

ROAD SAFETY AUDIT

West Chestnut Street at
Mercedes Road and Ettrick Street

Brockton, Massachusetts

May 6, 2022

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



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OLD COLONY
PLANNING COUNCIL

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Background

This Road Safety Audit for West Chestnut Street at Mercedes Road and Ettrick Street 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.

Project Data

This Road Safety Audit was held on May 6, 2022. 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 five-year crash history from January 1, 2017 through December 31, 2021 was analyzed and provided to audit participants. Based on MassDOT and Brockton Police Department data and reports, there were fifteen (15) crashes in the five-year period from 2017 through 2021. Twelve (80%) of these crashes were angled collisions that involved a vehicle entering from Ettrick Street. Seven (48%) of the crashes resulted in injury.

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

Audit Team Member	Agency/Affiliation
Brady Winsten	City of Brockton – Policy and Intergovernmental Affairs
Jay DeGrace	City of Brockton – Constituent Services Liasson
John Fay	City of Brockton – Planning
Chief Brian Nardelli	Brockton Fire Department
Michael Damon	Brockton Area Transit (BAT)
Kelly Forrester	Brockton Area Transit (BAT)
Al DiGirolamo	Office of State Senator Michael Brady
Dakota DelSignore	MassDOT Traffic and Safety Engineering Section
Kevin Fitzgerald	MassDOT Traffic and Safety Engineering Section
Raissah Kouame	MassDOT Office of Transportation Planning
Bianca Marshall	MassDOT District Five Traffic
Jason Walters	MassDOT District Five Projects
Michael Medeiros	MassDOT District Five Traffic
Ray Guarino	Old Colony Planning Council
Guoqiang Li	Old Colony Planning Council
Shawn Bailey	Old Colony Planning Council
Kyle Mowatt	Old Colony Planning Council
Bill McNulty	Old Colony Planning Council

Project Location and Description

The intersection of West Chestnut Street at Mercedes Road and Ettrick Street is a four-legged unsignalized intersection, with a STOP sign controls on the Mercedes Road and Ettrick Street approaches. Development around the intersection is residential. The intersection is about 0.6 miles from the South Middle School, and in an area where students could potentially be walking to and from school.

Figure 1 provides an aerial photo of the intersection.

- West Chestnut Street:** West Chestnut Street is a primarily an east-west roadway through the City of Brockton, connecting Pearl Street on its western end to Main Street on its eastern end. It is under the jurisdiction of the City of Brockton. It is a two-lane undivided roadway, functionally classified as a Principal Arterial, and is designated as part of the National Highway System network. There were no sidewalks on this section of West Chestnut Street. The posted speed limit in this section of West Chestnut Street is 30 MPH, per Special Speed Regulation #1067.
- Mercedes Road:** Mercedes Road is a non-functionally classified local road under the jurisdiction of the City of Brockton. It is a residential neighborhood street that connects between West Chestnut Street and Southworth Street. There is no posted speed limit, or

sidewalks. While Mercedes Road is a neighborhood street designed to provide access to approximately 20 single family residences, the street experiences a substantial amount of cut-through traffic by drivers avoiding the intersection of West Chestnut Street and Southworth Street.

- **Ettrick Street:** Ettrick Street is a non-functionally classified local road under the jurisdiction of the City of Brockton. It connects between West Chestnut Street on its southern end and Ash Street on its northern end. Development along Ettrick Street is residential, and with its multiple cross roadways between Ash Street and West Chestnut Street it provides connections to a very large residential area. There are no special speed regulations for Ettrick Street, however Brockton has a fundamental prima facie speed limit of 30 MPH throughout the City.



Figure 1: Locus Map

Audit Observations and Potential Safety Enhancements

The following safety issues along with potential safety enhancements were identified for the intersection of West Chestnut Street at Mercedes Road and Ettrick Street.

Limited Sight Distance: Ettrick Street arrives at West Chestnut Street at a slight angle, and this angled approach limits sight distance for drivers entering from Ettrick Street. Furthermore, roadside vegetation and utility poles obstruct sight lines to and from the intersection. Limited sight distance combined with high travel speeds on West Chestnut Street may be a factor in the frequency of angled collisions between vehicles on West Chestnut Street and those entering from Ettrick Street. A large tree that was on the corner of West Chestnut Street and Ettrick Street that was obstructing sight lines and possibly contributing to crashes was recently removed.

Potential Safety Enhancements:

1. *Short-Term / Low-Cost:* Clear as much vegetation as possible.
2. *Long term / High-Cost:* Consider realigning Ettrick Street approach to form a 90-degree angle with West Chestnut Street,

Substandard or Missing Signage: There are no advance warning signs for the intersection on either approach of West Chestnut Street. Neither Mercedes Road nor Ettrick Street have advance warning signs for the upcoming stop at West Chestnut Street. The STOP sign on Ettrick Street is not aligned properly with the stop bar. Foliage from a tree on the southeast corner obscures the Mercedes Road STOP sign. The signage indicating no commercial truck traffic on Mercedes Road is not consistent with the Massachusetts Amendments to the MUTCD regarding Heavy Commercial Vehicle Exclusion Zones. The roadway is not listed as a truck exclusion in the state trucking network system

Potential Safety Enhancements:

1. *Short-Term / Low-Cost:* Properly align Ettrick Street STOP sign with painted stop bar.
2. *Short-Term / Low-Cost:* Replace all outdated or non-compliant 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.
3. *Short-Term / Low-Cost:* Install advance intersection ahead warning signs on both approaches of West Chestnut Street, on both sides of roadway, consistent with MUTCD.

4. Install advance STOP ahead warning signs on Ettrick Street and Mercedes Road.
5. *Short-Term / Low-Cost*: Clear vegetation on southeast corner of intersection that obstructs Mercedes Road stop sign.
6. *Short-Term / Low-Cost*: Establish an HCVE on Mercedes Road and sign accordingly.

Minimal Clear Zones: Utility poles are located immediately adjacent to the travel lanes along West Chestnut Street. There is little room for error and high risk of impact should a roadway departure crash occur.

Potential Safety Enhancements:

1. Long term / High Cost: Relocate utility poles to create a clear zone along edges of West Chestnut Street.

Poor Drainage: During site visits to the location puddles were observed on the northeast corner several days after the most recent rainfall along with pavement deterioration indicated possible poor drainage at this location.

Potential Safety Enhancements:

1. *Mid-term / Medium Cost*: Evaluate existing drainage system, Make improvements if necessary.

Speed: Old Colony Planning Council traffic records indicate the 85th percentile speed of traffic on West Chestnut Street is 41 MPH, well above the speed limit of 30 MPH. Additionally, audit participants familiar with the area noted speeding is common on West Chestnut Street. Speed is likely a major factor in the frequency of angled collisions and along with severity (high percentage of crashes resulting in injury) at this location. Residents of Mercedes Road report common speeding by motorists using the roadway as a cut-through between Southworth Street and West Chestnut Street.

Potential Safety Enhancements:

1. *Short Term / Low Cost*: Increase enforcement of existing 30 MPH speed limit.
2. *Short-Term / Low-Cost*: Given the severity of crashes occurring at this location, coupled with the frequency of roadway departure crashes just west of the intersection on West Chestnut Street, consider establishing a Safety Zone with 20 MPH speed limit on West Chestnut Street through this intersection and adjacent intersection with Southworth Street.
3. *Mid-Term / Medium Cost*: Consider implementation of physical traffic calming measures on Mercedes Road to control speed of cut-through traffic using this neighborhood roadway.

4. *Short-Term / Low-Cost*: Consider making Mercedes Road one-way to calm traffic and reduce cut-through volumes.

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.

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

Potential Safety Enhancements:

1. *Long-term / High Cost*: Consider adding bicycle lanes or shared use path 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

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Sight Distance	Clear Vegetation	Medium	Short-Term	Low	City of Brockton
Sight Distance	Realign Ettrick Street Approach	Medium	Long-Term	High	City of Brockton
Substandard or Missing Signage	Align STOP sign on Ettrick Street with stop line	Medium	Short-Term	Low	City of Brockton
Substandard or Missing Signage	Install advance warning signage consistent with MUTCD	Medium	Short-Term	Low	City of Brockton
Substandard or Missing Signage	Clear tree canopy on southeast corner of West Chestnut Street and Mercedes Road that obscures STOP sign	High	Short-Term	Low	City of Brockton
Substandard or Missing Signage	Establish an HCVE on Mercedes Road and sign accordingly	Low	Short-Term	Low	City of Brockton
Minimal Clear Zones	Consider relocating utility poles further off road, or provide crash barrier	High	Long-Term	High	City of Brockton
Poor Drainage	Improve drainage, particularly on northwest corner	Medium	Mid-Term	Medium	City of Brockton
Speed	Enforce existing speed limit of 30 MPH	High	Short-Term	Low	City of Brockton
Speed	Consider establishing a 20 MPH Safety Speed Zone on West Chestnut Street	High	Short-Term	Low	City of Brockton
Speed	Traffic calming on Mercedes Road	High	Mid-Term	Medium	City of Brockton
Speed	Make Mercedes Road one-way southbound	Medium	Short-Term	Low	City of Brockton
Lack of Pedestrian Accommodations	Construct sidewalks or shared use path	High	Long-Term	High	City of Brockton
Lack of Bicycle Accommodations	Consider bike lanes or shared use path	High	Long-Term	High	City of Brockton

Appendix A. RSA Meeting Agenda

Agenda	<p align="center">Road Safety Audits for Warren Avenue at Market Street, and West Chestnut Street at Southworth Street and Mercedes Road, Brockton, MA</p> <p align="right">Friday, May 6, 2022 10:00 AM – 11:30 AM</p>
Contact:	Bill McNulty, Old Colony Planning Council (508) 583-1833 ext. 207 wmcnulty@ocpcrpa.org
Attendees:	Invited Participants Include a Multidisciplinary Team including Brockton Officials (Chief Elected Officials, DPW, Police, Fire, Traffic Commission, Brockton Public Schools), MassDOT, FHWA, Legislative Delegation
Please Bring:	Thoughts and Suggestions
Meeting Location:	<p>Virtual Meeting (Zoom): https://us02web.zoom.us/j/82365052171?pwd=ZW5TRIRIVndyTDJqR2cwQk5mYzdtZ09 Webinar ID: 823 6505 2171 Password: 216824</p>
10:00 AM	Welcome and Introductions
10:10 AM	<p>Virtual Road Safety Audit of Warren Avenue at Market Street</p> <ul style="list-style-type: none"> • Review of Traffic Data • Existing Conditions and Known Challenges • Identification of Potential Safety Improvements
10:40 AM	<p>Virtual Road Safety Audit of West Chestnut Street at Southworth Street and Mercedes Road</p> <ul style="list-style-type: none"> • Review of Traffic Data • Existing Conditions and Known Challenges • Identification of Potential Safety Improvements
11:10 AM	Wrap-Up Site Audit; Discussion of Next Steps
<p>Instructions For Participants:</p> <ul style="list-style-type: none"> • 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 • 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 • 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 	

Appendix B. RSA Audit Team Contact List

Participating Audit Team Members

Date: May 6 2022

Location: West Chestnut Street at Mercedes Rd /Ettrick St, Brockton

Audit Team Members	Agency/Affiliation
Brady Winsten	City of Brockton – Policy and Intergovernmental Affairs
Jay DeGrace	City of Brockton – Constituent Services Liasson
John Fay	City of Brockton – Planning
Chief Brian Nardelli	Brockton Fire Department
Michael Damon	Brockton Area Transit (BAT)
Kelly Forrester	Brockton Area Transit (BAT)
Al DiGirolamo	Office of State Senator Michael Brady
Dakota DelSignore	MassDOT Traffic and Safety Engineering Section
Kevin Fitzgerald	MassDOT Traffic and Safety Engineering Section
Raissah Kouame	MassDOT Office of Transportation Planning
Bianca Marshall	MassDOT District Five Traffic
Jason Walters	MassDOT District Five Projects
Michael Medeiros	MassDOT District Five Traffic
Ray Guarino	Old Colony Planning Council
Guoqiang Li	Old Colony Planning Council
Shawn Bailey	Old Colony Planning Council
Kyle Mowatt	Old Colony Planning Council

Appendix C. Detailed Crash Data

Crash Data Summary Table

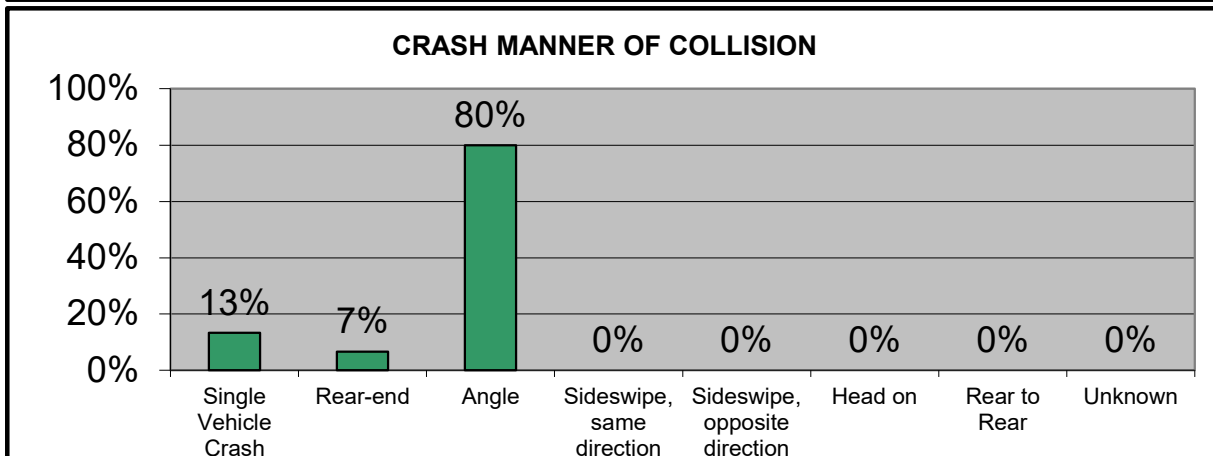
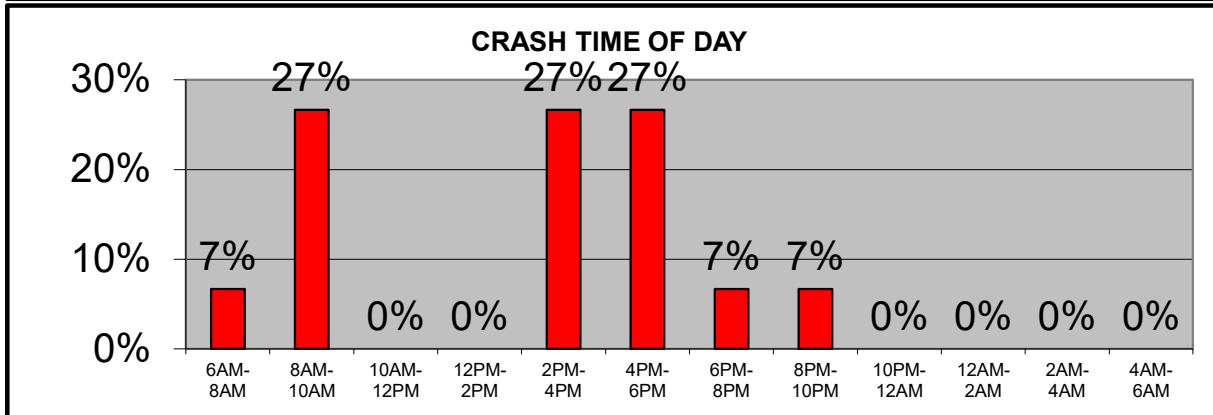
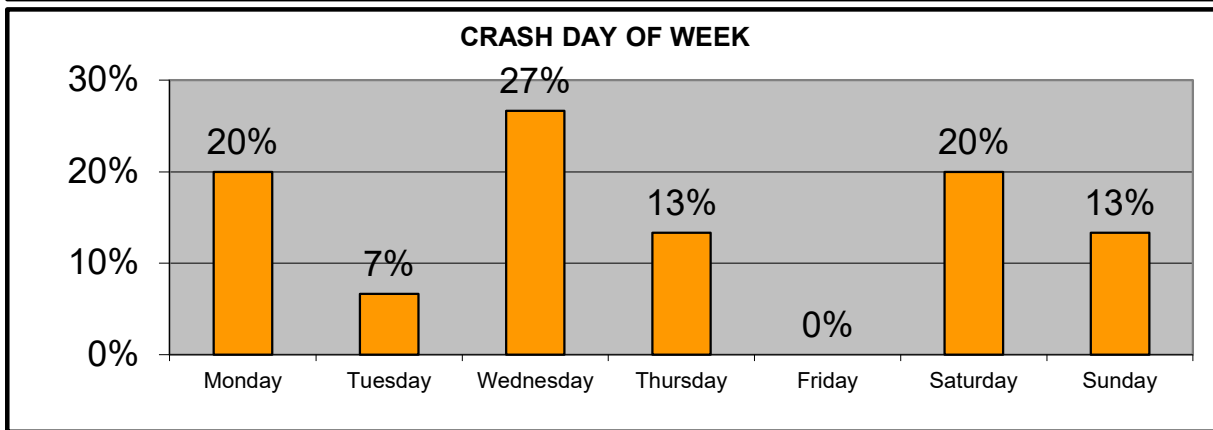
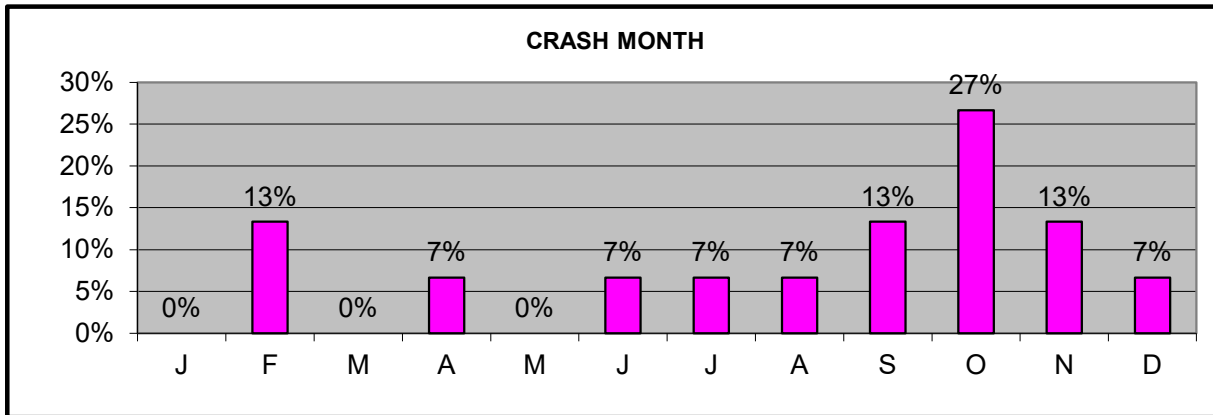
West Chestnut Street at Mercedes Road & Ettrick Street - Brockton, MA
2017-2021

Crash Diagram Ref #	Crash Date	Crash Day	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages				Comments
	m/d/y			Type	Type	Type	Type	Type	D1	D2	D3	D4	
1	7/10/17	Monday	5:05 PM	Angle	Daylight	Clear	Dry	Inattention	75	38			17-1248-AC
2	10/19/17	Thursday	9:48 AM	Angle	Daylight	Clear	Dry	Inattention	44	18			17-1884-AC
3	10/25/17	Wednesday	4:56 PM	Rear-end	Daylight	Rain	Wet	No Improper Driving	28	21			17-1932-AC
4	4/11/18	Wednesday	3:22 PM	Angle	Daylight	Clear	Dry	Failed to yield right of way	22	70			18-701-AC
5	9/22/18	Saturday	8:19 AM	Angle	Daylight	Clear	Dry	Failed to yield right of way	33	56	30	46	18-1761-AC
6	10/31/18	Wednesday	3:57 PM	Angle	Daylight	Cloudy	Dry	Failed to yield right of way	26	75			18-2009-AC
7	2/17/19	Sunday	8:41 PM	Single Vehicle Crash	Dark - lighted roadway	Clear	Dry	Unknown	51	37			19-296-AC
8	6/29/19	Saturday	6:01 PM	Angle	Daylight	Clear	Dry	Disregarded traffic signs, signals, road markings	20	18			19-1158-AC
9	9/14/19	Saturday	5:45 PM	Angle	Daylight	Cloudy	Dry	No Improper Driving	77	23			19-1667-AC
10	11/18/19	Monday	3:45 PM	Angle	Daylight	Rain	Wet	No Improper Driving	28	73			19-2141-AC
11	12/8/19	Sunday	8:40 AM	Single Vehicle Crash	Daylight	Clear	Dry	Operating Vehicle in erratic, reckless, careless, negligent, or aggressive manner	44				19-2304-AC
12	2/26/20	Wednesday	9:11 AM	Angle	Daylight	Clear	Dry	Failed to yield right of way	32	74			20-348-AC
13	10/1/20	Thursday	7:58 AM	Angle	Daylight	Clear	Dry	Failed to yield right of way	76	30			20-1412-AC
14	11/17/20	Tuesday	5:44 PM	Angle	Dark - lighted roadway	Clear	Dry	Failed to yield right of way	61	47			20-1708-AC
15	8/16/21	Monday	3:43 PM	Angle	Daylight	Clear	Dry	Failed to yield right of way	63	55			21-1423-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.

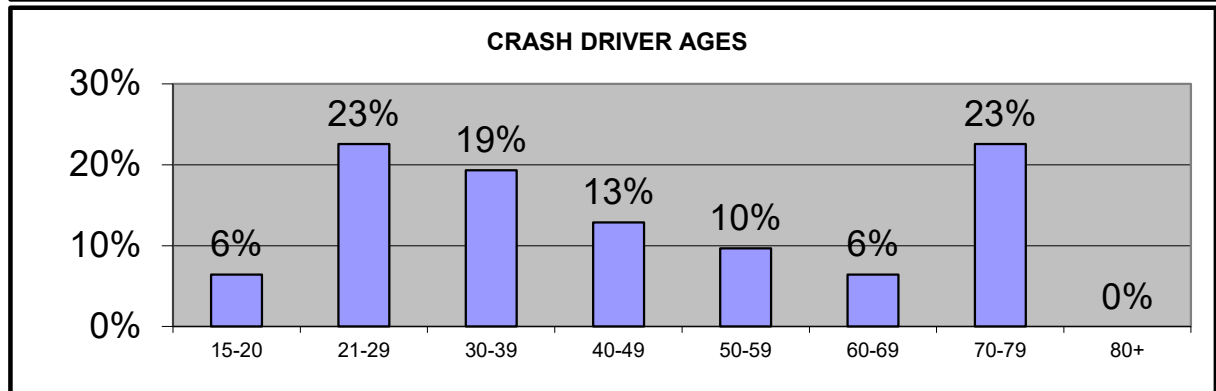
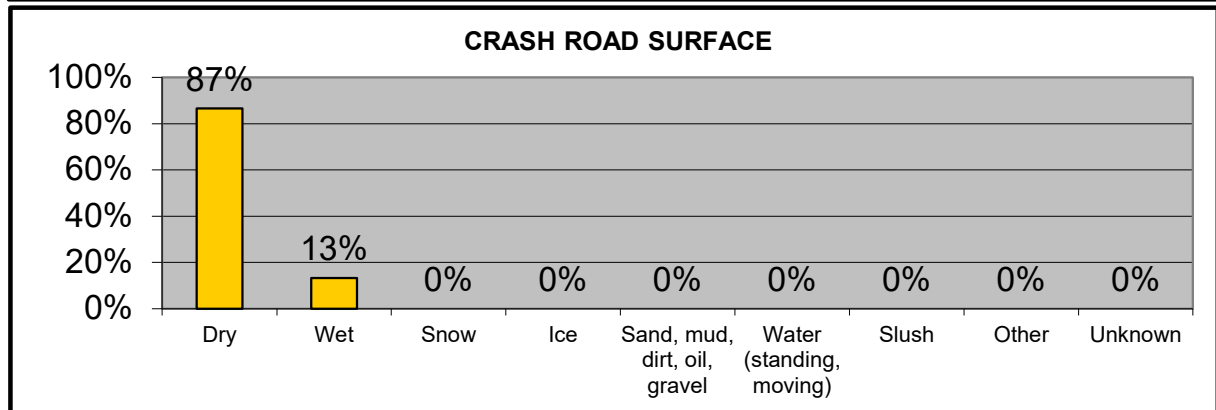
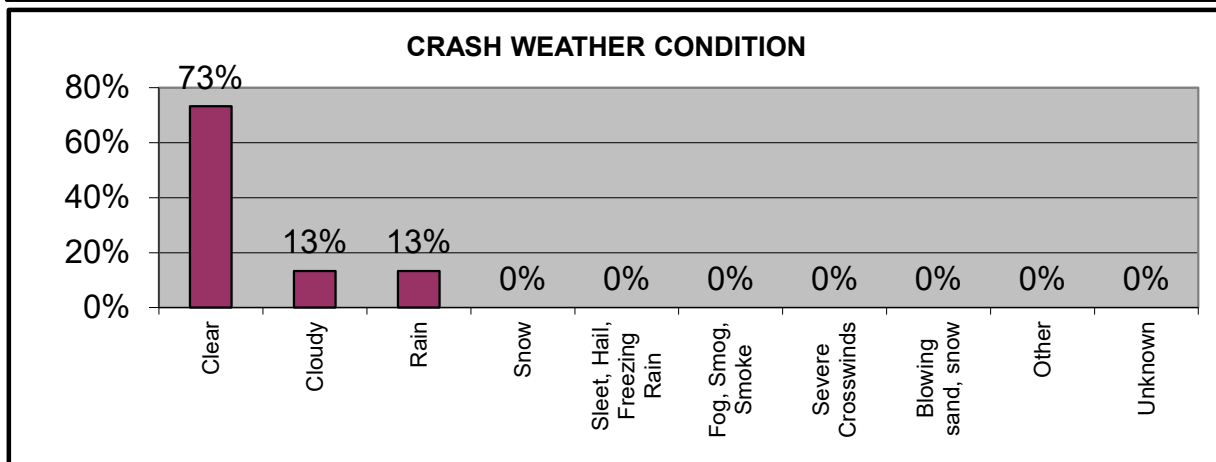
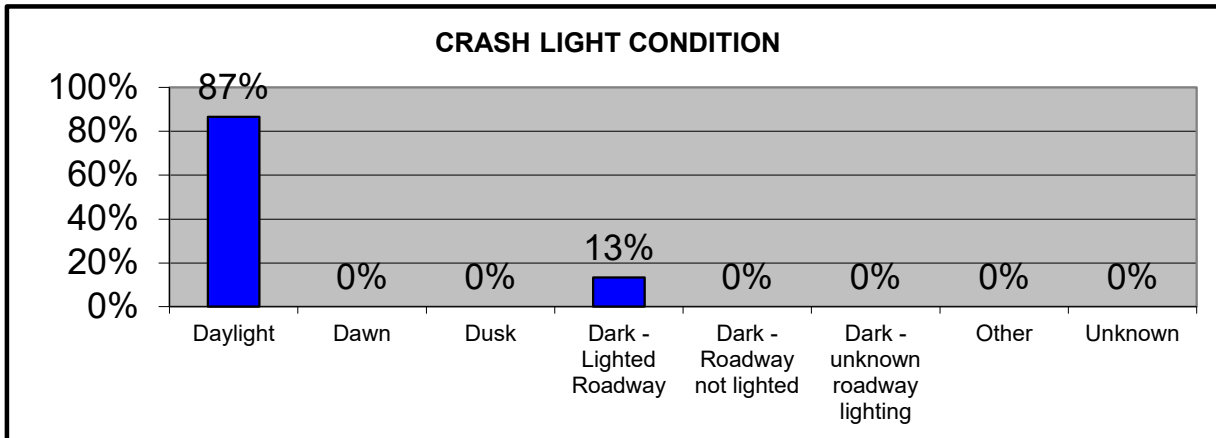
Crash Data Summary Tables and Charts

West Chestnut Street at Mercedes Road & Ettrick Street - Brockton, MA



Crash Data Summary Tables and Charts

West Chestnut Street at Mercedes Road & Ettrick Street - Brockton, MA

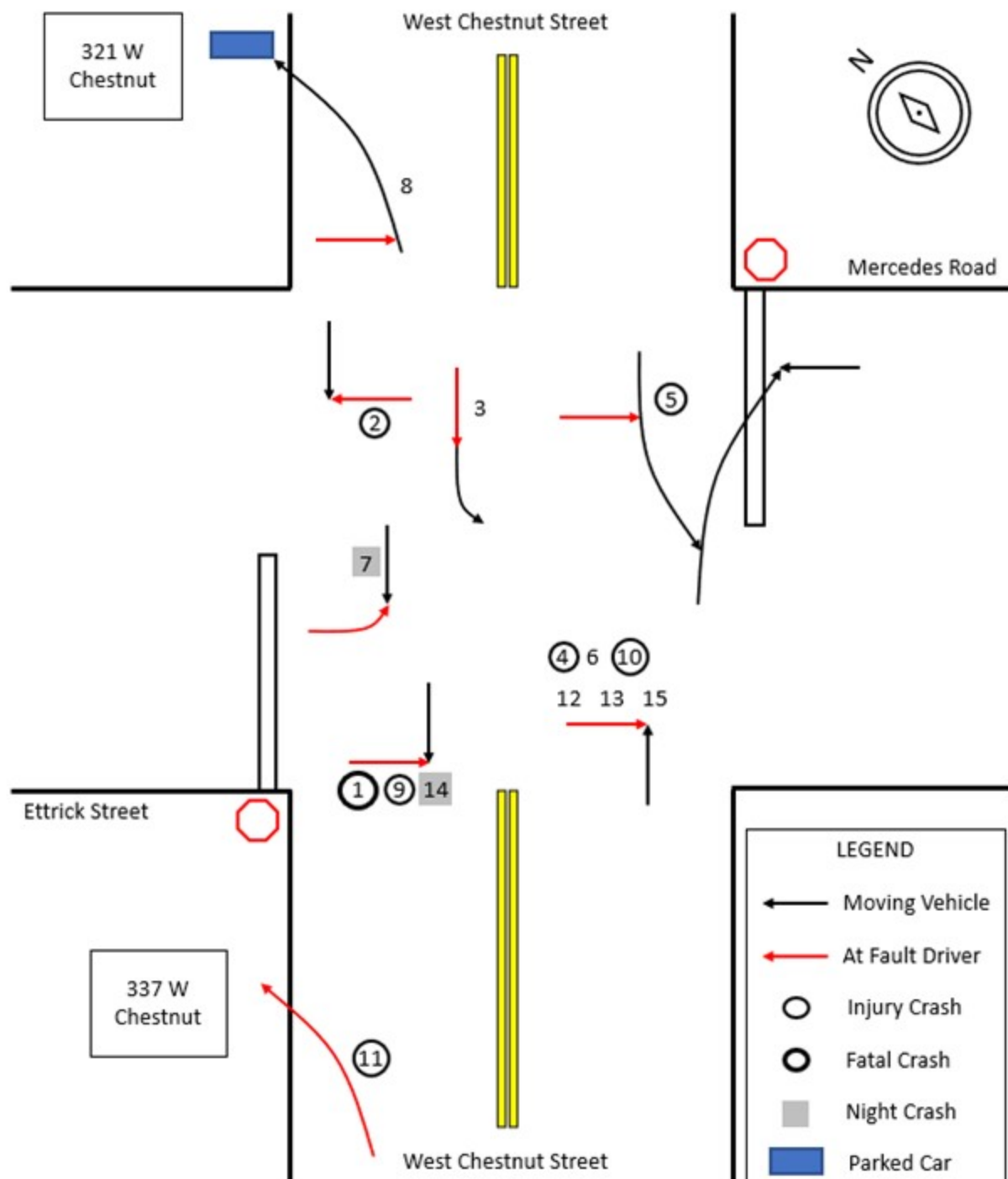


COLLISION DIAGRAM

West Chestnut Street at Mercedes Road / Ettrick Street

Collision Diagram for Crashes (2017-2021)

Prepared by OCPC (SB 2/2022) (Source: Brockton Police Dept.)



Appendix D. Additional Information

Appendix E. Road Safety Audit References

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/>.

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