

# ROAD SAFETY AUDIT

Congress Street (Route 14) at Franklin Street

Duxbury, Massachusetts

February 18, 2022

Prepared through Old Colony MPO FFY 2022 Unified Planning  
Work Program – Road Safety Audits at Multiple Locations:  
Under Contract with MassDOT



Prepared By:  
Old Colony Planning Council  
70 School Street, Brockton, MA. 02301



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## Background

This Road Safety Audit for Congress Street (Route 14) at Franklin Street in Duxbury was prepared as part of the Old Colony Metropolitan Planning Organization's (MPO) Road Safety Audits at Multiple Locations project in the MPO's FFY 2022 Unified Planning Work Program. The objective of the Road Safety Audits at Multiple Locations project is to identify known issues and potential improvements that can be implemented at high crash locations in a continuing effort to achieve safety performance targets for reducing serious injuries and fatalities on the regional highway network. Locations were selected through a data driven process as part of the MPO's Safety Management System and consultation with the communities of the Old Colony MPO.

A Road Safety Audit for a high crash location at nearby Summer Street (Route 53) at Franklin Street and High Street had been scheduled, and this location was selected to be included in that Road Safety Audit due to its close proximity and location on the state numbered highway network.

## Project Data

This Road Safety Audit was held on February 18, 2022. It was done in conjunction with Road Safety Audits for the nearby intersections of Summer Street (Route 53) at Franklin Street and High Street, and Route 3A at Route 139. Out of an abundance of caution and respect to health and safety of Audit participants, this Road Safety Audit was conducted virtually through a webinar format. Participants were provided crash data and associated analysis (crash characteristics charts, collision diagrams) prior to the Audit for review, and background traffic data (traffic volumes and travel speeds) along with surrounding land use were discussed during the Audit.

During the audit, crash analysis, land use, and traffic data was discussed. Aerial photographs of the intersection along with ground level photographs were provided.

A four-year crash history from January 1, 2017 through December 31, 2020 was initially analyzed and provided to audit participants. Based on MassDOT and Duxbury Police Department data and reports, there were 7 crashes in this four-year period. Three (43%) of those crashes resulted in personal injury. Four of the seven crashes are angled collisions, and the others were single vehicle crashes.

The RSA participants formed a multidisciplinary team representing many fields, including planning, and engineering. A list of RSA attendees is shown in Table 1.

Table 1: Participating Audit Team Members

<b>Audit Team Member</b>	<b>Agency/Affiliation</b>
Peter Buttkus	Duxbury Department of Public Works
Paul Bragna	Duxbury Highway Safety Committee
Chief Stephen McDonald	Duxbury Police Department
Deputy Chief Michael Carbone	Duxbury Police Department
Sergeant Friend Weiller	Duxbury Police Department
State Representative Josh Cutler	Commonwealth of Massachusetts House of Representatives
Cole Angley	Office of State Representative Josh Cutler
Deidre Teehan	Office of State Representative Josh Cutler
Michael Murphy	Office of State Senator Patrick O'Connor
Dakota Delsignore	MassDOT Traffic and Safety Engineering Section
Loussyan Darwich	MassDOT Traffic and Safety Engineering Section
Kevin Fitzgerald	MassDOT Traffic and Safety Engineering Section
James Kummer	MassDOT District Five Projects
Ale Kuncaitis	MassDOT District Five Traffic
Barbara Lachance	MassDOT District Five Projects
Bianca Marshall	MassDOT District Five Traffic
Jason Walters	MassDOT District Five Projects
Mary Waldron	Old Colony Planning Council
Charles Kilmer, AICP	Old Colony Planning Council
Bill McNulty, PTP	Old Colony Planning Council
Ray Guarino	Old Colony Planning Council
Guoqiang Li, PTP	Old Colony Planning Council
Shawn Bailey	Old Colony Planning Council
Kyle Mowatt	Old Colony Planning Council

## Project Location and Description

The intersection of Congress Street (Route 14) and Franklin Street is a four-legged unsignalized intersection. The intersection meets at a skewed angle, with Congress Street having a slight serpentine s-curve through the intersection. The Franklin Street approaches are controlled by STOP signs.

Development around the intersection is very low density. A Duxbury Fire Department station is located on the northern corner of the intersection. A restaurant is located east of the intersection. Otherwise, development is low density residential. The area is heavily wooded.

Figure 1 provides an aerial photo of the intersection.

- **Congress Street (Route 14):** Congress Street forms part of State Number Route 14 and connects from Route 139 and Route 3A in the eastern half of Duxbury westward through the town, connecting and aligning with Route 53 in Pembroke. It is under the jurisdiction of the Town of Duxbury, with the exception of the portion at the ramps for Route 3. Regionally, Route 14 connects from Duxbury at its eastern end to Brockton at its western end. It is a two-lane undivided roadway, functionally classified as an Urban Minor Arterial. There are no sidewalks nor any bicycle accommodations along Congress Street. The posted speed limit within the study area is 30 MPH per Massachusetts Special Speed Regulation 891.
- **Franklin Street:** Franklin Street is a two-lane local road under jurisdiction of the Town of Duxbury, Franklin Street serves as an east-west roadway from Pembroke into Marshfield. Franklin Street does not have sidewalks or any bicycle accommodations. There is a posted 30 MPH sign on the northern leg of Franklin Street. However, this speed limit is not supported by a special speed regulation.



Figure 1: Locus Map

## Audit Observations and Potential Safety Enhancements

**Alignment and S-Curve Curvature:** The intersection is in the middle of an S-Curve on Congress Street, which results in a misalignment of the two legs on Congress Street. A relatively high percentage of crashes in the crash history at this intersection are single vehicle crashes where a driver arriving into the intersection in the westbound direction of Congress Street lost control and struck a roadside object. This curvature and misalignment could be a significant factor in these crashes. The curvature is also a factor in reduced sight lines from the Franklin Street approaches.

*Potential Safety Enhancements:*

1. Short Term / Low Cost: Enhance driver awareness with improved advance warning signage.
2. Short-Term / Low-Cost: Enhance delineation through intersection with high visibility fog lines.
3. Mid Term / Medium Cost: Consider installation of overhead flashing beacon (AMBER for Congress Street, RED for Franklin Street) to enhance drive awareness of intersection.
4. Long term / High-Cost: Consider reconstructing intersection with roundabout.

**Limited Sight Distance:** The combination of the curvature of Congress Street, Franklin Street arriving into the intersection at a skewed angle, and heavy roadside vegetation of the northeast and southeast corners significantly limits sight distance at this location. Drivers from Franklin Street often must pull out into the intersection to check for approaching vehicles on Congress Street in either direction. A significant number of the crashes in the crash history were confirmed between vehicles arriving northbound on Franklin Street, and eastbound vehicles on Congress Street. This limited sight distance may be a factor in these crashes.

*Potential Safety Enhancements:*

1. Short-Term / Low-Cost: Maintain as much clear zone with vegetation clearing as possible.
2. Long term / High-Cost: Consider reconstructing intersection with roundabout. A roundabout would self-enforce lower speeds in approaching vehicles and as such mitigate the issue with reduced sight distances.

**Missing or Outdated Signage:** The eastbound approach of Congress Street does not have any advance warning signage of the intersection. The westbound approach has a sign that reads

“Intersection Ahead”, which is not supported by the MUTCD. The southbound approach of Franklin Street has a sign which reads “STOP AHEAD”, which is not supported by the MUTCD. The Franklin Street STOP signs are not placed in the correct positions, and appear to be low.

*Potential Safety Enhancements:*

1. Short-Term / Low-Cost: Replace all outdated and missing advance warning signs with MUTCD compliant, retroreflective signs. Place signs on both sides of roadway for maximum visibility and driver awareness. Use street name placards below signs to further enhance driver awareness.
2. Short-Term / Low-Cost: Replace STOP signs and place in correct position. Use retroreflective tape on posts for heightened visibility. Consider adding STOP signs on left hand side of approaches for increased visibility.

**Potential Speeding:** The severity of the roadway departure crashes at this location suggests a potential speeding issue, particularly for westbound traffic on Congress Street.

*Potential Safety Enhancements:*

1. Short-Term / Low-Cost: Regular and strict enforcement of speed limit.
2. Mid Term / Low Cost: Consider installation of radar-based speed feedback signs.

**No pedestrian accommodations:** The roadways do not include any existing sidewalks or marked crossings.

*Potential Safety Enhancements:*

1. Long term / High Cost: Consider adding sidewalks with any planned improvements.
2. Mid-Term / Low Cost: Evaluate feasibility of installing crosswalks at intersection.

**No bicycle accommodations:** The roadways do not include any existing bicycle accommodations.

*Potential Safety Enhancements:*

1. Long term / High Cost: Consider adding bicycle lanes with any planned improvements.

## Summary of Road Safety Audit

Based on the review of data, observations of the intersection made in the field, and group discussion, the RSA team identified possible enhancements that could improve safety at the intersection. Further study and design work will need to be conducted to determine the feasibility of improvements. Table 2 summarizes the estimated time frame and costs, and Table 3 summarizes the safety issues, possible enhancements, estimated safety payoff, time frame, cost, and jurisdiction 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), midterm (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 (\$10,001 to \$50,000), or high (>\$50,000).”

**Table 2: Estimated Time Frame and Costs Breakdown**

Time Frame		Costs	
Short-Term	<1 Year	Low	<\$10,000
Mid-Term	1-3 Years	Medium	\$10,001-\$50,000
Long-Term	>3 Years	High	>\$50,000



**Table 3: Potential Safety Enhancement Summary**

<b>Safety Issue</b>	<b>Potential Safety Enhancement</b>	<b>Safety Payoff</b>	<b>Time Frame</b>	<b>Cost</b>	<b>Jurisdiction</b>
Alignment and S-Curve Curvature Through Intersection	Enhance driver awareness with improved advance warning signage	High	Short-Term	Low)	Town of Duxbury
Alignment and S-Curve Curvature Through Intersection	Enhance delineation through intersection with high visibility striping	High	Short-Term	Low	Town of Duxbury
Alignment and S-Curve Curvature Through Intersection	consider installation of overhead flashing beacon	Medium	Mid-Term	Medium	Town of Duxbury
Alignment and S-Curve Curvature Through Intersection	consider reconstructing intersection with roundabout	High	Long-Term	High	Town of Duxbury
Limited Sight Lines from Franklin Street Approaches	Maintain as much clear zone with vegetation clearing as possible	Low	Short Term	Low	Town of Duxbury
Missing or Outdated Signage	Install MUTCD compliant advance warning signage where missing. Place signage on both sides of roadway	Medium	Short Term	Low	Town of Duxbury
Missing or Outdated Signage	Relocate STOP signs to proper position. Increase height of STOP signs, and add reflective tape to posts. Use additional STOP sign on left hand side of roadway	Medium	Short-Term	Low	Town of Duxbury
Potential Speeding	Regular and strict enforcement of speed limit	High	Short Term	Low	Town of Duxbury
Potential Speeding	Consider installation of speed feedback signs	High	Mid-Term	Medium	Town of Duxbury

<b>Safety Issue</b>	<b>Potential Safety Enhancement</b>	<b>Safety Payoff</b>	<b>Time Frame</b>	<b>Cost</b>	<b>Jurisdiction</b>
No Pedestrian Accommodations	Consider installation of sidewalks	High	Long Term	High	Town of Duxbury
No Pedestrian Accommodations	Evaluate feasibility of crosswalks	Medium	Mid-Term	Medium	Town of Duxbury
No Bicycle Accommodations	Consider adding bike lanes	High	Long Term	High	Town of Duxbury

## Appendix A. RSA Meeting Agenda

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<b>Agenda</b>	<b>Road Safety Audits for Route 53 at Franklin Street and High Street;  Route 14 at Franklin Street; and Route 3A at Route 139,  Duxbury, MA  Friday, February 18, 2022  10:00 AM – 12:00 Noon</b>
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<b>Contact:</b>	Bill McNulty, Old Colony Planning Council (508) 583-1833 ext. 207 wmcnulty@ocpcrpa.org
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<b>Attendees:</b>	Invited Participants Include a Multidisciplinary Team including Duxbury Officials (Chief Elected Officials, DPW, Police, Fire, Administration, Planning), MassDOT, FHWA, Legislative Delegation
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<b>Please Bring:</b>	Thoughts and Suggestions
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<b>Meeting Location:</b>	<b>Virtual Meeting (Zoom):</b> <a href="https://us02web.zoom.us/j/88064332210?pwd=S1BadEM2MzFZbTJtMzlpc2QrT3ZuZz09">https://us02web.zoom.us/j/88064332210?pwd=S1BadEM2MzFZbTJtMzlpc2QrT3ZuZz09</a> <b>Webinar ID:</b> 880 6433 2210 <b>Password:</b> 642581
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<b>10:00 AM</b>	Welcome and Introductions
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<b>10:10 AM</b>	Virtual Road Safety Audits of Summer Street (Route 53) at Franklin Street and High Street; Congress Street (Route 14) at Franklin Street; and Tremont Street (Route 3A) at Church Street and Tremont Street (Route 139) <ul style="list-style-type: none"> <li>• Each Intersection will include: <ul style="list-style-type: none"> <li>○ Review of Traffic Data</li> <li>○ Existing Conditions and Known Challenges</li> <li>○ Identification of Potential Safety Improvements</li> </ul> </li> </ul>
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<b>11:30 AM</b>	Wrap-Up Site Audit; Discussion of Next Steps
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<b>Instructions For Participants:</b>	
<ul style="list-style-type: none"> <li>• Before attending the Road Safety Audit, participants are encouraged to familiarize themselves with the study area, and make note of existing conditions and any deficiencies they observe</li> <li>• 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 Road Safety Audit process</li> <li>• After the meeting, participants will be asked to comment and respond to the document materials to ensure it is reflective of the Road Safety Audit completed by the multidisciplinary team</li> </ul>	

## Appendix B. RSA Audit Team Contact List

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## Participating Audit Team Members

Date: February 18, 2022      Location: Route 14 at Franklin Street, Duxbury

Audit Team Members	Agency/Affiliation
Peter Buttkus	Duxbury Department of Public Works
Paul Bragna	Duxbury Highway Safety Committee
Chief Stephen McDonald	Duxbury Police Department
Deputy Chief Michael Carbone	Duxbury Police Department
Sergeant Friend Weiller	Duxbury Police Department
State Representative Josh Cutler	Commonwealth of Massachusetts House of Representatives
Cole Angley	Office of State Representative Josh Cutler
Deidre Teehan	Office of State Representative Josh Cutler
Michael Murphy	Office of State Senator Patrick O'Connor
Dakota Delsignore	MassDOT Traffic and Safety Engineering Section
Loussyan Darwich	MassDOT Traffic and Safety Engineering Section
Kevin Fitzgerald	MassDOT Traffic and Safety Engineering Section
James Kummer	MassDOT District Five Projects
Ale Kuncaitis	MassDOT District Five Traffic
Barbara Lachance	MassDOT District Five Projects
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Shawn Bailey	Old Colony Planning Council
Kyle Mowatt	Old Colony Planning Council

## Appendix C. Detailed Crash Data

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## Crash Data Summary Table

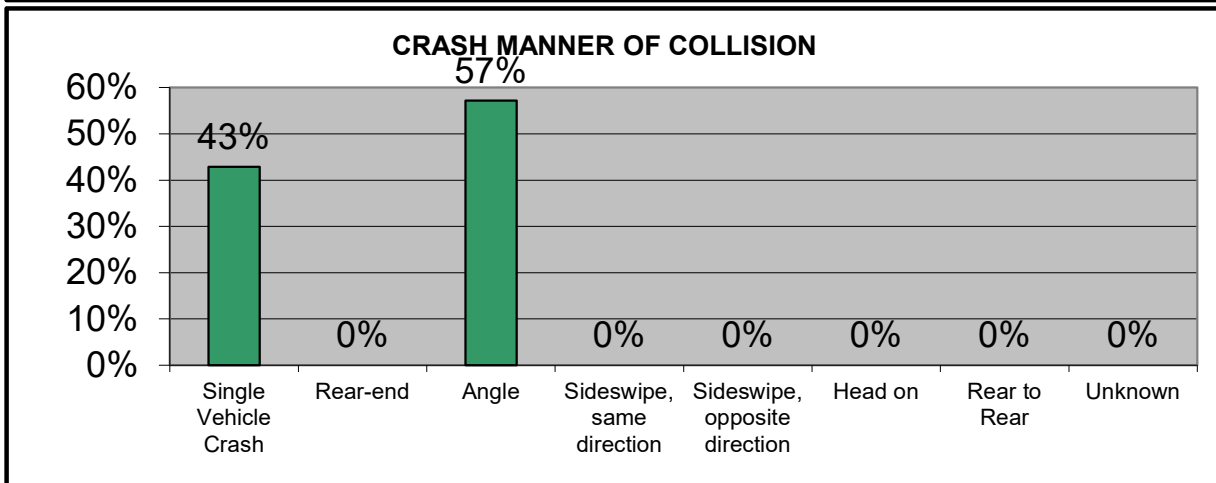
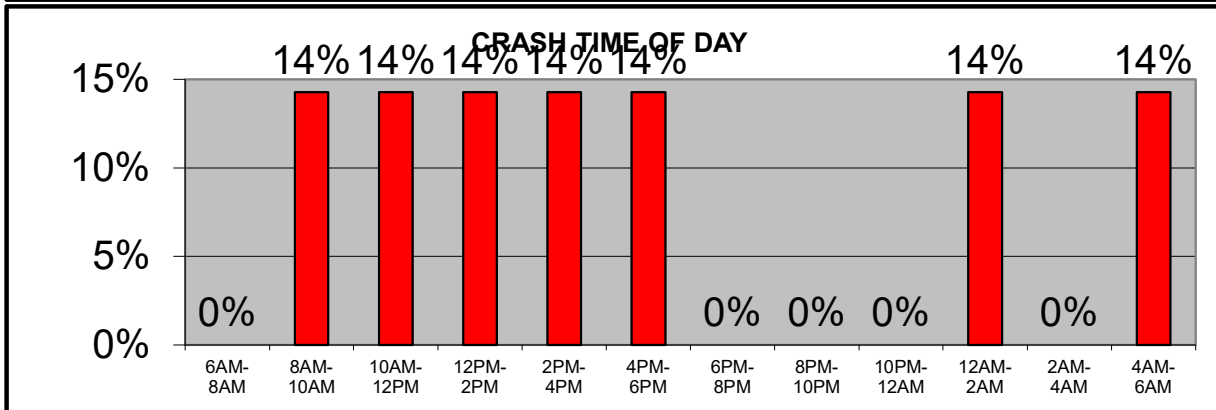
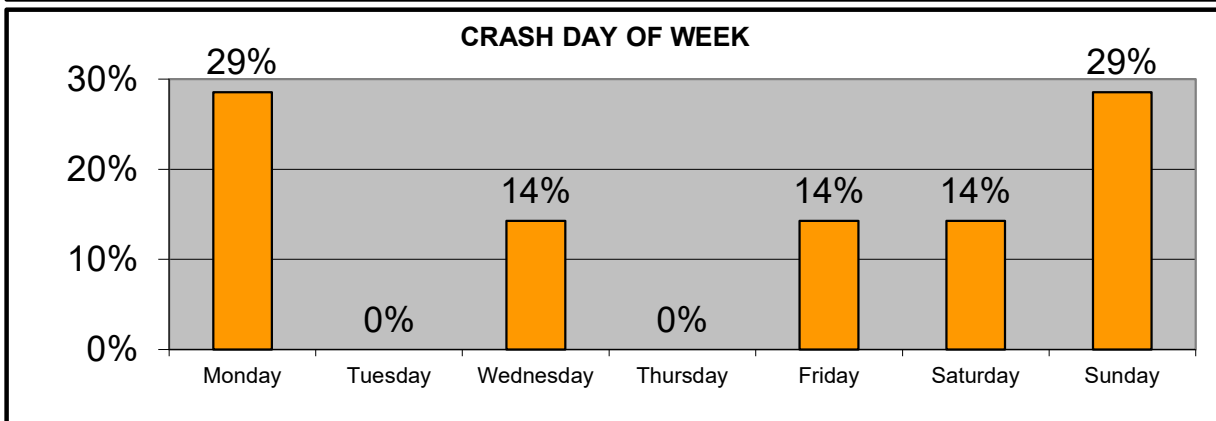
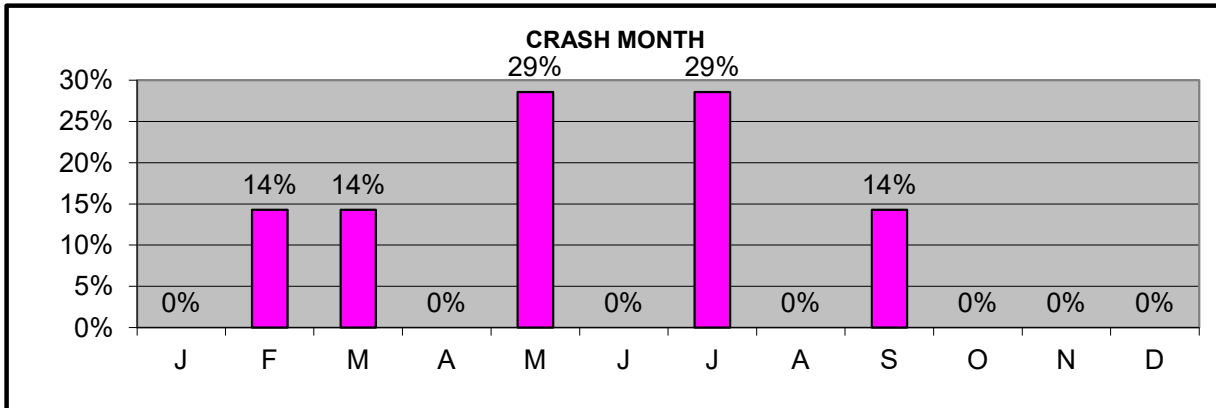
Congress Street (Route 14) at Franklin Street, Duxbury, MA  
2017-2020

Crash Diagram Ref #	Crash Date <i>m/d/y</i>	Crash Day	Time of Day	Manner of Collision <i>Type</i>	Light Condition <i>Type</i>	Weather Condition <i>Type</i>	Road Surface <i>Type</i>	Driver Contributing Code <i>Type</i>	Comments
1	3/11/17	Saturday	4:10 AM	Single Vehicle Crash	Dark - roadway not lighted	Blowing Sand, Snow	Snow	Unknown	17DUX-32-AC
2	5/16/18	Wednesday	3:48 PM	Angle	Daylight	Clear	Dry	Failed to yield right of way	18DUX-76-AC
3	7/9/18	Monday	11:48 AM	Single Vehicle Crash	Daylight	Clear	Dry	Failure to keep in proper lane or running off road	18DUX-106-AC
4	9/16/18	Sunday	1:02 AM	Single Vehicle Crash	Dark - roadway not lighted	Clear	Dry	Operating Vehicle in erratic, reckless, careless, negligent, or aggressive manner	18DUX-139-AC
5	2/4/19	Monday	9:58 AM	Angle	Daylight	Clear	Dry	Failed to yield right of way	19DUX-22-AC
6	5/26/19	Sunday	12:11 PM	Angle	Daylight	Cloudy	Dry	Failed to yield right of way	19DUX-69-AC
7	7/5/19	Friday	5:25 PM	Angle	Daylight	Clear	Dry	Disregarded traffic signs, signals, road markings	19DUX-104-AC

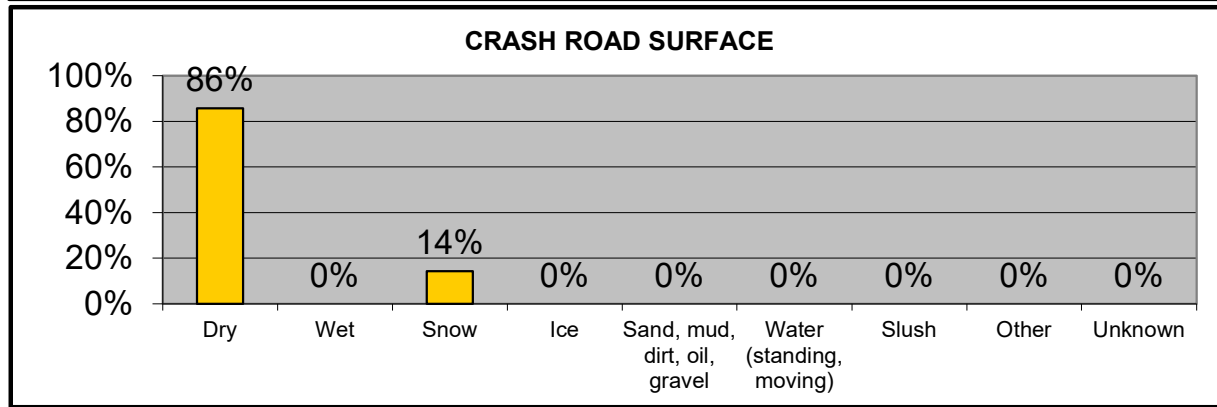
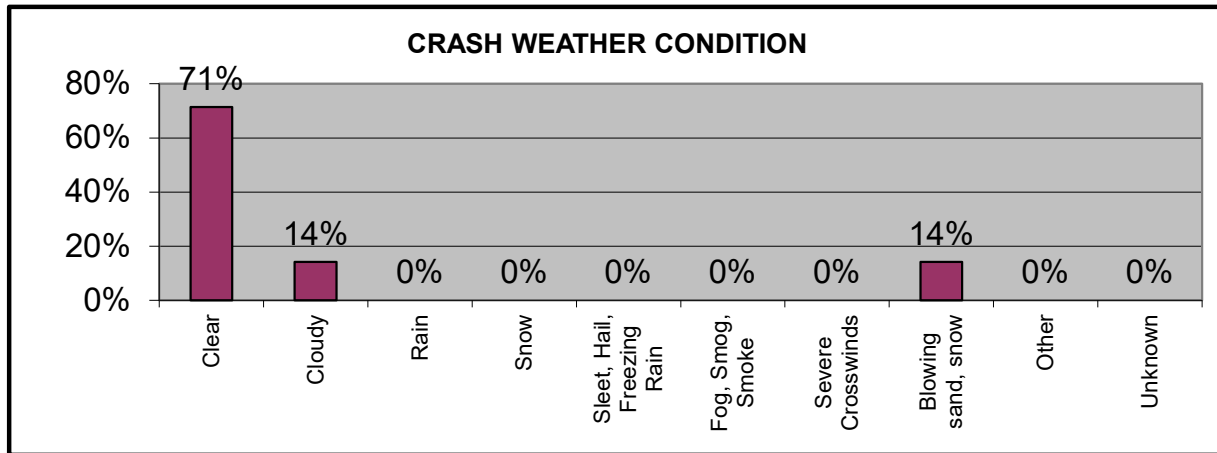
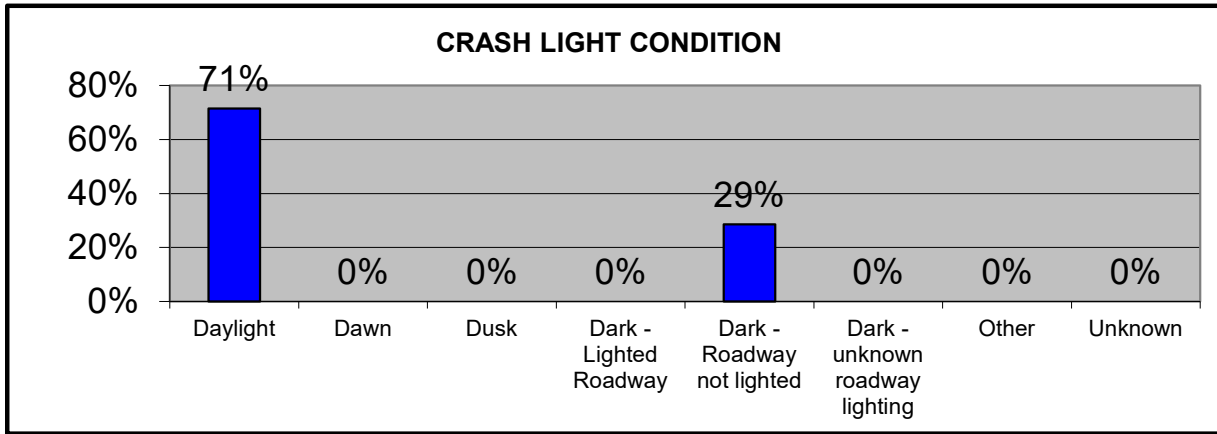
\*Courtesy Crash - A term used to describe a crash that occurs subsequent to a non-involved mainline driver who gives the right of way, contrary to the rules of the road, to another driver.



**Crash Data Summary Tables and Charts**  
Congress Street (Route 14) at Franklin Street, Duxbury, MA



**Crash Data Summary Tables and Charts**  
Congress Street (Route 14) at Franklin Street, Duxbury, MA

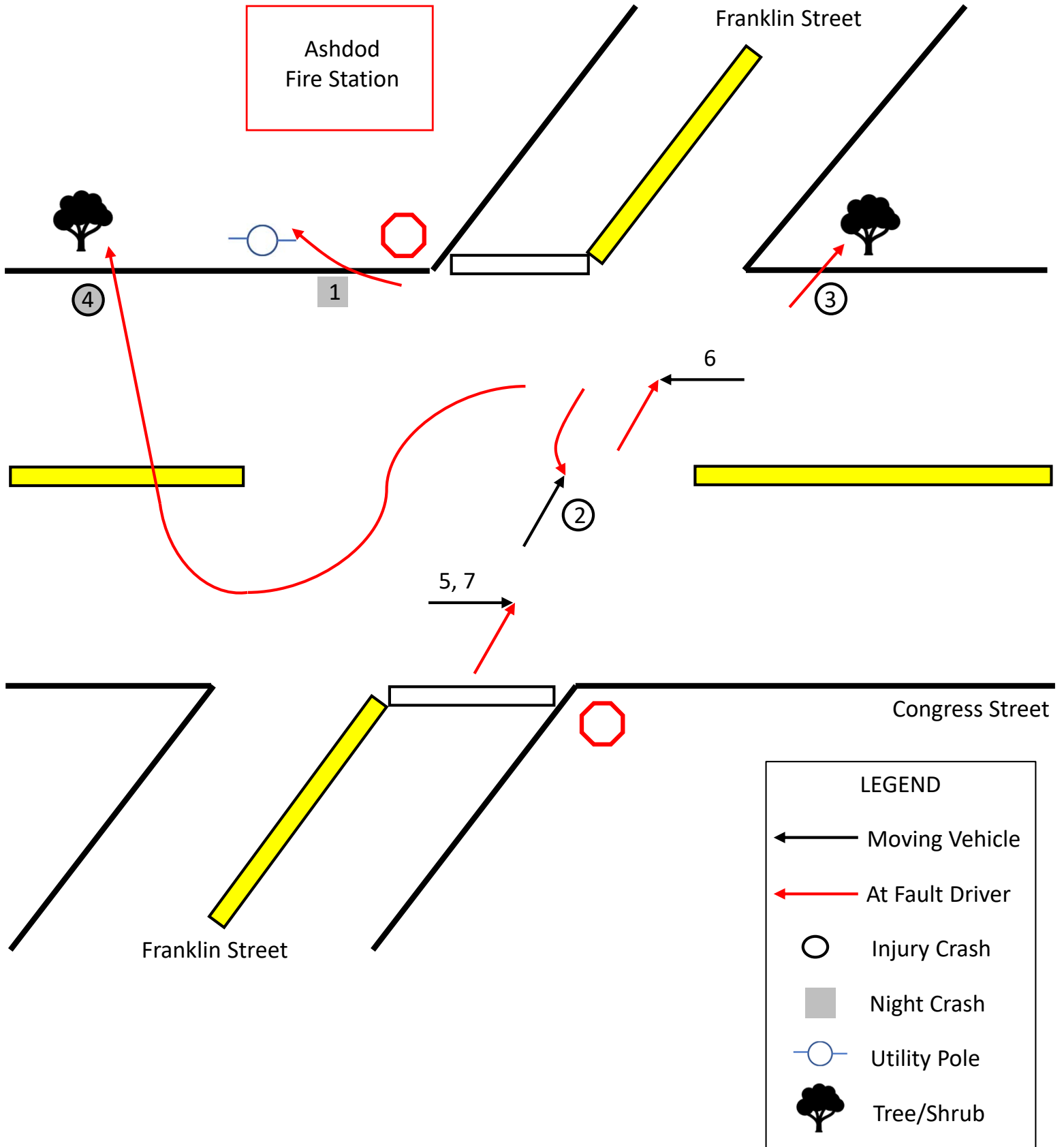


# COLLISION DIAGRAM

Congress Street (Route 14) at Franklin Street

Collision Diagram for Crashes (2017-2020)

Prepared by OCPC (SB 11/2021) (Source: Duxbury Police Dept.)



## Appendix D. Additional Information

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## Appendix E. Road Safety Audit References

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## Road Safety Audit References

*FHWA Office of Safety - Proven Safety Countermeasures*, U.S. Department of Transportation, Federal Highway Administration <https://safety.fhwa.dot.gov/provencountermeasures/>.

*Road Safety Audits, A Synthesis of Highway Practice*. NCHRP Synthesis 336. Transportation Research Board, National Cooperative Highway Research Program, 2004.

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*FHWA Road Safety Audit Guidelines*. U.S. Department of Transportation, Federal Highway Administration, 2006.

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*Road Safety Audits*. ITE Technical Council Committee 4S-7. Institute of Transportation Engineers, February 1995.