

ROAD SAFETY AUDIT

Montello Street (Route 28) at East Nilsson Street

Brockton, MA

September 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) is for the Montello Street (Route 28) at East Nilsson Street intersection in Brockton. It was conducted by the Old Colony Planning Council upon request by the City of Brockton Traffic Commission. This report includes manual turning movement counts, level-of-service analysis, traffic signal warrant analysis, and crash data compilation and analyses.

The Road Safety Audit Meeting and Team

The Road Safety Audit took place on Wednesday, August 7, 2019 at the Old Colony Planning Council offices, 70 School Street in Brockton, and also at the Montello Street/East Nilsson Street intersection. 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, as well as intersection peak hour levels-of-service, traffic counts, and 85th percentile speeds (for Montello Street).



The Road Safety Audit took place on Wednesday, August 7, 2019 at the Old Colony Planning Council offices, 70 School Street in Brockton

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 intersection 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 the intersection. 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 intersection location is shown in Figure 1.

Table 1. Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Joe Solomon	Brockton Fire Department
Chike Odunkwe	City of Brockton
Bianca Marshall	MassDOT District 5
Kyle Mowatt	Old Colony Planning Council
Jimmy Pereira	Old Colony Planning Council
Raymond Guarino	Old Colony Planning Council

Figure 1. Locus Map Montello Street at East Nilsson Street, Brockton



Project Location and Description

Montello Street (Route 28) at East Nilsson Street

Montello Street is under Brockton jurisdiction and is classified as an urban principal arterial. It is a two lane cross section in Brockton south of the downtown and runs from Plain Street in Brockton north through Brockton downtown to Avon. The land use along Montello Street is mixed residential and commercial/industrial. Montello Street runs parallel with the train tracks in Brockton, and the westbound East Nilsson Street approach to the Montello Street intersection crosses over the tracks creating a steep descending grade approaching Montello Street. The pavement width of Montello Street is approximately 30 feet wide and sidewalks are provided along both sides of the road. The Gilmore Elementary School is located on Clinton Street in the vicinity of the intersection (students cross Montello Street at East Nilsson to traverse over the train tracks on East Nilsson and then go right onto Clinton Street).

East Nilsson Street is a two lane cross section. It is classified as a local street and is under local Brockton jurisdiction. The pavement width is 26 feet. East Nilsson Street has raised curb sidewalks on both sides of the street. The land use along East Nilsson is mixed residential and commercial in the vicinity of Montello Street and Main Street. It is used as a cut-through route between Main Street and Montello Street (Route 28). Prohibited parking is posted on the south side of East Nilsson Street; however, parking is allowed on the north side of the street west of Montello Street. Montello Street meets East Nilsson Street south of the Brockton downtown to form a four-way stop sign controlled intersection. There is a single shared use lane



The East Nilsson Street westbound approach has a descending grade as the road is raised above the railroad tracks.

on all of the intersection approaches. There are sidewalks on all the approaches to the intersection, as well as pedestrian crosswalks across all the approaches to the intersection. Vehicles are sometimes parked partially on the sidewalk on Montello Street, which is prohibited under Brockton’s ordinances. The Traffic Commission restricts parking on both sides of Montello Street from December 1 to April 1, from the hours of 12:00 pm (midnight) to 7:00 am. In addition, if an emergency snow removal or weather related parking ban is declared at any time by the Mayor or the Commissioner of the Department of Public Works, there is no parking on any of Brockton’s streets. A “no parking” sign is posted on both sides of Montello Street south of Crescent Street; however, a “no parking to corner” sign is posted along with a “no parking” sign on the west side of Montello Street north of East Nilsson Street.

Morning and afternoon peak hour turning movement counts were conducted by OCPC at the intersection. These counts are included in the appendix to this report. The counts show that the heaviest volumes

through the intersection are on the northbound and southbound approaches of Montello Street. During the morning peak hour, there were 585 vehicles northbound and 517 vehicles southbound. During the afternoon peak hour, there were 374 vehicles northbound and 510 vehicles southbound on Montello Street. The heaviest left turning to the intersection are during the afternoon peak hours on East Nilsson Street with 51 vehicles turning left from East Nilsson eastbound and 47 vehicles turning left from East Nilsson Street on the westbound approach. There were 45 vehicles turning left from Montello Street southbound and 22 vehicles turning left from Montello Street on the northbound approach during the afternoon peak hour. During the morning peak hour, there were 28 vehicles turning left from East Nilsson Street eastbound, 10 turning left from east Nilsson Street westbound, 32 turning left southbound and 15 turning left northbound. The highest right turning volumes were on East Nilsson westbound with 39 during the morning peak hour. There were 6 vehicles turning right from East Nilsson eastbound, 17 turning right on the Montello Street southbound approach, and 11 turning right on the Montello Street northbound approach during the afternoon peak hour. During the morning peak hour, there were 30 right turns on the East Nilsson Street westbound approach, 12 right turns on the East Nilsson Street eastbound approach, 27 right turns on the Montello Street southbound approach, and 21 right turns on the Montello Street northbound approach.

The heaviest pedestrian volumes occurred during the afternoon peak hours with 28 pedestrians crossing the eastbound East Nilsson Street approach, 12 pedestrians crossing the westbound East Nilsson Street approach, 14 pedestrians crossing the Montello Street northbound approach, and 5 pedestrians crossing the Montello Street southbound approach. There were very few pedestrians crossing the intersection during the morning peak hour, with only one pedestrian each crossing the East Nilsson eastbound and westbound approach, one pedestrian crossing the Montello Street southbound approach, and no pedestrians crossing the Montello Street northbound approach.

The existing peak hour level-of-service (LOS) is “F”, during the morning and afternoon peak hours for the critical left turn movements from the east Nilsson Street eastbound and westbound minor street approaches. The speed limit on Montello Street is not posted and is 30 miles per hour based on the prima fascia (30 miles per hour in a thickly settled area).

Crash Details and Overview

Crash reports were compiled from the Brockton Police Department for the years 2016, 2017, and 2018. There were a total of 39 crashes at the intersection. Twenty of the 39 crashes (approximately 51 percent) at the intersection resulted in personal injury. The collision diagrams and a summary of the crash data for the intersection is included in the appendix of this report.

The Montello Street at East Nilsson Street is included in the Massachusetts Department of Transportation’s Top 200 Intersection Location Cluster, and is eligible for Highway Safety Improvement Program (HSIP) funding. The HSIP eligible locations are those locations in which the number of crashes within a three year period is within the top 200, or within the top 5% clusters in the region (the crash numbers are weighted based on the severity ten added for each fatal crash and five added for each crash resulting in personal injury). An HSIP eligible project is any strategy, activity or project that corrects or improves a hazardous public road location or feature, or addresses a highway safety problem.

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 for the intersection was presented to the audit participants. Following the presentation, the members of the audit team were asked to discuss the existing issues that may affect safety. The audit team then visited the intersection as a group, at which time observations, safety concerns, and deficiencies were identified and documented by OCPC staff.

The following sections list the safety concerns and the potential enhancements that were identified during the RSA.

Safety Issue: The sight distance on the minor street East Nilsson Street eastbound and westbound approaches is limited.

Vehicles approaching the intersection on both the eastbound and westbound minor street East Nilsson Street approaches is limited, especially looking northbound. Vehicles on the westbound approach pull ahead of the stop line in order to look for vehicles headed southbound on Montello Street toward the intersection. Vehicles on the East Nilsson Street eastbound approach also must pull ahead of the stop line to view vehicles headed southbound on Montello Street toward the intersection. Vegetation on the northwest corner of the intersection (next to a house on the corner) blocks sight lines for East Nilsson eastbound vehicles.

Enhancement: Request permission of the homeowner of the property on the northwest side of the intersection to trim the vegetation back to improve sight lines looking north to Montello Street.

Safety Issue: The peak hour levels-of-service for the minor street (East Nilsson eastbound and westbound approaches) are at “F”, “Forced Flow”.

The intersection is stop signed controlled on the East Nilsson minor street approaches. The peak hour volumes for Montello Street, northbound and southbound, which have the right of way, is heavy and lacks gaps in the through traffic long enough for safe entry for vehicles on the minor street. The level-of-service are at “F”, “Forced Flow”, whereby vehicles turning left, right, or headed through the intersection from the eastbound and westbound East Nilsson minor street have to force their way onto Montello Street. This creates unsafe conditions where vehicles on Montello Street have to slow down or brake to avoid collisions. Thirty-three (about 85 percent) of the crashes were angle type crashes involving vehicles from the minor East Nilsson Street approaches colliding with a vehicle on the Montello Street northbound and southbound approaches.



Vegetation on the northwest corner of the intersection (next to a house on the corner) blocks sight lines for East Nilsson eastbound vehicles.

In addition, there is heavy school traffic and pedestrian traffic due to the close proximity of an elementary school. The Gilmore Elementary School is located on Clinton Street near the Montello Street/East Nilsson Street intersection. Students cross Montello Street at East Nilsson to traverse over the train tracks on East Nilsson and then go right onto Clinton Street.

Enhancements: Install overhead flashing beacons. This includes flashing red on the East Nilsson Street minor street approaches and flashing yellow on the Montello Street northbound and southbound approaches. Flashing beacons can be installed during the interim during the design phase for full traffic signalization of the intersection.

Enhancement: Install traffic signals and pedestrian signals. The traffic signal heads should be overhead mounted on all approaches and include Opticon for emergency vehicle preemption and transit signal priority for buses. The signals should also include auditory prompts for sight impaired individuals. The intersection met the MUTCD Traffic Signal Warrant 7 Crash Experience Section 4C.08.

Safety Issue: There is a lack of pedestrian crossing warning signs on Montello Street (W11-2) and a lack of ADA compliance.

Enhancement: Install pedestrian crossing warning signs (W11-2) at the Montello Street crosswalk across the intersection and install ADA compliant sidewalks and ramps on all corners of the intersection with detectable warning mats.

Safety Issue: The lighting at the intersection is inconsistent with darkness in some areas.

Enhancement: Re-evaluate and improve intersection lighting.

Safety Issue: The turning radii for trucks is inadequate at the intersection.

Damage to the sidewalks and tire marks on the sidewalks on the southeast corner of the intersection indicate that trucks on the Montello Street northbound approach to the intersection making right turns encroach on the sidewalk. The same is true for the northeast corner of the intersection as trucks on the East Nilsson westbound approach turning right to Montello Street encroach on the sidewalk as they execute the turn. This creates a dangerous situation for pedestrians East Nilsson Street goes over the railroad tracks in Brockton, as opposed to the viaducts further north, which go under the tracks offering limited height clearances for trucks. Some drivers prefer to go over the tracks via east Nilsson, where they do not have to worry about height restrictions, to access Route 27 and Route 123, instead of crossing the tracks under the viaducts further north in Brockton downtown.

Enhancement: Examine the potential to increase the curb radii to better accommodate turning trucks if allowed based on available right of way. If improving turning radii is not possible, then examine the potential to re-route trucks.

Safety Issue: The pavement on Montello Street has heavy rutting.

Enhancement: Reclaim and repave to eliminate rutting.

Safety Issue: There is a lack of bicycle amenities on Montello Street.

Enhancement: Consider adding on one side of Montello Street (if the right of way permits), and sharrows on the opposite side.

Safety Issue: Speeding on Montello Street.

Enhancement: Consider a speed study in order to implement a special speed regulation as the roadway is not speed zoned, which increases enforcement difficulty.

Safety Issue: Vehicles parked partially on the sidewalk on Montello Street.

Enhancement: Enhanced parking enforcement.

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

Table 3: Potential Safety Enhancement Summary – Montello Street/East Nilsson Street

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
Limited sight distance on the minor street East Nilsson Street eastbound and westbound approaches.	Request permission of the homeowner of the property on the northwest side of the intersection to trim the vegetation back to improve sight lines looking north to Montello Street.	Medium	< 1 Year	Low	Brockton
The peak hour levels-of-service for the minor street (East Nilsson eastbound and westbound approaches) are at "F", "Forced Flow".	Install overhead flashing beacons. This includes flashing red on the East Nilsson Street minor street approaches and flashing yellow on the Montello Street northbound and southbound approaches. Flashing beacons can be installed during the interim during the design phase for full traffic signalization of the intersection.	Medium	1-3 Years	Medium	Brockton
	Enhancement: Install traffic signals. The traffic signal heads should be overhead mounted on all approaches and include Opticon for emergency vehicle preemption and transit signal priority for buses. The signals should also include auditory prompts for sight impaired individuals. The intersection met the MUTCD Traffic Signal Warrant 7 Crash Experience Section 4C.08.	High	> 3 Years	High	Brockton
There is a lack of pedestrian crossing warning signs on Montello Street (W11-2) and a lack of ADA compliance.	Install pedestrian crossing warning signs (W11-2) at the Montello Street crosswalk across the intersection and install ADA compliant sidewalks and ramps on all corners of the intersection with detectable warning mats.	Medium	1-3 Years	Medium	Brockton
The lighting at the intersection is inconsistent with darkness in some areas.	Re-evaluate and improve intersection lighting.	Medium	1-3 Years	Medium	Brockton
The turning radii for trucks is inadequate at the intersection.	Examine the potential to increase the curb radii to better accommodate turning trucks if allowed based on available right of way. If improving turning radii is not possible, then examine the potential to re-route trucks.	Low	< 1 Year	Low	Brockton
The pavement on Montello Street has heavy rutting.	Reclaim and repave to eliminate rutting.	Low	< 1 Year	Medium	Brockton
There is a lack of bicycle amenities on Montello Street.	Consider adding on one side of Montello Street (if the right of way permits), and sharrows on the opposite side.	Low	< 1 Year	Low	Brockton
Speeding on Montello Street.	Consider a speed study in order to implement a special speed regulation as the roadway is not speed zoned, which increases enforcement difficulty.	Low	< 1 Year	Low	Brockton
Vehicles parked on sidewalks on Montello Street.	Enhanced parking enforcement.	Low	< 1 Year	Low	Brockton

Appendix A. RSA Meeting Agenda

Agenda	<p>Road Safety Audit Brockton, MA Montello Street (Route 28) at East Nilsson Street Intersection Meeting Location: OCPC Office 70 School Street Brockton, MA 02301 Wednesday, August 7, 2019 10:00 AM – 12:00 PM</p>
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 <ul style="list-style-type: none"> • Review of Traffic Data • Existing Conditions and Known Challenges
10:45 AM	Visit the Intersection and Discussion <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Discuss issues and document and finalize potential improvements
12:00 PM	Adjourn for the Day
<p>Instructions for Participants:</p> <ul style="list-style-type: none"> • 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	

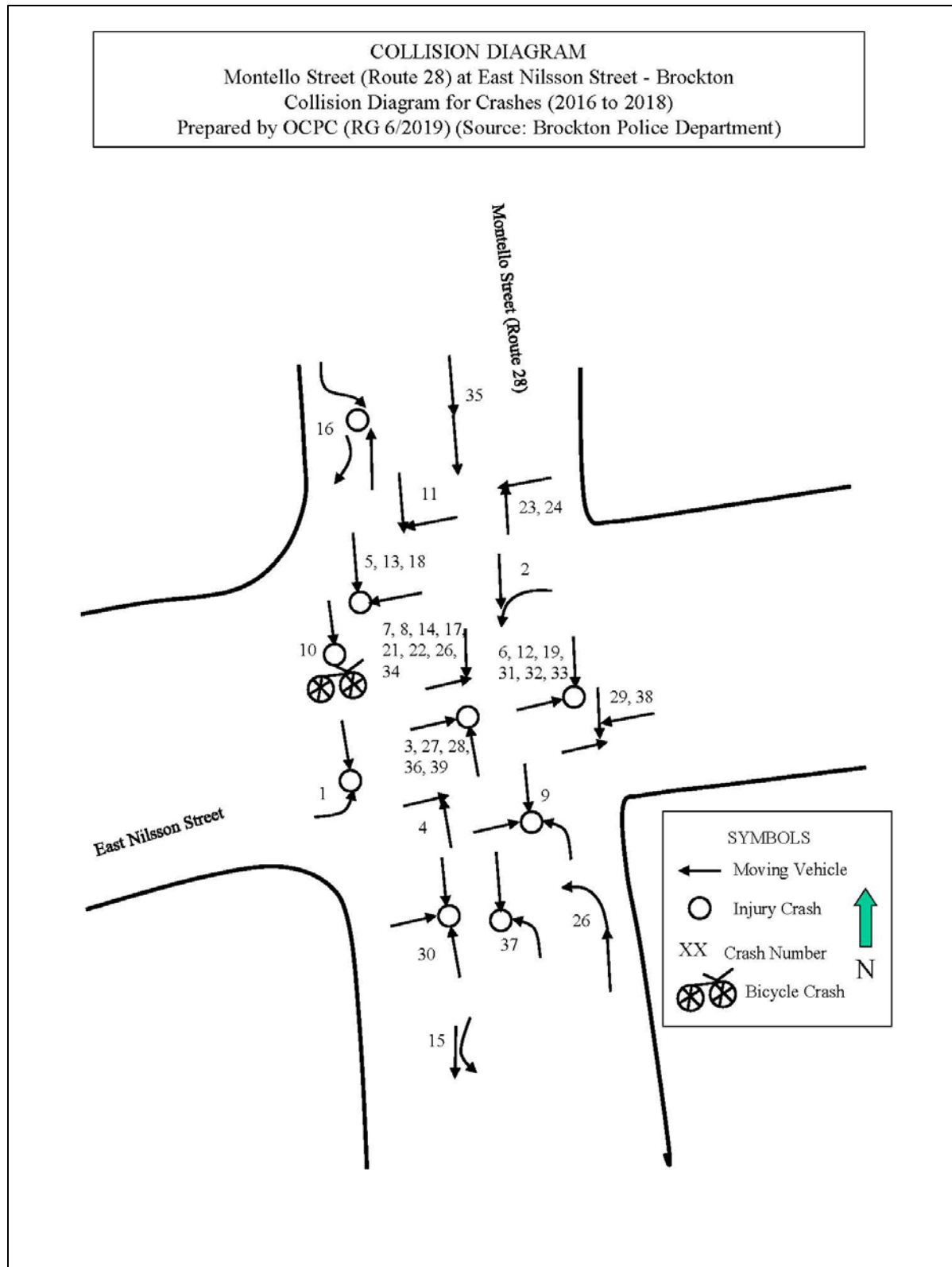
Appendix B: RSA Audit Team Contact List

Participating Audit Team Members

Date: August 7, 2019 Location: OCPC 70 School St Brockton, MA

Audit Team Members	Agency/Affiliation	Email Address
Name	Agency	Email
Joe Solomon	Brockton Fire Department - Signals	jsolomon@cobma.us
Chike Odunkwe	City of Brockton	codunkwe@cobma.us
Bianca Marshall	Massachusetts Department of Transportation District 5	bianca.marshall@state.ma.us
Kyle Mowatt	Old Colony Planning Council	kmowatt@ocpcrpa.org
Jimmy Pereira	Old Colony Planning Council	jpereira@ocpcrpa.org
Raymond Guarino	Old Colony Planning Council	rguarino@ocpcrpa.org

Appendix C: Detailed Crash Data



**Crash Data Summary Table
 at Montello Street (Route 28)/East Nilsson Street - Brockton**

Crash Num	P.D. Code	Crash Date	Crash Day	Time of Day	Manner of Coll	Light Cond	Weather	Road Surf	Age 1	Age 2	Comments	Injury
1	16-84-AC	1/15/2016	Fri	7:59 AM	Angle	Daylight	Cloudy	wet	23	52	Left turn driver failed to yield right of way.	INJ
2	16-93-AC	1/16/2016	Sat	10:38 AM	Angle	Daylight	Rain	wet	21	39	Left Turn driver failed to yeild right of way, was cited.	PDO
3	16-360-AC	2/24/2016	Wed	7:28 AM	Angle	Daylight	Rain	wet	39	72	Driver on East Nilsson failed to yield right of way.	INJ
4	16-514-AC	3/18/2016	Fri	3:38 PM	Angle	Daylight	Clear	dry	66	37	Driver on East Nilsson failed to yeild right of way, was cited.	PDO
5	16-555-AC	3/25/2016	Fri	5:44 PM	Angle	Daylight	Cloudy	wet	53	62	Driver on East Nilsson failed to yield right of way.	INJ
6	16-791-AC	5/1/2016	Sun	9:05 PM	Angle	Dark Lighted Road	Cloudy	wet	49	23	Operator states they stopped at the sign, but still collided with other vehicle.	INJ
7	16-937-AC	5/23/2016	Mon	5:00 PM	Angle	Daylight	Clear	dry	46	59	Driver on East Nilsson failed to yield right of way.	PDO
8	16-979-AC	5/30/2016	Mon	12:15 PM	Angle	Daylight	Rain	wet	54	23	Driver on East Nilsson failed to yield right of way.	PDO
9	16-1154-AC	6/26/2016	Sun	4:45 PM	Angle	Daylight	Clear	dry	83	35	Operator eastboind Nilsson faild to yield ROW at Stop was given citation.	INJ
10	16-1171-AC	6/29/2016	Wed	7:46 PM	Bicyclist	Daylight	Clear	dry	53	31	Motorist hit bicyclist.	INJ
11	16-2244-AC	12/2/2016	Fri	2:53 PM	Angle	Daylight	Clear	dry	30	57	East Nilsson westbound left tum failed to sop at stop sign and yield ROW.	PDO
12	16-2304-AC	12/10/2016	Sat	8:00 PM	Angle	Dark Lighted Road	Clear	dry	26	20	East Nilsson eastbound failed to stop at stop sign and yield ROW, motorist cited.	INJ
13	16-2344-AC	12/17/2016	Sat	9:13 AM	Angle	Daylight	Snow	Ice	52	32	Eastbound East Nilsson failed to stop for stop sign due to ice conditions.	INJ
14	16-2447-AC	12/31/2016	Sat	11:36 AM	Angle	Daylight	Clear	dry	77	32	Eastbound East Nilsson failed to stop for stop sign.	PDO
15	17-42-AC	1/6/2017	Fri	9:05 AM	Sideswipe same direction.	Daylight	Snow	slush	44	23	Sideswipe same direction with a schoolbus due to slush road conditions.	PDO
16	17-50-AC	1/7/2017	Sat	11:38 AM	Head-On	Daylight	Cloudy	slush	35	41	Citation issued to motorist for going around right turning vehicle and failing to stay in marked lanes.	INJ
17	17-307-AC	2/17/2017	Fri	8:24 AM	Angle	Daylight	Clear	dry	27	55	Eastbound East Nilsson faailed to yield right of way at stop sign, motorist cited.	PDO
18	17-383-AC	3/2/2017	Thur	4:04 PM	Angle	Daylight	Clear	dry	24	42	Westbound East Nilsson failed to yield row for stop sign, motorist cited.	INJ
19	17-714-AC	4/17/2017	Mon	7:34 PM	Angle	Dusk	Clear	dry	24	25	Eastbound on East Nilsson failed to stop at stop sign to yield ROW.	INJ

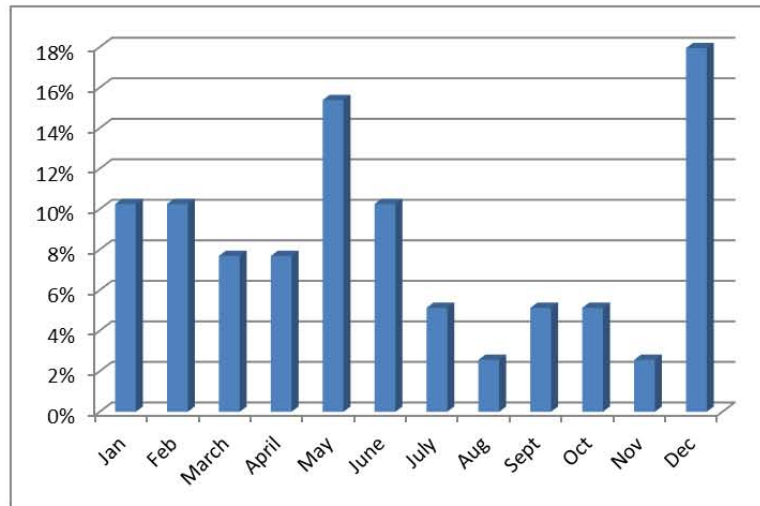
Montello Street (Route 28)/East Nilsson Street – Brockton

**Crash Data Summary Table
 at Montello Street (Route 28)/East Nilsson Street - Brockton**

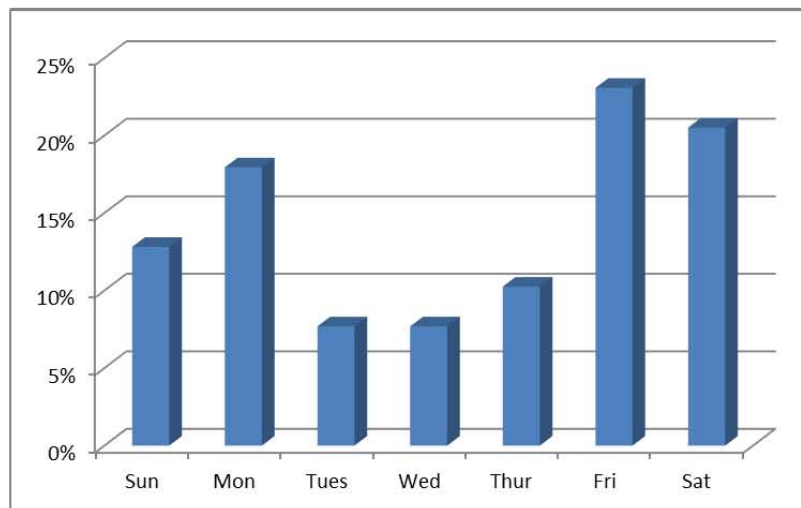
Crash Num	P.D. Code	Crash Date	Crash Day	Time of Day of Coll	Manner	Light Cond	Weather	Road Surf	Age 1	Age 2	Comments	Injury
20	17-795-AC	5/1/2017	Mon	9:34 AM	Angle	Daylight	Cloudy	dry	25	27	Westbound East Nilsson failed to yield row for stop sign.	PDO
21	17-825-AC	5/5/2017	Fri	1:25 PM	Angle	Daylight	Rain	wet	38	25	Eastbound East Nilsson failed to yield ROW, operator cited for failure to yield ROW.	PDO
22	17-1318-AC	7/20/2017	Thur	9:45 AM	Angle	Daylight	Clear	dry	20	21	Eastbound East Nilsson failed to yield ROW, operator cited for failure to yield ROW.	PDO
23	17-1651-AC	9/14/2017	Thur	1:55 PM	Angle	Daylight	Clear	dry	56	31	Westbound East Nilsson failed to yield ROW issued citation.	PDO
24	17-1671-AC	9/17/2017	Sun	1:28 AM	Angle	Dark Lighted Road	Clear	dry	23	48	Westbound East Nilsson failed to yield ROW issued citation.	PDO
25	17-1841-AC	10/13/2017	Fri	8:55 AM	Angle	Daylight	Clear	dry	20	47	Eastbound East Nilsson failed to yield ROW to southbound Montello, cited for failing to stop.	PDO
26	17-1914-AC	10/22/2017	Sun	9:12 PM	Rear-End	Dark Lighted Road	Clear	dry	20	34	Two northbound vehicles, rear-end as lead vehicle tried to turn left theo other rear-ended it, motorist cited for DUI.	PDO
27	17-2262-AC	12/6/2017	Wed	8:26 AM	Angle	Daylight	Cloudy	wet	44	31	Eastbound on East Nilsson failed to stop at stop sign to yield ROW.	INJ
28	18-304-AC	2/5/2018	Mon	7:45 AM	Angle	Daylight	Clear	dry	37	34	Eastbound on East Nilsson failed to stop at stop sign, motorist cited for failure to yield ROW.	INJ
29	18-307-AC	2/6/2018	Tues	2:33 PM	Angle	Daylight	Clear	dry	36	35	Westbound East Nilsson failed to stop for stop sign, hit southbound vehicle, which then hit eastbound vehicle.	PDO
30	18-764-AC	4/21/2018	Sat	2:03 PM	Angle	Daylight	Clear	dry	58	29	Eastbound on East Nilsson failed to stop at stop sign and hit southbound vehicle, which then hit northbound vehicle.	INJ
31	18-823-AC	4/29/2018	Sun	11:50 AM	Angle	Daylight	Cloudy	wet	27	19	Eastbound Nilsson vehicle failed to yield ROW hit southbound vehicle, eastbound vehicle cited for failing to yield ROW.	INJ
32	18-1009-AC	5/25/2018	Fri	5:38 PM	Angle	Daylight	Clear	dry	20	37	Eastbound Nilsson vehicle failed to yield ROW hit southbound vehicle.	INJ
33	18-1213-AC	6/26/2018	Tues	5:02 PM	Angle	Daylight	Clear	dry	42	60	Eastbound Nilsson vehicle failed to yield ROW hit southbound vehicle.	INJ
34	18-1253-AC	6/30/2018	Sat	1:52 PM	Angle	Daylight	Clear	dry	20	34	Eastbound Nilsson vehicle failed to yield ROW hit southbound vehicle, eastbound vehicle cited for failing to yield ROW.	PDO
35	18-1408-AC	7/26/2018	Thur	6:06 PM	Rear-end	Daylight	Clear	wet	39	32	Rear-end southbound Montello driver following too close.	PDO
36	18-1539-AC	8/18/2018	Sat	5:07 PM	Angle	Daylight	Rain	wet	58	19	Eastbound East Nilsson failed to yield ROW, motorist cited.	INJ
37	18-2173-AC	11/20/2018	Tues	4:24 PM	Angle	Dark Lighted Road	Rain	wet	52	21	Northbound Montello left turn failed to yield ROW, motorist cited.	INJ
38	18-2352-AC	12/17/2018	Mon	3:46 PM	Angle	Daylight	Clear	dry	45	29	Westbound East Nilsson failed to yield ROW.	PDO
39	18-2473-AC	12/31/2018	Mon	9:35 PM	Angle	Dark Lighted Road	Rain	wet	49	23	Eastbound East Nilsson failed to yield ROW, motorist cited.	INJ

Montello Street (Route 28)/East Nilsson Street – Brockton

Crash Month

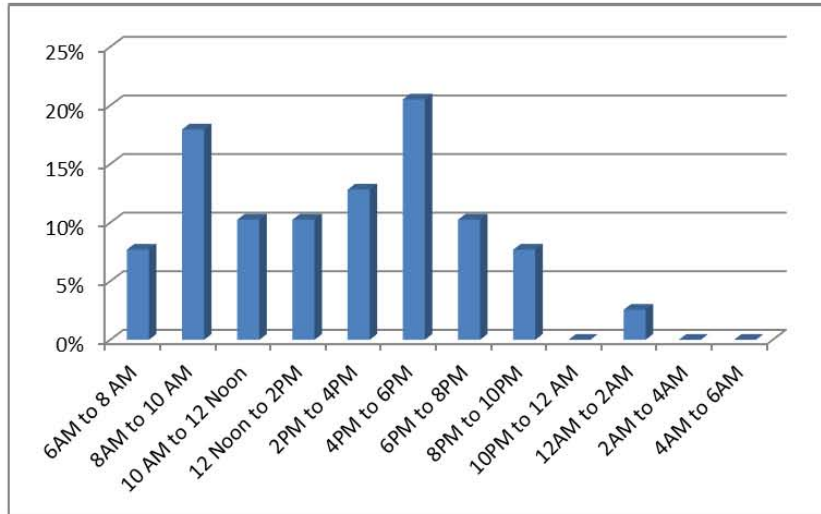


Day of the Week

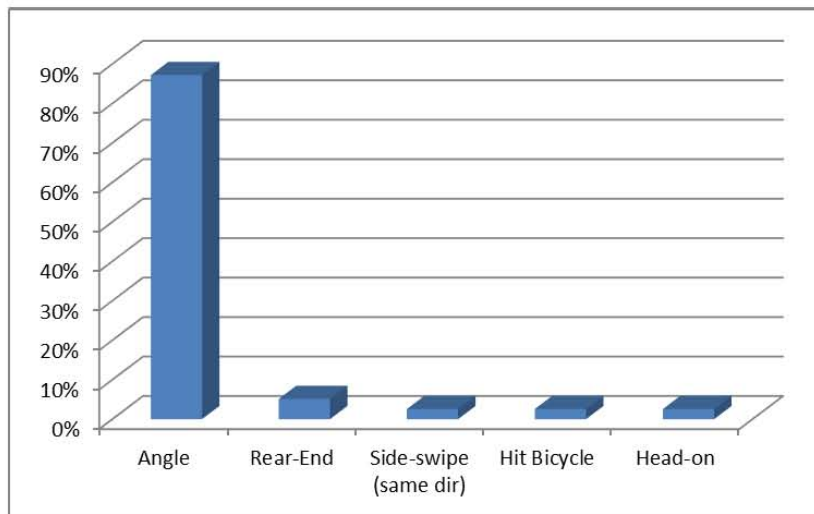


Montello Street (Route 28)/East Nilsson Street – Brockton

Time of Day

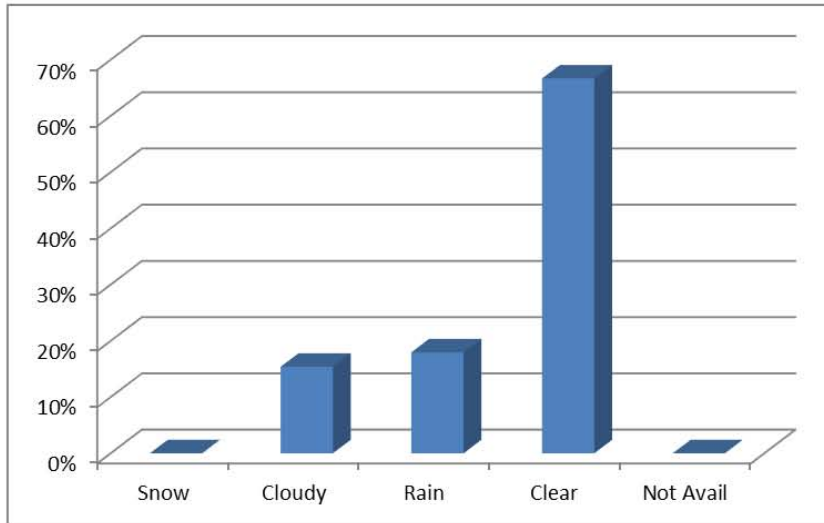


Manner of Collision

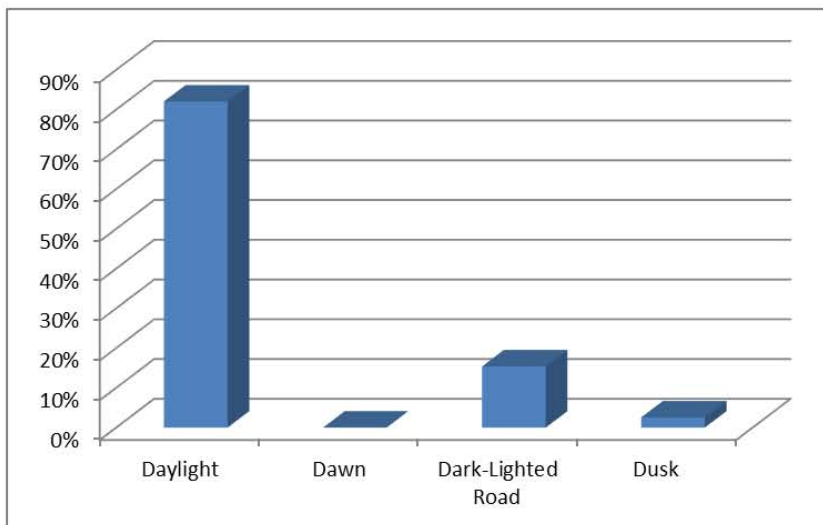


Montello Street (Route 28)/East Nilsson Street – Brockton

Light Conditions

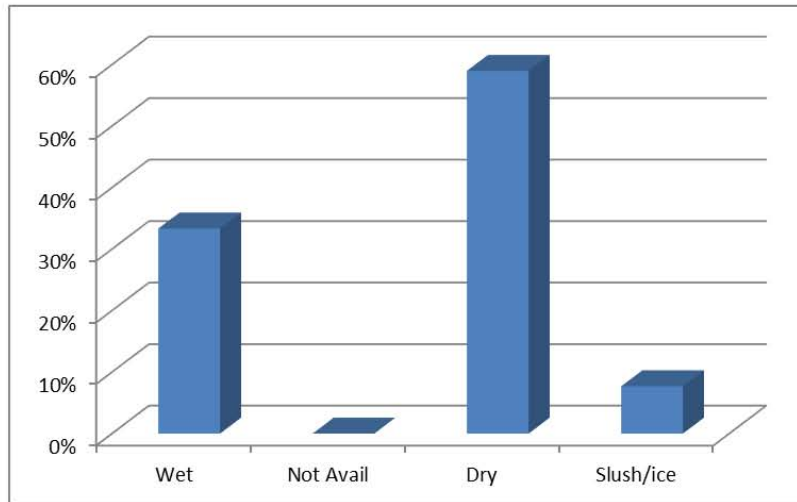


Weather Conditions

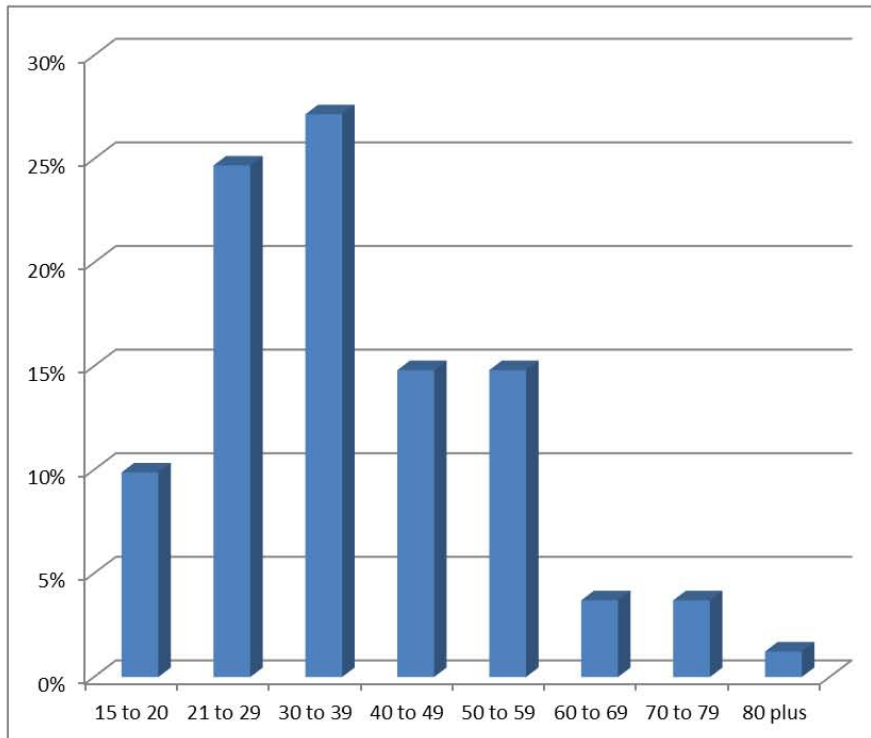


Montello Street (Route 28)/East Nilsson Street – Brockton

Road Surface Conditions



Age



Montello Street (Route 28)/East Nilsson Street – Brockton

Appendix D: Additional Information

- Intersection Turning Movement Counts
- Automatic Traffic Counts
- MUTCD Traffic Signal Warrant Analysis

Road Safety Audit—Montello Street (Route 28) at East Nilsson Street - Brockton
 Prepared by Old Colony Planning Council – **FINAL**

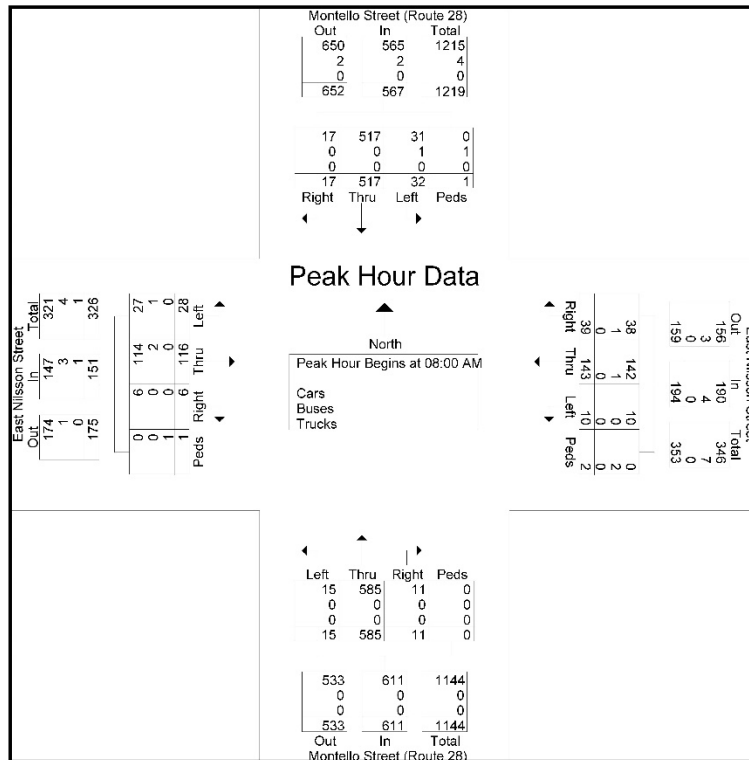


Old Colony Planning Council
 70 School Street
 Brockton, MA 02301
 (508) 583-1833
 www.ocpcrpa.org

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

File Name : Montello Street (28) & East Nilsson Street_AM
 Site Code : 44
 Start Date : 5/15/2019
 Page No : 4

	Montello Street (Route 28) Southbound				East Nilsson Street Westbound				Montello Street (Route 28) Northbound				East Nilsson Street Eastbound				App. Total	Int. Total			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds					
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	3	101	7	0	111	4	14	2	0	20	3	106	4	0	113	4	19	5	1	29	273
08:15 AM	5	80	0	1	86	6	21	4	0	31	1	76	0	0	77	1	24	15	0	40	234
08:30 AM	9	141	15	0	165	17	39	1	2	59	5	177	5	0	187	1	34	7	0	42	453
08:45 AM	0	195	10	0	205	12	69	3	0	84	2	226	6	0	234	0	39	1	0	40	563
Total Volume	17	517	32	1	567	39	143	10	2	194	11	585	15	0	611	6	116	28	1	151	1523
% App. Total	3	91.2	5.6	0.2		20.1	73.7	5.2	1	1.8	95.7	2.5	0		4	76.8	18.5	0.7			
PHF	.472	.663	.533	.250	.691	.574	.518	.625	.250	.577	.550	.647	.625	.000	.653	.375	.744	.467	.250	.899	.676
Cars	17	517	31	0	565	38	142	10	0	190	11	585	15	0	611	6	114	27	0	147	1513
% Cars	100	100	96.9	0	99.6	97.4	99.3	100	0	97.9	100	100	100	0	100	100	98.3	96.4	0	97.4	99.3
Buses	0	0	1	1	2	1	1	0	2	4	0	0	0	0	0	0	2	1	0	3	9
% Buses	0	0	3.1	100	0.4	2.6	0.7	0	100	2.1	0	0	0	0	0	0	1.7	3.6	0	2.0	0.6
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.7



Road Safety Audit—Montello Street (Route 28) at East Nilsson Street - Brockton
 Prepared by Old Colony Planning Council – **FINAL**



Old Colony Planning Council

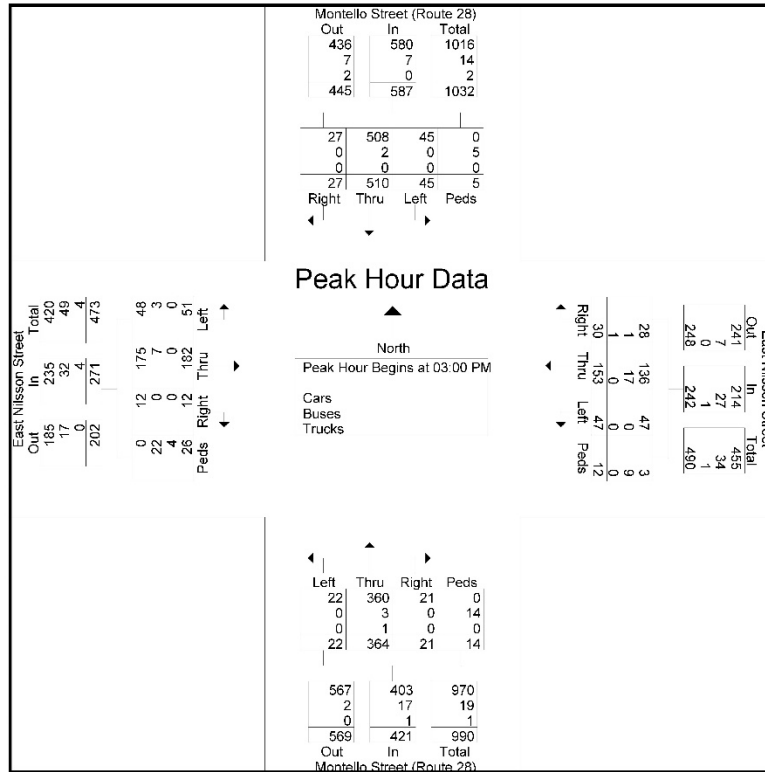
70 School Street
 Brockton, MA 02301
 (508) 583-1833

www.ocpcpra.org

Community: Brockton
 Weather: Clear
 Board # & Staff: TDC-8 (2) / JP
 Traffic Control: Stop Sign

File Name : Montello Street (28) & East Nilsson Street_PM
 Site Code : 44
 Start Date : 5/7/2019
 Page No : 4

	Montello Street (Route 28) Southbound					East Nilsson Street Westbound					Montello Street (Route 28) Northbound					East Nilsson Street Eastbound					Int. Total	
	Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds		App. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 03:00 PM																						
03:00 PM	4	109	16	0	129	8	25	4	9	46	7	80	7	7	101	1	51	7	0	59	335	
03:15 PM	9	138	8	5	160	6	59	24	0	89	4	109	2	0	115	1	48	10	19	78	442	
03:30 PM	4	111	11	0	126	10	38	13	3	64	6	71	6	7	90	3	36	15	2	56	336	
03:45 PM	10	152	10	0	172	6	31	6	0	43	4	104	7	0	115	7	47	19	5	78	408	
Total Volume	27	510	45	5	587	30	153	47	12	242	21	364	22	14	421	12	182	51	26	271	1521	
% App. Total	4.6	86.9	7.7	0.9		12.4	63.2	19.4	5		5	86.5	5.2	3.3		4.4	67.2	18.8	9.6			
PHF	.675	.839	.703	.250	.853	.750	.648	.490	.333	.680	.750	.835	.786	.500	.915	.429	.892	.671	.342	.869	.860	
Cars	27	508	45	0	580	28	136	47	3	214	21	360	22	0	403	12	175	48	0	235	1432	
% Cars	100	99.6	100	0	98.8	93.3	88.9	100	25.0	88.4	100	98.9	100	0	95.7	100	96.2	94.1	0	86.7	94.1	
Buses	0	2	0	5	7	1	17	0	9	27	0	3	0	14	17	0	7	3	22	32	83	
% Buses	0	0.4	0	100	1.2	3.3	11.1	0	75.0	11.2	0	0.8	0	100	4.0	0	3.8	5.9	84.6	11.8	5.5	
Trucks	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	4	4	6	
% Trucks	0	0	0	0	0	3.3	0	0	0	0.4	0	0.3	0	0	0.2	0	0	0	15.4	1.5	0.4	



Road Safety Audit—Montello Street (Route 28) at East Nilsson Street - Brockton
 Prepared by Old Colony Planning Council – **FINAL**

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

Page 1

Community: Brockton
 Com#_UR/FC: 44_U0
 Recorder #: 32537
 Layout: L6 Basic (2')

Station ID:
 Site Code: 44
 Date Start: 01-May-19
 Date End: 02-May-19
 E Nilsson St, east of Montello St (28)

Start Time	29-Apr-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	*	*	36	24	35	26	*	*	*	*	*	*	36	25
01:00	*	*	*	*	21	7	20	13	*	*	*	*	*	*	20	10
02:00	*	*	*	*	11	8	6	8	*	*	*	*	*	*	8	8
03:00	*	*	*	*	2	4	6	4	*	*	*	*	*	*	4	4
04:00	*	*	*	*	8	7	5	7	*	*	*	*	*	*	6	7
05:00	*	*	*	*	22	18	21	16	*	*	*	*	*	*	22	17
06:00	*	*	*	*	24	24	24	22	*	*	*	*	*	*	24	23
07:00	*	*	*	*	55	65	51	67	*	*	*	*	*	*	53	66
08:00	*	*	*	*	148	133	135	140	*	*	*	*	*	*	142	136
09:00	*	*	*	*	91	72	81	84	*	*	*	*	*	*	86	78
10:00	*	*	*	*	68	61	60	73	*	*	*	*	*	*	64	67
11:00	*	*	*	*	59	49	64	37	*	*	*	*	*	*	62	43
12:00 PM	*	*	*	*	64	83	109	80	*	*	*	*	*	*	86	82
01:00	*	*	*	*	63	58	140	122	*	*	*	*	*	*	102	90
02:00	*	*	*	*	90	80	90	60	*	*	*	*	*	*	90	70
03:00	*	*	*	*	142	98	104	80	*	*	*	*	*	*	123	89
04:00	*	*	*	*	152	123	116	107	*	*	*	*	*	*	134	115
05:00	*	*	*	*	115	114	138	108	*	*	*	*	*	*	126	111
06:00	*	*	*	*	160	125	144	104	*	*	*	*	*	*	152	114
07:00	*	*	*	*	105	80	109	85	*	*	*	*	*	*	107	82
08:00	*	*	*	*	116	74	88	61	*	*	*	*	*	*	102	68
09:00	*	*	*	*	85	53	88	68	*	*	*	*	*	*	86	60
10:00	*	*	*	*	56	47	72	44	*	*	*	*	*	*	64	46
11:00	*	*	*	*	46	28	62	29	*	*	*	*	*	*	54	28
Lane Day	0	0	0	0	1739	1435	1768	1445	0	0	0	0	0	0	1753	1439
AM Peak Vol.	-	-	-	-	08:00	08:00	08:00	08:00	-	-	-	-	-	-	08:00	08:00
PM Peak Vol.	-	-	-	-	18:00	18:00	18:00	13:00	-	-	-	-	-	-	18:00	16:00
Comb. Total	0	0	0	0	3174	3213	3213	3192	0	0	0	0	0	0	3192	3192

Road Safety Audit—Montello Street (Route 28) at East Nilsson Street - Brockton
 Prepared by Old Colony Planning Council – **FINAL**

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

Page 1

Community: Brockton
 Com#_UR/FC: 44_U0
 Recorder #: 32540
 Layout: L6 Basic (2')

Station ID:
 Site Code: 44
 Date Start: 01-May-19
 Date End: 02-May-19
 E Nilsson St, west of Montello St (28)

Start Time	29-Apr-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	*	*	23	6	18	16	*	*	*	*	*	*	20	11
01:00	*	*	*	*	10	13	10	10	*	*	*	*	*	*	10	12
02:00	*	*	*	*	4	7	9	5	*	*	*	*	*	*	6	6
03:00	*	*	*	*	12	10	7	7	*	*	*	*	*	*	10	8
04:00	*	*	*	*	23	18	24	18	*	*	*	*	*	*	24	18
05:00	*	*	*	*	46	23	51	22	*	*	*	*	*	*	48	22
06:00	*	*	*	*	77	71	67	70	*	*	*	*	*	*	72	70
07:00	*	*	*	*	130	115	113	113	*	*	*	*	*	*	122	114
08:00	*	*	*	*	104	67	93	76	*	*	*	*	*	*	98	72
09:00	*	*	*	*	77	61	63	61	*	*	*	*	*	*	70	61
10:00	*	*	*	*	78	60	72	64	*	*	*	*	*	*	75	62
11:00	*	*	*	*	69	78	108	99	*	*	*	*	*	*	88	88
12:00 PM	*	*	*	*	80	65	145	132	*	*	*	*	*	*	112	98
01:00	*	*	*	*	114	82	118	85	*	*	*	*	*	*	116	84
02:00	*	*	*	*	154	96	136	95	*	*	*	*	*	*	145	96
03:00	*	*	*	*	157	132	129	107	*	*	*	*	*	*	143	120
04:00	*	*	*	*	140	132	143	119	*	*	*	*	*	*	142	126
05:00	*	*	*	*	163	125	148	101	*	*	*	*	*	*	156	113
06:00	*	*	*	*	122	97	124	95	*	*	*	*	*	*	123	96
07:00	*	*	*	*	107	80	92	73	*	*	*	*	*	*	100	76
08:00	*	*	*	*	93	70	88	60	*	*	*	*	*	*	90	65
09:00	*	*	*	*	55	53	78	52	*	*	*	*	*	*	66	52
10:00	*	*	*	*	51	29	59	34	*	*	*	*	*	*	55	32
11:00	*	*	*	*	29	35	28	32	*	*	*	*	*	*	28	34
Lane	0	0	0	0	1918	1525	1923	1546	0	0	0	0	0	0	1919	1536
Day	0	0	0	0	3443	3443	3469	3469	0	0	0	0	0	0	3455	3455
AM Peak	-	-	-	-	07:00	07:00	07:00	07:00	-	-	-	-	-	-	07:00	07:00
Vol.	-	-	-	-	130	115	113	113	-	-	-	-	-	-	122	114
PM Peak	-	-	-	-	17:00	15:00	17:00	12:00	-	-	-	-	-	-	17:00	16:00
Vol.	-	-	-	-	163	132	148	132	-	-	-	-	-	-	156	126
Comb. Total	0	0	0	0	3443	3443	3469	3469	0	0	0	0	0	0	3455	3455

Road Safety Audit—Montello Street (Route 28) at East Nilsson Street - Brockton
 Prepared by Old Colony Planning Council – **FINAL**

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

Page 1

Community: Brockton
 Com#_UR/FC: 44_U3
 Recorder #: 25236
 Layout: L6 Basic (2')

Station ID:
 Site Code: 44
 Date Start: 01-May-19
 Date End: 02-May-19
 Montello St (28), north of E Nilsson St

Start Time	29-Apr-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	*	*	32	46	33	52	*	*	*	*	*	*	32	49
01:00	*	*	*	*	22	42	20	36	*	*	*	*	*	*	21	39
02:00	*	*	*	*	12	18	11	19	*	*	*	*	*	*	12	18
03:00	*	*	*	*	19	22	15	16	*	*	*	*	*	*	17	19
04:00	*	*	*	*	42	48	34	46	*	*	*	*	*	*	38	47
05:00	*	*	*	*	145	112	152	105	*	*	*	*	*	*	148	108
06:00	*	*	*	*	286	203	270	199	*	*	*	*	*	*	278	201
07:00	*	*	*	*	381	361	377	364	*	*	*	*	*	*	379	362
08:00	*	*	*	*	382	338	382	320	*	*	*	*	*	*	382	329
09:00	*	*	*	*	305	340	270	378	*	*	*	*	*	*	288	359
10:00	*	*	*	*	256	327	258	352	*	*	*	*	*	*	257	340
11:00	*	*	*	*	292	356	301	358	*	*	*	*	*	*	296	357
12:00 PM	*	*	*	*	263	359	322	395	*	*	*	*	*	*	292	377
01:00	*	*	*	*	301	392	319	338	*	*	*	*	*	*	310	365
02:00	*	*	*	*	353	442	334	431	*	*	*	*	*	*	344	436
03:00	*	*	*	*	379	467	339	455	*	*	*	*	*	*	359	461
04:00	*	*	*	*	364	511	349	554	*	*	*	*	*	*	356	532
05:00	*	*	*	*	373	507	325	509	*	*	*	*	*	*	349	508
06:00	*	*	*	*	265	408	258	366	*	*	*	*	*	*	262	387
07:00	*	*	*	*	193	308	206	293	*	*	*	*	*	*	200	300
08:00	*	*	*	*	164	229	172	249	*	*	*	*	*	*	168	239
09:00	*	*	*	*	122	184	120	173	*	*	*	*	*	*	121	178
10:00	*	*	*	*	87	114	95	146	*	*	*	*	*	*	91	130
11:00	*	*	*	*	59	105	74	93	*	*	*	*	*	*	66	99
Lane	0	0	0	0	5097	6239	5036	6247	0	0	0	0	0	0	5066	6240
Day	0	0	0	0	11336	11283	11283	11306	0	0	0	0	0	0	11306	11306
AM Peak	-	-	-	-	08:00	07:00	08:00	09:00	-	-	-	-	-	-	08:00	07:00
Vol.	-	-	-	-	382	361	382	378	-	-	-	-	-	-	382	362
PM Peak	-	-	-	-	15:00	16:00	16:00	16:00	-	-	-	-	-	-	15:00	16:00
Vol.	-	-	-	-	379	511	349	554	-	-	-	-	-	-	359	532
Comb. Total	0	0	0	0	11336	11283	11283	11306	0	0	0	0	0	0	11306	11306

Road Safety Audit—Montello Street (Route 28) at East Nilsson Street - Brockton
 Prepared by Old Colony Planning Council – **FINAL**

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

Page 1

Community: Brockton
 Com#_UR/FC: 44_U3
 Recorder #: 32539
 Layout: L6 Basic (2')

Station ID:
 Site Code: 44
 Date Start: 01-May-19
 Date End: 02-May-19
 Montello St (28), south of E Nilsson St

Start Time	29-Apr-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	*	*	28	42	28	47	*	*	*	*	*	*	28	44
01:00	*	*	*	*	19	33	21	35	*	*	*	*	*	*	20	34
02:00	*	*	*	*	8	12	8	17	*	*	*	*	*	*	8	14
03:00	*	*	*	*	17	22	14	18	*	*	*	*	*	*	16	20
04:00	*	*	*	*	37	43	29	43	*	*	*	*	*	*	33	43
05:00	*	*	*	*	112	92	125	95	*	*	*	*	*	*	118	94
06:00	*	*	*	*	271	183	257	183	*	*	*	*	*	*	264	183
07:00	*	*	*	*	347	294	326	300	*	*	*	*	*	*	336	297
08:00	*	*	*	*	364	317	371	290	*	*	*	*	*	*	368	304
09:00	*	*	*	*	286	319	258	369	*	*	*	*	*	*	272	344
10:00	*	*	*	*	236	295	254	315	*	*	*	*	*	*	245	305
11:00	*	*	*	*	288	356	301	321	*	*	*	*	*	*	294	338
12:00 PM	*	*	*	*	243	336	294	345	*	*	*	*	*	*	268	340
01:00	*	*	*	*	304	366	306	307	*	*	*	*	*	*	305	336
02:00	*	*	*	*	319	418	313	380	*	*	*	*	*	*	316	399
03:00	*	*	*	*	357	404	337	431	*	*	*	*	*	*	347	418
04:00	*	*	*	*	347	466	349	519	*	*	*	*	*	*	348	492
05:00	*	*	*	*	336	443	292	437	*	*	*	*	*	*	314	440
06:00	*	*	*	*	247	367	242	338	*	*	*	*	*	*	244	352
07:00	*	*	*	*	193	257	196	260	*	*	*	*	*	*	194	258
08:00	*	*	*	*	148	185	153	198	*	*	*	*	*	*	150	192
09:00	*	*	*	*	112	163	110	159	*	*	*	*	*	*	111	161
10:00	*	*	*	*	77	100	87	122	*	*	*	*	*	*	82	111
11:00	*	*	*	*	47	87	64	79	*	*	*	*	*	*	56	83
Lane Day	0	0	0	0	4743	5600	4735	5608	0	0	0	0	0	0	4737	5602
AM Peak Vol.	-	-	-	-	08:00 364	11:00 356	08:00 371	09:00 369	-	-	-	-	-	-	08:00 368	09:00 344
PM Peak Vol.	-	-	-	-	15:00 357	16:00 466	16:00 349	16:00 519	-	-	-	-	-	-	16:00 348	16:00 492
Comb. Total	0	0	0	0	10343	10343	10343	10343	0	0	0	0	0	0	10339	10339

MUTCD Traffic Signal Warrant 1 Minimum Vehicular Volume -						
NORTH MONTELLO STREET (ROUTE 28) AT EAST NILSSON STREET						
TRAFFIC SIGNAL WARRANT ONE Minimum Vehicular Volume						
Threshold A: Total Major must be 500, high volume minor street must be 150 for 8 hours						
Threshold B: Total Major must be 750, high volume minor street must be 75 for 8 hours						
If the 85th percentile is above 40 mph, use 70 percent of the values meet the requirement						
						(85th percentile is 36 MP
Time	Montello Street (Rte 28) Major Street entering SB	Montello Street (Rte 28) Entering major street NB	Total Major	East Nilsson EB	East Nilsson WB	Total minor
12:00 AM	49	28	77	33	25	58
1:00	39	20	59	26	10	36
2:00	18	8	26	12	8	20
3:00	19	16	35	14	4	18
4:00	47	33	80	20	7	27
5:00	108	118	226	71	17	88
6:00	201	264	465	114	23	137
7:00	362	336	698	136	66	202
8:00	329	368	697	134	136	270
9:00	359	272	631	119	78	197
10:00	340	245	585	86	67	153
11:00	357	294	651	127	43	170
12:00 PM	377	268	645	154	82	236
1:00	365	305	670	152	90	242
2:00	436	316	752	163	70	233
3:00	461	347	808	134	89	223
4:00	532	348	880	174	115	289
5:00	508	314	822	173	111	284
6:00	387	244	631	168	114	282
7:00	300	194	494	141	82	223
8:00	239	150	389	125	68	193
9:00	178	111	289	115	60	175
10:00	130	82	212	82	46	128
11:00	99	56	155	68	28	96
Total	6240	4737	10977	2541	1439	
THRESHOLD NOT MET FOR CONDITION A OR B WARRANT ONE MINIMUM VEHICULAR VOLUM						

MONTELLO STREET (ROUTE 28) AT EAST NILSSON STREET
 MUTCD Four Hour Vehicular Volume Signal Warrant 2

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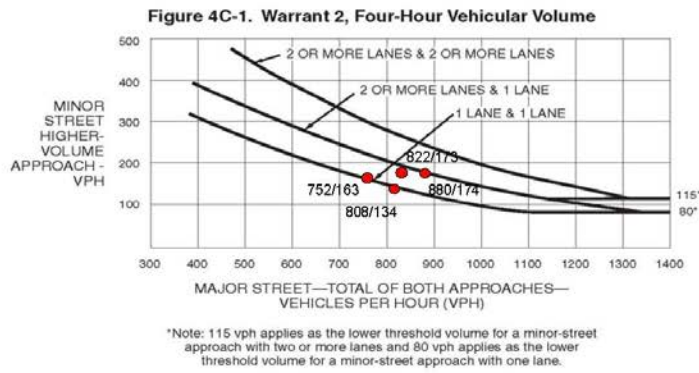
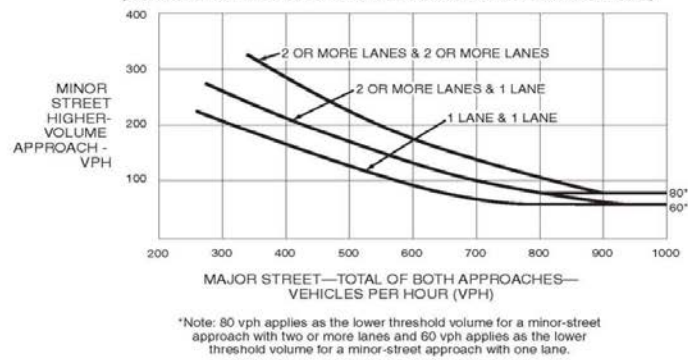


Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



Sect. 4C.04

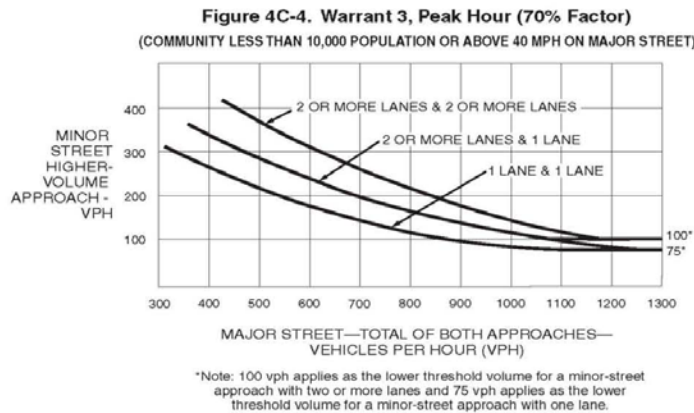
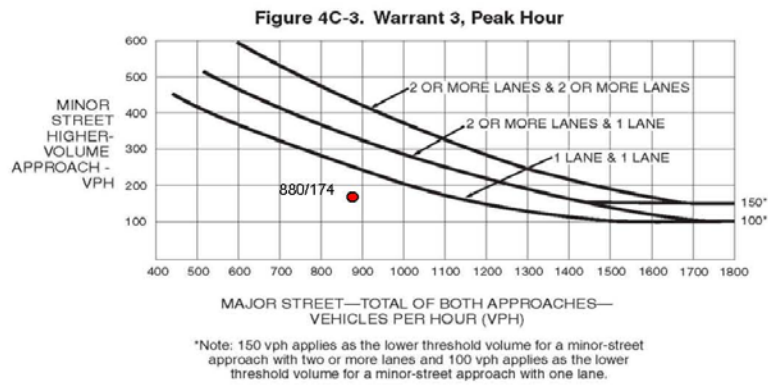
December 2009

THRESHOLD NOT MET FOR WARRANT 2 FOUR HOUR VEHICULAR VOLUME

NORTH MONTELLO STREET (ROUTE 28) AT EAST NILSSON STREET
 MUTCD Peak Hour Volume Warrant 3

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THRESHOLD NOT MET FOR WARRANT 3 PEAK HOUR VOLUME

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.

MUTCD Traffic Signal Warrant 7 Crash Experience

Section 4C.08 Warrant 7, Crash Experience

Support: **MONTELLO STREET (ROUTE 28) AT EAST NILSSON STREET**

1 The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

Standard:

2 The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:

A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and

B. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and

C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80% columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours

Threshold: Total Major must be at least 400, high volume minor must be 120 for 8 hours

Time	Street (Rte 28) Major Street entering SB	Street (Rte 28) major Entering	Total Major	East Nilsson EB	East Nilsson WB	
12:00 AM	49	28	77	33	25	not satisfied
1:00	39	20	59	26	10	not satisfied
2:00	18	8	26	12	8	not satisfied
3:00	19	16	35	14	4	not satisfied
4:00	47	33	80	20	7	not satisfied
5:00	108	118	226	71	17	not satisfied
6:00	201	264	465	114	23	not satisfied
7:00	362	336	698	136	66	satisfied
8:00	329	368	697	134	136	satisfied
9:00	359	272	631	119	78	not satisfied
10:00	340	245	585	86	67	not satisfied
11:00	357	294	651	127	43	satisfied
12:00 PM	377	268	645	154	82	satisfied
1:00	365	305	670	152	90	satisfied
2:00	436	316	752	163	70	satisfied
3:00	461	347	808	134	89	satisfied
4:00	532	348	880	174	115	satisfied
5:00	508	314	822	173	111	satisfied
6:00	387	244	631	168	114	satisfied
7:00	300	194	494	141	82	satisfied
8:00	239	150	389	125	68	not satisfied
9:00	178	111	289	115	60	not satisfied
10:00	130	82	212	82	46	not satisfied
11:00	99	56	155	68	28	not satisfied
Total	6240	4737	10977	2541	1439	

THRESHOLD MET FOR CRITERIA A, and B 27 Angle crashes in three years

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.

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