

# ROAD SAFETY AUDIT

Washington Street

Town of Holliston

December 2012

Prepared for:  
Massachusetts Department of Transportation



Prepared by:  
Howard/Stein-Hudson Associates  
38 Chauncy Street  
Boston, MA 02111



# Table of Contents

---

<b>Background .....</b>	<b>2</b>
<b>Project Data .....</b>	<b>4</b>
<b>Project Location Description .....</b>	<b>5</b>
<b>Road Safety Audit Observations .....</b>	<b>7</b>
Corridor-wide Issues .....	7
Location #1: Crosswalk South of Green Street/Exchange Street .....	10
Location #2: Green Street/Exchange Street/Washington Street Intersection .....	12
Location #3: Central Street/Washington Street Intersection Area .....	13
Location #4: Mid-block Crosswalk between Central Street and Hollis Street/Charles Street .....	16
Location #5: Hollis Street/Charles Street/Washington Street Intersection.....	18
Location #6: Washington Street/Church Street.....	20
<b>Potential Safety Enhancements .....</b>	<b>22</b>

## List of Appendices

- Appendix A. RSA Meeting Agenda and Background Information  
Appendix B. RSA Audit Team Contact List

## List of Figures

Figure 1. Locus Map.....	3
--------------------------	---

## List of Tables

Table 1. Participating Audit Team Members .....	4
Table 2. Summary of Potential Safety Enhancements .....	23

## Background

The Washington Street corridor has long been a source of concern regarding transportation safety in the Town of Holliston. In the summer of 2012, the Holliston Police Department conducted a crash analysis study of the Holliston Downtown Square: 725 – 830 Washington Street between July 1, 2007, and July 1, 2012. A supplemental report was also prepared between July 1, 2012, and August 8, 2012. These reports were prepared at the request of the Holliston Board of Selectmen as a result of a crash in June 2012 involving two pedestrians in the crosswalk at the intersection of Washington Street and Central Street in addition to the long-standing safety concerns along the corridor.

As a result of the safety study conducted by the Police Department, the Holliston Police Chief reached out to the Massachusetts Department of Transportation (MassDOT), requesting a Road Safety Audit (RSA) along the segment of Washington Street (Routes 16 and 126) from the pedestrian crosswalk just to the south of the intersection of Exchange Street/Green Street to Church Street in the Town of Holliston. The RSA study area is illustrated in **Figure 1**.

Based on a review of the crash data provided by the Town, the corridor includes two locations, Washington Street at Central Street and Washington Street at Hollis Street/Charles Street, whose Equivalent Property Damage Only (EPDO) values put them within the top 5% of High Crash Locations within the Metropolitan Area Planning Council (MAPC) region. MassDOT has further determined that these locations would be eligible to receive Highway Safety Improvement Program (HSIP) funding for reconstruction should an RSA be conducted, and the proposed design incorporated the safety improvements identified in the RSA.

During the RSA, the audit team focused on safety issues along the entire corridor; however, the team also discussed specific safety issues at the intersections of Green Street/Exchange Street, Central Street, Hollis Street/Charles Street, and Church Street. The RSA audit team also discussed specific safety issues at three pedestrian crossing locations in this section of Washington Street including:

- The raised crosswalk approximately 50 feet south of the Green Street/Exchange Street intersection;
- The north crosswalk at the Central Street intersection; and
- The mid-block raised crosswalk between Central Street and Hollis Street/Charles Street.

In general, the RSA is intended to identify potential safety improvements that can be evaluated and included as part of future design efforts for reconstruction. The short-term, low-cost potential improvements could be considered by the responsible agency for implementation prior to reconstruction, as appropriate.

Figure 1. Locus Map



Source: Google Maps

## Project Data

The audit team conducted a Road Safety Audit (RSA) along a roughly one-quarter mile segment of Washington Street (Routes 16 and 126) in Holliston, Massachusetts, on Wednesday, September 26, 2012. It should be noted that this date was a major religious holiday (Yom Kippur) and that schools in Holliston were closed. The RSA agenda and background material including the detailed crash data appear in **Appendix A. Table 1** lists the audit team members and their affiliations. **Appendix B** provides detailed contact information for all team members.

**Table 1. Participating Audit Team Members**

<b>Audit Team Member</b>	<b>Agency/Affiliation</b>
Carolyn Dykema	Massachusetts House of Representatives
Paul Lebeau	Holliston Town Administrator
Kevin Conley	Holliston Board of Selectman
Jay Leary	Holliston Board of Selectman
Jay Marsden	Holliston Board of Selectman
Jack Donovan	Holliston Planning Board
Chief John Moore	Holliston Police Department
Scott Downey	Holliston Police Department
Matthew Waugh	Holliston Police Department
Michael Cassidy	Holliston Fire Department
Karen Sherman	Holliston Town Planner
Tom Smith	Holliston Highway Department
Douglas Schmidt	Brickhouse Realty (Local Business)
Pam Zicko	Holliston Business Owner
Chenyuan Wang	Boston Region MPO
Lisa Schletzbaum	MassDOT, Highway Division, Safety Section
Corey O'Connor	MassDOT, Highway Division, Safety Section
Joe Frawley	MassDOT, District 3
Lola Campbell	MassDOT, District 3
Bobby Blair	Holliston Reporter
Laura Krantz	MetroWest Daily News
Keri Pyke	Howard/Stein-Hudson Associates, Inc.
Ted Brovitz	Howard/Stein-Hudson Associates, Inc.

Prior to the RSA, and in order to begin assessing possible safety issues, the audit team reviewed collision diagrams, crash detail summaries, and speed regulations for this segment of Washington Street based on crash records supplied by the Holliston Police Department.

According to data provided by the Holliston Police Department, a total of 65 crashes were reported that occurred within the public right-of-way along this segment of Washington Street from June 2009 to June 2012. According to the records, crashes occurred throughout the year with a slight increase between May and July (or approximately 38% of the total). Crashes generally occurred throughout the week; however,

approximately 29% of the crashes occurred on Fridays. The vast majority of crashes occurred between 6 AM and 6 PM (91%) and particularly in the afternoon between the hours of between 2:00 PM and 6:00 PM (approximately 42% of total crashes). The vast majority of crashes occurred during daylight conditions (89%), on clear days (62%), and on a dry roadway surface (80%). As the vast majority of crashes occurred during clear, daylight conditions on dry surfaces, this may indicate that speed could be a contributing factor to the number of crashes. However, this isn't necessarily supported by the crash descriptions. The Holliston Police Department routinely provides traffic enforcement along this segment of Washington Street; the officers indicated that the majority of violations along this segment do not include speeding.

Of the 65 crashes, 34 (or 52%) involved angle crashes. Looking at the crash diagram, most of these crashes occurred at the side street intersections and driveways onto Washington Street. Another 17 crashes (26% of total) were rear-end collisions and another 7 (or 11%) were single vehicle crashes. Driver age does not appear to be a significant factor as crashes were distributed across all age groups with the highest number (12 crashes or 19% of the total) occurring in the 40-49 year age bracket.

In terms of driver contributing factors, the most common one was failure to yield right-of-way (22 or 34% of the total). Another 11 crashes (17%) were attributed to driver inattention; four (6%) were attributed to following too closely; and three (5%) were attributed to failure to keep in proper lane or running off the road. A total of 7 crashes (or 11%) were not attributed to improper driving. Of the 65 crashes, 12 (or 18%) involved injury. Additionally, four (6%) crashes involved bicycles, two (3%) involved pedestrians, and three (5%) involved parked vehicles.

## Project Location Description

The RSA focused on the segment of Washington Street (Routes 16 and 126) from the area just north of Church Street to the pedestrian crosswalk south of Green Street/Exchange Street in the Town of Holliston. The Washington Street corridor length is approximately 1/4-mile from the pedestrian crosswalk south of Green Street/Exchange Street to Church Street. Washington Street serves numerous institutional and commercial uses along the corridor and provides connection to surrounding residential neighborhoods, public parks, schools, and emergency services.

There are four intersections within the corridor: Green Street/Exchange Street, Central Street, Hollis Street/Charles Street, and Church Street. There are also several private driveways, some of which are heavily used throughout the day. There are no full stop-and-go traffic signals in this segment of the corridor.

Within the study area, *Washington Street* generally runs north-south and consists of one travel lane in each direction with left-turn lanes provided at key intersections and on-street parking. The corridor is approximately 65 feet wide. There are sidewalks located on both sides of Washington Street which extend along the intersecting public streets. There are three (3) designated pedestrian crosswalks, all of which have overhead flashing yellow pedestrian warning lights. The pedestrian crossing signals are activated through either push buttons or passive motion detection. Two of the crosswalks are also raised, requiring vehicles to slow as they pass over them. There are no designated bicycle lanes in the corridor.

According to the MassDOT Office of Transportation Planning 2010 Road Inventory File, Washington Street is classified as a rural major collector and falls under local jurisdiction. The speed limit on Washington Street is 30 miles per hour (mph).

**Green Street** runs east-west and dead ends at a local park, which includes a field that can accommodate baseball, softball, or soccer games. Green Street is classified as a local street. Green Street consists of one narrow lane that can serve either direction. The road is approximately 20 feet wide. On-street parking is provided along the north side of the street. There are several residences located on the north side of the street.

**Exchange Street** runs east-west and provides one lane in each direction. There are a few marked on-street parking spaces on the south side near Washington Street. The land use along Exchange Street is primarily residential with the exception of the businesses at Washington Street, which include several banks. Exchange Street is classified as a local roadway. Exchange Street is stop-controlled at Washington Street.

**Central Street** is classified as a rural minor collector or urban collector and runs east-west, terminating at Washington Street. Central Street is approximately 30 feet wide and provides one lane in each direction. Marked on-street parking is provided on the north side of the street. The land use along Central Street is a mix of residential and commercial, with businesses located closest to Washington Street. The Town's on-call Fire Department and Emergency Medical Services station is located on Central Street. Central Street is stop-controlled at Washington Street.

**Hollis Street** is an east-west roadway approximately 30 feet wide, providing one lane in each direction. The roadway widens as it approaches Washington Street to provide left/through and right-turn lanes. Hollis Street is stop-controlled at Washington Street. The First Congregational Church is located on the northwest corner of the intersection of Hollis Street/Charles Street/Washington Street. No on-street parking is provided on Hollis Street. With the exception of the church, the land use on Hollis Street is residential. Hollis Street is classified as a rural minor collector or urban collector, according to the 2010 MassDOT Road Inventory database.

**Charles Street** is an east-west roadway approximately 20 feet wide. No on-street parking is provided on Charles Street. The land uses along the street are primarily residential, although adjacent to Washington Street there are a few commercial properties as Charles Street nears Washington Street. Charles Street is classified as a local roadway. Charles Street is one-way eastbound at Washington; there is no exit from Charles Street onto Washington Street.

**Church Street** is an east-west local roadway approximately 24 feet wide, providing one lane in each direction. Left turns are not allowed from Church Street onto Washington Street southbound. Church Street is classified as a local roadway. On-street parking is not provided on Church Street.

## Road Safety Audit Observations

Based on field observations on Wednesday, September 26, 2012, the RSA team determined that the Washington Street corridor segment between the pedestrian crosswalk south of the Exchange Street/Green Street intersection and Church Street has the following issues that affect safety:

- Queuing conditions/driver frustration;
- Intersection and roadway geometry;
- Parking/access management;
- Pedestrian conditions;
- Bicycle conditions; and
- Intersection control.

The following sections describe in more detail the safety issues and potential enhancements determined during the RSA. Several of these issues require further study and engineering judgment to determine the feasibility of implementing enhancements to address them.

For the purposes of this RSA report, the discussion of safety issues along the Washington Street corridor is broken down into the following segments:

- Corridor-wide Issues;
- Location #1: Crosswalk South of Green Street/Exchange Street;
- Location #2: Green Street/Exchange Street/Washington Street Intersection;
- Location #3: Central Street/Washington Street Intersection Area;
- Location #4: Mid-block Crosswalk between Central Street and Hollis Street/Charles Street;
- Location #5: Hollis Street/Charles Street/Washington Street Intersection; and
- Location #6: Church Street/Washington Street Intersection.

### Corridor-wide Issues

#### Observations

The following details the observations with respect to corridor-wide issues, such as speeding, queuing conditions/driver frustration,

#### *Speeding*

The posted speed limit is 30 mph through the Washington Street corridor. According to the Police Department, there isn't a significant speeding issue in this segment of the corridor and very few tickets are issued by the department for speeding infractions. However, on-site observation



gives the impression that vehicles are moving rapidly through this village business district setting. It was acknowledged by several participants that the 30 mph may be too fast given that the study area could be defined as a “thickly settled” area with a significant amount of vehicle turning, parking, and pedestrian interaction.

### ***Queuing Conditions/Driver Frustration***

Traffic volumes appeared to be moderate but consistent with limited gaps during the site visit, which was approaching noontime. RSA team members noted that high traffic volumes during peak hours, particularly in the afternoon, create queuing on the side streets. Some team members noted that, as a result of the infrequent gaps, drivers may be willing to accept a smaller gap to complete a turning movement onto Washington Street. The result is long queues on the intersecting streets and drivers taking chances, possibly resulting in a higher incidence of angle crashes. The long queues are also causing drivers to find alternative routes through local neighborhood streets. Participants also noted that there is a significant amount of truck traffic, which uses the corridor as a primary travel path to I-495.

### ***Courtesy Crashes***

According to several audit participants, several of the rear-end crashes along the corridor may be attributed to drivers making unanticipated stops to allow vehicles to enter from side streets or driveways, or to allow pedestrians to cross the street. Similarly, some angle crashes may be caused by a driver in one lane waving on a side street driver, who is then hit by the driver in the second lane, who doesn't see the vehicle coming in from the side street. These “courtesy crashes” occurred throughout the corridor.

Driver inattention may be a contributing factor to rear-end crashes according to team members, including the use of cell phones. Team members also indicated that unexpected left-turning vehicles, occasional u-turning vehicles, and jaywalking pedestrians could be contributing factors to rear-end crashes along Washington Street.



***The raised mid-block crosswalk between Central Street and Hollis Street/ Charles Street. The on-street parking spaces are located close to the crosswalk.***

### ***Parking/Access Management***

Site observations determined that several on-street parking spaces were located within a short distance to intersections, crosswalks, and driveways, within 10-15 feet in some cases. The proximity of on-street parking is reducing sight distance for vehicles turning onto Washington Street from the side streets and could be contributing to angle crashes. Further, the proximity of on-street parking spaces to crosswalks is reducing the visibility of pedestrians waiting to cross, even when the flashing beacons are activated. In some cases, a driver must enter a crosswalk in order to maneuver into a parallel on-street space, potentially creating an unsafe condition for pedestrians.

The corridor has a painted median throughout. However, the median does not deter motorists from making U-turns, and pedestrians have a longer distance to cross due to its presence.

### ***Pedestrian Conditions***

Site observations indicated a significant amount of pedestrian activity throughout the corridor. According to RSA team members, pedestrian activity is particularly high on Friday afternoons when local school children have no scheduled activities and tend to congregate in the village center. Other major pedestrian attractors are the local schools, Holliston Public Library, Goodwill Park, and the Community Children's Center.

It was noted that although the flashing beacon systems at the pedestrian crosswalks were designed to be activated both by motion and by push button, it is not clear whether the motion detection is operational at all three locations. There have been issues with false calls related to the motion detectors, which has caused motorists to disregard the beacons.

### ***Bicycling Conditions***

There are no dedicated bicycle facilities along the corridor. According to some team members, those bicyclists that use the corridor are not stopping at the intersections. They also feel there is not a lot of bicycle activity along the corridor and significant increases are not expected in the future.

## **Potential Enhancements**

1. Evaluate vehicle speeds in the area given the conditions through a speed study. Only if the 85<sup>th</sup> percentile speeds are lower than 30 mph may a speed limit be reduced.
2. Study the Washington Street corridor to determine whether changes in intersection control at one or more locations could alleviate side street queuing without worsening Washington Street conditions and flow significantly. Changes in control such as the installation of one or more traffic signals could create gaps throughout the corridor for vehicles and pedestrians to complete maneuvers in a more safe and orderly fashion. A change in traffic control in one or more locations along the corridor may also eliminate

the “courtesy crashes.” Also consider whether making some side streets one-way in pairs would benefit safety by reducing the number of conflict points.

3. Install curb extensions at the three existing crosswalks to shorten crossing distances, prevent motorists from parking too close to the crosswalks, and improve motorists’ visibility of a pedestrian waiting to cross.
4. Install curb extensions at driveways and intersection corners to prevent vehicles from parking too close and limiting sight distance.
5. Consider removing the painted median to narrow the roadway width. If the Town desires to maintain the median, consider whether installing a raised island would be beneficial for access management. In addition to providing access management, a raised median could also provide an opportunity for low planting, which would be aesthetically pleasing as well as providing a traffic calming effect. However, this could have an impact on area businesses that have driveways on Washington Street, effectively changing them to right-in, right-out access. However, there were four angle crashes at driveways, which could be eliminated through the installation of a raised median. The Town could test the median installation for a short time through the installation of temporary concrete median barrier.
6. Re-evaluate the locations and overall need for the three existing crosswalks across Washington Street in the study area. Consider the most appropriate locations with respect to adjacent intersecting driveways/roadways, lighting, visibility, and current pedestrian demand patterns.
7. Even though there is not a lot of bicycle activity in the study area, there were two crashes that involved bicyclists. Consider adding “sharrow” bicycle markings and “Share the Road” signs within the corridor.



*Looking west at the raised crosswalk located just south of Green Street/Exchange Street.*

### **Location #1: Crosswalk South of Green Street/Exchange Street**

This raised crosswalk extends approximately 65 feet from curb to curb across Washington Street. The crosswalk is not perpendicular to Washington Street but instead is skewed, making the crossing distance longer. According to the Holliston Police Department, the crosswalk was located south of the Green Street/Exchange Street intersection to accommodate the Mobil gas station

curb cut, which is only about 15 feet south of the Green Street intersection.

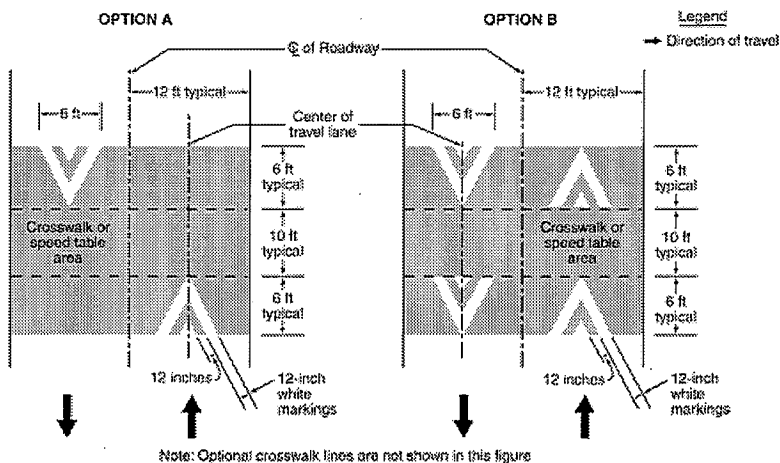
The crosswalk is approximately 14 feet wide, raised, and marked with a red brick pattern and white outline. Triangular “yield mark” symbols are applied on the inclines up to the crosswalk in both the northbound and southbound directions to alert motorists of the change in grade.

Mast arm mounted flashing yellow beacons are located over the crosswalk and are visible from either direction. Only one mast arm pole, located on the east side of Washington Street, is used to suspend the beacons; as a result, the signal heads facing the Washington Street southbound traffic are not located directly over the Washington Street southbound lane. The flashing beacons are activated by both push button and motion detection. The motion detection at this location appeared to be inactive during the team’s site visit.

## Observations

Six crashes of the 65 within the study area occurred in the vicinity of the crosswalk. Four crashes involved Washington Street southbound vehicles, including one in which a pedestrian was injured. In the case of the pedestrian crash, the position of the flashing beacons may have been a contributing factor. Three of the seven crashes involved vehicles entering or exiting the Mobil gas station driveway. One crash involved a cyclist. Three of the crashes involved a sideswipe crash where a vehicle either turned improperly or was merging. These crashes may be a result of vehicles merging as they approach the crosswalk. One crash involved a vehicle exiting the Mobil gas station driveway just north of the crosswalk.

Figure 3B-30. Pavement Markings for Speed Tables or Speed Humps with Crosswalks



Team members commented that some drivers don’t stop for a pedestrian waiting to cross even with the beacons flashing. The flashing timing of the beacons doesn’t take into consideration the perception – reaction time and braking distance of a driver and may give a pedestrian a false sense that because they are flashing, it is safe to cross.

It was noted that the pavement markings on the upgrades of the raised crosswalk are not correct according to the MUTCD. The

marking used to indicate the change in elevation of the raised crosswalk should be a small solid triangle inscribed by a larger triangle, see the excerpt, MUTCD Figure 3B-30. If the markings are intended to be yield lines, they should be placed a minimum of four feet from the crosswalk, as outlined in Section 3B-16 of the MUTCD.

## Potential Enhancements

1. Consider installing a separate mast arm pole to suspend the flashing beacons directed at the Washington Street southbound traffic over the center of the travel lane, improving their visibility for motorists.
2. Consider adding flashing beacons mounted at the roadside to the existing warning system. The addition of beacons at a height that doesn't require a driver to look up to the flashing lights and then back to the crosswalk level may eliminate some of the rear-end crashes.
3. Consider adding a sound and/or light indication to alert a pedestrian that the warning system has been activated.
4. Evaluate the length of time the yellow beacons flash upon pedestrian activation to ensure that the interval is sufficient for a pedestrian to perceive that vehicles have yielded and complete the crossing at a typical walking speed.
5. Consider altering the geometry of Washington Street to prevent vehicles merging on Washington Street southbound in the vicinity of the crosswalk. This could be accomplished by moving the curblines to narrow the roadway or through changes in the pavement markings.
6. Install pavement markings to indicate the change in elevation of the raised crosswalk and/or yield lines as outlined in sections 3B-30 and 3B-16 of the MUTCD, respectively.
7. If the overall roadway width is not narrowed as suggested in Enhancement #5, consider installing curb extensions at the crosswalk to shorten the crossing distance for pedestrians.
8. Consider reconfiguring the driveway of the Mobil Station to shorten the crosswalk. At the same time consider closing one of the three existing driveways. This will require additional study to ensure that a gasoline tanker truck can access the station to make fuel deliveries.

## Location #2: Green Street/Exchange Street/Washington Street Intersection

### Observations

It appears that the intersection is intended to be stop-controlled on the Green Street eastbound and Exchange Street westbound approaches. However, there is no STOP sign on the Green Street eastbound approach. There are crosswalks across both side streets as well. According to team members, there is a significant number of turning vehicles from both streets onto Washington Street. Exchange Street provides access to public parking and is a collector street for surrounding neighborhoods. There is a slight horizontal curve on Washington Street, which adds to the difficulty in exiting Green Street.

Green Street provides access to Goodwill Park, a heavily-used public recreation facility that generates high traffic volumes and pedestrian activity during sporting events, especially during the non-winter months. There are a few on-street and off-street parking spaces on Green Street. Team members indicate that visitors to Goodwill Park frequently check on Green Street for parking before looking for other parking, which results in additional congestion as drivers recirculate to find parking. There is a municipal parking lot that can be accessed from Exchange Street. There is little wayfinding signage to indicate that off-street parking is available. However, many Holliston residents are aware of the municipal parking lot location, which results in pedestrian traffic from the lot crossing Washington Street to access the park. The location of the crosswalk at Washington Street is not in line with the pedestrian desire line.

There were four crashes of the 65 within the study area that occurred at the intersection. None of those crashes resulted in injury. Two crashes were angle collisions with a vehicle crossing from Exchange Street to Green Street being struck by a vehicle traveling southbound on Washington Street. One or both of these could be described as “courtesy crashes” in which an uninvolved third party waved the crossing vehicle through, only to have another vehicle go around the stopped courteous motorist. One crash involved a vehicle turning left from the Mobil gas station driveway colliding with a vehicle turning left from Exchange Street onto Washington Street southbound. One crash was a sideswipe in which a distracted driver started to turn from Washington Street northbound to Exchange Street, only to change his/her mind and swerve back into a passing vehicle.

It was also noted that the edge line on the Green Street eastbound approach is yellow, which is improper for a two-way street, according to the *Manual on Uniform Traffic Control Devices (MUTCD)*. The intent was to convey that parking is not allowed on that side of the street.

### Potential Enhancements

1. Install more prominent wayfinding signage directing motorists to the municipal parking lot.
2. Consider signalizing the intersection in coordination with changes in intersection control at other corridor locations, including Central Street/Washington Street and Hollis Street/Charles Street/Washington Street. This will require additional study, including a warrant analysis of the intersection and capacity analysis of the corridor as a whole.
3. Consider removing the yellow edge line on Green Street eastbound. In order to convey that parking is not allowed, the MUTCD allows for painting the curb yellow.

## Location #3: Central Street/Washington Street Intersection Area

### Observations:

There were 23 crashes of the 65 in the study area associated with the Central Street/Washington Street intersection and the area immediately to the north and south on Washington Street, including the crosswalk across Washington Street at Central Street and the driveway to the Holliston Superette parking area. Of those crashes, eight were rear-end crashes, several of which

involved vehicles stopping for pedestrians. There were six crashes involving vehicles turning into or out of the Holliston Superette driveway, including one crash in which a cyclist was struck by a car exiting the driveway. Two crashes involved pedestrians that were hit and injured in the crosswalk across Washington Street at Central Street. Two collisions involved vehicles turning to or from Central Street onto Washington Street; both crashes involved left-turning vehicles. There were three crashes involving parked vehicles or fixed objects.

Audit team members expressed concern regarding the safety of pedestrians in the crosswalk across Washington Street. A motorist turning right from Central Street onto Washington Street northbound is looking left to determine whether there is a gap in the northbound traffic, and frequently does not look back to the right to determine whether there is a pedestrian in the crosswalk.



***The stop bar on Central Street is set back from the intersection, forcing a vehicle to creep forward across the crosswalk to have sufficient sight distance.***

Vehicles turning right from Washington Street northbound onto Central Street appear to be traveling at speeds that are too high over the crosswalk.

The stop bar on Central Street is set back from the intersection, due in part to the crosswalk location, and the buildings on the corner limit sight distance. A vehicle must creep forward over the crosswalk to improve sight distance in order to complete a turning maneuver. Pedestrians are then forced to walk between or behind a vehicle that has pulled forward over the crosswalk in order to see.

The mast arm holding the beacons facing Washington Street southbound is rotated slightly so the beacons are not very visible until a motorist is close to it. The MUTCD notes that a typical application of a warning beacon is as an emphasis for a mid-block crosswalk. This location may be too close to the intersection of Central Street/Washington Street to be considered mid-block. Although the beacons at this location are centered over the travel lanes in both directions, there are no beacons on either side of Washington Street within the peripheral vision of a motorist. A motorist must look up to see the beacons and then back down to the roadway to perceive whether there is a pedestrian crossing.

The mast arm holding the beacons facing Washington Street southbound is rotated

Team members commented that some drivers don't stop for a pedestrian waiting to cross even with the beacons flashing. The flashing timing of the beacons doesn't take into consideration the perception – reaction time and braking distance of a driver and may give a pedestrian a false sense that because they are flashing, it is safe to cross.



***The wide expanse of unmarked pavement on Washington Street southbound between Green Street/Exchange Street and Central Street.***

It was noted by team members that the Town has placed a police officer at the intersection of Central Street/Washington Street to direct traffic in the past, which provided more order and control at the intersection, improving safety.

A team member noted that the Washington Street southbound lane between Central Street and Green Street/Exchange Street is very wide, possibly more than two lanes wide, with no delineation. It was noted that this wide area may provide a refuge for a vehicle turning left out of Central Street when a vehicle continues to travel southbound on Washington Street after a southbound left-turning driver waves the Central Street driver out onto Washington

Street.

Team members noted that when the business on the northeast corner of the intersection of Central Street/Washington receives deliveries, the delivery vehicle frequently parks on the north side of Central Street, using the active travel lane, which can cause safety issues with a vehicle turning from Washington Street onto Central Street conflicting with a vehicle traveling west on Central Street.

## Potential Enhancements

1. Consider changes to geometry in the area immediately surrounding the intersection of Central Street. The roadway could be narrowed to shorten crossing distances, possibly widening sidewalks and/or creating angle parking on Washington Street. If angle parking is installed, consider utilizing reverse (or back-in) angle parking, which has many safety benefits compared to head-in angle parking.
2. Consider changes in lane configuration in concert with or instead of geometric changes on Washington Street between Green Street/Exchange Street and Central Street to define the lane use, particularly in the southbound direction. One option for considering would be the creation of a left-turn lane from Washington Street southbound onto Exchange Street. All options should be the subject of further study.
3. Consider installing a traffic signal at Central Street. A traffic signal would create gaps and improve vehicle and pedestrian safety. A signal at this location would provide the opportunity for an exclusive pedestrian phase, including pedestrian countdown signals. It could also include a crosswalk across the northbound approach of Washington Street, improving opportunities for a pedestrian to cross safely. A warrant analysis should be performed to determine whether the intersection warrants a signal. A study should be



undertaken that considers all three intersections along the corridor to determine what configuration would be optimal to improve safety without adversely impacting capacity.

4. Consider relocating the pedestrian crossing to the south side of Central Street to eliminate the threat of a right-turning vehicle from Central Street onto Washington Street not seeing a pedestrian in the crosswalk.
5. Coordinate with the business owners regarding loading areas to prevent the creation of conflict areas. Consider the creation of a part-time loading zone for use by businesses.
6. Install curb extensions at the corners of the intersection encompassing the crosswalk to provide better protection and visibility for pedestrians as well as preventing vehicles from parking too close to the crosswalk and/or corners of the intersection. Several of these locations are currently marked out with pavement markings.
7. Consider adding flashing beacons mounted at the roadside to the existing warning system. The addition of beacons at a height that doesn't require a driver to look up to the flashing lights and then back to the crosswalk level may increase perception – reaction time, thereby potentially eliminating some of the rear-end crashes.
8. Consider adding a sound and/or light indication to alert a pedestrian that the warning system has been activated.
9. Evaluate the length of time the yellow beacons flash upon pedestrian activation to ensure that the interval is sufficient for a vehicle to perceive that a pedestrian wants to cross and that the pedestrian can complete the crossing at a typical walking speed.

#### Location #4: Mid-block Crosswalk between Central Street and Hollis Street/Charles Street

##### Observations

This crosswalk is located approximately halfway between Central Street and Hollis Street/Charles Street. Team members stated that many pedestrians use the crosswalk, but even in the crosswalk they don't feel safe. Pedestrians hesitate in crossing, concerned that a driver may not see the flashing beacons. The flashing beacons can be activated by pedestrian pushbutton or by passive motion detectors. RSA team members noted that occasionally the beacons are activated and drivers cannot see whether a pedestrian is waiting to cross. It was also noted that the passive motion activation sensors may be



***A pedestrian in the mid-block crosswalk between Central Street and Hollis Street/Charles Street.***

giving false calls, causing motorists to disregard the beacons. The crosswalk is very long as Washington Street is very wide at its location. It was also noted during the site visit that the length of time during which the beacons flash may not be long enough. A pedestrian waits to be sure vehicles have stopped, and by the time s/he completes the crossing, the beacons have stopped flashing.

All four beacons (2 each for the Washington Street northbound and southbound directions) are mounted on one mast arm pole; the mast arm pole is located on the west side of Washington Street at this location. As a result the beacons are not centered over the travel lanes in the Washington Street northbound direction, which may affect their visibility to motorists. There are no beacons on either side of Washington Street within the peripheral vision of a motorist, which forces a motorist to look up to perceive the beacons, then back down to the roadway to perceive whether a pedestrian is actually waiting to cross.

The sign (State Law Yield to Pedestrians) that is mounted between the flashing beacons is too small and doesn't immediately convey the meaning that a pedestrian is likely in the crosswalk. The positioning of the beacons as well as the limited amount of information regarding the beacons' purpose may cause confusion or lack of appropriate response by motorists. Other locations where a beacon is located overhead include a two-way stop controlled intersection. Perhaps drivers are associating the beacons on Washington Street as similar to an intersection with a flashing beacon and aren't expecting a pedestrian but rather a vehicle at a side street.

It was noted that the pavement markings on the upgrades of the raised crosswalk are not correct according to the MUTCD. The marking used to indicate the change in elevation of the raised crosswalk should be a small solid triangle inscribed by a larger triangle, see MUTCD Figure 3B-30, shown previously in this report. If the markings are intended to be yield lines, they should be placed a minimum of four feet from the crosswalk, as outlined in Section 3B-16 of the MUTCD.

There were four crashes of the 65 within the study area at this location. All four crashes were rear-end crashes. There were no injuries. In most of these, the crash report noted that a vehicle was yielding for a pedestrian and was struck by the motorist behind, who was either following too closely or not paying attention.

### Potential Enhancements

1. Install curb extensions encompassing the crosswalk to provide better protection and visibility for pedestrians as well as preventing vehicles from parking too close to the crosswalk.
2. Install pavement markings to indicate the change in elevation of the raised crosswalk and/or yield lines as outlined in sections 3B-30 and 3B-16 of the MUTCD, respectively.
3. Consider adding a sound and/or light indication to alert a pedestrian that the warning system has been activated.

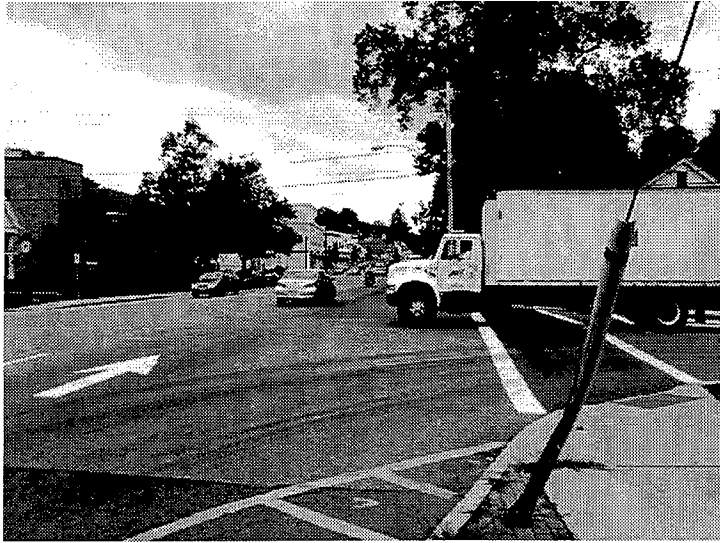
4. Evaluate the length of time the yellow beacons flash upon pedestrian activation to ensure that the interval is sufficient for a driver to perceive and react to a pedestrian and complete the crossing at a typical walking speed.
5. Consider removing the passive motion activation sensors. They may be giving false calls to the system, causing motorists to disregard the flashing beacons when they are activated by a pedestrian.
6. Consider installing a separate mast arm pole to suspend the flashing beacons directed at the Washington Street northbound traffic over the center of the travel lane, improving their visibility for motorists.
7. Consider adding flashing beacons mounted at the roadside to the existing warning system. The addition of beacons at a height that doesn't require a driver to look up to the flashing lights and then back to the crosswalk level may eliminate rear-end crashes.
8. Should the previous measures not be effective, consider changing the flashing beacon system to either a full-stop pedestrian signal with countdown pedestrian signal heads or to the High-intensity Activated crossWALK (HAWK) beacon system.

## Location #5: Hollis Street/Charles Street/Washington Street Intersection

### Observations

From Hollis Street, left-turns onto Washington Street are challenging given the prevailing speed of traffic and limited gaps in the traffic due to the limited number of traffic controls in this segment of the corridor. RSA team members noted that at around 2:15 PM, a number of buses leave the high school, located west of Washington Street on Hollis Street, and proceed toward Washington Street. Most of the buses turn left onto Washington Street northbound from Hollis Street. Team members also noted during the site visit that a larger vehicle such as an SUV or school bus waiting on Hollis Street to turn left onto Washington Street northbound block sight distance for smaller vehicles waiting to turn right from Hollis Street to Washington Street southbound and vice versa.

Vehicles approaching Hollis Street on Washington Street southbound are perceived to have higher speeds because they are coming from a very wide section of roadway with a higher speed limit. The cross section of Washington Street at Hollis Street/Charles Street is still very wide, approximately 62 feet, including a painted median, a parking lane on each side, a general travel lane in each direction, and opposing left-turn lanes for both directions of Washington Street.



***A box truck waiting to turn left from Hollis Street onto Washington Street northbound.***

Of the 65 crashes identified in the study area, 23 crashes occurred at this intersection, the same number as those that occurred in the vicinity of Central Street. Of those crashes, 17 were angle collisions. Eight of the angle collisions involved a vehicle turning left from Hollis Street to Washington Street northbound. An additional eight angle crashes involved vehicles proceeding east across Washington Street onto Charles Street from Hollis Street. There were 5 injury crashes, including one of the two crashes that involved a bicyclist.

## Potential Enhancements

1. Consider installing "Do Not Block Intersection" signs and pavement markings to prevent queued traffic on Washington Street from "blocking the box." This should be considered carefully, as concern was expressed that this may result in an increase in "courtesy crashes."
2. Consider a change in traffic control at the intersection. Possible changes could include a roundabout or a traffic signal. A roundabout would significantly reduce the number of injury crashes and slow traffic but has other potential impacts to right-of-way and may increase the emergency response time by the volunteer fire department. A traffic signal would create gaps and improve vehicle and pedestrian safety. A signal at this location would provide the opportunity for another safer pedestrian crossing location, including an exclusive pedestrian phase with pedestrian countdown signals. A warrant analysis should be performed to determine whether the intersection warrants a signal. A study should be undertaken that considers all three intersections along the corridor to determine what configuration would be optimal to improve safety without adversely impacting capacity.
3. Install curb extensions at the corners of the intersection to prevent vehicles from parking too close to the corners of the intersection as well as using an unoccupied parking lane to by-pass stopped traffic. Several of the corners are currently marked with pavement markings prohibiting parking. Drainage and snowplowing should be considered when installing curb extensions.

## Location #6: Washington Street/Church Street

### Observations

The painted median on the southern leg of Washington Street at Church Street is very wide; it was estimated at wider than 12 feet during the field visit. The painted median opposes an exclusive left-turn lane on Washington Street southbound at Church Street. A team member questioned whether such a median was necessary and what purpose it was serving. Left-turn movements are prohibited from Church Street. Although there is no physical barrier such as a median to prevent motorists from making the illegal left-turn, RSA team members including the Holliston Police Department members reported that most motorists obey the turn restriction.



*An aerial view of the wide painted median at the intersection of Church Street/Washington Street.*

Two of the 65 crashes within the study area occurred at this intersection. One involved an angle collision between a vehicle turning left from Washington Street southbound onto Church Street eastbound and a vehicle that exited an on-street parking space. The other was a rear-end crash on Church Street that had weather and pavement conditions as contributing factors in addition to driver inattention.

There is a bus stop for a MetroWest Regional Transit Authority (MWRTA) bus route located on the east side of Washington Street directly across from the First Congregational Church and south of the angle parking spaces. According to several team members, bus service is infrequent and not well utilized in the corridor.

There are no crosswalks across Washington Street at this location. There is a mid-block crossing approximately 170 feet north of Church Street at the entrance to Town Hall.

There is head-in angle parking on the east side of Washington Street just north of Church Street. The parking is primarily used by S. Mary's Church during services and other activities on Sunday.

### Potential Enhancements

1. Consider narrowing the Washington Street cross section by narrowing the painted median island. The horizontal alignment of the entire Washington Street corridor should be considered when studying this potential enhancement.
2. Considering installing a narrower, raised, planted median in place of the painted median on the southern leg of Washington Street at Church Street. Consider how this change

might fit with similar changes for the entire corridor. A raised, planted median could also serve as a traffic calming device as well as a gateway treatment and visual indicator to motorists that they are entering a business district.

3. Consider whether there is a need for a crosswalk across Washington Street at this location. This should be studied in conjunction with the other crossing locations in the corridor, including the mid-block crosswalk located to the north at Town Hall.
4. Although there were no reported crashes associated with the head-in angle parking in front of St. Mary's church, consider changing the parking to reverse (or back-in) angle parking, which has improved safety benefits over traditional head-in angle parking.

## Potential Safety Enhancements

Based on its observations and discussions, the RSA team identified the issues and possible enhancements that could improve safety along Washington Street within the study area.

*Short-term enhancements* include:

- Perform a speed study of the corridor;
- Study the crosswalk locations within the corridor;
- Improve bicycle crossing conditions; and
- Consider extending the time interval for crossing on each pedestrian warning beacon.

To enhance safety in the corridor, the *long-term enhancements* are to:

- Evaluate changing the intersection traffic control at one or more locations in the corridor; and
- Consider geometric changes to narrow the roadway.

Further study and design work need to be conducted to determine the feasibility of making such long-term improvements.

**Table 2** summarizes these safety issues, possible enhancements, estimated safety payoff, time frame, cost, and responsibility. Safety payoff estimates are based on engineering judgment and are categorized as low, medium, and high. The time frame is categorized as short-term (<1 year), mid-term (1 to 3 years), or long-term (typically >3 years). Long-term improvements are typically considered to be substantial improvements with an expected time frame for implementation greater than 3 years. The costs are categorized as low (<\$10,000), medium (\$10,000 to \$50,000), or high (>\$50,000).

The RSA is intended to identify potential safety improvements that can be evaluated and included as part of future design efforts for reconstruction. The short-term, low-cost potential improvements could be considered by the responsible agency for immediate implementation, as appropriate.

Table 2. Summary of Potential Safety Enhancements

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsibility <sup>1</sup>
Corridor-wide Issues	Evaluate vehicle speeds in the area given the conditions through a speed study. Only if 85 <sup>th</sup> percentile speeds are lower than 30 mph may a speed limit be reduced.	Low	Short-term	Low	Town of Holliston
	Study the Washington Street corridor to determine whether changes in intersection control at one or more locations could alleviate side street queuing without worsening Washington Street conditions and flow significantly.	High	Long-term	High	Town of Holliston
	Install curb extensions at the three existing crosswalks to shorten crossing distances, prevent motorists from parking too close to the crosswalks, and improve motorists' visibility of a pedestrian waiting to cross.	Medium	Mid-term	Medium	Town of Holliston
	Install curb extensions at driveways and intersection corners to prevent vehicles from parking too close and limiting sight distance.	Medium	Mid-term	Medium	Town of Holliston
	Consider removing the painted median to narrow the roadway width. If the Town desires to maintain the median, consider whether installing a raised island would be beneficial for access management. The Town could test the median installation for a short time through the installation of temporary concrete median barrier.	Medium	Long-term	High	Town of Holliston
	Re-evaluate the locations and overall need for the three existing crosswalks across Washington Street in the study area. Consider the most appropriate locations with respect to adjacent intersecting driveways/roadways, lighting, visibility, and current pedestrian demand patterns.	Low	Short-term	Medium	Town of Holliston
	Consider adding "sharrow" bicycle markings and "Share the Road" signs within the corridor.	Low	Short-term	Low	Town of Holliston



Table 2. Summary of Potential Safety Enhancements (Continued)

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsibility <sup>1</sup>
Location #1: Crosswalk South of Green Street/ Exchange Street	Consider installing a separate mast arm pole to suspend the flashing beacons directed at the Washington Street southbound traffic over the center of the travel lane, improving their visibility for motorists.	Low	Mid-term	Medium	Town of Holliston
	Consider adding flashing beacons mounted at the roadside to the existing warning system.	Medium	Mid-term	High	Town of Holliston
	Consider adding a sound and/or light indication to alert a pedestrian that the warning system has been activated.	Low	Short-term	Low	Town of Holliston
	Evaluate the length of time the yellow beacons flash upon pedestrian activation to ensure that the interval is sufficient for a pedestrian to perceive that vehicles have yielded and complete the crossing at a typical walking speed.	Medium	Short-term	Low	Town of Holliston
	Consider altering the geometry of Washington Street to prevent vehicles merging on Washington Street southbound in the vicinity of the crosswalk. This could be accomplished by moving the curblines to narrow the roadway or through changes in the pavement markings.	High	Long-term	High	Town of Holliston
	Correct the pavement markings to indicate the change in elevation of the raised crosswalk and/or yield lines as outlined in sections 3B-30 and 3B-16 of the MUTCD, respectively.	Low	Short-term	Low	Town of Holliston
	If the overall roadway width is not narrowed through other methods, consider installing curb extensions at the crosswalk to shorten the crossing distance for pedestrians.	Medium	Mid-term	Medium	Town of Holliston
	Consider reconfiguring the driveway of the Mobil Station to shorten the crosswalk. At the same time consider closing one of the three existing driveways. This will require additional study to ensure that a gasoline tanker truck can access the station to make fuel deliveries.	Low	Long-term	Medium	Town of Holliston

Table 2. Summary of Potential Safety Enhancements (Continued)

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsibility <sup>1</sup>
Location #2: Green Street/ Exchange Street/ Washington Street Intersection	Install more prominent wayfinding signage directing motorists to the municipal parking lot.	Low	Short-term	Low	Town of Holliston
	Consider signalizing the intersection in coordination with changes in intersection control at other corridor locations, including Central Street/Washington Street and Hollis Street/Charles Street/Washington Street. This will require additional study, including a warrant analysis of the intersection and capacity analysis of the corridor as a whole.	High	Long-term	High	Town of Holliston
	Consider removing the yellow edge line on Green Street eastbound. In order to convey that parking is not allowed, the MUTCD allows for painting the curb yellow.	Low	Short-term	Low	Town of Holliston
	Consider changes to geometry in the area immediately surrounding the intersection of Central Street. The roadway could be narrowed to shorten crossing distances, possibly widening sidewalks and/or creating angle parking on Washington Street. If angle parking is installed, consider utilizing reverse (or back-in) angle parking, which has many safety benefits compared to head-in angle parking.	High	Long-term	High	Town of Holliston
Location #3: Central Street/ Washington Street Intersection Area	Consider changes in lane configuration in concert with or instead of geometric changes on Washington Street between Green Street/Exchange Street and Central Street to define the lane use, particularly in the southbound direction. One option for consideration would be the creation of a left-turn lane from Washington Street southbound onto Exchange Street. All options should be the subject of further study.	Medium	Short-term	Low	Town of Holliston
	Consider installing a traffic signal at Central Street. A traffic signal would create gaps and improve vehicle and pedestrian safety. A study should be undertaken that considers all three intersections along the corridor to determine what configuration would be optimal to improve safety without adversely impacting capacity.	High	Long	High	Town of Holliston

Table 2. Summary of Potential Safety Enhancements (Continued)

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsibility <sup>1</sup>
Location #3: Central Street/ Washington Street Intersection Area (Continued)	Consider relocating the pedestrian crossing to the south side of Central Street to eliminate the threat of a right-turning vehicle from Central Street onto Washington Street not seeing a pedestrian in the crosswalk.	Low	Mid-term	Medium	Town of Holliston
	Coordinate with the business owners regarding loading areas to prevent the creation of conflict areas. Consider the creation of a part-time loading zone for use by businesses.	Low	Short-term	Low	Town of Holliston
	Install curb extensions at the corners of the intersection encompassing the crosswalk to provide better protection and visibility for pedestrians as well as preventing vehicles from parking too close to the crosswalk and/or corners of the intersection. Several of these locations are currently marked out with pavement markings.	Medium	Mid-term	Medium	Town of Holliston
	Consider adding flashing beacons mounted at the roadside to the existing warning system.	Medium	Mid-term	High	Town of Holliston
	Consider adding a sound and/or light indication to alert a pedestrian that the warning system has been activated.	Low	Short-term	Low	Town of Holliston
	Evaluate the length of time the yellow beacons flash upon pedestrian activation to ensure that the interval is sufficient for a vehicle to perceive that a pedestrian wants to cross and that the pedestrian can complete the crossing at a typical walking speed.	Medium	Short-term	Low	Town of Holliston

Table 2. Summary of Potential Safety Enhancements (Continued)

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsibility <sup>1</sup>
Location #4: Mid-block Crosswalk between Central Street and Hollis Street/Charles Street	Install curb extensions encompassing the crosswalk to provide better protection and visibility for pedestrians as well as preventing vehicles from parking too close to the crosswalk.	Medium	Mid-term	Medium	Town of Holliston
	Correct pavement markings to indicate the change in elevation of the raised crosswalk and/or yield lines as outlined in sections 3B-30 and 3B-16 of the MUTCD, respectively.	Low	Short-term	Low	Town of Holliston
	Consider adding a sound and/or light indication to alert a pedestrian that the warning system has been activated.	Low	Short-term	Low	Town of Holliston
	Evaluate the length of time the yellow beacons flash upon pedestrian activation to ensure that the interval is sufficient for a driver to perceive and react to a pedestrian and that the pedestrian can complete the crossing at a typical walking speed.	Medium	Short-term	Low	Town of Holliston
	Consider removing the passive motion activation sensors. They may be sending false calls to the system, causing motorists to disregard the flashing beacons when they are activated by a pedestrian.	Low	Short-term	Low	Town of Holliston
	Consider installing a separate mast arm pole to suspend the flashing beacons directed at the Washington Street northbound traffic over the center of the travel lane, improving their visibility for motorists.	Low	Mid-term	High	Town of Holliston
	Consider adding flashing beacons mounted at the roadside to the existing warning system. The addition of beacons at a height that doesn't require a driver to look up to the flashing lights and then back to the crosswalk level may eliminate rear-end crashes.	Medium	Mid-term	High	Town of Holliston
	Should the previous measures not be effective, consider changing the flashing beacon system to either a full-stop pedestrian signal with countdown pedestrian signal heads or to the High-intensity Activated crossWalk (HAWK) beacon system.	Medium	Long-term	High	Town of Holliston

Table 2. Summary of Potential Safety Enhancements (Continued)

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsibility <sup>1</sup>
Location #5: Hollis Street/ Charles Street/ Washington Street Intersection	Consider installing "Do Not Block Intersection" signs and pavement markings to prevent queued traffic on Washington Street from "blocking the box." This should be considered carefully, as concern was expressed that this may result in an increase in "courtesy crashes."	Low	Short-term	Low	Town of Holliston
	Consider a change in traffic control at the intersection. Possible changes could include a roundabout or a traffic signal. A study should be undertaken that considers all three intersections along the corridor to determine what configuration would be optimal to improve safety without adversely impacting capacity.	High	Long-term	High	Town of Holliston
	Install curb extensions at the corners of the intersection to prevent vehicles from parking too close to the corners of the intersection as well as using an unoccupied parking lane to by-pass stopped traffic. Several of the corners are currently marked with pavement markings prohibiting parking. Drainage and snowplowing should be considered when installing curb extensions.	Medium	Mid-term	Medium	Town of Holliston

Table 2. Summary of Potential Safety Enhancements (Continued)

Safety Issue	Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsibility <sup>1</sup>
Location #6: Church Street/ Washington Street Intersection	Consider narrowing the Washington Street cross section by narrowing the painted median island. The horizontal alignment of the entire Washington Street corridor should be considered when studying this potential enhancement.	High	Long-term	High	Town of Holliston
	Considering installing a narrower, raised, planted median in place of the painted median on the southern leg of Washington Street at Church Street. Consider how this change might fit with similar changes for the entire corridor. A raised, planted median could also serve as a traffic calming device as well as a gateway treatment and visual indicator to motorists that they are entering a business district.	Medium	Mid-term	Medium	Town of Holliston
	Consider whether there is a need for a crosswalk across Washington Street at this location. This should be studied in conjunction with the other crossing locations in the corridor, including the mid-block crosswalk located to the north at Town Hall.	Low	Short-term	Medium	Town of Holliston
	Although there were no reported crashes associated with the head-in angle parking in front of St. Mary's church, consider changing the parking to reverse (or back-in) angle parking, which has improved safety benefits over traditional head-in angle parking.	Low	Short-term	Low	Town of Holliston

## Appendix A. RSA Meeting Agenda and Background Information

---

# Agenda

## Road Safety Audit

Holliston

### Washington Street Corridor

Meeting Location: Holliston Police Department  
550 Washington Street, Holliston, MA  
Wednesday, September 26, 2012  
10:30 AM – 1:00 PM

- Type of meeting: High Crash Corridor – Road Safety Audit
- Attendees: Invited Participants to Comprise a Multidisciplinary Team
- Please bring: Thoughts and Enthusiasm!!
- 10:30 AM Welcome and Introductions
- 10:45 AM Discussion of Safety Issues
- Crash history, Speed Regulations – provided in advance
  - Existing Geometries and Conditions
- 11:30 AM Site Visit
- Drive/walk to the #725 - #830 Washington Street area
  - As a group, identify areas for improvement
- 12:30 PM Discussion of Potential Safety Improvements
- Discuss observations and finalize safety issue areas
  - Discuss potential safety improvements and finalize recommendations
- 1:00 PM Adjourn for the Day – but the RSA has not ended

#### Instructions for Participants:

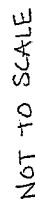
- Before attending the RSA on September 26th, participants are encouraged to drive/walk through the Downtown Square Area (#725-#830) and complete/consider elements on the RSA Prompt List with a focus on safety.
- All participants will be actively involved in the process throughout. Participants are encouraged to come with thoughts and ideas, but are reminded that the synergy that develops and respect for others' opinions are key elements to the success of the overall RSA process.
- After the RSA meeting, participants will be asked to comment and respond to the document materials to assure it is reflective of the RSA completed by the multidisciplinary team.





## COLLISION DIAGRAM

SOURCE OF CRASH REPORTS: LOCAL POLICE



# Crash Data Summary Table

Intersections on Washington Street (from Church St to Exchange St); Holliston, MA  
June 2009 - June 2012

Crash #	Crash Date	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages	Comments
1	6/17/09	7:02 AM	Single Vehicle Crash	Daylight	Clear	Dry	No Improper Driving	46	Vehicle turning out of rear parking lot of 777 Washington St & hit bicyclist.
2	6/28/09	12:54 PM	Angle	Daylight	Cloudy	Wet	Intentional	36	Vehicle hit parked vehicle while attempting to park.
3	7/17/09	8:42 AM	Angle	Daylight	Clear	Dry	Intentional	39	Bicyclist attempted to cross roadway in front of vehicle.
4	8/1/09	11:20 AM	Angle	Daylight	Clear	Dry	Failed to yield to right of way	51	Uninvolved vehicle in left turn lane on Washington St was obstructing the vision of vehicle exiting Hollis St.
5	8/13/09	2:34 PM	Rear-end	Daylight	Clear	Dry	Followed too closely	71	Uninvolved vehicle stopped abruptly for children crossing.
6	10/6/09	5:17 PM	Angle	Daylight	Rain	Dry	Failure to keep in proper lane or running off road	61	Uninvolved vehicle stopped to let Veh #1 cross intersection. Veh #2 went around involved vehicle.
7	10/23/09	3:37 PM	Angle	Daylight	Cloudy	Dry	Failure to keep in proper lane or running off road	51	
8	11/4/09	8:07 AM	Angle	Daylight	Clear	Dry	Intentional	42	
9	11/6/09	3:17 PM	Rear-end	Daylight	Clear	Dry	Followed too closely	53	
10	11/6/09	12:13 PM	Sideswipe, same direction	Daylight	Clear	Dry	No Improper Driving	Unk	Veh #1 began to turn, then stopped.
11	11/14/09	2:05 PM	Rear-end	Daylight	Rain	Wet	Followed too closely	43	Hit & run involving a parked vehicle.
12	12/21/09	5:01 PM	Angle	Dark - lighted roadway	Clear	Dry	Unknown	57	Wet pavement.
13	1/14/10	10:17 AM	Angle	Daylight	Clear	Dry	Failed to yield to right of way	78	
14	1/14/10	10:17 AM	Angle	Daylight	Clear	Dry	Disregarded traffic signs, signals, road markings	48	Stopped Veh #1 waiting to turn left. Veh #2 attempted to pass on left.
15	2/12/10	3:52 PM	Sideswipe, same direction	Daylight	Clear	Dry	No Improper Driving	87	Vehicle hit pedestrian west of crosswalk.
16	5/20/10	12:34 PM	Rear-end	Daylight	Clear	Dry	Operating Vehicle in erratic, reckless, careless, negligent, or aggressive manner	56	Driver operating under influence of drugs.
17	4/20/10	9:21 PM	Angle	Dark - lighted roadway	Clear	Dry	Failed to yield to right of way	55	Vehicle hit pedestrian in crosswalk.
18	4/21/10	11:35 AM	Single Vehicle Crash	Daylight	Clear	Dry	Failed to yield to right of way	21	
19	5/19/10	8:50 AM	Angle	Daylight	Rain	Wet	Failed to yield to right of way	26	
20	5/21/10	7:18 PM	Angle	Daylight	Clear	Dry	Disoriented	38	
21	5/28/10	9:37 AM	Angle	Daylight	Clear	Dry	Intentional	67	
22	6/1/10	2:23 PM	Angle	Daylight	Clear	Dry	No Improper Driving	70	Veh #1 turning left from Exchange - Veh #2 turning left from Mobil Gas.
23	6/2/10	1:09 PM	Rear-end	Daylight	Rain	Wet	No Improper Driving	66	Vehicle pulling out from parking space.
24	6/2/10	1:13 PM	Angle	Daylight	Cloudy	Wet	Failed to yield to right of way	63	Vehicle stopped abruptly for pedestrians - hit & run crash.
25	6/28/10	11:26 AM	Rear-end	Daylight	Clear	Dry	No Improper Driving	63	
26	7/12/10	8:19 AM	Rear-end	Daylight	Cloudy	Dry	Intentional	34	Vehicle slowed down to go over the raised crosswalk.
27	7/12/10	9:03 AM	Angle	Daylight	Clear	Dry	Failed to yield to right of way	27	
28	8/1/10	5:36 PM	Rear-end	Daylight	Clear	Dry	Unknown	18	
29	8/1/10	3:53 PM	Rear-end	Daylight	Clear	Dry	Intentional	55	
30	11/18/10	8:38 AM	Angle	Daylight	Clear	Dry	Failed to yield to right of way	49	Ice on roadway possibly caused crash.
31	12/17/10	7:47 AM	Angle	Dusk	Snow	Ice	Failed to yield to right of way	60	
32	12/17/10	4:27 PM	Angle	Daylight	Clear	Dry	Failed to yield to right of way	71	
33	12/22/10	2:21 PM	Angle	Daylight	Clear	Dry	Failed to yield to right of way	19	
34	1/25/11	9:54 AM	Rear-end	Daylight	Clear	Dry	Unknown	20	Vehicle pulled out of parking space.
35	2/28/11	12:39 PM	Angle	Daylight	Rain	Wet	Failed to yield to right of way	20	
36	3/8/11	5:44 PM	Angle	Daylight	Clear	Dry	Disoriented	45	View obstructed by traffic.
37	3/10/11	12:50 AM	Single Vehicle Crash	Dark - lighted roadway	Clear	Dry	Physical Impairment	25	Operator began to turn onto Exchange St but then changed mind.
38	3/30/11	7:39 AM	Rear-end	Daylight	Clear	Dry	Intentional	61	Driver was OUI and hit a light pole.
39	4/1/11	6:51 AM	Rear-end	Daylight	Freezing Rain	Slush	Intentional	45	Vehicle stopped to let an uninvolved vehicle back out of lot onto Washington St.
40	5/17/11	5:22 PM	Angle	Daylight	Rain	Wet	Failed to yield to right of way	23	
41	5/26/11	3:37 PM	Angle	Daylight	Clear	Dry	Failed to yield to right of way	47	
42	6/10/11	8:08 PM	Rear-end	Dusk	Clear	Dry	Unknown	20	
43	7/6/11	1:25 PM	Sideswipe, same direction	Daylight	Clear	Dry	Made an improper turn	36	
44	7/20/11	3:59 PM	Rear-end	Daylight	Clear	Dry	Intentional	65	Vehicle attempting to turn onto Central Street hit parked car.
45	7/21/11	4:24 PM	Angle	Daylight	Cloudy	Dry	Failure to keep in proper lane or running off road	65	Vehicle stopped for pedestrian in crosswalk.
46	8/13/11	2:18 PM	Single Vehicle Crash	Daylight	Clear	Dry	Intentional	51	Vehicle tried to go to the right of turning vehicle.
47	11/2/11	6:11 PM	Angle	Dark - lighted roadway	Clear	Dry	Intentional	71	Vehicle struck parked car.
48	11/18/11	3:12 PM	Rear-end	Daylight	Clear	Dry	Failed to yield to right of way	34	
49	12/2/11	3:04 PM	Angle	Daylight	Clear	Dry	Made an improper turn	42	
50	12/23/11	11:38 AM	Sideswipe, same direction	Daylight	Cloudy	Dry	Unknown	35	Vehicle stopped abruptly for a pedestrian in crosswalk.
51	1/10/12	2:00 PM	Angle	Daylight	Clear	Dry	Failed to yield to right of way	46	
52	1/20/12	7:56 AM	Rear-end	Daylight	Clear	Dry	Unknown	38	
53	2/2/12	4:51 PM	Angle	Dusk	Cloudy	Dry	Unknown	32	
54	2/16/12	3:03 PM	Single Vehicle Crash	Daylight	Cloudy	Dry	Failed to yield to right of way	83	
55	4/13/12	4:35 PM	Angle	Daylight	Cloudy	Dry	Unknown	73	
56	4/23/12	10:21 AM	Angle	Daylight	Clear	Wet	Unknown	48	
57	5/7/12	12:28 PM	Angle	Daylight	Clear	Dry	Failed to yield to right of way	50	Vehicle crossing over Washington St had to stop abruptly for pedestrian in crosswalk on Charles St.
58	5/16/12	3:59 PM	Rear-end	Daylight	Clear	Dry	Followed too closely	43	Stomping on pedestrian in crosswalk.
59	5/31/12	6:13 PM	Sideswipe, same direction	Daylight	Cloudy	Dry	Intentional	63	Operator on cell phone.
60	6/8/12	7:54 PM	Angle	Daylight	Cloudy	Dry	Failed to yield to right of way	30	
61	6/19/12	1:57 PM	Head on	Daylight	Clear	Dry	Unknown	19	Uninvolved vehicle blocked the view of the pedestrians.
62	10/10/10	2:13 PM	Single Vehicle Crash	Daylight	Cloudy	Dry	Failed to yield to right of way	32	
63	10/22/10	2:12 PM	Angle	Daylight	Cloudy	Dry	Failed to yield to right of way	70	
64	6/4/09	12:40 PM	Sideswipe, same direction	Daylight	Cloudy	Dry	No Improper Driving	62	Operator 2 attempted to turn right into Mobil. Operator 1 attempted to pass on right. Hit & run crash.
65	9/8/10	12:40 PM	Angle	Daylight	Cloudy	Dry	Failed to yield to right of way	56	

Summary based on Crash Reports obtained from the Holliston Police Department

### Crash Data Summary Tables and Charts

Intersections on Washington Street (from Church St to Exchange St); Holliston, MA

