

# Old Colony Planning Council

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February 3, 2015

Mr. Jonathan Beder, Director  
Town of Plymouth Department of Public Works  
159 Camelot Drive  
Plymouth, MA. 02360

RE: Road Safety Audit of Water Street at Nelson Street

Dear Mr. Beder,

Per the Town's request, through the Old Colony Planning Council's Local Highway Transportation Planning Technical Assistance Program, OCPC has completed its Road Safety Audit for Water Street at Nelson Street. Please find enclosed the final report, which includes analysis of turning movement count data collected, along with the findings and potential improvements and enhancements identified through the road safety audit process.

If you have any questions, or if any additional information is needed, please contact Bill McNulty at 508.583.1833 x207 or [wmcnulty@ocpcrpa.org](mailto:wmcnulty@ocpcrpa.org).

Sincerely,



Charles Kilmer, AICP  
Assistant Director / Transportation Program Manager

Cc:

Ms. Melissa Arrighi, Plymouth Town Manager  
Chief Michael E. Botieri, Plymouth Police Department  
Mr. Kenneth Tavares, Plymouth Board of Selectmen  
Mr. Lee Hartmann, Plymouth Director of Planning and Development  
Mr. Sid Kashi, P.E., MPS, Plymouth Town Engineer  
Ms. Pamela Haznar, P.E., MassDOT District Five  
Ms. Sreelatha Allam, MassDOT Office of Transportation Planning  
Ms. Leah Sirmin, Federal Highway Administration

Enclosures:

Road Safety Audit for Water Street at Nelson Street

# Road Safety Audit Water Street and Nelson Street Intersection

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Town of Plymouth

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January, 2015

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Old Colony Planning Council  
70 School Street  
Brockton, MA 02301

*Prepared under MassDOT Contract 69649*

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Old Colony Planning Council  
Title VI/ Nondiscrimination Coordinator  
Pat Ciaramella  
70 School Street  
Brockton, MA 02301  
508-583-1833 Extension 202  
pciaramella@ocpcrpa.org

Title VI Specialist  
MassDOT, Office of Diversity and Civil Rights  
10 Park Plaza  
Boston, MA 02116  
857-368-8580  
TTY: 857-368-0603  
[MASSDOT.CivilRights@state.ma.us](mailto:MASSDOT.CivilRights@state.ma.us)

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Boston, MA 02109  
617-994-6000  
TTY: 617-994-6196

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**Chinese Simplified: (mainland & Singapore):** 如果这个信息是需要用另一种语言，请联系帕特Ciaramella在508-583-1833分机202。

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**Arabic:** في 508-583-508 امتداد Ciaramella.202 إذا كانت هناك حاجة هذه المعلومات في لغة أخرى، يرجى الاتصال بات

*Updated March 2014*

*Old Colony Planning Council*

# Old Colony Metropolitan Planning Organization

|                                 |  |
|---------------------------------|--|
| The Honorable William Carpenter | Mayor, City of Brockton                      |
| Kenneth Tavares                 | Chairman, Board of Selectmen, Plymouth       |
| Daniel Salvucci                 | Vice Chairman, Board of Selectmen, Whitman   |
| Eldon Moreira                   | Member, Board of Selectmen, West Bridgewater |
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| Frank DePaola, P.E.             | Highway Administrator, MassDOT               |
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| Lee Hartmann, AICP              | President, OCPC                              |

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| Bridgewater - <i>Delegate</i>       | Robert Wood          |
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| MassDOT                     | Clinton Bench         |
| MassDOT                     | Sreelatha Allam       |
| MassDOT District 5          | Mary-Joe Perry        |
| MassDOT District 5          | Pamela Haznar, P.E.   |
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| FTA                         | Noah Berger           |
| FTA                         | Nicolas Garcia        |
| Brockton Traffic Commission | Captain Robert DiBari |

### OCPC Transportation Staff

|                      |   |
|----------------------|---|
| Charles Kilmer, AICP | Assistant Director/<br>Transportation Program Manager |
| Eric Arbeene, AICP   | Community Planner                                     |
| Shawn Bailey         | Temporary Transportation<br>Technician                |
| Joshua Callahan      | Temporary Transportation<br>Technician                |
| Paul Chenard         | Transportation Planner                                |
| Jed Cornock          | Senior Transportation Planner                         |
| Shauna Diersch       | Temporary Planning Technician                         |
| Raymond Guarino      | Senior Transportation Planner                         |
| William McNulty      | Senior Transportation Planner                         |
| Kyle Mowatt          | Transportation Planner                                |
| Jimmy Pereira        | Community/ Transportation Planner                     |
| Andrew Vidal         | GIS Manager/ Communications and<br>IT Specialist      |



# Old Colony Planning Council (OCPC)



## OCPC Officers

|           |                    |
|-----------|--------------------|
| President | Lee Hartmann, AICP |
| Treasurer | Fred Gilmetti      |
| Secretary | Frank P. Staffier  |

| COMMUNITY         | DELEGATE               | ALTERNATE              |
|-------------------|------------------------|------------------------|
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| Delegate-at-Large | Troy E. Garron         |                        |

## OCPC Staff

|                      |  |
|----------------------|--|
| Pat Ciaramella       | Executive Director                                 |
| Janet McGinty        | Fiscal Officer                                     |
| Jane Linhares        | Grants Monitor/ Secretary                          |
| Patrick Hamilton     | AAA Administrator                                  |
| Lila Burgess         | Ombudsman Program Director                         |
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| Jim Watson, AICP     | Comprehensive Planning Supervisor                  |
| Eric Arbeene, AICP   | Community Planner                                  |
| Jimmy Pereira        | Community/ Transportation Planner                  |
| Bruce Hughes         | Economic Development/ Community Planner            |
| Andrew Vidal         | GIS Manager/ Communications and IT Specialist      |
| Charles Kilmer, AICP | Assistant Director/ Transportation Program Manager |
| Jed Cornock          | Senior Transportation Planner                      |
| Ray Guarino          | Senior Transportation Planner                      |
| William McNulty      | Senior Transportation Planner                      |
| Paul Chenard         | Transportation Planner                             |
| Kyle Mowatt          | Transportation Planner                             |
| Shawn Bailey         | Temporary Transportation Technician                |
| Joshua Callahan      | Temporary Transportation Technician                |
| Shauna Diersch       | Temporary Planning Technician                      |

## ***Acknowledgements***

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The views and opinions of the Old Colony Planning Council expressed herein do not necessarily state or reflect those of the U.S. Department of Transportation.

This Planning Level Traffic Study was prepared by the following members of the Old Colony Planning Council staff under the direction of Pat Ciaramella, Executive Director, and the supervision of Charles Kilmer, Assistant Director / Transportation Program Manager.

|                  |  |
|------------------|--|
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| Supporting Staff | Jed Cornock, Senior Transportation Planner<br><a href="mailto:jcornock@ocpcrpa.org">jcornock@ocpcrpa.org</a>     |
| Supporting Staff | Ray Guarino, Senior Transportation Planner<br><a href="mailto:rguarino@ocpcrpa.org">rguarino@ocpcrpa.org</a>     |
| Data Collection  | Kyle Mowatt, Transportation Planner<br><a href="mailto:kmowatt@ocpcrpa.org">kmowatt@ocpcrpa.org</a>              |



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## Introduction

This Road Safety Audit (RSA) was conducted for the intersection of Water Street and Nelson Street by the Old Colony Planning Council (OCPC) at the request of the Town of Plymouth. The request was made due to safety concerns at the intersection. This report describes the components of a Road Safety Audit; itemizes the deficiencies discussed by the RSA team; and, includes potential recommendations to make the intersection safer for all users. The recommendations found in this report consist of a number of alternatives generally grouped into two categories: 1.) short term, low cost and, 2.) long term, high cost.

## What is a Road Safety Audit?

According to the *Road Safety Audits Guidelines* published by the Federal Highway Administration (FHWA), a Road Safety Audit (RSA) is a formal safety performance examination of an existing or future road or intersection by an independent audit team. The RSA qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users.

The Road Safety Audit (RSA) includes the following elements:

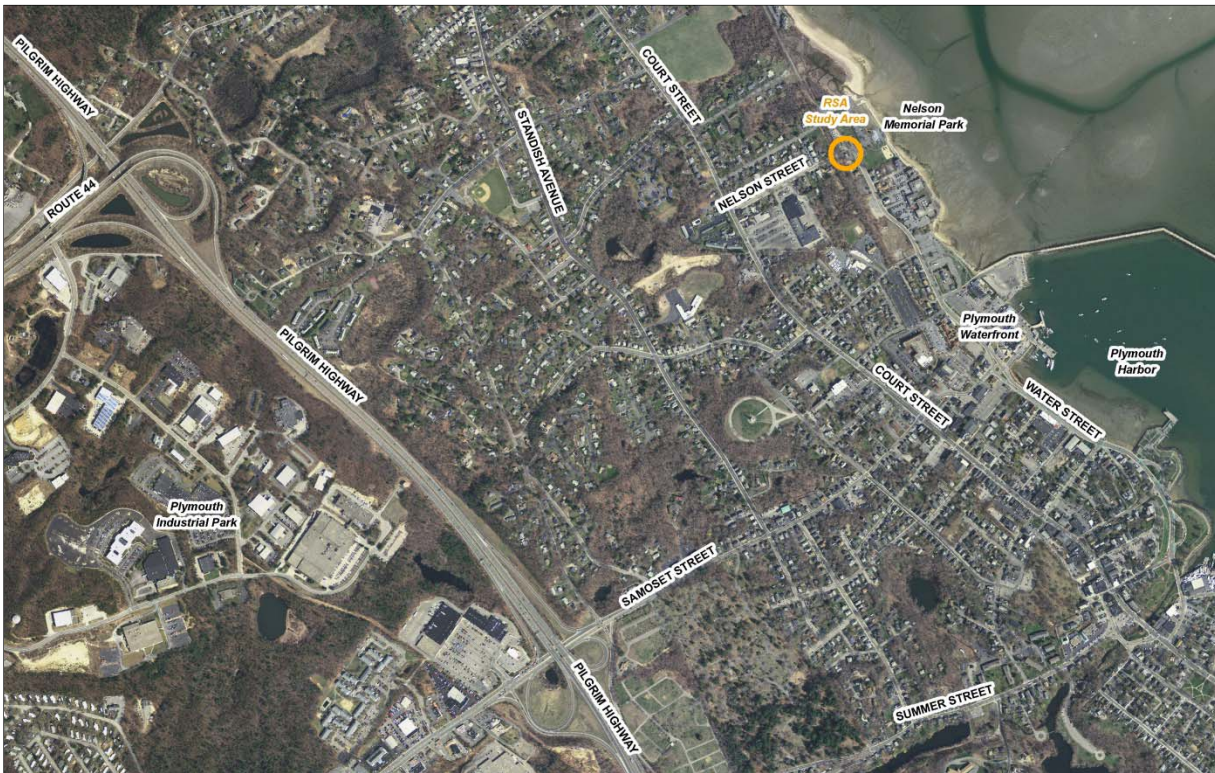
- Performed by an independent, multi-disciplined team;
- Considers all potential road users;
- Accounts for road user capabilities and limitations;
- Generates a formal report;
- Requires a response from the project owner

Old Colony Planning Council (OCPC) is the manager and facilitator of the process (responsible for data collection, analysis, meeting coordination, and grant and funding support) while the Town of Plymouth (project owner) is responsible for implementation of the proposed recommendations made by the audit team.

## Project Location Description

The Road Safety Audit focused on the intersection of Water Street and Nelson Street in North Plymouth. The Nelson Memorial Park is located adjacent to the intersection and the Plymouth Waterfront is less than half a mile to the south, which produces significant bicycle and pedestrian traffic through the intersection. Figure 1 illustrates the RSA study area.

Figure 1: RSA Study Area





The Water Street and Nelson Street intersection is an unconventional one way stop sign controlled intersection with three approaches. The entrance to the Nelson Memorial Park is stop sign controlled while Water Street and Nelson Street each allow free movement and meet at the bend in the road. All approaches to the intersection consist of a single general use travel lane. Figure 2 provides a more detailed view of the intersection and Figure 3 shows the street level view.

**Figure 2: Water Street and Nelson Street Intersection**



**Figure 3: Water Street and Nelson Street Intersection Photos**



## Background Data

### Physical Attributes

#### Water Street

Water Street is classified as an urban minor arterial under the jurisdiction of the Town of Plymouth. It is a commercial roadway that runs north-south along the Plymouth Harbor and provides access to the shops and restaurants along the Plymouth Waterfront. Water Street consists of one travel lane (approximately 12 feet wide) in each direction. Sidewalks are provided on both sides of Water Street; however, approximately 75 feet south of the intersection with the Nelson Memorial Park, the sidewalk on the west side of the road terminates and a crosswalk is provided to cross pedestrians. The sidewalk on the east side of the road continues past the crosswalk and connects with the sidewalk inside the park. A bicycle lane with official signage and pavement markings is provided on both sides of Water Street from the roundabout (South Park Avenue) to the Nelson Memorial Park.



#### Nelson Street

Nelson Street is classified as an urban minor arterial under the jurisdiction of the Town of Plymouth. Nelson Street is a residential roadway that runs east-west from Court Street (Route 3A) to the Nelson Memorial Park. In addition to providing direct access to the park, it also serves an alternative access to the waterfront rather than using South Park Avenue to the south. Nelson Street consists of one travel lane (approximately 12 feet wide) in each direction with no usable shoulder. Sidewalks are provided on both sides of Nelson Street; however, the sidewalks terminate approximately 130 feet west of the intersection. Unlike Water Street, there is no sidewalk connection to the Nelson Memorial Park or to the sidewalks on Water Street. Bicycles must share the travel lanes with vehicles as no formal bicycle accommodations are present on Nelson Street.



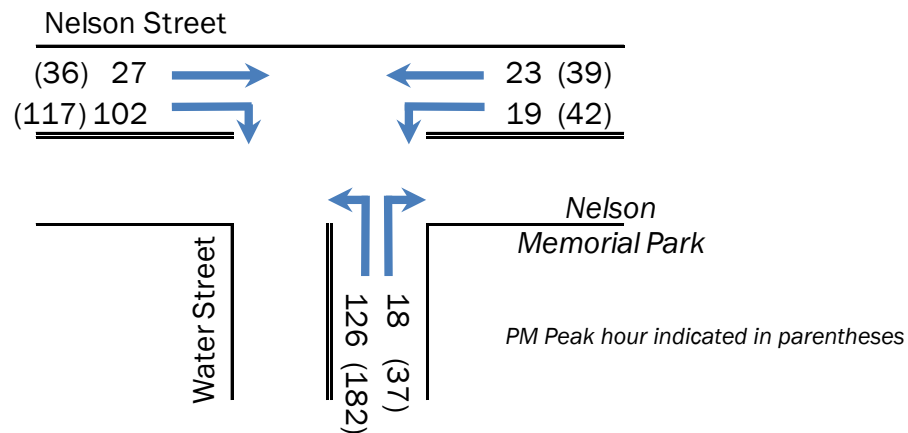
It should be noted that at the time of the RSA, the Town of Plymouth was completing a roadway improvement project for Water Street (from the roundabout to the Nelson Memorial Park) using funds from the MassWorks Infrastructure Program. The improvements included, but were not limited to: upgrading of the existing roadway surface; improvements to sidewalks; bicycle accommodations; pedestrian ramps; and, crosswalk areas to provide ADA compliance. Importantly, Water Street now has a dedicated bike lane on both sides of the road from the roundabout to the Nelson Memorial Park.

## Traffic Data & Intersection Operations

### Traffic Volumes

Old Colony Planning Council (OCPC) conducted a manual intersection turning movement count on August 21, 2014 in order to prepare intersection operations analyses as well as to perform a multi-way stop analysis and a traffic signal warrant analysis. The morning peak period occurred from 11:00 AM to 12:00 PM and the afternoon peak period occurred from 4:30 PM to 5:30 PM. Figure 4 shows the peak hour (AM & PM) turning movements at the Water Street and Nelson Street intersection.

**Figure 4: Water Street and Nelson Street AM and PM Peak Periods Turning Movements (2014)**



In addition, OCPC collected mainline roadway traffic counts using automatic traffic recorders on Water Street (near Lothrop Street) for a separate project in June, 2011. That data collection effort provided weekend and weekday vehicle volumes, vehicle speeds, and vehicle classifications for Water Street, which were supplied to the RSA team. Table 1 provides a summary of the Water Street traffic data collected in 2011.

**Table 1: Water Street Traffic Count Summary (2011)**

| Location                                       | Average Daily Traffic | 85 <sup>th</sup> Speed | Heavy Vehicle % |
|--|-----------------------|------------------------|-----------------|
| Water Street, south of Nelson Street - Weekday | 6,608                 | 28 MPH                 | 4.0 %           |
| Water Street, south of Nelson Street - Weekend | 6,530                 | 27 MPH                 | 3.6%            |



### Intersection Operations

Level-of-service analyses (LOS) were completed for the Water Street and Nelson Street intersection to determine the operating conditions during the morning and afternoon peak periods. Level-of-service analysis is a general measure that summarizes the overall operation of an intersection or transportation facility based on the analysis techniques published in the *Highway Capacity Manual* by the Transportation Research Board. It is based upon the operational conditions of a facility including lane use, traffic control, and lane width, and takes into account such factors as operating speeds, traffic interruptions, and freedom to maneuver.

Level-of-service represents a range of operating conditions and is summarized with letter grades from "A" to "F", with "A" being the most desirable and "E" representing the maximum flow rate or the capacity on a facility.

**LOS "A"** represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.

**LOS "B"** is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is still relatively unaffected.

**LOS "C"** is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. Occasional backups occur behind turning vehicles.

**LOS "D"** represents high-density, but stable, flow. Speed and freedom to maneuver are restricted, and the driver experiences a below average level of comfort and convenience as operations approach the capacity of the facility. Small increases in traffic flow will generally cause operational problems at this level.

**LOS "E"** represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform level. Freedom to maneuver within the traffic stream is extremely limited, and generally requires forcing other vehicles to give way. Congestion levels and delay are very high.

**LOS "F"** is representative of forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse the point, resulting in lengthy queues and delay.

Table 2 shows the Water Street and Nelson Street 2014 morning (AM) and afternoon (PM) peak period levels-of-service. The results of the level-of-service analyses are located in the Appendix.

**Table 2: Water Street and Nelson Street Level-of-Service (LOS)**

| <b>Location</b>                         | <b>AM LOS</b> | <b>PM LOS</b> |
|---|---------------|---------------|
| <b>Water Street and Nelson Street</b>   |               |               |
| <i>Water Street (all moves)</i>         | A             | A             |
| <i>Nelson Street (all moves)</i>        | A             | A             |
| <i>Nelson Memorial Park (all moves)</i> | B             | B             |
| <b>Water Street and Nelson Street</b>   |               |               |
| <i>Water Street (all moves)</i>         | A             | A             |
| <i>Nelson Street (all moves)</i>        | A             | A             |
| <i>Nelson Memorial Park (all moves)</i> | B             | B             |

## Crash Analyses

The latest three years of crash records (2011–2013) were obtained from the Plymouth Police Department prior to the Road Safety Audit. A total of seven crashes occurred at or immediately adjacent to the intersection during the three year period. Table 3 provides a crash summary for the Water Street and Nelson Street intersection.

**Table 3: Water Street and Nelson Street Intersection Crash Data Summary**

| No. | Date     | Time     | Manner of Collision        | Weather | Road Surface |
|-----|----------|----------|----------------------------|---------|--------------|
| 1   | 09/04/11 | 11:52 PM | Single Vehicle Crash       | Clear   | Dry          |
| 2   | 04/01/12 | 5:57 PM  | Single Vehicle Crash       | Cloudy  | Dry          |
| 3   | 08/19/12 | 5:43 PM  | Minor MVA. Details Unknown | Unknown | Unknown      |
| 4   | 10/23/12 | 5:54 PM  | Minor MVA. Details Unknown | Unknown | Unknown      |
| 5   | 02/18/13 | 12:48 PM | Single Vehicle Crash       | Snow    | Ice          |
| 6   | 07/08/13 | 10:10 PM | Single Vehicle Crash       | Cloudy  | Dry          |
| 7   | 08/04/13 | 1:08 AM  | Single Vehicle Crash       | Clear   | Dry          |

The majority of crashes occurred during good weather conditions, on a dry roadway, and during the hours of darkness. According to the crash reports, three crashes were the result of the driver failing to negotiate the curve properly or traveling at excessive speeds; one crash was due to weather conditions; one crash was the result of a vehicle swerving to avoid another vehicle; and, the final two crashes did not have manner of collision data. The crash data summary presented in Table 3 shows that weather and road surface do not appear to be as much of a factor as the time of day as well as driver behavior.

The Water Street and Nelson Street intersection has a crash rate of 1.27 crashes per million entering vehicles based on the crash records collected from 2011 to 2013. This crash rate exceeds both the Statewide average crash rate (0.60) and the MassDOT District 5 average (0.58) crash rate for un-signalized intersections. The crash rate calculation is located in the Appendix of the report.

## Multi-Way Stop & Traffic Signal Warrant Analyses

Chapter 2B and Chapter 4C of the *Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition* outline the requirements for the application of a multi-way stop or traffic signal respectively. Specifically, it states that the investigation of the need for both types of traffic control shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions.

The MUTCD also makes it clear that the satisfaction of a traffic signal warrant(s) shall not in itself require the installation of a traffic control signal but rather an engineering study of traffic conditions, pedestrian conditions, and physical characteristics be completed to justify the installation of a traffic signal.

Based on the Multi-Way Stop and Traffic Signal Warrant Analyses completed by Old Colony Planning Council, the volumes at the Water Street and Nelson Street intersection did not satisfy the warrants found in the *Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition* for the change to a multi-way stop sign control or for the installation of a traffic signal. As such, any change to the existing traffic control at the Water Street and Nelson Street intersection was not carried forward as a potential improvement.



## Road Safety Audit Observations and Potential Enhancements

### The Audit

The audit team conducted an RSA for the intersection of Water Street and Nelson Street on Tuesday – April 9, 2014. The RSA began at the Plymouth Town Hall with a classroom type gathering at which the team members reviewed the collision diagram and a crash detail summary for the intersection and discussed additional safety issues. The audit team then gathered at the intersection and recorded direct observations in the field while discussing potential safety improvements. Finally, the RSA wrapped up back at the Town Hall where the audit team further recorded additional deficiencies and developed a list of potential recommendations. Table 4 provides a list of the audit team members and their affiliations.

**Table 4: Participating Audit Team Members**

| <b>Audit Team Member</b> | <b>Agency/Affiliation</b>       |
|--------------------------|---------------------------------|
| Sid Kashi                | Plymouth Town Engineer          |
| James Downey             | Plymouth Engineering Department |
| Clare Montangri          | Plymouth Resident               |
| David Gilbert            | Plymouth Resident               |
| Corey O’Conner           | MassDOT Traffic Safety          |
| Yuan Liu                 | MassDOT Traffic Safety          |
| Bill McNulty             | Old Colony Planning Council     |
| Jed Cornock              | Old Colony Planning Council     |

The RSA Agenda and the complete attendance sheet with contact information for all team members are included in the Appendix.

### Observations and Potential Enhancements

Based on the discussions on Tuesday – April 9, 2014, the RSA team identified the following items as key issues at the Water Street and Nelson Street intersection:

- Sight distance is limited for Water Street and Nelson Street traffic due to the sharp curve and roadside vegetation.
- Motorists exiting the Nelson Memorial Park cannot see oncoming Water Street traffic without stopping past the painted stop line.
- Vehicle speeds around the sharp curve are excessive.
- Sidewalks on Nelson Street and Water Street do not connect around the sharp curve leaving pedestrians to walk on private property or in the roadway.
- Advanced warning signs for the sharp curve are inadequate.
- The pedestrian crossing signs at the Water Street crosswalk need to be more visible.
- Street lighting appears to be old and may be inadequate.
- Nelson Memorial Park entrance is very wide and is challenging for pedestrians to cross.
- Parking for the Nelson Memorial Park is limited and creates situations where motorists attempt to park on the street rather than in nearby lots.
- There are no direct bicycle accommodations on Water Street, Nelson Street, or at the intersection with the park (bicycle lanes are now present on Water Street and on the curve).

In order to simplify the discussion of deficiencies, it was determined that the aforementioned safety issues identified for the intersection of Water Street and Nelson Street could be grouped into the following general categories:

1. Sight Distance
2. Speed
3. Signage
4. Bicycle and Pedestrian Accommodations

The following sections describe in more detail the safety issues and potential enhancements identified during the RSA. It should be noted that several of these issues require further study and engineer judgment to determine the feasibility of implementing the respective enhancements.

## Safety Issue #1 – Sight Distance

### Observations

Sight distance for the vehicles exiting the Nelson Memorial Park onto Water Street and Nelson Street is good; however, vehicles must travel past the painted stop line in order to see oncoming Water Street northbound traffic. This situation is exacerbated when the park is busy with vehicles, pedestrians, and bicyclists. Sight lines are obscured for vehicles on Water Street and Nelson Street due to the sharp curve of the road and roadside objects. The house (#29 Nelson Street) on the inside of the curve is set back approximately ten to twelve feet from the edge of the roadway and obstructs the view of the Nelson Street eastbound traffic. At times, Nelson Street traffic attempting to enter the park is forced to edge out into the Water Street northbound approach in order to see around the curve. The hedge and trees (on private property) that line the inside of the curve cause significant obstruction to horizontal sight distance, particularly between roadway users on the eastbound and northbound approaches.



*Water Street northbound traffic sight distance is obscured by roadside vegetation and sharp curve.*



*Nelson Street eastbound traffic sight distance is obscured by the house on the inside of the curve.*

In the summer months, the Nelson Memorial Park is especially popular due to the many recreational opportunities it provides. The expansion of the parking area has helped provide more area for vehicles to park; however, at times, there are vehicles illegally parked near the entrance of the park, which further reduces sight lines for all users.

### Potential Enhancements

1. Consider the appropriateness of moving the location of the stop line forward for the Nelson Memorial Park to better inform motorists where they need to stop to improve their sight lines to the south of the intersection.
2. Install a retroreflective stop sign (R1-1) with retroreflective post strip on the Nelson Memorial Park driveway to further indicate the need to yield to Nelson Street and Water Street traffic.
3. Negotiate hedge trimming and/or tree removal with owner of hedge and trees on the inside corner of curve. If not feasible, mitigate with signage.
4. Replace the existing “curve ahead” signs with two *Manual on Uniform Traffic Control Devices* (MUTCD) compliant (W1-1L and W1-1R) retroreflective signs.
5. Install chevron signage around the outside of the curve.

## Safety Issue #2 – Speed

### Observations

According to the mainline roadway traffic counts conducted in 2011, the 85<sup>th</sup> percentile speeds on Water Street were 28 MPH during the weekday and 27 MPH during the weekend. These recorded speeds do not represent a significant speeding issue for the type of roadway and the surrounding



*Curb showing damage in front of #32  
Nelson Street*

land uses; however, those speeds at the sharp curve can certainly produce a hazardous situation. Field observations showed that at times, Water Street northbound traffic appeared to either misjudge or disregard the sharpness of the curve, which resulted in impeding into the oncoming lane or heavy braking. Moreover, the crash data presented earlier mentioned that several of the reported crashes at the intersection were due to speeding or vehicles not negotiating the curve properly and resulted in the vehicle hitting either the stone wall or curb located in front of #32 Nelson Street.

### Potential Enhancements

1. Increase police enforcement along Water Street and Nelson Street to discourage speeding.
2. Post “15 MPH” Advisory Speed Limit plaque with advanced curve warning signs for the curve (15 MPH advisory speed determined using ball bank indicator measurements and guidance from the Manual on Uniform Traffic Control Devices)
3. Consider using either a temporary speed trailer
4. Consider changing the existing street light bulbs to LED to enhance the existence of the curve



*Speed trailer showing speed limit  
and electronic speed display*

### Safety Issue #3 – Signage

#### Observations

The advanced warning signs (“curve ahead” – W1-1L and W1-1R) on Water Street and on Nelson Street approaching the sharp curve are in poor condition and are not retroreflective. The sign located on Water Street is located approximately 100 feet south of the curve while the sign on Nelson Street is located approximately 320 feet west of the curve. In addition, there is one chevron sign (W1-8L) mounted in front of the stone wall of #32 Nelson Street, but it is located very low to the ground; is not retroreflective; and, it is in poor condition.



Nelson Street curve ahead  
advanced warning sign



Chevron sign on stone wall

#### Potential Enhancements

1. Install new retroreflective MUTCD compliant “curve ahead” advanced warning signs (W1-1L and W1-1R) on Water Street and Nelson Street at consistent distances from the intersection to advise motorists of the curve. Placement of first warning signs should be 200’ in advance of the curve.
2. Consider adding a second “curve ahead” advanced warning sign (W1-1aR) for both approaches to reinforce the need to slow down before the curve (see MUTCD 2009 Edition Figure 2C-2). Include “15 MPH” advisory speed plaque with “curve ahead” advanced warning signs.
3. Install additional retroreflective chevron warning signs (W1-8L) on the outside portion of the curve (where possible) to emphasize the sharpness of the curve. The quantity, spacing and installation of the chevron signs should be in accordance with section 2C.06 of the MUTCD. W1-6 signs may also be considered
4. Install additional parking signage (D4-1) to direct visitors to parking lots in close proximity to the Nelson Memorial Park in the event that the parking lot is full.



MUTCD 2009 Edition Part 2 Figure 2C-2,  
Example of Warning Signs for a Turn

5. Replace STOP sign exiting Nelson Memorial Park with retroreflective sign
6. Install MUCTC complaint crosswalk signage at all crosswalks.
7. Install “Share The Road” signage where dedicated bike lane is not provided.



## Safety Issue #4 – Bicycle and Pedestrian Accommodations

### Observations

Currently, there are bike lanes on both sides of Water Street from the roundabout to the Nelson Memorial Park, but Nelson Street does not have any dedicated bicycle accommodations such as bike lanes, painted sharrows, or warning signs. There are painted sharrows on the curve indicating that vehicles must share the travel lane with bicyclists; however, the roadside vegetation and the limited lane widths still present an issue for multi-modal use.

The sidewalks on Water Street and Nelson Street are generally four to five feet wide, are located on both sides of the road, and are in good condition; however, they do not connect around the curve, thereby creating a gap in the network. The Nelson Memorial Park attracts a large number of recreational bicycle and pedestrian activity for a variety of reasons. The most prominent is that the park is located at the southern terminus of the Seaside Trail, which is a shared use rail trail that runs from Cordage Park in North Plymouth to the Nelson Memorial Park. In addition, a very large playground with splash pad and access to Plymouth Harbor contribute to the bicycle and pedestrian traffic.



*Inside of curve showing no sidewalk but clear indication of pedestrian use*



*Water Street crosswalk*

The lack of sidewalks on the curve creates a dangerous situation for pedestrians. The audit team observed many pedestrians attempting to walk on the private property located on the inside of the curve without adequate separation from vehicular traffic, or trying to cross the roadway on or near the curve to get to the sidewalk on the other side of the road.

The existing signage at the Water Street crosswalk is MUTCD compliant and in good condition; however, providing two signs (one on each side of the road) for each approach can enhance the visibility of the crosswalk.

### Potential Enhancements

1. Consider extending the existing sidewalks on both or one side of Nelson Street and Water Street to provide a continuous pedestrian network.
2. Consider installing Rapid Rectangular Flashing Beacons (RRFB) at the Water Street crosswalk with two back to back pedestrian crossing signs (W11-2 & W16-7p) on each approach.
3. Consider installing "Share the Road" advisory signs (W16-1P) to Nelson Street to remind vehicular traffic of the presence of bicycle traffic. Share the lane pavement markings, or "sharrows," may also be considered on Nelson Street where there is not adequate with for bike lanes.

## Recommendations

Based on its review of data, on-site field observations, and group discussion, the RSA team identified a number of possible enhancements that could improve safety at the Water Street and Nelson Street intersection. Further study and design work will need to be conducted to determine the feasibility of making some of the improvements.

The recommendations and potential enhancements developed by the RSA participants have been categorized by time frame and cost. The time frame is categorized as short-term (<1 year), mid-term (1 to 3 years), or long-term (typically >3 years). The costs are categorized as low (<\$10,000), medium (\$10,001 to \$50,000), or high (>\$50,000).

Some general **short-term improvements** for the Water Street and Nelson Street intersection include, but are not limited to:

- Removing obstructions to sight lines, including trimming and/or removal of hedges and trees on inside curve.
- Increasing police enforcement and installing speed trailers.
- Improving signage (curvature of roadway, pedestrian crossings, share the road).

Specific **long-term improvements** for the Water Street and Nelson Street intersection include, but are not limited to:

- Extending the existing sidewalks on both sides of Water Street and Nelson Street to create a continuous network around the curve.
- Installing Rapid Rectangular Flashing Beacons (RRFB) at the Water Street crosswalk.
- Constructing or purchasing additional off-site parking for the Nelson Memorial Park.

Table 5 summarizes the safety issues, possible enhancements, time frame to implement enhancement, cost, and the responsible party.



*Parking Area Guide Sign (D4-1)*



*Pedestrian Actuated Rapid Rectangular Flashing Beacon*



**Table 5: Summary of Potential Safety Enhancements**

| Safety Issue   | Safety Enhancement  | Time Frame | Cost   | Responsible Party   |
|----------------|---|------------|--------|---|
| Sight Distance | Trim back trees and roadside vegetation   | Short-Term | Low    | Town of Plymouth  |
| Sight Distance | Move Nelson Memorial Park stop line forward to help motorists see oncoming Water Street traffic   | Short-Term | Low    | Town of Plymouth  |
| Sight Distance | Replace all existing pavement markings and signs with retroreflective materials   | Short-Term | Medium | Town of Plymouth  |
| Speed          | Increase police enforcement along Water Street and Nelson Street to discourage speeding   | Short-Term | Low    | Town of Plymouth  |
| Speed          | Post “15 MPH” advisory speeds at curve, and consider using temporary speed trailers   | Short-Term | Medium | Town of Plymouth  |
| Speed          | Consider changing to LED bulbs in street lights   | Short-Term | Low    | Town of Plymouth<br>(Town responsible for requesting;<br>infrastructure owned by NSTAR) |
| Signage        | Update all advisory signs with MUTCD compliant retroreflective signs and install at standard distances from intersection  | Short-Term | Low    | Town of Plymouth  |
| Signage        | Replace “curve ahead” signs on Water Street and Nelson Street with MUTCD compliant retroreflective (W1-1L and W1-1R) sign(s), including “15 MPH” advisory speed plaques | Short-Term | Low    | Town of Plymouth  |
| Signage        | Install additional retroreflective chevron warning signs (W1-8L) on the outside portion of the curve (where possible) to emphasize the sharpness of the curve           | Short-Term | Low    | Town of Plymouth<br>(eminent domain)  |

**Table 5: Summary of Potential Safety Enhancements (Continued)**

| Safety Issue         | Safety Enhancement   | Time Frame | Cost   | Responsible Party                 |
|----------------------|--|------------|--------|-----------------------------------|
| Signage              | Install MUTCD compliant retroreflective “share the road” signs (on Water Street and Nelson Street (W1-1L)  | Short-Term | Low    | Town of Plymouth                  |
| Bicycle & Pedestrian | Extend the existing sidewalks on both sides of Nelson Street and Water Street to provide a continuous pedestrian network                               | Long-Term  | High   | Town of Plymouth (eminent domain) |
| Bicycle & Pedestrian | Extend the existing sidewalk on one side of Nelson Street to the Water Street sidewalks to provide a continuous pedestrian network                     | Long-Term  | High   | Town of Plymouth (eminent domain) |
| Bicycle & Pedestrian | Consider adding a traffic island to the Nelson Memorial Park entrance with a pedestrian refuge area  | Long-Term  | High   | Town of Plymouth                  |
| Bicycle & Pedestrian | Add crosswalk at Nelson Memorial Park entrance once a receiving area has been established  | Long-Term  | Low    | Town of Plymouth                  |
| Bicycle & Pedestrian | Consider reducing the size of the Nelson Memorial Park entrance  | Short-Term | Medium | Town of Plymouth                  |
| Bicycle & Pedestrian | Paint sharrows on Nelson Street to indicate the presence of bicycles and the need for vehicles to share the road                                       | Short-Term | Low    | Town of Plymouth                  |
| Bicycle & Pedestrian | Consider additional pedestrian crossing signs ( W11-2 & W16-7p) and using Rapid Rectangular Flashing Beacons at the existing crosswalk on Water Street | Short-Term | Medium | Town of Plymouth                  |

Appendix A  
Road Safety Audit Meeting Agenda & Attendance Sheet

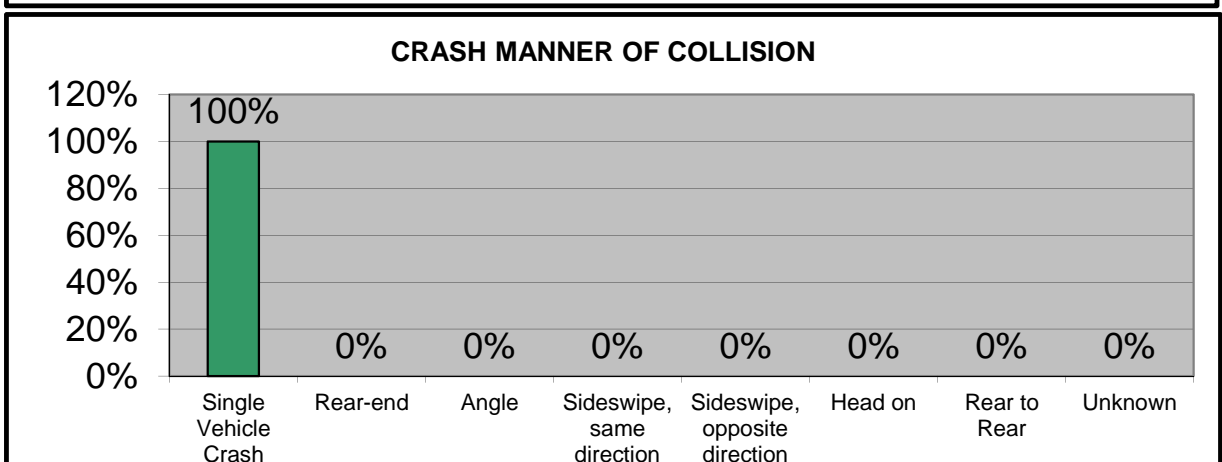
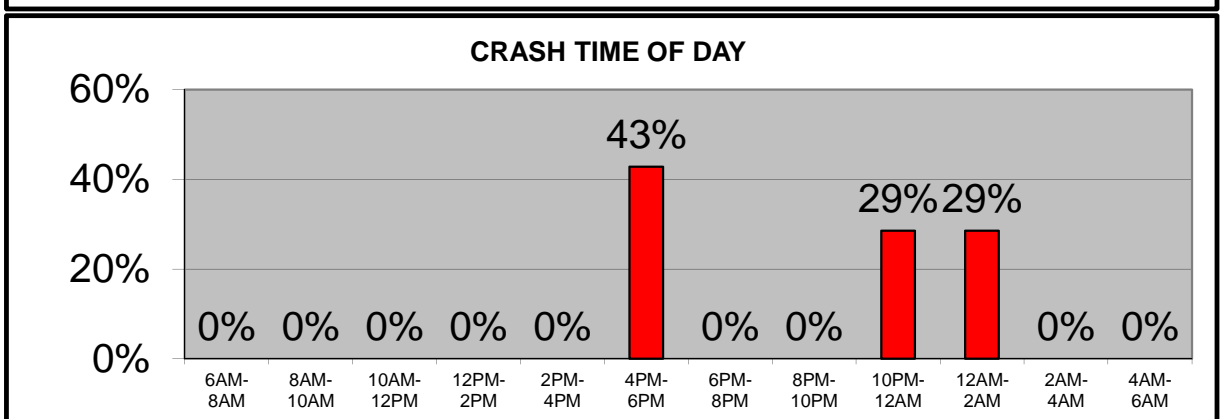
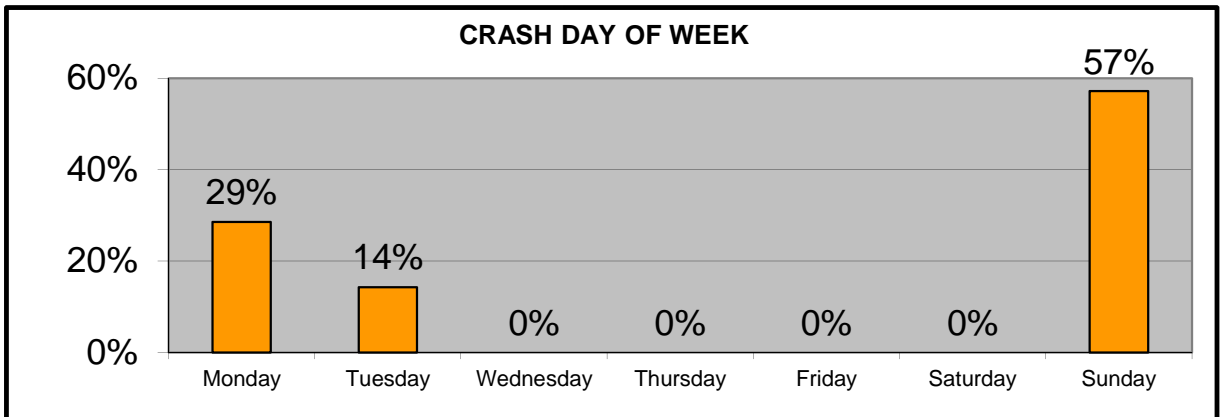
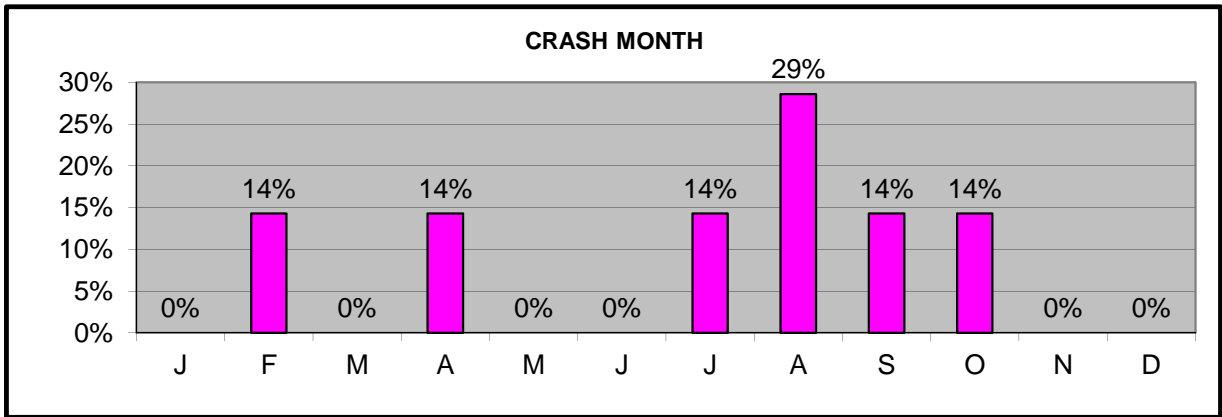
|                                       |  |
|---------------------------------------|--|
| <b>Agenda</b>                         | <b>Road Safety Audit for Water Street and Nelson Street, Plymouth</b><br><b>Wednesday, April 9<sup>th</sup>, 2014</b><br><b>10:00 AM – 12:00 PM</b>  |
| <b>Contact:</b>                       | Bill McNulty, Old Colony Planning Council<br>(508) 583-1833 ext. 207<br><a href="mailto:wmcnulty@ocpcrpa.org">wmcnulty@ocpcrpa.org</a>   |
| <b>Attendees:</b>                     | Invited Participants Include a Multidisciplinary Team including Plymouth Officials (DPW, Police, Fire, Planning, Administration), MassDOT, Residents, and OCPC   |
| <b>Please Bring:</b>                  | Thoughts and Suggestions   |
| <b>Meeting Location:</b>              | <b>Plymouth Town Hall – Plantation Meeting Room (2<sup>nd</sup> Floor)</b><br><b>11 Lincoln Street</b><br><b>Plymouth, MA. 02360</b>   |
| <b>10:00 AM</b>                       | Welcome and Introductions at the Plymouth Town Hall  |
| <b>10:10 AM</b>                       | Review and Discussion of Project and Site Specific Material <ul style="list-style-type: none"> <li>• Review of Traffic Data and Crash History</li> <li>• Existing Conditions and Known Challenges</li> </ul>   |
| <b>10:40 AM</b>                       | Adjourn from Opening Session and Head To Site Visit (Meet at Nelson Park) <ul style="list-style-type: none"> <li>• Identify any deficiencies and/or potential improvements at the study area location</li> <li>• OCPC staff will document all observations and comments</li> </ul>   |
| <b>11:30 AM</b>                       | Wrap-Up Site Visit / Conclude Audit Back at Plymouth Town Hall   |
| <b>12:00 PM</b>                       | Adjourn For The Day  |
| <b>Instructions For Participants:</b> | <ul style="list-style-type: none"> <li>• Before attending the Road Safety Audit, participants are encouraged to familiarize themselves with the study area, and make note of existing conditions and any deficiencies they observe</li> <li>• All participants will be actively involved in the process throughout. Participants are encouraged to come with thoughts and ideas, but are reminded that the synergy that develops and respect for others' opinions are key elements to the success of the Road Safety Audit process</li> <li>• After the meeting, participants will be asked to comment and respond to the document materials to ensure it is reflective of the Road Safety Audit completed by the multidisciplinary team</li> <li>• Please wear comfortable footwear, and bring safety vest if possible. A limited number of safety vests will be available at the audit.</li> </ul> |



Appendix B  
Crash Data and Analysis

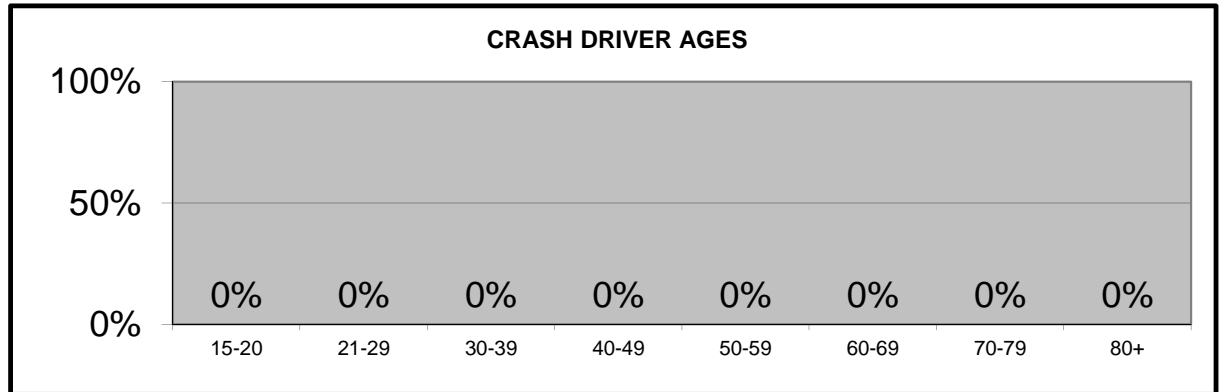
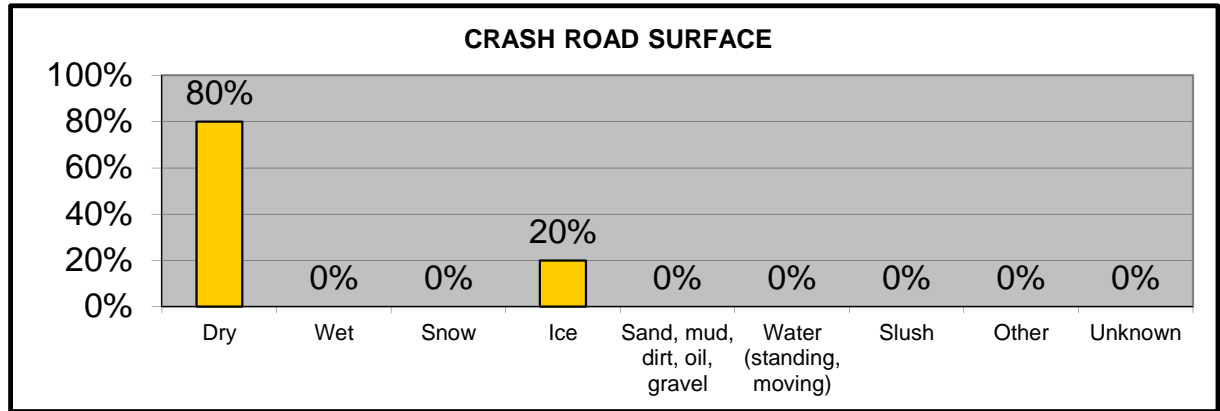
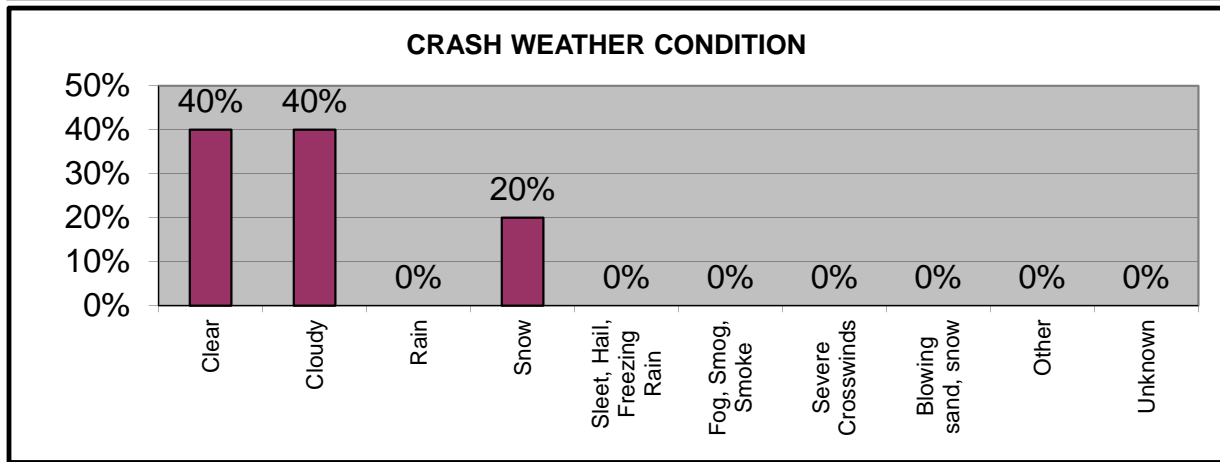
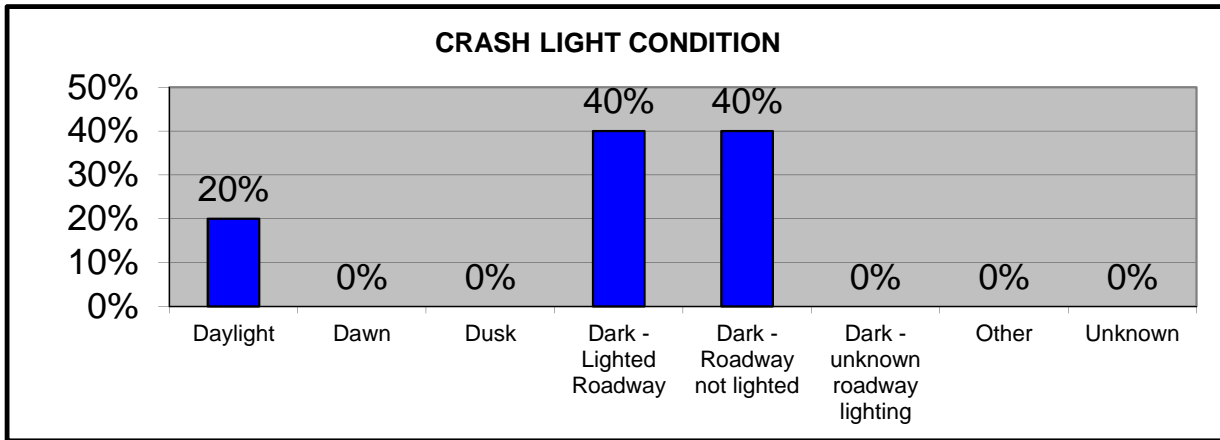
### Crash Data Summary Tables and Charts

Water Street at Nelson Street, Plymouth



### Crash Data Summary Tables and Charts

Water Street at Nelson Street, Plymouth





## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Plymouth COUNTY : DA DATE : 8/21/2014

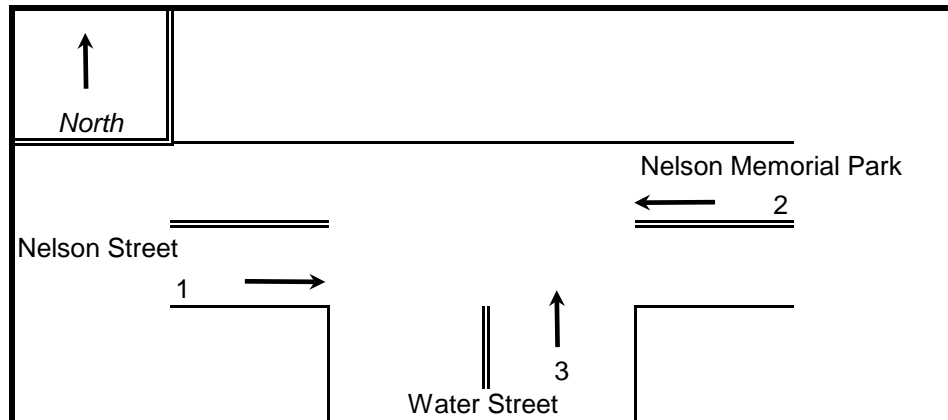
DISTRICT : 5 UNSIGNALIZED :  SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Water Street

MINOR STREET(S) : Nelson Street / Nelson Memorial Park

**INTERSECTION  
 DIAGRAM  
 (Label Approaches)**



**PEAK HOUR VOLUMES**

| APPROACH :                    | 1   | 2  | 3   | 4 | 5 | Total Peak Hourly Approach Volume |
|-------------------------------|-----|----|-----|---|---|-----------------------------------|
| DIRECTION :                   | EB  | WB | NB  |   |   |                                   |
| PEAK HOURLY VOLUMES (AM/PM) : | 153 | 81 | 219 |   |   | 453                               |

" K " FACTOR :  INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :  # OF YEARS :  AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**  RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date: \_\_\_\_\_

Appendix C  
Turning Movement Count (TMC) Data



# Old Colony Planning Council

70 School Street  
Brockton, MA 02301  
(508) 583-1833  
[www.ocpcrpa.org](http://www.ocpcrpa.org)

Community: Plymouth  
Weather: Clear  
Board # & Staff: TDC-8 (1) / OCPC Staff  
Traffic Control: Stop Sign

File Name : Water Street & Nelson Street\_All Day  
Site Code : 239  
Start Date : 8/21/2014  
Page No : 1

### Groups Printed- Cars - Buses - Trucks

| Start Time | Nelson Memorial Park<br>Westbound |      |      |            | Water Street<br>Northbound |      |      |            | Nelson Street<br>Eastbound |      |      |            | Int. Total |
|------------|-----------------------------------|------|------|------------|----------------------------|------|------|------------|----------------------------|------|------|------------|------------|
|            | Thru                              | Left | Peds | App. Total | Right                      | Left | Peds | App. Total | Right                      | Thru | Peds | App. Total |            |
| Factor     | 1.0                               | 1.0  | 1.0  |            | 1.0                        | 1.0  | 1.0  |            | 1.0                        | 1.0  | 1.0  |            |            |
| 06:00 AM   | 2                                 | 3    | 1    | 6          | 2                          | 6    | 0    | 8          | 7                          | 4    | 0    | 11         | 25         |
| 06:15 AM   | 1                                 | 5    | 3    | 9          | 7                          | 11   | 1    | 19         | 7                          | 2    | 1    | 10         | 38         |
| 06:30 AM   | 6                                 | 2    | 3    | 11         | 2                          | 12   | 1    | 15         | 11                         | 3    | 1    | 15         | 41         |
| 06:45 AM   | 0                                 | 6    | 3    | 9          | 6                          | 8    | 0    | 14         | 12                         | 2    | 0    | 14         | 37         |
| Total      | 9                                 | 16   | 10   | 35         | 17                         | 37   | 2    | 56         | 37                         | 11   | 2    | 50         | 141        |
| 07:00 AM   | 5                                 | 2    | 0    | 7          | 2                          | 19   | 0    | 21         | 10                         | 3    | 0    | 13         | 41         |
| 07:15 AM   | 2                                 | 2    | 4    | 8          | 3                          | 15   | 0    | 18         | 10                         | 3    | 1    | 14         | 40         |
| 07:30 AM   | 0                                 | 2    | 0    | 2          | 1                          | 20   | 0    | 21         | 17                         | 4    | 2    | 23         | 46         |
| 07:45 AM   | 2                                 | 2    | 2    | 6          | 1                          | 18   | 0    | 19         | 13                         | 3    | 0    | 16         | 41         |
| Total      | 9                                 | 8    | 6    | 23         | 7                          | 72   | 0    | 79         | 50                         | 13   | 3    | 66         | 168        |
| 08:00 AM   | 3                                 | 6    | 2    | 11         | 2                          | 14   | 3    | 19         | 17                         | 2    | 0    | 19         | 49         |
| 08:15 AM   | 0                                 | 0    | 0    | 0          | 3                          | 14   | 0    | 17         | 20                         | 4    | 1    | 25         | 42         |
| 08:30 AM   | 3                                 | 0    | 6    | 9          | 0                          | 17   | 7    | 24         | 22                         | 4    | 0    | 26         | 59         |
| 08:45 AM   | 4                                 | 2    | 0    | 6          | 2                          | 11   | 1    | 14         | 21                         | 4    | 1    | 26         | 46         |
| Total      | 10                                | 8    | 8    | 26         | 7                          | 56   | 11   | 74         | 80                         | 14   | 2    | 96         | 196        |
| 09:00 AM   | 3                                 | 1    | 1    | 5          | 0                          | 20   | 2    | 22         | 19                         | 9    | 0    | 28         | 55         |
| 09:15 AM   | 6                                 | 2    | 0    | 8          | 5                          | 36   | 1    | 42         | 21                         | 9    | 0    | 30         | 80         |
| 09:30 AM   | 6                                 | 1    | 0    | 7          | 6                          | 27   | 3    | 36         | 15                         | 6    | 0    | 21         | 64         |
| 09:45 AM   | 12                                | 1    | 0    | 13         | 6                          | 19   | 1    | 26         | 29                         | 4    | 1    | 34         | 73         |
| Total      | 27                                | 5    | 1    | 33         | 17                         | 102  | 7    | 126        | 84                         | 28   | 1    | 113        | 272        |
| 10:00 AM   | 3                                 | 0    | 0    | 3          | 7                          | 19   | 3    | 29         | 16                         | 4    | 0    | 20         | 52         |
| 10:15 AM   | 5                                 | 4    | 0    | 9          | 9                          | 31   | 3    | 43         | 23                         | 5    | 0    | 28         | 80         |
| 10:30 AM   | 7                                 | 2    | 0    | 9          | 6                          | 23   | 0    | 29         | 18                         | 4    | 0    | 22         | 60         |
| 10:45 AM   | 8                                 | 1    | 0    | 9          | 15                         | 40   | 1    | 56         | 27                         | 4    | 0    | 31         | 96         |
| Total      | 23                                | 7    | 0    | 30         | 37                         | 113  | 7    | 157        | 84                         | 17   | 0    | 101        | 288        |
| 11:00 AM   | 6                                 | 4    | 0    | 10         | 6                          | 19   | 4    | 29         | 9                          | 10   | 0    | 19         | 58         |
| 11:15 AM   | 9                                 | 7    | 0    | 16         | 2                          | 34   | 0    | 36         | 35                         | 4    | 0    | 39         | 91         |
| 11:30 AM   | 4                                 | 2    | 0    | 6          | 5                          | 33   | 0    | 38         | 21                         | 3    | 0    | 24         | 68         |
| 11:45 AM   | 4                                 | 6    | 0    | 10         | 5                          | 40   | 0    | 45         | 37                         | 10   | 0    | 47         | 102        |
| Total      | 23                                | 19   | 0    | 42         | 18                         | 126  | 4    | 148        | 102                        | 27   | 0    | 129        | 319        |
| 12:00 PM   | 11                                | 3    | 0    | 14         | 10                         | 36   | 0    | 46         | 33                         | 11   | 0    | 44         | 104        |
| 12:15 PM   | 6                                 | 11   | 0    | 17         | 7                          | 32   | 0    | 39         | 28                         | 4    | 0    | 32         | 88         |
| 12:30 PM   | 8                                 | 5    | 0    | 13         | 6                          | 51   | 0    | 57         | 28                         | 7    | 0    | 35         | 105        |
| 12:45 PM   | 8                                 | 6    | 0    | 14         | 6                          | 31   | 0    | 37         | 32                         | 8    | 0    | 40         | 91         |
| Total      | 33                                | 25   | 0    | 58         | 29                         | 150  | 0    | 179        | 121                        | 30   | 0    | 151        | 388        |
| 01:00 PM   | 10                                | 5    | 0    | 15         | 5                          | 47   | 0    | 52         | 22                         | 7    | 0    | 29         | 96         |
| 01:15 PM   | 10                                | 4    | 0    | 14         | 6                          | 51   | 0    | 57         | 12                         | 13   | 0    | 25         | 96         |
| 01:30 PM   | 4                                 | 4    | 0    | 8          | 5                          | 39   | 0    | 44         | 40                         | 4    | 0    | 44         | 96         |
| 01:45 PM   | 8                                 | 4    | 0    | 12         | 9                          | 42   | 0    | 51         | 23                         | 5    | 0    | 28         | 91         |
| Total      | 32                                | 17   | 0    | 49         | 25                         | 179  | 0    | 204        | 97                         | 29   | 0    | 126        | 379        |
| 02:00 PM   | 14                                | 5    | 0    | 19         | 9                          | 48   | 0    | 57         | 22                         | 9    | 0    | 31         | 107        |



# Old Colony Planning Council

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

Community: Plymouth  
 Weather: Clear  
 Board # & Staff: TDC-8 (1) / OCPC Staff  
 Traffic Control: Stop Sign

File Name : Water Street & Nelson Street\_All Day  
 Site Code : 239  
 Start Date : 8/21/2014  
 Page No : 2

## Groups Printed- Cars - Buses - Trucks

| Start Time  | Nelson Memorial Park<br>Westbound |      |      |            | Water Street<br>Northbound |      |      |            | Nelson Street<br>Eastbound |      |      |            | Int. Total |
|-------------|-----------------------------------|------|------|------------|----------------------------|------|------|------------|----------------------------|------|------|------------|------------|
|             | Thru                              | Left | Peds | App. Total | Right                      | Left | Peds | App. Total | Right                      | Thru | Peds | App. Total |            |
| Factor      | 1.0                               | 1.0  | 1.0  |            | 1.0                        | 1.0  | 1.0  |            | 1.0                        | 1.0  | 1.0  |            |            |
| 02:15 PM    | 5                                 | 1    | 0    | 6          | 4                          | 52   | 3    | 59         | 25                         | 1    | 3    | 29         | 94         |
| 02:30 PM    | 10                                | 2    | 0    | 12         | 13                         | 61   | 5    | 79         | 25                         | 4    | 0    | 29         | 120        |
| 02:45 PM    | 13                                | 4    | 0    | 17         | 5                          | 59   | 4    | 68         | 23                         | 7    | 3    | 33         | 118        |
| Total       | 42                                | 12   | 0    | 54         | 31                         | 220  | 12   | 263        | 95                         | 21   | 6    | 122        | 439        |
| 03:00 PM    | 10                                | 3    | 0    | 13         | 8                          | 52   | 5    | 65         | 13                         | 6    | 0    | 19         | 97         |
| 03:15 PM    | 8                                 | 3    | 0    | 11         | 6                          | 44   | 8    | 58         | 29                         | 5    | 0    | 34         | 103        |
| 03:30 PM    | 11                                | 1    | 0    | 12         | 10                         | 40   | 17   | 67         | 20                         | 8    | 0    | 28         | 107        |
| 03:45 PM    | 9                                 | 9    | 0    | 18         | 7                          | 38   | 6    | 51         | 24                         | 8    | 0    | 32         | 101        |
| Total       | 38                                | 16   | 0    | 54         | 31                         | 174  | 36   | 241        | 86                         | 27   | 0    | 113        | 408        |
| 04:00 PM    | 9                                 | 3    | 0    | 12         | 13                         | 39   | 0    | 52         | 22                         | 4    | 0    | 26         | 90         |
| 04:15 PM    | 11                                | 6    | 1    | 18         | 10                         | 28   | 0    | 38         | 25                         | 13   | 0    | 38         | 94         |
| 04:30 PM    | 5                                 | 10   | 0    | 15         | 7                          | 49   | 0    | 56         | 28                         | 12   | 0    | 40         | 111        |
| 04:45 PM    | 11                                | 11   | 0    | 22         | 12                         | 41   | 0    | 53         | 29                         | 9    | 0    | 38         | 113        |
| Total       | 36                                | 30   | 1    | 67         | 42                         | 157  | 0    | 199        | 104                        | 38   | 0    | 142        | 408        |
| 05:00 PM    | 12                                | 11   | 0    | 23         | 12                         | 46   | 0    | 58         | 35                         | 8    | 0    | 43         | 124        |
| 05:15 PM    | 11                                | 10   | 1    | 22         | 6                          | 46   | 0    | 52         | 25                         | 7    | 1    | 33         | 107        |
| 05:30 PM    | 10                                | 9    | 0    | 19         | 10                         | 40   | 1    | 51         | 20                         | 11   | 0    | 31         | 101        |
| 05:45 PM    | 15                                | 3    | 0    | 18         | 7                          | 41   | 0    | 48         | 20                         | 3    | 0    | 23         | 89         |
| Total       | 48                                | 33   | 1    | 82         | 35                         | 173  | 1    | 209        | 100                        | 29   | 1    | 130        | 421        |
| 06:00 PM    | 8                                 | 10   | 2    | 20         | 9                          | 40   | 0    | 49         | 27                         | 9    | 0    | 36         | 105        |
| 06:15 PM    | 9                                 | 8    | 0    | 17         | 9                          | 52   | 2    | 63         | 32                         | 5    | 0    | 37         | 117        |
| 06:30 PM    | 11                                | 4    | 0    | 15         | 8                          | 49   | 0    | 57         | 30                         | 3    | 0    | 33         | 105        |
| 06:45 PM    | 8                                 | 8    | 0    | 16         | 8                          | 44   | 0    | 52         | 23                         | 1    | 0    | 24         | 92         |
| Total       | 36                                | 30   | 2    | 68         | 34                         | 185  | 2    | 221        | 112                        | 18   | 0    | 130        | 419        |
| Grand Total | 366                               | 226  | 29   | 621        | 330                        | 1744 | 82   | 2156       | 1152                       | 302  | 15   | 1469       | 4246       |
| Apprch %    | 58.9                              | 36.4 | 4.7  |            | 15.3                       | 80.9 | 3.8  |            | 78.4                       | 20.6 | 1    |            |            |
| Total %     | 8.6                               | 5.3  | 0.7  | 14.6       | 7.8                        | 41.1 | 1.9  | 50.8       | 27.1                       | 7.1  | 0.4  | 34.6       |            |
| Cars        | 357                               | 219  | 0    | 576        | 319                        | 1699 | 1    | 2019       | 1114                       | 299  | 0    | 1413       | 4008       |
| % Cars      | 97.5                              | 96.9 | 0    | 92.8       | 96.7                       | 97.4 | 1.2  | 93.6       | 96.7                       | 99   | 0    | 96.2       | 94.4       |
| Buses       | 4                                 | 2    | 23   | 29         | 6                          | 10   | 43   | 59         | 14                         | 0    | 2    | 16         | 104        |
| % Buses     | 1.1                               | 0.9  | 79.3 | 4.7        | 1.8                        | 0.6  | 52.4 | 2.7        | 1.2                        | 0    | 13.3 | 1.1        | 2.4        |
| Trucks      | 5                                 | 5    | 6    | 16         | 5                          | 35   | 38   | 78         | 24                         | 3    | 13   | 40         | 134        |
| % Trucks    | 1.4                               | 2.2  | 20.7 | 2.6        | 1.5                        | 2    | 46.3 | 3.6        | 2.1                        | 1    | 86.7 | 2.7        | 3.2        |

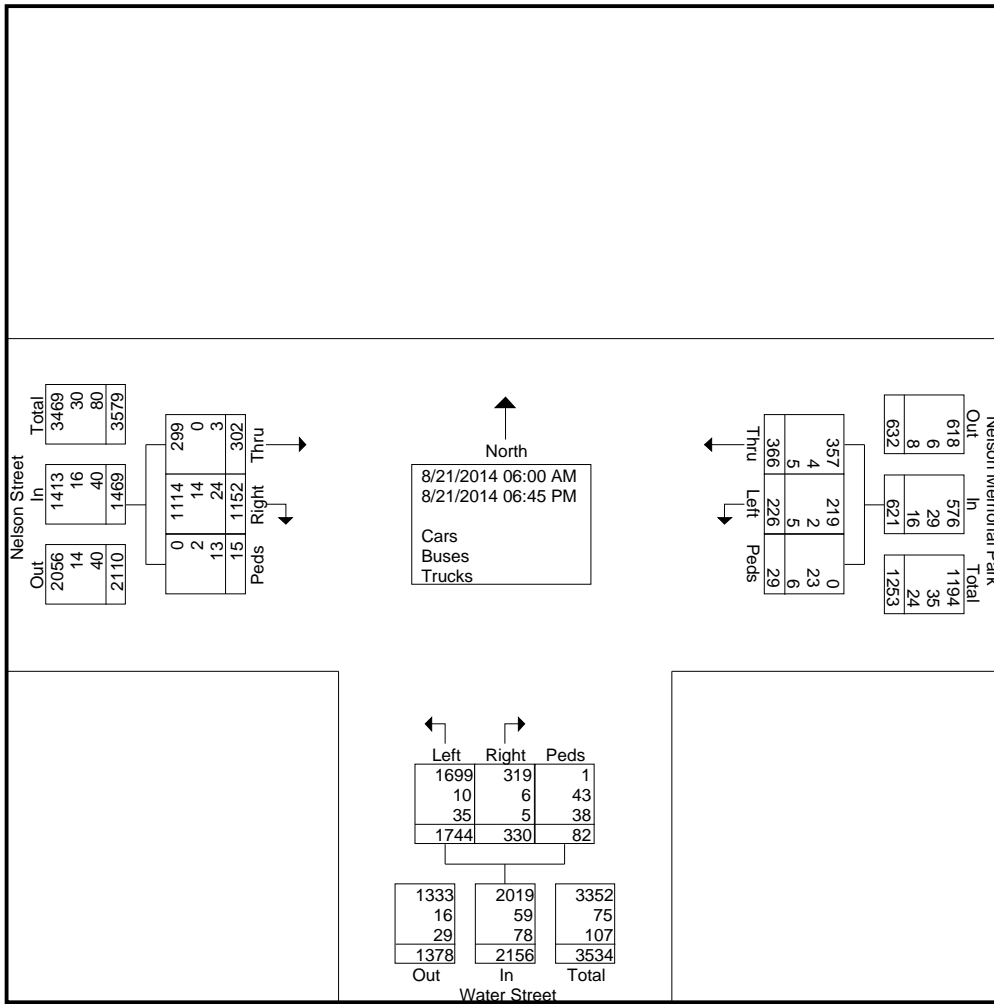


# Old Colony Planning Council

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

Community: Plymouth  
 Weather: Clear  
 Board # & Staff: TDC-8 (1) / OCPC Staff  
 Traffic Control: Stop Sign

File Name : Water Street & Nelson Street\_All Day  
 Site Code : 239  
 Start Date : 8/21/2014  
 Page No : 3



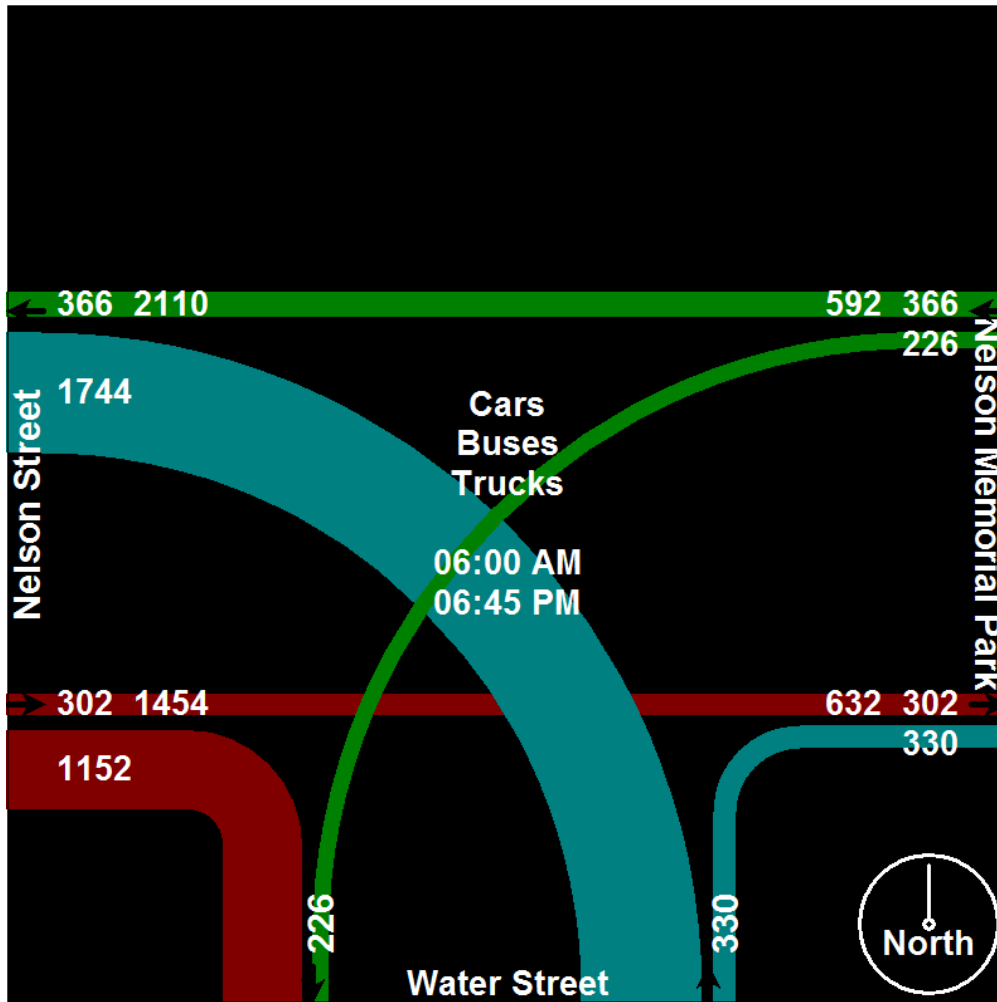


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| Start Time   | Nelson Memorial Park<br>Westbound |           |          |            | Water Street<br>Northbound |           |      |            | Nelson Street<br>Eastbound |           |          |            | Int. Total |
|--|-----------------------------------|-----------|----------|------------|----------------------------|-----------|------|------------|----------------------------|-----------|----------|------------|------------|
|  | Thru                              | Left      | Peds     | App. Total | Right                      | Left      | Peds | App. Total | Right                      | Thru      | Peds     | App. Total |            |
| Peak Hour Analysis From 06:00 AM to 06:45 PM - Peak 1 of 1 |                                   |           |          |            |                            |           |      |            |                            |           |          |            |            |
| Peak Hour for Entire Intersection Begins at 04:30 PM       |                                   |           |          |            |                            |           |      |            |                            |           |          |            |            |
| 04:30 PM   | 5                                 | 10        | 0        | 15         | 7                          | <b>49</b> | 0    | 56         | 28                         | <b>12</b> | 0        | 40         | 111        |
| 04:45 PM   | 11                                | <b>11</b> | 0        | 22         | <b>12</b>                  | 41        | 0    | 53         | 29                         | 9         | 0        | 38         | 113        |
| 05:00 PM   | <b>12</b>                         | 11        | 0        | <b>23</b>  | 12                         | 46        | 0    | <b>58</b>  | <b>35</b>                  | 8         | 0        | <b>43</b>  | <b>124</b> |
| 05:15 PM   | 11                                | 10        | <b>1</b> | 22         | 6                          | 46        | 0    | 52         | 25                         | 7         | <b>1</b> | 33         | 107        |
| Total Volume   | 39                                | 42        | 1        | 82         | 37                         | 182       | 0    | 219        | 117                        | 36        | 1        | 154        | 455        |
| % App. Total   | 47.6                              | 51.2      | 1.2      |            | 16.9                       | 83.1      | 0    |            | 76                         | 23.4      | 0.6      |            |            |
| PHF  | .813                              | .955      | .250     | .891       | .771                       | .929      | .000 | .944       | .836                       | .750      | .250     | .895       | .917       |
| Cars   | 39                                | 42        | 0        | 81         | 37                         | 180       | 0    | 217        | 114                        | 36        | 0        | 150        | 448        |
| % Cars   | 100                               | 100       | 0        | 98.8       | 100                        | 98.9      | 0    | 99.1       | 97.4                       | 100       | 0        | 97.4       | 98.5       |
| Buses  | 0                                 | 0         | 1        | 1          | 0                          | 0         | 0    | 0          | 1                          | 0         | 1        | 2          | 3          |
| % Buses  | 0                                 | 0         | 100      | 1.2        | 0                          | 0         | 0    | 0          | 0.9                        | 0         | 100      | 1.3        | 0.7        |
| Trucks   | 0                                 | 0         | 0        | 0          | 0                          | 2         | 0    | 2          | 2                          | 0         | 0        | 2          | 4          |
| % Trucks   | 0                                 | 0         | 0        | 0          | 0                          | 1.1       | 0    | 0.9        | 1.7                        | 0         | 0        | 1.3        | 0.9        |

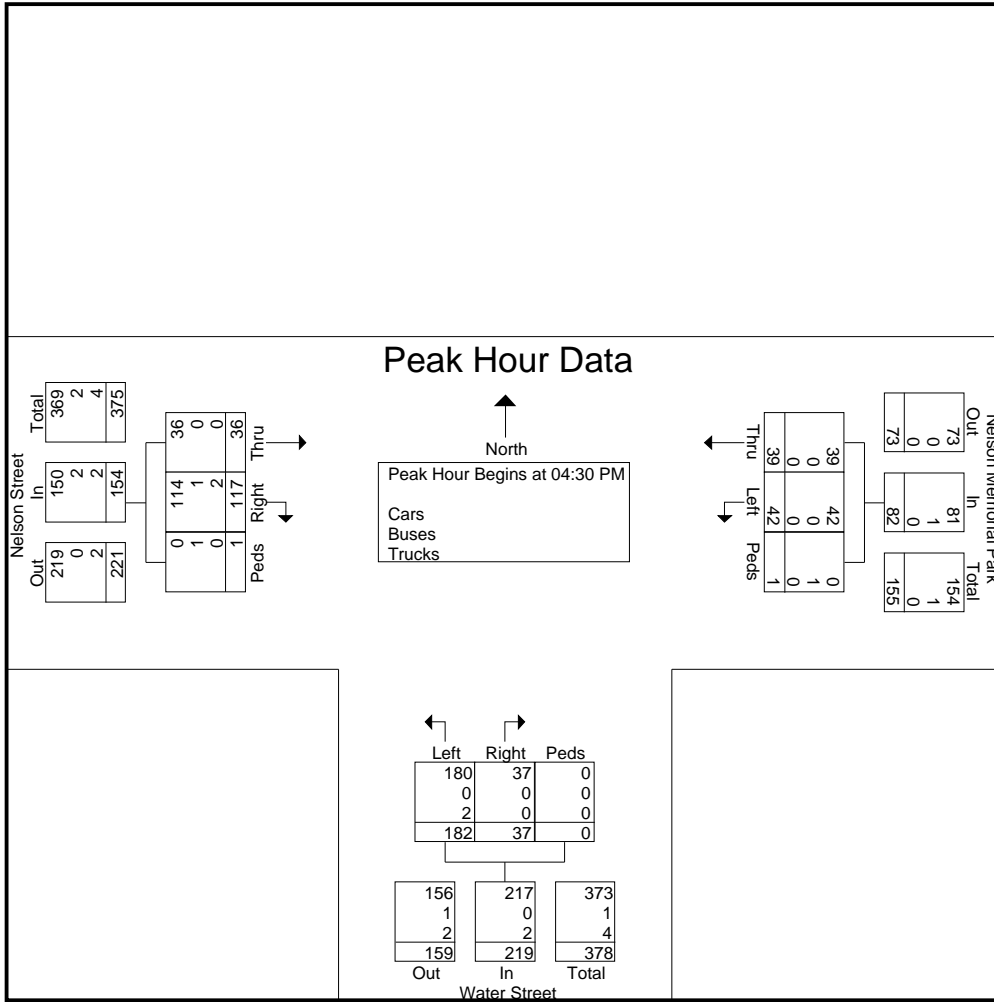


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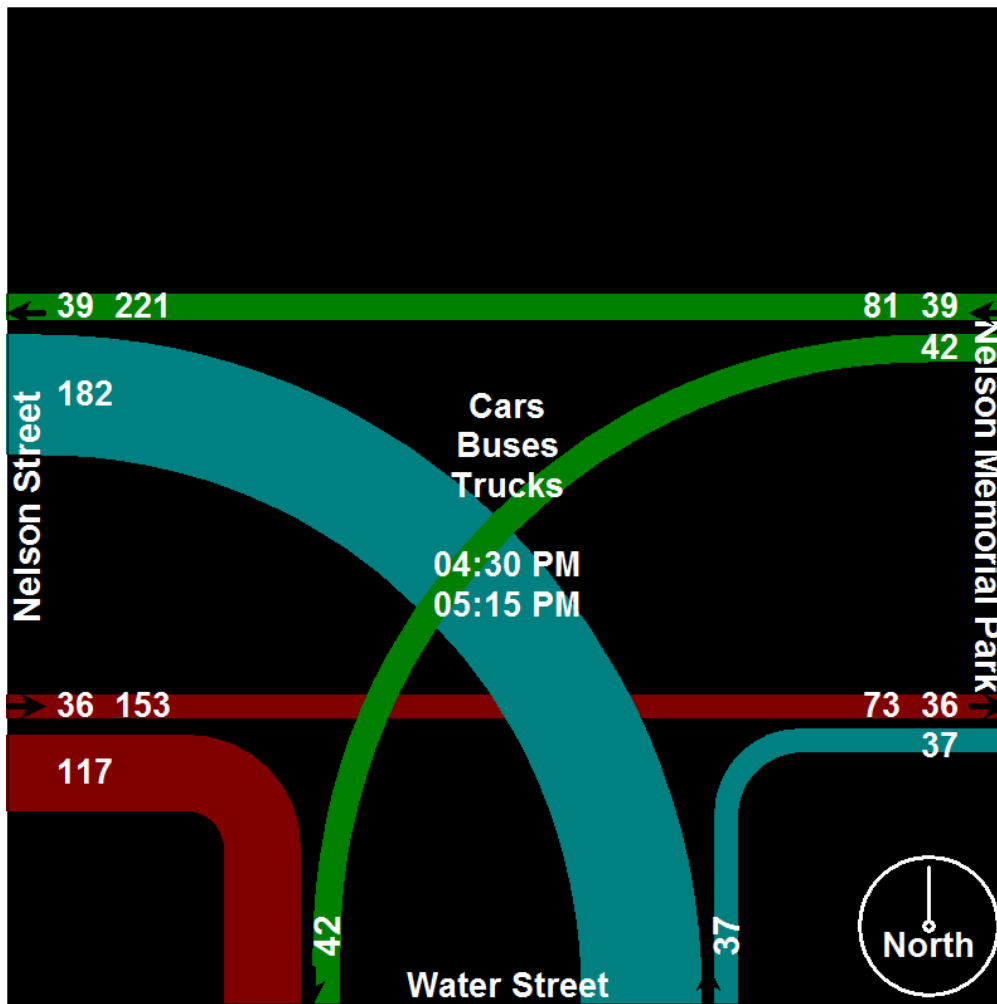


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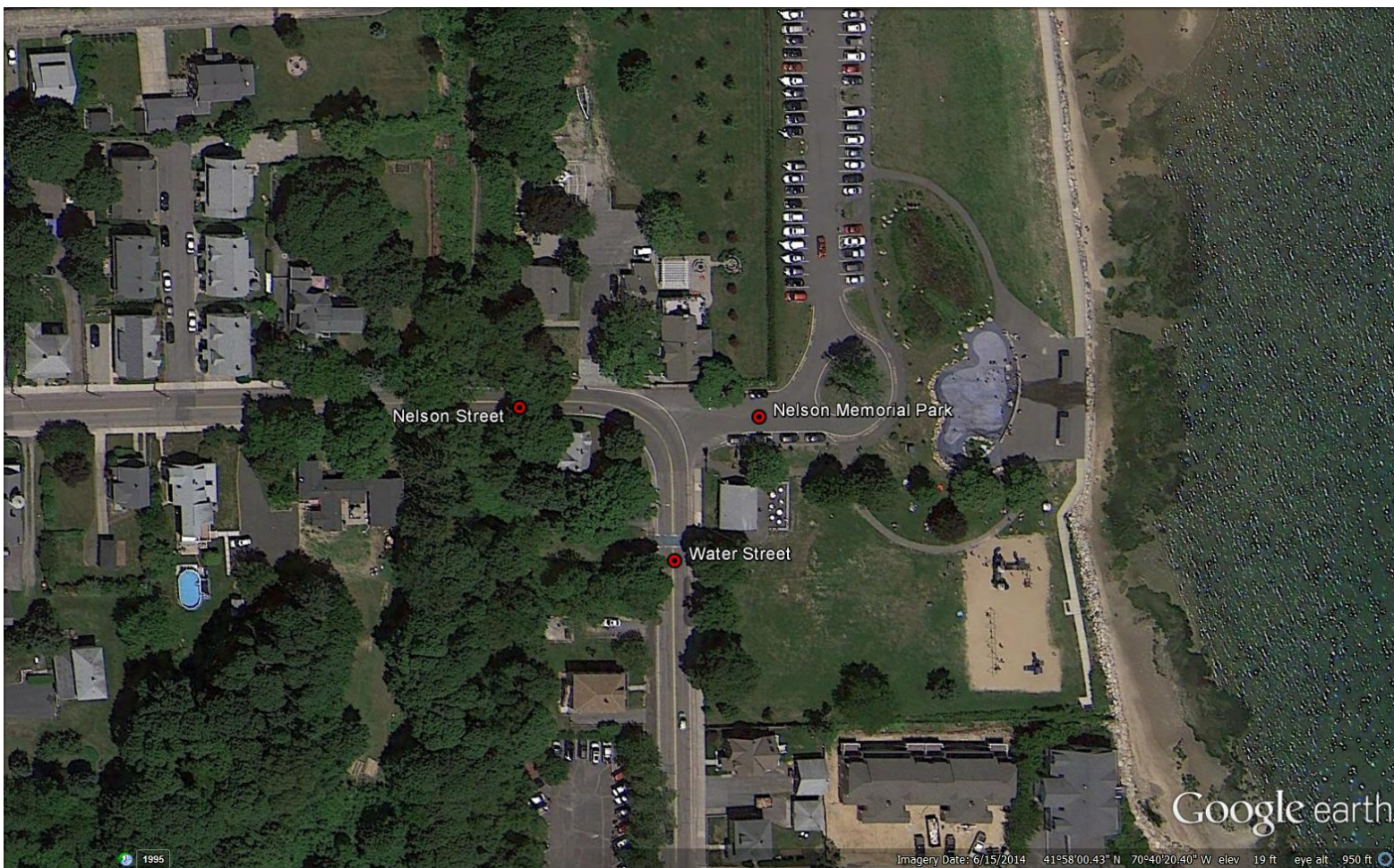
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Image 1



Appendix D  
Level of Service

HCM Unsignalized Intersection Capacity Analysis  
 2: Nelson Memorial Park & Water Street

2014 AM Existing Conditions



| Movement               | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------|------|------|------|------|------|------|
| Lane Configurations    | ↔    |      | ↔    |      | ↔    |      |
| Sign Control           | Stop |      | Free |      | Free |      |
| Grade                  | 0%   |      | 0%   |      | 0%   |      |
| Volume (veh/h)         | 19   | 23   | 126  | 18   | 102  | 27   |
| Peak Hour Factor       | 0.66 | 0.66 | 0.82 | 0.82 | 0.69 | 0.69 |
| Hourly flow rate (vph) | 29   | 35   | 154  | 22   | 148  | 39   |
| Pedestrians            |      |      | 4    |      |      |      |
| Lane Width (ft)        |      |      | 12.0 |      |      |      |
| Walking Speed (ft/s)   |      |      | 4.0  |      |      |      |
| Percent Blockage       |      |      | 0    |      |      |      |
| Right turn flare (veh) |      |      |      |      |      |      |
| Median type            | None |      |      |      |      |      |
| Median storage (veh)   |      |      |      |      |      |      |
| Upstream signal (ft)   |      |      |      |      |      |      |
| pX, platoon unblocked  |      |      |      |      |      |      |
| vC, conflicting volume | 503  | 165  |      |      | 176  |      |
| vC1, stage 1 conf vol  |      |      |      |      |      |      |
| vC2, stage 2 conf vol  |      |      |      |      |      |      |
| vCu, unblocked vol     | 503  | 165  |      |      | 176  |      |
| tC, single (s)         | 6.4  | 6.2  |      |      | 4.1  |      |
| tC, 2 stage (s)        |      |      |      |      |      |      |
| tF (s)                 | 3.5  | 3.3  |      |      | 2.2  |      |
| p0 queue free %        | 94   | 96   |      |      | 89   |      |
| cM capacity (veh/h)    | 474  | 885  |      |      | 1401 |      |

| Direction, Lane #      | WB 1 | NB 1 | SB 1 |
|------------------------|------|------|------|
| Volume Total           | 64   | 176  | 187  |
| Volume Left            | 29   | 0    | 148  |
| Volume Right           | 35   | 22   | 0    |
| cSH                    | 636  | 1700 | 1401 |
| Volume to Capacity     | 0.10 | 0.10 | 0.11 |
| Queue Length 95th (ft) | 8    | 0    | 9    |
| Control Delay (s)      | 11.3 | 0.0  | 6.4  |
| Lane LOS               | B    |      | A    |
| Approach Delay (s)     | 11.3 | 0.0  | 6.4  |
| Approach LOS           | B    |      |      |

| Intersection Summary              |       |                      |     |
|-----------------------------------|-------|----------------------|-----|
| Average Delay                     |       |                      | 4.5 |
| Intersection Capacity Utilization | 28.1% | ICU Level of Service | A   |
| Analysis Period (min)             |       |                      | 15  |

HCM Unsignalized Intersection Capacity Analysis  
 2: Nelson Memorial Park & Water Street

2014 PM Existing Conditions



| Movement               | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------|------|------|------|------|------|------|
| Lane Configurations    |      |      |      |      |      |      |
| Sign Control           | Stop |      | Free |      |      | Free |
| Grade                  | 0%   |      | 0%   |      |      | 0%   |
| Volume (veh/h)         | 42   | 39   | 182  | 37   | 117  | 36   |
| Peak Hour Factor       | 0.89 | 0.89 | 0.94 | 0.94 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 47   | 44   | 194  | 39   | 130  | 40   |
| Pedestrians            |      |      |      |      |      | 1    |
| Lane Width (ft)        |      |      |      |      |      | 12.0 |
| Walking Speed (ft/s)   |      |      |      |      |      | 4.0  |
| Percent Blockage       |      |      |      |      |      | 0    |
| Right turn flare (veh) |      |      |      |      |      |      |
| Median type            | None |      |      |      |      |      |
| Median storage (veh)   |      |      |      |      |      |      |
| Upstream signal (ft)   |      |      |      |      |      |      |
| pX, platoon unblocked  |      |      |      |      |      |      |
| vC, conflicting volume | 513  | 214  |      |      | 233  |      |
| vC1, stage 1 conf vol  |      |      |      |      |      |      |
| vC2, stage 2 conf vol  |      |      |      |      |      |      |
| vCu, unblocked vol     | 513  | 214  |      |      | 233  |      |
| tC, single (s)         | 6.4  | 6.2  |      |      | 4.1  |      |
| tC, 2 stage (s)        |      |      |      |      |      |      |
| tF (s)                 | 3.5  | 3.3  |      |      | 2.2  |      |
| p0 queue free %        | 90   | 95   |      |      | 90   |      |
| cM capacity (veh/h)    | 474  | 830  |      |      | 1346 |      |

| Direction, Lane #      | WB 1 | NB 1 | SB 1 |
|------------------------|------|------|------|
| Volume Total           | 91   | 233  | 170  |
| Volume Left            | 47   | 0    | 130  |
| Volume Right           | 44   | 39   | 0    |
| cSH                    | 597  | 1700 | 1346 |
| Volume to Capacity     | 0.15 | 0.14 | 0.10 |
| Queue Length 95th (ft) | 13   | 0    | 8    |
| Control Delay (s)      | 12.1 | 0.0  | 6.3  |
| Lane LOS               | B    |      | A    |
| Approach Delay (s)     | 12.1 | 0.0  | 6.3  |
| Approach LOS           | B    |      |      |

| Intersection Summary              |       |                      |   |
|-----------------------------------|-------|----------------------|---|
| Average Delay                     |       | 4.4                  |   |
| Intersection Capacity Utilization | 35.2% | ICU Level of Service | A |
| Analysis Period (min)             |       | 15                   |   |

Appendix E  
Results of All-Way Stop and Traffic Signal Warrant Analyses



# Warrants Summary Report

## 1: Water at Nelson

### Intersection Information:

|                 | Major Street | Minor Street |
|-----------------|--------------|--------------|
| Street Name     | Water Street | Nelson Park  |
| Direction       | EB/NB        | WB           |
| Number of Lanes | 1            | 1            |
| Approach Speed  | 30           | 30           |

| Warrant                                       | Met? | Notes                    |
|---|------|--------------------------|
| <b>Warrant 1, Eight-Hour Vehicular Volume</b> |      |                          |
|   | No   |                          |
| Condition A or B Met?                         | No   | 0 Hours met (8 required) |
| Condition A and B Met?                        | No   | 0 Hours met (8 required) |
| <hr/>   |      |                          |
| <b>Warrant 2, Four-Hour Vehicular Volume</b>  |      |                          |
|   | No   | 0 Hours met (4 required) |
| <hr/>   |      |                          |
| <b>Warrant 3, Peak Hour</b>                   |      |                          |
|   | No   |                          |
| Condition A Met?                              | No   | 0 Hours met (1 required) |
| Condition B Met?                              | No   | 0 Hours met (1 required) |
| <hr/>   |      |                          |
| <b>Warrant 4, Pedestrian Volume</b>           |      |                          |
|   | No   |                          |
| Condition A Met?                              | No   | 0 Hours met (4 required) |
| Condition B Met?                              | No   | 0 Hours met (1 required) |

**Intersection Information:**

|                        | <b>Major Street</b> | <b>Minor Street</b> |
|------------------------|---------------------|---------------------|
| <b>Street Name</b>     | Water Street        | Nelson Park         |
| <b>Direction</b>       | EB/NB               | WB                  |
| <b>Number of Lanes</b> | 1                   | 1                   |
| <b>Approach Speed</b>  | 30                  | 30                  |

| <b>Warrant</b>                                       | <b>Met?</b> | <b>Notes</b>             |
|--|-------------|--------------------------|
| <b>Warrant 5, School Crossing</b>                    | No          |                          |
| <b>Warrant 6, Coordinated Signal System</b>          | No          |                          |
| <b>Warrant 7, Crash Experience</b>                   | No          |                          |
| Traffic Volume Condition?                            | No          | 0 Hours met (8 required) |
| Ped Condition?                                       | No          | 0 Hours met (8 required) |
| <b>Warrant 8, Roadway Network</b>                    | No          |                          |
| <b>Warrant 9, Intersection Near a Grade Crossing</b> | No          |                          |

**Intersection Information:**

|                        | <b>Major Street</b> | <b>Minor Street</b> |
|------------------------|---------------------|---------------------|
| <b>Street Name</b>     | Water Street        | Nelson Park         |
| <b>Direction</b>       | EB/NB               | WB                  |
| <b>Number of Lanes</b> | 1                   | 1                   |
| <b>Approach Speed</b>  | 30                  | 30                  |

| <b>Warrant</b>                                 | <b>Met?</b> | <b>Notes</b> |
|--|-------------|--------------|
| <b>AWSC Warrant, Multiway Stop Application</b> |             |              |
|  | No          |              |
| Condition A Met?                               | No          |              |
| Condition B Met?                               | No          |              |
| Condition C Met?                               | No          |              |

# Warrant 1: Eight-hour Vehicular Volume

## 1: Water at Nelson

### Intersection Information:

|                        |              |
|------------------------|--------------|
| <b>Major Street</b>    | Water Street |
| <b>Major Direction</b> | EB/NB        |
| <b>Minor Direction</b> | WB           |

Warrant 1 Met?

**No**

### Details:

|                        |           |                          |
|------------------------|-----------|--------------------------|
| Condition A or B Met?  | <b>No</b> | 0 Hours met (8 required) |
| Condition A and B Met? | <b>No</b> | 0 Hours met (8 required) |

| Hour           | Major Street Vehicles (total of both approaches) | Condition A                  |                             | Condition B                  |                             | High-volume Minor Approach Vehicles | Condition A                  |                             | Condition B                 |                            | 100% Standard Met? Cond. A OR Cond. B |                         | 80% Standard Met? Cond. A AND Cond. B |                        |
|----------------|--|------------------------------|-----------------------------|------------------------------|-----------------------------|-------------------------------------|------------------------------|-----------------------------|-----------------------------|----------------------------|---------------------------------------|-------------------------|---------------------------------------|------------------------|
|                |  | Volume >= 100% column (500)? | Volume >= 80% column (400)? | Volume >= 100% column (750)? | Volume >= 80% column (600)? |                                     | Volume >= 100% column (150)? | Volume >= 80% column (120)? | Volume >= 100% column (75)? | Volume >= 80% column (60)? | Condition A 100% Column               | Condition B 100% Column | Condition A 80% Column                | Condition B 80% Column |
| 06:00 to 07:00 | 102  | No                           | No                          | No                           | No                          | 25                                  | No                           | No                          | No                          | No                         | No                                    | No                      | No                                    | No                     |
| 06:15 to 07:15 | 117  | No                           | No                          | No                           | No                          | 27                                  | No                           | No                          | No                          | No                         | No                                    | No                      | No                                    | No                     |
| 06:30 to 07:30 | 121  | No                           | No                          | No                           | No                          | 25                                  | No                           | No                          | No                          | No                         | No                                    | No                      | No                                    | No                     |
| 06:45 to 07:45 | 135  | No                           | No                          | No                           | No                          | 19                                  | No                           | No                          | No                          | No                         | No                                    | No                      | No                                    | No                     |
| 07:00 to 08:00 | 142  | No                           | No                          | No                           | No                          | 17                                  | No                           | No                          | No                          | No                         | No                                    | No                      | No                                    | No                     |
| 07:15 to 08:15 | 143  | No                           | No                          | No                           | No                          | 19                                  | No                           | No                          | No                          | No                         | No                                    | No                      | No                                    | No                     |
| 07:30 to 08:30 | 153  | No                           | No                          | No                           | No                          | 15                                  | No                           | No                          | No                          | No                         | No                                    | No                      | No                                    | No                     |
| 07:45 to 08:45 | 154  | No                           | No                          | No                           | No                          | 16                                  | No                           | No                          | No                          | No                         | No                                    | No                      | No                                    | No                     |
| 08:00 to 09:00 | 157  | No                           | No                          | No                           | No                          | 18                                  | No                           | No                          | No                          | No                         | No                                    | No                      | No                                    | No                     |
| 08:15 to 09:15 | 170  | No                           | No                          | No                           | No                          | 13                                  | No                           | No                          | No                          | No                         | No                                    | No                      | No                                    | No                     |

|                |     |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 08:30 to 09:30 | 200 | No | No | No | No | 21 | No | No | No | No | No | No | No | No |
| 08:45 to 09:45 | 211 | No | No | No | No | 25 | No | No | No | No | No | No | No | No |
| 09:00 to 10:00 | 231 | No | No | No | No | 32 | No | No | No | No | No | No | No | No |
| 09:15 to 10:15 | 229 | No | No | No | No | 31 | No | No | No | No | No | No | No | No |
| 09:30 to 10:30 | 226 | No | No | No | No | 32 | No | No | No | No | No | No | No | No |
| 09:45 to 10:45 | 223 | No | No | No | No | 34 | No | No | No | No | No | No | No | No |
| 10:00 to 11:00 | 251 | No | No | No | No | 30 | No | No | No | No | No | No | No | No |
| 10:15 to 11:15 | 244 | No | No | No | No | 37 | No | No | No | No | No | No | No | No |
| 10:30 to 11:30 | 251 | No | No | No | No | 44 | No | No | No | No | No | No | No | No |
| 10:45 to 11:45 | 262 | No | No | No | No | 41 | No | No | No | No | No | No | No | No |
| 11:00 to 12:00 | 268 | No | No | No | No | 42 | No | No | No | No | No | No | No | No |
| 11:15 to 12:15 | 319 | No | No | No | No | 46 | No | No | No | No | No | No | No | No |
| 11:30 to 12:30 | 315 | No | No | No | No | 47 | No | No | No | No | No | No | No | No |
| 11:45 to 12:45 | 345 | No | No | No | No | 54 | No | No | No | No | No | No | No | No |
| 12:00 to 13:00 | 330 | No | No | No | No | 58 | No | No | No | No | No | No | No | No |
| 12:15 to 13:15 | 321 | No | No | No | No | 59 | No | No | No | No | No | No | No | No |
| 12:30 to 13:30 | 332 | No | No | No | No | 56 | No | No | No | No | No | No | No | No |
| 12:45 to 13:45 | 328 | No | No | No | No | 51 | No | No | No | No | No | No | No | No |
| 13:00 to 14:00 | 330 | No | No | No | No | 49 | No | No | No | No | No | No | No | No |
| 13:15 to 14:15 | 337 | No | No | No | No | 53 | No | No | No | No | No | No | No | No |
| 13:30 to 14:30 | 337 | No | No | No | No | 45 | No | No | No | No | No | No | No | No |
| 13:45 to 14:45 | 352 | No | No | No | No | 49 | No | No | No | No | No | No | No | No |
| 14:00 to 15:00 | 367 | No | No | No | No | 54 | No | No | No | No | No | No | No | No |
| 14:15 to 15:15 | 358 | No | No | No | No | 48 | No | No | No | No | No | No | No | No |
| 14:30 to 15:30 | 360 | No | No | No | No | 53 | No | No | No | No | No | No | No | No |
| 14:45 to 15:45 | 335 | No | No | No | No | 53 | No | No | No | No | No | No | No | No |
| 15:00 to 16:00 | 318 | No | No | No | No | 54 | No | No | No | No | No | No | No | No |
| 15:15 to 16:15 | 317 | No | No | No | No | 53 | No | No | No | No | No | No | No | No |

|                |     |    |    |    |    |    |    |    |     |     |    |    |    |    |
|----------------|-----|----|----|----|----|----|----|----|-----|-----|----|----|----|----|
| 15:30 to 16:30 | 309 | No | No | No | No | 59 | No | No | No  | No  | No | No | No | No |
| 15:45 to 16:45 | 327 | No | No | No | No | 62 | No | No | No  | Yes | No | No | No | No |
| 16:00 to 17:00 | 341 | No | No | No | No | 66 | No | No | No  | Yes | No | No | No | No |
| 16:15 to 17:15 | 364 | No | No | No | No | 77 | No | No | Yes | Yes | No | No | No | No |
| 16:30 to 17:30 | 372 | No | No | No | No | 81 | No | No | Yes | Yes | No | No | No | No |
| 16:45 to 17:45 | 357 | No | No | No | No | 85 | No | No | Yes | Yes | No | No | No | No |
| 17:00 to 18:00 | 337 | No | No | No | No | 81 | No | No | Yes | Yes | No | No | No | No |
| 17:15 to 18:15 | 321 | No | No | No | No | 76 | No | No | Yes | Yes | No | No | No | No |
| 17:30 to 18:30 | 335 | No | No | No | No | 72 | No | No | No  | Yes | No | No | No | No |
| 17:45 to 18:45 | 344 | No | No | No | No | 68 | No | No | No  | Yes | No | No | No | No |
| 18:00 to 19:00 | 349 | No | No | No | No | 66 | No | No | No  | Yes | No | No | No | No |
| 18:15 to 19:15 | 264 | No | No | No | No | 48 | No | No | No  | No  | No | No | No | No |
| 18:30 to 19:30 | 166 | No | No | No | No | 31 | No | No | No  | No  | No | No | No | No |
| 18:45 to 19:45 | 76  | No | No | No | No | 16 | No | No | No  | No  | No | No | No | No |

# Warrant 2: Four-hour Vehicular Volume

## 1: Water at Nelson

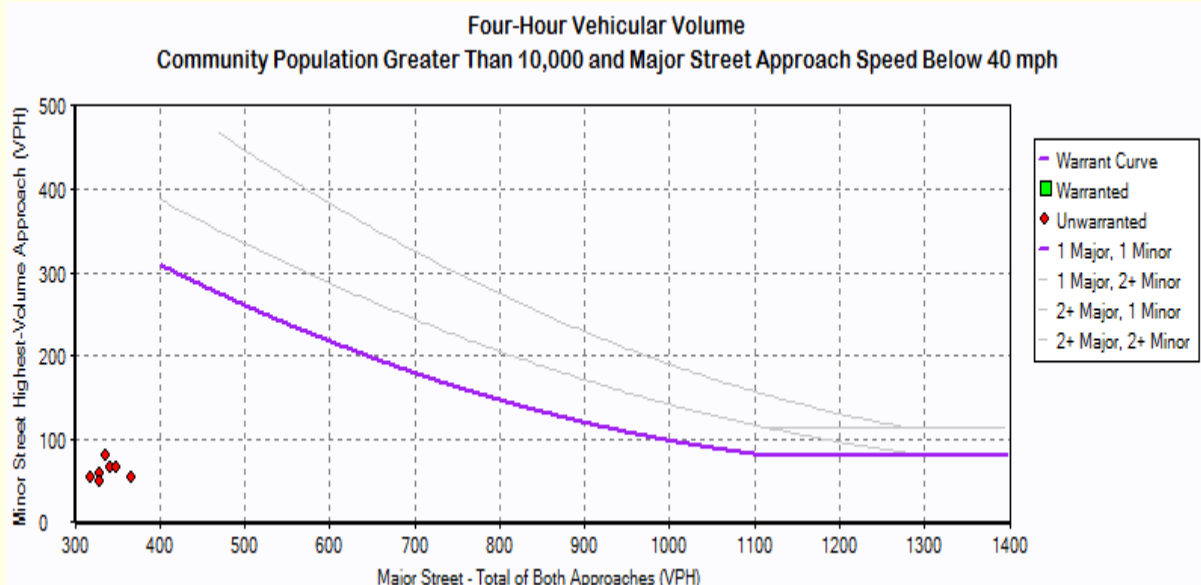
### Intersection Information

|                 | Major Street | Minor Street |
|-----------------|--------------|--------------|
| Street Name     | Water Street | Nelson Park  |
| Direction       | EB/NB        | WB           |
| Number of Lanes | 1            | 1            |
| Approach Speed  | 30           | 30           |

Warrant 2 Met? **No**

### Details:

|                 |                          |
|-----------------|--------------------------|
| Notes:          | 0 Hours met (4 required) |
| Low Population? | <b>No</b>                |



| Hourly Volumes      |   |  |
|---------------------|---|--|
| Hour                | Major Street Total of both approaches (VPH) | Minor Street Highest volume approach (VPH) |
| 00:00:00 - 01:00:00 | 0.00  | 0.00                                       |
| 01:00:00 - 02:00:00 | 0.00  | 0.00                                       |
| 02:00:00 - 03:00:00 | 0.00  | 0.00                                       |
| 03:00:00 - 04:00:00 | 0.00  | 0.00                                       |
| 04:00:00 - 05:00:00 | 0.00  | 0.00                                       |
| 05:00:00 - 06:00:00 | 0.00  | 0.00                                       |
| 06:00:00 - 07:00:00 | 102.00                                      | 25.00                                      |
| 07:00:00 - 08:00:00 | 142.00                                      | 17.00                                      |
| 08:00:00 - 09:00:00 | 157.00                                      | 18.00                                      |
| 09:00:00 - 10:00:00 | 231.00                                      | 32.00                                      |
| 10:00:00 - 11:00:00 | 251.00                                      | 30.00                                      |
| 11:00:00 - 12:00:00 | 268.00                                      | 42.00                                      |
| 12:00:00 - 13:00:00 | 330.00                                      | 58.00                                      |
| 13:00:00 - 14:00:00 | 330.00                                      | 49.00                                      |
| 14:00:00 - 15:00:00 | 367.00                                      | 54.00                                      |
| 15:00:00 - 16:00:00 | 318.00                                      | 54.00                                      |
| 16:00:00 - 17:00:00 | 341.00                                      | 66.00                                      |
| 17:00:00 - 18:00:00 | 337.00                                      | 81.00                                      |
| 18:00:00 - 19:00:00 | 349.00                                      | 66.00                                      |
| 19:00:00 - 20:00:00 | 0.00  | 0.00                                       |
| 20:00:00 - 21:00:00 | 0.00  | 0.00                                       |
| 21:00:00 - 22:00:00 | 0.00  | 0.00                                       |
| 22:00:00 - 23:00:00 | 0.00  | 0.00                                       |
| 23:00:00 - 00:00:00 | 0.00  | 0.00                                       |



| <b>Warranted Hours</b> |              |              |
|------------------------|--------------|--------------|
| Hour                   | Major Volume | Minor Volume |
|                        |              |              |

Note: Only data of hours warranted is represented in the above table.

## Warrant 3: Peak Hour 1: Water at Nelson

### Intersection Information:

|                        | Major Street | Minor Street |
|------------------------|--------------|--------------|
| <b>Street Name</b>     | Water Street | Nelson Park  |
| <b>Direction</b>       | EB/NB        | WB           |
| <b>Number of Lanes</b> | 1            | 1            |
| <b>Approach Speed</b>  | 30           | 30           |

Warrant 3 Met? No

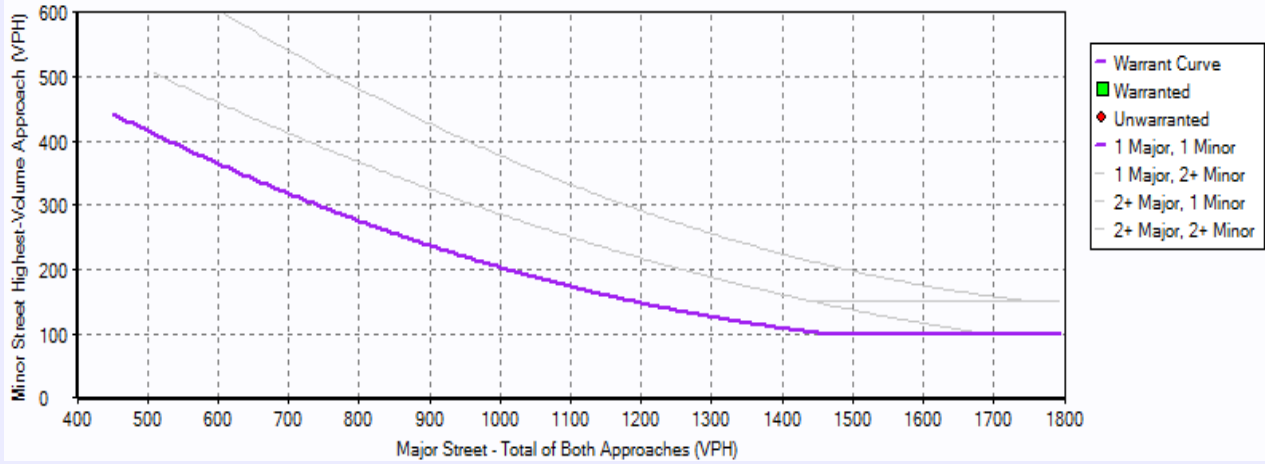
### Details:

|  |  |
|--|--|
| Low Population?                              | <span style="background-color: red; color: white; padding: 2px 10px;">No</span>      |
| Condition A Met?                             | <span style="background-color: red; color: white; padding: 2px 10px;">No</span>      |
| Notes:                                       | 0 Hours met (1 required)   |
| Minor Approach Time Delay Condition          | <span style="background-color: red; color: white; padding: 2px 10px;">Not Met</span> |
| Minor Approach Volume Condition              | <span style="background-color: red; color: white; padding: 2px 10px;">Not Met</span> |
| Total Entering Intersection Volume Condition | <span style="background-color: red; color: white; padding: 2px 10px;">Not Met</span> |
| Condition B Met?                             | <span style="background-color: red; color: white; padding: 2px 10px;">No</span>      |
| Notes:                                       | 0 Hours met (1 required)   |

### Warrant 3

#### Peak Hour Vehicular Volume

Community Population Greater Than 10,000 and Major Street Approach Speed Below 40 mph



Note: Please turn over for volume information.

Warranted / Unwarranted

| Hour  | Major Street Total of both approaches (VPH) | Minor Street Highest volume approach (VPH) |
|-------|---|--|
| 6:00  | 102   | 25   |
| 7:00  | 142   | 17   |
| 8:00  | 157   | 18   |
| 9:00  | 231   | 32   |
| 10:00 | 251   | 30   |
| 11:00 | 268   | 42   |
| 12:00 | 330   | 58   |
| 13:00 | 330   | 49   |
| 14:00 | 367   | 54   |
| 15:00 | 318   | 54   |
| 16:00 | 341   | 66   |
| 17:00 | 337   | 81   |
| 18:00 | 349   | 66   |

Federal 2009

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9/17/2014

Federal 2009

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## Warrant 4: Pedestrian Volume 1: Water at Nelson

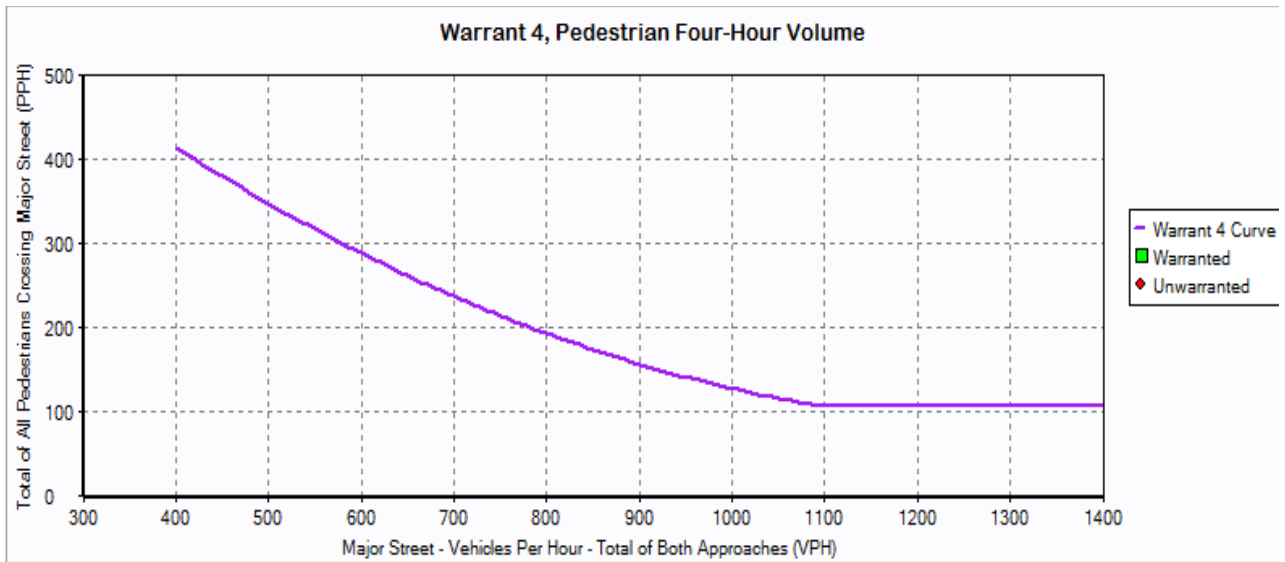
**Intersection Information:**

|                        | Major Street | Minor Street |
|------------------------|--------------|--------------|
| <b>Street Name</b>     | Water Street | Nelson Park  |
| <b>Direction</b>       | EB/NB        | WB           |
| <b>Number of Lanes</b> | 1            | 1            |
| <b>Approach Speed</b>  | 30           | 30           |

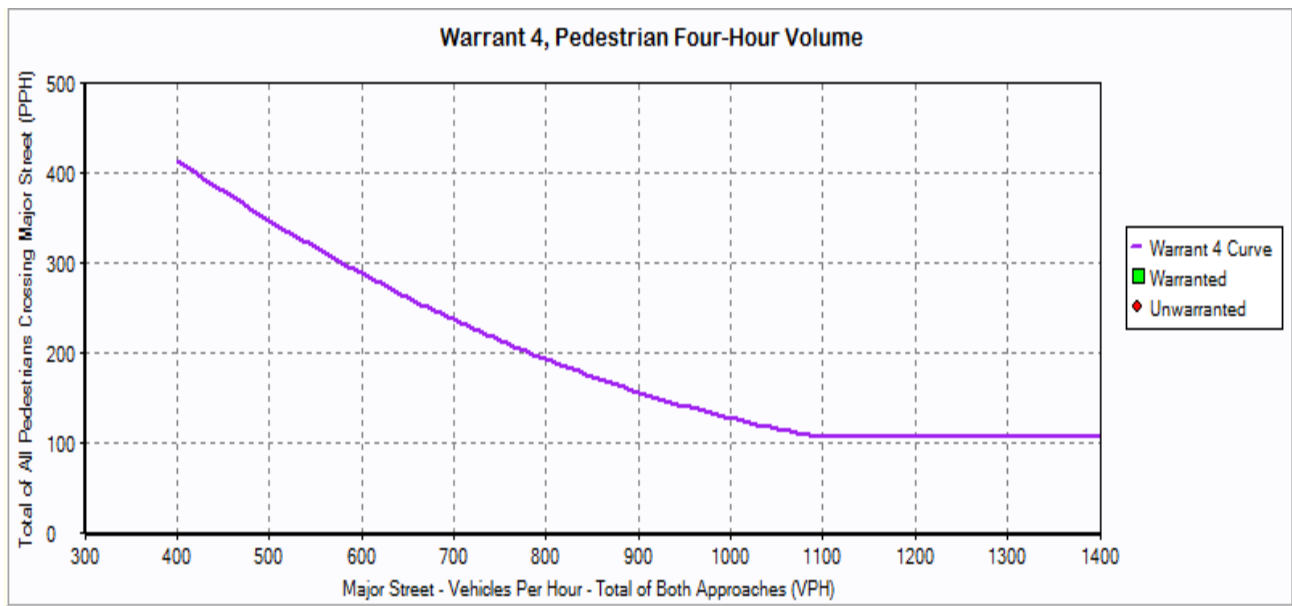
Warrant 4 Met? No

**Details:**

|   |  |
|---|--|
| Pedestrian Four-Hour Volume Warrant met?  | <span style="background-color: #FF0000; color: white; padding: 2px 10px; font-weight: bold;">No</span> |
| Pedestrian Peak Hour Warrant Met?   | <span style="background-color: #FF0000; color: white; padding: 2px 10px; font-weight: bold;">No</span> |
| Notes:  | 0 Hours met (4 required)   |
| Speed limit or 85th-percentile speed on the major street > 35 mph, or intersection lies within an isolated community with population < 10,000 | <span style="background-color: #FF0000; color: white; padding: 2px 10px; font-weight: bold;">No</span> |



| <b>Warranted / Unwarranted</b> |                                   |   |
|--------------------------------|-----------------------------------|---|
| Hour                           | Major Street Vehicle Volume (VPH) | Volume of Pedestrians Crossing Major Street (VPH) |
|                                |                                   |   |



| Pedestrian Peak Hour |                  |                   |
|----------------------|------------------|-------------------|
| Hour                 | Vehicular Volume | Pedestrian Volume |
| N/A                  | N/A              | N/A               |

## Warrant 5: School Crossing

### 1: Water at Nelson

#### Intersection Information:

|                          |              |
|--------------------------|--------------|
| <b>Major Street Name</b> | Water Street |
| <b>Major Direction</b>   | EB/NB        |

Warrant 5 Met? **No**

#### Details:

|  |           |
|--|-----------|
| Time Period Interval for Students Crossing (min) | <b>0</b>  |
| Number of Students Crossing in Time Period       | <b>0</b>  |
| Number of Adequate Gaps in Time Period           | <b>0</b>  |
| Other Remedial Measures Attempted?               | <b>No</b> |
| Adjacent Signal on EB approach?                  | <b>No</b> |
| Distance to signal on EB Approach (ft)           | -         |
| Adjacent Signal on NB approach?                  | <b>No</b> |
| Distance to signal on NB Approach (ft)           | -         |
| Will New Signal Restrict Progressive Traffic?    | <b>No</b> |



## Warrant 6: Coordinated Signal System 1: Water at Nelson

**Intersection Information:**

|                          |              |
|--------------------------|--------------|
| <b>Major Street Name</b> | Water Street |
| <b>Major Direction</b>   | EB/NB        |

Warrant 6 Met? No

**Details:**

| Approach<br>Dir/Name        | Acceptable<br>Platooning? | Adjacent Coordinating<br>Signal? | Adjacent Intersection<br>Distance |
|-----------------------------|---------------------------|----------------------------------|-----------------------------------|
| <hr/>                       |                           |                                  |                                   |
| EB Approach (Nelson Street) | Yes                       | No                               | N/A                               |
| <hr/>                       |                           |                                  |                                   |
| WB Approach (Nelson Park)   | Yes                       | No                               | N/A                               |
| <hr/>                       |                           |                                  |                                   |
| NB Approach (Water Street)  | Yes                       | No                               | N/A                               |

**Unacceptable Platooning?**  
(At least one approach)  

---

**No**

**Distance to Closest Signal**  
(Must be N/A or >= 1000)  

---

**N/A**

# Warrant 7: Crash Experience

## 1: Water at Nelson

### Intersection Information:

|                          |              |
|--------------------------|--------------|
| <b>Major Street Name</b> | Water Street |
| <b>Major Direction</b>   | EB/NB        |
| <b>Minor Direction</b>   | WB           |

Warrant 7 Met? No

### Details:

|   |
|---|
| Low Population? <b>No</b><br>Major Street Speed Limit <b>30</b><br>Major Street 85th-Percentile Speed <b>0.00</b>   |
| Qualifying Crashes <b>0</b><br>Adequate Alternative Trials? <b>No</b><br>Traffic Volume Condition Met? <b>No</b> 0 Hours Met (8 Required)<br>Ped Volume Condition Met? <b>No</b> 0 Hours Met (8 Required) |

| Hour           | Traffic Volumes       |                       |                             |             | Pedestrian Volumes    |       |      |       |
|----------------|-----------------------|-----------------------|-----------------------------|-------------|-----------------------|-------|------|-------|
|                | Major Street Vehicles | Minor Street Vehicles | 80% Standard Met?<br>A OR B |             | Westbound Ped Volumes |       |      |       |
|                |                       |                       | Condition A                 | Condition B | Peds                  | > 80? | Peds | > 80? |
| 06:00 to 07:00 | 102                   | 0                     | No                          | No          | 0                     | No    | 0    | No    |
| 06:15 to 07:15 | 117                   | 0                     | No                          | No          | 0                     | No    | 0    | No    |
| 06:30 to 07:30 | 121                   | 0                     | No                          | No          | 0                     | No    | 0    | No    |
| 06:45 to 07:45 | 135                   | 0                     | No                          | No          | 0                     | No    | 0    | No    |
| 07:00 to 08:00 | 142                   | 0                     | No                          | No          | 0                     | No    | 0    | No    |
| 07:15 to 08:15 | 143                   | 0                     | No                          | No          | 0                     | No    | 0    | No    |
| 07:30 to 08:30 | 153                   | 0                     | No                          | No          | 0                     | No    | 0    | No    |
| 07:45 to 08:45 | 154                   | 0                     | No                          | No          | 0                     | No    | 0    | No    |

|                |     |   |    |    |   |    |   |    |
|----------------|-----|---|----|----|---|----|---|----|
| 08:00 to 09:00 | 157 | 0 | No | No | 0 | No | 0 | No |
| 08:15 to 09:15 | 170 | 0 | No | No | 0 | No | 0 | No |
| 08:30 to 09:30 | 200 | 0 | No | No | 0 | No | 0 | No |
| 08:45 to 09:45 | 211 | 0 | No | No | 0 | No | 0 | No |
| 09:00 to 10:00 | 231 | 0 | No | No | 0 | No | 0 | No |
| 09:15 to 10:15 | 229 | 0 | No | No | 0 | No | 0 | No |
| 09:30 to 10:30 | 226 | 0 | No | No | 0 | No | 0 | No |
| 09:45 to 10:45 | 223 | 0 | No | No | 0 | No | 0 | No |
| 10:00 to 11:00 | 251 | 0 | No | No | 0 | No | 0 | No |
| 10:15 to 11:15 | 244 | 0 | No | No | 0 | No | 0 | No |
| 10:30 to 11:30 | 251 | 0 | No | No | 0 | No | 0 | No |
| 10:45 to 11:45 | 262 | 0 | No | No | 0 | No | 0 | No |
| 11:00 to 12:00 | 268 | 0 | No | No | 0 | No | 0 | No |
| 11:15 to 12:15 | 319 | 0 | No | No | 0 | No | 0 | No |
| 11:30 to 12:30 | 315 | 0 | No | No | 0 | No | 0 | No |
| 11:45 to 12:45 | 345 | 0 | No | No | 0 | No | 0 | No |
| 12:00 to 13:00 | 330 | 0 | No | No | 0 | No | 0 | No |
| 12:15 to 13:15 | 321 | 0 | No | No | 0 | No | 0 | No |
| 12:30 to 13:30 | 332 | 0 | No | No | 0 | No | 0 | No |
| 12:45 to 13:45 | 328 | 0 | No | No | 0 | No | 0 | No |
| 13:00 to 14:00 | 330 | 0 | No | No | 0 | No | 0 | No |
| 13:15 to 14:15 | 337 | 0 | No | No | 0 | No | 0 | No |
| 13:30 to 14:30 | 337 | 0 | No | No | 0 | No | 0 | No |
| 13:45 to 14:45 | 352 | 0 | No | No | 0 | No | 0 | No |
| 14:00 to 15:00 | 367 | 0 | No | No | 0 | No | 0 | No |
| 14:15 to 15:15 | 358 | 0 | No | No | 0 | No | 0 | No |
| 14:30 to 15:30 | 360 | 0 | No | No | 0 | No | 0 | No |

|                |     |   |    |    |   |    |   |    |
|----------------|-----|---|----|----|---|----|---|----|
| 14:45 to 15:45 | 335 | 0 | No | No | 0 | No | 0 | No |
| 15:00 to 16:00 | 318 | 0 | No | No | 0 | No | 0 | No |
| 15:15 to 16:15 | 317 | 0 | No | No | 0 | No | 0 | No |
| 15:30 to 16:30 | 309 | 0 | No | No | 0 | No | 0 | No |
| 15:45 to 16:45 | 327 | 0 | No | No | 0 | No | 0 | No |
| 16:00 to 17:00 | 341 | 0 | No | No | 0 | No | 0 | No |
| 16:15 to 17:15 | 364 | 0 | No | No | 0 | No | 0 | No |
| 16:30 to 17:30 | 372 | 0 | No | No | 0 | No | 0 | No |
| 16:45 to 17:45 | 357 | 0 | No | No | 0 | No | 0 | No |
| 17:00 to 18:00 | 337 | 0 | No | No | 0 | No | 0 | No |
| 17:15 to 18:15 | 321 | 0 | No | No | 0 | No | 0 | No |
| 17:30 to 18:30 | 335 | 0 | No | No | 0 | No | 0 | No |
| 17:45 to 18:45 | 344 | 0 | No | No | 0 | No | 0 | No |
| 18:00 to 19:00 | 349 | 0 | No | No | 0 | No | 0 | No |
| 18:15 to 19:15 | 264 | 0 | No | No | 0 | No | 0 | No |
| 18:30 to 19:30 | 166 | 0 | No | No | 0 | No | 0 | No |
| 18:45 to 19:45 | 76  | 0 | No | No | 0 | No | 0 | No |

## Warrant 8: Roadway Network 1: Water at Nelson

**Intersection Information:**

|                          |              |
|--------------------------|--------------|
| <b>Major Street Name</b> | Water Street |
| <b>Major Direction</b>   | EB/NB        |
| <b>Minor Direction</b>   | WB           |

Warrant 8 Met? (A or B) No

**Details:**

| Growth Rates (per year) |       |    |       |    |       |
|-------------------------|-------|----|-------|----|-------|
| NB                      |       | EB |       | WB |       |
| L                       | 0.00% | L  | 0.00% | L  | 0.00% |
| T                       | 0.00% | T  | 0.00% | T  | 0.00% |
| R                       | 0.00% | R  | 0.00% | R  | 0.00% |

| Condition A, Total Entering Volume   | Condition B, Non-normal Business Day |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
|--|--------------------------------------|-----|--------------|------|-------------------------|-----|------------------------------|----|------------------------------|----|------------------------------|----|--|-----------------|--|---------------------|---|----------------------------|---|---------------------------|---|----------------------------|---|---------------------------|---|---------------------------|-------|--------------|------|---------------|--|---------------------|---|----------------------------|---|---------------------------|---|----------------------------|---|---------------------------|---|
| <table style="width: 100%; border-collapse: collapse;"> <tr><td><b>Existing Peak Hour</b></td><td style="text-align: right;">453</td></tr> <tr><td><b>Years</b></td><td style="text-align: right;">0.00</td></tr> <tr><td><b>Future Peak Hour</b></td><td style="text-align: right;">453</td></tr> <tr><td><b>Warrant 1 in 5 Years?</b></td><td style="text-align: right;">No</td></tr> <tr><td><b>Warrant 2 in 5 Years?</b></td><td style="text-align: right;">No</td></tr> <tr><td><b>Warrant 3 in 5 Years?</b></td><td style="text-align: right;">No</td></tr> </table> | <b>Existing Peak Hour</b>            | 453 | <b>Years</b> | 0.00 | <b>Future Peak Hour</b> | 453 | <b>Warrant 1 in 5 Years?</b> | No | <b>Warrant 2 in 5 Years?</b> | No | <b>Warrant 3 in 5 Years?</b> | No | <table style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2"><u>Existing</u></td></tr> <tr><td><b>Highest Hour</b></td><td style="text-align: right;">0</td></tr> <tr><td><b>Second Highest Hour</b></td><td style="text-align: right;">0</td></tr> <tr><td><b>Third Highest Hour</b></td><td style="text-align: right;">0</td></tr> <tr><td><b>Fourth Highest Hour</b></td><td style="text-align: right;">0</td></tr> <tr><td><b>Fifth Highest Hour</b></td><td style="text-align: right;">0</td></tr> <tr><td><b>Yearly Growth Rate</b></td><td style="text-align: right;">0.00%</td></tr> <tr><td><b>Years</b></td><td style="text-align: right;">0.00</td></tr> <tr><td colspan="2"><u>Future</u></td></tr> <tr><td><b>Highest Hour</b></td><td style="text-align: right;">0</td></tr> <tr><td><b>Second Highest Hour</b></td><td style="text-align: right;">0</td></tr> <tr><td><b>Third Highest Hour</b></td><td style="text-align: right;">0</td></tr> <tr><td><b>Fourth Highest Hour</b></td><td style="text-align: right;">0</td></tr> <tr><td><b>Fifth Highest Hour</b></td><td style="text-align: right;">0</td></tr> </table> | <u>Existing</u> |  | <b>Highest Hour</b> | 0 | <b>Second Highest Hour</b> | 0 | <b>Third Highest Hour</b> | 0 | <b>Fourth Highest Hour</b> | 0 | <b>Fifth Highest Hour</b> | 0 | <b>Yearly Growth Rate</b> | 0.00% | <b>Years</b> | 0.00 | <u>Future</u> |  | <b>Highest Hour</b> | 0 | <b>Second Highest Hour</b> | 0 | <b>Third Highest Hour</b> | 0 | <b>Fourth Highest Hour</b> | 0 | <b>Fifth Highest Hour</b> | 0 |
| <b>Existing Peak Hour</b>  | 453                                  |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Years</b>   | 0.00                                 |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Future Peak Hour</b>  | 453                                  |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Warrant 1 in 5 Years?</b>   | No                                   |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Warrant 2 in 5 Years?</b>   | No                                   |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Warrant 3 in 5 Years?</b>   | No                                   |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <u>Existing</u>  |                                      |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Highest Hour</b>  | 0                                    |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Second Highest Hour</b>   | 0                                    |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Third Highest Hour</b>  | 0                                    |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Fourth Highest Hour</b>   | 0                                    |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Fifth Highest Hour</b>  | 0                                    |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Yearly Growth Rate</b>  | 0.00%                                |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Years</b>   | 0.00                                 |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <u>Future</u>  |                                      |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Highest Hour</b>  | 0                                    |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Second Highest Hour</b>   | 0                                    |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Third Highest Hour</b>  | 0                                    |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Fourth Highest Hour</b>   | 0                                    |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |
| <b>Fifth Highest Hour</b>  | 0                                    |     |              |      |                         |     |                              |    |                              |    |                              |    |  |                 |  |                     |   |                            |   |                           |   |                            |   |                           |   |                           |       |              |      |               |  |                     |   |                            |   |                           |   |                            |   |                           |   |

Condition A Met? No

Condition B Met? No

## Warrant 9: Intersection Near a Grade Crossing 1: Water at Nelson

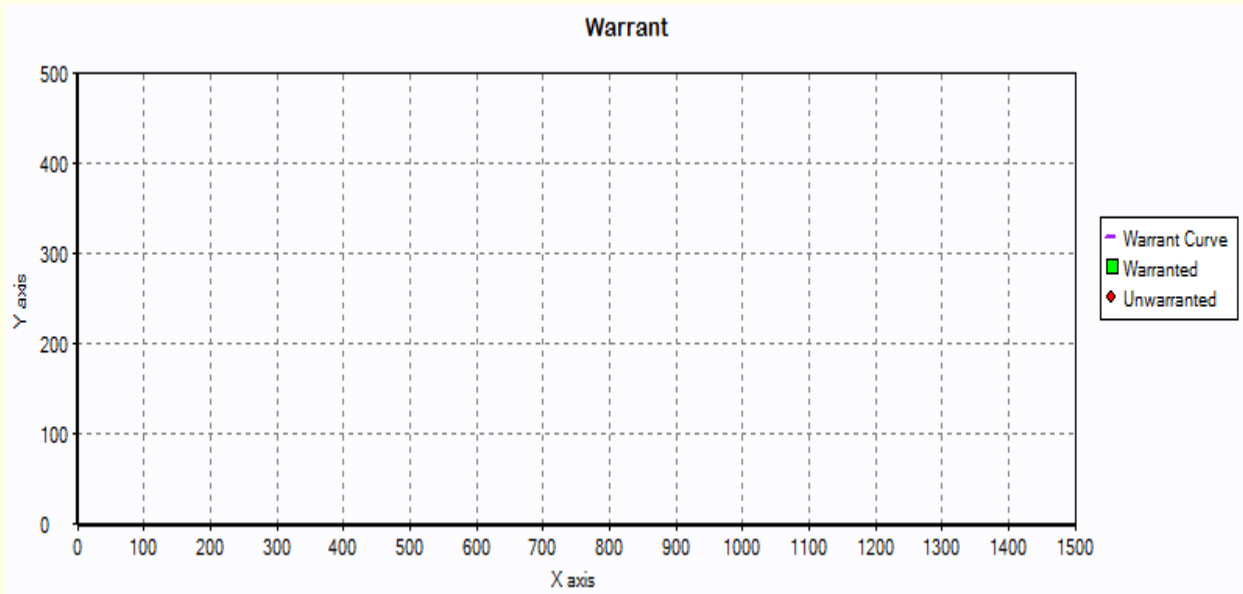
### Intersection Information:

|                        | Major Street | Minor Street |
|------------------------|--------------|--------------|
| <b>Street Name</b>     | Water Street | Nelson Park  |
| <b>Direction</b>       | EB/NB        | WB           |
| <b>Number of Lanes</b> | 1            | 1            |
| <b>Approach Speed</b>  | 30           | 30           |

Warrant 9 Met? No

### Details:

|  |                     |
|--|---------------------|
| Note: No approach with a railroad grade crossing   |                     |
| Minor-street approach having a grade crossing  |                     |
| Distance from the center of the track to the stop or yield line                                | interpolated        |
| Number of occurrences of rail traffic per day  | Adjustment factor   |
| Percentage of high-occupancy buses crossing the track  | % Adjustment factor |
| Percentage of tractor-trailer trucks crossing the track  | % Adjustment factor |
| The rail traffic arrival times are unknown, the highest traffic volume hour of the day is used |                     |



| <b>Warranted / Unwarranted</b> |  |   |
|--------------------------------|--|---|
| <b>Hour</b>                    | <b>Major Street Total of Both Approaches (VPH)</b> | <b>Adjusted Volume of Minor Approach Crossing the Track (VPH)</b> |
|                                |  |   |



## All-Way Stop Control Warrant : Multiway Stop Applications 1: Water at Nelson

### Intersection Information:

|                          |              |
|--------------------------|--------------|
| <b>Major Street Name</b> | Water Street |
| <b>Major Direction</b>   | EB/NB        |
| <b>Minor Direction</b>   | WB           |

AWSC Warrant Met? **No**

### Details:

|                  |                                    |
|------------------|------------------------------------|
| Condition A Met? | <b>No</b>                          |
| Condition B Met? | <b>No</b>                          |
| Condition C Met? | <b>No</b> 0 Hours Met (8 Required) |

|                                    |      |
|------------------------------------|------|
| Qualifying Crashes                 | 0    |
| Major Street 85th-Percentile Speed | 0.00 |
| Major Street Speed Limit           | 30   |

| Hour | Traffic Volumes       |                       | Bicycle Volumes           | Ped Volumes               | Condition C                   |                                 |             |
|------|-----------------------|-----------------------|---------------------------|---------------------------|-------------------------------|---------------------------------|-------------|
|      | Major Street Vehicles | Minor Street Vehicles | Westbound Bicycle Volumes | Westbound Bicycle Volumes | Major Street                  | Minor Street                    |             |
|      |                       |                       |                           |                           | (Total Vehicle Volume) >= 210 | Avg(Veh + Ped + Bicycle) >= 200 | Delay >= 30 |
|      |                       |                       |                           |                           |                               |                                 |             |