ROAD SAFETY AUDIT

Orleans/Eastham Rotary
Route 6/Van Dale Avenue Intersection

Towns of Eastham and Orleans

April 2019

Prepared For:
MassDOT

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In cooperation with:
MassDOT Highway Division
and the Town of Eastham and
the Town of Orleans

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Background

The Federal Highway Administration (FHWA) defines a Road Safety Audit (RSA) as the formal safety examination of an existing or future road or intersection by an independent, multidisciplinary team. The purpose of an RSA is to identify potential safety issues and possible opportunities for safety improvements considering all roadway users. This RSA evaluates the following locations along Route 6 in Orleans and Eastham:

- Eastham/Orleans Rotary
- Route 6 at Van Dale Avenue Intersection.

A safety audit was scheduled for these locations as part of an ongoing Complete Streets Study for Route 6 through the Outer Cape communities of Eastham, Wellfleet, and Truro. The goal of this RSA is to identify short-term and long-term safety improvements that can be made at the study intersections.

Project Data

A Road Safety Audit was conducted for the Eastham/Orleans rotary and the intersection of Route 6 at Van Dale Avenue on April 3, 2019. The RSA meeting was held in the Earle Mountain Room at Eastham Town Hall located at 2500 State Hwy, Eastham, MA 02642. A copy of the Agenda for the meeting is provided in Appendix A. The road safety audit team, as shown in Table 1, was comprised of representatives from State, Regional and local agencies, and included a cross-section of engineers, planners, enforcement, and emergency response fields. A complete list of the contact information for all attendees can be found in Appendix B.

Table 1: Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Kate Maker	Michael Baker International
Alex Liptak	Michael Baker International
Steven Tupper	Cape Cod Commission (CCC)
David Nolan	Cape Cod Commission (CCC)
Silvio Genao	Eastham DPW Director
Kent Farrenkopf	Eastham Fire Department
Paul Lagg	Eastham Planning Director
Adam Bohannon	Eastham Police Department
Jason Walters	MassDOT District 5 Projects
Bianca Marshall	MassDOT District 5 Traffic
Kevin Fitzgerald	MassDOT Traffic Safety
Michelle Deng	MassDOT Traffic Safety
Geof Deering	Orleans Fire Department

Prior to the meeting, Michael Baker International, distributed a copy of the agenda, crash diagrams, summary tables, and a safety prompt list to all RSA attendees. Crash diagrams and summary tables for 2014-2016 were compiled from local and state police crash reports obtained from the Eastham Police Department, the Orleans Police Department, and the Massachusetts Department of Transportation (MassDOT). All attendees were encouraged to visit the study area locations prior to the meeting.

The pre- and post- audit meetings were held in the Earle Mountain Room at Eastham Town Hall. The meeting started with a brief description of the agenda of the RSA meeting, followed by introductions and a description of the RSA process. During the pre-audit meeting, using the crash materials and safety prompt list provided in advance, Michael Baker International facilitated the discussion of existing safety issues with all RSA attendees. RSA attendees were encouraged to bring their local knowledge and expertise to the discussion on existing safety and operational issues for the study area locations.

Following the pre-audit meeting, the audit team visited the intersections as a group to identify additional safety concerns. After the field visit, the team then returned to Eastham Town Hall to discuss potential solutions, ranging from short-term to long-term, low cost to high cost countermeasures for each identified safety concern.

Project Location and Description

This RSA focused on two locations:

- Eastham/Orleans Rotary
- Route 6 at Van Dale Avenue Intersection.

Eastham/Orleans Rotary: The Eastham/Orleans rotary is a major circular intersection on Cape Cod along Route 6, a critical regional roadway under MassDOT jurisdiction (see Figure 1). Route 6A meets the rotary on the southern approach. Smith Lane is the northern leg of the rotary, which offers access to local roads in Orleans and Eastham. Smith Lane becomes Rock Harbor Road when crossing the Orleans town line. The Barnstable 2nd District Courthouse is located on Rock Harbor Road. The town line between Orleans and Eastham bisects the circle. Route 6 and Route 6A are classified as Principal Arterials and located on the National Highway System (NHS). The rotary approaches, departures, and circulating roadways are unmarked, and assumed to be one lane. The RSA team members noted that the pavement widths are wide enough for two lanes and sometimes operate as such.

The posted speed limit on the Route 6A northbound and Route 6 westbound approaches is 25 mph. The posted speed limit on the Route 6 eastbound approach is 40 mph. Rock Harbor Road/Smith Lane are not posted. The first posted speed limit on Route 6A southbound and Route 6 eastbound after exiting the rotary is 40 mph. The first posted speed limit on Route 6 westbound after exiting the rotary is 50 mph.

An unmarked crosswalk is located across the Route 6 eastern leg. Tactile panels are not provided along the pedestrian route. No bicycle accommodations are provided.

Route 6 is the sole north-south thoroughfare connecting the Outer Cape communities, and as such the rotary experiences very high volumes and long near constant queues at all approaches during the summer months.

Route 6 at Van Dale Avenue: The Route 6 at Van Dale Avenue intersection is an unsignalized "T" intersection (see Figure 2). Van Dale Avenue is a local road under Town of Eastham jurisdiction and intersects Route 6 from the west. Route 6, at this location, is under MassDOT jurisdiction and is classified as a Principal Arterial and is located on the National Highway System (NHS). Route 6 runs north-south and is two-lanes in each direction within the study area. A United States Postal Service post office (USPS post office) is located at the northwest corner of the intersection. The building is served by a 40-foot wide driveway just north of Van Dale Avenue. The USPS post office building is set approximately 100-feet back from the edge of the roadway. CJ's Auto Garage is located at the southwest corner of the intersection. The garage is serviced by two 70-feet wide driveway curb cuts off Route 6 and a third 55-foot wide driveway off Van Dale Avenue. 7-Eleven with BP gas station is located on the east side across from the USPS post office. The convenience store/gas station is serviced by two driveways, one is signed as Enter Only the other is signed as Exit Only. A small private roadway, Christian Creek Road, is located south of Van Dale Avenue and intersects with Route 6 from the east.

The posted speed limit on Route 6 is 40 mph. Van Dale Avenue is not posted.

There is sidewalk along the west side of Route 6 that ends just north of the USPS post office driveway and picks back up south of the northern driveway to CJ's Auto Garage.

Road Safety Audit: Eastham/Orleans, MA
Figure 1 | Eastham/Orleans Rotary

0 100 200 400 Feet

MassDOT Massachusetts Department of Transportation Highway Division

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Road Safety Audit: Eastham/Orleans, MA
Figure 2 | Van Dale Avenue at Route 6

0 50 100 200 Feet

massDOT Massachusetts Department of Transportation Highway Division

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MBAKERINTL.COM

Crash Data

Crash data provided by the Eastham Police Department, the Orleans Police Department show 51 crashes from January 2014 to December 2016 at the Eastham/Orleans rotary and 16 crashes during the same time period at the Route 6/Van Dale Avenue intersection. Crash data summary and collision diagrams are provided in Appendix C.

For the Eastham/Orleans rotary, the most prevalent crash type was rear-end crashes, accounting for 76% of all crashes. Sideswipe crashes were the second most common manner of collisions, accounting for 12% of crashes. Single vehicle crashes and angle collisions account for 6% and 6% of the crashes, respectively. 78% of crashes occurred under daylight conditions, while 22% of crashes occurred under dark conditions.

For the Route 6/Van Dale Avenue intersection, the most prevalent crash type was angle crashes, accounting for 47% of all crashes. Sideswipe crashes were the second most common manner of collision, accounting for 27% of crashes. Rear-end and single vehicle collisions account for 20% and 6% of the crashes, respectively. 81% of crashes occurred under daylight conditions, while 19% of crashes occurred under dark conditions.

Audit Observations and Potential Safety Enhancements

Following an introduction to the RSA process and a summary of crash history data, the audit team members were asked to discuss safety concerns throughout the study areas. Audit team members then virtually walked the rotary location by watching a taped video of traffic moving through the rotary. The video was collected on Monday, April 1st and was utilized in lieu of walking due to unsafe/nonexistent pedestrian accommodations at the Eastham/Orleans rotary. Audit team members walked the Van Dale Avenue at Route 6 study area on Wednesday, April 3, 2019. Following both 'visits' the team made observations of various safety concerns and deficiencies which were documented during the site visits. Provided below is a list of the safety concerns and the potential enhancements that were identified for the two locations during the RSA.

Eastham/Orleans Rotary

Safety Concern #1: Deficient approach and exit geometry

The approaches to the rotary align on a tangent, allowing entering and exiting motorists to maintain high speeds and drivers to disregard the need to slow down and yield to circulating/exiting vehicles. Audit team members noted that the current alignment and angle of the roadways create 'slip lane' geometry which allows drivers to enter and exit the circle without yielding, and that the excessively large entry radii produce a fast entry speed into the rotary. Audit team members also noted the long tangential approaches provide too much time for drivers approaching the circle to view the circulating traffic. This condition causes the driver to become distracted and pay less attention to the vehicle directly in front of them,

resulting in a rear-end crash. During the three-year period of crashes collected and reviewed, rear-end crashes accounted for 76% of all crashes (39 of 51 crashes between 2014-2016). Crashes occurring at the entrance approaches to the rotary from Route 6 or Route 6A accounted for 71% (36 of 51 crashes between 2014-2016)

On the Route 6 eastbound approach, participants noted skid marks on the pavement and median as evidence of deficient geometry encouraging high entry speeds instead of geometry that enforces yielding and slower entries.

Figure 3: Aerial image of Eastham/Orleans rotary depicting tangential entries and exits

Potential Enhancements

- Participants discussed modifying the geometry of the splitter islands, so vehicles enter the circulating roadway at more of a 'T' than a 'Y' configuration, reducing the radius of the entry curve and tangent. The modifications would more closely resemble a modern roundabout with approach geometry designed to slow vehicles upon entry into the roundabout.
- Evaluate the feasibility of replacing the existing rotary with a modern roundabout. During the discussion it was noted that the center island is designated as wetland.
- Consider the feasibility of right turn bypass lane (6A Northbound) that is separated/channelized with the circle.

Safety Concern #2: Extensive pavement, wide travel lanes, lack of pavement markings and incorrectly placed signage

During the RSA virtual field visit, participants noted that at the rotary approaches, departures and circulating roadways there is an extensive amount of pavement (20'-30' wide) that is very wide and unmarked. It was remarked that the wide unmarked lanes cause confusion for positioning and frequent adjustments of position by drivers. The unmarked nature and inconsistent widths encourage erratic merging, weaving, and jockeying maneuvers. The inconsistent lane widths and limited pavement marking also contribute to drivers being in the 'wrong' lane when circulating verse exiting the rotary. Participants noted the yield signage is located too early and is not aligned with the location where drivers need to or should be yielding, and that there is no yield line pavement marking. Participants also noted

that the signage at the guardrail at the Smith lane intersection was unclear. Vegetation obscuring the existing signage was also noted.

Figure 4: Route 6 eastbound approach to Eastham/Orleans rotary

Figure 5: Route 6A northbound approach to Eastham/Orleans rotary

Potential Enhancements

- Stripe the approaches, exits, and circulating roadway for one lane.
- Where Route 6A enters the roundabout consider a two-lane approach with a two-lane departure to Route 6 eastbound. This modification would provide a dedicated lane for drivers turning from Route 6A to Route 6 eastbound. Flexible delineators were discussed to channelize this dedicated movement. The impact of this treatment on vehicle speeds at the pedestrian crossing just north of the rotary would need to be evaluated.
- Reposition the yield signs closer to the merge point.
- Consider striping the approaches to include "yield markings", YIELD (word) and YIELD AHEAD (symbol or word) markings

- Consider addition of a 25 MPH speed limit sign on Route 6 eastbound as drivers approach the circle. There is some speed signage currently but no sign for the actual speed limit.

Safety Concern #3: Substandard/non-existent pedestrian accommodations

Audit team members expressed concern that pedestrians are present within the vicinity of the rotary. Participants noted a break in the chain-link fence on the east side of the Route 6 eastbound exit lane that pedestrians frequently utilize. Most pedestrians cross at the unmarked crosswalk location. Neither a crosswalk nor truncated domes are present at this location.

Figure 6: Unmarked crossing at Route 6 eastbound exit lane, looking west

Potential Enhancements

- Provide high-visibility marked crosswalk at current unmarked location. Upgrade curb ramps to meet the minimum ADA requirements. Investigate whether enhanced crossing treatments such as a Rectangular Rapid Flashing Beacon (RRFB) or Pedestrian Hybrid Beacon (PHB) are necessary due to the speed and volume of the vehicular traffic.
- As a short-term measure, consider striping and/or signing the existing crossing.
- Evaluate pedestrian desire lines and the feasibility to provide a sidewalk between Route 6 westbound approach and Rock Harbor Road/Smith Lane. The Cape Cod Rail Trail (CCRT) and Orleans District Court can be accessed from Rock Harbor Road.
- Evaluate pedestrian desire lines and the feasibility to provide a sidewalk between Route 6 eastbound departure and Route 6A northbound approach. There is a documented pedestrian desire line currently utilizing Old State Highway to access the commercial development off of Canal Road.
- Consider wayfinding signage to direct pedestrians on Rock Harbor Road/Smith Lane to utilize the existing pedestrian bridge for safe access to the commercial development on Canal Road.
- Investigate 'ownership' of fence access point. Investigate whether this location is the safest access point for pedestrians to utilize.
- Where new sidewalks are proposed, ensure safe termini are constructed.

Safety Concern #4: Substandard/non-existent bicycle accommodations

Participants noted a bike route sign located within the roundabout to direct riders to exit at Rock Harbor Road/Smith Lane to access the CCRT. Participants thought this was a remnant of the "MassBike 1". All participants felt in its current condition, cyclists should not be biking through the rotary due to the high speeds and erratic driver behaviors experienced at the circle. Also, the lack of any nearby accommodations means drivers are not expecting to see cyclists here.

Potential Enhancements

- Evaluate bicycle desire lines and the feasibility to provide a separated bicycle lane around the rotary. Of note is the bicycle movement from Route 6 westbound to Rock Harbor Road/Smith Lane. Providing a safe connection would facilitate a connection to the CCRT which can be accessed off of Rock Harbor Road.
- Consider removing the existing bike route sign from the rotary.

Safety Concern #5: Proximity of nearby intersections

The Rock Harbor Road/Smith Lane intersection is located directly north of the rotary, approximately 150' from the circulating roadway, resulting in an abrupt, unexpected stop. In addition to its proximity to the rotary, the signage is unclear regarding who has the right-of-way causing driver confusion. There is a yield sign on the rotary exit located approximately 50-feet before the intersection. The Smith Lane stop sign is not visible to exiting traffic. Additionally, the Smith Lane stop bar and stop sign are not aligned. Participants understand the exiting traffic has the right-of-way and is not required to stop, but this may be not be clear to drivers unfamiliar with the area.

Figure 7: View of Eastham/Orleans rotary exit at Rock Harbor Road/Smith Lane

Potential Enhancements

- Consider additional pavement markings to facilitate a direct connection from the rotary exit to Rock Harbor Road. Realign Smith Lane to intersect perpendicularly to the direct connection.

- Align the Smith Lane stop bar and stop sign. Consider relocating so oncoming traffic can see Smith Lane stop sign and markings. Consider signage alerting drivers that Smith Lane is controlled by a stop sign.
- Provide signage for Rock Harbor Road approach.

Safety Concern #6: Canal Road

Although outside the limits of the crash data collected and the original scope of the RSA to be conducted, the Canal Road intersection is located within close proximity to the rotary (approximately 350' from the circulating roadway). Audit members reiterated the safety concerns at this intersection throughout the RSA by emphasizing that many crashes occur at Canal Road. Audit members noted that cars exiting the rotary are approaching the Canal Road intersection at high speeds where sight lines are challenging due to the horizontal curve in Route 6A. Additionally, participants noted the utility poles along the west side of Route 6A are very close to the edge of the roadway and get hit frequently.

In addition to the horizontal curve, just prior to the Canal Road intersection, Route 6A northbound narrows from two lanes to one lane to facilitate the single lane approach at the rotary. The Canal Road intersection is located within this transition area and therefore the roadway width is not quite wide enough for two lanes, but drivers still try to 'squeeze' around the left turning traffic. Additionally, traffic exiting Canal Road does not expect the second car to continue through the intersection.

Finally, participants noted that cars exiting Canal Road tend to block each other's sight lines.

Potential Enhancements

- Where Route 6A transitions from two lanes to one lane consider whether a dedicated left turn lane would alleviate friction or if narrowing this area to a single lane would reduce conflicts.
- Straighten out horizontal curve in Route 6A.
- Relocate Canal Road further south away from the rotary.
- Relocate utility poles south of Canal Road to the west, away from the edge of pavement.
- Consider concept of a small roundabout at intersection of Canal Road and Route 6A due to high traffic turning onto Route 6 from Canal Rd. Future redevelopment of commercial properties on canal road may increase traffic in this area even more.

Van Dale at Route 6 Intersection

Safety Concern #1: Access management

As one participant noted, "it isn't that the traffic volumes are exceedingly high in the area, its just there's a lot going on and it can feel as though cars are everywhere". This observation can likely be attributed to the six very wide driveway curb cuts located within the small vicinity of the intersection. Additionally, both the 7-Eleven and USPS post office experience a high volume of in-and-out trips.

Audit members discussed the poor sight lines of vehicles exiting the post office driveway. Sight lines to the Depot Road/Samoset Road signal located north of the intersection are obscured by vehicles parked in the marked spaces along Route 6.

Participants noted that CJ's garage may have too many driveway curb cuts. As previously noted, the garage is serviced by two 70-feet wide driveway curb cuts off Route 6 and a third 55-foot wide driveway off Van Dale Avenue.

The 7-Eleven convenience store/BP gas station is serviced by two driveways, one is signed as Enter Only the other is signed as Exit Only. Participants noted the exit only and enter only signs are small and hard to see when driving along Route 6.

Potential Enhancements

- Participants discussed relocating the USPS post office driveway to Van Dale Avenue. This would eliminate one curb cut along Route 6.
- At the convenience store/gas station driveway participants suggested 'Do Not Enter' signs at the Exit Only driveway. In addition, installing more visible enter-only and exit-only signage may help to enforce the intended traffic flow.
- Participants debated prohibiting left turns through the area during the summer months using flexible delineators along the centerline.
- Audit members recommended restriping the post office parking lot to relocate the parking spaces along Route 6 obscuring sight lines closer to the post office building.
- The width and number of driveways accessing CJ's Auto Garage are excessive. Participants suggested consolidating and narrowing CJ's Auto Garage driveways to one driveway off Van Dale Avenue. Participants also suggested investigating whether the garage has the appropriate permissions from the state for the curb cuts prior to eliminating the access points.

Safety Concern #2: High vehicular speeds

Participants noted while standing at the USPS post office driveway, the traffic on Route 6 is travelling much faster than the posted speed limit, especially those vehicles travelling southbound having just been released from the Depot Road/Samoset Road traffic signal.

Potential Enhancements

- Implement traffic calming measures along Route 6. Participants discussed the possibility of a four-lane to three-lane with a two-way left turn road diet to reduce traffic speeds. A four lane to two-lane cross-section was also discussed.

Safety Concern #3: High pedestrian activity with substandard/non-existent pedestrian accommodations

Audit members discussed the active pedestrian area, noting many customers park at either the USPS post office or 7-Eleven convenience store/BP gas station to conduct business at one business and then walk across the street to conduct business at the other location instead of driving. Audit members also mentioned the nearby residents often contribute to pedestrian activity at the intersection. Residents of the House often walk to 7-Eleven and back which includes crossing Route 6. Note, there is no marked crosswalk at this location.

Participants noted the lack of sidewalk on the east side of Route 6 and lack of crossing accommodations at the intersection. Participants also noted that the sidewalk on the west side ends just north of the post office driveway and doesn't reappear until south of the CJ's northern driveway which results in a 150 feet section without a sidewalk where pedestrians are within the vehicle zone. Audit members also noted the pedestrian path of travel between the USPS post office driveway and Van Dale Avenue is obstructed by a utility pole and small median forcing pedestrians into the street.

Participants noted minimal bicycle activity in the area. It was also noted that this was likely due to the lack of any bicycle accommodations.

Potential Enhancements

- Narrow driveways to reduce the distance pedestrians are exposed to vehicular traffic.
- Relocate utility pole to create continuous pedestrian path of travel across the USPS post office driveway and Van Dale Avenue.
- Investigate a road diet along Route 6 as suggested under Safety Concern #2. If a road diet is feasible, consider enhanced pedestrian accommodations within the newly obtained area.
- Consider addition of a sidewalk on the east side of Route 6 from the Town Hall to the 7-Eleven gas station to provide pedestrian accommodations between the businesses and the signalized crossing at the Town Hall.

Summary of Road Safety Audit

Following the site visit and discussion of existing safety issues, audit team members were asked to consider various safety related improvements. The audit team members were encouraged to consider both short-term and long-term improvements for each of the existing safety issues. Each improvement considered has been categorized as short-term, medium-term, or long-term based on the definitions shown in Table 2. Additionally, a cost category has been assigned to each improvement based on the parameters set forth in Table 2. The safety payoff estimate is a subjective judgement of the potential effectiveness of the safety recommendations.

Table 3 lists each safety issue and the corresponding potential safety enhancements, its potential safety payoff, the estimated time frame for completion, the estimated construction cost, and the roadway jurisdiction.

Table 2: Estimated Time Frame and Costs Breakdown

Time Frame	
Short-Term	<1 Year
Mid-Term	1-3 Years
Long-Term	>3 Years

Costs	
Low	<$10,000
Medium	$10,001-$50,000
High	>$50,000

Table 3: Potential Safety Enhancement Summary

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Eastham/Orleans Rotary					
Safety Concern #1: Deficient approach and exit geometry	Participants discussed modifying the geometry of the splitter islands, so vehicles enter the circulating roadway at more of a 'T' than a 'Y' configuration, reducing the radius of the entry curve and tangent. The modifications would more closely resemble a modern roundabout with approach geometry designed to slow vehicles upon entry into the roundabout.	High	Mid-Term	High	MassDOT
	Consider the feasibility of right turn bypass lane (6A Northbound) that is separated/channelized with the circle.	Medium	Long-Term	High	MassDOT
	Evaluate the feasibility of replacing the existing rotary with a modern roundabout. During the discussion it was noted that the center island is designated as wetland.	High	Long-Term	High	MassDOT
Safety Concern #2: Extensive pavement, wide travel lanes, lack of pavement markings and incorrectly placed signage	Stripe the approaches, exits, and circulating roadway for one lane.	High	Short-term	Low	MassDOT
	Consider addition of a 25 MPH speed limit sign on Route 6 eastbound as drivers approach the circle. There is some speed signage currently but no sign for the actual speed limit.	Medium	Short-Term	Low	MassDOT
	Where Route 6A enters the roundabout consider a two-lane approach with a two-lane departure to Route 6 eastbound. This modification would provide a dedicated lane for drivers turning from Route 6A to Route 6 eastbound. Flexible delineators were discussed to channelize this dedicated movement.	Medium	Mid-Term	Medium	MassDOT
	Reposition the yield signs closer to the rotary.	Medium	Short-term	Low	MassDOT

Safety Concern #3: Substandard/non-existent pedestrian accommodations	Provide high-visibility marked crosswalk at current unmarked location. Upgrade curb ramps to meet the minimum ADA requirements. Investigate whether enhanced crossing treatments such as a Rectangular Rapid Flashing Beacon (RRFB) or Pedestrian Hybrid Beacon (PHB) are necessary due to the speed and volume of the vehicular traffic.	High	Mid-Term	High	MassDOT
	Evaluate pedestrian desire lines and the feasibility to provide a sidewalk between Route 6 westbound approach and Rock Harbor Road/Smith Lane. The CCRT and Orleans District Court can be accessed from Rock Harbor Road. Where new sidewalks are proposed, ensure safe termini are constructed.	High	Long-Term	High	MassDOT
	Evaluate pedestrian desire lines and the feasibility to provide a sidewalk between Route 6 eastbound departure and Route 6A northbound approach. There is a documented pedestrian desire line currently utilizing Old State Highway to access the commercial development off of Canal Road. Where new sidewalks are proposed, ensure safe termini are constructed.	High	Long-Term	High	MassDOT
	Consider striping and/or signing the existing crossing.	Medium	Short-term	Low	MassDOT
	Consider wayfinding signage to direct pedestrians on Rock Harbor Road/Smith Lane to utilize the existing pedestrian bridge for safe access to the commercial development on Canal Road.	Medium	Short-term	Low	Town of Orleans/Town of Eastham
	Investigate 'ownership' of fence access point. Investigate whether this location is the safest access point for pedestrians to utilize.	Medium	Short-term	Low	MassDOT/Other

Safety Concern #4: Substandard/non-existent bicycle accommodations	Evaluate bicycle desire lines and the feasibility to provide a separated bicycle lane around the rotary. Of note is the bicycle movement from Route 6 westbound to Rock Harbor Road/Smith Lane. Providing a safe connection would facilitate a connection to the CCRT which can be accessed off of Rock Harbor Road.	High	Long-Term	High	MassDOT/ Town of Orleans
	Consider removing the existing bike route sign from the rotary.	Low	Short-term	Low	MassDOT
Safety Concern #5: Proximity of nearby intersections	Consider additional pavement markings to facilitate a direct connection from the rotary exit to Rock Harbor Road. Realign Smith Lane to intersect perpendicularly to the direct connection.	Medium	Mid-Term	Medium to High	MassDOT
	Align the Smith Lane stop bar and stop sign. Consider relocating so oncoming traffic can see Smith Lane stop sign and markings. Consider signage alerting drivers that Smith Lane is controlled by a stop sign.	Medium	Short-term	Low	Town of Orleans
Safety Concern #6: Canal Road	Where Route 6A transitions from two lanes to one lane consider whether a dedicated left turn lane would alleviate friction or if narrowing this area to a single lane would reduce conflicts.	Medium	Mid-Term	Medium	MassDOT
	Straighten out horizontal curve in Route 6A.	High	Long-Term	High	MassDOT
	Consider concept of a small roundabout at intersection of Canal Road and Route 6A due to high traffic turning onto Route 6 from Canal Rd. Future redevelopment of commercial properties on canal road may increase traffic in this area even more.	High	Long-Term	High	Town of Orleans
	Relocate Canal Road further south away from the rotary.	High	Long-Term	High	Town of Orleans
	Relocate utility poles south of Canal Road to the west, away from the edge of pavement.	High	Long-Term	High	Town of Orleans/ Private Utility

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Van Dale Avenue at Route 6					
Safety Concern #1: Access management	Participants discussed relocating the USPS post office driveway to Van Dale Avenue. This would eliminate one curb cut along Route 6.	High	Mid-Term	High	MassDOT/ USPS
	At the convenience store/gas station driveway participants suggested 'Do Not Enter' signs at the Exit Only driveway. In addition, installing more visible enter-only and exit-only signage may help to enforce the intended traffic flow.	Medium	Short-term	Low	MassDOT/ Private Owner
	Participants debated prohibiting left turns through the area during the summer months using flexible delineators along the centerline.	Medium	Mid-Term	Low	MassDOT
	Audit members recommended restriping the post office parking lot to relocate the parking spaces along Route 6 obscuring sight lines closer to the post office building.	High	Short-term	Low	MassDOT/ USPS
	The width and number of driveways accessing CJ's Auto Garage are excessive. Participants suggested consolidating and narrowing CJ's Auto Garage driveways to one driveway off Van Dale Avenue. Participants also suggested investigating whether the garage has the appropriate permissions from the state for the curb cuts prior to eliminating the access points.	High	Mid-Term to Long-Term	Medium to High	MassDOT/ Private Owner
Safety Concern #2: High vehicular speeds	Implement traffic calming measures along Route 6. Participants discussed the possibility of a four-lane to three-lane with a two-way left turn road diet to reduce traffic speeds. A four lane to two-lane cross-section was also discussed.	High	Long-Term	High	MassDOT
Safety Concern #3: High pedestrian activity with	Narrow driveways to reduce the distance pedestrians are exposed to vehicular traffic.	High	Mid-Term to Long-Term	Medium to High	MassDOT/ Private Owner

substandard/non-existent pedestrian accommodations	Relocate utility pole to create continuous pedestrian path of travel across the USPS post office driveway and Van Dale Avenue.	Medium	Mid-Term to Long-Term	High	MassDOT/ Private Utility
	Consider addition of a sidewalk on the east side of Route 6 from the Town Hall to the 7-Eleven gas station to provide pedestrian accommodations between the businesses and the signalized crossing at the Town Hall.	High	Long-Term	High	MassDOT
	Investigate a road diet along Route 6 as suggested under Safety Concern #2. If a road diet is feasible, consider enhanced pedestrian accommodations within the newly obtained area.	High	Long-Term	High	MassDOT

Appendix A. RSA Meeting Agenda

Agenda

Road Safety Audit

Eastham, MA

Meeting Location: Eastham Town Hall
2500 State Hwy, Eastham, MA 02642
Earle Mountain Room
April 3, 2019
8:00 AM – 12:00 noon

Type of meeting:	**High Crash Location – Road Safety Audit**
Attendees:	**Invited Participants to Comprise a Multidisciplinary Team**
Please bring:	**Thoughts and Enthusiasm!!**

8:15 AM — **Welcome and Introductions**

8:30 AM — **Review of Site-Specific Material**

- Crash, Speed & Volume Summaries– provided in advance
- Existing Geometries and Conditions

9:00 AM — **Eastham/Orleans Rotary**

- Watch video of Orleans/Eastham Rotary
- As a group, identify areas for improvement
- Discuss observations and finalize findings
- Discuss potential improvements and finalize recommendations

10:30 AM — **Route 6/Van Dale Avenue Intersection**

- Walk/drive to Van Dale Avenue
- As a group, identify areas for improvement
- Discuss observations and finalize findings
- Discuss potential improvements and finalize recommendations

12:00 noon — **Adjourn for the Day – but the RSA has not ended**

Instructions for Participants:

* **Before attending the RSA on April 3rd, participants are encouraged to drive through the intersection 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.**

Appendix B. RSA Audit Team Contact List

Participating Audit Team Members

Date: April 4, 2019 Location: Eastham and Orleans, MA

Audit Team Members	Agency/Affiliation	Email Address
Steven Tupper	Cape Cod Commission	stupper@capecodcommission.org
David Nolan	Cape Cod Commission	david.nolan@capecodcommission.org
Silvio Genao	Eastham DPW Director	dpwdir@eastham-ma.gov
Kent Farrenkopf	Eastham Fire Department	kfarrenkopf@eastham-ma.gov
Paul Lagg	Eastham Planning Director	plagg@eastham-ma.gov
Adam Bohannon	Eastham Police Department	abohannon@eastham-ma.gov
Jason Walters	MassDOT District 5 Projects	Jason.walters@dot.state.ma.us
Bianca Marshall	MassDOT District 5 Traffic	Bianca.Marshall@dot.state.ma.us
Kevin Fitzgerald	MassDOT Traffic Safety	kevin.t.fitzgerald@state.ma.us
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Alex Liptak	Michael Baker International	Alexander.Liptak@mbakerintl.com
Katharine Maker	Michael Baker International	katharine.maker@mbakerintl.com
Geof Deering	Orleans Fire Department	gdeering@orleansfd.com

Appendix C. Detailed Crash Data

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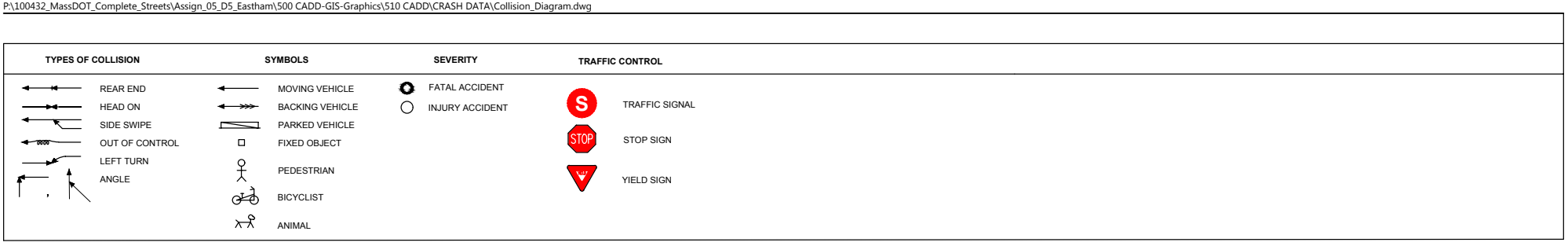
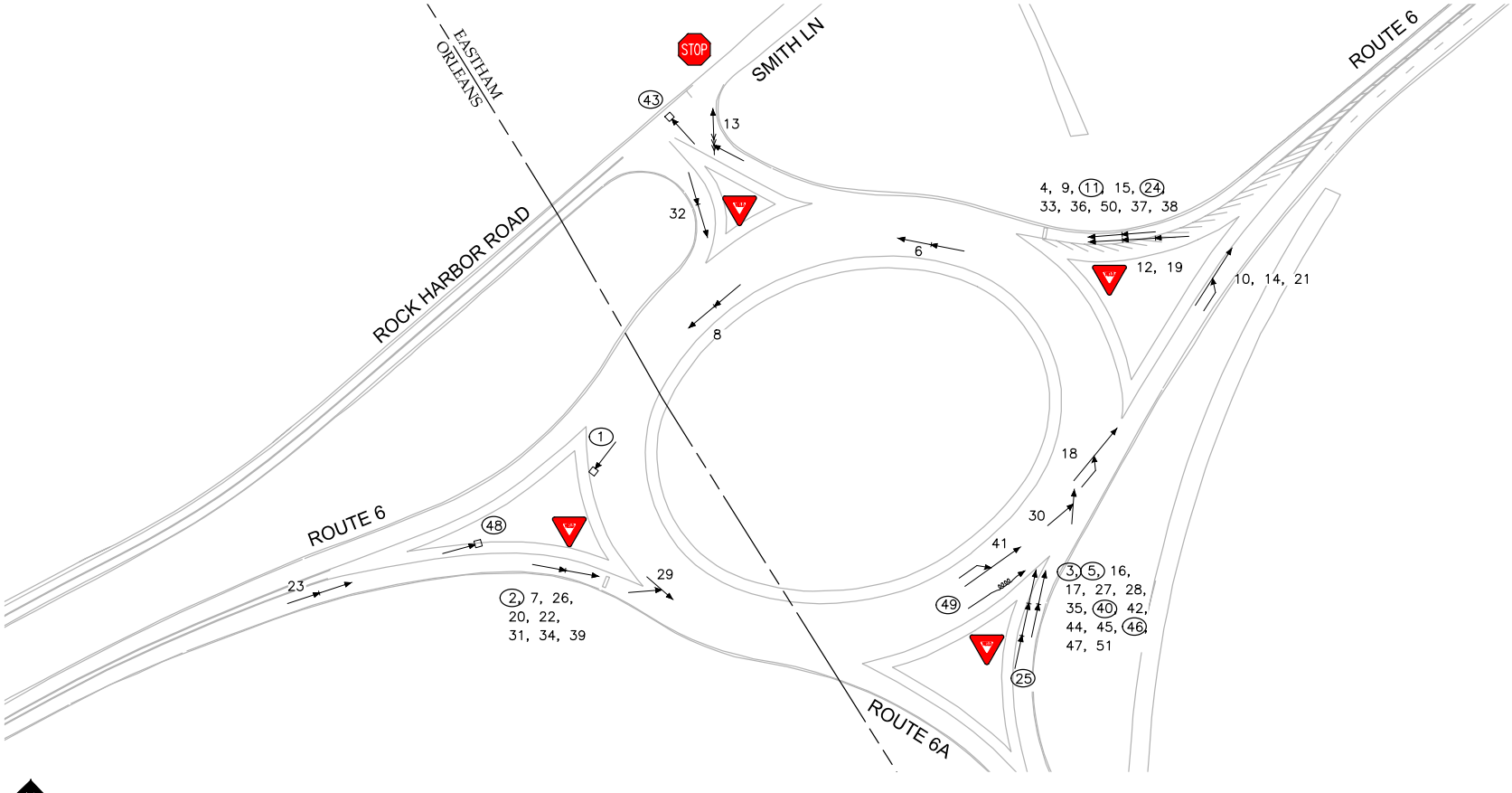




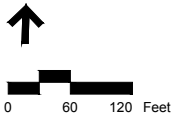


Figure 1

Collision Diagram
Rotary at Mid-Cape Highway (Rte. 6)
Eastham & Orleans, Massachusetts

Route 6 Rotary at Rock Harbor Rd and Smith Ln
2/25/2019
Source: MassDOT, Eastham Police, Orleans Police

Crash Diagram Ref #	Crash Date	Crash Day	Crash Time	Manner of Collision Type	Crash Severity Type	Driver Contributing Code	D1 Age	D2 Age	Ambient Light Type	Weather Condition Type	Road Surface Condition Type	Comments
1	2/15/2014	Saturday	11:44 PM	Sideswipe, same direction	Non-incapacitating injury	Driving too fast for conditions			Dark - roadway not lighted	Snow/Reported but invalid	Ice	Vehicle collision with pedestrian and parked motor vehicle
2	4/23/2014	Wednesday	12:33 PM	Rear-end	Possible injury				Daylight	Cloudy	Dry	Collision with motor vehicle in traffic
3	6/9/2014	Monday	7:34 AM	Rear-end	Non-incapacitating injury	Other improper action	70	73	Daylight	Clear	Dry	V1 rear ended by V2 after V2 failed to yield at rotary.
4	6/27/2014	Friday	4:33 PM	Rear-end	Property damage only (none injured)	Distracted	60	57	Daylight	Clear	Dry	V1 rear ended V2 due to V1 driver being distracted and thinking that V2 driver had begun moving. Both vehicles were stopped in traffic prior to incident.
5	7/2/2014	Wednesday	6:10 PM	Rear-end	Possible non-fatal injury	Inattention	50	24	Daylight	Clear	Dry	V2 entering rotary from Rt 6A, and stopped to yield. V1 driver did not see V2 stop and struck V1 from behind.
6	7/19/2014	Saturday	5:37 PM	Rear-end	Property damage only (none injured)	Failed to yield right of way	48	65	Daylight	Clear	Dry	V2 traveling inside rotary, V1 enters rotary from north. V2 moves right to exit rotary, and left front corner of V1 collides with the right rear corner of V2.
7	8/14/2014	Thursday	1:30 PM	Rear-end	Property damage only (none injured)	Inattention			Daylight	Clear	Dry	Collision with motor vehicle in traffic
8	8/23/2014	Saturday	5:45 PM	Rear-end	Property damage only (none injured)	Followed too closely			Daylight	Clear	Dry	Collision with motor vehicle in traffic
9	11/10/2014	Monday	10:00 AM	Rear-end	Property damage only (none injured)	Inattention			Daylight	Clear	Dry	Collision with motor vehicle in traffic
10	12/26/2014	Friday	9:23 PM	Sideswipe, same direction	Property damage only (none injured)	Disregarded traffic signs, signals, road markings, Other improper action	40	28	Dark - roadway not lighted	Clear	Dry	V1 traveling out of Eastham/Orleans rotary when V2 merged into the rotary from Rt 6A in Orleans. While both vehicles were exiting the rotary, V2 attempted to pass V1 on the right side of the roadway, sideswiping V1 causing damage to the passenger side of V1 and the driver side of V2.
11	1/14/2015	Wednesday	8:13 PM	Rear-end	Possible non-fatal injury	Unknown	49	45	Dark - roadway not lighted	Rain	Wet	V1 struck rear passenger side bumper of V2 from behind while both vehicles were entering the rotary.
12	2/25/2015	Wednesday	3:59 PM	Rear-end	Property damage only (none injured)	Followed too closely	18	45	Daylight	Clear	Dry	Operator of V2 was stopped in traffic waiting to enter rotary, was struck from behind by V1. V2 was then pushed into V3 due to the rear collision of V1. 3 car rear-end.
13	2/26/2015	Thursday	2:40 PM	Sideswipe, same direction	Property damage only (none injured)	Visibility Obstructed	40	81	Daylight	Snow	Snow	Operator of V1, a plowtruck, was backing into the roadway after plowing snow off the roadway. V2, using the rotary off ramp, struck V1 from behind at an angle, damaging the rear quarter panel of V2.
14	3/19/2015	Thursday	12:51 AM	Sideswipe, same direction	Property damage only (none injured)	Disregarded traffic signs, signals, road markings, Followed too closely	38	28	Dark - lighted roadway	Clear	Dry	V1 and V2 were traveling northbound on Rt 6 exiting the Eastham/Orleans rotary. V2 attempted to pass V1 on the right. V1 then struck V2 while moving into the middle to the off ramp lane thus causing damage to both vehicles.

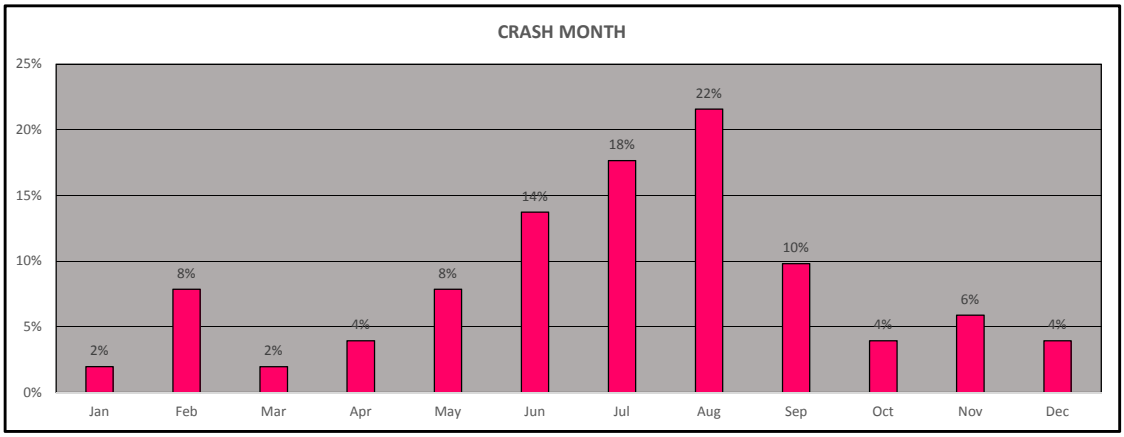
15	5/24/2015	Sunday	3:55 PM	Rear-end	Property damage only (none injured)	Followed too closely			Daylight	Clear	Dry	Collision with motor vehicle in traffic
16	6/4/2015	Thursday	10:10 PM	Rear-end	Property damage only (none injured)	Followed too closely			Dark - lighted roadway	Clear	Dry	Collision with motor vehicle in traffic
17	6/14/2015	Sunday	12:27 PM	Rear-end	Property damage only (none injured)	Other improper action, Inattention	34	22	Daylight	Clear	Dry	V1 yielding to traffic on the rotary when V2 failed to stop and rear ended V1.
18	6/27/2015	Saturday	4:58 PM	Sideswipe, same direction	Property damage only (none injured)	Failed to yield right of way			Daylight	Not Reported	Dry	Collision with motor vehicle in traffic
19	7/10/2015	Friday	5:14 PM	Rear-end	Property damage only (none injured)	Followed too closely	22	68	Daylight	Clear	Dry	V1 was behind V2 as they were stopped entering rotary. V1 began to move forward, struck V2, which was then pushed into V3. 3 car rear-end.
20	7/22/2015	Wednesday	3:45 PM	Rear-end	Property damage only (none injured)	Followed too closely			Daylight	Clear	Dry	Collision with motor vehicle in traffic
21	7/28/2015	Tuesday	1:47 PM	Sideswipe, same direction	Property damage only (none injured)	Other improper action	48	58	Daylight	Clear	Dry	V2 passed V1 and V1's trailer, side swiping the trailer and vehicle. V2 then left the area.
22	7/29/2015	Wednesday	5:15 PM	Rear-end	Property damage only (none injured)	Inattention			Daylight	Clear	Dry	Collision with motor vehicle in traffic
23	8/2/2015	Sunday	11:48 AM	Rear-end	Property damage only (none injured)	Inattention			Daylight	Clear	Dry	Collision with motor vehicle in traffic
24	8/11/2015	Tuesday	4:08 PM	Rear-end	Non-incapacitating injury	Other improper action	82	18	Daylight	Rain/Cloudy	Wet	V1 rear ended V2. V1 operator reported foot slipped off pedal causing accident.
25	8/12/2015	Wednesday	2:50 PM	Rear-end	Non-incapacitating injury	Followed too closely			Daylight	Clear	Dry	Collision with motor vehicle in traffic. 3 car rear-end.
26	8/13/2015	Thursday	10:26 AM	Rear-end	Property damage only (none injured)				Daylight	Clear	Dry	Collision with motor vehicle in traffic
27	8/24/2015	Monday	6:08 PM	Rear-end	Property damage only (none injured)	Distracted	18	39	Daylight	Clear	Dry	V1 operator was not paying attention and rear ended V2.
28	8/27/2015	Thursday	10:58 AM	Rear-end	Property damage only (none injured)		47	18	Daylight	Clear	Dry	V1 was attempting to merge into the rotary from Rt. 6A. V2 was following too close to V1 and made contact with the rear bumper of V1.
29	9/11/2015	Friday	10:07 PM	Angle	Property damage only (none injured)	Inattention			Dark - roadway not lighted	Clear	Dry	Collision with motor vehicle in traffic
30	9/23/2015	Wednesday	5:26 PM	Angle	Property damage only (none injured)	Unknown	47	54	Daylight	Clear	Dry	V1 was in rotary coming from Rt. 6A when V2, also in rotary, attempted to cut across the rotary to enter Rt. 6, and collided with the front driver side of V1.

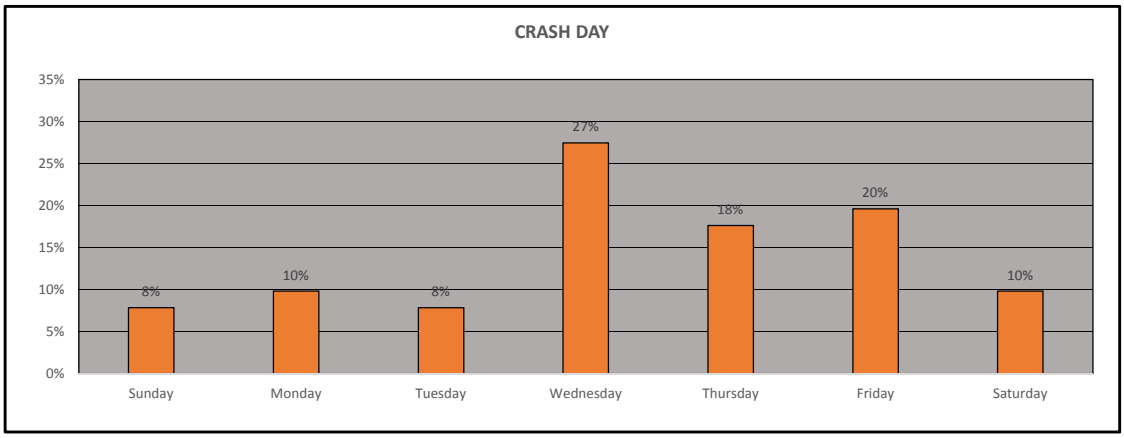
31	9/23/2015	Wednesday	11:47 AM	Rear-end	Property damage only (none injured)		28	69	Daylight	Clear	Dry	Vehicle 2 yielding to traffic at rotary travelling Rt 6 East, V1 struck V2 from behind.
32	9/28/2015	Monday	4:15 PM	Rear-end	Property damage only (none injured)	Inattention	74	66	Daylight	Clear	Dry	V2 was attempting entry into rotary from Rock harbor road approach ramp, when V1 rear ended V2.
33	10/12/2015	Monday	3:40 PM	Rear-end	Property damage only (none injured)	Inattention	50	51	Daylight	Clear	Dry	Driver of V1, expecting V2 to continue moving into the rotary, rear ended V2 when V2 stopped for traffic.
34	2/4/2016	Thursday	5:05 PM	Rear-end	Property damage only (none injured)	Followed too closely			Dark - roadway not lighted	Clear	Dry	Collision with motor vehicle in traffic
35	4/20/2016	Wednesday	3:20 PM	Rear-end	Property damage only (none injured)	Inattention	23	66	Daylight	Clear	Dry	V2 stopped for approaching traffic in rotary on Rt 6. V1 operator assumed V2 had entered traffic, and collided with the rear of V2 after V2 stopped for traffic.
36	5/11/2016	Wednesday	1:47 PM	Rear-end	Property damage only (none injured)	Other improper action	24	92	Daylight	Clear	Dry	Collision with motor vehicle in traffic
37	5/17/2016	Tuesday	1:50 PM	Rear-end	Property damage only (none injured)	Failed to yield right of way	21	65	Daylight	Clear	Dry	V2 entering rotary and yielding, V1 also entering rotary. V1 struck V2 from behind when V1 stopped for traffic.
38	5/27/2016	Friday	7:57 AM	Rear-end	Property damage only (none injured)	Failed to yield right of way	58	33	Daylight	Clear	Dry	V2 stopped for traffic rotary, V1 approached from rear and struck V2.
39	6/22/2016	Wednesday	12:00 PM	Rear-end	Property damage only (none injured)	Inattention			Daylight	Clear	Dry	Collision with motor vehicle in traffic
40	6/23/2016	Thursday	5:29 PM	Rear-end	Non-incapacitating injury	Inattention, Followed too closely	58	47	Daylight	Clear	Dry	V1 came to Eastham police station lobby to report previous crash at rotary entrance from 6A northbound. V1 reports being rear ended by V2.
41	7/20/2016	Wednesday	3:37 PM	Angle	Property damage only (none injured)	Failed to yield right of way	72	41	Daylight	Clear	Dry	V1 approaching the rotary heading NB from Rt. 6a. V2 in rotaryt attempting to enter onto Rt 6 NB into Eastham. V1 failed to yield to V2 in the rotary, striking the front passenger bumper of V2.
42	7/28/2016	Thursday	2:58 PM	Rear-end	Property damage only (none injured)	Followed too closely	45	63	Daylight	Clear	Dry	V1 rear ended V2 as they both attempted to enter the rotary.
43	7/29/2016	Friday	1:34 AM	Single vehicle crash	Non-incapacitating injury	Operating vehicle in erratic, reckless, careless, negligent or aggressive manner	23		Dark - roadway not lighted	Clear	Dry	V1 exited the rotary at a high rate of speed, failed to brake and turn either right or left at the intersection. V1 collided with the guardrail on the west side of Smith lane.
44	8/24/2016	Wednesday	9:48 AM	Rear-end	Property damage only (none injured)	Inattention, Followed too closely	65	74	Daylight	Clear	Dry	V1 traveling from Rt. 6A stopped while attempting to merge into rotary traffic. V2 rear ended V1.
45	8/26/2016	Friday	1:48 PM	Rear-end	Property damage only (none injured)	Inattention, Followed too closely	18	55	Daylight	Cloudy	Dry	V1 stopped attempting to enter the rotary from 6A NB. V2 rear ended V1.
46	8/27/2016	Saturday	2:57 PM	Rear-end	Possible non-fatal injury	Inattention	23	60	Daylight	Clear	Dry	V2 waiting to enter the lane of traffic in the rotary. V1, looking at traffic trying to enter the rotary, did not see V2 and collided with the rear of V2.

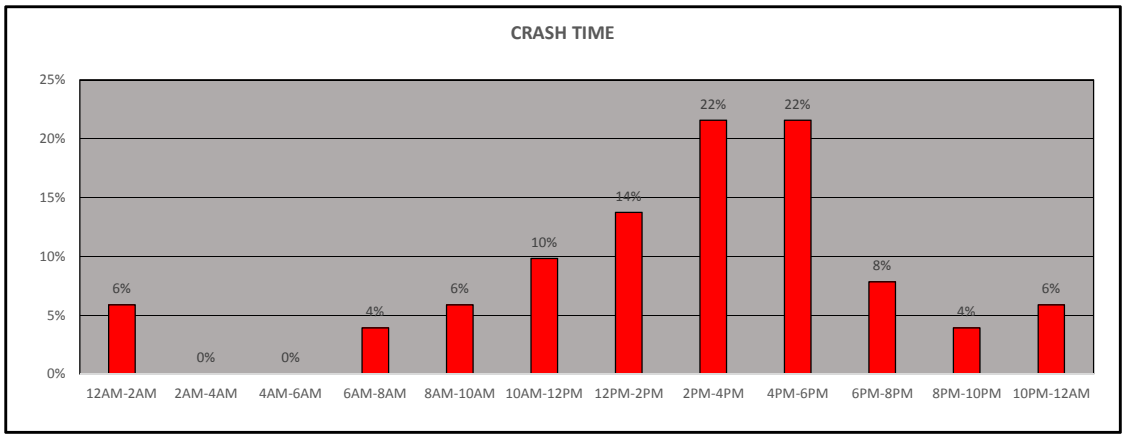
47	9/2/2016	Friday	7:41 PM	Rear-end	Property damage only (none injured)	Inattention	34	20	Dark - roadway not lighted	Clear	Dry	V2 stopped on Rt 6A, waiting to yield to traffic in the rotary. V1, slowing to stop, misjudged the position of V2, and rear ended V2.
48	10/2/2016	Sunday	0.01875	Single vehicle crash	Non-incapacitating injury	Unknown	23		Dark - roadway not lighted	Cloudy/Rain	Wet	V1 traveling eastbound on Rt. 6 approaching rotary, left roadway over a curb and drove over a grass island to avoid "bunny" in roadway, into the rotary, and then collided with a tree in the rotary island.
49	11/1/2016	Tuesday	7:45 PM	Single vehicle crash	Possible non-fatal injury	Operating vehicle in erratic, reckless, careless, negligent or aggressive manner, Other improper action	26		Dark - roadway not lighted	Clear	Dry	V1 traveling east on Rt 6. Vehicle 1 entered Eastham / Orleans Rotary. As vehicle was in rotary, operator lost control and rolled the vehicle, which ended up on its roof and hood on the east side of the rotary.
50	11/25/2016	Friday	3:29 PM	Rear-end	Property damage only (none injured)	Inattention	51	64	Daylight	Cloudy/Rain	Wet	V1 and V2 were in a lane of stop and go traffic on Rt 6. V1 was looking down once traffic had started moving, but once traffic stopped he did not have time to stop and collided with the rear of V2.
51	12/16/2016	Friday	8:26 AM	Rear-end	Property damage only (none injured)	Inattention	32	36	Daylight	Cloudy	Dry	V1 travelling NB entering rotary from Rt. 6A. V1 slowed and stopped on the on-ramp. V2 approached and struck V1 from behind, colliding with the left rear of V1.

Crash Data Summary Charts

Route 6 Rotary in Eastham/Orleans, MA

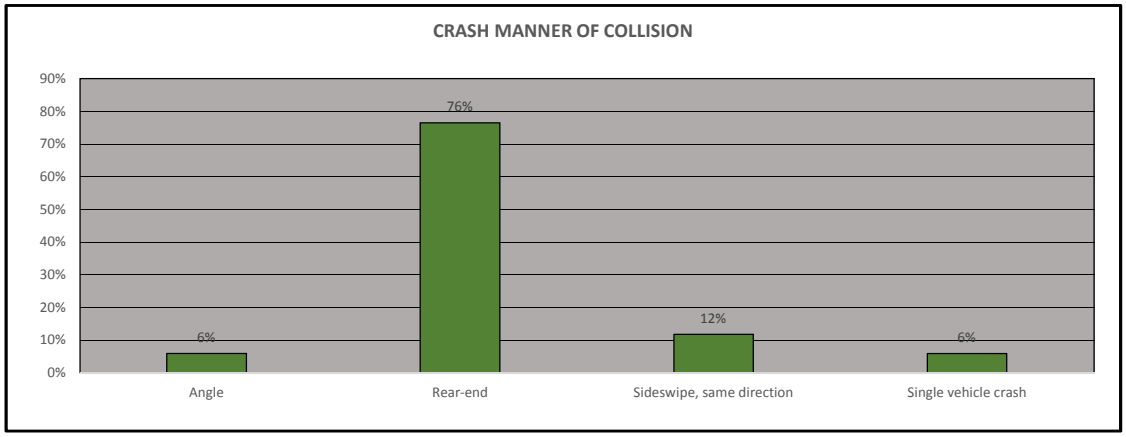


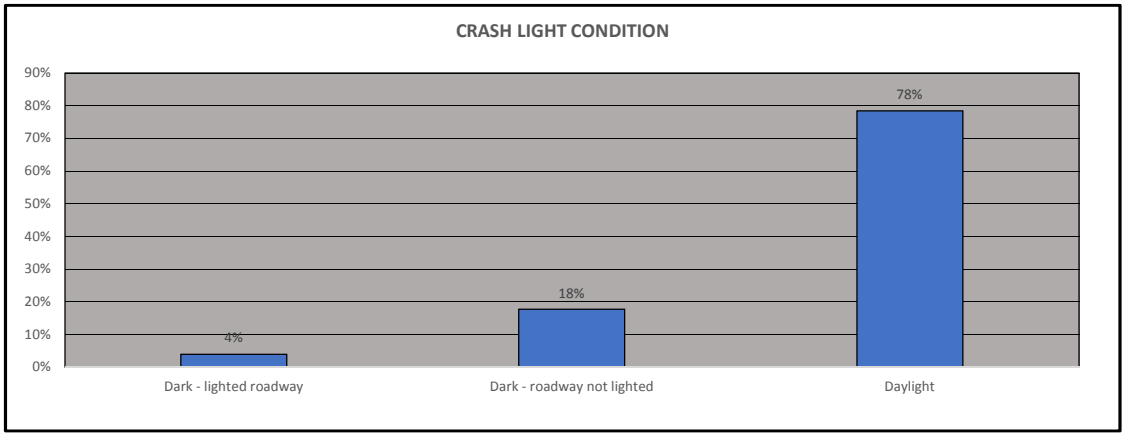


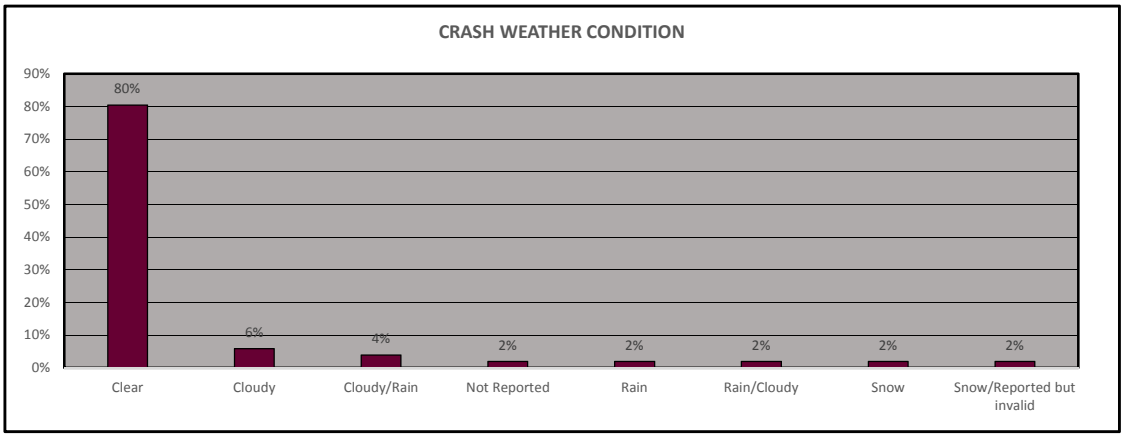


Crash Data Summary Charts

Route 6 Rotary in Eastham/Orleans, MA

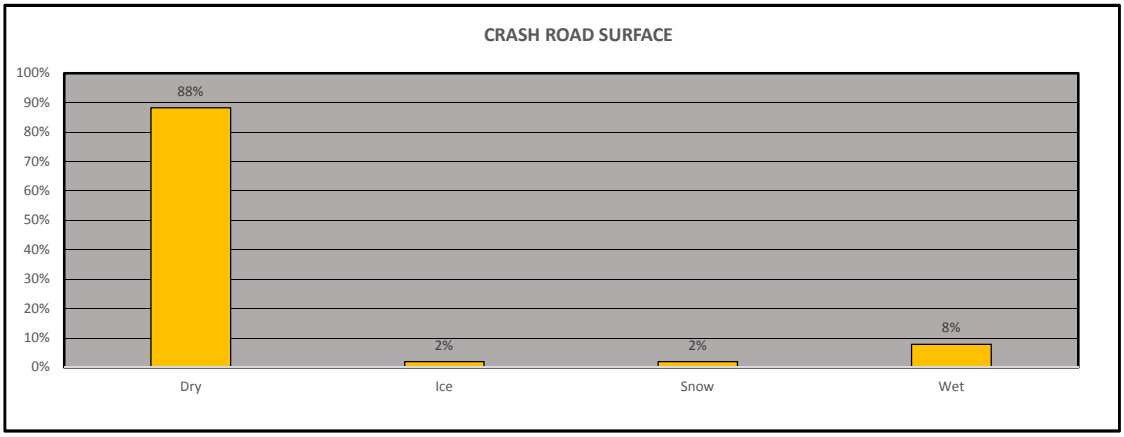


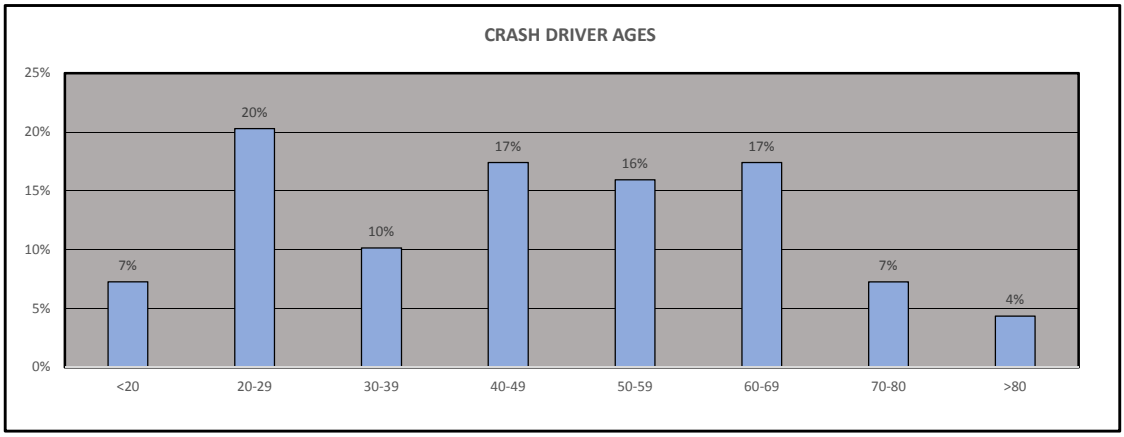


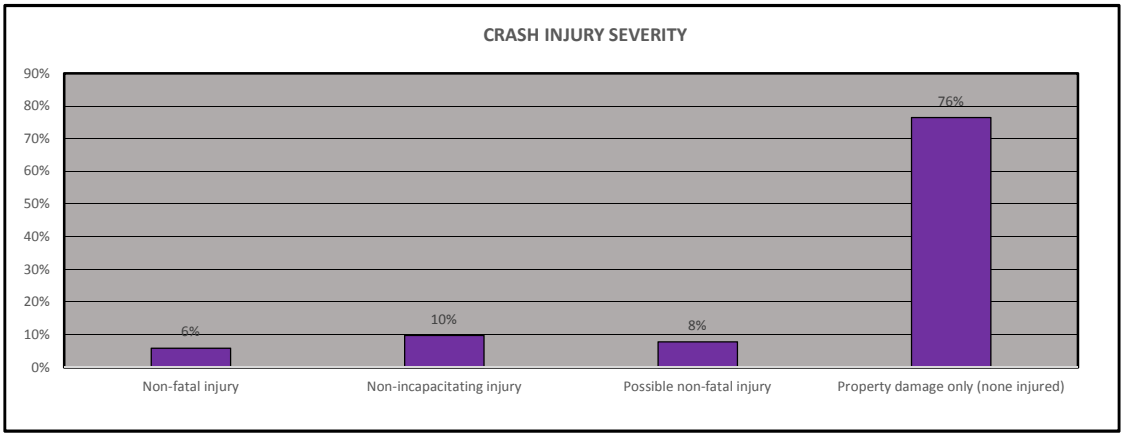


Crash Data Summary Charts

Route 6 Rotary in Eastham/Orleans, MA







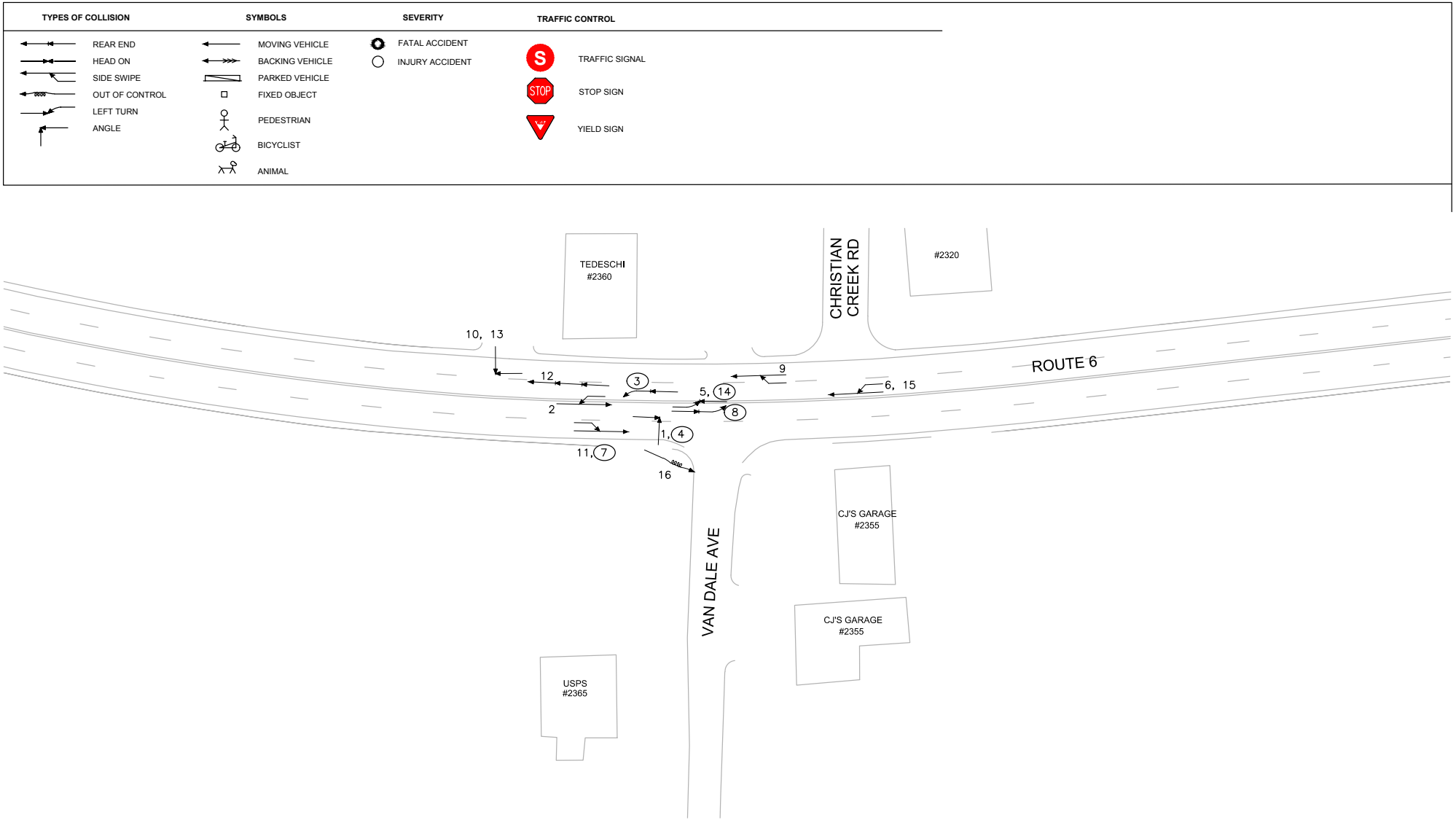


Figure 2

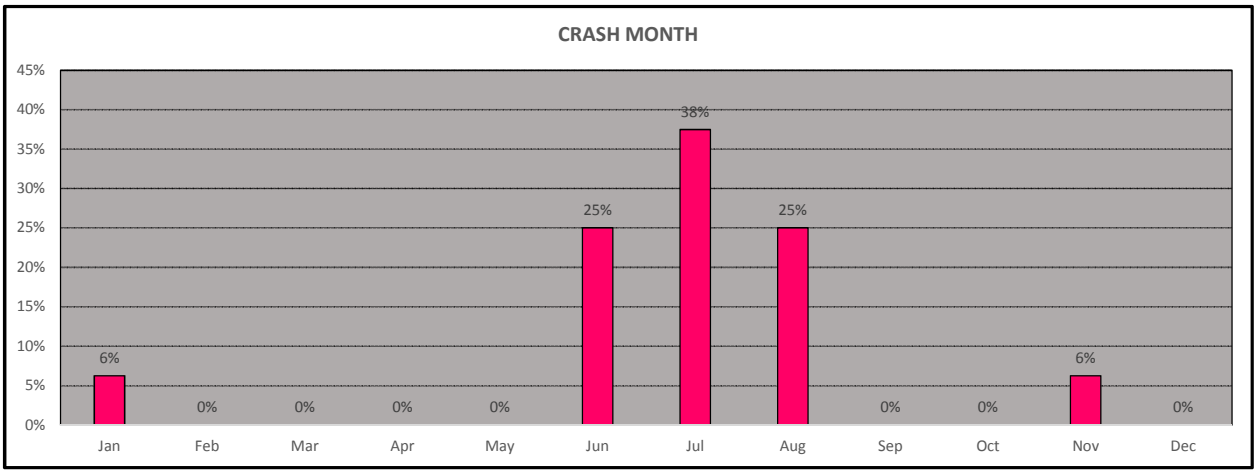
Collision Diagram
Van Dale Avenue at Mid-Cape Highway (Rte. 6)
Eastham, Massachusetts

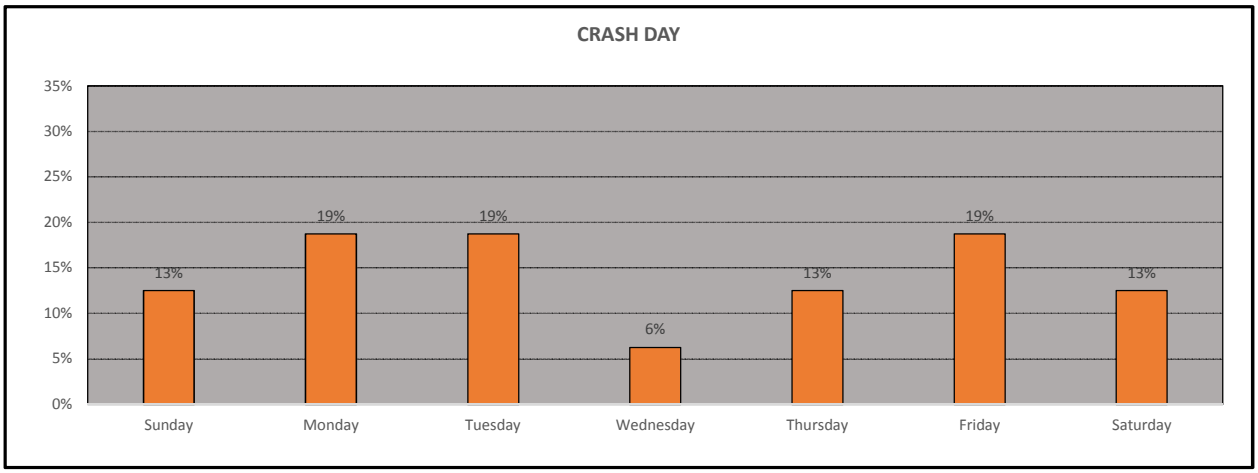
Van Dale Avenue and Christian Creek Rd at Route 6
2/25/2019
Source: MassDOT and Eastham Police Department

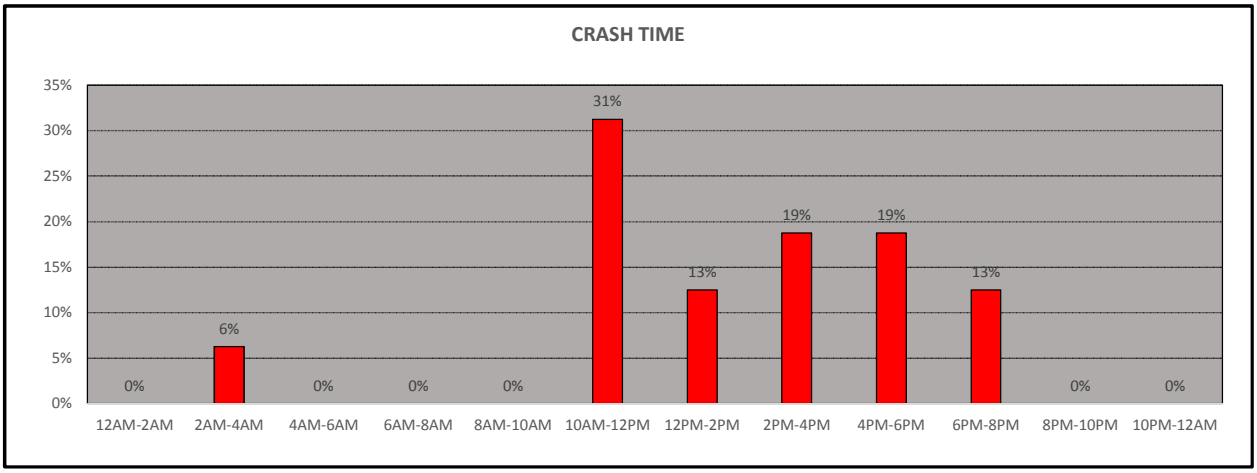
Crash Diagram Ref #	Crash Date	Crash Day	Crash Time	Manner of Collision Type	Crash Severity Type	Driver Contributing Code	D1 Age	D2 Age	Ambient Light Type	Weather Condition Type	Road Surface Condition Type	Comments
1	6/21/2014	Saturday	11:16 AM	Angle	Property damage only (none injured)	Failed to yield right of way, inattention	64	84	Daylight	Clear	Dry	V1 traveling southbound on Rte 6 in travel lane, V2 pulled out of South Eastham post office turning left, was struck on left side by V1.
2	8/5/2014	Tuesday	6:05 PM	Sideswipe, opposite direction	Property damage only (none injured)	Unknown	N/A	20	Daylight	Clear	Dry	V2 made left turn out of Tedeschi's parking lot, traveling south on Rt 6, into the southbound left passing lane. V1, traveling northbound in left passing lane, side-swiped V2 by crossing over the median line (according to V2 driver). V1 did not return to the scene and driver information is unknown.
3	11/28/2014	Friday	4:14 PM	Rear-end	Non-incapacitating injury	Distracted	19	60	Dark - roadway not lighted	Cloudy	Wet	V2 stopped to make left turn into Eastham post office, V1 driver collided with rear of V2 because driver was not paying attention (tuning radio).
4	6/15/2015	Monday	11:34 AM	Angle	Non-incapacitating injury	Other improper action	69	8	Daylight	Cloudy/Rain	Wet	V1 traveling south bound on state highway in passing lane. V2 pulled out from Eastham post office onto state highway. V2 pulled out in front of V1, causing V1 to strike the front end of V2.
5	6/22/2015	Monday	7:01 PM	Angle	Property damage only (none injured)	Failed to yield right of way	28	51	Daylight	Clear	Dry	V1 making left turn into tedeschi gas station on Rt. 6 SB. V2, traveling NB on Rt 6, struck V1 at an oncoming angle after V1 failed to yield to oncoming traffic. V1 spun into parking lot after being struck.
6	6/28/2015	Sunday	3:22 PM	Sideswipe, same direction	Property damage only (none injured)	Failure to keep in proper lane or running off road	77	17	Daylight	Clear	Dry	V1 traveling NB on Rt 6 in left lane. V2 traveling NB on Rt6 in right lane. V2 attempted to make a U-turn from the right lane and struck V1 in the right front quarter panel.
7	7/9/2015	Thursday	12:39 PM	Sideswipe, same direction	Non-incapacitating injury	Other improper action	44	17	Daylight	Cloudy	Dry	V1 traveling Rt 6 SB in passing lane. V2 traveling Rt 6 SB in travel lane attempted to make lange change into SB passing lane, colliding with V1.
8	7/13/2015	Monday	11:30 AM	Rear-end	Non-incapacitating injury	Followed too closely, Inattention	59	29	Daylight	Clear	Dry	V1 stopped in left lane to turn into tedeschi gas station. V2 was traveling behind V1, and could not stop in time, striking V1.
9	7/19/2015	Sunday	11:06 AM	Angle	Property damage only (none injured)	Made an improper turn	24	43	Daylight	Clear	Dry	V1 was in the NB passing lane. V2 was in the NB travel lane and was passing V1 on the inside lane. As V2 was passing, V1 made a right turn, clipping the trailer of V2. V1 operator misjudged the length of V2 causing the crash.
10	1/12/2016	Tuesday	4:38 PM	Angle	Property damage only (none injured)	Visibility Obstructed	57	20	Dark - lighted roadway	Clear	Wet	V1 traveling NB on Rt 6 in left lane. V2 attempted left turn out of Tedeschi parking lot. Stopped vehicle in right lane of Rt. 6 waved for V2 to turn out of lot, but V2 did not see V1 coming in the left lane, pulled out in front of V1, and was struck in the left rear quarter panel by V2.
11	7/16/2016	Saturday	10:53 AM	Sideswipe, same direction	Property damage only (none injured)	Failure to keep in proper lane or running off road	56	33	Daylight	Clear	Dry	V1 changed from left SB lane of Rt 6 to right SB lane. V2 travelling straight ahead in SB rt 6 when V1 changed lanes into V2, and the vehicles collided.
12	7/28/2016	Thursday	5:37 PM	Rear-end	Property damage only (none injured)	Followed too closely	34	22	Daylight	Clear	Dry	V1 forced to stop abruptly in passing lane due to an unknown vehicle which stopped abruptly in order to turn into 2360 state highway. V2 was unable to stop and collided with rear bumper of V1. V3 was unable to stop and collided with rear bumped of V2. 3 car rear-end.
13	7/29/2016	Friday	12:58 PM	Angle	Property damage only (none injured)	Failed to yield right of way	46	23	Daylight	Cloudy/Rain	Wet	V1 was exiting Tedeschi's parking lot attempting to turn left on to Rt. 6 SB. Unknown vehicle stopped to let V1 enter roadway, but V1 did not see V2 approaching in the left lane. Front of V1 collided with front passenger fender of V2.
14	8/2/2016	Tuesday	2:15 PM	Angle	Possible non-fatal injury	Visibility Obstructed	36	22	Daylight	Cloudy	Dry	V1 was traveling SB on Rt 6 and stopped ot make a left turn across NB traffic lanes into Tedeschi. NB vehicle had slowed and/or stopped and signaled for V2 to make the left hand turn across the traffic lanes. V2 did not see V2 turning across the highway and struck the rear passenger side of MV1 and pushed MV1 into the Tedeschi parking lot.
15	8/12/2016	Friday	3:43 PM	Sideswipe, same direction	Property damage only (none injured)	Other improper action	60	88	Daylight	Clear	Dry	V1 was traveling NB on state highway in passing lane. V2 was also traveling NB on state highway. V2 went to change lanes and drove from the travel lane into the passing lane, colliding into V1. Operator of V2 stated that he did not see V1 in the passing lane.
16	8/24/2016	Wednesday	2:41 AM	Single vehicle crash	Property damage only (none injured)	Fatigued/asleep	22		Dark - lighted roadway	Clear	Dry	V1 traveling SB on Rt 6 in left lane drifter across right lane and sideswiped utility pole at the corner of Rt 6 and Van Dale Ave, before returning to travel lane. Driver fell asleep at the wheel.

Crash Data Summary Charts

Route 6 & Van Dale Avenue, Eastham, MA

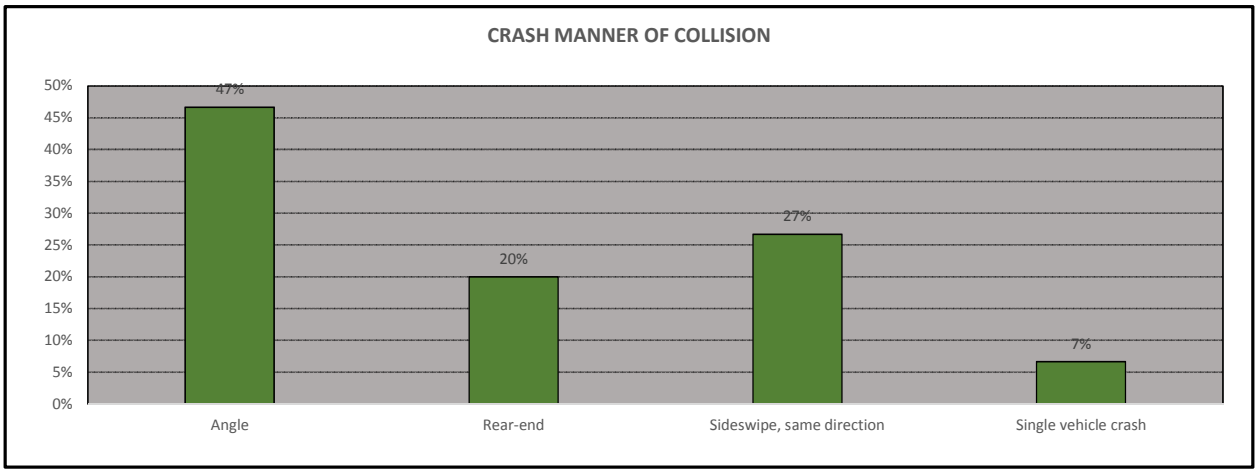


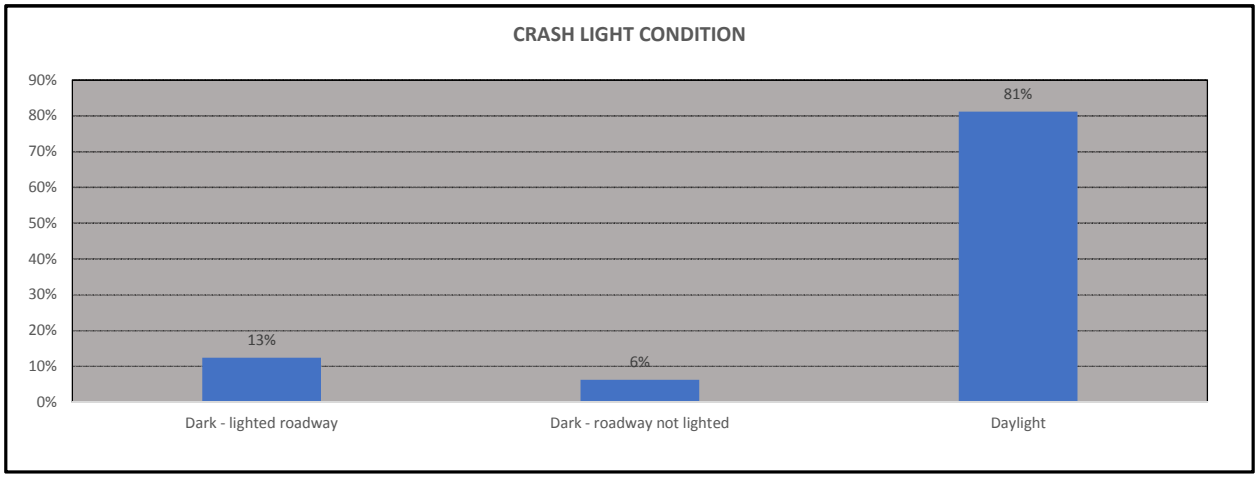


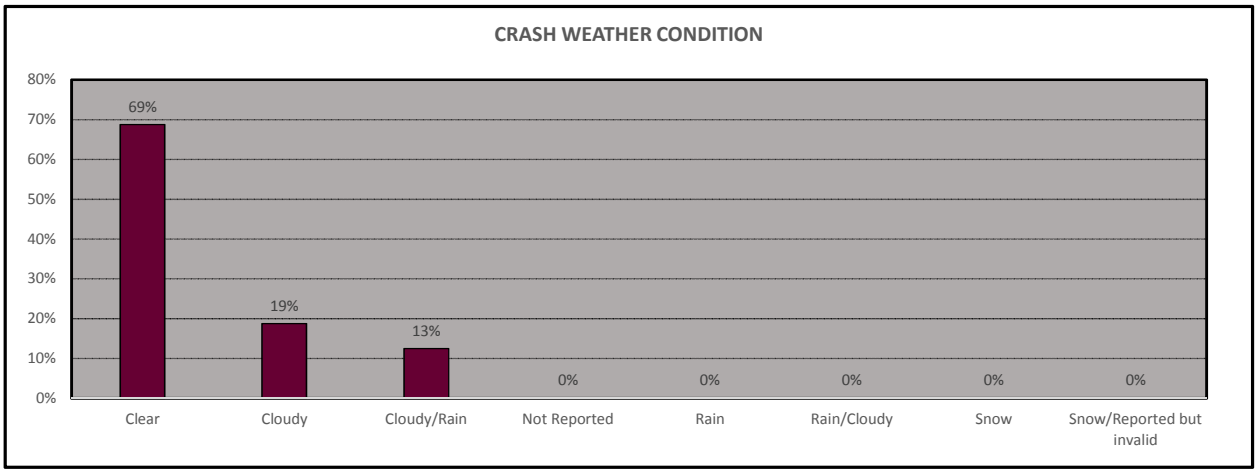


Crash Data Summary Charts

Route 6 & Van Dale Avenue, Eastham, MA

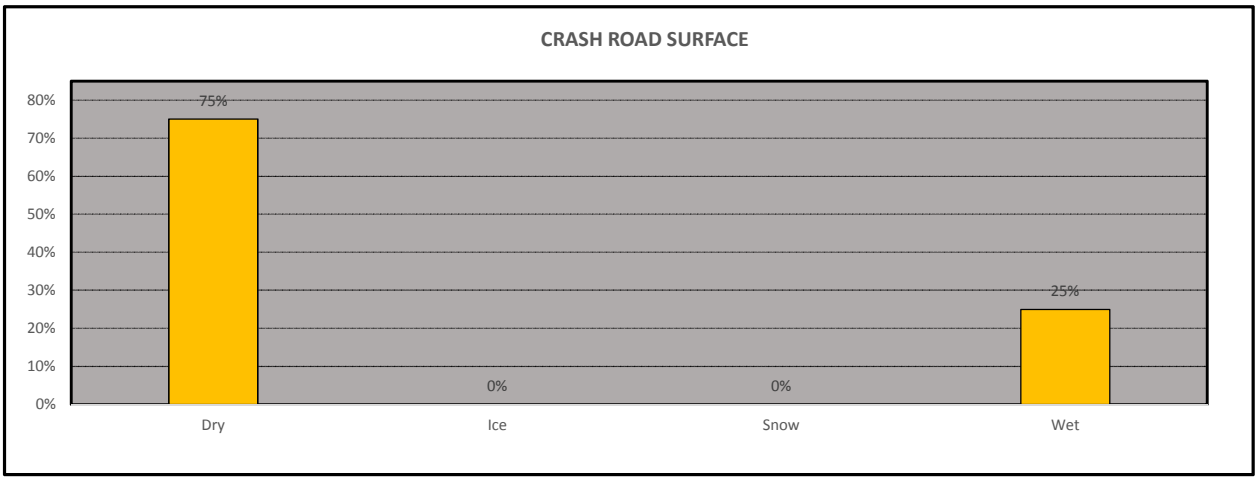


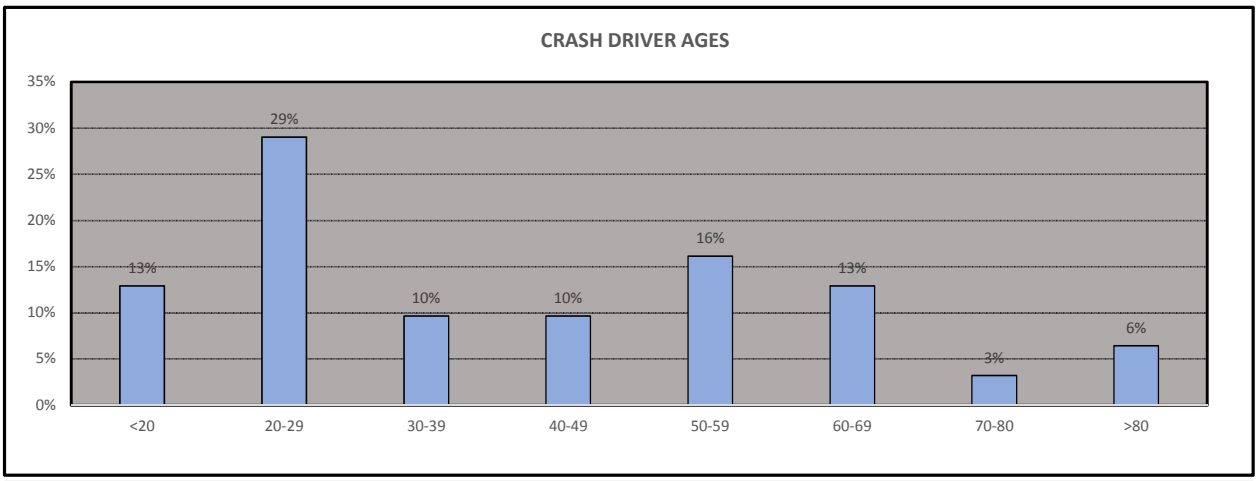


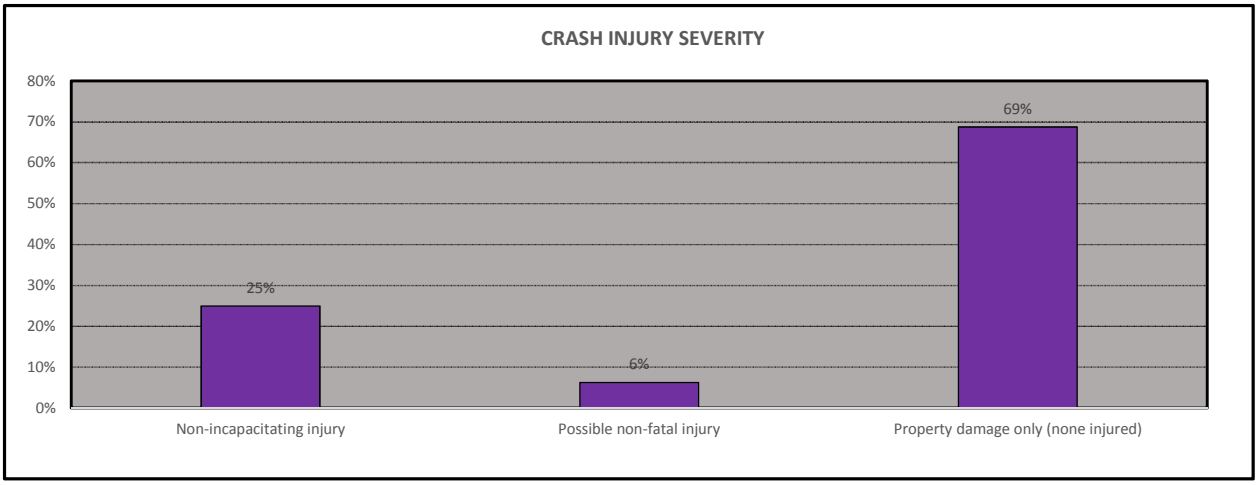


Crash Data Summary Charts

Route 6 & Van Dale Avenue, Eastham, MA







Appendix D. 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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