

# Appendix E – Transportation Information

This section includes the following:

- Bicycle/Pedestrian access information requested by the City as a result of the Pre-Application meeting in May, 2016
- A Traffic Impact Study performed by Maine Traffic Resources in June, 2016

## Hall School Bicycle/Pedestrian Access Breakdown

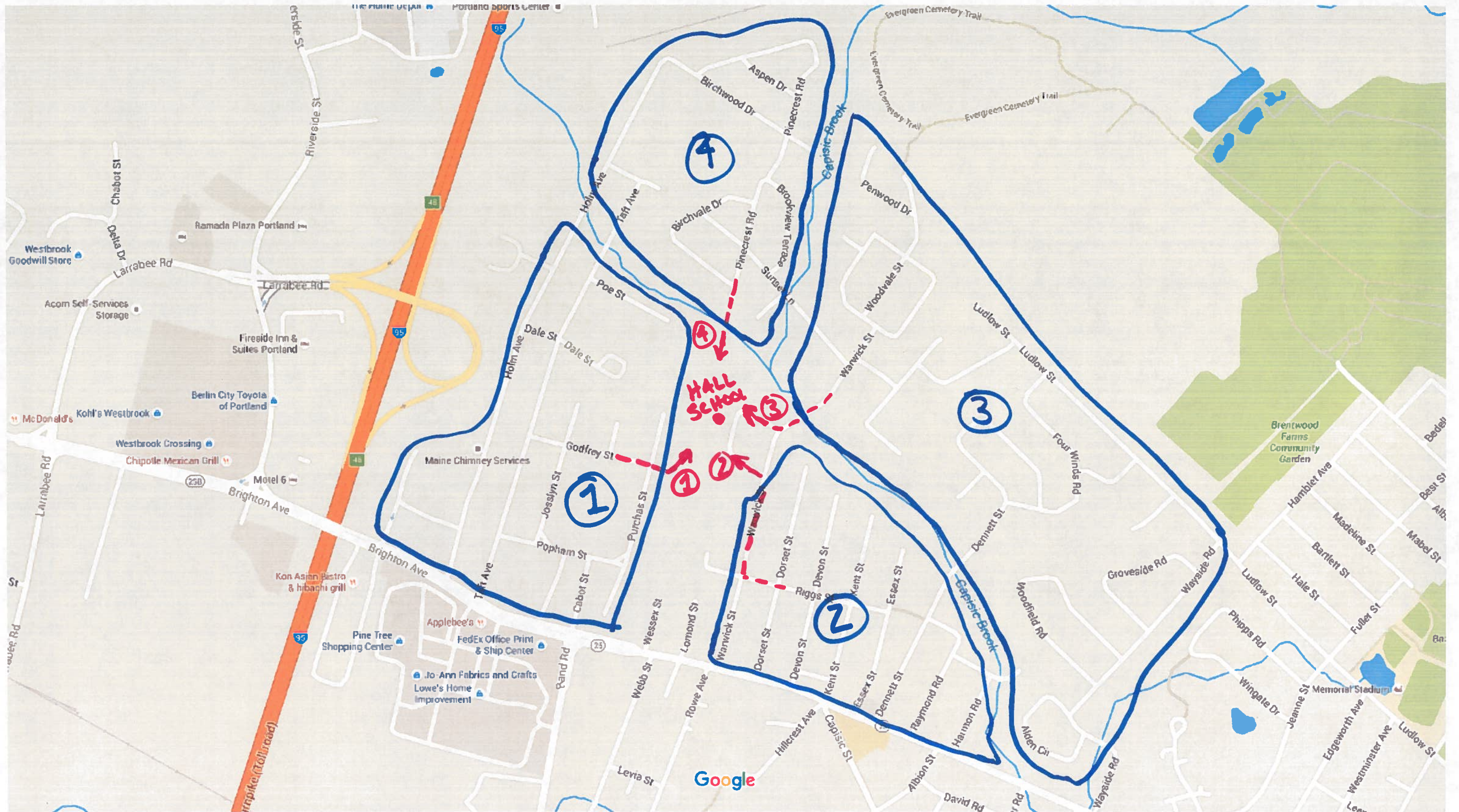
Data Below is existing usage based on interviews with Hall School Staff in Fall, 2015 and Spring, 2016.  
 Percentages are not anticipated to change after construction is completed

| <b>Bicycle Access</b>                 |                         |                                 |
|---------------------------------------|-------------------------|---------------------------------|
| Access Point/Area (see plans)         | Percentage of Bicycling | Percentage of Total Population* |
| 1 - Sagamore Village/Godfrey Street   | 10%                     | 0.60%                           |
| 2 - Orono Road (Warwick Street South) | 75%                     | 4.50%                           |
| 3 - Warwick Street North              | 7.5%                    | 0.45%                           |
| 4 - Pinecrest Road                    | 7.5%                    | 0.45%                           |

\*6% of total population rides bicycle to school

| <b>Pedestrian Access</b>              |                           |                                  |
|---------------------------------------|---------------------------|----------------------------------|
| Access Point/Area (see plans)         | Percentage of Pedestrians | Percentage of Total Population** |
| 1 - Sagamore Village/Godfrey Street   | 65%                       | 11.70%                           |
| 2 - Orono Road (Warwick Street South) | 20%                       | 3.60%                            |
| 3 - Warwick Street North              | 7.5%                      | 1.35%                            |
| 4 - Pinecrest Road                    | 7.5%                      | 1.35%                            |

\*\*18% of total population walks to school



HALL SCHOOL  
BICYCLE / PEDESTRIAN  
ACCESS POINTS  
JUNE, 2016      ↑ N

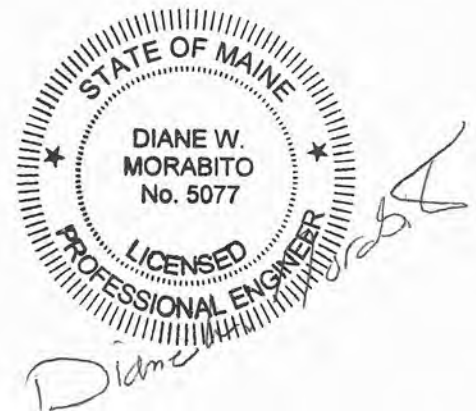


**TRAFFIC IMPACT STUDY  
FRED P. HALL ELEMENTARY SCHOOL  
Portland, Maine**

**June 21, 2016**

**Prepared for:**

**Oak Point Associates  
231 Main Street  
Biddeford, ME 04005**



**Prepared by:**

**Maine  
Traffic  
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## **Introduction**

The purpose of this study is to assess the traffic impacts of the proposed expansion/replacement of the Fred P. Hall Elementary School on Orono Road in Portland, Maine. The site is located on the westerly side of Orono Road, off of Warwick Street, as shown on the map in Figure 1. Access to the site is proposed to be provided by the existing Orono Road exit, which will become entrance only for parent drop-offs destined from the north and an entrance/exit for buses. In addition, a full movement drive is proposed from Riggs Street, along an extension of Lomond Street. A copy of the current site plan is including in the appendix for reference.

The existing Hall Elementary School currently provides for 440 students. The expanded new school will provide for a larger student population of 558. The proposed school is expected to be ready for occupancy in fall 2018. For this reason, 2018 was used as the study year for traffic analysis purposes.

## **Existing Traffic Volumes**

Turning movement counts were conducted by Maine Traffic Resources at the Warwick Street intersections of Orono Road, Brighton Avenue and Riggs Street. The Orono Road count was conducted on November 3, 2015 from 8:00 – 9:00 AM. The Brighton Avenue count was conducted on April 18, 2016 during the AM peak hour period, with the peak hour occurring from 7:45 – 8:45 AM. The Riggs Street count was conducted on June 14, 2016 and the peak hour occurred from 7:45 – 8:45 AM. The count summaries are included in the appendix of this report. The counts were factored, as necessary, using published MaineDOT group mean factors to peak school conditions. The results are expected to be representative of peak school volumes in mid-June or early September. The existing 2016 volumes for both the AM and PM peak hour are shown in Figure 2.

Existing average annual daily traffic (AADT) data for the vicinity of the school campus was obtained from "Traffic Volume Counts, 2014, 2009 and 2006 Annual Reports", published by the Maine Department of Transportation (MaineDOT). The data is summarized below:

| <u>Location</u>                      | <b>Average Annual Daily Traffic</b> |             |             |             |             |             |
|--------------------------------------|-------------------------------------|-------------|-------------|-------------|-------------|-------------|
|                                      | <u>2002</u>                         | <u>2005</u> | <u>2007</u> | <u>2009</u> | <u>2010</u> | <u>2013</u> |
| Brighton Avenue, NW/O Devon Street   | 29,170                              | 24,600      | ---         | ---         | 25,280      | 25,220      |
| Brighton Avenue, NW/O Capisic Street | ---                                 | ---         | ---         | 27,100      | ---         | ---         |
| Brighton Avenue, SE/O Kent Street    | ---                                 | 19,590      | 22,150      | 19,190      | 21,500      | 19,250      |
| Warwick Street, N/O Brighton Avenue  | 2,730                               | ---         | ---         | ---         | ---         | ---         |

As can be seen in the preceding table, traffic volumes on Brighton Avenue in the vicinity of Warwick Street decreased over the long term period 2002 to 2013. Volumes have remained fairly steady over the more recent period 2005 to 2013. To be conservative, a 1% growth rate was used to project 2015 volumes to base 2016 conditions. The existing 2016 volumes were also factored to base 2018 conditions using the same 1% growth rate.

The City of Portland identified one other development project which is expected to impact traffic volumes in the study area, which needs to be considered in the traffic analysis. The Town of Westbrook is reviewing a large development, the Dirigo Plaza mixed-use commercial development. Trip assignments were obtained from the Traffic Impact Study completed by Vanasse & Associates, Inc. dated February 2016 and amended May 2016. Based on the TIS, the development is projected to send approximately 20 % of their total trips to and from the intersection of Brighton Avenue and Warwick Street during the PM peak hour. Trip assignments for the AM peak hour were not provided so MTR applied the same 20 % and assigned them similarly to the study intersections. The resulting 2018 no-build volumes, assuming 1% annual growth, and the including the trips to and from Dirigo Plaza, are shown in Figure 3. Since the school access points will be relocated, the existing school trips were relocated to the new accesses based upon the travel patterns recorded during the traffic counts. The 2018 no-build volumes, with the relocated school driveway trips, are shown in Figure 4.

**Trip Generation**

The number of trips generated by the existing and proposed expanded school was estimated using the Institute of Transportation Engineers (ITE) “Trip Generation, 9<sup>th</sup> Edition”, the newest edition, as well as measured field rates. The 7<sup>th</sup> edition is currently being used by the Maine Department of Transportation (MaineDOT) for traffic permitting purposes but the 9<sup>th</sup> edition provides higher rates for schools which more accurately predict trip-ends for schools in Maine. The trips were estimated using land use code (LUCs) 520 – Elementary School on the basis of 440 (existing) and 558 (proposed) students. The results for the AM and PM peak hours are summarized in the following table:

| <u>Time Period</u> | <b>ITE Trip Generation (one-way trip-ends)</b> |                        |                 |
|--------------------|--|------------------------|-----------------|
|                    | <u>Existing School</u>                         | <u>Proposed School</u> | <u>Increase</u> |
| Weekday            | 568  | 720                    | 152             |
| AM Peak Hour       | 198  | 251                    | 53              |
| Entering           | 109  | 138                    | 29              |
| Exiting            | 89   | 113                    | 24              |

| <u>Time Period</u>    | <u>Existing School</u> | <u>Proposed School</u> | <u>Increase</u> |
|-----------------------|------------------------|------------------------|-----------------|
| PM Peak Hour – School | 123                    | 156                    | 33              |
| Entering              | 55                     | 70                     | 15              |
| Exiting               | 68                     | 86                     | 18              |

As can be seen above, the increase in trip generation for the expanded school with an enlarged student population is expected to be 53 one-way trips during the AM peak hour period and 33 trips during the PM peak hour, based upon the most recent ITE data. Trip generation counts were conducted at the existing school during the AM peak hour to compare to ITE rates. The measured rate was 0.61 trips per student during the AM peak hour compared to the 0.45 ITE rate. As a result, the higher measured trip rate was used to estimate trips for the proposed school expansion and to determine the associated increase in trips from existing conditions. The results are shown in the table:

#### **Measured Trip Generation (one-way trip-ends)**

| <u>Time Period</u> | <u>Measured School</u> | <u>Proposed School</u> | <u>Increase</u> |
|--------------------|------------------------|------------------------|-----------------|
| AM Peak Hour       | 268                    | 340                    | 72              |
| Entering           | 143                    | 180                    | 37              |
| Exiting            | 125                    | 160                    | 35              |

As shown above, utilizing the field measured rate results in a greater trip increase from the existing school to the proposed expanded school. Based upon this measured rate, the proposed new school will generate 340 AM peak hour trips, a 72 trip increase from the existing 268 trips. To be conservative, the higher 72 trip increase (as opposed to ITE 53 trip increase) was used for the analysis. The trips were assigned to and from the school based on the patterns recorded during the turning movement counts. The trip assignments are shown in Figure 5 for the AM peak hour analysis period. The resulting build volumes with the new school fully occupied are shown in Figure 6.

Given that new trip generation will be fewer than 100 peak hour trips, as demonstrated by both ITE and the field measured rate, the project should not require a Traffic Movement Permit (TMP). In addition, a project will generally not have significant impact off-site unless it generates in excess of 25 to 35 lane hour trips. Based upon the trip assignments, the school expansion will generate only 20 new lane hour trips. Given this, the study area for City of Portland approval includes the signalized intersection of Warwick Street and Brighton Avenue as well as the unsignalized intersection of Warwick Street and Riggs Street. The intersection of Warwick Street and Orono Road was not analyzed in terms of capacity. The new school project will significantly reduce trips at that intersection since many existing trips will be relocated to the new Riggs Street access point, thus improving the level of service and dismissing the need for the intersection to be analyzed in terms of capacity.



### **Capacity Analysis**

Traffic operations are evaluated in terms of level of service (LOS). Level of service is a qualitative measure that describes operations by letter designation. The levels range from A - very little delay to F - extreme delays. Level of service "D" is generally considered acceptable in urban locations while LOS "E" is generally considered the capacity of a facility and the minimum tolerable level. The level of service for signalized intersections is based upon average control delay per vehicle, as defined in the following tables excerpted from the 2010 "Highway Capacity Manual":

| <b>Signalized Intersection Level of Service</b> |                                  |
|---|----------------------------------|
| <u>LOS</u>                                      | <u>Control Delay per Vehicle</u> |
| A   | <= 10.0 seconds                  |
| B   | > 10.0 and <= 20.0               |
| C   | > 20.0 and <= 35.0               |
| D   | > 35.0 and <= 55.0               |
| E   | > 55.0 and <= 80.0               |
| F   | > 80.0                           |

The level of service for unsignalized intersections is based upon average control delay per vehicle for each minor, opposed movement, as defined in the following table:

| <b>Unsignalized Intersection Level of Service</b> |                    |
|---|--------------------|
| <u>LOS</u>  | <u>Delay Range</u> |
| A   | <= 10.0 seconds    |
| B   | > 10.0 and <= 15.0 |
| C   | > 15.0 and <= 25.0 |
| D   | > 25.0 and <= 35.0 |
| E   | > 35.0 and <= 50.0 |
| F   | > 50.0             |

### **Signalized Intersection Analysis**

The level of service was calculated using Synchro 7 for the signalized intersection of Brighton Avenue, Warwick Street and Rowe Avenue for existing 2016 and projected 2018 volumes, with and without the new expanded school. The results are provided in the appendix and are summarized in the following table with the level of service followed by the delay, in seconds, in parentheses:

**Brighton Avenue, Warwick Street and Rowe Avenue**

| <u>Approach/Movement</u>          | <b>AM Peak Hour Levels of Service</b> |                 |                 |
|-----------------------------------|---------------------------------------|-----------------|-----------------|
|                                   | 2016                                  | 2018            | 2018            |
|                                   | <u>Existing</u>                       | <u>No-Build</u> | <u>Build</u>    |
| Eastbound Brighton Avenue Overall | B (16.2)                              | B (17.5)        | C (21.1)        |
| Westbound Brighton Avenue Overall | B (11.8)                              | B (12.3)        | B (13.0)        |
| Northbound Rowe Avenue Overall    | C (31.8)                              | C (32.3)        | C (32.9)        |
| Southbound Warwick Avenue         | C (32.4)                              | C (33.1)        | C (34.9)        |
| <b>Overall Intersection</b>       | <b>B (16.2)</b>                       | <b>B (17.0)</b> | <b>B (19.4)</b> |

As can be seen above, the signalized intersection is currently operating at LOS “B” overall during the AM peak hour, with all movements at a level of service “C” or better. The same levels of service are expected under both 2018 no-build and build volumes. The overall intersection only demonstrates a minor (2.4 second) increase in delay from no-build to build volumes, showing that the new expanded Hall School will not have any significant impact on operations at this signalized intersection or hence, off-site.

**Unsignalized Intersection Analysis**

The level of service was calculated for the unsignalized intersection of Warwick Street and Riggs Street for existing 2016 and projected 2018 volumes, with and without the expanded new school. The results are provided in the appendix and are summarized below with the level of service followed by the delay, in seconds, in parentheses:

| <u>Approach/Movement</u>          | <b>Warwick Street and Riggs Street</b> |                |                |
|-----------------------------------|--|----------------|----------------|
|                                   | <b>AM Peak Hour Levels of Service</b>  |                |                |
|                                   | 2016                                   | 2018           | 2018           |
| <u>Existing</u>                   | <u>No-Build</u>                        | <u>Build</u>   |                |
| Eastbound Riggs Street Overall    | A (9.4)                                | A (9.4)        | B (12.8)       |
| Westbound Riggs Street Overall    | A (9.9)                                | A (9.9)        | B (12.7)       |
| Northbound Warwick Street Overall | A (0.0)                                | A (0.0)        | A (5.2)        |
| Southbound Warwick Street Overall | A (1.0)                                | A (1.0)        | A (0.0)        |
| <b>Overall Intersection</b>       | <b>A (1.7)</b>                         | <b>A (1.7)</b> | <b>A (8.0)</b> |

As can be seen in the preceding table, the unsignalized intersection is currently operating at LOS “A” overall and will remain such under projected 2018 no-build conditions. With the addition of the school access drive, the intersection will remain at LOS “A” overall during the AM peak hour. Eastbound and westbound Riggs Streets will operate at LOS “B” under full build conditions which would be expected given the added volumes.

### Safety Analysis

#### Accident Review

The Maine Department of Transportation uses two criteria to determine high crash locations (HCLs). The first is the critical rate factor (CRF), which is a measure of the accident rate. A CRF greater than one indicates a location which has a higher than expected accident rate. The expected rate is calculated as a statewide average of similar facilities.

The second criterion, which must also be met, is based upon the number of accidents that occur at a particular location. Eight or more accidents must occur over the three-year study period for the location to be considered a high crash location. The CRF and number of accidents are summarized by location for the most recent three-year period, 2013 to 2015, below:

| <u>Warwick Street Location Description</u>               | <u># of Acc.</u> | <u>CRF</u>  |
|--|------------------|-------------|
| Between Brighton Avenue and Glen Haven Road              | 0                | 0.00        |
| <u>Brighton Avenue Location Description</u>              | <u># of Acc.</u> | <u>CRF</u>  |
| Intersection of Capisic Street                           | 9                | 0.29        |
| Between Capisic Street and Devon Street                  | 1                | 0.18        |
| Intersection of Devon Street                             | 2                | 0.38        |
| Between Devon Street and Dorset Street                   | 5                | 0.77        |
| Intersection of Dorset Street                            | 2                | 0.38        |
| Between Dorset Street and Warwick Street                 | 3                | 0.46        |
| Intersection of Warwick Street                           | 19               | 0.58        |
| <b>Between Rowe Avenue and Lomond Street</b>             | <b>8</b>         | <b>1.79</b> |
| Intersection of Terrace Avenue                           | 1                | 0.11        |
| Between Terrace Avenue and Webb Street                   | 2                | 0.44        |
| Intersection of Wessex Street                            | 1                | 0.11        |
| Between Wessex Street and 0.07 miles west                | 3                | 0.58        |
| Between Wessex Street and Intersection of Cabot and Rand | 1                | 0.17        |
| Intersection of Cabot Street and Rand Road               | 17               | 0.51        |

As can be seen on the previous page, there is one high crash location within the vicinity of the Hall School on Brighton Avenue, the link between the intersection of Rowe Avenue and Lomond Street. Individual accident reports were obtained and a collision diagram was prepared to determine if there are any accident patterns or trends evident that may indicate a correctable safety deficiency. The diagram is included in the appendix and is evaluated below:

#### Between Rowe Avenue and Lomond Street

The link between Rowe Avenue and Lomond Street has 8 accidents and a CRF of 1.79. Four of the accidents were rear-end collisions, two eastbound on Brighton Avenue and two westbound. Three of those rear-ends were caused by slippery road conditions due to snow. Two accidents were sideswipes, one due to an improper lane change and another caused by a vehicle avoiding an opposing vehicle in their lane. One accident occurred when an eastbound bicyclist swerved to avoid a pothole and hit a vehicle. The final accident occurred when a vehicle traveling westbound on Brighton Avenue attempted to take a left-turn from the right travel lane, failing to yield to the vehicle in the left travel lane. There is no pattern of accidents that indicates any potential safety deficiencies.

#### *Driveway Sight Distance*

One of the most important safety factors to consider for a project is sight distance from the access drives. This sight distance is measured ten feet back from the edge of travel way at a driver's eye height of 3.5 feet to an object height of 4.25 feet. Maine Traffic Resources recommends a minimum sight distance of 250 feet for the posted 25 mile per hour speed limit zone on Warwick Street. The City of Portland ordinance requires a lesser 200 feet for the posted 25 mile per hour speed limit.

Sight distance was measured from the proposed school drive at Riggs Street and from the existing Orono Road drive. From Riggs Street, sight distance to the left was approximately 250 feet, but a vehicle parked on the side of the road during the time of the site visit, obscured sight distance further. Without the parked car, sight distance would exceed 300 feet. Sight distance to the right was obscured by some shrubbery around the existing 25 mph speed limit sign. With removal of the shrubbery sight distance would be more than adequate, exceeding 300 feet. Sight distance from Orono Road to the left extends to the bend in Warwick Street, approximately 325 feet. To the right, sight distance exceeds 300 feet.

To summarize, MTR recommends 250 feet of sight distance be provided to assure safety for the school. For that reason MTR recommends the shrubbery around the speed limit sign be trimmed (and maintained). In addition, "No Parking" signs should be added

on the west side of Warwick Street to the north and south of Riggs Street in the immediate vicinity of Riggs Street, to assure sight distance is adequate at all times. The recommended “No Parking” zones, approximately 150’ and 170’ in length, for Warwick Street are shown on a sketch in the appendix. It is also important to note that no landscaping or signage should be located within the sight triangle along the property frontage which could obscure the sight distances in the future from Riggs Street.

### **Pedestrian Facilities**

Based on data provided from the school, 18% of the students walk to school and 6% of them ride a bicycle. Given the current high numbers of both pedestrians and bicyclers to and from the school, MTR reviewed the study area intersections in regards to pedestrian facilities. The intersection of Brighton Avenue and Warwick Street is properly equipped with pedestrian features including countdown pedestrian signals, truncated domes and curb ramps. The intersection provides a crosswalk on Warwick Street from the sidewalk on Brighton Avenue to the sidewalk that travels the entire length of the west side of Warwick Street to the school. The intersection also provides crosswalks across Rowe Avenue and Brighton Avenue with pedestrian signals to provide safe access to Warwick Street.

The intersection of Warwick Street and Riggs Street also provides for pedestrian access. A crosswalk is located on the westbound Riggs Street approach, which has truncated domes and curb ramps. The southbound Warwick Street approach also has a striped crosswalk with truncated domes and curb ramps, as well as pedestrian signage. Additionally, it is recommended that a crosswalk be provided across the Riggs Street school access point to provide for crossing from the north side of Warwick Street to the south.

In addition, the site plan prepared by Oak Point Associates was reviewed in terms of pedestrian accommodations on the school site. Oak Point provides a sidewalk along the entire westerly side of Lomond Street and Riggs Street from the school entrance to Warwick Street. A sidewalk is also provided to Warwick Street, north of Orono Road, to serve students destined to and from the north. In addition, there are proposed sidewalks on site that will connect to the trails to Pinecrest Road and Godfrey Street, as well as along the perimeter of the parking lot and along the entire bus loop. Lastly, crosswalks are provided where these sidewalks cross access ways.

### *School Zone Signage*

Information regarding the existing school zone signage, provided by Oak Point Associates, is summarized below:

- +/- 350 feet south of Riggs Street, on southbound side, facing Brighton Ave
- +/-90-100 feet north of the Riggs Street Intersection (on northbound side, facing Brighton Ave)
- +/-300 feet north of the Warwick St entrance to the school, at the end of the bridge crossing Capisic Brook (on southbound side, facing away from the school, toward Sunset Ln).

The Manual on Uniform Traffic Control Devices (MUTCD), 2009 edition, states that the start of a school speed limit zone (S5-1) should be 200 feet in advance of the school grounds. The signs currently located approximately 350 feet south of Riggs Street and approximately 300 feet north of the Orono Road entrance are adequate as is. The sign located north of the Riggs Street intersection, most likely initially set to alert drivers arriving from Riggs Street, should be relocated due to the relocated access point. MTR recommends this sign be relocated to the westbound Riggs Street approach, at least 200 feet prior to Warwick Street, to alert drivers arriving from the Riggs Street neighborhoods of the school zone.

## **SUMMARY**

The new school, serving an increased student population, is expected to generate 72 new one-way trips during the AM peak hour study period, based upon the measured trip generation rates (as opposed to the lesser ITE rates). Given that the new school will generate fewer than 100 new one-way trips during peak hours the project will not require a Traffic Movement Permit.

In terms of capacity, the intersection of Brighton Avenue and Warwick Street will operate at LOS "B" overall during the AM peak hour. The intersection of Warwick Street and Riggs Street will operate at LOS "A" overall. With the project generating a maximum of 20 new lane hour trips and given the good levels of service, there are no capacity concerns.

In terms of safety, one high crash location was identified within the study area. There are no accident patterns or trends evident that indicate any potential safety deficiency.

Sight distance from Riggs Street is currently obscured by shrubbery to the right and could be limited by potential on-street parking. MTR recommends the shrubbery be cut back and that "No Parking" signs be installed to the left and right of the Riggs Street school access point, creating 150' and 170' no parking zones, to maintain good sight distance at all times. Sight distance from Orono Road is adequate to both the right and left.

The area provides adequate pedestrian facilities to allow for safe and efficient travel for pedestrians traveling to and from the school. In terms of site pedestrian safety, MTR recommends a new crosswalk be provided across Riggs Street (school access drive).

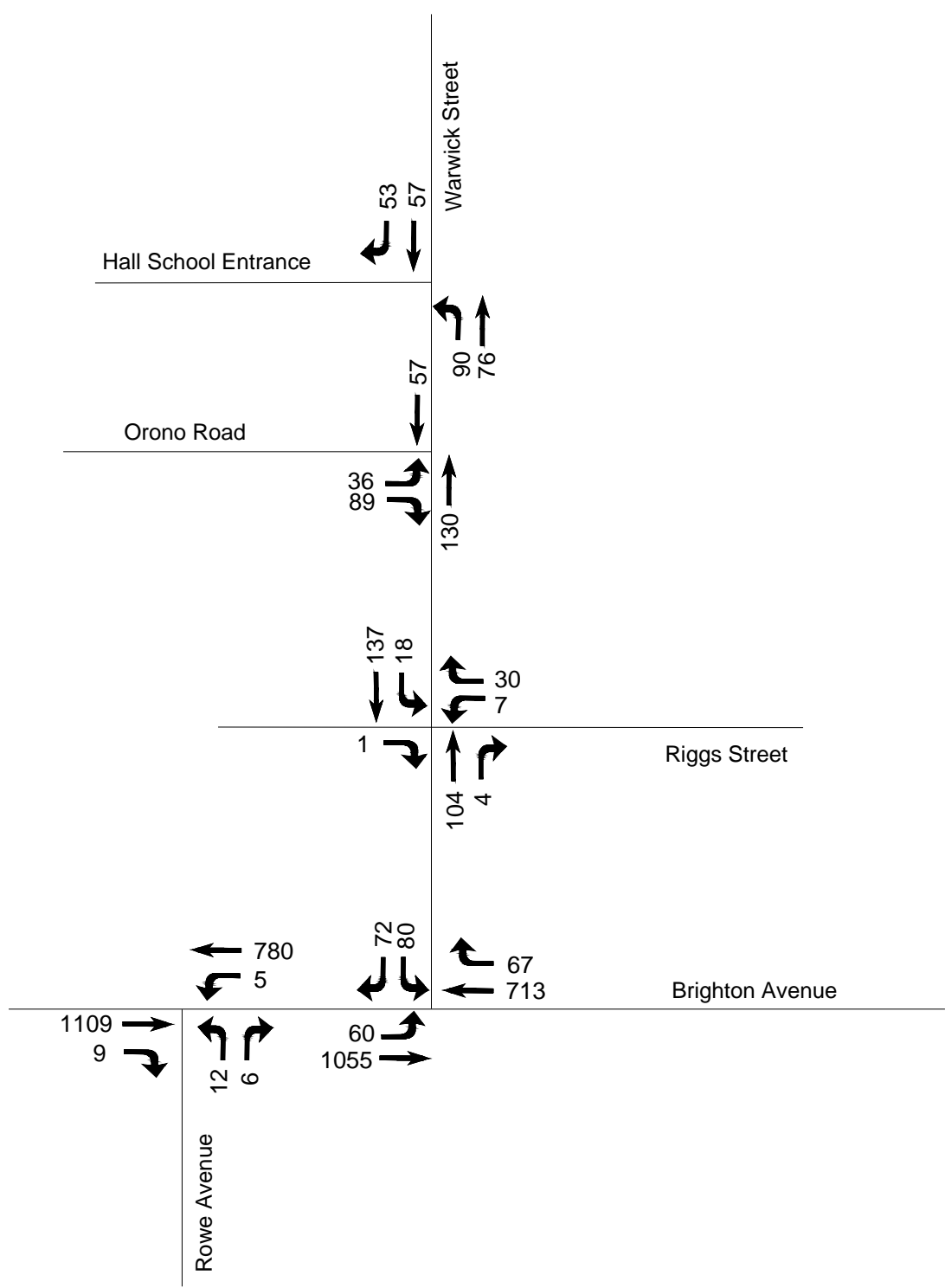
In regards to signage for the school, two of the three existing school speed zone signs are located in acceptable locations. The sign currently located to the north of the Riggs Street intersection no longer serves its intended purpose to alert Riggs Street drivers of the school zone. For this reason, this sign should be relocated to the westbound Riggs Street approach, at least 200 feet in advance of Warwick Street.




**Figure 1**  
**Site Location Map**  
**Fred P Hall School**  
**Portland, Maine**

**Maine Traffic Resources**  
 25 Vine Street  
 Gardiner, ME  
 04345  
 tel: (207) 582-5252  
 fax: (207) 582-1677



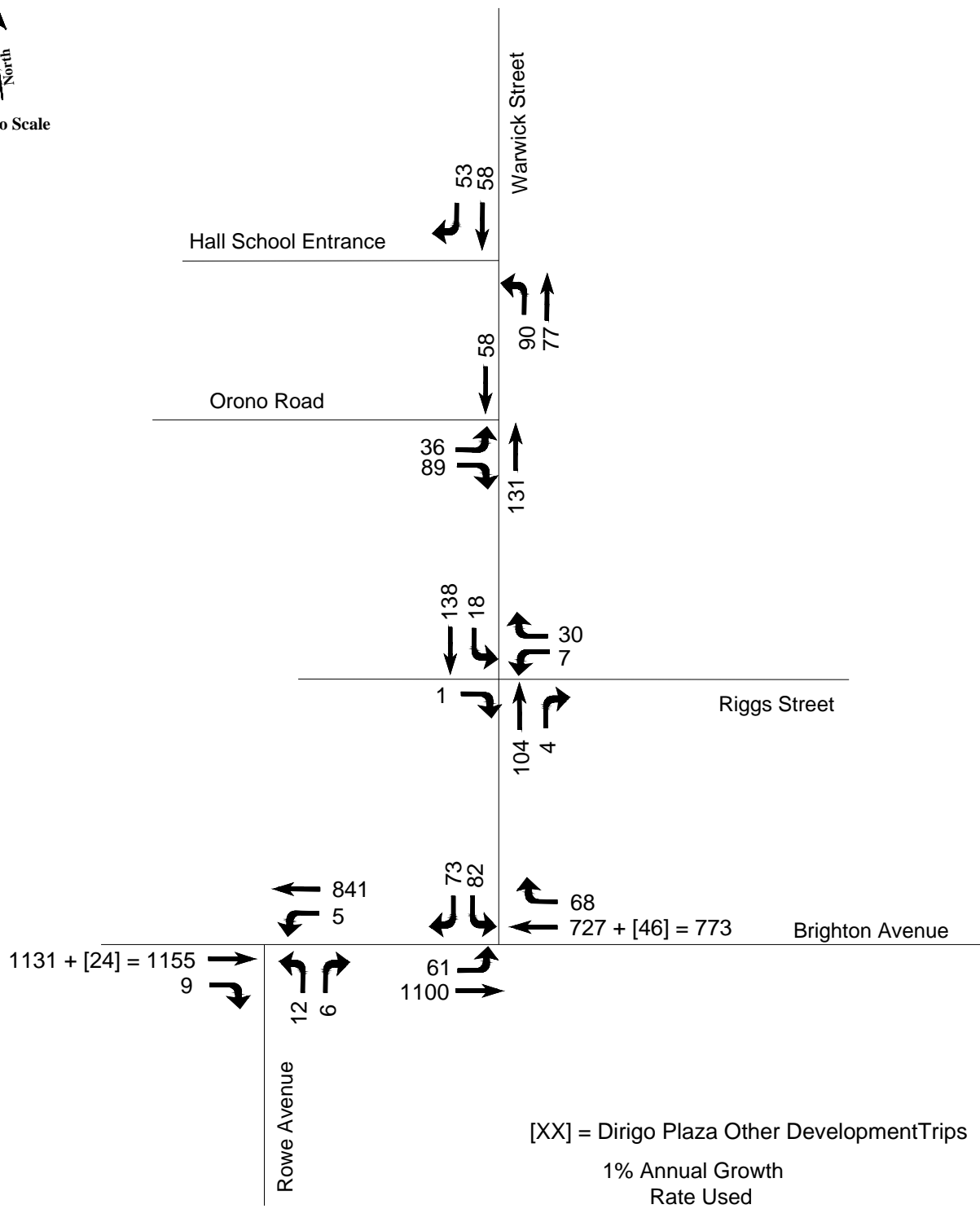


**Figure 2**  
**2016 Existing Peak Hour Volumes**  
**Fred P. Hall School Expansion**  
**Portland, Maine**


 25 Vine Street  
 Gardiner, ME  
 04345  
 tel: (207) 582-5252  
 fax: (207) 582-1677



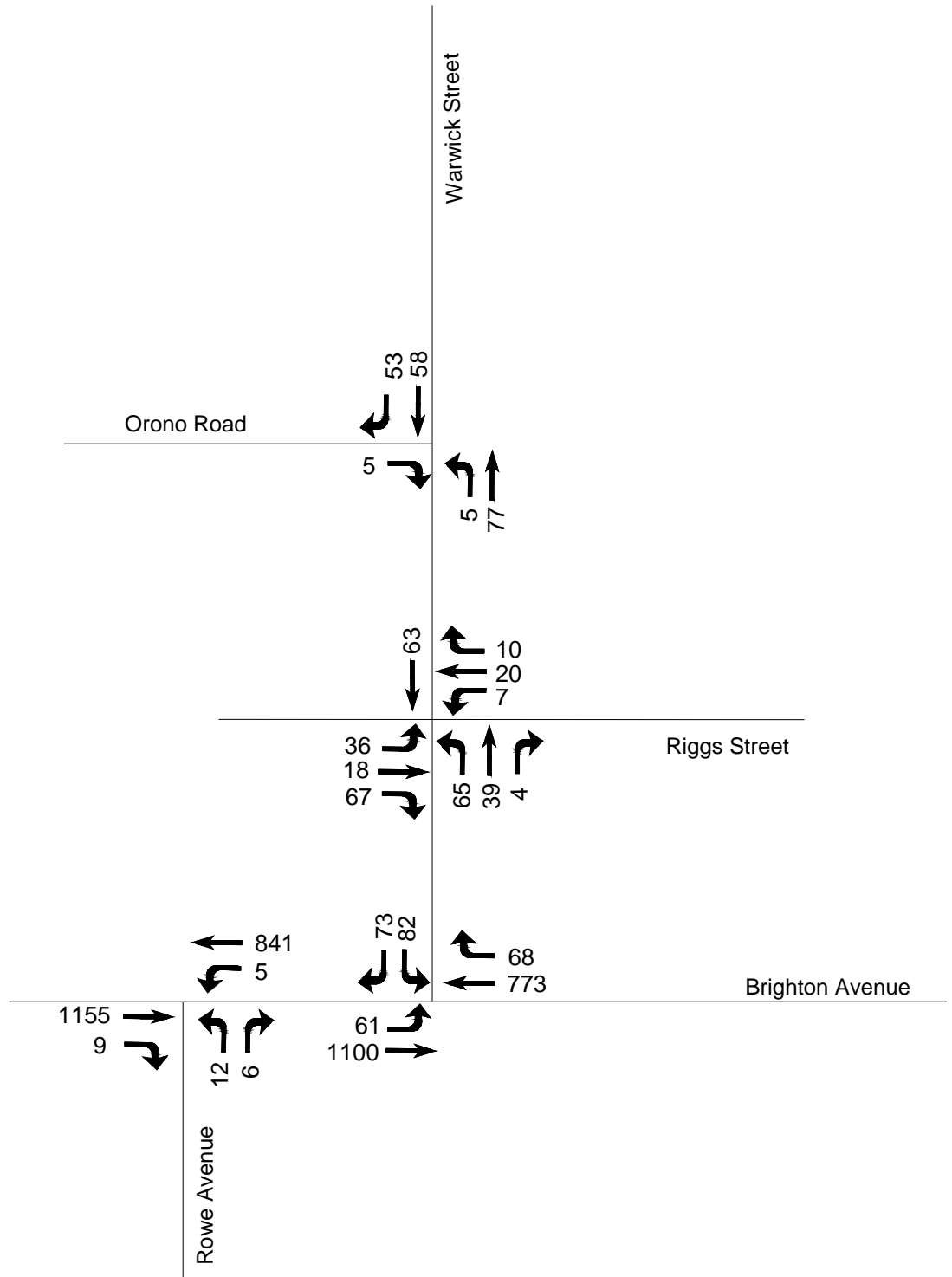
Not To Scale



**Figure 3**  
**2018 No-Build Peak Hour Volumes**  
**Fred P. Hall School Expansion**  
**Portland, Maine**



Not To Scale



**Figure 4**

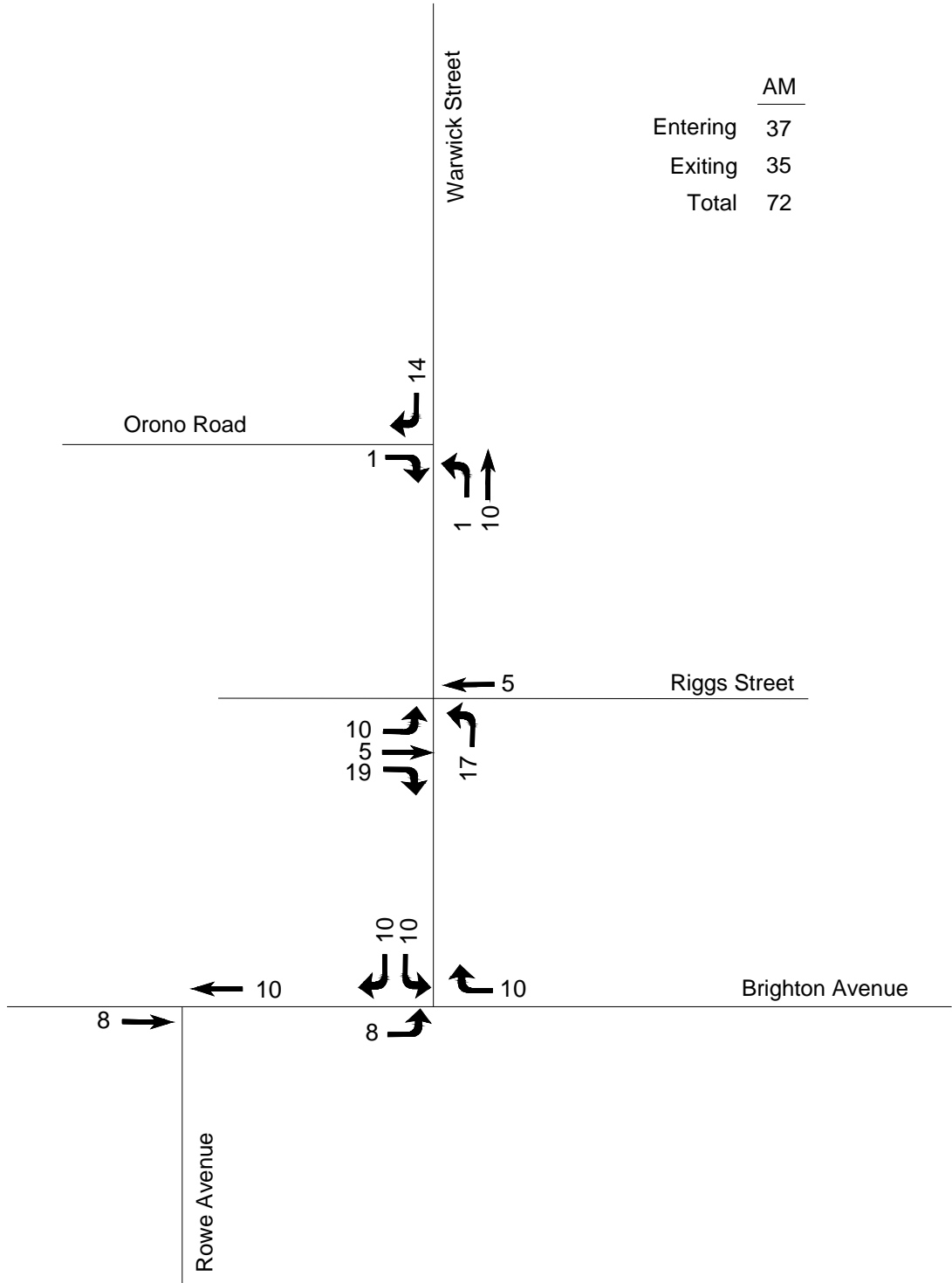
**Relocated No-Build Volumes**  
**Fred P. Hall School Expansion**  
**Portland, Maine**

**Maine  
Traffic  
Resources**

25 Vine Street  
Gardiner, ME  
04345  
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fax: (207) 582-1677



Not To Scale



|          | AM |
|----------|----|
| Entering | 37 |
| Exiting  | 35 |
| Total    | 72 |

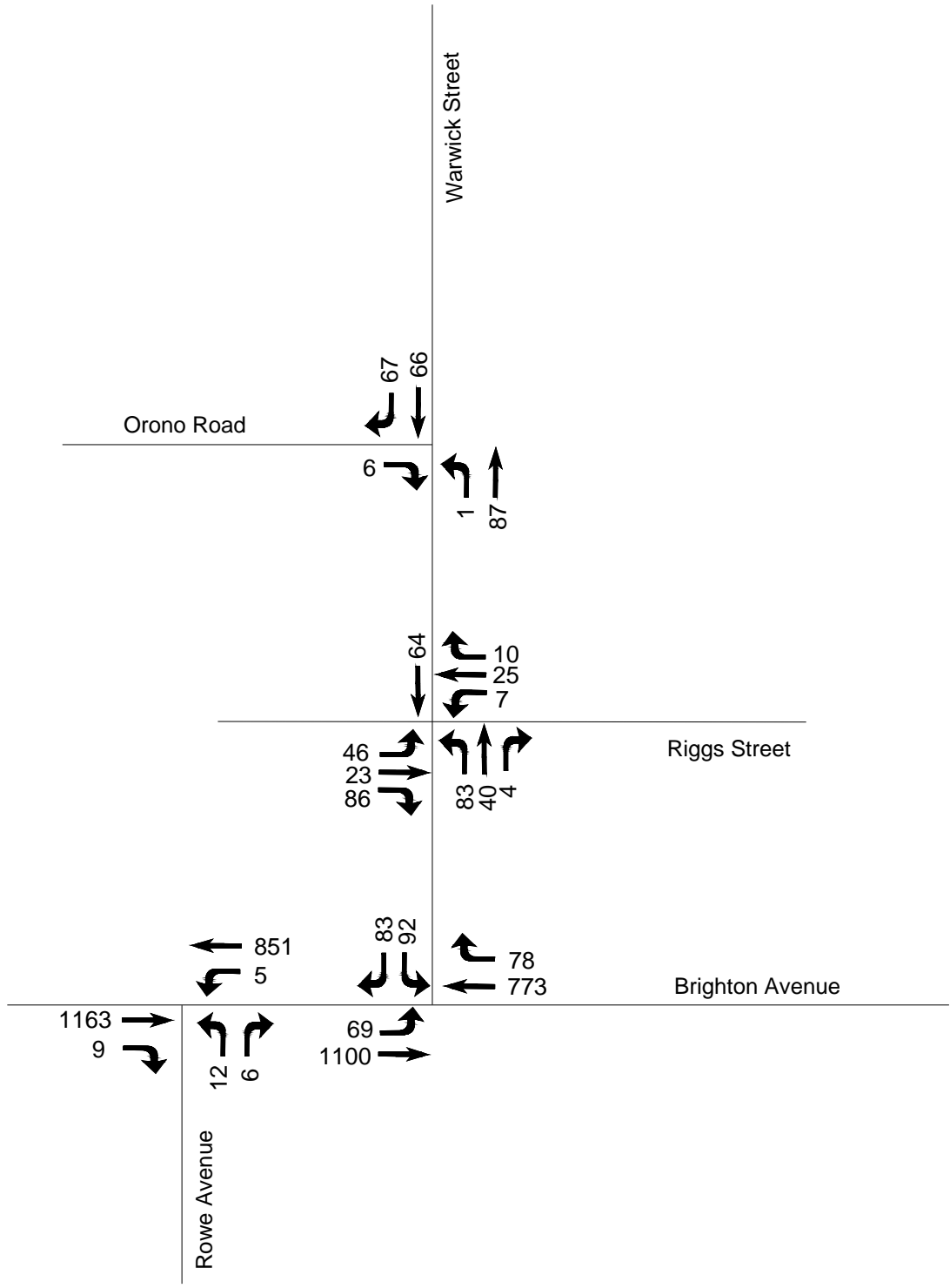
**Figure 5**

**AM Peak Hour Trip Assignments  
Fred P. Hall School Expansion  
Portland, Maine**


**Maine  
Traffic  
Resources**  
 25 Vine Street  
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Not To Scale



**Figure 6**

**2018 AM Peak Hour Build Volumes**  
**Fred P. Hall School Expansion**  
**Portland, Maine**

**Maine  
 Traffic  
 Resources**

25 Vine Street  
 Gardiner, ME  
 04345  
 tel: (207) 582-5252  
 fax: (207) 582-1677

# **APPENDIX**

Hall School Site Plan

Turning Movement Counts

Capacity Analysis

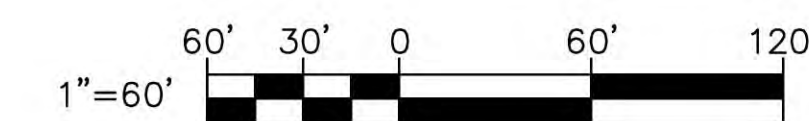
Accident Data

Collision Diagram



**FRED P. HALL ELEMENTARY SCHOOL**  
 Portland, Maine

**Schematic Site Plan**



OAK POINT  
 ASSOCIATES



Maine Traffic Resources  
 25 Vine Street  
 Gardiner, ME 04345  
 mainetrafficresources.com

Title: Fred P Hall School AM  
 Town: Portland, Maine  
 Counter: NLS  
 Weather: Sunny

File Name : PortlandHallSchoolAM  
 Site Code : 00000001  
 Start Date : 11/4/2015  
 Page No : 1

Groups Printed- Passenger Vehicles - Light Trucks

| Start Time  | Warwick Street From North |       |      |       |            | From East |       |      |       |            | Warwick Street From South |       |      |       |            | Orono Road Exit From West |       |      |       |            | Int. Total |
|-------------|---------------------------|-------|------|-------|------------|-----------|-------|------|-------|------------|---------------------------|-------|------|-------|------------|---------------------------|-------|------|-------|------------|------------|
|             | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht    | Thr u | Left | Ped s | App. Total | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht                    | Thr u | Left | Ped s | App. Total |            |
| Factor      | 1.0                       | 1.0   | 1.0  | 1.0   |            | 1.0       | 1.0   | 1.0  | 1.0   |            | 1.0                       | 1.0   | 1.0  | 1.0   |            | 1.0                       | 1.0   | 1.0  | 1.0   |            |            |
| 08:00 AM    | 11                        | 21    | 0    | 0     | 32         | 0         | 0     | 0    | 0     | 0          | 0                         | 3     | 14   | 0     | 17         | 6                         | 0     | 4    | 0     | 10         | 59         |
| 08:15 AM    | 23                        | 14    | 0    | 0     | 37         | 0         | 0     | 0    | 0     | 0          | 0                         | 5     | 44   | 0     | 49         | 26                        | 0     | 13   | 0     | 39         | 125        |
| 08:30 AM    | 17                        | 8     | 0    | 0     | 25         | 0         | 0     | 0    | 0     | 0          | 0                         | 2     | 28   | 0     | 30         | 51                        | 0     | 16   | 0     | 67         | 122        |
| 08:45 AM    | 2                         | 11    | 0    | 0     | 13         | 0         | 0     | 0    | 0     | 0          | 0                         | 7     | 4    | 0     | 11         | 6                         | 0     | 3    | 0     | 9          | 33         |
| Total       | 53                        | 54    | 0    | 0     | 107        | 0         | 0     | 0    | 0     | 0          | 0                         | 17    | 90   | 0     | 107        | 89                        | 0     | 36   | 0     | 125        | 339        |
| Grand Total | 53                        | 54    | 0    | 0     | 107        | 0         | 0     | 0    | 0     | 0          | 0                         | 17    | 90   | 0     | 107        | 89                        | 0     | 36   | 0     | 125        | 339        |
| Apprch %    | 49.5                      | 50.5  | 0.0  | 0.0   |            | 0.0       | 0.0   | 0.0  | 0.0   |            | 0.0                       | 15.9  | 84.1 | 0.0   |            | 71.2                      | 0.0   | 28.8 | 0.0   |            |            |
| Total %     | 15.6                      | 15.9  | 0.0  | 0.0   | 31.6       | 0.0       | 0.0   | 0.0  | 0.0   | 0.0        | 0.0                       | 5.0   | 26.5 | 0.0   | 31.6       | 26.3                      | 0.0   | 10.6 | 0.0   | 36.9       |            |

| Start Time  | Warwick Street From North |       |      |       |            | From East  |       |      |       |            | Warwick Street From South |       |      |       |            | Orono Road Exit From West |       |      |       |            | Int. Total |
|---|---------------------------|-------|------|-------|------------|------------|-------|------|-------|------------|---------------------------|-------|------|-------|------------|---------------------------|-------|------|-------|------------|------------|
|   | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht     | Thr u | Left | Ped s | App. Total | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht                    | Thr u | Left | Ped s | App. Total |            |
| Peak Hour From 08:00 AM to 08:45 AM - Peak 1 of 1 |                           |       |      |       |            |            |       |      |       |            |                           |       |      |       |            |                           |       |      |       |            |            |
| Intersecti on                                     | 08:00 AM                  |       |      |       |            |            |       |      |       |            |                           |       |      |       |            |                           |       |      |       |            |            |
| Volume  | 53                        | 54    | 0    | 0     | 107        | 0          | 0     | 0    | 0     | 0          | 0                         | 17    | 90   | 0     | 107        | 89                        | 0     | 36   | 0     | 125        | 339        |
| Percent   | 49.5                      | 50.5  | 0.0  | 0.0   |            | 0.0        | 0.0   | 0.0  | 0.0   |            | 0.0                       | 15.9  | 84.1 | 0.0   |            | 71.2                      | 0.0   | 28.8 | 0.0   |            |            |
| 08:15 Volume                                      | 23                        | 14    | 0    | 0     | 37         | 0          | 0     | 0    | 0     | 0          | 0                         | 5     | 44   | 0     | 49         | 26                        | 0     | 13   | 0     | 39         | 125        |
| Peak Factor                                       |                           |       |      |       |            |            |       |      |       |            |                           |       |      |       |            |                           |       |      |       |            |            |
| High Int. Volume                                  | 08:15 AM                  |       |      |       |            | 7:45:00 AM |       |      |       |            | 08:15 AM                  |       |      |       |            | 08:30 AM                  |       |      |       |            |            |
| Peak Factor                                       | 23                        | 14    | 0    | 0     | 37         | 0          | 0     | 0    | 0     | 0          | 0                         | 5     | 44   | 0     | 49         | 51                        | 0     | 16   | 0     | 67         |            |
|   | 0.72                      |       |      |       |            |            |       |      |       |            | 0.54                      |       |      |       |            | 0.46                      |       |      |       |            |            |
|   | 3                         |       |      |       |            |            |       |      |       |            | 6                         |       |      |       |            | 6                         |       |      |       |            |            |

To 1st week in September  
 Group I → 0.96/0.91 = 1.055



Maine Traffic Resources  
25 Vine Street

Title: Brighton, Warwick, Rowe AM  
Town: Portland, Maine  
Counter: NLS  
Weather: Sunny

Gardiner, ME 04345  
mainetrafficresources.com

File Name : PortlandBrightonWarwickAM  
Site Code : 00014111  
Start Date : 5/18/2016  
Page No : 1

Groups Printed- Passenger Vehicles - Light Trucks - Heavy Trucks

| Start Time  | Warwick Street From North |       |      |       |            | Brighton Avenue From East |       |      |       |            | Rowe Avenue From South |       |      |       |            | Brighton Avenue From West |       |      |       |            | Int. Total |
|-------------|---------------------------|-------|------|-------|------------|---------------------------|-------|------|-------|------------|------------------------|-------|------|-------|------------|---------------------------|-------|------|-------|------------|------------|
|             | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht                 | Thr u | Left | Ped s | App. Total | Rig ht                    | Thr u | Left | Ped s | App. Total |            |
| Factor      | 1.0                       | 1.0   | 1.0  | 1.0   |            | 1.0                       | 1.0   | 1.0  | 1.0   |            | 1.0                    | 1.0   | 1.0  | 1.0   |            | 1.0                       | 1.0   | 1.0  | 1.0   |            |            |
| 07:00 AM    | 7                         | 0     | 4    | 3     | 14         | 0                         | 133   | 0    | 0     | 133        | 1                      | 0     | 3    | 2     | 6          | 0                         | 222   | 3    | 0     | 225        | 378        |
| 07:15 AM    | 16                        | 0     | 11   | 1     | 28         | 2                         | 169   | 0    | 1     | 172        | 8                      | 0     | 0    | 2     | 10         | 1                         | 261   | 6    | 0     | 268        | 478        |
| 07:30 AM    | 16                        | 0     | 11   | 1     | 28         | 3                         | 188   | 1    | 0     | 192        | 4                      | 0     | 3    | 0     | 7          | 0                         | 306   | 11   | 0     | 317        | 544        |
| 07:45 AM    | 11                        | 0     | 13   | 1     | 25         | 10                        | 220   | 1    | 0     | 231        | 4                      | 0     | 2    | 1     | 7          | 0                         | 309   | 11   | 0     | 320        | 583        |
| Total       | 50                        | 0     | 39   | 6     | 95         | 15                        | 710   | 2    | 1     | 728        | 17                     | 0     | 8    | 5     | 30         | 1                         | 1098  | 31   | 0     | 1130       | 1983       |
| 08:00 AM    | 13                        | 0     | 15   | 0     | 28         | 21                        | 188   | 2    | 0     | 211        | 0                      | 0     | 4    | 0     | 4          | 3                         | 287   | 11   | 0     | 301        | 544        |
| 08:15 AM    | 25                        | 0     | 18   | 0     | 43         | 23                        | 154   | 0    | 0     | 177        | 2                      | 0     | 3    | 2     | 7          | 1                         | 279   | 21   | 0     | 301        | 528        |
| 08:30 AM    | 26                        | 0     | 31   | 0     | 57         | 18                        | 193   | 0    | 0     | 211        | 1                      | 0     | 3    | 2     | 6          | 2                         | 272   | 16   | 0     | 290        | 564        |
| 08:45 AM    | 8                         | 0     | 16   | 2     | 26         | 5                         | 178   | 3    | 0     | 186        | 3                      | 0     | 2    | 1     | 6          | 3                         | 217   | 12   | 0     | 232        | 450        |
| Total       | 72                        | 0     | 80   | 2     | 154        | 67                        | 713   | 5    | 0     | 785        | 6                      | 0     | 12   | 5     | 23         | 9                         | 1055  | 60   | 0     | 1124       | 2086       |
| Grand Total | 122                       | 0     | 119  | 8     | 249        | 82                        | 1423  | 7    | 1     | 1513       | 23                     | 0     | 20   | 10    | 53         | 10                        | 2153  | 91   | 0     | 2254       | 4069       |
| Apprch %    | 49.0                      | 0.0   | 47.8 | 3.2   |            | 5.4                       | 94.1  | 0.5  | 0.1   |            | 43.4                   | 0.0   | 37.7 | 18.9  |            | 0.4                       | 95.5  | 4.0  | 0.0   |            |            |
| Total %     | 3.0                       | 0.0   | 2.9  | 0.2   | 6.1        | 2.0                       | 35.0  | 0.2  | 0.0   | 37.2       | 0.6                    | 0.0   | 0.5  | 0.2   | 1.3        | 0.2                       | 52.9  | 2.2  | 0.0   | 55.4       |            |

| Start Time  | Warwick Street From North |       |      |       |            | Brighton Avenue From East |          |      |       |            | Rowe Avenue From South |       |          |       |            | Brighton Avenue From West |       |      |          |            | Int. Total |    |   |     |      |
|---|---------------------------|-------|------|-------|------------|---------------------------|----------|------|-------|------------|------------------------|-------|----------|-------|------------|---------------------------|-------|------|----------|------------|------------|----|---|-----|------|
|   | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht                    | Thr u    | Left | Ped s | App. Total | Rig ht                 | Thr u | Left     | Ped s | App. Total | Rig ht                    | Thr u | Left | Ped s    | App. Total |            |    |   |     |      |
| Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1 |                           |       |      |       |            |                           |          |      |       |            |                        |       |          |       |            |                           |       |      |          |            |            |    |   |     |      |
| Intersection                                      | 07:45 AM                  |       |      |       |            |                           |          |      |       |            |                        |       |          |       |            |                           |       |      |          |            |            |    |   |     |      |
| Volume  | 75                        | 0     | 77   | 1     | 153        | 72                        | 755      | 3    | 0     | 830        | 7                      | 0     | 12       | 5     | 24         | 6                         | 1147  | 59   | 0        | 1212       | 2219       |    |   |     |      |
| Percent   | 49.0                      | 0.0   | 50.3 | 0.7   |            | 8.7                       | 91.0     | 0.4  | 0.0   |            | 29.2                   | 0.0   | 50.0     | 20.8  |            | 0.5                       | 94.6  | 4.9  | 0.0      |            |            |    |   |     |      |
| 07:45 Volume Peak Factor                          | 11                        | 0     | 13   | 1     | 25         | 10                        | 220      | 1    | 0     | 231        | 4                      | 0     | 2        | 1     | 7          | 0                         | 309   | 11   | 0        | 320        | 583        |    |   |     |      |
| High Int. Volume Peak Factor                      | 08:30 AM                  | 26    | 0    | 31    | 0          | 57                        | 07:45 AM | 10   | 220   | 1          | 0                      | 231   | 07:45 AM | 4     | 0          | 2                         | 1     | 7    | 07:45 AM | 0          | 309        | 11 | 0 | 320 | 0.94 |
|   |                           |       |      |       | 0.67       |                           |          |      |       | 0.89       |                        |       |          |       | 0.85       |                           |       |      |          | 0.94       | 0.952      |    |   |     |      |
|   |                           |       |      |       | 1          |                           |          |      |       | 8          |                        |       |          |       | 7          |                           |       |      |          | 7          |            |    |   |     |      |

To 15<sup>+</sup> Week in September

Group I → 0.91/0.91 = 1.00

# Maine Traffic Resources

25 Vine Street

Gardiner, ME 04345

mainetrafficresources.com

Title: Warwick St & Riggs St AM

Town: Portland, Maine

Counter: NLS

Weather: Cloudy

File Name : PortlandWarwickRiggsAM

Site Code : 00000001

Start Date : 6/14/2016

Page No : 1

Groups Printed- Passenger Vehicles - Light Trucks - Heavy Trucks

















| Start Time  | Warwick Street From North |       |      |       |            | Riggs Street From East |       |      |       |            | Warwick Street From South |       |      |       |            | Riggs Street From West |       |      |       |            | Int. Total |
|-------------|---------------------------|-------|------|-------|------------|------------------------|-------|------|-------|------------|---------------------------|-------|------|-------|------------|------------------------|-------|------|-------|------------|------------|
|             | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht                 | Thr u | Left | Ped s | App. Total | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht                 | Thr u | Left | Ped s | App. Total |            |
| Factor      | 1.0                       | 1.0   | 1.0  | 1.0   |            | 1.0                    | 1.0   | 1.0  | 1.0   |            | 1.0                       | 1.0   | 1.0  | 1.0   |            | 1.0                    | 1.0   | 1.0  | 1.0   |            |            |
| 07:45 AM    | 0                         | 35    | 6    | 1     | 42         | 7                      | 0     | 2    | 0     | 9          | 0                         | 21    | 0    | 0     | 21         | 1                      | 0     | 0    | 0     | 1          | 73         |
| Total       | 0                         | 35    | 6    | 1     | 42         | 7                      | 0     | 2    | 0     | 9          | 0                         | 21    | 0    | 0     | 21         | 1                      | 0     | 0    | 0     | 1          | 73         |
| 08:00 AM    | 0                         | 25    | 4    | 3     | 32         | 7                      | 0     | 3    | 0     | 10         | 2                         | 30    | 0    | 0     | 32         | 0                      | 0     | 0    | 0     | 0          | 74         |
| 08:15 AM    | 0                         | 38    | 4    | 11    | 53         | 10                     | 0     | 0    | 0     | 10         | 1                         | 36    | 0    | 0     | 37         | 0                      | 0     | 0    | 3     | 3          | 103        |
| 08:30 AM    | 0                         | 56    | 7    | 1     | 64         | 9                      | 0     | 4    | 0     | 13         | 0                         | 25    | 0    | 0     | 25         | 1                      | 0     | 0    | 1     | 2          | 104        |
| 08:45 AM    | 0                         | 18    | 3    | 0     | 21         | 4                      | 0     | 0    | 0     | 4          | 1                         | 13    | 0    | 0     | 14         | 0                      | 0     | 0    | 0     | 0          | 39         |
| Total       | 0                         | 137   | 18   | 15    | 170        | 30                     | 0     | 7    | 0     | 37         | 4                         | 104   | 0    | 0     | 108        | 1                      | 0     | 0    | 4     | 5          | 320        |
| 09:00 AM    | 0                         | 12    | 0    | 0     | 12         | 2                      | 0     | 3    | 0     | 5          | 2                         | 4     | 0    | 0     | 6          | 0                      | 0     | 0    | 1     | 1          | 24         |
| Grand Total | 0                         | 184   | 24   | 16    | 224        | 39                     | 0     | 12   | 0     | 51         | 6                         | 129   | 0    | 0     | 135        | 2                      | 0     | 0    | 5     | 7          | 417        |
| Apprch %    | 0.0                       | 82.1  | 10.7 | 7.1   |            | 76.5                   | 0.0   | 23.5 | 0.0   |            | 4.4                       | 95.6  | 0.0  | 0.0   |            | 28.6                   | 0.0   | 0.0  | 71.4  |            |            |
| Total %     | 0.0                       | 44.1  | 5.8  | 3.8   | 53.7       | 9.4                    | 0.0   | 2.9  | 0.0   | 12.2       | 1.4                       | 30.9  | 0.0  | 0.0   | 32.4       | 0.5                    | 0.0   | 0.0  | 1.2   | 1.7        |            |

| Start Time  | Warwick Street From North |       |      |       |            | Riggs Street From East |       |      |       |            | Warwick Street From South |       |      |       |            | Riggs Street From West |       |      |       |            | Int. Total |
|---|---------------------------|-------|------|-------|------------|------------------------|-------|------|-------|------------|---------------------------|-------|------|-------|------------|------------------------|-------|------|-------|------------|------------|
|   | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht                 | Thr u | Left | Ped s | App. Total | Rig ht                    | Thr u | Left | Ped s | App. Total | Rig ht                 | Thr u | Left | Ped s | App. Total |            |
| Peak Hour From 07:45 AM to 09:00 AM - Peak 1 of 1 |                           |       |      |       |            |                        |       |      |       |            |                           |       |      |       |            |                        |       |      |       |            |            |
| Intersecti on                                     | 07:45 AM                  |       |      |       |            |                        |       |      |       |            |                           |       |      |       |            |                        |       |      |       |            |            |
| Volume  | 0                         | 154   | 21   | 16    | 191        | 33                     | 0     | 9    | 0     | 42         | 3                         | 112   | 0    | 0     | 115        | 2                      | 0     | 0    | 4     | 6          | 354        |
| Percent   | 0.0                       | 80.6  | 11.0 | 8.4   |            | 78.6                   | 0.0   | 21.4 | 0.0   |            | 2.6                       | 97.4  | 0.0  | 0.0   |            | 33.3                   | 0.0   | 0.0  | 66.7  |            |            |
| 08:30 Volume                                      | 0                         | 56    | 7    | 1     | 64         | 9                      | 0     | 4    | 0     | 13         | 0                         | 25    | 0    | 0     | 25         | 1                      | 0     | 0    | 1     | 2          | 104        |
| Peak Factor                                       | 0.851                     |       |      |       |            |                        |       |      |       |            |                           |       |      |       |            |                        |       |      |       |            |            |
| High Int. Volume                                  | 0                         | 56    | 7    | 1     | 64         | 9                      | 0     | 4    | 0     | 13         | 1                         | 36    | 0    | 0     | 37         | 0                      | 0     | 0    | 3     | 3          | 0.74       |
| Peak Factor                                       | 0.777                     |       |      |       |            |                        |       |      |       |            |                           |       |      |       |            |                        |       |      |       |            |            |

To 1st Week in September  
 Group I → 0.90/0.91  
 No factor needed

Lanes, Volumes, Timings  
3: Brighton Avenue & Warwick Street

6/15/2016

|                            |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group                 | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations        |   |  |   |   |  |   |  |  |   |   |  |   |
| Volume (vph)               | 60  | 1055  | 9   | 5   | 713   | 67  | 12   | 0   | 6   | 80  | 0   | 72  |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Lane Util. Factor          | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Ped Bike Factor            |   |   |   |   |   |   |  | 0.99  |   |   | 0.99  |   |
| Fr't                       |   | 0.999   |   |   | 0.987   |   |  | 0.955   |   |   | 0.936   |   |
| Flt Protected              |   | 0.997   |   |   |   |   |  | 0.968   |   |   | 0.974   |   |
| Satd. Flow (prot)          | 0   | 3525  | 0   | 0   | 3459  | 0   | 0  | 1745  | 0   | 0   | 1670  | 0   |
| Flt Permitted              |   | 0.847   |   |   | 0.947   |   |  | 0.968   |   |   | 0.974   |   |
| Satd. Flow (perm)          | 0   | 2995  | 0   | 0   | 3276  | 0   | 0  | 1738  | 0   | 0   | 1667  | 0   |
| Right Turn on Red          |   |   | Yes   |   |   | Yes   |  |   | Yes   |   |   | Yes   |
| Satd. Flow (RTOR)          |   | 1   |   |   | 11  |   |  | 7   |   |   | 50  |   |
| Link Speed (mph)           |   | 25  |   |   | 25  |   |  | 25  |   |   | 25  |   |
| Link Distance (ft)         |   | 75  |   |   | 1330  |   |  | 316   |   |   | 628   |   |
| Travel Time (s)            |   | 2.0   |   |   | 36.3  |   |  | 8.6   |   |   | 17.1  |   |
| Conf. Peds. (#/hr)         |   |   |   |   |   |   | 5  |   | 5   | 2   |   | 2   |
| Peak Hour Factor           | 0.95  | 0.95  | 0.95  | 0.90  | 0.90  | 0.90  | 0.85   | 0.85  | 0.85  | 0.70  | 0.70  | 0.70  |
| Heavy Vehicles (%)         | 2%  | 2%  | 2%  | 3%  | 3%  | 3%  | 0%   | 0%  | 0%  | 3%  | 3%  | 3%  |
| Adj. Flow (vph)            | 63  | 1111  | 9   | 6   | 792   | 74  | 14   | 0   | 7   | 114   | 0   | 103   |
| Shared Lane Traffic (%)    |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)      | 0   | 1183  | 0   | 0   | 872   | 0   | 0  | 21  | 0   | 0   | 217   | 0   |
| Enter Blocked Intersection | No  | No  | No  | No  | No  | No  | No   | No  | No  | No  | No  | No  |
| Lane Alignment             | Left  | Left  | Right   | Left  | Left  | Right   | Left   | Left  | Right   | Left  | Left  | Right   |
| Median Width(ft)           |   | 0   |   |   | 0   |   |  | 0   |   |   | 0   |   |
| Link Offset(ft)            |   | 0   |   |   | 0   |   |  | -10   |   |   | -65   |   |
| Crosswalk Width(ft)        |   | 16  |   |   | 16  |   |  | 16  |   |   | 16  |   |
| Two way Left Turn Lane     |   |   |   |   |   |   |  |   |   |   |   |   |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Turning Speed (mph)        | 15  |   | 9   | 15  |   | 9   | 15   |   | 9   | 15  |   | 9   |
| Number of Detectors        | 1   | 2   |   | 1   | 2   |   | 1  | 2   |   | 1   | 2   |   |
| Detector Template          | Left  | Thru  |   | Left  | Thru  |   | Left   | Thru  |   | Left  | Thru  |   |
| Leading Detector (ft)      | 20  | 100   |   | 20  | 100   |   | 20   | 100   |   | 20  | 100   |   |
| Trailing Detector (ft)     | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Detector 1 Position(ft)    | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Detector 1 Size(ft)        | 20  | 6   |   | 20  | 6   |   | 20   | 6   |   | 20  | 6   |   |
| Detector 1 Type            | Cl+Ex   | Cl+Ex   |   | Cl+Ex   | Cl+Ex   |   | Cl+Ex  | Cl+Ex   |   | Cl+Ex   | Cl+Ex   |   |
| Detector 1 Channel         |   |   |   |   |   |   |  |   |   |   |   |   |
| Detector 1 Extend (s)      | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |
| Detector 1 Queue (s)       | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |
| Detector 1 Delay (s)       | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |
| Detector 2 Position(ft)    |   | 94  |   |   | 94  |   |  | 94  |   |   | 94  |   |
| Detector 2 Size(ft)        |   | 6   |   |   | 6   |   |  | 6   |   |   | 6   |   |
| Detector 2 Type            |   | Cl+Ex   |   |   | Cl+Ex   |   |  | Cl+Ex   |   |   | Cl+Ex   |   |
| Detector 2 Channel         |   |   |   |   |   |   |  |   |   |   |   |   |
| Detector 2 Extend (s)      |   | 0.0   |   |   | 0.0   |   |  | 0.0   |   |   | 0.0   |   |
| Turn Type                  | pm+pt   |   |   | Perm  |   |   | Split  |   |   | Split   |   |   |
| Protected Phases           | 7   | 4   |   |   | 8   |   | 2  | 2   |   | 6   | 6   |   |
| Permitted Phases           | 4   |   |   | 8   |   |   |  |   |   |   |   |   |
| Detector Phase             | 7   | 4   |   | 8   | 8   |   | 2  | 2   |   | 6   | 6   |   |

Lanes, Volumes, Timings  
3: Brighton Avenue & Warwick Street

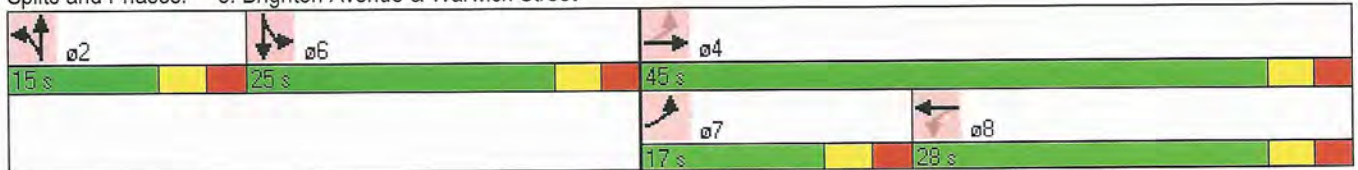
6/15/2016

| Lane Group              | EBL   | EBT   | EBR  | WBL   | WBT   | WBR  | NBL   | NBT   | NBR  | SBL   | SBT   | SBR  |
|-------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Switch Phase            |       |       |      |       |       |      |       |       |      |       |       |      |
| Minimum Initial (s)     | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0   |      |
| Minimum Split (s)       | 9.5   | 21.5  |      | 21.5  | 21.5  |      | 21.5  | 21.5  |      | 21.5  | 21.5  |      |
| Total Split (s)         | 17.0  | 45.0  | 0.0  | 28.0  | 28.0  | 0.0  | 15.0  | 15.0  | 0.0  | 25.0  | 25.0  | 0.0  |
| Total Split (%)         | 20.0% | 52.9% | 0.0% | 32.9% | 32.9% | 0.0% | 17.6% | 17.6% | 0.0% | 29.4% | 29.4% | 0.0% |
| Maximum Green (s)       | 11.5  | 39.5  |      | 22.5  | 22.5  |      | 9.5   | 9.5   |      | 19.5  | 19.5  |      |
| Yellow Time (s)         | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      |
| All-Red Time (s)        | 2.5   | 2.5   |      | 2.5   | 2.5   |      | 2.5   | 2.5   |      | 2.5   | 2.5   |      |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  |
| Total Lost Time (s)     | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   | 4.0  |
| Lead/Lag                | Lead  |       |      | Lag   |       |      | Lag   |       |      | Lag   |       |      |
| Lead-Lag Optimize?      | Yes   |       |      | Yes   |       |      | Yes   |       |      | Yes   |       |      |
| Vehicle Extension (s)   | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      |
| Recall Mode             | None  | None  |      | None  | None  |      | Min   | Min   |      | None  | None  |      |
| Walk Time (s)           |       | 5.0   |      | 5.0   | 5.0   |      | 5.0   | 5.0   |      | 5.0   | 5.0   |      |
| Flash Dont Walk (s)     |       | 11.0  |      | 11.0  | 11.0  |      | 11.0  | 11.0  |      | 11.0  | 11.0  |      |
| Pedestrian Calls (#/hr) |       | 0     |      | 0     | 0     |      | 0     | 0     |      | 0     | 0     |      |
| Act Effct Green (s)     |       | 38.9  |      | 38.9  | 38.9  |      | 6.3   | 6.3   |      | 12.8  | 12.8  |      |
| Actuated g/C Ratio      |       | 0.52  |      | 0.52  | 0.52  |      | 0.08  | 0.08  |      | 0.17  | 0.17  |      |
| v/c Ratio               |       | 0.76  |      | 0.51  | 0.51  |      | 0.14  | 0.14  |      | 0.66  | 0.66  |      |
| Control Delay           |       | 19.3  |      | 13.6  | 13.6  |      | 28.9  | 28.9  |      | 32.2  | 32.2  |      |
| Queue Delay             |       | 0.0   |      | 0.0   | 0.0   |      | 0.0   | 0.0   |      | 0.0   | 0.0   |      |
| Total Delay             |       | 19.3  |      | 13.6  | 13.6  |      | 28.9  | 28.9  |      | 32.2  | 32.2  |      |
| LOS                     |       | B     |      | B     | B     |      | C     | C     |      | C     | C     |      |
| Approach Delay          |       | 19.3  |      | 13.6  | 13.6  |      | 28.9  | 28.9  |      | 32.2  | 32.2  |      |
| Approach LOS            |       | B     |      | B     | B     |      | C     | C     |      | C     | C     |      |

Intersection Summary

Area Type: Other  
 Cycle Length: 85  
 Actuated Cycle Length: 74.7  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.76  
 Intersection Signal Delay: 18.4  
 Intersection Capacity Utilization 76.9%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service D

















Splits and Phases: 3: Brighton Avenue & Warwick Street



# HCM Signalized Intersection Capacity Analysis

## 3: Brighton Avenue & Warwick Street

6/15/2016

















|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement               | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations    |   |  |   |   |  |   |   |  |   |   |  |   |
| Volume (vph)           | 60  | 1055  | 9   | 5   | 713   | 67  | 12  | 0   | 6   | 80  | 0   | 72  |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)    |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |
| Lane Util. Factor      |   | 0.95  |   |   | 0.95  |   |   | 1.00  |   |   | 1.00  |   |
| Frbp, ped/bikes        |   | 1.00  |   |   | 1.00  |   |   | 0.99  |   |   | 0.99  |   |
| Flpb, ped/bikes        |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |
| Frnt                   |   | 1.00  |   |   | 0.99  |   |   | 0.95  |   |   | 0.94  |   |
| Flt Protected          |   | 1.00  |   |   | 1.00  |   |   | 0.97  |   |   | 0.97  |   |
| Satd. Flow (prot)      |   | 3526  |   |   | 3459  |   |   | 1745  |   |   | 1671  |   |
| Flt Permitted          |   | 0.85  |   |   | 0.95  |   |   | 0.97  |   |   | 0.97  |   |
| Satd. Flow (perm)      |   | 2995  |   |   | 3275  |   |   | 1745  |   |   | 1671  |   |
| Peak-hour factor, PHF  | 0.95  | 0.95  | 0.95  | 0.90  | 0.90  | 0.90  | 0.85  | 0.85  | 0.85  | 0.70  | 0.70  | 0.70  |
| Adj. Flow (vph)        | 63  | 1111  | 9   | 6   | 792   | 74  | 14  | 0   | 7   | 114   | 0   | 103   |
| RTOR Reduction (vph)   | 0   | 0   | 0   | 0   | 5   | 0   | 0   | 6   | 0   | 0   | 41  | 0   |
| Lane Group Flow (vph)  | 0   | 1183  | 0   | 0   | 867   | 0   | 0   | 15  | 0   | 0   | 176   | 0   |
| Confl. Peds. (#/hr)    |   |   |   |   |   |   | 5   |   | 5   | 2   |   | 2   |
| Heavy Vehicles (%)     | 2%  | 2%  | 2%  | 3%  | 3%  | 3%  | 0%  | 0%  | 0%  | 3%  | 3%  | 3%  |
| Turn Type              | pm+pt   |   |   | Perm  |   |   | Split   |   |   | Split   |   |   |
| Protected Phases       | 7   | 4   |   |   | 8   |   | 2   | 2   |   | 6   | 6   |   |
| Permitted Phases       | 4   |   |   | 8   |   |   |   |   |   |   |   |   |
| Actuated Green, G (s)  |   | 38.9  |   |   | 38.9  |   |   | 6.3   |   |   | 12.8  |   |
| Effective Green, g (s) |   | 38.9  |   |   | 38.9  |   |   | 6.3   |   |   | 12.8  |   |
| Actuated g/C Ratio     |   | 0.52  |   |   | 0.52  |   |   | 0.08  |   |   | 0.17  |   |
| Clearance Time (s)     |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |
| Vehicle Extension (s)  |   | 3.0   |   |   | 3.0   |   |   | 3.0   |   |   | 3.0   |   |
| Lane Grp Cap (vph)     |   | 1564  |   |   | 1710  |   |   | 148   |   |   | 287   |   |
| v/s Ratio Prot         |   |   |   |   |   |   |   | c0.01   |   |   | c0.11   |   |
| v/s Ratio Perm         |   | c0.39   |   |   | 0.26  |   |   |   |   |   |   |   |
| v/c Ratio              |   | 0.76  |   |   | 0.51  |   |   | 0.10  |   |   | 0.61  |   |
| Uniform Delay, d1      |   | 14.1  |   |   | 11.6  |   |   | 31.5  |   |   | 28.6  |   |
| Progression Factor     |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |
| Incremental Delay, d2  |   | 2.1   |   |   | 0.2   |   |   | 0.3   |   |   | 3.8   |   |
| Delay (s)              |   | 16.2  |   |   | 11.8  |   |   | 31.8  |   |   | 32.4  |   |
| Level of Service       |   | B   |   |   | B   |   |   | C   |   |   | C   |   |
| Approach Delay (s)     |   | 16.2  |   |   | 11.8  |   |   | 31.8  |   |   | 32.4  |   |
| Approach LOS           |   | B   |   |   | B   |   |   | C   |   |   | C   |   |

### Intersection Summary

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 16.2  | HCM Level of Service | B    |
| HCM Volume to Capacity ratio      | 0.65  |                      |      |
| Actuated Cycle Length (s)         | 74.5  | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 76.9% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Lanes, Volumes, Timings  
3: Brighton Avenue & Warwick Street

6/15/2016

|                            |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group                 | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations        |   |  |   |   |  |   |  |  |   |   |  |   |
| Volume (vph)               | 61  | 1100  | 9   | 5   | 773   | 68  | 12   | 0   | 6   | 82  | 0   | 73  |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Lane Util. Factor          | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Ped Bike Factor            |   |   |   |   |   |   |  | 0.99  |   |   | 0.99  |   |
| Fr't                       |   | 0.999   |   |   | 0.988   |   |  | 0.955   |   |   | 0.936   |   |
| Flt Protected              |   | 0.997   |   |   |   |   |  | 0.968   |   |   | 0.974   |   |
| Satd. Flow (prot)          | 0   | 3525  | 0   | 0   | 3463  | 0   | 0  | 1745  | 0   | 0   | 1670  | 0   |
| Flt Permitted              |   | 0.836   |   |   | 0.947   |   |  | 0.968   |   |   | 0.974   |   |
| Satd. Flow (perm)          | 0   | 2956  | 0   | 0   | 3279  | 0   | 0  | 1738  | 0   | 0   | 1667  | 0   |
| Right Turn on Red          |   |   | Yes   |   |   | Yes   |  |   | Yes   |   |   | Yes   |
| Satd. Flow (RTOR)          |   | 1   |   |   | 10  |   |  | 7   |   |   | 49  |   |
| Link Speed (mph)           |   | 25  |   |   | 25  |   |  | 25  |   |   | 25  |   |
| Link Distance (ft)         |   | 75  |   |   | 1330  |   |  | 316   |   |   | 628   |   |
| Travel Time (s)            |   | 2.0   |   |   | 36.3  |   |  | 8.6   |   |   | 17.1  |   |
| Confl. Peds. (#/hr)        |   |   |   |   |   |   | 5  |   | 5   | 2   |   | 2   |
| Peak Hour Factor           | 0.95  | 0.95  | 0.95  | 0.90  | 0.90  | 0.90  | 0.85   | 0.85  | 0.85  | 0.70  | 0.70  | 0.70  |
| Heavy Vehicles (%)         | 2%  | 2%  | 2%  | 3%  | 3%  | 3%  | 0%   | 0%  | 0%  | 3%  | 3%  | 3%  |
| Adj. Flow (vph)            | 64  | 1158  | 9   | 6   | 859   | 76  | 14   | 0   | 7   | 117   | 0   | 104   |
| Shared Lane Traffic (%)    |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)      | 0   | 1231  | 0   | 0   | 941   | 0   | 0  | 21  | 0   | 0   | 221   | 0   |
| Enter Blocked Intersection | No  | No  | No  | No  | No  | No  | No   | No  | No  | No  | No  | No  |
| Lane Alignment             | Left  | Left  | Right   | Left  | Left  | Right   | Left   | Left  | Right   | Left  | Left  | Right   |
| Median Width(ft)           |   | 0   |   |   | 0   |   |  | 0   |   |   | 0   |   |
| Link Offset(ft)            |   | 0   |   |   | 0   |   |  | -10   |   |   | -65   |   |
| Crosswalk Width(ft)        |   | 16  |   |   | 16  |   |  | 16  |   |   | 16  |   |
| Two way Left Turn Lane     |   |   |   |   |   |   |  |   |   |   |   |   |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Turning Speed (mph)        | 15  |   | 9   | 15  |   | 9   | 15   |   | 9   | 15  |   | 9   |
| Number of Detectors        | 1   | 2   |   | 1   | 2   |   | 1  | 2   |   | 1   | 2   |   |
| Detector Template          | Left  | Thru  |   | Left  | Thru  |   | Left   | Thru  |   | Left  | Thru  |   |
| Leading Detector (ft)      | 20  | 100   |   | 20  | 100   |   | 20   | 100   |   | 20  | 100   |   |
| Trailing Detector (ft)     | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Detector 1 Position(ft)    | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Detector 1 Size(ft)        | 20  | 6   |   | 20  | 6   |   | 20   | 6   |   | 20  | 6   |   |
| Detector 1 Type            | CI+Ex   | CI+Ex   |   | CI+Ex   | CI+Ex   |   | CI+Ex  | CI+Ex   |   | CI+Ex   | CI+Ex   |   |
| Detector 1 Channel         |   |   |   |   |   |   |  |   |   |   |   |   |
| Detector 1 Extend (s)      | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |
| Detector 1 Queue (s)       | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |
| Detector 1 Delay (s)       | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |
| Detector 2 Position(ft)    |   | 94  |   |   | 94  |   |  | 94  |   |   | 94  |   |
| Detector 2 Size(ft)        |   | 6   |   |   | 6   |   |  | 6   |   |   | 6   |   |
| Detector 2 Type            |   | CI+Ex   |   |   | CI+Ex   |   |  | CI+Ex   |   |   | CI+Ex   |   |
| Detector 2 Channel         |   |   |   |   |   |   |  |   |   |   |   |   |
| Detector 2 Extend (s)      |   | 0.0   |   |   | 0.0   |   |  | 0.0   |   |   | 0.0   |   |
| Turn Type                  | pm+pt   |   |   | Perm  |   |   | Split  |   |   | Split   |   |   |
| Protected Phases           | 7   | 4   |   |   | 8   |   | 2  | 2   |   | 6   | 6   |   |
| Permitted Phases           | 4   |   |   | 8   |   |   |  |   |   |   |   |   |
| Detector Phase             | 7   | 4   |   | 8   | 8   |   | 2  | 2   |   | 6   | 6   |   |

Lanes, Volumes, Timings  
3: Brighton Avenue & Warwick Street

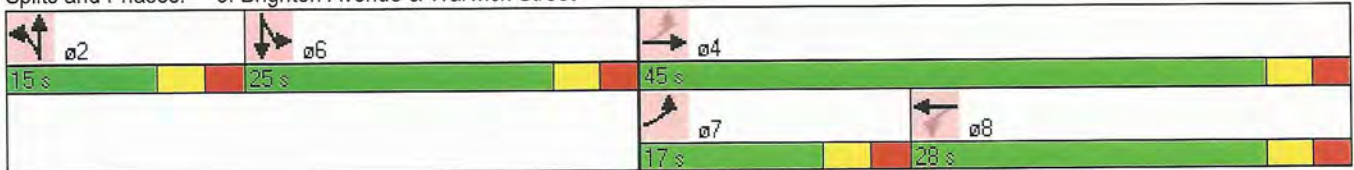
6/15/2016

| Lane Group              | EBL   | EBT   | EBR  | WBL   | WBT   | WBR  | NBL   | NBT   | NBR  | SBL   | SBT   | SBR  |
|-------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Switch Phase            |       |       |      |       |       |      |       |       |      |       |       |      |
| Minimum Initial (s)     | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0   |      |
| Minimum Split (s)       | 9.5   | 21.5  |      | 21.5  | 21.5  |      | 21.5  | 21.5  |      | 21.5  | 21.5  |      |
| Total Split (s)         | 17.0  | 45.0  | 0.0  | 28.0  | 28.0  | 0.0  | 15.0  | 15.0  | 0.0  | 25.0  | 25.0  | 0.0  |
| Total Split (%)         | 20.0% | 52.9% | 0.0% | 32.9% | 32.9% | 0.0% | 17.6% | 17.6% | 0.0% | 29.4% | 29.4% | 0.0% |
| Maximum Green (s)       | 11.5  | 39.5  |      | 22.5  | 22.5  |      | 9.5   | 9.5   |      | 19.5  | 19.5  |      |
| Yellow Time (s)         | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      |
| All-Red Time (s)        | 2.5   | 2.5   |      | 2.5   | 2.5   |      | 2.5   | 2.5   |      | 2.5   | 2.5   |      |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  |
| Total Lost Time (s)     | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   | 4.0  |
| Lead/Lag                | Lead  |       |      | Lag   |       |      | Lag   |       |      | Lag   |       |      |
| Lead-Lag Optimize?      | Yes   |       |      | Yes   |       |      | Yes   |       |      | Yes   |       |      |
| Vehicle Extension (s)   | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      |
| Recall Mode             | None  | None  |      | None  | None  |      | Min   | Min   |      | None  | None  |      |
| Walk Time (s)           |       | 5.0   |      | 5.0   | 5.0   |      | 5.0   | 5.0   |      | 5.0   | 5.0   |      |
| Flash Dont Walk (s)     |       | 11.0  |      | 11.0  | 11.0  |      | 11.0  | 11.0  |      | 11.0  | 11.0  |      |
| Pedestrian Calls (#/hr) |       | 0     |      | 0     | 0     |      | 0     | 0     |      | 0     | 0     |      |
| Act Effct Green (s)     |       | 39.7  |      |       | 39.7  |      |       | 6.3   |      |       | 13.1  |      |
| Actuated g/C Ratio      |       | 0.53  |      |       | 0.53  |      |       | 0.08  |      |       | 0.17  |      |
| v/c Ratio               |       | 0.79  |      |       | 0.55  |      |       | 0.14  |      |       | 0.67  |      |
| Control Delay           |       | 20.9  |      |       | 14.2  |      |       | 29.1  |      |       | 33.0  |      |
| Queue Delay             |       | 0.0   |      |       | 0.0   |      |       | 0.0   |      |       | 0.0   |      |
| Total Delay             |       | 20.9  |      |       | 14.2  |      |       | 29.1  |      |       | 33.0  |      |
| LOS                     |       | C     |      |       | B     |      |       | C     |      |       | C     |      |
| Approach Delay          |       | 20.9  |      |       | 14.2  |      |       | 29.1  |      |       | 33.0  |      |
| Approach LOS            |       | C     |      |       | B     |      |       | C     |      |       | C     |      |

Intersection Summary

Area Type: Other  
 Cycle Length: 85  
 Actuated Cycle Length: 75.6  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.79  
 Intersection Signal Delay: 19.4  
 Intersection Capacity Utilization 80.0%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service D

















Splits and Phases: 3: Brighton Avenue & Warwick Street



# HCM Signalized Intersection Capacity Analysis

## 3: Brighton Avenue & Warwick Street

6/15/2016

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement               | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations    |   |  |   |   |  |   |   |  |   |   |  |   |
| Volume (vph)           | 61  | 1100  | 9   | 5   | 773   | 68  | 12  | 0   | 6   | 82  | 0   | 73  |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)    |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |
| Lane Util. Factor      |   | 0.95  |   |   | 0.95  |   |   | 1.00  |   |   | 1.00  |   |
| Frbp, ped/bikes        |   | 1.00  |   |   | 1.00  |   |   | 0.99  |   |   | 0.99  |   |
| Flpb, ped/bikes        |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |
| Frt                    |   | 1.00  |   |   | 0.99  |   |   | 0.95  |   |   | 0.94  |   |
| Flt Protected          |   | 1.00  |   |   | 1.00  |   |   | 0.97  |   |   | 0.97  |   |
| Satd. Flow (prot)      |   | 3526  |   |   | 3461  |   |   | 1745  |   |   | 1671  |   |
| Flt Permitted          |   | 0.84  |   |   | 0.95  |   |   | 0.97  |   |   | 0.97  |   |
| Satd. Flow (perm)      |   | 2955  |   |   | 3278  |   |   | 1745  |   |   | 1671  |   |
| Peak-hour factor, PHF  | 0.95  | 0.95  | 0.95  | 0.90  | 0.90  | 0.90  | 0.85  | 0.85  | 0.85  | 0.70  | 0.70  | 0.70  |
| Adj. Flow (vph)        | 64  | 1158  | 9   | 6   | 859   | 76  | 14  | 0   | 7   | 117   | 0   | 104   |
| RTOR Reduction (vph)   | 0   | 0   | 0   | 0   | 5   | 0   | 0   | 6   | 0   | 0   | 41  | 0   |
| Lane Group Flow (vph)  | 0   | 1231  | 0   | 0   | 936   | 0   | 0   | 15  | 0   | 0   | 180   | 0   |
| Confl. Peds. (#/hr)    |   |   |   |   |   |   | 5   |   | 5   | 2   |   | 2   |
| Heavy Vehicles (%)     | 2%  | 2%  | 2%  | 3%  | 3%  | 3%  | 0%  | 0%  | 0%  | 3%  | 3%  | 3%  |
| Turn Type              | pm+pt   |   |   | Perm  |   |   | Split   |   |   | Split   |   |   |
| Protected Phases       | 7   | 4   |   |   | 8   |   | 2   | 2   |   | 6   | 6   |   |
| Permitted Phases       | 4   |   |   | 8   |   |   |   |   |   |   |   |   |
| Actuated Green, G (s)  |   | 39.7  |   |   | 39.7  |   |   | 6.3   |   |   | 13.1  |   |
| Effective Green, g (s) |   | 39.7  |   |   | 39.7  |   |   | 6.3   |   |   | 13.1  |   |
| Actuated g/C Ratio     |   | 0.53  |   |   | 0.53  |   |   | 0.08  |   |   | 0.17  |   |
| Clearance Time (s)     |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |
| Vehicle Extension (s)  |   | 3.0   |   |   | 3.0   |   |   | 3.0   |   |   | 3.0   |   |
| Lane Grp Cap (vph)     |   | 1552  |   |   | 1721  |   |   | 145   |   |   | 290   |   |
| v/s Ratio Prot         |   |   |   |   |   |   |   | c0.01   |   |   | c0.11   |   |
| v/s Ratio Perm         |   | c0.42   |   |   | 0.29  |   |   |   |   |   |   |   |
| v/c Ratio              |   | 0.79  |   |   | 0.54  |   |   | 0.10  |   |   | 0.62  |   |
| Uniform Delay, d1      |   | 14.6  |   |   | 11.9  |   |   | 32.0  |   |   | 29.0  |   |
| Progression Factor     |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |
| Incremental Delay, d2  |   | 2.9   |   |   | 0.4   |   |   | 0.3   |   |   | 4.1   |   |
| Delay (s)              |   | 17.5  |   |   | 12.3  |   |   | 32.3  |   |   | 33.1  |   |
| Level of Service       |   | B   |   |   | B   |   |   | C   |   |   | C   |   |
| Approach Delay (s)     |   | 17.5  |   |   | 12.3  |   |   | 32.3  |   |   | 33.1  |   |
| Approach LOS           |   | B   |   |   | B   |   |   | C   |   |   | C   |   |


















### Intersection Summary

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 17.0  | HCM Level of Service | B    |
| HCM Volume to Capacity ratio      | 0.68  |                      |      |
| Actuated Cycle Length (s)         | 75.6  | Sum of lost time (s) | 16.5 |
| Intersection Capacity Utilization | 80.0% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |



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|                            |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|--|---|---|---|---|---|---|
| Lane Group                 | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |   |
| Lane Configurations        |   |  |   |   |  |   |  |  |   |   |   |  |   |
| Volume (vph)               | 69  | 1100  | 9   | 5   | 773   | 78  | 12   | 0   | 6   | 92  | 0   | 83  |   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |   |
| Lane Util. Factor          | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |
| Ped Bike Factor            |   |   |   |   |   |   |  | 0.99  |   |   | 0.99  |   |   |
| Frnt                       |   | 0.999   |   |   | 0.986   |   |  | 0.955   |   |   | 0.936   |   |   |
| Flt Protected              |   | 0.997   |   |   |   |   |  | 0.968   |   |   | 0.974   |   |   |
| Satd. Flow (prot)          | 0   | 3525  | 0   | 0   | 3456  | 0   | 0  | 1745  | 0   | 0   | 1670  | 0   |   |
| Flt Permitted              |   | 0.794   |   |   | 0.947   |   |  | 0.968   |   |   | 0.974   |   |   |
| Satd. Flow (perm)          | 0   | 2807  | 0   | 0   | 3273  | 0   | 0  | 1738  | 0   | 0   | 1667  | 0   |   |
| Right Turn on Red          |   |   | Yes   |   |   | Yes   |  |   | Yes   |   |   | Yes   |   |
| Satd. Flow (RTOR)          |   | 1   |   |   | 12  |   |  | 7   |   |   | 50  |   |   |
| Link Speed (mph)           |   | 25  |   |   | 25  |   |  | 25  |   |   | 25  |   |   |
| Link Distance (ft)         |   | 75  |   |   | 1330  |   |  | 316   |   |   | 628   |   |   |
| Travel Time (s)            |   | 2.0   |   |   | 36.3  |   |  | 8.6   |   |   | 17.1  |   |   |
| Confl. Peds. (#/hr)        |   |   |   |   |   |   | 5  |   | 5   | 2   |   | 2   |   |
| Peak Hour Factor           | 0.95  | 0.95  | 0.95  | 0.90  | 0.90  | 0.90  | 0.85   | 0.85  | 0.85  | 0.70  | 0.70  | 0.70  |   |
| Heavy Vehicles (%)         | 2%  | 2%  | 2%  | 3%  | 3%  | 3%  | 0%   | 0%  | 0%  | 3%  | 3%  | 3%  |   |
| Adj. Flow (vph)            | 73  | 1158  | 9   | 6   | 859   | 87  | 14   | 0   | 7   | 131   | 0   | 119   |   |
| Shared Lane Traffic (%)    |   |   |   |   |   |   |  |   |   |   |   |   |   |
| Lane Group Flow (vph)      | 0   | 1240  | 0   | 0   | 952   | 0   | 0  | 21  | 0   | 0   | 250   | 0   |   |
| Enter Blocked Intersection | No  | No  | No  | No  | No  | No  | No   | No  | No  | No  | No  | No  |   |
| Lane Alignment             | Left  | Left  | Right   | Left  | Left  | Right   | Left   | Left  | Right   | Left  | Left  | Right   |   |
| Median Width(ft)           |   | 0   |   |   | 0   |   |  | 0   |   |   | 0   |   |   |
| Link Offset(ft)            |   | 0   |   |   | 0   |   |  | -10   |   |   | -65   |   |   |
| Crosswalk Width(ft)        |   | 16  |   |   | 16  |   |  | 16  |   |   | 16  |   |   |
| Two way Left Turn Lane     |   |   |   |   |   |   |  |   |   |   |   |   |   |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |
| Turning Speed (mph)        | 15  |   | 9   | 15  |   | 9   | 15   |   | 9   | 15  |   | 9   |   |
| Number of Detectors        | 1   | 2   |   | 1   | 2   |   | 1  | 2   |   | 1   | 2   |   |   |
| Detector Template          | Left  | Thru  |   | Left  | Thru  |   | Left   | Thru  |   | Left  | Thru  |   |   |
| Leading Detector (ft)      | 20  | 100   |   | 20  | 100   |   | 20   | 100   |   | 20  | 100   |   |   |
| Trailing Detector (ft)     | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |   |
| Detector 1 Position(ft)    | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |   |
| Detector 1 Size(ft)        | 20  | 6   |   | 20  | 6   |   | 20   | 6   |   | 20  | 6   |   |   |
| Detector 1 Type            | Cl+Ex   | Cl+Ex   |   | Cl+Ex   | Cl+Ex   |   | Cl+Ex  | Cl+Ex   |   | Cl+Ex   | Cl+Ex   |   |   |
| Detector 1 Channel         |   |   |   |   |   |   |  |   |   |   |   |   |   |
| Detector 1 Extend (s)      | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |   |
| Detector 1 Queue (s)       | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |   |
| Detector 1 Delay (s)       | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |   |
| Detector 2 Position(ft)    |   | 94  |   |   | 94  |   |  | 94  |   |   | 94  |   |   |
| Detector 2 Size(ft)        |   | 6   |   |   | 6   |   |  | 6   |   |   | 6   |   |   |
| Detector 2 Type            |   | Cl+Ex   |   |   | Cl+Ex   |   |  | Cl+Ex   |   |   | Cl+Ex   |   |   |
| Detector 2 Channel         |   |   |   |   |   |   |  |   |   |   |   |   |   |
| Detector 2 Extend (s)      |   | 0.0   |   |   | 0.0   |   |  | 0.0   |   |   | 0.0   |   |   |
| Turn Type                  | pm+pt   |   |   | Perm  |   |   | Split  |   |   | Split   |   |   |   |
| Protected Phases           | 7   | 4   |   |   | 8   |   | 2  | 2   |   | 6   | 6   |   |   |
| Permitted Phases           | 4   |   |   | 8   |   |   |  |   |   |   |   |   |   |
| Detector Phase             | 7   | 4   |   | 8   | 8   |   | 2  | 2   |   | 6   | 6   |   |   |

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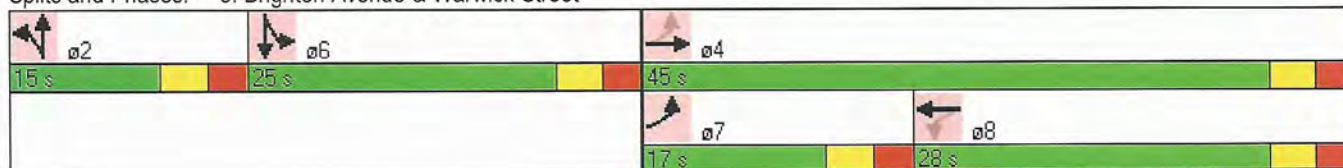


| Lane Group              | EBL   | EBT   | EBR  | WBL   | WBT   | WBR  | NBL   | NBT   | NBR  | SBL   | SBT   | SBR  |
|-------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Switch Phase            |       |       |      |       |       |      |       |       |      |       |       |      |
| Minimum Initial (s)     | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0   |      |
| Minimum Split (s)       | 9.5   | 21.5  |      | 21.5  | 21.5  |      | 21.5  | 21.5  |      | 21.5  | 21.5  |      |
| Total Split (s)         | 17.0  | 45.0  | 0.0  | 28.0  | 28.0  | 0.0  | 15.0  | 15.0  | 0.0  | 25.0  | 25.0  | 0.0  |
| Total Split (%)         | 20.0% | 52.9% | 0.0% | 32.9% | 32.9% | 0.0% | 17.6% | 17.6% | 0.0% | 29.4% | 29.4% | 0.0% |
| Maximum Green (s)       | 11.5  | 39.5  |      | 22.5  | 22.5  |      | 9.5   | 9.5   |      | 19.5  | 19.5  |      |
| Yellow Time (s)         | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      |
| All-Red Time (s)        | 2.5   | 2.5   |      | 2.5   | 2.5   |      | 2.5   | 2.5   |      | 2.5   | 2.5   |      |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  |
| Total Lost Time (s)     | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   | 4.0  |
| Lead/Lag                | Lead  |       |      | Lag   | Lag   |      |       |       |      |       |       |      |
| Lead-Lag Optimize?      | Yes   |       |      | Yes   | Yes   |      |       |       |      |       |       |      |
| Vehicle Extension (s)   | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      |
| Recall Mode             | None  | None  |      | None  | None  |      | Min   | Min   |      | None  | None  |      |
| Walk Time (s)           |       | 5.0   |      | 5.0   | 5.0   |      | 5.0   | 5.0   |      | 5.0   | 5.0   |      |
| Flash Dont Walk (s)     |       | 11.0  |      | 11.0  | 11.0  |      | 11.0  | 11.0  |      | 11.0  | 11.0  |      |
| Pedestrian Calls (#/hr) |       | 0     |      | 0     | 0     |      | 0     | 0     |      | 0     | 0     |      |
| Act Effct Green (s)     |       | 39.7  |      |       | 39.7  |      |       | 6.3   |      |       | 14.2  |      |
| Actuated g/C Ratio      |       | 0.52  |      |       | 0.52  |      |       | 0.08  |      |       | 0.19  |      |
| v/c Ratio               |       | 0.85  |      |       | 0.56  |      |       | 0.14  |      |       | 0.72  |      |
| Control Delay           |       | 24.8  |      |       | 14.8  |      |       | 29.4  |      |       | 35.3  |      |
| Queue Delay             |       | 0.0   |      |       | 0.0   |      |       | 0.0   |      |       | 0.0   |      |
| Total Delay             |       | 24.8  |      |       | 14.8  |      |       | 29.4  |      |       | 35.3  |      |
| LOS                     |       | C     |      |       | B     |      |       | C     |      |       | D     |      |
| Approach Delay          |       | 24.8  |      |       | 14.8  |      |       | 29.4  |      |       | 35.3  |      |
| Approach LOS            |       | C     |      |       | B     |      |       | C     |      |       | D     |      |

Intersection Summary

Area Type: Other  
 Cycle Length: 85  
 Actuated Cycle Length: 76.7  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 22.1  
 Intersection Capacity Utilization 81.8%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service D

















Splits and Phases: 3: Brighton Avenue & Warwick Street



# HCM Signalized Intersection Capacity Analysis

















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|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations               |   |  |   |   |  |   |   |  |   |   |  |   |
| Volume (vph)                      | 69  | 1100  | 9   | 5   | 773   | 78  | 12  | 0   | 6   | 92  | 0   | 83  |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |
| Lane Util. Factor                 |   | 0.95  |   |   | 0.95  |   |   | 1.00  |   |   | 1.00  |   |
| Frbp, ped/bikes                   |   | 1.00  |   |   | 1.00  |   |   | 0.99  |   |   | 0.99  |   |
| Flpb, ped/bikes                   |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |
| Frt                               |   | 1.00  |   |   | 0.99  |   |   | 0.95  |   |   | 0.94  |   |
| Flt Protected                     |   | 1.00  |   |   | 1.00  |   |   | 0.97  |   |   | 0.97  |   |
| Satd. Flow (prot)                 |   | 3525  |   |   | 3456  |   |   | 1745  |   |   | 1670  |   |
| Flt Permitted                     |   | 0.79  |   |   | 0.95  |   |   | 0.97  |   |   | 0.97  |   |
| Satd. Flow (perm)                 |   | 2808  |   |   | 3272  |   |   | 1745  |   |   | 1670  |   |
| Peak-hour factor, PHF             | 0.95  | 0.95  | 0.95  | 0.90  | 0.90  | 0.90  | 0.85  | 0.85  | 0.85  | 0.70  | 0.70  | 0.70  |
| Adj. Flow (vph)                   | 73  | 1158  | 9   | 6   | 859   | 87  | 14  | 0   | 7   | 131   | 0   | 119   |
| RTOR Reduction (vph)              | 0   | 0   | 0   | 0   | 6   | 0   | 0   | 6   | 0   | 0   | 41  | 0   |
| Lane Group Flow (vph)             | 0   | 1240  | 0   | 0   | 946   | 0   | 0   | 15  | 0   | 0   | 209   | 0   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   | 5   |   | 5   | 2   |   | 2   |
| Heavy Vehicles (%)                | 2%  | 2%  | 2%  | 3%  | 3%  | 3%  | 0%  | 0%  | 0%  | 3%  | 3%  | 3%  |
| Turn Type                         | pm+pt   |   |   | Perm  |   |   | Split   |   |   | Split   |   |   |
| Protected Phases                  | 7   | 4   |   |   | 8   |   | 2   | 2   |   | 6   | 6   |   |
| Permitted Phases                  | 4   |   |   | 8   |   |   |   |   |   |   |   |   |
| Actuated Green, G (s)             |   | 39.7  |   |   | 39.7  |   |   | 6.3   |   |   | 14.2  |   |
| Effective Green, g (s)            |   | 39.7  |   |   | 39.7  |   |   | 6.3   |   |   | 14.2  |   |
| Actuated g/C Ratio                |   | 0.52  |   |   | 0.52  |   |   | 0.08  |   |   | 0.19  |   |
| Clearance Time (s)                |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |   | 5.5   |   |
| Vehicle Extension (s)             |   | 3.0   |   |   | 3.0   |   |   | 3.0   |   |   | 3.0   |   |
| Lane Grp Cap (vph)                |   | 1453  |   |   | 1694  |   |   | 143   |   |   | 309   |   |
| v/s Ratio Prot                    |   |   |   |   |   |   |   | c0.01   |   |   | c0.13   |   |
| v/s Ratio Perm                    |   | c0.44   |   |   | 0.29  |   |   |   |   |   |   |   |
| v/c Ratio                         |   | 0.85  |   |   | 0.56  |   |   | 0.10  |   |   | 0.68  |   |
| Uniform Delay, d1                 |   | 16.0  |   |   | 12.6  |   |   | 32.6  |   |   | 29.1  |   |
| Progression Factor                |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |   | 1.00  |   |
| Incremental Delay, d2             |   | 5.1   |   |   | 0.4   |   |   | 0.3   |   |   | 5.8   |   |
| Delay (s)                         |   | 21.1  |   |   | 13.0  |   |   | 32.9  |   |   | 34.9  |   |
| Level of Service                  |   | C   |   |   | B   |   |   | C   |   |   | C   |   |
| Approach Delay (s)                |   | 21.1  |   |   | 13.0  |   |   | 32.9  |   |   | 34.9  |   |
| Approach LOS                      |   | C   |   |   | B   |   |   | C   |   |   | C   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |   |   |   |   |   |   |
| HCM Average Control Delay         |   |   | 19.4  |   |   | HCM Level of Service  |   |   | B   |   |   |   |
| HCM Volume to Capacity ratio      |   |   | 0.73  |   |   |   |   |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 76.7  |   |   | Sum of lost time (s)  |   | 16.5  |   |   |   |   |
| Intersection Capacity Utilization |   |   | 81.8%   |   |   | ICU Level of Service  |   |   | D   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |   |   |   |   |   |   |
| c                                 | Critical Lane Group   |   |   |   |   |   |   |   |   |   |   |   |

Lanes, Volumes, Timings  
7: Riggs Street & Warwick Street

6/15/2016

|                            |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group                 | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations        |   |  |   |   |  |   |  |  |   |   |  |   |
| Volume (vph)               | 0   | 0   | 1   | 7   | 0   | 30  | 0  | 104   | 4   | 18  | 137   | 0   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Lane Util. Factor          | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Ped Bike Factor            |   |   |   |   |   |   |  |   |   |   |   |   |
| Frt                        |   | 0.865   |   |   | 0.891   |   |  | 0.995   |   |   |   |   |
| Flt Protected              |   |   |   |   | 0.991   |   |  |   |   |   | 0.994   |   |
| Satd. Flow (prot)          | 0   | 1644  | 0   | 0   | 1645  | 0   | 0  | 1835  | 0   | 0   | 1834  | 0   |
| Flt Permitted              |   |   |   |   | 0.991   |   |  |   |   |   | 0.994   |   |
| Satd. Flow (perm)          | 0   | 1644  | 0   | 0   | 1645  | 0   | 0  | 1835  | 0   | 0   | 1834  | 0   |
| Link Speed (mph)           |   | 25  |   |   | 25  |   |  | 25  |   |   | 25  |   |
| Link Distance (ft)         |   | 259   |   |   | 578   |   |  | 628   |   |   | 410   |   |
| Travel Time (s)            |   | 7.1   |   |   | 15.8  |   |  | 17.1  |   |   | 11.2  |   |
| Confl. Peds. (#/hr)        | 4   |   | 4   | 7   |   | 7   | 15   |   | 15  | 15  |   | 15  |
| Peak Hour Factor           | 0.80  | 0.80  | 0.80  | 0.80  | 0.80  | 0.80  | 0.75   | 0.75  | 0.75  | 0.75  | 0.75  | 0.75  |
| Heavy Vehicles (%)         | 0%  | 0%  | 0%  | 2%  | 2%  | 2%  | 3%   | 3%  | 3%  | 3%  | 3%  | 3%  |
| Adj. Flow (vph)            | 0   | 0   | 1   | 9   | 0   | 38  | 0  | 139   | 5   | 24  | 183   | 0   |
| Shared Lane Traffic (%)    |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)      | 0   | 1   | 0   | 0   | 47  | 0   | 0  | 144   | 0   | 0   | 207   | 0   |
| Enter Blocked Intersection | No  | No  | No  | No  | No  | No  | No   | No  | No  | No  | No  | No  |
| Lane Alignment             | Left  | Left  | Right   | Left  | Left  | Right   | Left   | Left  | Right   | Left  | Left  | Right   |
| Median Width(ft)           |   | 0   |   |   | 0   |   |  | 0   |   |   | 0   |   |
| Link Offset(ft)            |   | 0   |   |   | 0   |   |  | 0   |   |   | 0   |   |
| Crosswalk Width(ft)        |   | 16  |   |   | 16  |   |  | 16  |   |   | 16  |   |
| Two way Left Turn Lane     |   |   |   |   |   |   |  |   |   |   |   |   |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Turning Speed (mph)        | 15  |   | 9   | 15  |   | 9   | 15   |   | 9   | 15  |   | 9   |
| Sign Control               |   | Stop  |   |   | Stop  |   |  | Free  |   |   | Free  |   |

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized  
 Intersection Capacity Utilization 31.6% ICU Level of Service A  
 Analysis Period (min) 15

# HCM Unsignalized Intersection Capacity Analysis

## 7: Riggs Street & Warwick Street

6/15/2016

| Movement               | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations    |      |      |      |      |      |      |      |      |      |      |      |      |
| Volume (veh/h)         | 0    | 0    | 1    | 7    | 0    | 30   | 0    | 104  | 4    | 18   | 137  | 0    |
| Sign Control           |      | Stop |      |      | Stop |      |      | Free |      |      | Free |      |
| Grade                  |      | 0%   |      |      | 0%   |      |      | 0%   |      |      | 0%   |      |
| Peak Hour Factor       | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Hourly flow rate (vph) | 0    | 0    | 1    | 9    | 0    | 38   | 0    | 139  | 5    | 24   | 183  | 0    |
| Pedestrians            |      | 15   |      |      | 15   |      |      | 7    |      |      | 7    |      |
| Lane Width (ft)        |      | 12.0 |      |      | 12.0 |      |      | 12.0 |      |      | 12.0 |      |
| Walking Speed (ft/s)   |      | 4.0  |      |      | 4.0  |      |      | 4.0  |      |      | 4.0  |      |
| Percent Blockage       |      | 1    |      |      | 1    |      |      | 1    |      |      | 1    |      |
| Right turn flare (veh) |      |      |      |      |      |      |      |      |      |      |      |      |
| Median type            |      |      |      |      |      |      |      | None |      |      | None |      |
| Median storage (veh)   |      |      |      |      |      |      |      |      |      |      |      |      |
| Upstream signal (ft)   |      |      |      |      |      |      |      | 628  |      |      |      |      |
| pX, platoon unblocked  |      |      |      |      |      |      |      |      |      |      |      |      |
| vC, conflicting volume | 432  | 405  | 205  | 395  | 402  | 163  | 198  |      |      | 159  |      |      |
| vC1, stage 1 conf vol  |      |      |      |      |      |      |      |      |      |      |      |      |
| vC2, stage 2 conf vol  |      |      |      |      |      |      |      |      |      |      |      |      |
| vCu, unblocked vol     | 432  | 405  | 205  | 395  | 402  | 163  | 198  |      |      | 159  |      |      |
| tC, single (s)         | 7.1  | 6.5  | 6.2  | 7.1  | 6.5  | 6.2  | 4.1  |      |      | 4.1  |      |      |
| tC, 2 stage (s)        |      |      |      |      |      |      |      |      |      |      |      |      |
| tF (s)                 | 3.5  | 4.0  | 3.3  | 3.5  | 4.0  | 3.3  | 2.2  |      |      | 2.2  |      |      |
| p0 queue free %        | 100  | 100  | 100  | 98   | 100  | 96   | 100  |      |      | 98   |      |      |
| cM capacity (veh/h)    | 489  | 516  | 826  | 536  | 515  | 865  | 1352 |      |      | 1397 |      |      |

















| Direction, Lane #      | EB 1 | WB 1 | NB 1 | SB 1 |
|------------------------|------|------|------|------|
| Volume Total           | 1    | 46   | 144  | 207  |
| Volume Left            | 0    | 9    | 0    | 24   |
| Volume Right           | 1    | 38   | 5    | 0    |
| cSH                    | 826  | 775  | 1352 | 1397 |
| Volume to Capacity     | 0.00 | 0.06 | 0.00 | 0.02 |
| Queue Length 95th (ft) | 0    | 5    | 0    | 1    |
| Control Delay (s)      | 9.4  | 9.9  | 0.0  | 1.0  |
| Lane LOS               | A    | A    |      | A    |
| Approach Delay (s)     | 9.4  | 9.9  | 0.0  | 1.0  |
| Approach LOS           | A    | A    |      |      |

### Intersection Summary

|                                   |       |                      |   |
|-----------------------------------|-------|----------------------|---|
| Average Delay                     | 1.7   |                      |   |
| Intersection Capacity Utilization | 31.6% | ICU Level of Service | A |
| Analysis Period (min)             | 15    |                      |   |

Lanes, Volumes, Timings  
7: Riggs Street & Warwick Street

6/15/2016

|                            |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group                 | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations        |   |  |   |   |  |   |  |  |   |   |  |   |
| Volume (vph)               | 0   | 0   | 1   | 7   | 0   | 30  | 0  | 104   | 4   | 18  | 138   | 0   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Lane Util. Factor          | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Ped Bike Factor            |   |   |   |   |   |   |  |   |   |   |   |   |
| Frt                        |   | 0.865   |   |   | 0.891   |   |  | 0.995   |   |   |   |   |
| Flt Protected              |   |   |   |   | 0.991   |   |  |   |   |   | 0.994   |   |
| Satd. Flow (prot)          | 0   | 1644  | 0   | 0   | 1645  | 0   | 0  | 1835  | 0   | 0   | 1834  | 0   |
| Flt Permitted              |   |   |   |   | 0.991   |   |  |   |   |   | 0.994   |   |
| Satd. Flow (perm)          | 0   | 1644  | 0   | 0   | 1645  | 0   | 0  | 1835  | 0   | 0   | 1834  | 0   |
| Link Speed (mph)           |   | 25  |   |   | 25  |   |  | 25  |   |   | 25  |   |
| Link Distance (ft)         |   | 259   |   |   | 578   |   |  | 628   |   |   | 410   |   |
| Travel Time (s)            |   | 7.1   |   |   | 15.8  |   |  | 17.1  |   |   | 11.2  |   |
| Confl. Peds. (#/hr)        | 7   |   | 7   | 4   |   | 4   | 15   |   | 15  | 15  |   | 15  |
| Peak Hour Factor           | 0.80  | 0.80  | 0.80  | 0.80  | 0.80  | 0.80  | 0.75   | 0.75  | 0.75  | 0.75  | 0.75  | 0.75  |
| Heavy Vehicles (%)         | 0%  | 0%  | 0%  | 2%  | 2%  | 2%  | 3%   | 3%  | 3%  | 3%  | 3%  | 3%  |
| Adj. Flow (vph)            | 0   | 0   | 1   | 9   | 0   | 38  | 0  | 139   | 5   | 24  | 184   | 0   |
| Shared Lane Traffic (%)    |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)      | 0   | 1   | 0   | 0   | 47  | 0   | 0  | 144   | 0   | 0   | 208   | 0   |
| Enter Blocked Intersection | No  | No  | No  | No  | No  | No  | No   | No  | No  | No  | No  | No  |
| Lane Alignment             | Left  | Left  | Right   | Left  | Left  | Right   | Left   | Left  | Right   | Left  | Left  | Right   |
| Median Width(ft)           |   | 0   |   |   | 0   |   |  | 0   |   |   | 0   |   |
| Link Offset(ft)            |   | 0   |   |   | 0   |   |  | 0   |   |   | 0   |   |
| Crosswalk Width(ft)        |   | 16  |   |   | 16  |   |  | 16  |   |   | 16  |   |
| Two way Left Turn Lane     |   |   |   |   |   |   |  |   |   |   |   |   |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Turning Speed (mph)        | 15  |   | 9   | 15  |   | 9   | 15   |   | 9   | 15  |   | 9   |
| Sign Control               |   | Stop  |   |   | Stop  |   |  | Free  |   |   | Free  |   |

















Intersection Summary

Area Type: Other  
 Control Type: Unsignalized  
 Intersection Capacity Utilization 31.1% ICU Level of Service A  
 Analysis Period (min) 15

# HCM Unsignalized Intersection Capacity Analysis

















## 7: Riggs Street & Warwick Street

6/15/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations               |   |  |   |   |  |   |  |  |   |   |  |   |
| Volume (veh/h)                    | 0   | 0   | 1   | 7   | 0   | 30  | 0  | 104   | 4   | 18  | 138   | 0   |
| Sign Control                      |   | Stop  |   |   | Stop  |   |  | Free  |   |   | Free  |   |
| Grade                             |   | 0%  |   |   | 0%  |   |  | 0%  |   |   | 0%  |   |
| Peak Hour Factor                  | 0.80  | 0.80  | 0.80  | 0.80  | 0.80  | 0.80  | 0.75   | 0.75  | 0.75  | 0.75  | 0.75  | 0.75  |
| Hourly flow rate (vph)            | 0   | 0   | 1   | 9   | 0   | 38  | 0  | 139   | 5   | 24  | 184   | 0   |
| Pedestrians                       |   | 15  |   |   | 15  |   |  | 7   |   |   | 7   |   |
| Lane Width (ft)                   |   | 12.0  |   |   | 12.0  |   |  | 12.0  |   |   | 12.0  |   |
| Walking Speed (ft/s)              |   | 4.0   |   |   | 4.0   |   |  | 4.0   |   |   | 4.0   |   |
| Percent Blockage                  |   | 1   |   |   | 1   |   |  | 1   |   |   | 1   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |  |   |   |   |   |   |
| Median type                       |   |   |   |   |   |   |  | None  |   |   | None  |   |
| Median storage (veh)              |   |   |   |   |   |   |  |   |   |   |   |   |
| Upstream signal (ft)              |   |   |   |   |   |   |  | 628   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |  |   |   |   |   |   |
| vC, conflicting volume            | 433   | 406   | 206   | 397   | 403   | 163   | 199  |   |   | 159   |   |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |  |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |  |   |   |   |   |   |
| vCu, unblocked vol                | 433   | 406   | 206   | 397   | 403   | 163   | 199  |   |   | 159   |   |   |
| tC, single (s)                    | 7.1   | 6.5   | 6.2   | 7.1   | 6.5   | 6.2   | 4.1  |   |   | 4.1   |   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |  |   |   |   |   |   |
| tF (s)                            | 3.5   | 4.0   | 3.3   | 3.5   | 4.0   | 3.3   | 2.2  |   |   | 2.2   |   |   |
| p0 queue free %                   | 100   | 100   | 100   | 98  | 100   | 96  | 100  |   |   | 98  |   |   |
| cM capacity (veh/h)               | 488   | 515   | 824   | 535   | 514   | 865   | 1350   |   |   | 1397  |   |   |
| <b>Direction, Lane #</b>          | <b>EB 1</b>   | <b>WB 1</b>   | <b>NB 1</b>   | <b>SB 1</b>   |   |   |  |   |   |   |   |   |
| Volume Total                      | 1   | 46  | 144   | 208   |   |   |  |   |   |   |   |   |
| Volume Left                       | 0   | 9   | 0   | 24  |   |   |  |   |   |   |   |   |
| Volume Right                      | 1   | 38  | 5   | 0   |   |   |  |   |   |   |   |   |
| cSH                               | 824   | 775   | 1350  | 1397  |   |   |  |   |   |   |   |   |
| Volume to Capacity                | 0.00  | 0.06  | 0.00  | 0.02  |   |   |  |   |   |   |   |   |
| Queue Length 95th (ft)            | 0   | 5   | 0   | 1   |   |   |  |   |   |   |   |   |
| Control Delay (s)                 | 9.4   | 9.9   | 0.0   | 1.0   |   |   |  |   |   |   |   |   |
| Lane LOS                          | A   | A   |   | A   |   |   |  |   |   |   |   |   |
| Approach Delay (s)                | 9.4   | 9.9   | 0.0   | 1.0   |   |   |  |   |   |   |   |   |
| Approach LOS                      | A   | A   |   |   |   |   |  |   |   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| Average Delay                     |   |   | 1.7   |   |   |   |  |   |   |   |   |   |
| Intersection Capacity Utilization |   |   | 31.1%   |   | ICU Level of Service  |   |  |   |   | A   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |

Lanes, Volumes, Timings  
7: Riggs Street & Warwick Street

6/15/2016

|                            |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group                 | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations        |   |  |   |   |  |   |  |  |   |   |  |   |
| Volume (vph)               | 46  | 23  | 86  | 7   | 25  | 10  | 83   | 40  | 4   | 0   | 64  | 0   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Lane Util. Factor          | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Ped Bike Factor            |   |   |   |   |   |   |  |   |   |   |   |   |
| Frt                        |   | 0.925   |   |   | 0.969   |   |  | 0.996   |   |   |   |   |
| Flt Protected              |   | 0.985   |   |   | 0.991   |   |  | 0.968   |   |   |   |   |
| Satd. Flow (prot)          | 0   | 1731  | 0   | 0   | 1789  | 0   | 0  | 1778  | 0   | 0   | 1845  | 0   |
| Flt Permitted              |   | 0.985   |   |   | 0.991   |   |  | 0.968   |   |   |   |   |
| Satd. Flow (perm)          | 0   | 1731  | 0   | 0   | 1789  | 0   | 0  | 1778  | 0   | 0   | 1845  | 0   |
| Link Speed (mph)           |   | 25  |   |   | 25  |   |  | 25  |   |   | 25  |   |
| Link Distance (ft)         |   | 259   |   |   | 578   |   |  | 628   |   |   | 410   |   |
| Travel Time (s)            |   | 7.1   |   |   | 15.8  |   |  | 17.1  |   |   | 11.2  |   |
| Confl. Peds. (#/hr)        | 4   |   | 4   | 7   |   | 7   | 15   |   | 15  | 15  |   | 15  |
| Peak Hour Factor           | 0.80  | 0.80  | 0.80  | 0.80  | 0.80  | 0.80  | 0.75   | 0.75  | 0.75  | 0.75  | 0.75  | 0.75  |
| Heavy Vehicles (%)         | 0%  | 0%  | 0%  | 2%  | 2%  | 2%  | 3%   | 3%  | 3%  | 3%  | 3%  | 3%  |
| Adj. Flow (vph)            | 58  | 29  | 108   | 9   | 31  | 13  | 111  | 53  | 5   | 0   | 85  | 0   |
| Shared Lane Traffic (%)    |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)      | 0   | 195   | 0   | 0   | 52  | 0   | 0  | 169   | 0   | 0   | 85  | 0   |
| Enter Blocked Intersection | No  | No  | No  | No  | No  | No  | No   | No  | No  | No  | No  | No  |
| Lane Alignment             | Left  | Left  | Right   | Left  | Left  | Right   | Left   | Left  | Right   | Left  | Left  | Right   |
| Median Width(ft)           |   | 0   |   |   | 0   |   |  | 0   |   |   | 0   |   |
| Link Offset(ft)            |   | 0   |   |   | 0   |   |  | 0   |   |   | 0   |   |
| Crosswalk Width(ft)        |   | 16  |   |   | 16  |   |  | 16  |   |   | 16  |   |
| Two way Left Turn Lane     |   |   |   |   |   |   |  |   |   |   |   |   |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Turning Speed (mph)        | 15  |   | 9   | 15  |   | 9   | 15   |   | 9   | 15  |   | 9   |
| Sign Control               |   | Stop  |   |   | Stop  |   |  | Free  |   |   | Free  |   |

Intersection Summary

















Area Type: Other  
 Control Type: Unsignalized  
 Intersection Capacity Utilization 36.0% ICU Level of Service A  
 Analysis Period (min) 15



# HCM Unsignalized Intersection Capacity Analysis

## 7: Riggs Street & Warwick Street

6/15/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations               |   |  |   |   |  |   |   |  |   |   |  |   |
| Volume (veh/h)                    | 46  | 23  | 86  | 7   | 25  | 10  | 83  | 40  | 4   | 0   | 64  | 0   |
| Sign Control                      |   | Stop  |   |   | Stop  |   |   | Free  |   |   | Free  |   |
| Grade                             |   | 0%  |   |   | 0%  |   |   | 0%  |   |   | 0%  |   |
| Peak Hour Factor                  | 0.80  | 0.80  | 0.80  | 0.80  | 0.80  | 0.80  | 0.75  | 0.75  | 0.75  | 0.75  | 0.75  | 0.75  |
| Hourly flow rate (vph)            | 58  | 29  | 108   | 9   | 31  | 12  | 111   | 53  | 5   | 0   | 85  | 0   |
| Pedestrians                       |   | 15  |   |   | 15  |   |   | 7   |   |   | 7   |   |
| Lane Width (ft)                   |   | 12.0  |   |   | 12.0  |   |   | 12.0  |   |   | 12.0  |   |
| Walking Speed (ft/s)              |   | 4.0   |   |   | 4.0   |   |   | 4.0   |   |   | 4.0   |   |
| Percent Blockage                  |   | 1   |   |   | 1   |   |   | 1   |   |   | 1   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |   |   |   |   |   |   |
| Median type                       |   |   |   |   |   |   |   | None  |   |   | None  |   |
| Median storage (veh)              |   |   |   |   |   |   |   |   |   |   |   |   |
| Upstream signal (ft)              |   |   |   |   |   |   |   | 628   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |   |   |   |   |   |   |
| vC, conflicting volume            | 413   | 395   | 107   | 507   | 393   | 78  | 100   |   |   | 74  |   |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |   |   |   |   |   |   |
| vCu, unblocked vol                | 413   | 395   | 107   | 507   | 393   | 78  | 100   |   |   | 74  |   |   |
| tC, single (s)                    | 7.1   | 6.5   | 6.2   | 7.1   | 6.5   | 6.2   | 4.1   |   |   | 4.1   |   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |   |   |   |   |   |   |
| tF (s)                            | 3.5   | 4.0   | 3.3   | 3.5   | 4.0   | 3.3   | 2.2   |   |   | 2.2   |   |   |
| p0 queue free %                   | 88  | 94  | 88  | 98  | 94  | 99  | 92  |   |   | 100   |   |   |
| cM capacity (veh/h)               | 472   | 491   | 935   | 366   | 490   | 965   | 1467  |   |   | 1501  |   |   |
| <b>Direction, Lane #</b>          | <b>EB 1</b>   | <b>WB 1</b>   | <b>NB 1</b>   | <b>SB 1</b>   |   |   |   |   |   |   |   |   |
| Volume Total                      | 194   | 52  | 169   | 85  |   |   |   |   |   |   |   |   |
| Volume Left                       | 58  | 9   | 111   | 0   |   |   |   |   |   |   |   |   |
| Volume Right                      | 108   | 12  | 5   | 0   |   |   |   |   |   |   |   |   |
| cSH                               | 656   | 522   | 1467  | 1501  |   |   |   |   |   |   |   |   |
| Volume to Capacity                | 0.30  | 0.10  | 0.08  | 0.00  |   |   |   |   |   |   |   |   |
| Queue Length 95th (ft)            | 31  | 8   | 6   | 0   |   |   |   |   |   |   |   |   |
| Control Delay (s)                 | 12.8  | 12.7  | 5.2   | 0.0   |   |   |   |   |   |   |   |   |
| Lane LOS                          | B   | B   | A   |   |   |   |   |   |   |   |   |   |
| Approach Delay (s)                | 12.8  | 12.7  | 5.2   | 0.0   |   |   |   |   |   |   |   |   |
| Approach LOS                      | B   | B   |   |   |   |   |   |   |   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |   |   |   |   |   |   |
| Average Delay                     |   |   | 8.0   |   |   |   |   |   |   |   |   |   |
| Intersection Capacity Utilization |   |   | 36.0%   |   | ICU Level of Service  |   |   |   |   | A   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |   |   |   |   |   |   |

# Crash Summary Report

## Report Selections and Input Parameters

### REPORT SELECTIONS

Crash Summary I       Section Detail       Crash Summary II       1320 Public       1320 Private       1320 Summary

### REPORT DESCRIPTION

Brighton

### REPORT PARAMETERS

Year 2013, Start Month 1 through Year 2015 End Month: 12

|                     |  |  |   |
|---------------------|--|--|---|
| Route: <b>0025X</b> | Start Node: <b>13042</b><br>End Node: <b>13054</b> | Start Offset: <b>0</b><br>End Offset: <b>0</b> | <input type="checkbox"/> Exclude First Node<br><input type="checkbox"/> Exclude Last Node                       |
| Route: <b>0025E</b> | Start Node: <b>13054</b><br>End Node: <b>13133</b> | Start Offset: <b>0</b><br>End Offset: <b>0</b> | <input checked="" type="checkbox"/> Exclude First Node<br><input checked="" type="checkbox"/> Exclude Last Node |

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

### Crash Summary I

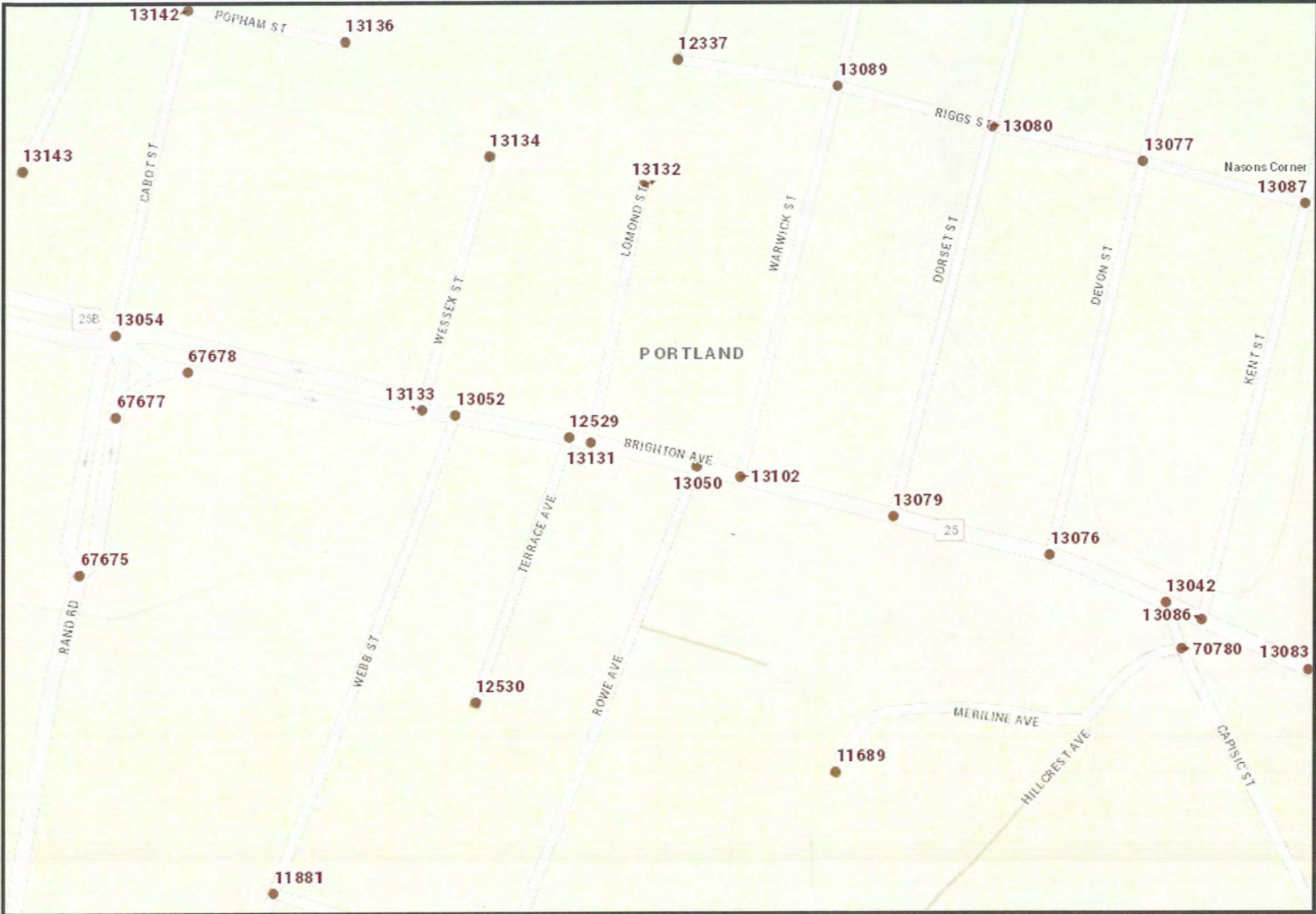
| Node                     | Route - MP   | Node Description                    | U/R                 | Nodes            |    |   |   |   |    |      | Percent Annual M<br>Injury Ent-Veh | Crash Rate | Critical<br>Rate | CRF  |      |
|--------------------------|--------------|-------------------------------------|---------------------|------------------|----|---|---|---|----|------|------------------------------------|------------|------------------|------|------|
|                          |              |                                     |                     | Total<br>Crashes | K  | A | B | C | PD |      |                                    |            |                  |      |      |
| P13042                   | 0025X - 2.70 | Int of BRIGHTON AV CAPISIC ST       | 9                   | 9                | 0  | 0 | 0 | 1 | 8  | 11.1 | 9.873                              | 0.30       | 1.04             | 0.29 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.67       |                  |      |      |
| 13076                    | 0025X - 2.74 | Int of BRIGHTON AV DEVON ST         | 2                   | 2                | 0  | 0 | 0 | 1 | 1  | 50.0 | 4.943                              | 0.13       | 0.34             | 0.38 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.13       |                  |      |      |
| 13079                    | 0025X - 2.79 | Int of BRIGHTON AV DORSET ST        | 2                   | 2                | 0  | 0 | 0 | 1 | 1  | 50.0 | 4.947                              | 0.13       | 0.34             | 0.38 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.13       |                  |      |      |
| P13102                   | 0025X - 2.84 | Int of BRIGHTON AV WARWICK ST       | 9                   | 19               | 0  | 0 | 1 | 3 | 15 | 21.1 | 10.469                             | 0.60       | 1.03             | 0.58 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.67       |                  |      |      |
| A13050                   | 0025X - 2.85 | Int of BRIGHTON AV, ROWE AV         | 2                   | 0                | 0  | 0 | 0 | 0 | 0  | 0.0  | 0.000                              | 0.00       | 0.00             | 0.00 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.13       |                  |      |      |
| A13131                   | 0025X - 2.88 | Int of BRIGHTON AV LOMOND ST        | 2                   | 0                | 0  | 0 | 0 | 0 | 0  | 0.0  | 0.000                              | 0.00       | 0.00             | 0.00 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.13       |                  |      |      |
| P12529                   | 0025X - 2.89 | Int of BRIGHTON AV TERRACE AV       | 2                   | 1                | 0  | 0 | 0 | 0 | 1  | 0.0  | 10.100                             | 0.03       | 0.28             | 0.11 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.13       |                  |      |      |
| 13052                    | 0025X - 2.92 | Int of BRIGHTON AV WEBB ST          | 2                   | 0                | 0  | 0 | 0 | 0 | 0  | 0.0  | 5.207                              | 0.00       | 0.33             | 0.00 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.13       |                  |      |      |
| 13133                    | 0025X - 2.93 | Int of BRIGHTON AV WESSEX ST        | 2                   | 1                | 0  | 0 | 0 | 0 | 1  | 0.0  | 10.303                             | 0.03       | 0.28             | 0.11 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.13       |                  |      |      |
| P13054                   | 0025X - 3.02 | Int of BRIGHTON AV CABOT ST RAND RD | 9                   | 17               | 0  | 0 | 0 | 4 | 13 | 23.5 | 10.655                             | 0.53       | 1.03             | 0.51 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.67       |                  |      |      |
| A67678                   | 0025E - 2.67 | Int of BRIGHTON AV RD INV 3209763   | 2                   | 0                | 0  | 0 | 0 | 0 | 0  | 0.0  | 0.000                              | 0.00       | 0.00             | 0.00 |      |
|                          |              |                                     |                     |                  |    |   |   |   |    |      | Statewide Crash Rate:              | 0.13       |                  |      |      |
| <b>Study Years: 3.00</b> |              |                                     | <b>NODE TOTALS:</b> |                  | 51 | 0 | 0 | 1 | 10 | 40   | 21.6                               | 66.497     | 0.26             | 0.49 | 0.52 |

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

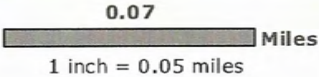
### Crash Summary I

| Sections                            |          |         |                       |              |                              |                  |    |                |   |   |    |    |                   |                |            |                  |      |
|-------------------------------------|----------|---------|-----------------------|--------------|------------------------------|------------------|----|----------------|---|---|----|----|-------------------|----------------|------------|------------------|------|
| Start Node                          | End Node | Element | Offset<br>Begin - End | Route - MP   | Section U/R<br>Length        | Total<br>Crashes | K  | Injury Crashes |   |   |    |    | Percent<br>Injury | Annual<br>HMVM | Crash Rate | Critical<br>Rate | CRF  |
|                                     |          |         |                       |              |                              |                  |    | A              | B | C | PD |    |                   |                |            |                  |      |
| 13042                               | 13076    | 3139393 | 0 - 0.04              | 0025X - 2.70 | 0.04                         | 2                | 1  | 0              | 0 | 0 | 0  | 1  | 0.0               | 0.00391        | 85.25      | 467.65           | 0.18 |
| Int of BRIGHTON AV CAPISIC ST       |          |         |                       | ST RTE 25    | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| 13076                               | 13079    | 3119844 | 0 - 0.05              | 0025X - 2.74 | 0.05                         | 2                | 5  | 0              | 1 | 0 | 2  | 2  | 60.0              | 0.00489        | 341.02     | 441.93           | 0.77 |
| Int of BRIGHTON AV DEVON ST         |          |         |                       | ST RTE 25    | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| 13079                               | 13102    | 3119200 | 0 - 0.05              | 0025X - 2.79 | 0.05                         | 2                | 3  | 0              | 0 | 0 | 0  | 3  | 0.0               | 0.00489        | 204.61     | 441.93           | 0.46 |
| Int of BRIGHTON AV DORSET ST        |          |         |                       | ST RTE 25    | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| 13050                               | 13102    | 3131552 | 0 - 0.01              | 0025X - 2.84 | 0.01                         | 2                | 0  | 0              | 0 | 0 | 0  | 0  | 0.0               | 0.00098        | 0.00       | 663.12           | 0.00 |
| Int of BRIGHTON AV ROWE AV          |          |         |                       | ST RTE 25    | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| 13050                               | 13131    | 3131553 | 0 - 0.03              | 0025X - 2.85 | 0.03                         | 2                | 8  | 0              | 0 | 2 | 3  | 3  | 62.5              | 0.00296        | 900.10     | 502.28           | 1.79 |
| Int of BRIGHTON AV ROWE AV          |          |         |                       | ST RTE 25    | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| 12529                               | 13131    | 3120019 | 0 - 0.01              | 0025X - 2.88 | 0.01                         | 2                | 0  | 0              | 0 | 0 | 0  | 0  | 0.0               | 0.00099        | 0.00       | 662.52           | 0.00 |
| Int of BRIGHTON AV TERRACE AV       |          |         |                       | ST RTE 25    | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| 12529                               | 13052    | 3130457 | 0 - 0.03              | 0025X - 2.89 | 0.03                         | 2                | 2  | 0              | 0 | 0 | 0  | 2  | 0.0               | 0.00308        | 216.80     | 497.46           | 0.44 |
| Int of BRIGHTON AV TERRACE AV       |          |         |                       | ST RTE 25    | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| 13052                               | 13133    | 3123711 | 0 - 0.01              | 0025X - 2.92 | 0.01                         | 2                | 0  | 0              | 0 | 0 | 0  | 0  | 0.0               | 0.00103        | 0.00       | 656.78           | 0.00 |
| Int of BRIGHTON AV WEBB ST          |          |         |                       | ST RTE 25    | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| 13054                               | 13133    | 3139185 | 0 - 0.09              | 0025X - 2.93 | 0.09                         | 2                | 1  | 0              | 0 | 0 | 1  | 0  | 100.0             | 0.00454        | 73.39      | 450.17           | 0.16 |
| Int of BRIGHTON AV CABOT ST RAND RD |          |         |                       | ST RTE 25    | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| 13054                               | 67678    | 3416044 | 0 - 0.02              | 0025E - 2.65 | 0.02                         | 2                | 0  | 0              | 0 | 0 | 0  | 0  | 0.0               | 0.00070        | 0.00       | 715.20           | 0.00 |
| Int of BRIGHTON AV CABOT ST RAND RD |          |         |                       | ST RTE 25E   | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| 67678                               | 13133    | 3416045 | 0 - 0.07              | 0025E - 2.67 | 0.07                         | 2                | 3  | 0              | 0 | 0 | 2  | 1  | 66.7              | 0.00361        | 276.78     | 477.20           | 0.58 |
| Int of BRIGHTON AV RD INV 3209763   |          |         |                       | ST RTE 25E   | Statewide Crash Rate: 185.94 |                  |    |                |   |   |    |    |                   |                |            |                  |      |
| <b>Study Years: 3.00</b>            |          |         |                       |              | <b>Section Totals:</b>       | 0.41             | 23 | 0              | 1 | 2 | 8  | 12 | 47.8              | 0.03157        | 242.85     | 294.80           | 0.82 |
|                                     |          |         |                       |              | <b>Grand Totals:</b>         | 0.41             | 74 | 0              | 1 | 3 | 18 | 52 | 29.7              | 0.03157        | 781.35     | 416.44           | 1.88 |

# BRIGHTON



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Date: 5/6/2016  
Time: 9:35:47 AM

## Crash Summary Report

### Report Selections and Input Parameters

#### REPORT SELECTIONS

Crash Summary I       Section Detail       Crash Summary II       1320 Public       1320 Private       1320 Summary

#### REPORT DESCRIPTION

Warwick

#### REPORT PARAMETERS

Year 2013, Start Month 1 through Year 2015 End Month: 12

Route: 0560768

Start Node: 13106

Start Offset: 0

Exclude First Node

End Node: 13102

End Offset: 0

Exclude Last Node

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

### Crash Summary I

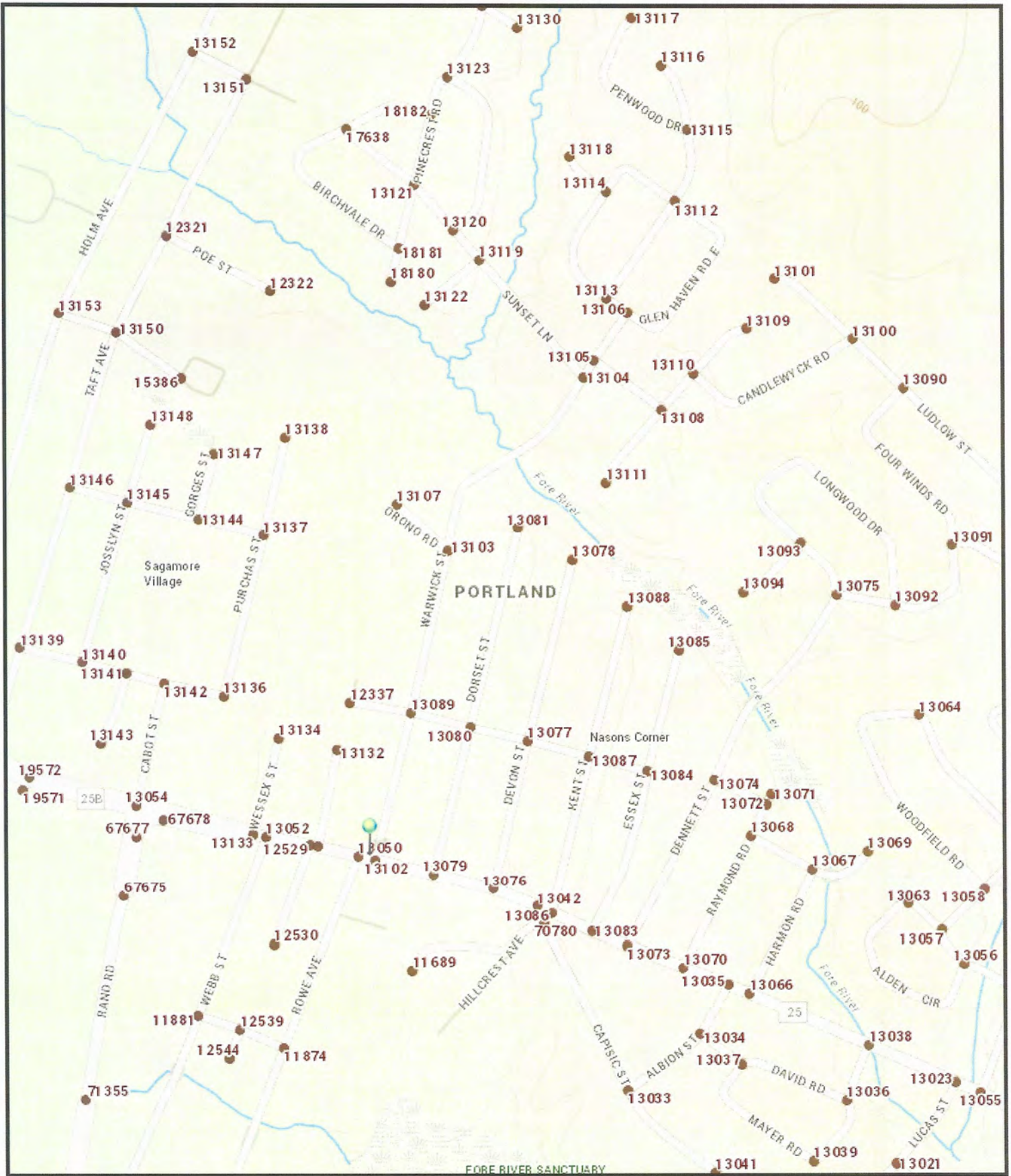
| Node              | Route - MP     | Node Description                     | U/R          | Nodes            |   |   |   |   |    | Percent Annual M<br>Injury Ent-Veh | Crash Rate                 | Critical<br>Rate | CRF  |      |
|-------------------|----------------|--------------------------------------|--------------|------------------|---|---|---|---|----|------------------------------------|----------------------------|------------------|------|------|
|                   |                |                                      |              | Total<br>Crashes | K | A | B | C | PD |                                    |                            |                  |      |      |
| 13106             | 0560768 - 0    | 0503520 POR,GLENHAVEN RD,WARWICK ST. | 2            | 0                | 0 | 0 | 0 | 0 | 0  | 0.0                                | 0.248                      | 0.00             | 0.59 | 0.00 |
|                   |                |                                      |              |                  |   |   |   |   |    |                                    | Statewide Crash Rate: 0.14 |                  |      |      |
| 13105             | 0560768 - 0.04 | 0503519 POR,WARWICK ST,STARLITE RD.  | 2            | 0                | 0 | 0 | 0 | 0 | 0  | 0.0                                | 0.974                      | 0.00             | 0.53 | 0.00 |
|                   |                |                                      |              |                  |   |   |   |   |    |                                    | Statewide Crash Rate: 0.14 |                  |      |      |
| 13104             | 0560768 - 0.05 | 0503518 POR,WARWICK ST,SUNSET LA.    | 2            | 0                | 0 | 0 | 0 | 0 | 0  | 0.0                                | 1.328                      | 0.00             | 0.50 | 0.00 |
|                   |                |                                      |              |                  |   |   |   |   |    |                                    | Statewide Crash Rate: 0.14 |                  |      |      |
| 13103             | 0560768 - 0.24 | 0503517 POR,WARWICK ST,ORONO RD.     | 2            | 0                | 0 | 0 | 0 | 0 | 0  | 0.0                                | 1.338                      | 0.00             | 0.50 | 0.00 |
|                   |                |                                      |              |                  |   |   |   |   |    |                                    | Statewide Crash Rate: 0.14 |                  |      |      |
| 13089             | 0560768 - 0.37 | 0503503 POR,WARWICK,RIGGS ST.        | 2            | 0                | 0 | 0 | 0 | 0 | 0  | 0.0                                | 1.191                      | 0.00             | 0.51 | 0.00 |
|                   |                |                                      |              |                  |   |   |   |   |    |                                    | Statewide Crash Rate: 0.14 |                  |      |      |
| Study Years: 3.00 |                |                                      | NODE TOTALS: |                  | 0 | 0 | 0 | 0 | 0  | 0.0                                | 5.079                      | 0.00             | 0.35 | 0.00 |

### Crash Summary I

| Sections                            |          |         |                    |                 |                              |     |               |   |                |   |   |    |                |             |            |               |        |      |
|-------------------------------------|----------|---------|--------------------|-----------------|------------------------------|-----|---------------|---|----------------|---|---|----|----------------|-------------|------------|---------------|--------|------|
| Start Node                          | End Node | Element | Offset Begin - End | Route - MP      | Section Length               | U/R | Total Crashes | K | Injury Crashes |   |   |    | Percent Injury | Annual HMVM | Crash Rate | Critical Rate | CRF    |      |
|                                     |          |         |                    |                 |                              |     |               |   | A              | B | C | PD |                |             |            |               |        |      |
| 13105                               | 13106    | 187753  | 0 - 0.04           | 0560768 - 0     | 0.04                         | 2   | 0             | 0 | 0              | 0 | 0 | 0  | 0.0            | 0.00009     | 0.00       | 1613.50       | 0.00   |      |
| 0503519 POR,WARWICK ST,STARLITE RD. |          |         |                    | RD INV 05 60768 | Statewide Crash Rate: 383.99 |     |               |   |                |   |   |    |                |             |            |               |        |      |
| 13104                               | 13105    | 187751  | 0 - 0.01           | 0560768 - 0.04  | 0.01                         | 2   | 0             | 0 | 0              | 0 | 0 | 0  | 0.0            | 0.00010     | 0.00       | 1622.05       | 0.00   |      |
| 0503518 POR,WARWICK ST,SUNSET LA.   |          |         |                    | RD INV 05 60768 | Statewide Crash Rate: 383.99 |     |               |   |                |   |   |    |                |             |            |               |        |      |
| 13103                               | 13104    | 187749  | 0 - 0.19           | 0560768 - 0.05  | 0.19                         | 2   | 0             | 0 | 0              | 0 | 0 | 0  | 0.0            | 0.00224     | 0.00       | 925.29        | 0.00   |      |
| 0503517 POR,WARWICK ST,ORONO RD.    |          |         |                    | RD INV 05 60768 | Statewide Crash Rate: 383.99 |     |               |   |                |   |   |    |                |             |            |               |        |      |
| 13089                               | 13103    | 187736  | 0 - 0.13           | 0560768 - 0.24  | 0.13                         | 2   | 0             | 0 | 0              | 0 | 0 | 0  | 0.0            | 0.00166     | 0.00       | 998.26        | 0.00   |      |
| 0503503 POR,WARWICK,RIGGS ST.       |          |         |                    | RD INV 05 60768 | Statewide Crash Rate: 383.99 |     |               |   |                |   |   |    |                |             |            |               |        |      |
| 13089                               | 13102    | 187735  | 0 - 0.11           | 0560768 - 0.37  | 0.11                         | 2   | 0             | 0 | 0              | 0 | 0 | 0  | 0.0            | 0.00116     | 0.00       | 1095.72       | 0.00   |      |
| 0503503 POR,WARWICK,RIGGS ST.       |          |         |                    | RD INV 05 60768 | Statewide Crash Rate: 383.99 |     |               |   |                |   |   |    |                |             |            |               |        |      |
| Study Years: 3.00                   |          |         |                    |                 | Section Totals:              |     | 0.48          | 0 | 0              | 0 | 0 | 0  | 0              | 0.0         | 0.00525    | 0.00          | 754.32 | 0.00 |
|                                     |          |         |                    |                 | Grand Totals:                |     | 0.48          | 0 | 0              | 0 | 0 | 0  | 0              | 0.0         | 0.00525    | 0.00          | 901.62 | 0.00 |



# WARWICK



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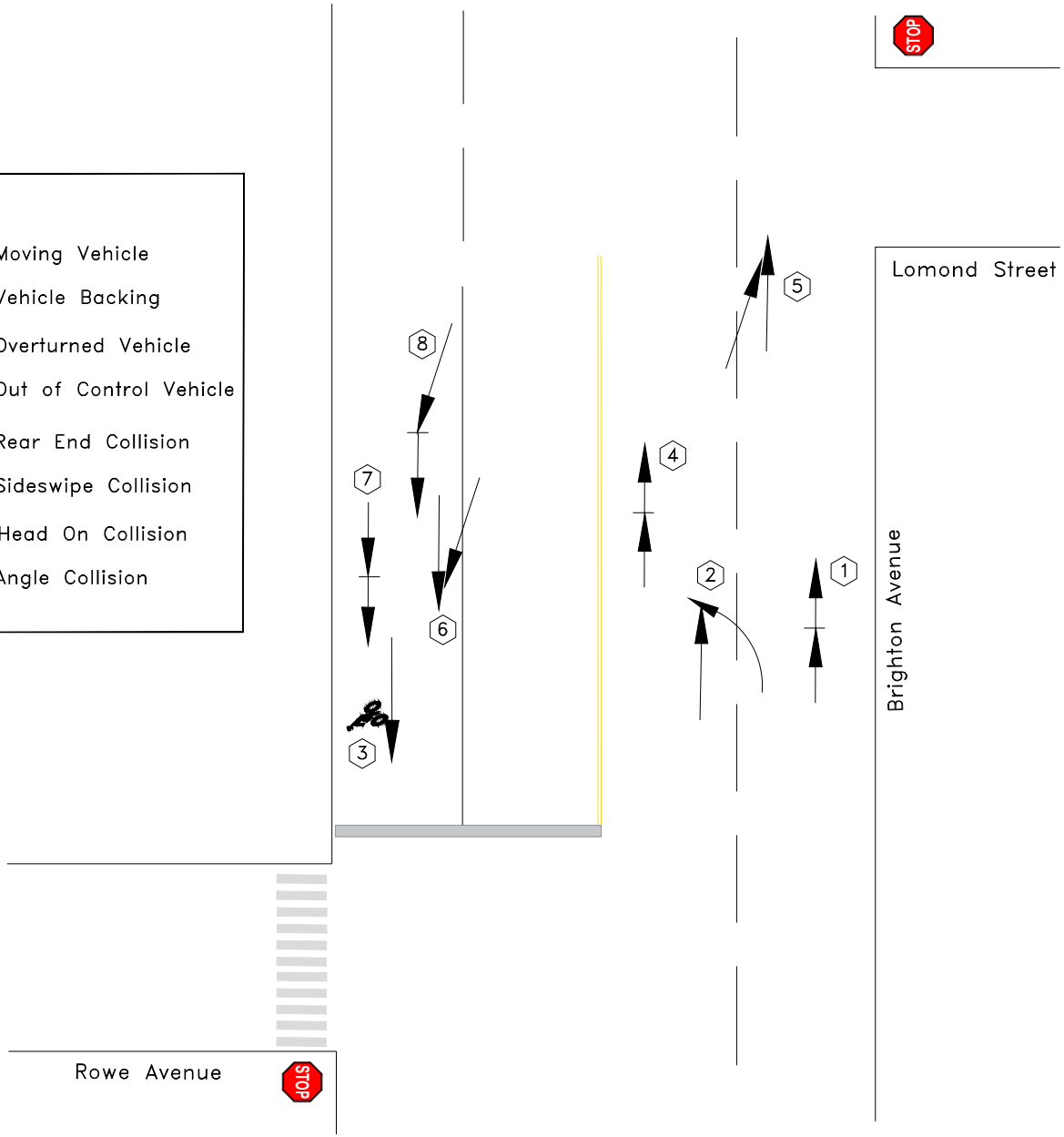
0.1 Miles  
1 inch = 0.13 miles

Date: 5/6/2016  
Time: 9:40:24 AM

Approx. North

**LEGEND:**

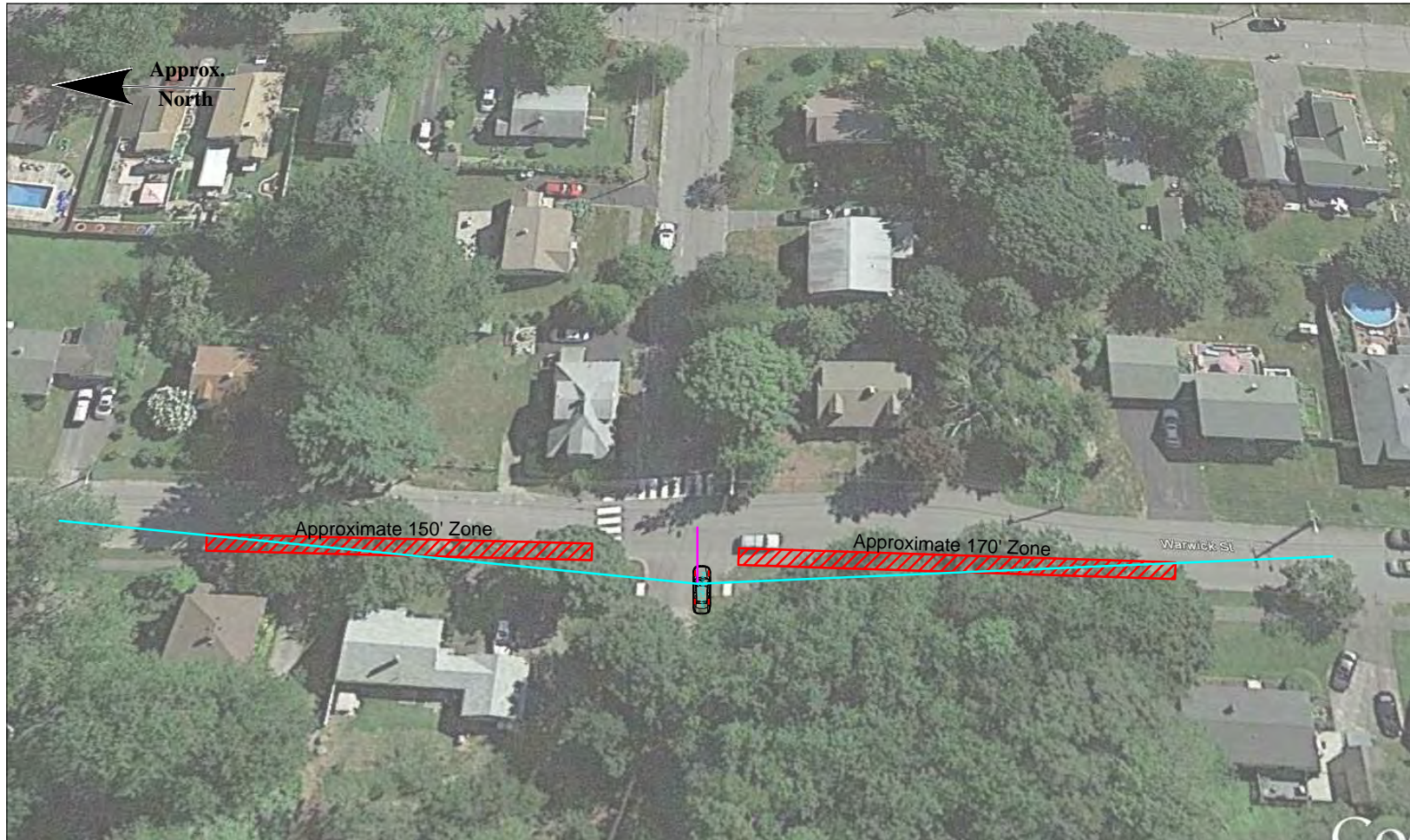
- Moving Vehicle
- Vehicle Backing
- Overturned Vehicle
- Out of Control Vehicle
- Rear End Collision
- Sideswipe Collision
- Head On Collision
- Angle Collision






| # | DATE     | TIME  | CONTRIBUTING FACTOR                                | MDOT REPORT # |
|---|----------|-------|--|---------------|
| 1 | 01/16/13 | 06:58 | REAR END - IN TRAFFIC - SNOW                       | 13-000187     |
| 2 | 02/23/13 | 16:21 | LEFT-TURN ACROSS TWO LANES - FAILURE TO YIELD      | 13-00658      |
| 3 | 07/02/13 | 15:50 | BICYCLE SWERVED INTO TRAVEL LANE TO AVOID POT HOLE | 13-001881     |
| 4 | 07/09/13 | 16:30 | REAR END - IN TRAFFIC                              | 13-001930     |
| 5 | 10/24/13 | 12:50 | SIDESWIPE - SWERVED TO AVOID OPPOSING VEHICLE      | 13-003004     |
| 6 | 05/17/14 | 15:30 | SIDESWIPE - IMPROPER LANE CHANGE                   | 14-001509     |
| 7 | 01/24/15 | 13:52 | REAR END - SLUSH ON WINDSHIELD AND ROADWAY         | 15-000312     |
| 8 | 01/28/15 | 10:39 | REAR END - SNOW - SLIPPERY CONDITIONS              | 15-000346     |

**Portland, Maine**  
**Collision Diagram: 2013-2015**  
**MDOT Link # 13050 - 13131**

**Maine Traffic Resources**  
 25 Vine Street  
 Gardiner, ME 04345  
 tel: (207) 582-5252  
 fax: (207) 582-1677



**Recommended "No Parking" Zone**  
**Fred P Hall Elementary**  
**Portland, Maine**

-  Recommended "NO PARKING" Zone
-  250' of Sight Distance from Riggs Street
-  22' Setback from Centerline

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