ROAD SAFETY AUDIT

Three Intersections in North Brockton:

- North Cary Street at Ames Street
- North Cary Street at North Quincy Street
- North Cary Street at Toby Road

Brockton, MA

January 2019

Prepared For:

The City of Brockton, MA

Prepared By:
Old Colony Planning Council
70 School Street, Brockton, MA 02301
Prepared under MassDOT Contract 88826

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The Road Safety Audit

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 the RSA is to identify potential safety issues and possible opportunities for safety improvements considering all roadway users. The RSA is intended to be a proactive process based on collaborative, qualitative, and quantitative analyses.

This Road Safety Audit (RSA) for three intersections in north Brockton; North Cary Street at Ames Street, North Cary Street at North Quincy Street, and North Cary Street at Toby Road, was conducted by the Old Colony Planning Council upon request by the City of Brockton. City Councilor Jack Lally requested the Road Safety Audit for North Quincy Street at North Cary Street (and Toby Road), and Mayor Bill Carpenter requested the Road Safety Audit for North Cary Street at Ames Street. This report includes average daily traffic volume counts, manual turning movement counts and level-of-service analysis, crash data compilation and analyses, and intersection warrant analyses for traffic signal and multi-way stop control implementation.

The Road Safety Audit Meeting and Team

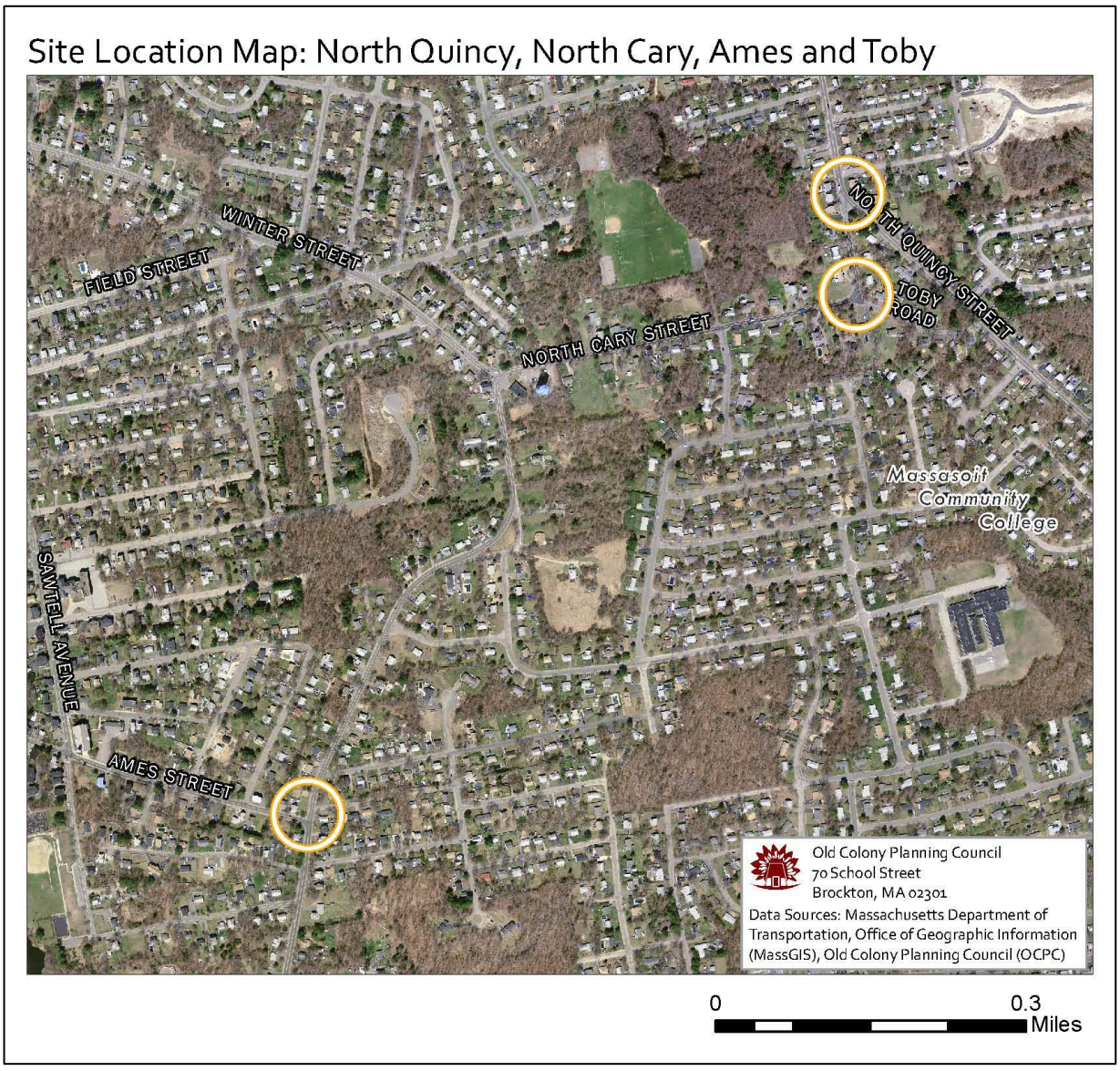
The Road Safety Audit took place on Friday, October 26, 2018 at the Old Colony Planning Council offices, 70 School Street in Brockton. The meeting was facilitated by OCPC staff. OCPC provided a collision diagram and the latest three year crash experience based on crash reports provided by the Brockton Police Department, which were supplemented by MassDOT crash data.

The RSA meeting consisted of three components. The first portion of the meeting focused on a discussion of the issues and concerns. The participants then departed the OCPC office and visited the intersections for observations for the second portion of the meeting. The discussion of issues was continued during the site visits as OCPC staff took notes. The third portion of the meeting focused on potential short term and long term potential improvements for each of the intersections. The agenda and the background materials are included in the appendix to this report. Table 1 lists the names and affiliations of the audit participants. The three intersection locations are shown in Figure 1.

Table 1. Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Chike Odunakwe	Brockton Department of Public Works
Jack Lally	Brockton City Councilor
Kevin O'Gorman	North Cary Street Resident
Bianca Marshall	MassDOT District 5
Charles Kilmer	Old Colony Planning Council
Paul Chenard	Old Colony Planning Council
William McNulty	Old Colony Planning Council
Raymond Guarino	Old Colony Planning Council

Figure 1. Locus Map



Project Location and Description

North Cary Street at Ames Street

Both North Cary Street and Ames Street are classified as urban collector roads in Brockton. Both Streets are under City of Brockton jurisdiction and provide a two lane cross-section. Ames Street is an east west street, which provides access between North Main Street and North Cary Street, and it also intersects North Montello Street (Route 28), which is a regionally significant arterial. It is approximately 26 feet wide and provides sidewalks on both sides of the street. The shoulders on Ames Street, which are provided on both sides of the street, vary between one and two feet wide.

North Cary Street is a two-lane urban collector road that runs northeasterly from Court Street to North Quincy Street in North Brockton. The width of the road varies between 26 feet and 32 feet wide. Sidewalks are provided on some portions of the road, on the western side south of Cynthia Drive to Court Street. The width of shoulders varies between one to two feet wide, which is not adequate for bicycle use.

North Cary Street meets North Ames Street to form a "T" type intersection in North Brockton. The intersection is stop-sign controlled on the eastbound Ames Street approach. A sidewalk is provided on the west side of North Cary Street. The crosswalk across Ames Street, which connects the sidewalk, is set back from the intersection and lacks ADA ramps. In addition, a guard rail on the northwest corner of the intersection reduces the width of the sidewalk, which is less than three feet wide. The northbound and southbound approaches to the intersection provide one shared use approach lane. The North Cary southbound approach is on a descending grade and a curve in the road as it approaches the intersection. The eastbound Ames Street approach provides on shared left turn right turn lane. This approach has limited sight distance looking north on North Cary Street due to the grade on North Cary Street.

Peak hour turning movement counts were conducted by OCPC. These counts are included in the appendix to this report. The counts show that there were heavy right turns from Ames Street to North Cary southbound (175 vehicles) and heavy left turns from North Cary Street northbound to Ames Street westbound (252 vehicles) during the morning peak hour. There were also heavy through movements on the northbound and southbound North Cary Street approaches (230 vehicles northbound and 251 vehicles southbound). There were 29 vehicles turning left from Ames Street to North Cary Street northbound during the morning peak hour. The afternoon peak hour had heavy right turn movements from Ames Street eastbound to North Cary southbound (342 vehicles) and heavy left turns from North Cary Street to Ames Street westbound (247 vehicles). There were 246 through movements northbound and 237 through movements southbound on North Cary Street. There were 47 vehicles turning left from Ames Street to North Cary Street during the afternoon peak hour. The existing peak hour level-of-service (LOS) is "C" during the morning peak hour and LOS "D" during the afternoon peak hour.

North Cary Street at North Quincy Street

The southbound North Quincy approach to the North Cary/North Quincy intersection, showing overhead flashing beacon, chevrons, and flashing warning signs (facing vehicles approaching from North Quincy westbound).

North Quincy Street is a two lane urban collector street that runs northwest from Court Street to the Town of Holbrook. North Quincy is approximately 36 feet wide. It has a two lane cross section with sidewalks on the western side of the street. It also provides two shoulders approximately four feet wide on both sides of the street. The North Cary Street approach to the intersection is a two lane cross section and is approximately 24 feet wide. The intersection has a stop sign on the northbound North Cary Street approach and overhead flashing beacons (red facing the northbound North Cary Street approach, and yellow facing the southbound North Quincy and northbound North Quincy approaches). There are flashing warning signs on the North Quincy westbound approach. North Cary Street and North Quincy Street form a "Y" type intersection in North Brockton. Vehicles approaching the intersection southbound on North Quincy traveling to North Cary are actually traveling straight through. These vehicles make this movement with little change in speed. If this was a conventional intersection, these movements, from North Quincy southbound to North Cary Street, would be right turns and the vehicles would be at slower speeds to make a right turn. North Quincy Street has four feet shoulders on both sides of the road.

During the morning peak hour, there are 669 vehicles traveling northbound on North Quincy Street through the intersection continuing on North Quincy Street. In addition, there are 56 vehicles turning left from North Quincy northbound to North Cary Street southwest, 350 vehicles traveling southbound from North Quincy Street through to North Quincy Street during the morning peak hour, and 113 vehicles turning right from North Quincy southbound to North Cary Street. During the morning peak hour, there are 108 vehicles entering the intersection on North Cary Street and turning left to North Quincy Street northbound, and 3 vehicles on this approach turning right from North Cary Street to North Quincy Street southbound.

During the afternoon peak hour, there are 441 vehicles traveling northbound on North Quincy Street through the intersection continuing on North Quincy Street. Also, there are 29 vehicles turning left from North Quincy northbound to North Cary Street southbound, 604 vehicles traveling southbound from North Quincy Street through to North Quincy Street during the afternoon peak hour, and 175 vehicles turning right from North Quincy southbound to North Cary Street. During the afternoon peak hour, there are 85 vehicles entering the intersection on North Cary Street and turning left to North Quincy Street northbound, and no vehicles on this approach turning right from North Cary Street to North Quincy Street

southbound. Based on automatic traffic counts conducted by OCPC, there are approximately 17,576 vehicles per day on North Quincy Street just north of the North Cary Street/North Quincy Street intersection, and there are approximately 14,500 vehicles per day on North Quincy Street south of the North Cary Street/North Quincy Street intersection.

North Cary Street at Toby Street

North Cary Street curves sharply at a point approximately 525 feet south of the North Cary Street/North Quincy Street intersection. Toby Road intersects North Cary Street at this curve in the road. Toby Road is classified as a local street under local jurisdiction, and is one-way in the eastbound direction headed away from its intersection with North Cary Street. North Cary Street and Toby Road form an unconventional three-way intersection. The prevailing movements are on North Cary Street (northbound and southbound), which has dashed white lines to keep traffic in the lanes as North Cary Street makes a sharp curve through the intersection. Based on automatic traffic counts conducted by OCPC, there are approximately 4,689 vehicles per day on North Cary Street just north of the North Cary Street/Toby Street intersection.

The North Cary Street/Toby Road intersection, North Cary Street curves sharply through the intersection and Toby Road is a one-way street eastbound (away from the intersection).

Crash Details and Overview

Crash reports were compiled from the Brockton Police Department for the years 2015, 2016, and 2017, (and were cross referenced and supplemented with crash data from the MassDOT). The crashes are included in the appendix to this report. There were two crashes recorded at the North Cary/Toby Road intersection within the three year crash period. One was a head-on collision, which resulted in personal injury, and the other a single vehicle lane departure crash (property damage only, vehicle ran off the road).

There were a total of thirteen crashes at the intersection of North Cary Street at Ames Street within the three year study period. Eight of these crashes were angle type crashes, four were single vehicle lane departure crashes where the vehicle ran off the road, and one was a rear-end crash. Nine of the thirteen crashes resulted in personal injury, and four resulted in property damage only.

There were a total of eight crashes at the intersection of North Cary Street at North Quincy Street within the three year study period. Three of these crashes were angle type crashes, three were single vehicle lane departure crashes where the vehicle ran off the road, and two were head-on crashes. Three of the eight crashes resulted in personal injury, and the remainder resulted in property damage only.

Audit Observations and Potential Safety Enhancements

During the RSA meeting prior to the field visits, an introduction of the RSA process and a summary of the crash information was presented to the audit participants. Following this presentation, the members of the audit team were asked to discuss the existing issues that may affect safety at the three intersections. The audit team then visited the all three intersections as a group, at which time observations, safety concerns, and deficiencies were identified and documented by OCPC staff.

Provided below is a list of the safety concerns and the potential enhancements that were identified during the RSA.

North Cary Street at Ames Street

Safety Issue: There is limited sight distance for vehicles on the eastbound Ames Street stop sign approach. There is sun glare on the southbound approach during the afternoon.

The North Cary Street southbound approach to the North Cary Street/Ames Street intersection.

Vehicles approaching on the Ames Street stop sign approach have limited sight lines because of the constrained turning radii, especially looking north toward North Cary Street. The southbound North Cary Street approach to the intersection approaches on a descending grade with a curve in the road, which limits sight distances for the southbound traffic as well as for the eastbound traffic on Ames Street approaching on Ames Street eastbound. Vehicles often do a "rolling stop" on the Ames Street eastbound approach to the intersection. The stop line on Ames Street is located further back from the intersection at a location where there are no sight lines on the approach looking northbound and southbound toward North Cary Street.

Enhancement: Add advanced intersection warning signs on the northbound and southbound approaches to the intersection.

Enhancement: Remove the vegetation on the northwest corner of the intersection to improve sight lines.

Enhancement: Install overhead flashing beacons, yellow on the northbound and southbound approaches and red on the Ames Street approach. Flashing beacons can also be utilized as an interim treatment as the city pursues funding for the installation of a traffic signal.

Enhancement: Consider installing traffic signals. Based on warrant analyses conducted by OCPC, the intersection satisfies Warrant 1 Eight-Hour Vehicular Volume, Warrant 2 Four-Hour Vehicular Volume, and Warrant 3 Peak Hour, of the Manual on Traffic Control Devices (MUTCD). The signal warrant analyses are included in the appendix to this report.

Safety Issue: Vehicles traveling on the northbound and southbound North Cary approaches have a tendency to speed.

Enhancements: Institute enhanced speed enforcement.

Safety Issue: Sidewalks at the intersection are limited and the sidewalk amenities at the intersection are also limited. There are a lack of shoulders and amenities for bicycles.

Although there are sidewalks on North Cary Street on the westbound side of the street, a guard rail on the northwest corner of the intersection further constrains the width of the intersection. The sidewalk is also broken on the northwest corner. Although there is a crosswalk across Ames Street, which is set back from North Cary Street, there is a lack of ADA ramps on the corners of the intersection to accommodate the crosswalk.

The Ames Street eastbound approach to the North Cary Street/Ames Street intersection.

Enhancement: Relocate guardrail on the northeast side of the intersection and reconstruct the sidewalks to remove broken sections. Add ADA compliant curb ramps to accommodate the crosswalks.

Safety Issue: There is a lack of signage and striping at the intersection and the Stop Sign should be MUTCD compliant for size and retro-reflectivity.

Enhancement: Improve street sign visibility and install street signs and traffic control signs (stop sign) that conform to MUTCD compliance. Move the stop line and crosswalk closer to the intersection and repaint pavement markings throughout the intersection.

Safety Issue: Drainage is inadequate; there is ponding on the east side of North Cary Street.

Enhancement: Upgrade and relocate drainage further north on North Cary Street, as feasible.

North Cary Street at North Quincy Street

Safety Issue: Lane departure crashes on North Quincy Street, on both the northbound and southbound approaches to the intersection, are frequent and problematic due to the speeds and the poor alignment of the intersection.

Enhancement: Add additional chevrons on the southbound and northbound approaches.

Enhancement: Add temporary barriers (surface mounted delineators) to channel southbound North Quincy traffic, which will create deflection, thereby slowing traffic traveling to North Cary Street, and keep traffic in the travel lane on North Quincy Street.

The North Quincy Street southbound approach to the North Cary Street/North Quincy Street intersection. Vehicles from North Quincy Street bare right to North Cary Street at high speeds.

Enhancement: Extend the guard rail along the west side of North Quincy Street to protect residences along the side of the road from vehicles exiting the travel lanes.

Safety Issue: The speeds on North Quincy Street northbound and southbound are problematic, the intersection lacks traffic calming. Loring Street, which also intersects North Quincy Street, is in close proximity to the intersection North Quincy Street/North Cary Street intersection and turning movements in and out of this street interfere with operations at the North Cary Street at North Quincy Street.

Enhancement: Institute enhanced speed enforcement.

Enhancement: Reconstruct the intersection and install traffic signals or a roundabout. Based on warrant analyses conducted by OCPC, the intersection satisfies Warrant 1 Eight-Hour Vehicular Volume, Warrant 2 Four-Hour Vehicular Volume, and Warrant 3 Peak Hour, of the Manual on Traffic Control Devices (MUTCD). The signal warrant analyses are included in the appendix to this report.

Enhancement: Replace advanced warning sign on North Quincy Street that was knocked over due to a crash.

Safety Issue: Due to the poor alignment of the intersection, there is a lack of sight distance on the North Cary Street approach looking south toward the North Quincy Street northbound. Vehicles approaching the intersection on North Cary Street make "rolling stops". Vehicles do not come to a complete stop at the stop sign approach.

Enhancement: Move the stop line closer to the intersection and align it closer to 90 degrees.

Enhancement: Install "Stop Sign Ahead" warning sign on the North Cary Street approach to the intersection.

Enhancement: Institute enhanced traffic control device enforcement.

Safety Issue: Lack of pedestrian safety across North Cary Street.

Enhancement: Add pedestrian warning signs on the crosswalk across North Cary Street.

Safety Issue: During the winter, snow is plowed so that it is piled up high at the intersection interfering with turning movements and sight lines.

Enhancement: Improve snow plowing and snow removal during storms.

North Cary Street at Toby Street

Safety Issue: There are excessive speeds on North Cary Street through the intersection, especially on the North Cary Street southbound approach as vehicles maintain a high rate of speed traveling from North Quincy southbound to North Cary Street.

Enhancement: Add advisory speed signs on the North Cary Street southbound and northbound approaches to the intersection.

Enhancement: Enhance speed enforcement including utilizing radar speed feedback sign to notify motorists of speeds.

Safety Issue: There are a high number of lane departure crashes. Vehicles on the southbound approach run off the road and onto the adjacent residential properties. The configuration and visibility of the intersection are not readily discernible on the North Cary Street northbound and southbound approaches to the intersection.

Enhancement: Extend the existing guardrail on North Cary Street south to the utility pole.

Enhancement: Add chevrons on the northbound and southbound North Cary Street approaches to the intersection.

Enhancement: Utilize temporary barriers to accentuate turning radius to Toby Street.

Enhancement: Install overhead flashing beacons (flashing yellow on the North Cary northbound and southbound approaches) to improve intersection visibility.

Enhancement: Reconstruct and realign the intersection to improve turning radius to Toby Street.

Safety Issue: Pavement markings at the intersection are faded; the sign that designates one-way for Toby road is not readily viewable from North Cary Street.

Enhancement: Paint and restripe pavement markings, install signs that conform to MUTCD compliance, and ensure that they are visible from the intersection approaches.

Summary of Road Safety Audit

Based on the review of data, on-site field observations 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 making some of the improvements. Table 2 summarizes the estimated time frame and costs breakdown and Table 3 summarizes the safety issues, possible enhancements, estimated safety payoff, time frame, cost, and responsibility. Safety payoff estimates are based on engineering judgment and are categorized as low, medium, and high. The time frame is categorized as short-term (<1 year), 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	
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 - North Cary Street at Ames Street

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
The sight distance is limited on the eastbound Ames Street stop sign approach and there is sun glare on the southbound approach in the afternoon.	Add advanced intersection warning signs on the northbound and southbound approaches.	Low	< 1 Year	Low	City of Brockton
	Remove the vegetation on the northwest corner of the intersection to improve sight lines.	Medium	< 1 Year	Low	
	Install overhead flashing beacons.	Medium	< 1 Year	Medium	
	Consider installing traffic signals.	High	1-3 Years	High	
Speeding on the northbound and southbound North Cary approaches.	Institute enhanced speed enforcement.	Low	< 1 Year	Low	City of Brockton
Sidewalks at the intersection are limited and the sidewalk amenities at the intersection are also limited. There are a lack of shoulders and amenities for bicycles	Relocate guardrail on the northeast side of the intersection and reconstruct the sidewalks to remove broken sections. Add ADA compliant curb ramps to accommodate the crosswalks.	High	>3 Years	High	City of Brockton
There is a lack of signage and striping at the intersection and the Stop Sign should be MUTCD compliant for size and retro-reflectivity.	Improve street sign visibility and install street signs and traffic control signs (stop sign) that conform to MUTCD compliance. Move the stop line and crosswalk closer to the intersection and repaint pavement markings throughout the intersection.	Medium	< 1 Year	Low	City of Brockton
Drainage is inadequate; there is ponding on the east side of North Cary Street.	Upgrade and relocate drainage further north on North Cary Street.	Low	>3 Years	High	City of Brockton

Table 4: Potential Safety Enhancement Summary – North Cary Street at North Quincy Street

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
Lane departure crashes on North Quincy Street, on both the northbound and southbound approaches to the intersection, are frequent and problematic due to the speeds and the poor alignment of the intersection.	Add additional chevrons on the southbound and northbound approaches.	Medium	< 1 Year	Low	City of Brockton
	Add temporary barriers (surface mounted delineators) to channel southbound North Quincy traffic to slow traffic traveling to North Cary Street and to keep traffic in the travel lane on North Quincy Street.	Medium	1-3 Years	Low	
	Extend the guardrail along the west side of North Quincy Street to protect residences along the side of the road from vehicles exiting the travel lanes.	Medium	1-3 Years	Medium	
The speeds on North Quincy Street northbound and southbound are problematic, the intersection lacks traffic calming. Loring Street intersects North Quincy Street in close proximity to the intersection and turning movements in and out of this street interfere with operations at the North Cary Street at North Quincy Street.	Institute Enhanced speed enforcement	Medium	< 1 Year	Low	City of Brockton
	Reconstruct the intersection and install a traffic signal or roundabout.	High	>3 Years	High	
	Replace advanced warning sign on North Quincy Street that was knocked over due to a crash.	Medium	< 1 Year	Low	
There is a lack of sight distance on the North Cary Street approach looking south toward the North Quincy Street northbound. Vehicles approaching on North Cary Street make “rolling stops”. Vehicles do not come to a complete stop at the stop sign approach.	Move the stop line closer to the intersection and align it closer to 90 degrees.	Medium	< 1 Year	Low	City of Brockton
	Install “Stop Sign Ahead” warning sign on the North Cary Street approach to the intersection.	Low	< 1 Year	Low	
Safety Issue: Lack of pedestrian safety across North Cary Street.	Add pedestrian warning signs on the crosswalk across North Cary Street.	Medium	< 1 Year	Low	City of Brockton
During the winter, snow is plowed so that it is piled up high at the intersection interfering with turning movements and sight lines.	Improve snow plowing and snow removal during storms.	Low	< 1 Year	Low	City of Brockton

Table 5: Potential Safety Enhancement Summary – North Cary Street at Toby Road

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
There are excessive speeds especially on the North Cary Street southbound approach. Vehicles maintain a high rate of speed traveling from North Quincy southbound to North Cary Street.	Add advisory speed signs on the North Cary Street southbound and northbound approaches to the intersection.	Medium	< 1 Year	Low	City of Brockton
	Enhance speed enforcement including utilizing radar speed feedback sign to notify motorists of speeds.	Medium	< 1 Year	Low	
There are a high number of lane departure crashes. Vehicles on the southbound approach run off the road and onto the adjacent residential properties. The configuration and visibility of the intersection are not readily discernible on the North Cary Street northbound and southbound approaches.	Extend the existing guard rail on North Cary Street south to the utility pole.	Medium	< 1 Year	Medium	City of Brockton
	Add chevrons on the northbound and southbound North Cary Street approaches to the intersection.	Medium	< 1 Year	Low	
	Utilize temporary barriers to accentuate turning radius to Toby Street.	Medium	< 1 Year	Low	
	Install overhead flashing beacons (flashing yellow on the North Cary northbound and southbound approaches) to improve intersection visibility.	Medium	1-3 Years	Medium	
	Reconstruct and realign the intersection to improve turning radius to Toby Street.	Medium	Medium	High	
Pavement markings at the intersection are faded; the sign that designates one-way for Toby road is not readily viewable from North Cary Street.	Paint and restripe pavement markings, install signs that conform to MUTCD compliance, and ensure that they are visible from the intersection approaches.	Medium	< 1 Year	Low	City of Brockton

Appendix A. RSA Meeting Agenda

Agenda

Road Safety Audit

Brockton, MA

North Brockton - Three Intersections

- **North Cary Street at Ames Street**
- **North Quincy Street at North Cary Street**
- **North Cary Street at Toby Road**

Meeting Location: Old Colony Planning Council
70 School Street
Brockton, MA 02301
Friday October 26, 2018
10:00 AM – 12:00 PM

Type of meeting:	**Road Safety Audit**
Attendees:	**Invited Participants to Comprise a Multidisciplinary Team**
Please bring:	**Thoughts and Enthusiasm**
10:00 AM	**Welcome and Introductions**
10:05 AM	**Review of Site Specific Material - Review and Discuss Project** • Review of Traffic Data • Existing Conditions and Known Challenges
10:45 AM	**Visit the Intersections and Discussion** • Identify deficiencies at the study area location • OCPC staff will document all observations and comments
11:30 AM	**Wrap up Site Visit and Post Visit Discussion Meeting** • Discuss issues and document and finalize potential improvements
12:00 PM	**Adjourn for the Day**

Instructions for Participants:

- **Before attending the RSA 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.**
- **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.**
- **CONTACT: Please direct questions regarding this RSA to Raymond Guarino, OCPC, (508) 583-1833, Ext 212, rguarino@ocpcrpa.org.**
  Old Colony Planning Council, 70 School Street. Brockton, MA 02301

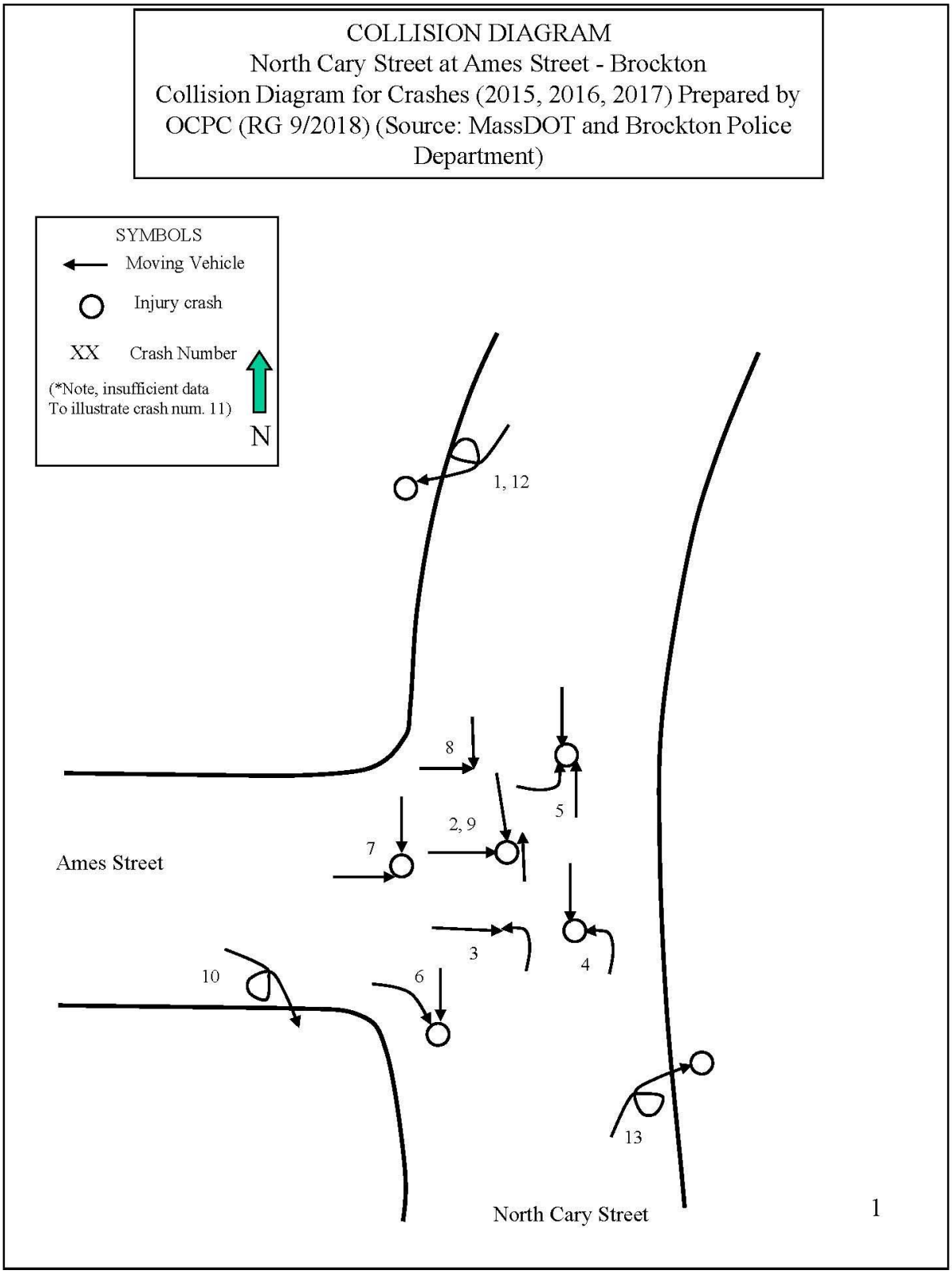
Appendix B: RSA Audit Team Contact List

Participating Audit Team Members

Date: October 26, 2018 Location: OCPC 70 School St Brockton, MA

Audit Team Members	Agency/Affiliation	Email Address	Phone Number
Name	Agency	Email	xxx-xxx-xxxx
Chike Odunakwe	Brockton DPW	codunakwe@cobma.us	508-897-6437
Jack Lally	Brockton City Councilor		
Kevin O'Gorman	Resident of Brockton		
Bianca Marshall	Massachusetts Department of Transportation District 5	Bianca.marshall@dot.state.ma.us	
Charles Kilmer	Old Colony Planning Council	ckilmer@ocpcrpa.org	508-583-1833
William McNulty	Old Colony Planning Council	wmcnulty@ocpcrpa.org	508-583-1833
Paul Chenard	Old Colony Planning Council	pchenard@ocpcrpa.org	508-583-1833
Raymond Guarino	Old Colony Planning Council	rguarino@ocpcrpa.org	508-583-1833

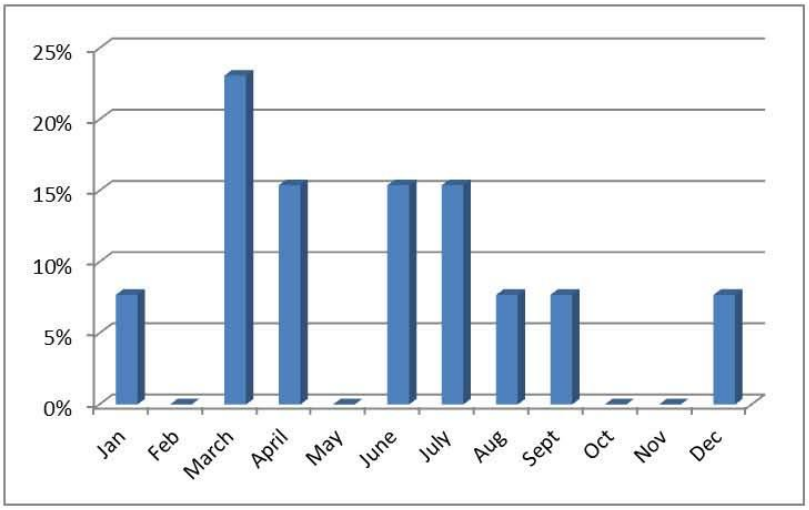
Appendix C: Detailed Crash Data


COLLISION DIAGRAM
North Cary Street at Ames Street - Brockton
Collision Diagram for Crashes (2015, 2016, 2017) Prepared by OCPC (RG 9/2018) (Source: MassDOT and Brockton Police Department)
SYMBOLS
Moving Vehicle
Injury crash
XX Crash Number
(*Note, insufficient data To illustrate crash num. 11)
N
1, 12
8
5
2, 9
7
Ames Street
3
4
10
6
13
North Cary Street
1

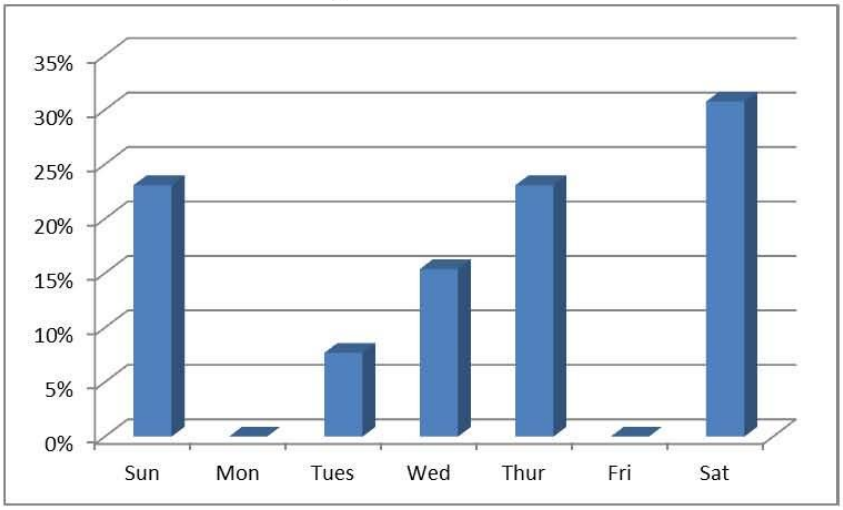
Crash Data Summary Table 2015, 2016, 2017
North Cary Street at Ames Street - Brockton

Crash Num	P.D. Code	Crash Date	Crash Day	Time of Day	Manner of Coll	Light Cond	Weather	Road Surf	Inj
1	15-790-AC	4/29/2015	Wed	12:08 AM	Ran off Road	Dark Lighted Roadway	Clear	Dry	Inj
2	17-559-AC	3/26/2017	Sun	10:02 AM	Angle	Light	Clear	Dry	Inj
3	17-1082-AC	6/11/2017	Sun	9:30 PM	Angle	Dark Lighted Roadway	Clear	Dry	PDO
4	4391709	19-Jan-2016	Tues	9:49 AM	Angle	Daylight	Clear	Dry	Inj
5	4395854	22-Jun-2016	Wed	5:35 PM	Angle	Daylight	Clear	Dry	Inj
6	4520074	03-Dec-2016	Sat	12:52 PM	Angle	Daylight	Clear	Dry	Inj
7	4026338	26-Mar-2015	Thur	7:51 AM	Angle	Daylight	Clear	Dry	Inj
8	4037920	23-Apr-2015	Thur	3:20 PM	Angle	Daylight	Clear	Dry	PDO
9	4070976	01-Aug-2015	Sat	3:13 PM	Angle	Daylight	Clear	Dry	Inj
10	4066954	11-Jul-2015	Sat	1:44 AM	Single vehicle crash	Dark - lighted roadway	Snow	Dry	PDO
11	4025936	26-Mar-2015	Thur	8:26 AM	Rear-end	Daylight	Clear	Dry	PDO
12	4394942	16-Jul-2016	Sat	7:04 AM	Single vehicle crash	Daylight	Clear	Dry	Inj
13	4395325	04-Sep-2016	Sun	11:41 PM	Single vehicle crash	Dark - lighted roadway	Clear	Dry	Inj

Crash Month



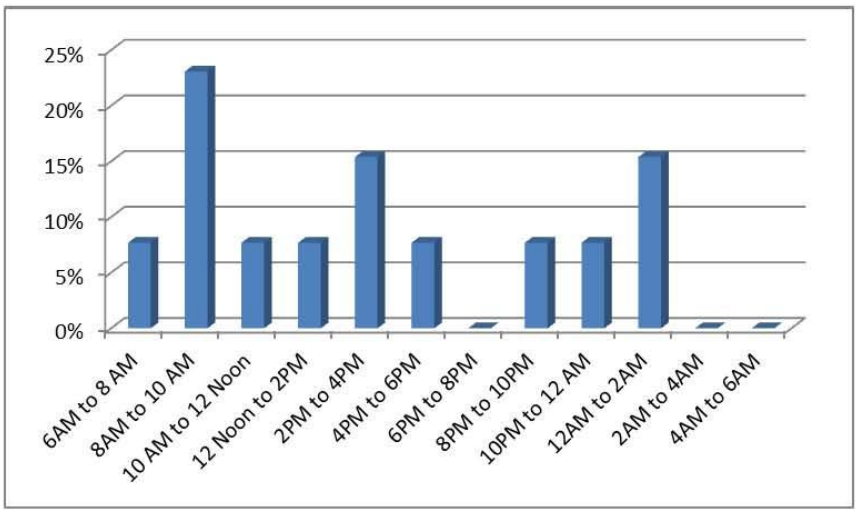
Day of the Week



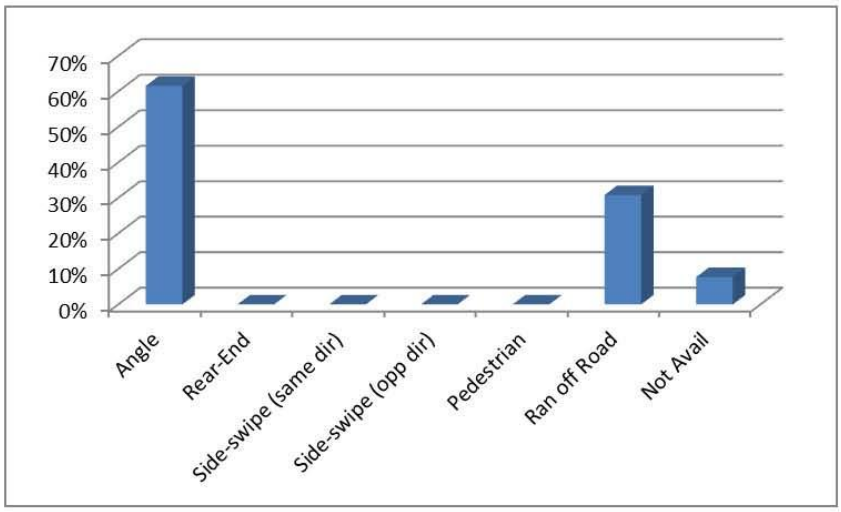
North Cary Street at Ames Street

3

Time of Day

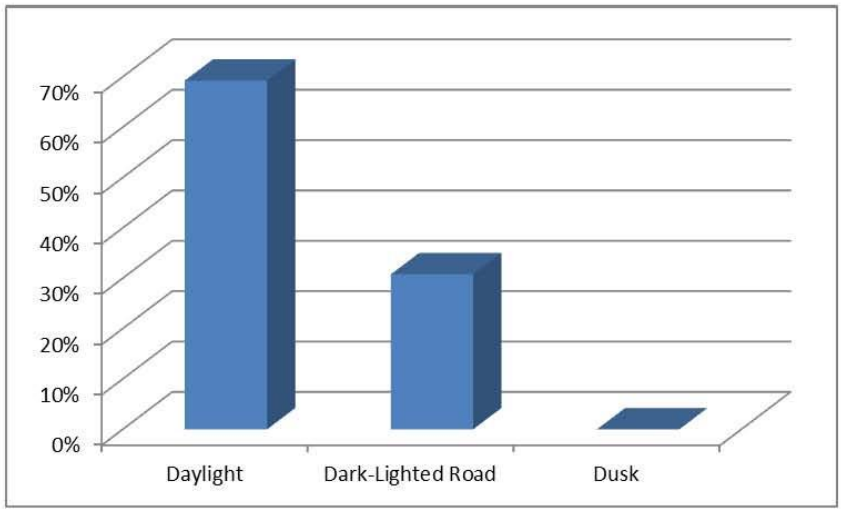


Manner of Collision

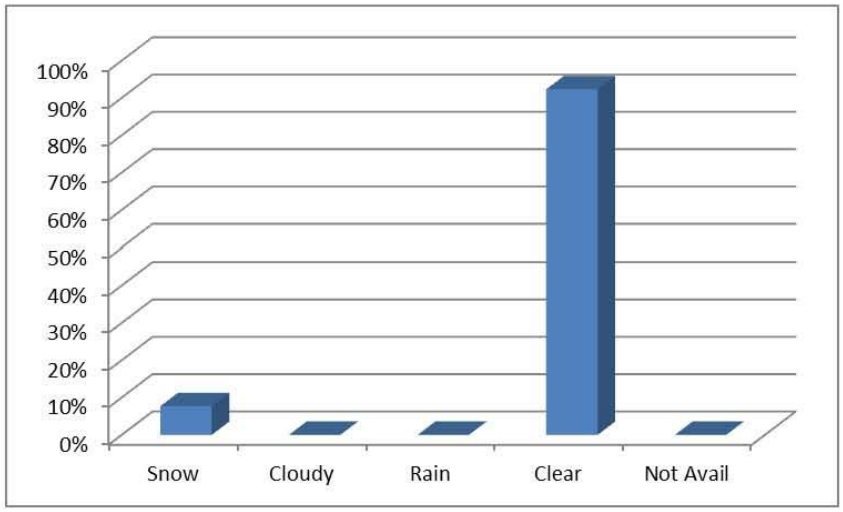


North Cary Street at Ames Street 4

Light Conditions



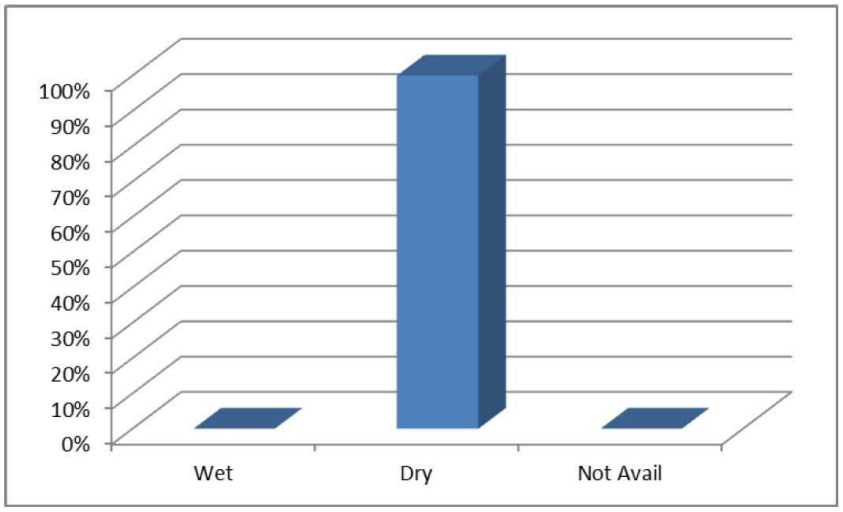
Weather Conditions



North Cary Street at Ames Street

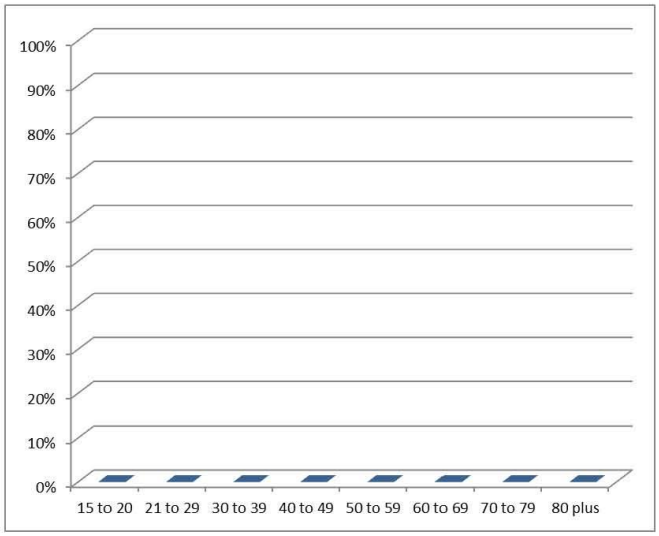
5

Road Surface Conditions



Age

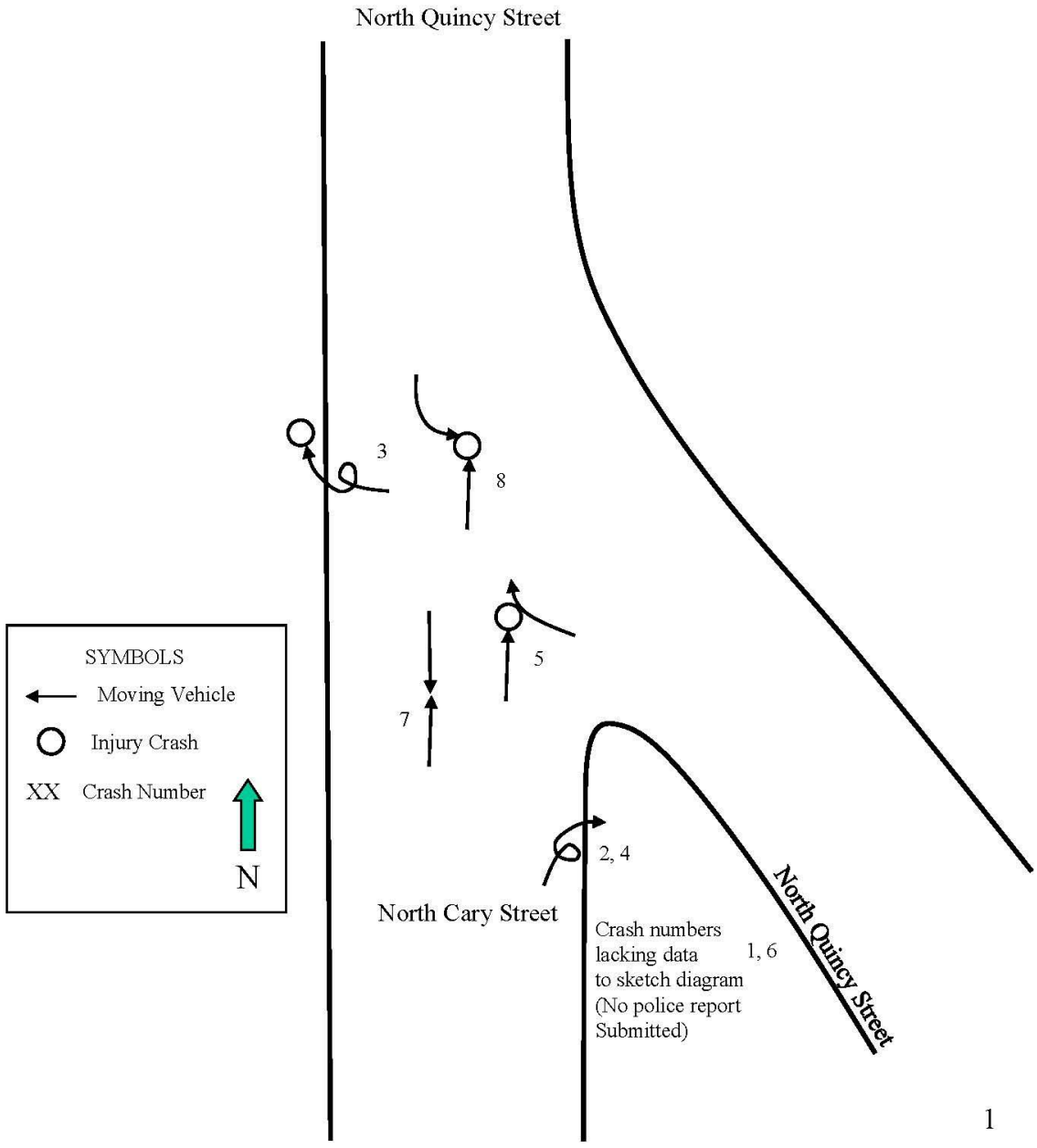
INSUFFICIENT DATA



North Cary Street at Ames Street

6

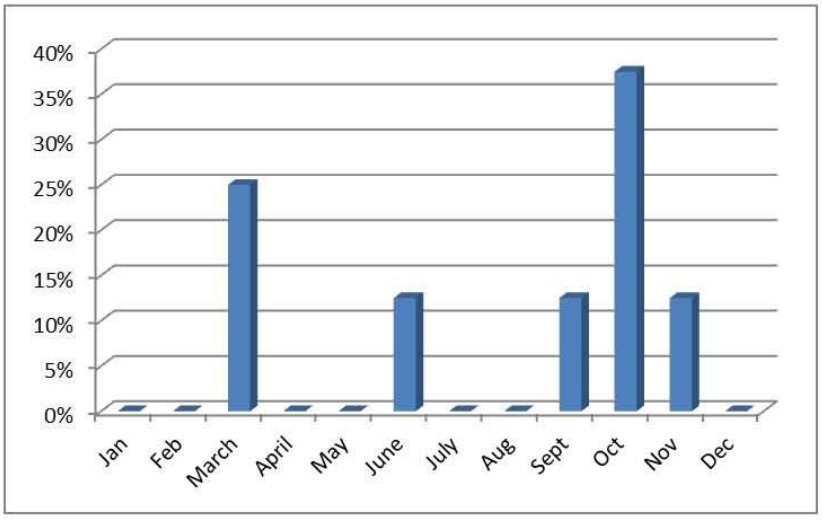
COLLISION DIAGRAM
North Quincy Street at North Cary Street
Collision Diagram for Crashes (2015, 2016, 2017)
Prepared by OCPC (RG 10/2018) (Source: MassDOT and Brockton Police Department)



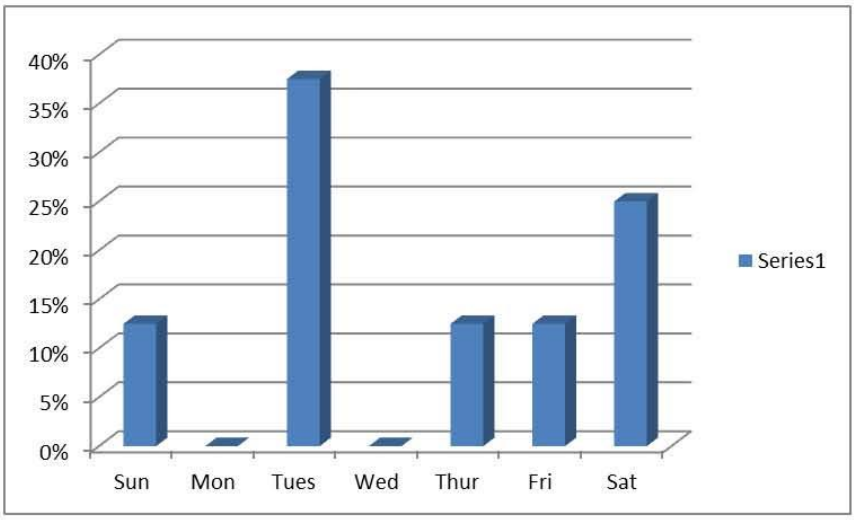
Crash Data Summary Table 2015, 2016, 2017
North Quincy at North Cary - Brockton

Crash Num	P.D. Code	Crash Date	Crash Day	Time of Day	Manner of Coll	Light Cond	Weather	Road Surf	Driver Contribute Code	Age 1	Age 2	Comments	Inj
1	15-5667-OF	9/13/2015	Sun	8:31 PM	Head-on					28	52		
2	15-1829-AC	10/1/2015	Thur	3:02 PM	Ran off Road	Daylight	Cloudy	Dry	Failure to keep in the lane	45			PDO
3	16-1011-AC	6/4/2016	Sat	1:12 PM	Ran off Road	Dark lighted Road	Cloudy	Dry	Overcorrecting over steering	33		Citation issued	Inj
4	16-1794-AC	10/1/2016	Sat	10:20 AM	Ran off Road	Daylight	Rain	Wet					PDO
5	16-1857-AC	10/11/2016	Tues	5:07 PM	Angle	Daylight	Clear	Dry	Failed to yield Right of Way	25	59	Written warning issued	Inj
6	------	11/17/2017	Fri	1:00 AM	Angle								
7	4396116	3/15/2016	Tues	1:10 PM	Head-on	Daylight	Rain	Wet					PDO
8	4396117	3/15/2016	Tues	1:43 PM	Angle	Daylight	Rain	Wet					Inj

Crash Month



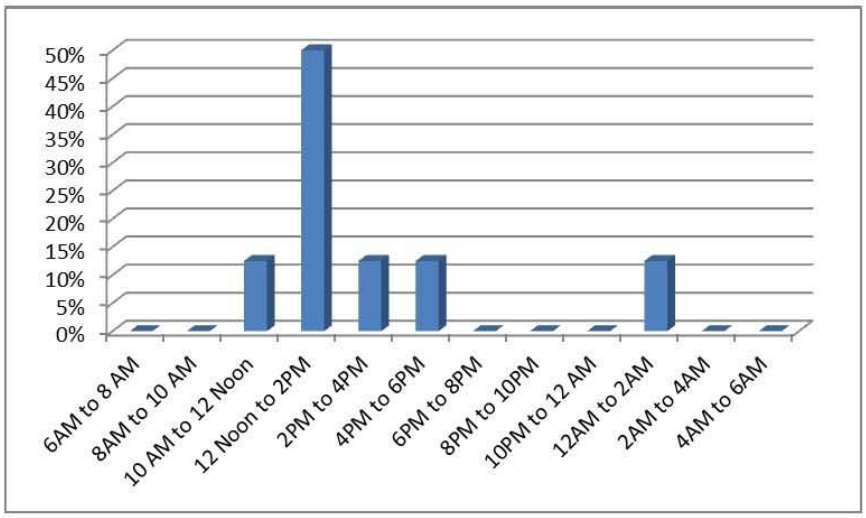
Day of the Week



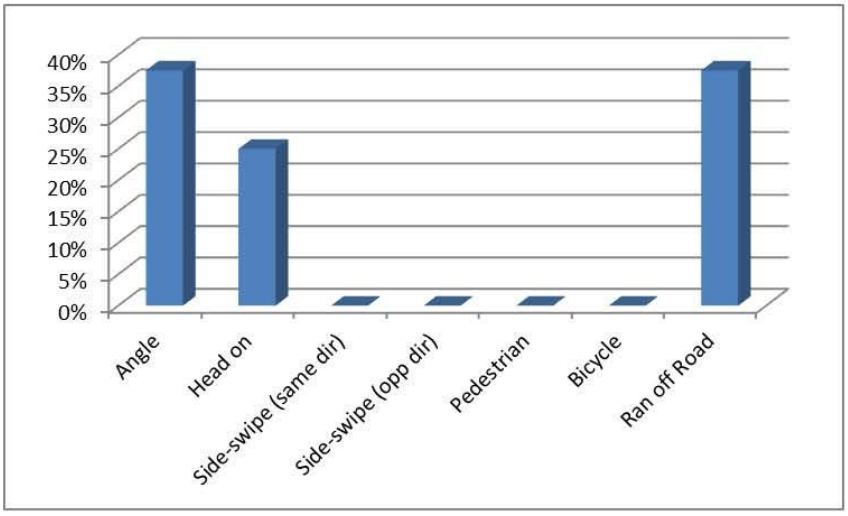
North Quincy at North Cary - Brockton

3

Time of Day

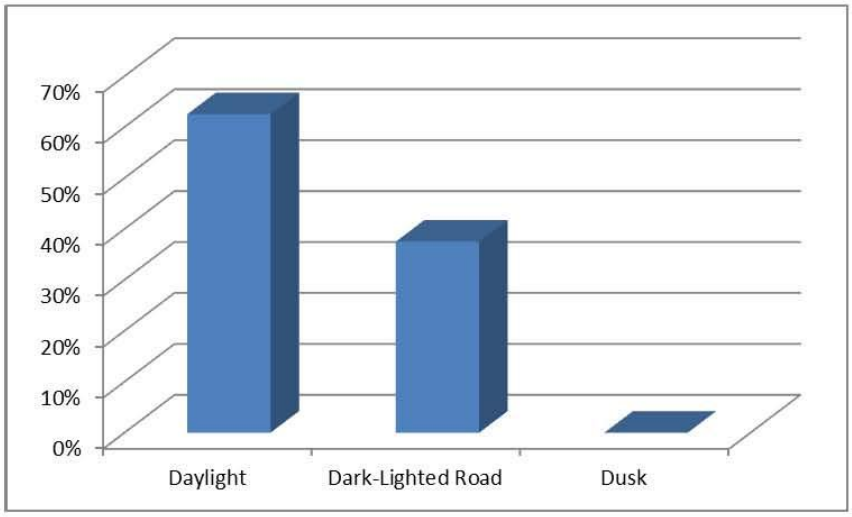


Manner of Collision

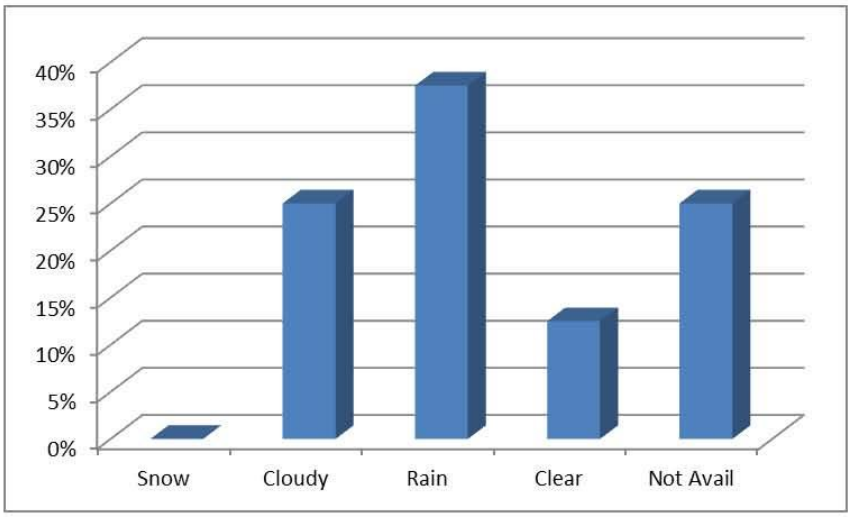


North Quincy at North Cary - Brockton

Light Conditions



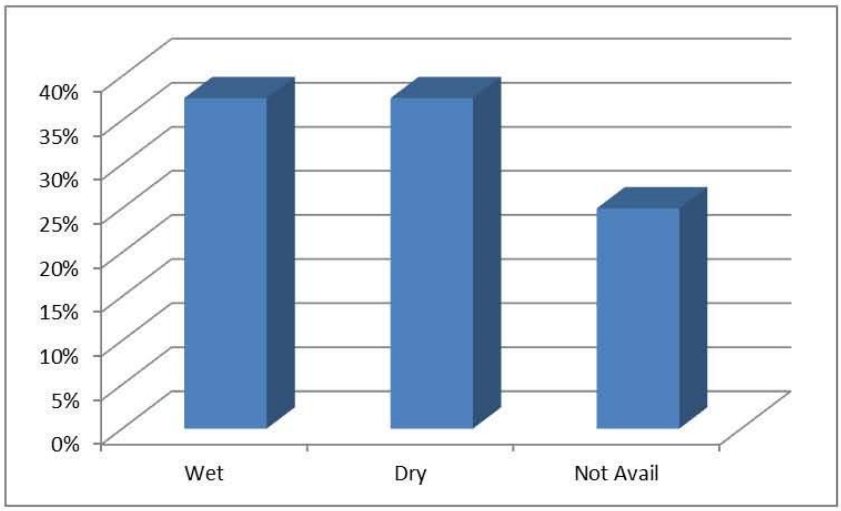
Weather Conditions



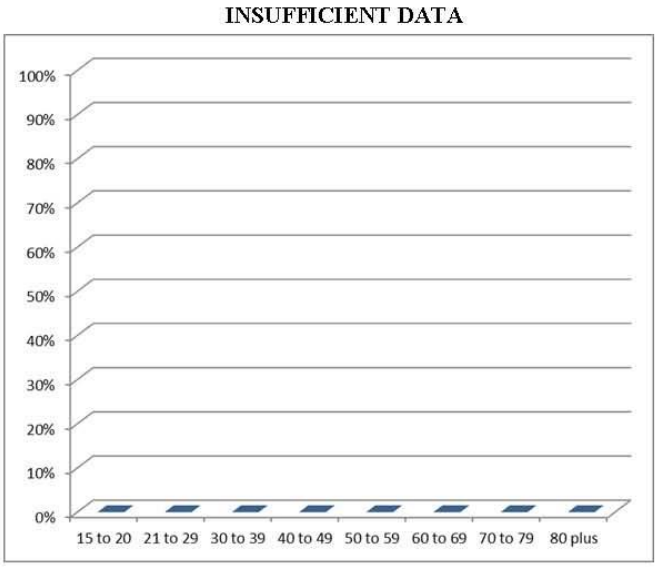
North Quincy at North Cary - Brockton

5

Road Surface Conditions



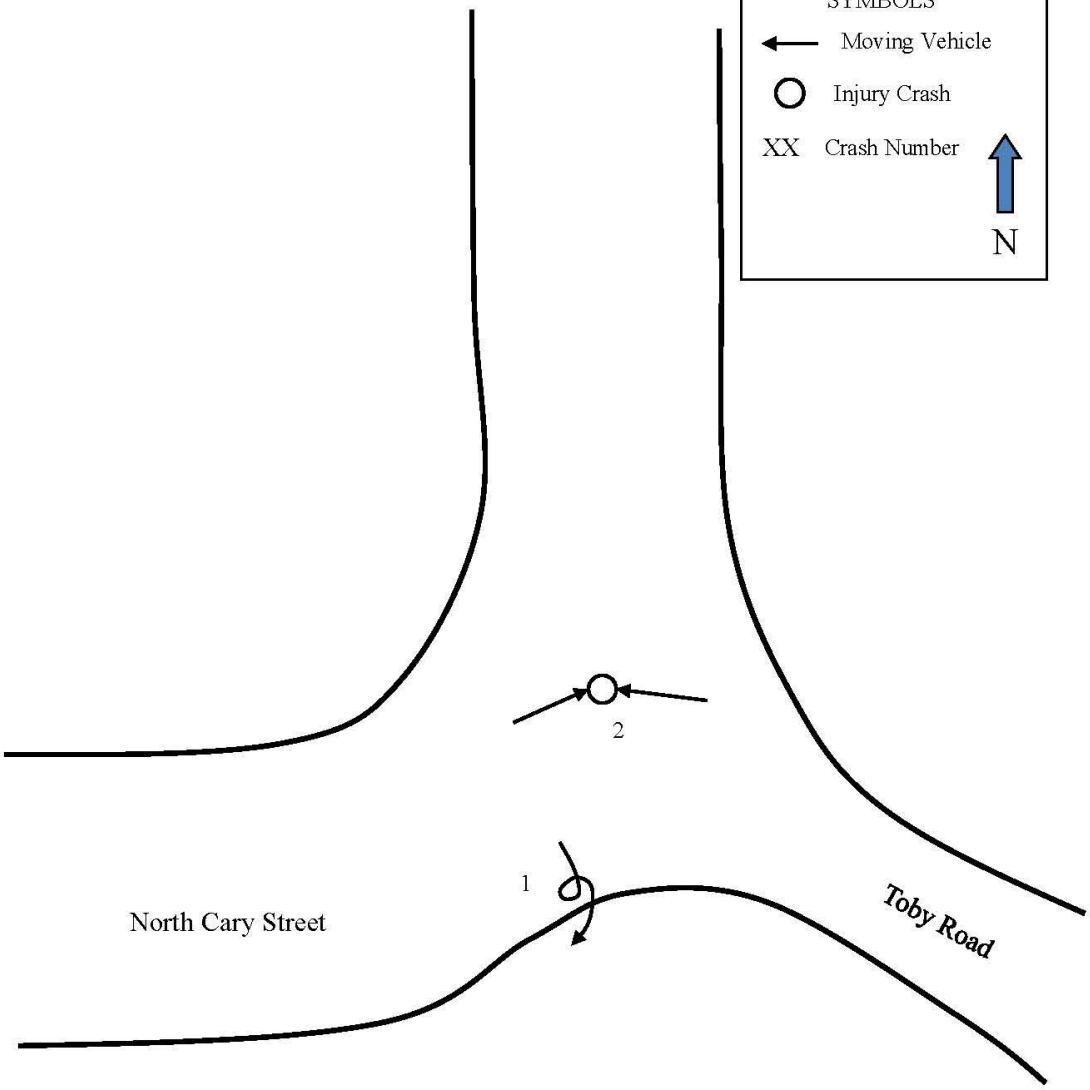
Age



North Quincy at North Cary - Brockton

6

COLLISION DIAGRAM
North Cary Street at Toby Road
Collision Diagram for Crashes (2015, 2016, 2017)
Prepared by OCPC (RG 10/2018) (Source: MassDOT and Brockton Police Department)



1

North Cary Street at Toby Road - Brockton
Crashes (2015, 2016, 2017)
(RG 9/2018) (Source: MassDOT and Brockton Police Department)

Crash Num	P.D. Code	Crash Date	Crash Day	Time of Day	Manner of Coll	Light Cond	Weather	Road Surf	Driver Contribute Code	Age 1	Age 2	Comments	Inj
1	17-2364-AC	12/22/2017	Fri	6:43 AM	Ran off Road	Daylight	Clear	Dry	Hit a tree	24			PDO
2	2294	15-Jul-2015	Wed	6:09 PM	Head-on	Unknown	Unknown	Dry					Inj

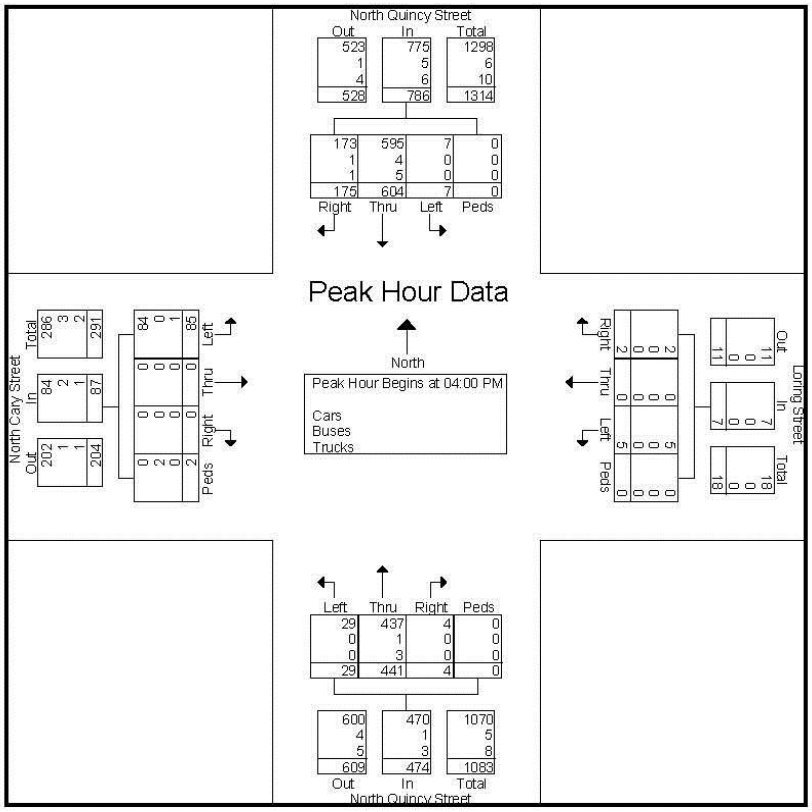
Appendix D: Additional Information

- Intersection Turning Movement Counts
- Automatic Traffic Recorder (ATR) Vehicle Counts
- Warrant Analyses

Old Colony Planning Council
70 School Street
Brockton, MA 02301
(508) 583-1833
www.ocpcrpa.org

Community: Brockton
Weather: Clear
Board # & Staff: DB-400 (5) / RG
Traffic Control: Two-Way Stop

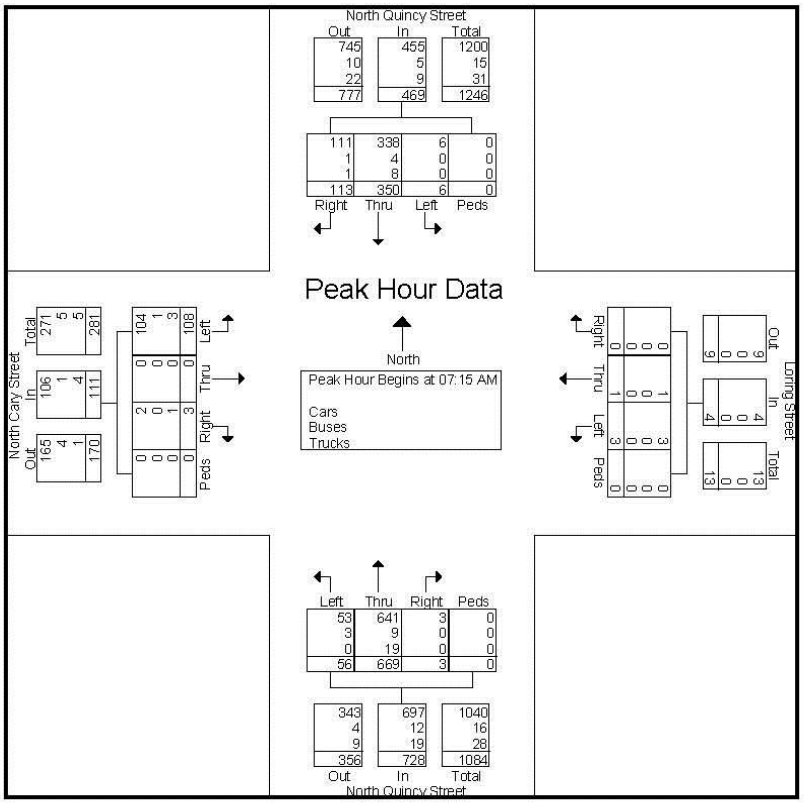
File Name : North Quincy Street & North Cary_Loring Street_PM
Site Code : 44
Start Date : 4/3/2013
Page No : 5



Old Colony Planning Council
70 School Street
Brockton, MA 02301
(508) 583-1833
www.ocpcrpa.org

Community: Brockton
Weather: Clear
Board # & Staff: TDC-8 (2) / Jcal
Traffic Control: Two-Way Stop

File Name : North Quincy Street & North Cary_Loring Street_AM
Site Code : 44
Start Date : 4/3/2013
Page No : 5



Old Colony Planning Council
70 School Street
Brockton, MA 02301
(508) 583-1833
www.ocpcrpa.org

Community: Brockton
Com#_UR/FC: 44_U6
Recorder #: 25310
Layout: L6 Basic (2')

Station ID:
Site Code: 44
Date Start: 15-May-18
Date End: 16-May-18
Ames St, west of North Cary St

Start	14-May-18		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	52	32	39	35	*	*	*	*	*	*	*	*	46	34
01:00	*	*	13	17	17	14	*	*	*	*	*	*	*	*	15	16
02:00	*	*	6	7	7	11	*	*	*	*	*	*	*	*	6	9
03:00	*	*	4	15	5	16	*	*	*	*	*	*	*	*	4	16
04:00	*	*	18	58	16	50	*	*	*	*	*	*	*	*	17	54
05:00	*	*	48	137	40	122	*	*	*	*	*	*	*	*	44	130
06:00	*	*	107	209	106	250	*	*	*	*	*	*	*	*	106	230
07:00	*	*	**202**	**318**	**198**	**321**	*	*	*	*	*	*	*	*	**200**	**320**
08:00	*	*	184	257	167	248	*	*	*	*	*	*	*	*	176	252
09:00	*	*	172	204	168	195	*	*	*	*	*	*	*	*	170	200
10:00	*	*	179	164	149	176	*	*	*	*	*	*	*	*	164	170
11:00	*	*	172	163	164	184	*	*	*	*	*	*	*	*	168	174
12:00 PM	*	*	213	202	205	205	*	*	*	*	*	*	*	*	209	204
01:00	*	*	201	191	230	173	*	*	*	*	*	*	*	*	216	182
02:00	*	*	279	256	276	248	*	*	*	*	*	*	*	*	278	**252**
03:00	*	*	314	**267**	349	231	*	*	*	*	*	*	*	*	332	249
04:00	*	*	**355**	232	**359**	**251**	*	*	*	*	*	*	*	*	**357**	242
05:00	*	*	355	254	355	243	*	*	*	*	*	*	*	*	355	248
06:00	*	*	277	199	321	222	*	*	*	*	*	*	*	*	299	210
07:00	*	*	198	133	238	171	*	*	*	*	*	*	*	*	218	152
08:00	*	*	144	132	204	163	*	*	*	*	*	*	*	*	174	148
09:00	*	*	127	110	141	123	*	*	*	*	*	*	*	*	134	116
10:00	*	*	81	65	76	74	*	*	*	*	*	*	*	*	78	70
11:00	*	*	65	68	59	52	*	*	*	*	*	*	*	*	62	60
Lane	0	0	3766	3690	3889	3778	0	0	0	0	0	0	0	0	3828	3738
Day	0		7456		7667		0		0		0		0		7566	
AM Peak	-	-	07:00	07:00	07:00	07:00	-	-	-	-	-	-	-	-	07:00	07:00
Vol.	-	-	202	318	198	321	-	-	-	-	-	-	-	-	200	320
PM Peak	-	-	16:00	15:00	16:00	16:00	-	-	-	-	-	-	-	-	16:00	14:00
Vol.	-	-	355	267	359	251	-	-	-	-	-	-	-	-	357	252

Comb. Total	0	7456	7667	0	0	0	0	7566

Old Colony Planning Council
70 School Street
Brockton, MA 02301
(508) 583-1833
www.ocpcrpa.org

Community: Brockton
Com#_UR/FC: 44_U6
Recorder #: 25236
Layout: L6 Basic (2')

Station ID:
Site Code: 44
Date Start: 15-May-18
Date End: 16-May-18
North Cary St, north of Ames St

Start	14-May-18		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	23	35	19	27	*	*	*	*	*	*	*	*	21	31
01:00	*	*	11	9	8	10	*	*	*	*	*	*	*	*	10	10
02:00	*	*	7	6	3	10	*	*	*	*	*	*	*	*	5	8
03:00	*	*	8	11	4	12	*	*	*	*	*	*	*	*	6	12
04:00	*	*	19	19	22	18	*	*	*	*	*	*	*	*	20	18
05:00	*	*	72	61	72	65	*	*	*	*	*	*	*	*	72	63
06:00	*	*	178	154	195	155	*	*	*	*	*	*	*	*	186	154
07:00	*	*	189	**284**	210	**258**	*	*	*	*	*	*	*	*	200	**271**
08:00	*	*	**223**	246	**211**	247	*	*	*	*	*	*	*	*	**217**	246
09:00	*	*	166	193	136	181	*	*	*	*	*	*	*	*	151	187
10:00	*	*	121	151	142	132	*	*	*	*	*	*	*	*	132	142
11:00	*	*	131	143	142	112	*	*	*	*	*	*	*	*	136	128
12:00 PM	*	*	142	185	147	186	*	*	*	*	*	*	*	*	144	186
01:00	*	*	133	183	168	169	*	*	*	*	*	*	*	*	150	176
02:00	*	*	205	229	207	229	*	*	*	*	*	*	*	*	206	229
03:00	*	*	232	**291**	237	**298**	*	*	*	*	*	*	*	*	234	**294**
04:00	*	*	**251**	249	**274**	271	*	*	*	*	*	*	*	*	**262**	260
05:00	*	*	225	269	255	293	*	*	*	*	*	*	*	*	240	281
06:00	*	*	152	227	184	260	*	*	*	*	*	*	*	*	168	244
07:00	*	*	128	144	173	170	*	*	*	*	*	*	*	*	150	157
08:00	*	*	103	120	130	134	*	*	*	*	*	*	*	*	116	127
09:00	*	*	67	104	100	95	*	*	*	*	*	*	*	*	84	100
10:00	*	*	57	67	62	64	*	*	*	*	*	*	*	*	60	66
11:00	*	*	42	51	38	49	*	*	*	*	*	*	*	*	40	50
Lane	0	0	2885	3431	3139	3445	0	0	0	0	0	0	0	0	3010	3440
Day	0		6316		6584		0		0		0		0		6450	
AM Peak	-	-	08:00	07:00	08:00	07:00	-	-	-	-	-	-	-	-	08:00	07:00
Vol.	-	-	223	284	211	258	-	-	-	-	-	-	-	-	217	271
PM Peak	-	-	16:00	15:00	16:00	15:00	-	-	-	-	-	-	-	-	16:00	15:00
Vol.	-	-	251	291	274	298	-	-	-	-	-	-	-	-	262	294

Comb. Total	0	6316	6584	0	0	0	0	6450

Old Colony Planning Council
70 School Street
Brockton, MA 02301
(508) 583-1833
www.ocpcrpa.org

Community: Brockton
Com#_UR/FC: 44_U6
Recorder #: 32537
Layout: L6 Basic (2')

Station ID:
Site Code: 44
Date Start: 15-May-18
Date End: 16-May-18
North Cary St, south of Ames St

Start	14-May-18		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	53	88	59	65	*	*	*	*	*	*	*	*	56	76
01:00	*	*	26	27	21	25	*	*	*	*	*	*	*	*	24	26
02:00	*	*	10	10	12	14	*	*	*	*	*	*	*	*	11	12
03:00	*	*	21	19	16	16	*	*	*	*	*	*	*	*	18	18
04:00	*	*	63	39	62	40	*	*	*	*	*	*	*	*	62	40
05:00	*	*	195	112	182	110	*	*	*	*	*	*	*	*	188	111
06:00	*	*	350	271	411	294	*	*	*	*	*	*	*	*	380	282
07:00	*	*	**468**	**495**	**469**	**452**	*	*	*	*	*	*	*	*	**468**	**474**
08:00	*	*	435	437	417	401	*	*	*	*	*	*	*	*	426	419
09:00	*	*	343	369	315	344	*	*	*	*	*	*	*	*	329	356
10:00	*	*	272	325	316	295	*	*	*	*	*	*	*	*	294	310
11:00	*	*	291	307	324	287	*	*	*	*	*	*	*	*	308	297
12:00 PM	*	*	337	387	340	374	*	*	*	*	*	*	*	*	338	380
01:00	*	*	317	394	333	391	*	*	*	*	*	*	*	*	325	392
02:00	*	*	432	488	457	503	*	*	*	*	*	*	*	*	444	496
03:00	*	*	484	**578**	454	622	*	*	*	*	*	*	*	*	469	**600**
04:00	*	*	494	578	**524**	597	*	*	*	*	*	*	*	*	**509**	588
05:00	*	*	**497**	575	507	**625**	*	*	*	*	*	*	*	*	502	600
06:00	*	*	347	475	402	567	*	*	*	*	*	*	*	*	374	521
07:00	*	*	273	323	351	386	*	*	*	*	*	*	*	*	312	354
08:00	*	*	220	252	294	318	*	*	*	*	*	*	*	*	257	285
09:00	*	*	171	210	230	238	*	*	*	*	*	*	*	*	200	224
10:00	*	*	120	144	148	142	*	*	*	*	*	*	*	*	134	143
11:00	*	*	113	110	101	110	*	*	*	*	*	*	*	*	107	110
Lane	0	0	6332	7013	6745	7216	0	0	0	0	0	0	0	0	6535	7114
Day	0		13345		13961		0		0		0		0		13649	
AM Peak	-	-	07:00	07:00	07:00	07:00	-	-	-	-	-	-	-	-	07:00	07:00
Vol.	-	-	468	495	469	452	-	-	-	-	-	-	-	-	468	474
PM Peak	-	-	17:00	15:00	16:00	17:00	-	-	-	-	-	-	-	-	16:00	15:00
Vol.	-	-	497	578	524	625	-	-	-	-	-	-	-	-	509	600

Comb. Total	0	13345	13961	0	0	0	0	13649

Community: Brockton
Com#_UR/FC: 44_U5
Recorder #: 32539
Layout: L6 Basic (2')

Old Colony Planning Council
70 School Street
Brockton, MA 02301
(508) 583-1833
www.ocpcrpa.org

Page 1

Station ID:
Site Code: 44
Date Start: 07-Nov-18
Date End: 08-Nov-18
N Cary St, south of N Quincy St

Start	05-Nov-18		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	*	*	9	17	8	21	*	*	*	*	*	*	8	19
01:00	*	*	*	*	5	9	1	9	*	*	*	*	*	*	3	9
02:00	*	*	*	*	0	1	0	6	*	*	*	*	*	*	0	4
03:00	*	*	*	*	5	5	7	9	*	*	*	*	*	*	6	7
04:00	*	*	*	*	28	16	30	18	*	*	*	*	*	*	29	17
05:00	*	*	*	*	71	49	78	44	*	*	*	*	*	*	74	46
06:00	*	*	*	*	**164**	109	**152**	108	*	*	*	*	*	*	**158**	108
07:00	*	*	*	*	154	**217**	142	**237**	*	*	*	*	*	*	148	**227**
08:00	*	*	*	*	142	214	134	206	*	*	*	*	*	*	138	210
09:00	*	*	*	*	101	144	87	131	*	*	*	*	*	*	94	138
10:00	*	*	*	*	63	108	72	126	*	*	*	*	*	*	68	117
11:00	*	*	*	*	57	126	70	127	*	*	*	*	*	*	64	126
12:00 PM	*	*	*	*	86	122	79	139	*	*	*	*	*	*	82	130
01:00	*	*	*	*	71	161	69	154	*	*	*	*	*	*	70	158
02:00	*	*	*	*	105	182	**124**	222	*	*	*	*	*	*	114	202
03:00	*	*	*	*	**110**	270	120	250	*	*	*	*	*	*	**115**	260
04:00	*	*	*	*	109	256	114	251	*	*	*	*	*	*	112	254
05:00	*	*	*	*	100	**271**	101	**281**	*	*	*	*	*	*	100	**276**
06:00	*	*	*	*	77	219	89	246	*	*	*	*	*	*	83	232
07:00	*	*	*	*	73	154	67	161	*	*	*	*	*	*	70	158
08:00	*	*	*	*	47	102	50	116	*	*	*	*	*	*	48	109
09:00	*	*	*	*	33	75	44	87	*	*	*	*	*	*	38	81
10:00	*	*	*	*	36	57	40	62	*	*	*	*	*	*	38	60
11:00	*	*	*	*	13	59	17	72	*	*	*	*	*	*	15	66
Lane	0	0	0	0	1659	2943	1695	3083	0	0	0	0	0	0	1675	3014
Day	0		0		4602		4778		0		0		0		4689	
AM Peak	-	-	-	-	06:00	07:00	06:00	07:00	-	-	-	-	-	-	06:00	07:00
Vol.	-	-	-	-	164	217	152	237	-	-	-	-	-	-	158	227
PM Peak	-	-	-	-	15:00	17:00	14:00	17:00	-	-	-	-	-	-	15:00	17:00
Vol.	-	-	-	-	110	271	124	281	-	-	-	-	-	-	115	276

Comb. Total	0	0	4602	4778	0	0	0	4689

Old Colony Planning Council
70 School Street
Brockton, MA 02301
(508) 583-1833
www.ocpcrpa.org

Community: Brockton
Com#_UR/FC: 44_U5
Recorder #: 32537
Layout: L6 Basic (2')

Station ID:
Site Code: 44
Date Start: 07-Nov-18
Date End: 08-Nov-18
N Quincy St, north of N Cary St

Start	05-Nov-18		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	*	*	37	64	36	65	*	*	*	*	*	*	36	64
01:00	*	*	*	*	15	31	25	36	*	*	*	*	*	*	20	34
02:00	*	*	*	*	9	15	19	17	*	*	*	*	*	*	14	16
03:00	*	*	*	*	17	11	30	20	*	*	*	*	*	*	24	16
04:00	*	*	*	*	159	44	155	36	*	*	*	*	*	*	157	40
05:00	*	*	*	*	468	99	486	102	*	*	*	*	*	*	477	100
06:00	*	*	*	*	**894**	234	869	244	*	*	*	*	*	*	882	239
07:00	*	*	*	*	889	506	**890**	**520**	*	*	*	*	*	*	**890**	**513**
08:00	*	*	*	*	736	**519**	719	472	*	*	*	*	*	*	728	496
09:00	*	*	*	*	542	404	501	377	*	*	*	*	*	*	522	390
10:00	*	*	*	*	437	370	423	355	*	*	*	*	*	*	430	362
11:00	*	*	*	*	416	344	421	374	*	*	*	*	*	*	418	359
12:00 PM	*	*	*	*	478	391	456	433	*	*	*	*	*	*	467	412
01:00	*	*	*	*	437	503	459	460	*	*	*	*	*	*	448	482
02:00	*	*	*	*	566	584	591	566	*	*	*	*	*	*	578	575
03:00	*	*	*	*	560	714	606	718	*	*	*	*	*	*	583	716
04:00	*	*	*	*	**607**	**803**	**622**	786	*	*	*	*	*	*	**614**	794
05:00	*	*	*	*	541	795	528	**814**	*	*	*	*	*	*	534	**804**
06:00	*	*	*	*	426	646	384	663	*	*	*	*	*	*	405	654
07:00	*	*	*	*	305	425	323	460	*	*	*	*	*	*	314	442
08:00	*	*	*	*	269	339	263	261	*	*	*	*	*	*	266	300
09:00	*	*	*	*	187	221	203	246	*	*	*	*	*	*	195	234
10:00	*	*	*	*	125	159	144	180	*	*	*	*	*	*	134	170
11:00	*	*	*	*	73	128	75	181	*	*	*	*	*	*	74	154
Lane	0	0	0	0	9193	8349	9228	8386	0	0	0	0	0	0	9210	8366
Day	0		0		17542		17614		0		0		0		17576	
AM Peak	-	-	-	-	06:00	08:00	07:00	07:00	-	-	-	-	-	-	07:00	07:00
Vol.	-	-	-	-	894	519	890	520	-	-	-	-	-	-	890	513
PM Peak	-	-	-	-	16:00	16:00	16:00	17:00	-	-	-	-	-	-	16:00	17:00
Vol.	-	-	-	-	607	803	622	814	-	-	-	-	-	-	614	804

Comb. Total	0	0	17542	17614	0	0	0	17576

Old Colony Planning Council
70 School Street
Brockton, MA 02301
(508) 583-1833
www.ocpcrpa.org

Community: Brockton
Com#_UR/FC: 44_U5
Recorder #: 32538
Layout: L6 Basic (2')

Station ID:
Site Code: 44
Date Start: 07-Nov-18
Date End: 08-Nov-18
N Quincy St, south of N Cary St

Start	05-Nov-18		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	*	*	31	50	34	47	*	*	*	*	*	*	32	48
01:00	*	*	*	*	13	25	28	27	*	*	*	*	*	*	20	26
02:00	*	*	*	*	10	13	21	13	*	*	*	*	*	*	16	13
03:00	*	*	*	*	13	9	28	18	*	*	*	*	*	*	20	14
04:00	*	*	*	*	129	33	125	23	*	*	*	*	*	*	127	28
05:00	*	*	*	*	400	67	415	78	*	*	*	*	*	*	408	72
06:00	*	*	*	*	770	168	736	184	*	*	*	*	*	*	753	176
07:00	*	*	*	*	**821**	356	**850**	**357**	*	*	*	*	*	*	**836**	**356**
08:00	*	*	*	*	656	**380**	623	327	*	*	*	*	*	*	640	354
09:00	*	*	*	*	475	301	448	282	*	*	*	*	*	*	462	292
10:00	*	*	*	*	394	276	387	275	*	*	*	*	*	*	390	276
11:00	*	*	*	*	396	257	395	284	*	*	*	*	*	*	396	270
12:00 PM	*	*	*	*	446	295	420	319	*	*	*	*	*	*	433	307
01:00	*	*	*	*	411	365	430	330	*	*	*	*	*	*	420	348
02:00	*	*	*	*	511	432	547	395	*	*	*	*	*	*	529	414
03:00	*	*	*	*	549	504	571	542	*	*	*	*	*	*	560	523
04:00	*	*	*	*	**576**	**606**	**572**	582	*	*	*	*	*	*	**574**	**594**
05:00	*	*	*	*	537	564	517	**594**	*	*	*	*	*	*	527	579
06:00	*	*	*	*	415	473	368	456	*	*	*	*	*	*	392	464
07:00	*	*	*	*	286	301	301	318	*	*	*	*	*	*	294	310
08:00	*	*	*	*	242	254	248	174	*	*	*	*	*	*	245	214
09:00	*	*	*	*	171	163	184	165	*	*	*	*	*	*	178	164
10:00	*	*	*	*	107	119	120	137	*	*	*	*	*	*	114	128
11:00	*	*	*	*	70	79	66	113	*	*	*	*	*	*	68	96
Lane	0	0	0	0	8429	6090	8434	6040	0	0	0	0	0	0	8434	6066
Day	0		0		14519		14474		0		0		0		14500	
AM Peak	-	-	-	-	07:00	08:00	07:00	07:00	-	-	-	-	-	-	07:00	07:00
Vol.	-	-	-	-	821	380	850	357	-	-	-	-	-	-	836	356
PM Peak	-	-	-	-	16:00	16:00	16:00	17:00	-	-	-	-	-	-	16:00	16:00
Vol.	-	-	-	-	576	606	572	594	-	-	-	-	-	-	574	594

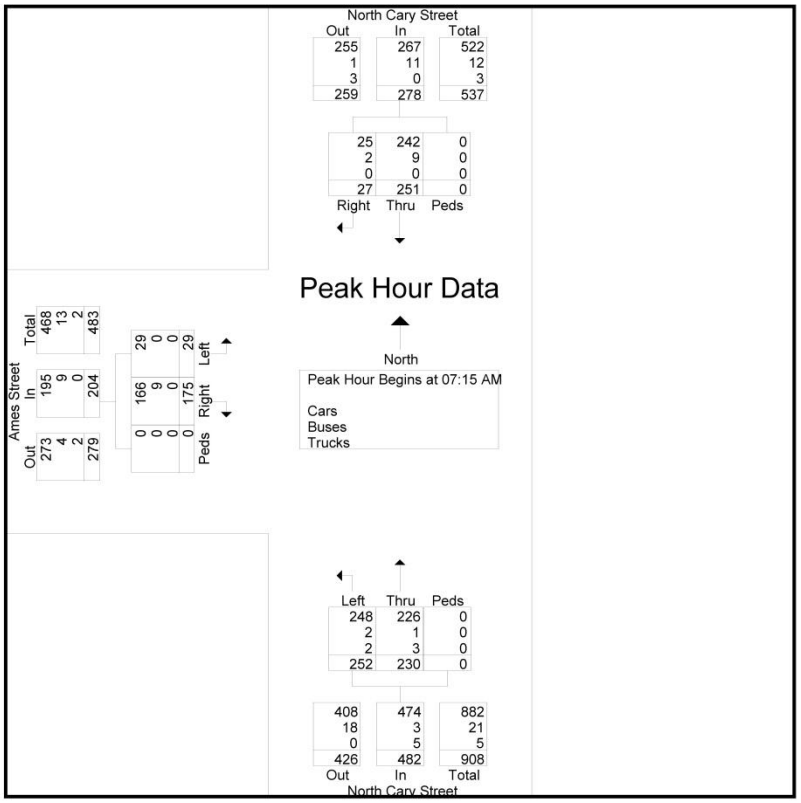
Comb. Total	0	0	14519	14474	0	0	0	14500

Old Colony Planning Council
70 School Street
Brockton, MA 02301
(508) 583-1833
www.ocpcrpa.org

Community: Brockton
Weather: Clear
Board # & Staff: DB-400 (3) / JP
Traffic Control: Stop Sign

File Name : North Cary Street & Ames Street_AM
Site Code : 44
Start Date : 5/8/2018
Page No : 4

	North Cary Street Southbound				North Cary Street Northbound				Ames Street Eastbound				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:30 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	3	42	0	45	53	66	0	119	36	3	0	39	203
07:30 AM	**12**	74	0	86	61	**69**	0	**130**	38	10	0	48	264
07:45 AM	9	**81**	0	**90**	**62**	61	0	123	49	**12**	0	**61**	**274**
08:00 AM	3	54	0	57	54	56	0	110	**52**	4	0	56	223
Total Volume	27	251	0	278	230	252	0	482	175	29	0	204	964
% App. Total	9.7	90.3	0		47.7	52.3	0		85.8	14.2	0		
PHF	.563	.775	.000	.772	.927	.913	.000	.927	.841	.604	.000	.836	.880
Cars	25	242	0	267	226	248	0	474	166	29	0	195	936
% Cars	92.6	96.4	0	96.0	98.3	98.4	0	98.3	94.9	100	0	95.6	97.1
Buses	2	9	0	11	1	2	0	3	9	0	0	9	23
% Buses	7.4	3.6	0	4.0	0.4	0.8	0	0.6	5.1	0	0	4.4	2.4
Trucks	0	0	0	0	3	2	0	5	0	0	0	0	5
% Trucks	0	0	0	0	1.3	0.8	0	1.0	0	0	0	0	0.5

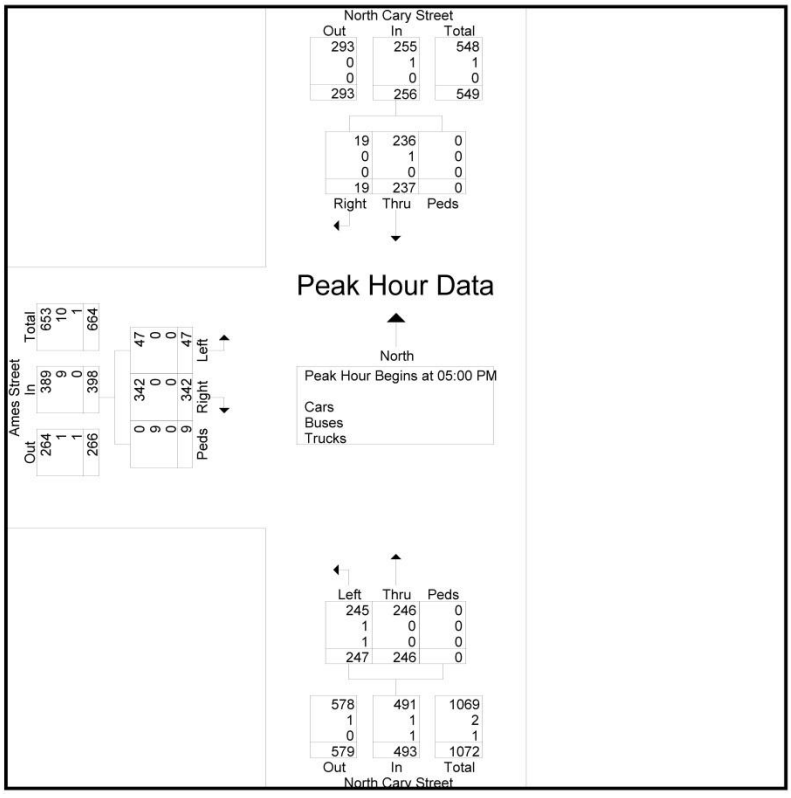


Old Colony Planning Council
70 School Street
Brockton, MA 02301
(508) 583-1833
www.ocpcrpa.org

Community: Brockton
Weather: Clear
Board # & Staff: DB-400 (3) / JP
Traffic Control: Stop Sign

File Name : North Cary Street & Ames Street_PM
Site Code : 44
Start Date : 4/26/2018
Page No : 4

	North Cary Street Southbound				North Cary Street Northbound				Ames Street Eastbound				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	2	**72**	0	**74**	61	56	0	117	65	8	3	76	267
05:15 PM	4	52	0	56	**69**	**66**	0	**135**	94	8	0	102	293
05:30 PM	3	53	0	56	61	65	0	126	**99**	11	1	**111**	293
05:45 PM	**10**	60	0	70	55	60	0	115	84	**20**	**5**	109	**294**
Total Volume	19	237	0	256	246	247	0	493	342	47	9	398	1147
% App. Total	7.4	92.6	0		49.9	50.1	0		85.9	11.8	2.3		
PHF	.475	.823	.000	.865	.891	.936	.000	.913	.864	.588	.450	.896	.975
Cars	19	236	0	255	246	245	0	491	342	47	0	389	1135
% Cars	100	99.6	0	99.6	100	99.2	0	99.6	100	100	0	97.7	99.0
Buses	0	1	0	1	0	1	0	1	0	0	9	9	11
% Buses	0	0.4	0	0.4	0	0.4	0	0.2	0	0	100	2.3	1.0
Trucks	0	0	0	0	0	1	0	1	0	0	0	0	1
% Trucks	0	0	0	0	0	0.4	0	0.2	0	0	0	0	0.1



Warrants Summary Report

1: North Cary at Ames

Intersection Information

	Major Street	Minor Street
Street Name	North Cary Street	Ames Street
Direction	NB/SB	EB
Number of Lanes	1	1
Approch Speed	35	30

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	Yes	
Condition A or B Met	Yes	10 Hours met (8 required)
Condition A and B M	No	7 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	Yes	6 Hours met (4 required)
Warrant 3, Peak Hour		
	Yes	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	Yes	3 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Peds > 100 Conditio	No	0 Hours met (4 required)
Peds > 190 Conditio	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Federal 2003 1

Warrants Summary Report

1: NQuincy at NCary

Intersection Information

	Major Street	Minor Street
Street Name	N Quincy	N Cary
Direction	WB/SB	NB
Number of Lanes	1	1
Approch Speed	30	30

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	Yes	
Condition A or B Met?	Yes	11 Hours met (8 required)
Condition A and B Met?	No	5 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	Yes	8 Hours met (4 required)
Warrant 3, Peak Hour		
	Yes	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	Yes	2 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

All-Way Stop Control Warrant: Multiway Stop Applications

1: NQuincy at NCary

Intersection Information

Major Street Name:	N Quincy
Major Street Direction:	WB/SB
Minor Street Direction:	NB

AWSC WARRANT MET? **Yes**

Details:

Condition A Met?	Yes	Qualifying Crashes	8
Condition B Met?	Yes	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	30

Notes: 0 Hours Met (8 Required)

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	West Bound Bicycle Volumes	North Bound Bicycle Volumes	West Bound Ped Volumes	North Bound Ped Volumes	Major Street: Veh Volume > 300	Minor Street: Avg(Veh + Ped + Bicycle) > 200	Minor Street: Delay > 30

Federal 2009 34

All-Way Stop Control Warrant: Multiway Stop Applications

1: NCaryAmes

Intersection Information

Major Street Name:	-
Major Street Direction:	NB/SB
Minor Street Direction:	EB

AWSC WARRANT MET? Yes

Details:

Condition A Met?	Yes	Qualifying Crashes	4
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	30

Notes: Delay for highest hour < 30 sec/veh

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	North Bound Bicycle Volumes	East Bound Bicycle Volumes	North Bound Ped Volumes	East Bound Ped Volumes	Major Street	Minor Street	
							Veh Volume > 300	Avg(Veh + Ped + Bicycle) > 200	Delay > 30
07:00 to 08:00	739	200	0	0	0	0	False	No	No
12:00 to 13:00	524	209	0	0	0	0	False	No	No
13:00 to 14:00	501	216	0	0	0	0	False	No	No
14:00 to 15:00	673	278	0	0	0	0	False	No	No
15:00 to 16:00	763	332	0	0	0	0	False	No	No
16:00 to 17:00	769	357	0	0	0	0	False	No	No
17:00 to 18:00	783	355	0	0	0	0	False	No	No
18:00 to 19:00	618	299	0	0	0	0	False	No	No
19:00 to 20:00	469	218	0	0	0	0	False	No	No

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/.

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

Road Safety Audits. U.S. Department of Transportation, Federal Highway Administration, https://safety.fhwa.dot.gov/rsa/

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

Road Safety Audit, 2nd edition. Austroads, 2000.

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