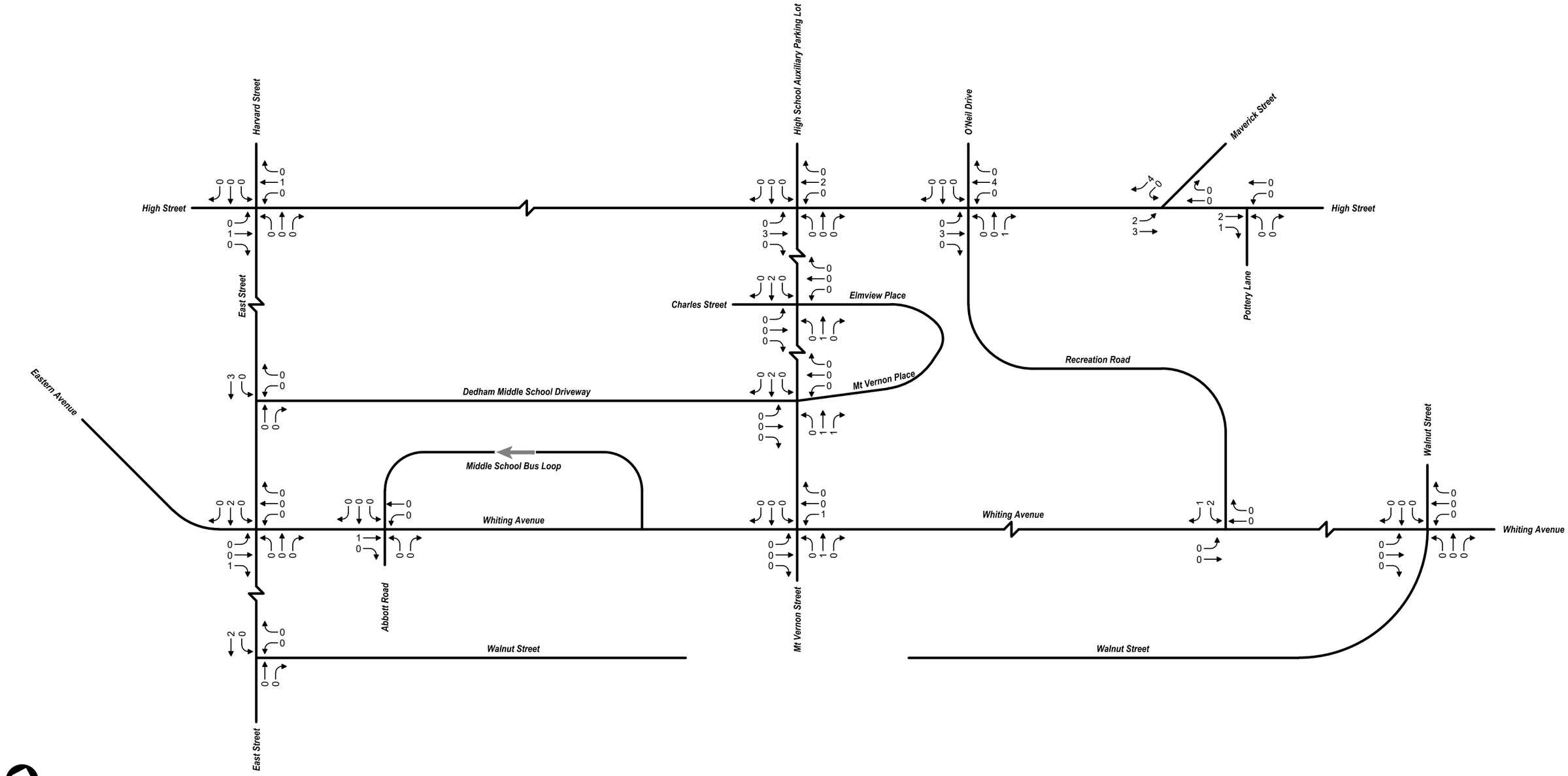


Not to Scale

Figure 10

2019 Existing Conditions - Fall
Weekday Dismissal Peak Hr Bicycles

Dedham Public Schools
Dedham, Massachusetts



Not to Scale

Figure 11

2019 Existing Conditions - Fall
Weekday Evening Peak Hr Bicycles

Dedham Public Schools
Dedham, Massachusetts

Vehicular Crash History

To identify potential vehicle crash trends in the study area, reported vehicular crash data for the study area intersections was obtained from MassDOT for the years 2013 through 2017 (the most recent five-year history available) and supplemented with data provided by the Dedham Police Department. The crash data provided by Dedham coincided with the detailed data obtained from MassDOT. The crash data summary is presented in Table 1.

In addition to summarizing the crash history, VHB also calculated crash rates for the study area intersections based on existing traffic volumes collected in October 2019. Intersection crash rates are calculated based on the number of crashes at an intersection and the volume of traffic traveling through that intersection daily. The MassDOT average intersection crash rate for District 6 (the MassDOT district designation for Dedham) is 0.71 for signalized intersections and 0.52 for unsignalized intersections. In other words, on average, 0.52 crashes occurred per million vehicles entering unsignalized intersections throughout District 6. The crash rate worksheets are included in the Appendix.

Three intersections, East Street at Whiting Avenue, High Street at Maverick Street/Pottery Lane, and Whiting Avenue at Walnut Street exceed the district average crash rate. Crashes at two locations, East Street at Whiting Avenue and High Street at Maverick Street/Pottery Lane involved a pedestrian or bicyclist. No other reported crashes involved non-motorized transportation and none involved a fatality.

Table 1 Vehicular Crash Summary (2013 – 2017)

	East Street at Walnut Street	East Street at Middle School Driveway	East Street at Whiting Avenue	High Street at East Street, Harvard Street and Harris Street	High Street at Maverick Street and Pottery Lane	High Street at Mount Vernon Street	High Street at Recreation Road
Signalized?	No	No	No	Yes	No	No	No
MassDOT Average Crash Rate	0.52	0.52	0.52	0.71	0.52	0.52	0.52
Calculated Crash Rate	0.09	0.13	0.96	0.27	0.55	0.48	0.10
Exceeds Average?	No	No	Yes	No	Yes	No	No
Year							
2013	0	0	4	0	4	3	0
2014	0	0	9	0	3	1	1
2015	1	0	5	2	4	3	0
2016	0	1	5	4	5	1	1
2017	1	0	6	1	0	6	1
Total	2	1	29	7	16	14	3
Collision Type							
Angle	2	0	24	1	1	2	2
Head-on	0	0	1	0	1	0	0
Rear-end	0	0	2	5	11	7	1
Rear-to-rear	0	0	0	0	0	0	0
Sideswipe, opposite direction	0	0	0	0	0	0	0
Sideswipe, same direction	0	1	0	1	0	1	0
Single Vehicle Crash	0	0	1	0	3	3	0
Not reported	0	0	1	0	0	1	0
Severity							
Fatal Injury	0	0	0	0	0	0	0
Non-Fatal Injury	0	0	5	2	4	8	0
Property Damage Only	2	1	22	5	11	5	3
Not Reported	0	0	2	0	1	1	0
Time of day							
Weekday ,7:00 AM - 9:00 AM	1	1	1	1	3	2	0
Weekday, 2:00 PM – 4:00 PM	0	0	3	2	2	1	1
Weekday, 4:00 – 6:00 PM	0	0	3	0	5	4	0
Saturday 11:00 AM – 2:00 PM	1	0	0	0	0	0	0
Weekday, other time	0	0	18	3	5	5	2
Weekend, other time	0	0	4	1	1	2	0
Pavement Conditions							
Dry	1	1	20	6	11	12	2
Wet	1	0	7	1	4	2	1
Snow	0	0	1	0	0	0	0
Ice	0	0	0	0	1	0	0
Slush	0	0	0	0	0	0	0
Not reported	0	0	1	0	0	0	0
Non-Motorist (Bike, Pedestrian)	0	0	1	0	1	0	0

Table 1 Vehicular Crash Summary (2013-2017) (continued)

	Mount Vernon Street at Middle School Driveway	Mount Vernon Street at Elmview Place	Whiting Avenue at Middle School Driveways	Whiting Avenue at Mount Vernon Street	Whiting Avenue at Recreation Road	Whiting Avenue at Walnut Street
Signalized?	No	No	No	No	No	No
MassDOT Average Crash Rate	0.52	0.52	0.52	0.52	0.52	0.52
Calculated Crash Rate	0.00	0.00	0.07	0.26	0.15	1.90
Exceeds Average?	No	No	No	No	No	Yes
Year						
2013	0	0	0	0	0	6
2014	0	0	0	1	0	6
2015	0	0	0	2	1	8
2016	0	0	1	2	0	9
2017	0	0	0	0	1	15
Total	0	0	1	5	2	44
Collision Type						
Angle	0	0	0	2	1	40
Head-on	0	0	0	1	0	0
Rear-end	0	0	0	1	0	0
Rear-to-rear	0	0	0	0	0	0
Sideswipe, opposite direction	0	0	0	0	0	2
Sideswipe, same direction	0	0	0	1	0	0
Single Vehicle Crash	0	0	1	0	1	0
Not reported	0	0	0	0	0	2
Severity						
Fatal Injury	0	0	0	0	0	0
Non-Fatal Injury	0	0	0	1	0	10
Property Damage Only	0	0	1	4	1	31
Not Reported	0	0	0	0	1	3
Time of day						
Weekday, 7:00 AM - 9:00 AM	0	0	0	0	0	1
Weekday, 2:00 PM – 4:00 PM	0	0	0	0	0	6
Weekday, 4:00 – 6:00 PM	0	0	0	0	0	5
Saturday, 11:00 AM – 2:00 PM	0	0	0	1	0	0
Weekday, other time	0	0	0	2	2	22
Weekend, other time	0	0	1	2	0	10
Pavement Conditions						
Dry	0	0	1	3	1	34
Wet	0	0	0	1	0	9
Snow	0	0	0	0	0	1
Ice	0	0	0	0	1	0
Slush	0	0	0	0	0	0
Not reported	0	0	0	1	0	0
Non-Motorist (Bike, Pedestrian)	0	0	0	0	0	0

Source: MassDOT Crash Portal

Field Observations

To understand the existing traffic flow and circulation at Dedham High School, Dedham Middle School, Avery Elementary School, and the surrounding area roadways, VHB conducted field observations of the drop-off and pick-up operations during the spring on Thursday, April 25, 2019 and on Wednesday, May 8, 2019, during the summer on Wednesday, July 10, 2019, and during the fall on Friday, October 4, 2019. VHB staff were on site during the peak periods and observed operational protocols and vehicle queueing. Key takeaways from the observations are provided below, and more detailed observation descriptions are included in the existing conditions memos, provided in the appendix.

Dedham High School

The school day at Dedham High School begins at 7:35 AM and ends at 2:10 PM each day.

Parent/Guardian Pick-up/drop-off

Most of the parent/guardian pickup/drop-off activity occurred on the westbound side of Whiting Avenue in front of the high school. Other pickup/drop-off locations include along southbound Mount Vernon Street north of Whiting Avenue, along northbound Mount Vernon Street south of Whiting Avenue, within the loop of Mount Vernon Place and Elmview Place, along Recreation Road behind the high school building, and in the Recreation Road parking lot east of the high school track.

Several U-turn movements were observed on Whiting Avenue during pickup/drop-off times, and some drop-offs and pickups occurred within the roadway without vehicles pulling up to the curb. Some students who were dropped off on Mount Vernon Street were observed to walk directly across Mount Vernon Street without using crosswalks.

School Bus Activity

School bus activity occurred behind the high school along Recreation Road. Nine buses were observed at the high school on Recreation Road, which contained five to 30 students each. The elementary school also uses Recreation Road for bus drop-off and pick-up, but not simultaneously. The high school buses arrived in the morning between 7:10 AM and 7:20 AM. In the afternoon, the buses departed at 2:15 PM.

Parking

Student parking for Dedham High School is available in the tennis court parking lot located to the east of Mount Vernon Street and west of Recreation Road, containing approximately 80 parking spaces. Students who park in this lot walk to the school via a sidewalk along Recreation Road. Additionally, high school students are permitted to park in the parking lot north of the intersection of High Street and Mount Vernon Street, but few vehicles were observed in this parking lot. Some high school students were also observed parking in the reserved spaces for Avery Elementary School staff along Recreation Road between the elementary school and high school. Parking for high school staff is available in 84 parking

spaces on Recreation Road, on-street along Whiting Avenue (about 32 parking spaces), 26 parking spaces south of the high school track, and 48 parking spaces behind the high school between Mount Vernon Place and Elmview Place.

Before morning drop-off, the parking lots along Recreation Road were mostly empty, the perpendicular parking spaces between Whiting Ave and the high school track were full, and there were six vehicles parked on-street westbound on Whiting Ave. During drop-off, it was observed that the parking lot between Elmview Place and Mount Vernon Place was about half-full and that a handful of drop-offs also occur in this parking lot. After morning drop-off, the parking lot next to the tennis courts west of Avery Elementary School was full, and the parking spots along Recreation Road were full.

Before afternoon pick up, the parking lots along Recreation Road north of the high school track were about half full, the parking lot east of the high school track was mostly full, and the parking spaces south of the high school track were mostly full. Twenty-seven vehicles, including three bus-vans, were observed to be parked on-street in the westbound direction on Whiting Avenue waiting to pick-up students from the high school.

Dedham Middle School

The school day at Dedham Middle School begins at 8:05 AM and ends at 2:35 PM each day. During morning drop-off, students were not permitted to enter the building until 8:05 AM.

Parent/Guardian Pick-up/drop-off

Parent/guardian drop-offs and pick-ups occurred within the loop through the parking lot just east of the middle school building. This parking lot is accessed via driveways on East Street to the west of the school and Mount Vernon Street to the east of the school, although most traffic enters from East Street. Some drop-offs were observed curbside near the intersection of Mount Vernon Street and Whiting Avenue. A handful of drop-offs and pickups also occur along the westbound side of Whiting Avenue.

School Bus Activity

Six buses were observed at the middle school within the bus loop off Whiting Avenue, containing approximately 30 to 40 students each. The middle school buses arrived in the morning between 7:40 AM and 7:45 AM. In the afternoon, they arrived and departed between 2:30 PM and 2:45 PM.

Parking

Parking is available behind the middle school building between East Street and Mount Vernon Street, and within the drop-off/pick-up loop east of the school. There are 82 parking spaces behind the middle school building and 45 parking spaces in the drop-off/pick-up loop east of the school. Additionally, approximately 20 parking spaces are located within the bus loop south of the school.

During morning drop-off, the parking lot east of the middle school building was about half full, the parking spaces north of the middle school building were nearly full, and the parking spaces within the bus loop were full. During afternoon pick up, the parking areas at the

middle school were nearly full. Parents were observed parking on neighborhood streets between schools to facilitate both middle school and Avery School pick-up.

It is noted that parking meeting accessibility standards is provided in the adjacent parking lot but is not proximate to the front door of the building. Parking spaces were established closer to the front door in 2019 but do not fully meet accessibility requirements.

Avery Elementary School

The school day at Avery Elementary School begins at 8:45 AM and ends at 3:00 PM each day.

Parent/Guardian Pick-up/drop-off

Drop-offs began around 8:10 AM and occurred curbside within the parking lot west of the elementary school building. Drop-off activity decreases at about 8:40 AM.

Parent/guardian drop-offs and pick-ups occurred within the one-way loop within the parking lot off Recreation Road just west of the elementary school building. During pick-up times, four staff members were observed in the loading zone to supervise the drop-off and pick-up activity. The crossing guard on Recreation Road directs parent/guardian vehicles into the one-way loop in addition to assisting students crossing Recreation Road. It was noted that when the crossing guard was absent, some vehicles would travel the wrong way, westbound on Recreation Road. Activity at the Avery School is not implemented as originally proposed, as last minute access changes were required when the school was built. Therefore, although not used simultaneously due to scheduling, there is overlap between the high school and element school routing,

School Bus Activity

The buses arrive between 8:15 AM and 8:25 AM. Three buses were observed at the elementary school. In the afternoon, the buses departed between 3:00 PM and 3:10 PM.

Parking

There are 52 parking spaces in the Recreation Road parking lot east of the high school track, 84 parking spaces along Recreation Road, and 48 parking spaces in the parking lot west of the elementary school. This parking is shared with the high school.

Before morning drop-off, the parking lot west of the elementary school building was full, and the spots along Recreation Road were full. During afternoon pickup, the parking lot next to the tennis courts was about half full. It was also observed that some parents were live-parked in the parking lot near the tennis courts, and a handful of parents were in live-parked near the pool building.

Crossing Guards

During drop-off and pick-up times, crossing guards are located at the following intersections:

- High Street at Recreation Road
- High Street at Maverick Street
- Mount Vernon Street at Elmview Place
- Mount Vernon Street at Whiting Avenue
- East Street at Whiting Avenue
- Recreation Road between Avery Elementary School and Dedham High School

The crossing guard at the intersection of East Street and Whiting Avenue also held traffic for buses to clear the intersection. At the intersection of High Street at Recreation Road, a police officer was observed directing traffic during afternoon pick-up.

Observed Vehicle Queueing

High Street at Mount Vernon Street, Recreation Road, and Maverick Street

During afternoon pick-up for the elementary school, it was observed that the eastbound queue on Recreation Road would extend back to the tennis court parking lot. In addition, the northbound queue on Recreation Road to access High Street would extend back to the tennis court parking lot. It was also observed that the eastbound left turn queue from High Street onto Maverick Street extended back approximately to Linden Place. The westbound left turn queue from High Street onto Mount Vernon Street extended back approximately to Joyce Lane.

Mount Vernon Street at Whiting Avenue

During the morning drop-off, the westbound queue on Whiting Avenue extended more than 50 vehicles from Mount Vernon Street past the football field, with many students getting out of vehicles waiting in the queue. This queue lasted for about five minutes before dissipating. The southbound queue extended about 12 vehicles back.

During afternoon pick-up, it was observed that the eastbound queue was approximately seven vehicles long, the westbound queue was approximately 10 vehicles long, the northbound queue was approximately six vehicles long, and the southbound queue extended back to Mount Vernon Place.

East Street at Whiting Avenue

During morning drop-off, it was observed that the northbound queue was approximately 40 vehicles long and extended back to Michael Road. The westbound queue at this intersection extended past the middle school bus loop driveway, which blocked buses from exiting at times.

During afternoon pick-up for the Middle School, it was observed that the eastbound queue was over 15 vehicles long, the westbound queue was over 20 vehicles long, the northbound queue was over 20 vehicles long, and the southbound queue was approximately 10 vehicles long.

Middle School Pickup/Drop-off Loop

The parent/guardian pickup area filled up and extended around the back of the school until the queue started to dissipate just before dismissal. when students are dismissed. The queue was contained on the middle school driveway, and no spillback onto East Street was observed.

Existing Traffic Operations Analysis

To assess quality of flow, roadway capacity analyses were conducted for the existing spring, summer, and fall traffic volume conditions. Due to construction on the Walnut Street bridge north of Whiting Avenue during the spring traffic counts and in the absence of regular school activity during the summer counts, the existing fall traffic volumes were used for the analysis presented below. Capacity analyses for existing spring and summer traffic conditions can be found in the spring and summer existing conditions memos contained in the appendix. Capacity analyses provide an indication of the adequacy of the roadway facilities to serve the traffic demands. All capacity analysis worksheets for the fall existing conditions are contained the appendix.

Level-of-service (LOS) is the term used to denote the operating conditions of a given roadway segment or intersection under various traffic volume loads. It is a qualitative measure that considers several factors including roadway geometry, speed, travel delay, freedom to maneuver, and safety. Level of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

For signalized intersections, the evaluation criteria used to analyze study area intersections are based on the percentile-delay method (*Synchro* software results). For unsignalized two-way stop-controlled intersections, the analysis assumes that traffic on the mainline is not affected by traffic on the side streets. The LOS is only determined for left-turns from the main street and all movements from the minor street. The evaluation criteria used to analyze unsignalized intersections are based on the *Highway Capacity Manual*[1]. Table 2 presents a summary of the capacity analyses for the signalized study intersection and Table 3 presents a summary of the unsignalized study intersections.

[1] Transportation Research Board, Highway Capacity Manual, Washington, D.C., 2010.

Table 2 Existing Conditions Signalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	v/c [a]	Del [b]	LOS [c]	50 Q [d]	95 Q [e]	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
High Street at East Street, Harvard Street and Harris Street															
Weekday Evening															
EB L/T	0.35	14	B	66	264	0.54	29	C	248	404	0.51	21	C	130	248
EB R	0.11	2	A	0	10	0.19	5	A	7	47	0.18	3	A	6	31
WB L/T/R	0.65	17	B	155	#605	0.60	21	C	288	450	0.58	10	B	154	269
NB L	0.60	43	D	53	130	0.56	48	D	66	120	0.61	40	D	63	99
NB T/R	0.15	16	B	4	33	0.26	21	C	15	54	0.30	13	B	10	37
SB L/T/R	0.11	18	B	4	13	0.10	26	C	7	28	0.10	23	C	7	16
Total		17	B				24	C				16	B		

a Volume to capacity ratio.
b Average total delay, in seconds per vehicle.
c Level-of-service.
d 50th percentile queue, in feet.
e 95th percentile queue, in feet.

~ Volume exceeds capacity, queue is theoretically infinite.
# 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal

Table 3 Existing Conditions Unsignalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
High Street at Mount Vernon Street and Parking Lot (Side-street stop-control)															
EB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
WB L	140	0.16	9	A	15	140	0.17	9	A	15	160	0.19	10	A	18
NB L/T/R	215	1.09	117	F	323	180	>1.20	>120	F	298	155	1.14	>120	F	253
SB L/T/R	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
High Street at Recreation Road and O'Neil Drive (Side-street stop-control)															
EB L	10	0.01	9	A	0	5	0.01	10	A	0	10	0.01	10	A	0
WB L	45	0.05	9	A	5	15	0.02	9	A	3	10	0.01	9	A	0
NB L/T/R	75	0.78	77	F	125	120	>1.20	>120	F	443	60	0.60	65	F	78
SB L/T/R	10	0.12	35	D	10	15	0.21	46	E	18	15	0.19	33	D	18
High Street at Pottery Lane (Side-street stop-control)															
WB L	5	0.01	8	A	0	0	0.00	0	A	0	0	0.00	0	A	0
NB L/R	0	0.00	0	A	0	30	0.26	32	D	25	20	0.27	29	D	25
East Street at Dedham Middle School Driveway (Side-street stop-control)															
WB L/R	0	0.00	0	A	0	25	0.09	12	B	8	5	0.02	10	A	3
SB L	100	0.12	8	A	10	5	0.00	8	A	0	0	0.00	0	A	0
East Street at Whiting Avenue and Eastern Avenue (All-way stop-control)															
EB L/T	215	0.60	23	C	85	410	1.17	>120	F	418	375	1.05	76	F	283
EB R	140	0.36	15	B	38	320	0.84	41	E	190	320	0.83	37	E	163
WB L/T/R	350	0.99	56	F	270	315	0.95	57	F	230	375	>1.20	>120	F	510
NB L/T/R	465	1.12	110	F	465	365	1.06	92	F	348	350	1.04	72	F	270
SB L/T/R	135	0.41	18	C	45	245	0.83	42	E	173	280	0.87	44	E	170
East Street at Walnut Street (Side-street stop-control)															
WB L/R	110	0.36	20	C	40	110	0.56	35	D	78	145	0.63	35	E	98
SB L	25	0.03	9	A	3	50	0.05	8	A	5	30	0.03	8	A	3
Whiting Avenue at Middle School Driveway and Abbott Road (Side-street stop-control)															
WB L	10	0.01	8	A	0	0	0.00	0	A	0	5	0.01	8	A	0
NB L/R	40	0.15	16	C	13	10	0.08	19	C	8	5	0.03	19	C	3
SB L/T/R	20	0.07	14	B	5	30	0.11	15	B	10	0	0.00	0	A	0
Whiting Avenue at Mount Vernon Street (All-way stop-control)															
EB L/T/R	195	0.36	12	B	40	420	0.74	22	C	163	370	0.62	18	C	110
WB L/T/R	270	0.55	15	C	83	225	0.41	13	B	48	265	0.59	16	C	88
NB L/T/R	190	0.37	13	B	43	95	0.22	11	B	20	110	0.26	12	B	25
SB L/T/R	205	0.40	13	B	48	200	0.38	13	B	45	230	0.43	14	B	53
Mount Vernon Street at Middle School Driveway and Mount Vernon Place (Side-street stop-control)															
EB L/T/R	170	0.64	23	C	110	20	0.05	11	B	5	5	0.01	10	A	0
WB L/T/R	0	0.00	0	A	0	5	0.03	13	B	3	0	0.00	0	A	0
NB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
SB L	30	0.04	8	A	3	5	0.00	8	A	0	0	0.00	0	A	0

a Demand
b Volume to capacity ratio
c Average total delay, in seconds per vehicle
d Level-of-service
e 95th percentile queue, in feet

Table 3 Existing Conditions Unsignalized Intersection Capacity Analysis (continued)

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
Mount Vernon Street at Elmview Place and Charles Street (Side-street stop-control)															
EB L/T/R	5	0.02	14	B	0	5	0.02	12	B	3	10	0.03	11	B	3
WB L/T/R	30	0.12	13	B	10	15	0.05	11	B	5	15	0.04	11	B	3
NB L	5	0.00	8	A	0	0	0.00	0	A	0	5	0.01	8	A	0
SB L	5	0.01	8	A	0	0	0.00	0	A	0	0	0.00	0	A	0
Whiting Avenue at Recreation Road (Side-street stop-control)															
EB L	45	0.05	9	A	5	40	0.03	8	A	3	30	0.03	8	A	3
SB L/R	20	0.10	14	B	8	40	0.09	13	B	8	35	0.11	15	B	10
Whiting Avenue at Walnut Street (All-way stop-control)															
EB L/T/R	130	0.28	12	B	28	300	0.61	20	C	100	305	0.63	22	C	108
WB L/T/R	170	0.35	12	B	38	125	0.28	13	B	28	170	0.41	16	C	48
NB L/T/R	190	0.39	12	B	45	225	0.46	15	C	60	240	0.56	19	C	85
SB L/T/R	295	0.69	20	C	133	365	0.87	37	E	250	420	0.89	43	E	265
High Street at Maverick Street (Side-street stop-control)															
EB L	105	0.13	10	A	13	140	0.20	10	B	18	120	0.14	10	A	13
SB L/R	195	0.57	26	D	85	270	1.11	120	F	350	180	0.57	26	D	85

a Demand
b Volume to capacity ratio
c Average total delay, in seconds per vehicle
d Level-of-service
e 95th percentile queue, in feet

3

Improvement Alternatives

Based on the existing conditions capacity analysis, crash data summary, field observations and a public outreach meeting with residents and stakeholders, VHB identified targeted planning-level alternatives aimed to address student pickup/drop-off, bus operations, on-site circulation, access to surrounding roadways, and managing congestion along roadways surrounding the schools.

The identified alternatives were presented to the Dedham School Committee and to the public at an informational open house meeting on Tuesday, February 4, 2020 to get feedback. The following sections summarize the presented alternatives and the feedback received at the informational open house meeting.

Short-Term Opportunities

VHB identified short-term improvement opportunities for the roadways in the vicinity of the schools that could be implemented at a lower cost and can sometimes be covered by regular maintenance budgets. These opportunities include: VHB recommends that the school committee progress all short-term opportunities immediately.

Clarify Signage at the Middle School Driveways

At the intersection of East Street and the Middle School driveway there are signs indicating one-way traffic flow eastbound. Below the one-way signs, there are small signs indicating that the one-way eastbound flow is only effective from 7:00 AM to 9:00 AM and from 2:00 PM to 4:00 PM. There is also a stop sign for westbound traffic exiting from the Middle School driveway, contradicting the eastbound one-way signage.

At the intersection of Mount Vernon Street and the Middle School driveway, there is a "do not enter" sign facing westbound traffic, which indicates eastbound flow. Below the "do not enter sign" is a "student drop off only / no thru traffic" sign.

These signs conflict with one another and could cause driver confusion and should be clarified. Because Middle School traffic is intended to flow eastbound from East Street to Mount Vernon Street, the one-way and "do not enter" signs should be replaced to indicate eastbound traffic flow, the stop sign at East Street could be removed, and a stop sign could be installed at Mount Vernon Street for clarification.

Relocate the Accessible Parking Spaces at the Middle School

Currently there are accessible parking spaces striped along the south side of the Middle School bus loop near the main entrance. These spaces do not provide an fully accessible access path and do not fully meet the requirements of the Americans with Disabilities Act (ADA) The spaces should be reconstructed to fully meet ADA guidance or they could be relocated to the north side of the Middle School bus loop to better accommodate accessible parking.

Discouraging Barrows Street and Charles Street Cut-Through Traffic

Because the Middle School drop-off flows eastbound from East Street to Mount Vernon Street some motorists use Barrows Street or Charles Street to head back westbound to East Street during peak hours. Installing "no left turn" signs facing northbound traffic on Mount Vernon Street in advance of Barrow Street and Charles Street would prohibit motorists from using these roadways as cut throughs and could reduce the traffic volume on these roadways during school drop-off and pickup times.

Several comments were received at the informational open house meeting on the idea of discouraging the use of Barrows Street and Charles Street for cut-through traffic. Residents suggested and/or supported the following measures:

- No left turn on Barrows Street and Clark Street
- Signs limiting time to use Clark Street and Barrows Street
- Calming measures on Barrows Street and Charles Street / Clark Street

Speed bumps were also considered for Barrows Street and Charles Street to slow and discourage cut-through traffic. Typically speed bumps are spaced about 400 feet apart, which means two speed bumps would be appropriate for either roadway. It should be noted that there are drainage considerations associated with speed bumps. Without modification

to the existing drainage system, placement of speed bumps can redirect stormwater runoff in an undesirable direction. Given the drainage implications, the short-term signage changes noted above are suggested as a phased approach to alleviating neighbor concerns. The School Committee should work with the town to identify drainage modifications that may be necessary along Barrows Street and Clark Street and determine the associated costs and impacts. Speed bumps would be a preferred deterrent to calm speeding traffic if feasible drainage modifications can be achieved at a manageable cost.

Provide a Safer Crossing on Mount Vernon Street

There are currently no striped crosswalks across Mount Vernon Street between Whiting Avenue and High Street but based on field observations there is a desire for pedestrians to cross Mount Vernon Street especially for students during arrival and dismissal times. A crosswalk could be provided on Mount Vernon Street, and for added safety a rectangular rapid flashing beacon should also be installed along with the crosswalk to better alert motorists of crossing pedestrians.

At the informational open house meeting, some attendees questioned whether the crosswalk would better serve students if it were provided across Mount Vernon Street at the tennis courts. Overall support seemed to indicate that regardless of location, the crossing guard should be stationed at the crosswalk. While there are no sight distance restrictions that would prohibit a crosswalk at the tennis courts, the existing crossing guard location seems to better serve the overall school campus than the proposed relocation would.

Do Not Block Intersection Treatment on Recreation Road

Long westbound queues at Whiting Avenue from Mount Vernon Street and eastbound queues on High Street at Maverick Street can at times block causing difficulty for motorists making the left-turns out of Recreation Road. To accommodate these left-turns, "do not block the intersection" signs and pavement markings could be installed at these intersections to keep them clear of queued traffic.

Clarify the Drop-off / Pickup Circulation at Avery Elementary School

The drop-off / pickup loop at Avery Elementary School operates in the clockwise direction in the parking area west of the school building. Some driver confusion, specifically wrong-way driving, was observed at the drop-off / pickup area at Avery Elementary School during arrival and dismissal times. Currently, there is a "do not enter sign" on the south side of Recreation Road facing eastbound traffic at the crosswalk between Avery Elementary School and the Dedham High School that is installed too far from the edge of the roadway. To clarify the proper circulation in this area, the "do not enter" sign on Recreation Road should be moved closer to Recreation Road to prevent motorists from continuing the wrong way eastbound on Recreation Road. In addition, two new "do not enter signs" should be installed to prevent motorists from making the eastbound left-turn from Recreation Road circulating the wrong way counterclockwise through the drop-off / pickup area.

Swap the High School Parent/Guardian and Bus Drop-off / Pick-up Areas

During school arrival and dismissal periods a long westbound queue was observed, which backed up past Recreation Road at times caused by parent/guardian drop-offs and pickups at Dedham High School. The school buses for Dedham High School currently operate on Recreation Road. Moving the parent/guardian drop-off / pickup activity to Recreation Road and moving the bus drop-off / pickup to Whiting Avenue could improve operations on Whiting Avenue. Note that the Dedham High School drop-off and pickup times are not expected to coincide those at Avery Elementary School, which facilitates this change without conflict.

Update School Zone Signage and Pavement Markings

There is an existing school zone for Dedham Middle School on East Street, Whiting Avenue, and Mount Vernon Street along the school frontage. The school zone for Avery Elementary School is on High Street between Mount Vernon Street and Pottery Lane and on a short segment of Maverick Street. The school zone signage and pavement markings are inconsistent. There is also a gap between the middle school and elementary school zones on Mount Vernon Street between the Dedham Middle School driveway and High Street. The school zone signage and pavement markings should be updated for consistency and for compliance with The Massachusetts Amendments to the 2009 Manual on Uniform Traffic Control Devices. Additionally, because the Dedham Middle School and Avery Elementary school campuses are close to each other, their school zones should be combined into a single, concise zone. An illustration showing the existing and proposed school zone signage for the study area is included in the appendix.

There were several comments received at the public information session about expanding school zones for longer distances along adjacent roadways. The Commonwealth has specific requirements for areas that can be designated as school zones. The comments received do not meet these requirements and as such, are not incorporated into these recommendations.

Provide New Middle School Bus to the Oakdale School Neighborhood

Based on the school-provided student address data there are approximately 85 students who live in the Oakdale Elementary School neighborhood, located between one and two miles from Dedham Middle School. Therefore, an additional school bus could be provided to service this neighborhood for middle school students, which would decrease the number of parent/guardian vehicles that drop-off or pickup at Dedham Middle School.

An illustration of these short-term solutions and a scan of the comments received from the informational open house meeting can be found in the appendix.

Longer-term Alternatives

A number of longer term were considered to improve conditions in the study area. These alternatives are classified as longer term because they would require further design and are more costly than could be accommodated within an existing school or town budget. The

town would also likely provide opportunities for further public outreach around these alternatives, as they impact/benefit residents beyond the school community. The following mid- to long-term alternatives were considered:

- **Alternative 1** – Make Whiting Avenue one-way westbound between Mount Vernon Street and Walnut Street
- **Alternative 2** – Make Recreation Road one-way southbound
- **Alternative 3** – Close segment of Mount Vernon Street between Mount Vernon Place and Whiting Avenue.
- **Alternative 4** – Signalize High Street at Recreation Road
- **Alternative 5** – Provide a new driveway connection between the middle school parent/guardian pickup/drop-off loop and Whiting Avenue
- **Alternative 6** – Repurpose the tennis courts parking lot and provide a one-way eastbound connection between Mount Vernon Street and Recreation Road.
- **Combined Alternatives 1, 3, and 5**

For each alternative, the anticipated rerouting of traffic volumes was estimated, the affected intersections were analyzed, and the relative opportunities and impacts were identified. Illustrations of these alternatives as well as volume rerouting figures, capacity analysis worksheets, and scans of comments received from the informational open house meeting can be found in the appendix.

The following sections summarize the opportunities and impacts for each alternative.

Alternative 1 – One-way Whiting Avenue

In Alternative 1, Whiting Avenue is proposed to be one-way westbound between Mount Vernon Street and Walnut Street. As shown in the illustration at the end of this chapter, Whiting Avenue can be narrowed to one westbound lane of travel with a separated bike lane along the north side of the roadway.

Alternative 1 – Volume Rerouting

To accommodate the proposed changes to traffic flow under Alternative 1, eastbound volumes along Whiting Avenue between Mount Vernon Street and Walnut Street were relocated to High Street and Walnut Street. Trips to Recreation Road making the eastbound left-turn from Whiting Avenue were rerouted to the westbound right-turn from Whiting Avenue.

Alternative 1 – Capacity Analysis

The study intersections that were impacted by relocated traffic volumes were reanalyzed using the *Synchro* software package. Table 4 presents a summary of the capacity analyses for the signalized study intersection and Table 5 presents a summary of the unsignalized study intersections.

Table 4 Alternative 1 - Signalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	v/c [a]	Del [b]	LOS [c]	50 Q [d]	95 Q [e]	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
High Street at East Street, Harvard Street and Harris Street															
Weekday Evening															
EB L/T	0.35	14	B	66	264	0.55	29	C	248	411	0.51	21	C	130	257
EB R	0.11	2	A	0	10	0.19	5	A	7	48	0.18	3	A	6	33
WB L/T/R	0.65	17	B	155	#605	0.60	21	C	288	459	0.59	10	B	154	279
NB L	0.60	43	D	53	130	0.55	48	D	66	119	0.60	40	D	63	99
NB T/R	0.34	12	B	4	46	0.55	14	B	16	79	0.54	10	B	11	42
SB L/T/R	0.11	18	B	4	13	0.10	25	C	7	27	0.10	23	C	7	16
Total		17	B				23	C				15	B		

a Volume to capacity ratio.
b Average total delay, in seconds per vehicle.
c Level-of-service.
d 50th percentile queue, in feet.
e 95th percentile queue, in feet.
~ Volume exceeds capacity, queue is theoretically infinite.
# 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal

Table 5 Alternative 1 - Unsignalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
High Street at Mount Vernon Street and Parking Lot (Side-street stop-control)															
EB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
WB L	140	0.17	9	A	15	140	0.20	10	B	18	160	0.21	10	B	20
NB L/T/R	270	>1.20	>120	F	528	305	>1.20	>120	F	693	265	>1.20	>120	F	560
SB L/T/R	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
High Street at Recreation Road and O'Neil Drive (Side-street stop-control)															
EB L	10	0.01	9	A	0	5	0.01	10	A	0	10	0.01	10	A	0
WB L	45	0.05	9	A	5	15	0.03	10	B	3	10	0.02	10	A	0
NB L/T/R	75	0.93	>120	F	158	120	>1.20	>120	F	568	60	0.85	>120	F	118
SB L/T/R	10	0.15	42	E	13	15	0.37	93	F	35	15	0.26	47	E	25
High Street at Pottery Lane (Side-street stop-control)															
WB L	5	0.01	9	A	0	0	0.00	0	A	0	0	0.00	0	A	0
NB L/R	0	0.00	0	A	0	35	0.38	51	F	40	20	0.36	41	E	38
East Street at Dedham Middle School Driveway (Side-street stop-control)															
WB L/R	0	0.00	0	A	0	25	0.10	14	B	8	5	0.02	11	B	3
SB L	100	0.13	9	A	13	5	0.01	8	A	0	0	0.00	0	A	0
East Street at Whiting Avenue and Eastern Avenue (All-way stop-control)															
EB L/T	215	0.62	24	C	88	410	>1.20	>120	F	440	360	1.04	74	F	268
EB R	140	0.36	15	B	38	320	0.86	43	E	198	320	0.85	38	E	163
WB L/T/R	355	1.01	60	F	283	335	1.01	71	F	270	400	>1.20	>120	F	588
NB L/T/R	465	1.12	113	F	473	365	1.09	100	F	363	350	1.06	75	F	273
SB L/T/R	135	0.41	18	C	45	245	0.85	44	E	178	280	0.89	45	E	170
East Street at Walnut Street (Side-street stop-control)															
WB L/R	110	0.36	20	C	40	110	0.56	35	D	78	145	0.63	35	E	98
SB L	25	0.03	9	A	3	50	0.05	8	A	5	30	0.03	8	A	3
Whiting Avenue at Middle School Driveway and Abbott Road (Side-street stop-control)															
WB L	10	0.01	8	A	0	0	0.00	0	A	0	5	0.01	8	A	0
NB L/R	40	0.14	15	B	13	10	0.06	16	C	5	5	0.03	17	C	3
SB L/T/R	20	0.06	13	B	5	30	0.10	13	B	8	0	0.00	0	A	0

Table 5 Alternative 1 - Unsignalized Intersection Capacity Analysis (continued)

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
Whiting Avenue at Mount Vernon Street (All-way stop-control)															
EB L/T/R	135	0.24	11	B	23	290	0.50	14	B	70	245	0.40	12	B	48
WB L/T/R	275	0.53	14	B	78	245	0.41	12	B	50	290	0.57	15	C	88
NB L/T/R	170	0.32	12	B	35	85	0.18	11	B	18	100	0.22	11	B	20
SB L/T/R	205	0.38	12	B	43	200	0.35	12	B	40	230	0.40	12	B	48
Mount Vernon Street at Middle School Driveway and Mount Vernon Place (Side-street stop-control)															
EB L/T/R	170	0.69	28	D	130	20	0.06	11	B	5	5	0.01	10	A	0
WB L/T/R	0	0.00	0	A	0	5	0.03	15	C	3	0	0.00	0	A	0
NB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
SB L	30	0.04	8	A	3	5	0.01	8	A	0	0	0.00	0	A	0
Mount Vernon Street at Elmview Place and Charles Street (Side-street stop-control)															
EB L/T/R	5	0.02	15	B	3	5	0.03	15	B	3	10	0.03	12	B	3
WB L/T/R	30	0.13	14	B	10	15	0.06	13	B	5	15	0.05	13	B	3
NB L	5	0.00	8	A	0	0	0.00	0	A	0	5	0.01	8	A	0
SB L	5	0.01	8	A	0	0	0.00	0	A	0	0	0.00	0	A	0
Whiting Avenue at Recreation Road (Side-street stop-control)															
EB L	45	0.05	9	A	5	0	0.00	0	A	0	30	0.03	8	A	3
SB L/R	20	0.10	14	B	8	40	0.06	10	B	5	35	0.11	15	B	10
Whiting Avenue at Walnut Street (All-way stop-control)															
EB L/T/R	130	0.28	12	B	28	300	0.65	22	C	115	305	0.63	22	C	108
WB L/T/R	170	0.35	12	B	38	125	0.30	14	B	30	170	0.41	16	C	48
NB L/T/R	190	0.39	12	B	45	300	0.63	21	C	105	240	0.56	19	C	85
SB L/T/R	295	0.69	20	C	133	365	0.93	49	E	298	420	0.89	43	E	265
High Street at Maverick Street (Side-street stop-control)															
EB L	105	0.13	10	A	13	140	0.20	10	B	18	120	0.14	10	A	13
SB L/R	195	0.57	26	D	85	270	>1.20	>120	F	415	180	0.62	30	D	100

a Demand
b Volume to capacity ratio
c Average total delay, in seconds per vehicle
d Level-of-service
e 95th percentile queue, in feet

Alternative 1 – Opportunities and Impacts

Separated bike lanes can be implemented on Whiting Avenue, which would better accommodate cyclists, support the towns Complete Streets initiatives, and encourage biking as a means of transportation. The on-street parking spaces along the westbound side of Whiting Avenue would be displaced and the provision of a separated bicycle facility would require the one-way street designation to be permanent (rather than by time of day).

U-turn movements and eastbound drop-offs on Whiting Avenue along the high school site frontage would be eliminated, which would reduce vehicle/pedestrian conflicts.

Traffic from the neighborhood to the south of Whiting Avenue including Morse Avenue and Fulton Street would be reduced. A portion of these vehicles would be relocated to Walnut Street.

Eastbound traffic through the school area is expected to be rerouted to High Street and Walnut Street, which would increase vehicle delay at the intersections of High Street at Mount Vernon Street and High Street at Recreation Road.

Alternative 1 – Informational Open House Comments

Scans of all of the comments received from the informational open house meeting on Alternative 1 can be found in the appendix. In summary, the questions and comments received pertaining to Alternative 1 included the following:

- A number of comments suggested that Whiting Avenue should be one-way only during certain times of day, which would eliminate the ability to provide the proposed bicycle accommodations.
- Several comments were concerned with what happens to on-street parking on Whiting Avenue if made one-way.
- Protected bike lanes are not that helpful in isolation. It is better if they could be integrated with other bike lanes and paths. It is noted that there are no other paths/bike lanes in the vicinity of Whiting Avenue.
- If you build bike infrastructure, more people will bike.
- Are there existing riders to justify this accommodation?
- Can the bike lane continue to the Middle School?
- If Whiting Avenue becomes one-way could the town consider signalizing the four-way stop at Whiting Avenue and Mount Vernon Street?
- If Whiting Avenue is one-way, will residents have to sit in school traffic to get to Mount Vernon Street?
- Keep Whiting Avenue the way it is.

Alternative 2 – One-way Recreation Road

In Alternative 2, Recreation Road is proposed to be formalized as one-way southbound from High Street to Whiting Avenue. As shown in the illustration at the end of this chapter, Recreation Road can be narrowed to better encourage one-way flow and to dissuade wrong-way motorists.

Alternative 2 – Volume Rerouting

By making Recreation Road one-way, traffic volumes entering Recreation Road from Whiting Avenue would be relocated to High Street, and traffic volumes exiting Recreation Road onto High Street would be relocated to the Whiting Avenue exit.

Alternative 2 – Capacity Analysis

The study intersections that were impacted by relocated traffic volumes were reanalyzed using the *Synchro* software package. Table 6 presents a summary of the capacity analyses for the signalized study intersection and Table 7 presents a summary of the unsignalized study intersections.

Table 6 Alternative 2 - Signalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	v/c [a]	Del [b]	LOS [c]	50 Q [d]	95 Q [e]	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
High Street at East Street, Harvard Street and Harris Street															
Weekday Evening															
EB L/T	0.40	15	B	77	305	0.58	36	D	276	448	0.53	25	C	140	268
EB R	0.11	2	A	0	10	0.19	5	A	7	47	0.18	3	A	6	31
WB L/T/R	0.62	16	B	140	513	0.55	20	B	250	394	0.56	10	A	142	248
NB L	0.60	43	D	53	130	0.56	48	D	66	120	0.61	40	D	63	99
NB T/R	0.15	16	B	4	33	0.26	21	C	15	54	0.30	13	B	10	37
SB L/T/R	0.08	23	C	4	13	0.10	26	C	7	28	0.10	23	C	7	16
Total		17	B				26	C				17	B		

a Volume to capacity ratio.
b Average total delay, in seconds per vehicle.
c Level-of-service.
d 50th percentile queue, in feet.
e 95th percentile queue, in feet.

~ Volume exceeds capacity, queue is theoretically infinite.
# 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal

Table 7 Alternative 2 - Unsignalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
High Street at Mount Vernon Street and Parking Lot (Side-street stop-control)															
EB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
WB L	140	0.17	9	A	15	140	0.18	10	A	18	160	0.19	10	A	18
NB L/T/R	215	1.14	>120	F	348	180	>1.20	>120	F	300	155	1.15	>120	F	255
SB L/T/R	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
High Street at Recreation Road and O'Neil Drive (Side-street stop-control)															
EB L	10	0.01	9	A	0	5	0.01	10	A	0	10	0.01	10	A	0
WB L	90	0.10	9	A	8	50	0.07	10	A	5	45	0.06	9	A	5
NB L/T/R	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
SB L/T/R	10	0.13	37	E	10	15	0.17	36	E	15	15	0.20	36	E	18
High Street at Pottery Lane (Side-street stop-control)															
WB L	5	0.01	8	A	0	0	0.00	0	A	0	0	0.00	0	A	0
NB L/R	0	0.00	0	A	0	30	0.24	30	D	23	20	0.27	29	D	25
East Street at Dedham Middle School Driveway (Side-street stop-control)															
WB L/R	0	0.00	0	A	0	25	0.09	12	B	8	5	0.02	10	A	3
SB L	100	0.12	8	A	10	5	0.00	8	A	0	0	0.00	0	A	0
East Street at Whiting Avenue and Eastern Avenue (All-way stop-control)															
EB L/T	170	0.49	19	C	58	370	1.10	94	F	330	345	0.98	61	F	233
EB R	140	0.36	15	C	38	320	0.88	44	E	195	320	0.84	38	E	163
WB L/T/R	385	1.07	74	F	340	365	1.10	94	F	338	405	>1.20	>120	F	598
NB L/T/R	465	1.12	103	F	443	365	1.11	101	F	358	310	1.06	73	F	268
SB L/T/R	135	0.41	18	C	45	245	0.87	47	E	185	280	0.89	45	E	168

a Demand
b Volume to capacity ratio
c Average total delay, in seconds per vehicle
d Level-of-service
e 95th percentile queue, in feet

Table 7 Alternative 2 - Unsignalized Intersection Capacity Analysis (continued)

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
Whiting Avenue at Middle School Driveway and Abbott Road (Side-street stop-control)															
WB L	10	0.01	8	A	0	0	0.00	0	A	0	5	0.01	8	A	0
NB L/R	40	0.15	16	C	13	10	0.08	19	C	8	5	0.03	20	C	3
SB L/T/R	20	0.07	14	B	5	30	0.11	15	C	10	0	0.00	0	A	0
Whiting Avenue at Mount Vernon Street (All-way stop-control)															
EB L/T/R	150	0.28	12	B	28	380	0.69	20	C	133	340	0.58	17	C	93
WB L/T/R	305	0.60	17	C	100	275	0.49	14	B	65	295	0.62	18	C	108
NB L/T/R	190	0.37	13	B	43	95	0.22	12	B	20	110	0.26	12	B	25
SB L/T/R	205	0.40	13	B	48	200	0.38	13	B	45	230	0.43	14	B	55
Whiting Avenue at Recreation Road (Side-street stop-control)															
EB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
SB L/R	95	0.45	18	C	58	160	0.33	14	B	35	95	0.24	14	B	23
Whiting Avenue at Walnut Street (All-way stop-control)															
EB L/T/R	170	0.36	13	B	40	370	0.75	27	D	160	335	0.68	24	C	128
WB L/T/R	125	0.26	11	B	25	90	0.21	13	B	20	135	0.32	14	B	35
NB L/T/R	190	0.39	12	B	45	225	0.48	16	C	63	240	0.55	18	C	83
SB L/T/R	295	0.69	20	C	133	365	0.90	42	E	268	420	0.89	42	E	263
High Street at Maverick Street (Side-street stop-control)															
EB L	105	0.14	10	A	13	140	0.21	11	A	20	120	0.14	10	A	13
SB L/R	195	0.60	29	D	95	270	1.13	>120	F	358	180	0.60	28	D	93

a Demand
b Volume to capacity ratio
c Average total delay, in seconds per vehicle
d Level-of-service
e 95th percentile queue, in feet

Alternative 2 – Opportunities and Impacts

By narrowing Recreation Road, there is an opportunity to widen or repurpose the sidewalk along Recreation Road in the vicinity of Avery Elementary School.

Motorist confusion and wrong-way driving would be reduced on Recreation Road, particularly in the vicinity of the Avery Elementary School pickup/drop-off loop.

Because under this alternative no traffic would be exiting from Recreation Road onto High Street, traffic congestion and delay would be reduced at this intersection. These trips would instead exit onto Whiting Avenue, which would increase delay at this intersection. However, the analysis results for Alternative 2 show that this intersection would operate at LOS C or better during peak hours, which is considered acceptable.

Alternative 2 – Informational Open House Comments

Scans of all of the comments received from the informational open house meeting on Alternative 2 can be found in the appendix. In summary, the questions and comments received pertaining to Alternative 2 included the following:

- Recreation Road as one-way really lengthens commutes for Avery Parents driving from East Dedham
- Avery School if one-way, drop-off and pickup will create a traffic build up coming out of Avery lot behind the pool. Will need signs including "no student parking", "do not enter", and flashing "slow down" signs.
- Very little turning space at High Street for buses.
- Isn't Recreation Road already one-way?

Alternative 3 – Close Segment of Mount Vernon Street

Alternative 3 proposes to close the segment of Mount Vernon Street between Mount Vernon Place and Whiting Avenue to create a continuous campus between the Dedham High School and Dedham Middle School.

Alternative 3 – Volume Rerouting

Closing the segment of Mount Vernon Street between Mount Vernon Place and Whiting Avenue would reduce the existing cut through traffic. These trips would instead be relocated to East Street or Walnut Street. Additionally, all trips exiting from Dedham Middle School to Mount Vernon Street would have to turn left, to the north towards High Street.

Alternative 3 – Capacity Analysis

The study intersections that were impacted by relocated traffic volumes were reanalyzed using the *Synchro* software package. Table 8 presents a summary of the capacity analyses for the signalized study intersection and Table 9 presents a summary of the unsignalized study intersections.

Table 8 Alternative 3 - Signalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	v/c [a]	Del [b]	LOS [c]	50 Q [d]	95 Q [e]	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
High Street at East Street, Harvard Street and Harris Street															
Weekday Evening															
EB L/T	0.32	13	B	59	239	0.50	25	C	222	369	0.47	17	B	115	229
EB R	0.14	3	A	0	26	0.24	6	A	20	68	0.22	4	A	11	43
WB L/T/R	0.68	17	B	165	#644	0.59	21	C	277	440	0.57	10	A	149	270
NB L	0.60	43	D	53	130	0.55	48	D	66	119	0.59	39	D	63	99
NB T/R	0.51	11	B	4	56	0.56	14	B	16	80	0.58	10	B	10	43
SB L/T/R	0.08	23	C	4	13	0.10	25	C	8	27	0.10	23	C	7	16
Total		16	B				21	C				14	B		

a Volume to capacity ratio.
b Average total delay, in seconds per vehicle.
c Level-of-service.
d 50th percentile queue, in feet.
e 95th percentile queue, in feet.

~ Volume exceeds capacity, queue is theoretically infinite.
# 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal

Table 9 Alternative 3 - Unsignalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
High Street at Mount Vernon Street and Parking Lot (Side-street stop-control)															
EB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
WB L	45	0.06	9	A	5	0	0.00	0	A	0	0	0.00	0	A	0
NB L/T/R	120	0.57	30	D	83	45	0.22	24	C	20	0	0.00	0	A	0
SB L/T/R	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
High Street at Recreation Road and O'Neil Drive (Side-street stop-control)															
EB L	10	0.01	9	A	0	5	0.01	9	A	0	10	0.01	9	A	0
WB L	45	0.05	9	A	5	15	0.02	9	A	3	10	0.01	9	A	0
NB L/T/R	75	0.80	83	F	130	120	>1.20	>120	F	403	60	0.50	48	E	60
SB L/T/R	10	0.12	35	D	10	15	0.18	39	E	15	15	0.16	27	D	13
High Street at Pottery Lane (Side-street stop-control)															
WB L	5	0.01	9	A	0	0	0.00	0	A	0	0	0.00	0	A	0
NB L/R	0	0.00	0	A	0	30	0.22	27	D	20	20	0.23	24	C	23
East Street at Dedham Middle School Driveway (Side-street stop-control)															
WB L/R	0	0.00	0	A	0	25	0.11	14	B	10	5	0.02	10	A	3
SB L	100	0.15	9	A	13	5	0.01	8	A	0	0	0.00	0	A	0
East Street at Whiting Avenue and Eastern Avenue (All-way stop-control)															
EB L/T	215	0.66	26	D	90	410	>1.20	>120	F	443	375	0.99	55	F	190
EB R	140	0.39	16	C	38	320	0.96	53	F	208	320	0.94	46	E	173
WB L/T/R	335	1.04	58	F	253	360	>1.20	110	F	345	425	>1.20	>120	F	650
NB L/T/R	565	>1.20	>120	F	775	420	>1.20	>120	F	533	420	>1.20	>120	F	433
SB L/T/R	165	0.53	21	C	63	285	1.09	75	F	255	325	1.12	71	F	233
East Street at Walnut Street (Side-street stop-control)															
WB L/R	110	0.43	26	D	53	110	0.57	36	E	80	145	0.80	62	F	148
SB L	25	0.03	9	A	3	50	0.06	9	A	5	30	0.03	8	A	3
Whiting Avenue at Middle School Driveway and Abbott Road (Side-street stop-control)															
WB L	10	0.01	8	A	0	0	0.00	0	A	0	5	0.01	8	A	0
NB L/R	40	0.14	15	B	13	10	0.07	18	C	5	5	0.03	19	C	3
SB L/T/R	20	0.06	13	B	5	30	0.11	14	B	10	0	0.00	0	A	0
Whiting Avenue at Mount Vernon Street (All-way stop-control)															
EB L/T/R	150	0.21	9	A	20	340	0.49	12	B	68	305	0.40	11	B	48
WB L/T/R	325	0.51	12	B	75	345	0.48	12	B	65	395	0.62	14	B	110
NB L/T/R	90	0.15	9	A	13	40	0.08	9	A	8	40	0.08	9	A	8
SB L/T/R	0	0.00	9	A	0	0	0.00	9	A	0	0	0.00	9	A	0
Mount Vernon Street at Middle School Driveway and Mount Vernon Place (Side-street stop-control)															
EB L/T/R	170	0.42	13	B	53	20	0.04	9	A	3	5	0.01	9	A	0
WB L/T/R	0	0.00	0	A	0	5	0.00	0	A	0	0	0.00	0	A	0
NB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
SB L	30	0.03	7	A	3	5	0.00	7	A	0	0	0.00	0	A	0
Mount Vernon Street at Elmview Place and Charles Street (Side-street stop-control)															
EB L/T/R	5	0.01	11	B	0	5	0.01	9	A	0	10	0.02	9	A	3
WB L/T/R	30	0.09	11	B	8	15	0.03	9	A	3	5	0.01	8	A	0
NB L	5	0.00	7	A	0	0	0.00	0	A	0	5	0.00	7	A	0
SB L	5	0.00	8	A	0	0	0.00	0	A	0	0	0.00	0	A	0
Whiting Avenue at Recreation Road (Side-street stop-control)															
EB L	45	0.06	9	A	5	40	0.04	8	A	3	30	0.03	9	A	3
SB L/R	20	0.11	15	B	10	40	0.11	14	B	10	35	0.13	17	C	13

Table 9 Alternative 3 - Unsignalized Intersection Capacity Analysis (continued)

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
Whiting Avenue at Walnut Street (All-way stop-control)															
EB L/T/R	95	0.20	11	B	18	275	0.59	19	C	85	280	0.61	20	C	88
WB L/T/R	130	0.26	11	B	25	105	0.25	13	B	23	140	0.35	15	B	35
NB L/T/R	190	0.37	11	B	43	225	0.47	15	C	58	240	0.56	18	C	78
SB L/T/R	350	0.75	22	C	170	505	1.14	102	F	565	580	1.14	111	F	575
High Street at Maverick Street (Side-street stop-control)															
EB L	105	0.13	10	A	10	140	0.17	9	A	15	120	0.12	9	A	10
SB L/R	195	0.53	23	C	75	270	0.84	45	E	203	180	0.47	19	C	63

a Demand
b Volume to capacity ratio
c Average total delay, in seconds per vehicle
d Level-of-service
e 95th percentile queue, in feet

Alternative 3 – Opportunities and Impacts

Closing the segment Mount Vernon Street between Mount Vernon Place and Whiting Avenue creates a safe connection between the middle school and high school campuses for pedestrians and bicyclists. The closed segment allows the opportunity to add approximately 10,000 square feet of open space. It also allows Dedham Public Schools to consider better opportunities for educational opportunities (i.e. Middle School students taking advanced classes at the high school without having to cross Mount Vernon Street) and for teacher sharing (i.e. one full time position that can serve both schools).

By removing the cut-through opportunity, traffic along Mount Vernon Street would be reduced, and vehicular delay at the intersection of High Street and Mount Vernon Street would decrease. However, additional trips would be reallocated to East Street, Walnut Street, and High Street, and vehicular delay would increase at the intersections of Whiting Avenue at Walnut Street and Whiting Avenue at East Street.

It is noted that under this alternative, vehicular traffic may be encouraged to use of Charles Street and Barrows Street to travel between Mount Vernon Street and East Street. To preclude the use of Charles Street and Barrows Street for cut through traffic, traffic calming measures such as the speed tables discussed above become a more critical consideration. If Alternative 3 is desired, drainage modifications to Barrows Street and Charles Street should be completed as part of construction and speed humps installed along both roadways.

Alternative 3 – Informational Open House Comments

Scans of all of the comments received from the informational open house meeting on Alternative 3 can be found in the appendix. In summary, the questions and comments received pertaining to Alternative 3 included the following:

- Several comments suggested a pedestrian bridge over Mount Vernon Street.
- Need designated bike / pedestrian access to be fleshed out as part of campus planning.
- Barrows Street, Charles Street, and High Street will be more congested.
- Unfair to local residents whose access would change due to the roadway closure (i.e. Elmview Place).
- Several comments in support of Alternative 3.

Alternative 4 – Signalize High Street at Recreation Road

Currently, there is a signal on the west side of this intersection to stop traffic on High Street allowing pedestrians to safely cross. In Alternative 4, the intersection of High Street and Recreation Road is proposed to be fully signalized including all approaches and crosswalks.

Alternative 4 – Volume Rerouting

No volume rerouting is expected under Alternative 4, so this alternative was analyzed using existing fall traffic volumes.

Alternative 4 – Capacity Analysis

Table 10 presents a summary of the capacity analyses for the signalized study intersection of High Street at Recreation Road.

Table 10 Alternative 4 - Signalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	v/c [a]	Del [b]	LOS [c]	50 Q [d]	95 Q [e]	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
High Street at Recreation Road and O'Neil Drive															
Weekday Evening															
EB L/T/R	0.43	8	A	61	301	0.66	17	B	109	432	0.52	13	B	85	399
WB L/T/R	0.72	15	B	134	#714	0.82	24	C	157	#619	0.69	17	B	137	#660
NB L/T/R	0.58	29	C	22	46	0.79	45	D	53	77	0.28	17	B	5	37
SB L/T/R	0.06	1	A	0	0	0.07	1	A	0	0	0.10	4	A	0	0
Total		14	B				24	C				15	B		

a Volume to capacity ratio.
b Average total delay, in seconds per vehicle.
c Level-of-service.
d 50th percentile queue, in feet.
e 95th percentile queue, in feet.

~ Volume exceeds capacity, queue is theoretically infinite.
# 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal

Alternative 4 – Opportunities and Impacts

Signalizing the intersection of High Street at Recreation Road improves operations and decreases vehicular delay. Specifically, motorists on the northbound approach who have difficulty finding a gap in the High Street traffic stream would benefit most from the traffic signal. Additionally, signalizing this intersection would provide the opportunity for signal-controlled pedestrian crossings.

Improved operations at the intersection of High Street and Recreation Road, may encourage cut-through traffic between Whiting Avenue and High Street via Recreation Road rather than Mount Vernon Street.

Alternative 4 – Informational Open House Comments

Scans of all of the comments received from the informational open house meeting on Alternative 4 can be found in the appendix. In summary, the questions and comments received pertaining to Alternative 4 included the following:

- Add coordinated light at High Street and Mount Vernon Street. Change to flashing yellow during off hours.
- Pedestrian lights are already installed.
- Several comments suggested a raised crosswalk at High Street and Recreation Road.
- Several comments in support of Alternative 4.

Alternative 5 – Middle School Connection to Whiting Avenue

In Alternative 5, a new curb cut is proposed from the Dedham Middle School pickup/drop-off area directly to Whiting Avenue. The driveway would be stop-controlled and exit-only.

Alternative 5 – Volume Rerouting

The new exit-only driveway would allow traffic from the Dedham Middle School pickup/drop-off area to exit directly onto Whiting Avenue. This would decrease traffic that currently exits from the middle school to Mount Vernon Street.

Alternative 5 – Capacity Analysis

The unsignalized study intersections that were impacted by relocated traffic volumes were reanalyzed using the *Synchro* software package and are summarized in Table 11.

Table 11 Alternative 5 - Unsignalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
Whiting Avenue at Mount Vernon Street (All-way stop-control)															
EB L/T/R	240	0.36	12	B	40	430	0.74	22	C	163	370	0.62	18	C	108
WB L/T/R	270	0.51	14	B	73	225	0.40	13	B	48	265	0.56	16	C	88
NB L/T/R	190	0.35	12	B	40	95	0.22	11	B	20	110	0.26	14	B	25
SB L/T/R	125	0.24	11	B	23	185	0.35	12	B	40	225	0.42	12	B	53
Mount Vernon Street at Middle School Driveway and Mount Vernon Place (Side-street stop-control)															
EB L/T/R	90	0.43	21	C	53	5	0.02	12	B	3	0	0.00	0	A	0
WB L/T/R	0	0.00	0	A	0	5	0.03	12	B	3	0	0.00	0	A	0
NB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
SB L	30	0.03	8	A	3	5	0.00	8	A	0	0	0.00	0	A	0
Whiting Avenue at Recreation Road (Side-street stop-control)															
EB L	45	0.05	9	A	5	40	0.03	8	A	3	30	0.03	8	A	3
SB L/R	20	0.10	14	B	8	40	0.09	13	B	8	35	0.11	15	B	10
Whiting Avenue at Walnut Street (All-way stop-control)															
EB L/T/R	145	0.31	12	B	33	305	0.62	20	C	105	305	0.63	22	C	108
WB L/T/R	170	0.35	13	B	40	125	0.28	13	B	28	170	0.41	16	C	48
NB L/T/R	190	0.40	13	B	48	225	0.46	16	C	60	240	0.56	19	C	85
SB L/T/R	295	0.70	21	C	138	365	0.88	38	E	253	420	0.89	43	E	265
Whiting Avenue at New Connection between Middle School Driveway and Whiting Avenue (Side-street stop-control)															
SB L/R	80	0.15	13	B	13	15	0.04	14	B	3	5	0.01	11	B	0

a Demand
b Volume to capacity ratio
c Average total delay, in seconds per vehicle
d Level-of-service
e 95th percentile queue, in feet

Alternative 5 – Opportunities and Impacts

Creating a new exit-only driveway between the Dedham Middle School drop-off/pickup area and Whiting Avenue would reduce traffic on Mount Vernon Street, and it would slightly reduce vehicular delay at the intersection of Whiting Avenue and Mount Vernon Street. However, it would create a new pedestrian crossing across the new driveway. Because this alternative will create a new egress point from the Middle School parking lot, the drop-off/pickup circulation may need to be reconfigured to better guide motorists to their desired exit.

Alternative 5 – Informational Open House Comments

Scans of all of the comments received from the informational open house meeting on Alternative 5 can be found in the appendix. In summary, the questions and comments received pertaining to Alternative 5 included the following:

- If doing the single campus connection (Alternative 3) is needed to reduce traffic dumped onto Barrows Street and Clark Street, this exit doesn't matter.
- Traffic could build up at the drop-off line.
- The exit could impact the driveways at #65, #73, and #77 Whiting Avenue.
- Students are still being dropped off in the middle of Mount Vernon Street and Whiting Avenue.
- Several comments in support of Alternative 5.

Alternative 6 – Connection Through Tennis Courts Parking Lot

Alternative 6 proposes a one-way eastbound connection between Mount Vernon Street and Recreation Road through the existing tennis courts parking lot. As shown in the Alternative 6 illustration, the existing tennis courts would be removed and replaced with a 113-space parking lot. Alternatively, the perimeter spaces in the proposed parking lot could be used as a pickup/drop-off area for the high school.

Alternative 6 – Volume Rerouting

It is proposed that a portion of the traffic that currently makes the eastbound right-turn from High Street onto Recreation Road would instead enter the paring area from Mount Vernon Street and exit onto Recreation Road.

Alternative 6 – Capacity Analysis

The unsignalized study intersections that were impacted by relocated traffic volumes were reanalyzed using the *Synchro* software package and are summarized in Table 12.

Table 12 Alternative 6 - Unsignalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
High Street at Mount Vernon Street and Parking Lot (Side-street stop-control)															
EB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
WB L	140	0.16	9	A	15	140	0.17	9	A	0	160	0.19	10	A	18
NB L/T/R	205	1.05	106	F	298	175	>1.20	>120	F	290	150	1.11	>120	F	238
SB L/T/R	0	0.00	0	A	0	0	0.00	0	A	15	0	0.00	0	A	0
High Street at Recreation Road and O'Neil Drive (Side-street stop-control)															
EB L	10	0.01	9	A	0	5	0.01	10	A	0	10	0.01	10	A	0
WB L	45	0.05	9	A	3	15	0.02	9	A	3	10	0.01	9	A	0
NB L/T/R	75	0.77	75	F	123	120	>1.20	>120	F	438	60	0.59	64	F	75
SB L/T/R	10	0.12	34	D	10	15	0.21	45	E	18	15	0.19	33	D	18
Mount Vernon Street at Tennis Courts Driveway (Side-street stop-control)															
SB L	10	0.01	8	A	0	5	0.00	8	A	0	5	0.00	8	A	0
Recreation Road at Tennis Courts Driveway (Side-street stop-control)															
EB L/R	20	0.02	9	A	3	10	0.01	9	A	0	10	0.01	8	A	0

a Demand
b Volume to capacity ratio
c Average total delay, in seconds per vehicle
d Level-of-service
e 95th percentile queue, in feet

Alternative 6 – Opportunities and Impacts

The proposed 113-space parking lot replacing the tennis courts and existing 80-space parking lot could add a total of 33 parking spaces. There is also an opportunity to instead use the parking lot for high school pickup/drop-off activity. This alternative could potentially encourage cut-throughs between Mount Vernon Street and Recreation Road. Alternative 6 is only viable if a replacement location for the tennis courts is available. There was a previous opportunity being discussed that led to the creation of this alternative. However, since that opportunity is no longer available, Alternative 6 appears to be infeasible.

Alternative 6 – Informational Open House Comments

Scans of all of the comments received from the informational open house meeting on Alternative 6 can be found in the appendix. In summary, the questions and comments received pertaining to Alternative 6 included the following:

- Tennis courts should be relocated to the parking lot north of High Street across from Mount Vernon Street.
- Park on green space between High School and Mount Vernon Street rather than at the tennis courts.
- Several comments were opposed to relocating the tennis courts.

Combined Alternatives 1, 3, and 5

As previously discussed, Alternative 1 proposes that Whiting Avenue be made one-way westbound between Walnut Street and Mount Vernon Street, Alternative 3 proposes to close

the segment of Mount Vernon Street between Mount Vernon Place and Whiting Avenue, and Alternative 5 proposes a new exit-only driveway from the middle school pickup/drop-off area directly to Whiting Avenue. These alternatives were analyzed together to determine their combined opportunities and impacts.

Combined Alternatives 1, 3, and 5 – Volume Rerouting

The volumes were rerouted similarly to how each was previously discussed above.

Eastbound volumes along Whiting Avenue between Mount Vernon Street and Walnut Street were relocated to High Street and Walnut Street. Trips to Recreation Road making the eastbound left-turn from Whiting Avenue were rerouted to the eastbound right-turn into Recreation Road from High Street or the westbound right-turn from Whiting Avenue.

Existing traffic volumes on Mount Vernon Street between Mount Vernon Place and Whiting Avenue would be relocated to East Street and Walnut Street.

All existing vehicles that currently exit from Dedham Middle School onto Mount Vernon Place would instead exit via the proposed driveway from the middle school pickup/drop-off area.

Combined Alternatives 1, 3, and 5 – Capacity Analysis

The study intersections that were impacted by relocated traffic volumes were reanalyzed using the *Synchro* software package. Table 13 presents a summary of the capacity analyses for the signalized study intersection and Table 14 presents a summary of the unsignalized study intersections.

Table 13 Combined Alternatives 1, 3, and 5 - Signalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	v/c [a]	Del [b]	LOS [c]	50 Q [d]	95 Q [e]	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
High Street at East Street, Harvard Street and Harris Street															
Weekday Evening															
EB L/T	0.37	15	B	69	278	0.55	29	C	253	411	0.50	22	C	131	248
EB R	0.11	2	A	0	10	0.20	5	A	17	48	0.18	3	A	7	33
WB L/T/R	0.67	17	B	161	#630	0.61	21	C	295	459	0.59	11	B	159	276
NB L	0.59	42	D	53	130	0.54	47	D	66	119	0.57	38	D	63	99
NB T/R	0.61	11	B	4	61	0.73	14	B	15	105	0.73	11	B	10	42
SB L/T/R	0.08	23	C	4	13	0.10	25	C	7	27	0.10	23	C	7	16
Total		16	B				22	C				15	B		

a Volume to capacity ratio.
b Average total delay, in seconds per vehicle.
c Level-of-service.
d 50th percentile queue, in feet.
e 95th percentile queue, in feet.

~ Volume exceeds capacity, queue is theoretically infinite.
# 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal

Table 14 Combined Alternatives 1, 3, and 5 - Unsignalized Intersection Capacity Analysis

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
High Street at Mount Vernon Street and Parking Lot (Side-street stop-control)															
EB L	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
WB L	45	0.06	9	A	5	0	0.00	0	A	0	0	0.00	0	A	0
NB L/T/R	40	0.23	23	C	23	30	0.25	38	E	23	10	0.10	38	E	8
SB L/T/R	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
High Street at Recreation Road and O'Neil Drive (Side-street stop-control)															
EB L	10	0.01	9	A	0	5	0.01	9	A	0	10	0.01	9	A	0
WB L	45	0.05	9	A	5	15	0.03	10	B	3	10	0.02	10	A	0
NB L/T/R	75	0.84	93	F	138	120	>1.20	>120	F	498	60	0.66	78	F	85
SB L/T/R	10	0.13	36	E	10	15	0.27	60	F	25	15	0.19	34	D	18
High Street at Pottery Lane (Side-street stop-control)															
WB L	5	0.01	9	A	0	0	0.00	0	A	0	0	0.00	0	A	0
NB L/R	0	0.00	0	A	0	30	0.28	34	D	28	20	0.29	31	D	28
East Street at Dedham Middle School Driveway (Side-street stop-control)															
WB L/R	0	0.00	0	A	0	25	0.12	16	C	10	5	0.03	13	B	3
SB L	100	0.16	10	A	15	5	0.01	8	A	0	0	0.00	0	A	0
East Street at Whiting Avenue and Eastern Avenue (All-way stop-control)															
EB L/T	215	0.63	24	C	85	410	1.18	115	F	398	375	1.07	86	F	305
EB R	140	0.36	15	B	35	320	0.81	35	D	168	320	0.81	37	E	165
WB L/T/R	300	0.89	37	E	175	255	0.78	35	D	140	285	1.01	68	F	260
NB L/T/R	585	>1.20	>120	F	705	420	1.16	116	F	433	420	1.16	>120	F	438
SB L/T/R	135	0.41	17	C	43	245	0.81	37	E	155	280	0.85	43	E	170
East Street at Walnut Street (Side-street stop-control)															
WB L/R	110	0.42	25	C	50	110	0.61	41	E	90	145	0.63	35	E	98
SB L	25	0.03	9	A	3	50	0.06	9	A	5	30	0.03	8	A	3
Whiting Avenue at Middle School Driveway and Abbott Road (Side-street stop-control)															
WB L	10	0.01	8	A	0	0	0.00	0	A	0	5	0.01	8	A	0
NB L/R	40	0.12	13	B	10	10	0.05	13	B	3	5	0.02	14	B	3
SB L/T/R	20	0.06	12	B	5	30	0.08	11	B	5	0	0.00	0	A	0
Whiting Avenue at Mount Vernon Street (All-way stop-control)															
EB R	125	0.22	8	A	13	190	0.22	8	A	20	165	0.18	8	A	15
WB L/T	235	0.36	10	A	43	225	0.29	9	A	30	260	0.39	10	A	45
NB L	70	0.11	9	A	10	30	0.05	8	A	5	30	0.06	9	A	5
Mount Vernon Street at Middle School Driveway and Mount Vernon Place (Side-street stop-control)															
EB L/T	90	0.22	11	B	20	5	0.01	9	A	0	0	0.00	0	A	0
WB T/R	0	0.00	0	A	0	0	0.00	0	A	0	0	0.00	0	A	0
SB L/R	35	0.03	7	A	3	10	0.00	7	A	0	15	0.00	0	A	0
Mount Vernon Street at Elmview Place and Charles Street (Side-street stop-control)															
EB L/T/R	5	0.01	10	B	0	5	0.01	9	A	0	10	0.02	9	A	3
WB L/T/R	30	0.08	10	A	5	15	0.03	9	A	3	15	0.02	9	A	3
NB L	5	0.00	7	A	0	0	0.00	0	A	0	5	0.00	7	A	0
SB L	5	0.00	7	A	0	0	0.00	0	A	0	0	0.00	0	A	0

a Demand
b Volume to capacity ratio
c Average total delay, in seconds per vehicle
d Level-of-service
e 95th percentile queue, in feet

Table 14 Combined Alternatives 1, 3, and 5 - Unsignalized Intersection Capacity Analysis (continued)

Location / Movement	Weekday Morning Peak Hour					Weekday Dismissal Peak Hour					Weekday Evening Peak Hour				
	D [a]	v/c [b]	Del [c]	LOS [d]	95Q [e]	D	v/c	Del	LOS	95Q	D	v/c	Del	LOS	95Q
Whiting Avenue at Recreation Road (Side-street stop-control)															
SB L/R	20	0.08	12	B	8	40	0.06	10	A	5	35	0.06	10	B	5
Whiting Avenue at Walnut Street (All-way stop-control)															
WB L/TR	130	0.25	11	B	25	105	0.19	11	B	18	140	0.27	11	B	28
NB L/T/R	335	0.57	13	B	88	405	0.58	14	B	90	400	0.63	16	C	115
SB L/T/R	295	0.61	15	C	105	365	0.68	17	C	135	420	0.68	18	C	138
High Street at Maverick Street (Side-street stop-control)															
EB L	105	0.13	10	A	10	140	0.17	9	A	15	120	0.12	9	A	10
SB L/R	195	0.53	23	C	75	270	0.90	56	F	233	180	0.50	21	C	68
Whiting Avenue at Middle School Connector Road (Side-street stop-control)															
SB L/R	80	0.13	11	B	10	15	0.03	11	B	3	5	0.01	12	B	0

a Demand
b Volume to capacity ratio
c Average total delay, in seconds per vehicle
d Level-of-service
e 95th percentile queue, in feet

Combined Alternatives 1, 3, and 5 – Opportunities and Impacts

Similar opportunities and impacts would be present under this combined alternative as under the individual alternatives. Combining the three alternatives leads to a overall more dramatic change to traffic circulation and access in the vicinity of the schools. It opens other opportunities for improvement and requires the schools to rethink drop-off and pick-up activities. The combined changes would also better discourage non-school related traffic from outside the adjacent neighborhoods from driving through to/from Route 1.

With the proposed closed segment of Mount Vernon Street, the proposed driveway from the middle school pickup/drop-off area to Whiting Avenue allows vehicles to exit from the middle school to the south and west.

Combined Alternatives 1, 3, and 5 – Informational Open House Comments

Scans of all of the comments received from the informational open house meeting on Combined Alternatives 1, 3, and 5 can be found in the appendix. In summary, the questions and comments received pertaining to Combined Alternatives 1, 3, and 5 included the following:

- Any one-way needs to be a one-way all the time, not by time of day.
- Need to consider connections and safety for joining into and exiting protected bike lane.
- Like the idea of the Whiting Avenue bike lane, but Dedham is not bike safe. All roads need bike lanes. Kids will get hit.
- Make sure parking lot on Whiting Avenue is eliminated to help flow and replace somewhere else.
- Several comments in support of Combined Alternatives 1, 3, and 5.

In response to the concerns about conflicts between the separated bike lane and the parking lot on Whiting Avenue (area adjacent to the track), the proposed bike lane on Whiting Avenue was realigned behind the perpendicular parking spaces south of the Dedham High School track. This change was also reflected in Alternative 1.

Alternatives Evaluation Matrix

The relative advantages, disadvantages, and costs for each short-term opportunity and longer-term alternative were compared and summarized in the alternatives evaluation matrix as shown in Table 15. Each potential improvement was evaluated on whether it had a positive, negative, or neutral impact on driver comprehension, cut-through traffic, illegal vehicle maneuvers, traffic congestion, campus connectivity, parking space supply, pedestrian accommodations, and bicycle accommodations. Cost estimation calculation worksheets can be found in the appendix.

Table 15 Alternatives Evaluation Matrix

Description	Advantages	Disadvantages	Relative Cost[1]	Driver Comprehension	Cut-Through Traffic	Illegal Vehicle Maneuvers	Traffic Congestion	Campus Connectivity	Parking Space Supply	Pedestrian Accommodations	Bicycle Accommodations
Short Term Opportunities											
Clarify Signage at the Middle School Driveways	- Reduces driver confusion - Clarifies drop-off/pick-up circulation	- No apparent disadvantages	Low	+	O	+	O	O	O	O	O
Relocate the Accessible Parking Spaces at the Middle School	- Provides better location for accessible parking	- No apparent disadvantages	Medium	O	O	O	O	O	O	O	O
Discouraging Barrows Street and Charles Street for Cut-Through Traffic	- Reduces cut-through traffic	- May add traffic to High Street and Whiting Avenue - Drivers may disobey signage	Low	O	+	-	O	O	O	O	O
Provide a Safe Crossing on Mount Vernon Street	- Accommodates pedestrian crossings on Mount Vernon Street	- No apparent disadvantages	Medium	O	O	O	O	O	O	+	+
Do Not Block Intersection Treatment on Recreation Road	- Prevents blockage of school traffic in front of Recreation Road	- No apparent disadvantages	Low	O	O	O	+	O	O	O	O
Clarify the Drop-off/Pickup Circulation at Avery Elementary School	- Reduces driver confusion - Clarifies drop-off/pick-up circulation	- No apparent disadvantages	Low	+	O	+	O	O	O	O	O
Swap the High School Parent/Guardian and Bus Drop-off/Pickup Areas	- May help reduce congestion on Whiting Avenue during school arrival and dismissal times	- May add additional traffic to Recreation Road and High Street	Low	O	O	O	+	O	O	O	O
Update School Zone Signage and Pavement Markings	- Clarifies the school zones	- No apparent disadvantages	Low	+	O	O	O	O	O	O	O
Provide a New Dedham Middle School Bus to the Oakdale Elementary School Neighborhood	- Reduces parent/guardian drop-off traffic	- No apparent disadvantages	High	O	O	O	+	O	O	O	O
Alternatives											
Alternative 1 - One-Way Whiting Avenue	- Separated bike lanes can be implemented - Eliminates eastbound drop-offs and U-turn maneuvers - Fewer vehicle conflicts in front of High School - Decreases safety concerns with parents dropping off students on opposite side of Whiting Avenue - Reduces traffic on Whiting Avenue from the neighborhood to the south on Morse Avenue and Fulton Street	- Increases delay to the northbound approaches at High Street / Mount Vernon Street and High Street / Recreation Road - Eastbound traffic through school area rerouted to High Street and Walnut Street - May remove on-street parking on Whiting Avenue	High	O	O	+	-	O	-	+	+
Alternative 2 - One-Way Recreation Road	- Potential to add sidewalk area in vicinity of Avery Elementary School - Reduces traffic congestion at High Street / Recreation Road - Reduces motorist confusion and wrong way driving on Recreation Road	- Additional trips added to Recreation Road / Whiting Avenue, but operations are LOS C or better during peak hours	High	O	O	+	+	O	O	+	+
Alternative 3 - Close Segment of Mount Vernon Street	- Provides safe connection between Middle School and High School campuses for pedestrians and bicyclists - Reduces delay at High Street / Mount Vernon Street - Potential to add about 10,000 square feet of open space - Reduces traffic on Mount Vernon Street	- Adds trips to East Street, Walnut Street, and High Street - Increases vehicle delay at Whiting Avenue / Walnut Street and Whiting Avenue / East Street - May increase traffic along side streets like Barrows Street and Charles Street	High	O	-	O	O	+	O	+	+
Alternative 4 - Signalize High Street at Recreation Road	- Improves operations at High Street / Recreation Road - Opportunity to provide signal-controlled pedestrian crossings	- May encourage cut-through traffic on Recreation Road	High	O	-	O	+	O	O	+	O
Alternative 5 - Middle School Connnection to Whiting Avenue	- Reduces traffic on Mount Vernon Street - Reduces delay on Whting Avenue / Mount Vernon Street	- Creates new crossing at Middle School exit to Whiting Avenue	High	O	O	O	+	O	O	-	O
Alternative 6 - Connection Through Tennis Courts Parking Lot	- Can add approximately 30-35 parking spaces - Alternatively, could provide drop-off/pickup instead of parking	- May encourage cut-throughs between Mount Vernon Street and Recreation Road	High	O	-	O	O	O	+	O	O
Combined Alternative 1, 3, and 5	- Separated bike lanes can be implemented - Eliminates eastbound drop-offs and U-turn maneuvers - Fewer vehicle conflicts in front of High School - Reduces traffic on Whiting Avenue from the neighborhood to the south on Morse Avenue and Fulton Street - Provides safe connection between Middle School and High School campuses for pedestrians and bicyclists - Potential to add about 10,000 square feet of open space - Reduces traffic along Mount Vernon Street	- Increases delay at East Street / Walnut Street and East Street / Whiting Avenue - Reduces delay at Mount Vernon Street / High Street and Mount Vernon Street / Whiting Avenue - Eastbound traffic through school area rerouted to High Street and Walnut Street - Creates new crossing at Middle School exit to Whiting Avenue	High	O	-	+	O	+	-	+	+

[1] Low cost <$25,000; Medium cost $25,000-$75,000; High cost > $75,000

Legend

+ : Improved condition

- : Negatively impacted condition

O : Neutral or no impact to condition

4

Recommendations

The traffic and circulation study requested by the Town of Dedham will serve as a blueprint for the improvements ultimately constructed. The purpose of this study was to gain a baseline understanding of congestion issues and identify solutions to those issues.

School arrival and dismissal times often generate substantial traffic activity, particularly as it relates to drop-off and pick-up activities. The associated congestion, while frustrating at times, is generally short in duration and limited to less than 30 minutes during arrival and dismissal. However, traffic safety and the ability to provide comfortable non-motorized transportation options for students can be achieved despite congestion; through careful development of improvements that channelize traffic flow and better education for parents and guardians on the importance of following traffic laws during drop-off and pick-up. Additionally, pavement marking and signage plans should meet all current standards and be clearly identified by motorists.

The concepts presented as part of this study all have benefits to the school community, with some requiring compromise to achieve a balance between motorized (car and bus) and non-motorized (bicycle and pedestrian) transportation. The short-term alternatives focus on discrete improvements that can be made for relatively low cost and would not require extensive planning and permitting. They are not considered controversial and focus primarily on safety and can be implemented with cooperation between Dedham Public Schools and

the Dedham Department of Public Works. It is recommended that all of the short-term alternatives be implemented as quickly as possible.

The longer-term alternatives developed will go further in addressing existing deficiencies and congestion points. However, they require roadway design and construction, modifications to traffic flow patterns, and an increased capital budget in order to implement. Many also require broad consensus of town residents, with public outreach extending beyond those in the school community. As such, it is expected these alternatives will be further developed and refined through additional efforts. Implementation of combined alternatives 1, 3, and 5 seemed to generate the most interest and support through the public information session. Attendees understood the benefits of combining alternatives on the transportation infrastructure, as well as some of the long term non-transportation related goals that would be achieved with a unified campus. It is recommended that these three alternatives are progressed, and that further consideration be given to the inclusion of Alternative 2. Funding for construction of these alternatives may come from various sources but would likely require town meeting appropriations. Next steps for the Dedham Public Schools would include partnering with town staff to determine the best plan for implementation. The town may consider forming a committee of stakeholders to secure funding, advance design, and gain more widespread public consensus. The focus of the committee should continue to be the safety of transportation options for Dedham Public School students, improved access to non-motorized transportation options, and equitable access to schools from all areas of town and all populations. A Recommendations and Implementation Plan the Town can use to guide the process moving forward is included ono the following pages.

Recommended Action Plan – Commitment Matrix and Implementation Timeframe

Alternative	Construction Cost [1]	Possible Funding Source(s)	Facilitating Organizations: MassDOT	Facilitating Organizations: School Committee	Facilitating Organizations: Town of Dedham	Implementation Timeframe (Years)	Next Steps: Next Steps	Next Steps: Responsible Party	Notes
Clarify signage at Middle School Driveway	$4,000	• Town Funds • State Chapter 90			X	Short-Term (1)	Discuss sign modifications with DPW	Town	
Discourage cut-through traffic on Barrows and Charles/Clark Streets	$1,000[2]	• Town Funds • State Chapter 90			X	Short-Term (Signage, Education, Drainage Evaluation); Medium-Term (Construction)	Determine drainage implications of speed tables	Town	Signage can be implemented in the short term. If drainage modifications are required for speed table installation, meet with residents to discuss cost implications and timelines.
Recreation Road "Do Not Block the Box" treatment	$5,000	• Town funds		X	X	Short-Term (1)	Request Town DPW provide striping and associated signage	School Committee	Assumes striping and signage installed at each end of Recreation Road.
Drop-off/Pick-up Improvements at Avery School	$1,800	• Town funds		X	X	Short-Term (1)	Discuss sign modifications with DPW	School Committee	Outreach to parents highlighting sign changes and reminding them of the correct drop-off/pick-up procedures.
High School Drop-off/Pick-up Pilot Program	$1,000[3]	• Town Funds		X	X	Short-Term (Pilot Program)	Establish pilot program.	School Committee	If successful, implement striping and signage changes as necessary.
School Zone Updates	$15,300	• Town funds • State Chapter 90			X	Short-Term (1)	Update school zone signage and striping to be fully compliant with latest regulations	Town	See appendix for concept plan
Accessible Middle School Parking	$45,000	• Town funds		X	X	Short-Term (Design and Construction)	Construct fully accessible parking across from Middle School Driveway	Town	Ensure compliance with all Americans with Disabilities Act and Massachusetts Architectural Access Board (ADA/MAAB) guidance.
Mt. Vernon Street Pedestrian Crossing	$90,000[4]	• Town Funds • Safe Routes to School	X		X	Short-Term (Design and initial construction); Medium-Term (RRFB/ HAWK)	Design and implementation of curb ramps and crosswalk should occur in short-term, with RRFB or pedestrian beacon to follow as funds are available.	Town	Construction should occur in short term if funds can be identified. Consider Safe Routes to School or Complete Streets funding through MassDOT.

MassDOT - Massachusetts Department of Transportation

Information on state funding sources can be found at the following locations: Complete Streets (mass.gov/massdot/completestreets), Chapter 90 (mass.gov/massdot/chapter90), State Transportation Improvement Program (ctps.org/tip-dev)

1 Construction cost estimates in 2019 dollars. Estimates do not include survey, design fees, right-of-way (ROW) acquisition, permitting, or utility modifications (if necessary). Costs include anticipated drainage modifications, mobilization, construction staking, traffic management, police detail allowances and other contingencies. Details provided in study appendix.

2 Cost estimate for signage only. Cost of speed tables dependent on drainage evaluation. Assuming 3 speed tables per roadway and some drainage modifications, estimated construction costs are $786,000. See appendix for cost information.

3 Costs reflect the need for some temporary signage installation to facilitate pilot program. If successful, permanent signage and striping changes may be desired.

4 Includes crosswalk and cost to install Rapid Rectangular Flashing Beacons (RRFBs). Cost of RRFB estimated to be $70,000, including contingencies.

Recommended Action Plan – Commitment Matrix and Implementation Timeframe

Alternative	Construction Cost [1]	Possible Funding Source(s)	Facilitating Organizations: MassDOT	School Committee	Town of Dedham	EEA[2]	Implementation Timeframe (Years): Short-Term 1	2	3	4	5	Medium-Term 6	7	8	9	10	Long-Term 10+	Next Steps	Responsible Party	Notes
One-way Whiting Avenue	$1,753,000	• Town funds • State Transportation Improvement Program	X		X	?						Permitting and Design					Construction	Advance design. Stakeholder outreach. Research permitting requirements.	Town	Will require additional public and stakeholder outreach. Cost includes separated bicycle lane and parking modifications along Field House.
Middle School connection to Whiting Avenue	$105,000	• Town funds			X				Design			Construction						Advance design. Stakeholder outreach.	Town	Will require abutter coordination and outreach.
One-way Recreation Road	$472,000	• Town funds		X	X							Design					Construction	Advance design. Stakeholder outreach.	School Committee	Will require additional public and stakeholder outreach. Costs include bicycle lane along Recreation Road (on-road)
High Street/Recreation Road Traffic Signal	$337,000[3]	• Town Funds • State Transportation Improvement Program • Safe Routes to School	X									Design and Construction							Town	
Mt. Vernon Street Closure/Unified Campus	$351,000[4]	• Town Funds • Safe Routes to School	X	X	X	?			Planning			Design					Construction	Ultimate schedule should be prioritized based on education benefits of a unified campus	School Committee	

MassDOT - Massachusetts Department of Transportation, EEA – Executive Office of Energy and Environmental Affairs.
Information on state funding sources can be found at the following locations: Complete Streets (mass.gov/massdot/completestreets), Chapter 90 (mass.gov/massdot/chapter90), State Transportation Improvement Program (ctps.org/tip-dev)

1 Construction cost estimates in 2019 dollars. Estimates do not include survey, design fees, right-of-way (ROW) acquisition, permitting, or utility modifications (if necessary). Costs include anticipated drainage modifications, mobilization, construction staking, traffic management, police detail allowances and other contingencies. Details provided in study appendix.
2 Environmental Permitting is not anticipated for the long-term recommendations. However, subsurface conditions are unknown and some environmental permitting may be required.
3 Costs reflect for full traffic signal upgrade/replacement of equipment.
4 Costs assume loam and seed within new campus area created. No landscaping or green infrastructure features (trees, rain gardens, etc.) assumed at this time.