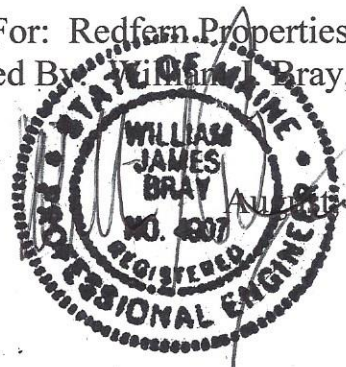
TRAFFIC IMPACT STUDY

FOR

PROPOSED

89 Anderson Street Apartment Complex

Prepared For: Redfern Properties, Inc.
Prepared By: William J. Bray, P.E.



August 2014

INTRODUCTION

Redfern Properties, LLC is proposing to construct a 53-unit apartment building on a parcel of property located at 89 Anderson Street. A total of 53 parking spaces will be provided under the cover of the proposed apartment building. Access to the covered parking spaces will be provided through a single entrance located on Everett Street.

The purpose of this study is to examine existing traffic conditions in the general vicinity of the proposed project, estimate the total number of site trips generated by the project, and make a determination as to whether the existing transportation system can safely accommodate the added traffic demand generated by the project.

EXISTING CONDITIONS

Existing Traffic: Manual turning movement counts were conducted at three study area intersections per direction received from the City's Traffic Peer Review Consultant. The intersections included the following locations:

1. Anderson Street @ Fox Street
2. Washington Avenue/Fox Street/Walnut Street
3. Anderson Street @ Cumberland Avenue

All vehicular traffic entering each intersection was recorded in 15-minute intervals between the hours of 7:00 to 9:00 AM and between 3:00 to 6:00 PM (Copies of the field data summary sheets are attached). In addition, both pedestrian and bicycle data was gathered at each location both directionally and time of day. From a summary of the data, it was determined that the morning peak hour occurs between 8:00 and 9:00 AM at each study area location; the PM peak hour falls between 4:30 and 5:30 at each of the locations.

Bicycle and pedestrian volume totals recorded during the vehicular peak hour(s) at each study location are summarized in the following tables:

Bicycle Volumes
(Street Peak Hour)

Intersection/Approach	AM Peak Hour	PM Peak Hour
Washington Ave./Walnut St./Fox St.		
- Washington Avenue EB	1	9
- Washington Avenue WB	2	13
- Walnut Street	0	1
- Fox Street	2	2
Anderson St./Fox St.		
- Anderson Street EB	1	6
- Anderson Street WB	3	9
- Fox Street NB	0	11
- Fox Street SB	0	7
Anderson St./Cumberland Ave.		
- Anderson Street	1	0
- Cumberland Avenue NB	2	4
- Cumberland Avenue SB	5	5

Bicycle travel through the study intersections was somewhat moderate during the afternoon peak hour; volumes recorded in the morning peak hour were very low at each of the three study intersections. The highest volume of bicycle trips in the PM peak hour were recorded traveling along the Washington Avenue corridor (22

two-way trips) and a second predominate travel route was along Fox Street with a total two-way volume of 18 trips.

Pedestrian Volumes
(Street Peak Hour)

Intersection/Approach	AM Peak Hour	PM Peak Hour
Washington Ave./Walnut St./Fox St.		
- Crossing Washington Ave. @ Walnut St.	2	0
- Crossing Washington Ave. @ Fox St.	6	8
- Crossing Walnut St.	5	4
- Crossing Fox St.	4	18
Anderson St./Fox St.		
- Crossing East Anderson St.	9	14
- Crossing West Anderson St.	4	2
- Crossing North Fox St.	12	6
- Crossing South Fox St.	7	9
Anderson St./Cumberland Ave.		
- Crossing Anderson St.	21	29
- Crossing Cumberland Ave. @ Anderson St.	14	30

The volume of pedestrian movements recorded at each of the three study intersections was highest at the Anderson Street/Cumberland Avenue intersection where a total of 35 pedestrian movements were recorded in the morning peak hour and 59 pedestrian movements were recorded in the afternoon peak hour.

Traffic data collected during the months of July and August are generally representative of "peak" travel conditions and further adjustment is not required. Figures 1 and 2 are "*line-diagrams*" presenting "*peak*" hour vehicular traffic volumes for the AM and PM peak hours, respectively, for the study area intersections.

Existing Safety Trends: The Maine Department of Transportation's (MaineDOT) Accident Records Section provided the latest three-year (2011 through 2013) crash data for the following roadway segments:

1. Fox Street between Franklin Arterial and Washington Avenue
2. Washington Avenue/Fox Street/Walnut Street intersection
3. Anderson Street between Fox Street and Cumberland Avenue
4. Everett Street between Anderson Street and Greenleaf Street

Their report is summarized as follows and attached as an appendix to the report:

2011 -2013 Traffic Accident Summary

Location	Total Crashes	Critical Rate Factor
1. Fox Street @ Franklin Arterial	20	0.58
2. Fox Street and N. Boyd Street	3	1.03
3. Fox Street @ Diamond Street	1	0.34
4. Fox Street @ Anderson Street	2	0.73
5. Fox Street @ Greenleaf Street	2	0.98
6. Fox Street @ Winthrop Street	2	1.06
7. Washington Avenue/Fox Street/Walnut Street	9	1.98
8. Fox Street btw. Cove Street and Greenleaf Street	1	0.54
9. Fox Street btw. Winthrop Street and Washington Avenue	1	0.48
10. Anderson Street @ Madison Street	1	4.63
11. Anderson Street @ Oxford Street	1	4.09
12. Anderson Street @ Cumberland Avenue	2	0.71
13. Anderson Street btw. Fox Street and Everett Street	1	4.42
14. Anderson Street btw. E. Lancaster Street and E. Oxford Street	4	16.00
15. Anderson Street btw. E. Oxford Street and Cumberland Avenue	4	11.44

The MaineDOT considers any roadway intersection or segment a high crash location if both of the following criteria are met:

- ***8 or more accidents***
- ***A Critical Rate Factor greater than 1.00***

As the data presented in the table shows (location highlighted in yellow), the Washington Avenue/ Walnut Street/Fox Street intersection meets MaineDOT's criteria for a high crash location. A total of 9 crashes and a Critical Rate Factor (CRF) of 1.98 were reported for the intersection. A more in-depth review (preparation of detailed vehicle collision diagrams) was prepared for the intersection to determine if a clear pattern of accident is occurring (Copies of the Collision Diagrams are attached as an appendix to the report).

The detailed review of the vehicle crash reports for the intersection would suggest two clear patterns of concern: 1) Four of the nine accidents involved vehicles on the Fox Street approach turning left onto Washington Avenue being struck by thru vehicles traveling eastbound on Washington Avenue; 2) A total of three collisions involved vehicles approaching Washington Avenue from the Walnut Street approach sliding through the intersection and striking a thru vehicle on Washington Avenue.

Implementation of one or more of the suggested remediation measures should help reduce the frequency of traffic crashes occurring at this "off-set" intersection:

- Utilization of an anti-icing agent on the full length of Walnut Street would potentially reduce vehicle skidding problems on Walnut Street.
- Alternatively, or in conjunction with utilization of the anti-icing agent, the City may want to consider closure of Walnut Street at North Street during periods of severe winter road conditions using a remotely operated flashing "*Street Closed*" beacon placed at the top of the Walnut Street "hill".
- Replace and/or update existing pedestrian crossing equipment (equipment presently inoperative) at both existing Washington Avenue crosswalks to improve safety of pedestrians crossing "busy" Washington Avenue.

In addition to the aforementioned recommendations, preliminary evaluation was given to full traffic signalization of the intersection; however, present intersection traffic volumes and/or other factors do not appear to satisfy the warrants for traffic signals.

SITE TRAFFIC

Site Trip Generation: The eighth edition of the Institute of Transportation Engineers (ITE) "**TRIP GENERATION**" manual was used to determine the volume of site traffic generated by the proposed 53-unit residential apartment complex project. The ITE publication provides numerous land-use categories and the average volume of trips that are generated by each category. The following trip rates were used to calculate the trip generation of the proposed project:

Land Use #220 - Apartment

AM Peak Hour	= 0.51 trips per occupied unit
PM Peak Hour	= 0.62 trips per occupied unit.

Accordingly, the proposed 53-unit apartment complex can be expected to generate a total of 27 trips in the morning peak hour and 33 trips during the afternoon peak hour.

Site Trip Distribution: The Institute of Transportation Engineers handbook provides the following directional distribution rates for an apartment unit during the AM and PM peak hours:

AM Peak Hour	= 20% enter site and 80% exit site
PM Peak Hour	= 65% enter site and 35% exit site

Based upon the noted directional distribution patterns, 22 trips during the morning peak hour and 12 trips in the evening peak hour will exit the site and the remaining trips (5 AM trips and 21 PM trips) during both peak time periods will enter the site.

Site Trip Assignment: Vehicle trips generated by the proposed project were assigned through the three study intersections on the basis of existing travel patterns and the Consultants knowledge of travel patterns in the City of Portland. Figures 3 and 4 graphically depict the assignment for both peak commuter time periods.

FUTURE TRAFFIC

Other Development Traffic: Traffic generated by projects that have been approved by the Local Planning Board and/or the Maine Department of Transportation, yet are not opened, must be included in the estimate of pre-development traffic. At the direction of the City's Development Review Services Manager, trips generated by the following projects were appropriately added to the base travel conditions at the site driveway intersections.

- Washington Avenue Efficiencies
- PHA Bayside Anchor Project
- Munjoy Heights
- Intermodal "Staging" Area

Figures 5 and 6 illustratively present the Other Development traffic assignment for the study intersections.

2014 Pre-Development Traffic: The 2014 Pre-Development traffic forecasts were prepared for the study intersections by combining the 2014 Design Hour traffic volumes shown on Figures 1 and 2 with the Other Development traffic values displayed on Figures 5 and 6. Figures 7 and 8 present the 2014 pre-development traffic forecasts at each of the three study intersections.

2014 Post-Development Traffic: Estimated 2014 Pre-Development traffic forecasts prepared for the study intersections, as depicted on Figures 7 and 8, were combined with the site traffic projections highlighted on Figures 3 and 4 to create estimated 2014 Post-Development traffic forecasts for the study intersections. Figures 9 (AM Peak Hour) and 10 (PM Peak Hour) are line diagrams that present the estimated 2014 Post-Development traffic conditions for the study intersections.

MOBILITY ANALYSIS

Capacity analyses of both 2014 Pre and Post-Development traffic conditions were performed for each of the three study intersections utilizing the Synchro and SimTraffic computer models. Levels of Service rankings are similar to the academic grading system, where an "A" is very good with little delay and "F" represents very poor conditions.

The following table summarizes the relationship between delay and Level of Service for an unsignalized intersection:

Level of Service Criteria for Unsignalized Intersections

Level of Service	Total Control Delay (sec/veh)
A	Up to 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	Greater than 50.0

The result of the capacity analysis is presented in the following table:

Level of Service Summary
2014 Pre and Post-Development Conditions

	2014 Pre-Development				2014 Post-Development			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection/Approach	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS
1. Washington Ave./ Walnut St./Fox St.								
- Washington Ave. EB	1 sec.	A	2 sec.	A	1 sec.	A	2 sec.	A
- Washington Ave. WB	1 sec.	A	4 sec.	A	4 sec.	A	4 sec.	A
- Walnut St.	13 sec.	B	16 sec.	C	15 sec.	B	17 sec.	C
- Fox St.	11 sec.	B	27 sec.	D	13 sec.	B	27 sec.	D
2. Fox St. @ Anderson St.								
- Anderson St. EB	5 sec.	A	5 sec.	A	5 sec.	A	5 sec.	A
- Anderson St. WB	6 sec.	A	6 sec.	A	6 sec.	A	6 sec.	A
- Fox St. NB	6 sec.	A	7 sec.	A	6 sec.	A	7 sec.	A
- Fox St. SB	6 sec.	A	7 sec.	A	7 sec.	A	7 sec.	A
3. Anderson St. @ Cumberland Ave.								
- Anderson St.	4 sec.	A	3 sec.	A	4 sec.	A	3 sec.	A
- Cumberland Ave. NB	1 sec.	A	1 sec.	A	1 sec.	A	1 sec.	A
- Cumberland Ave. SB	1 sec.	A	1 sec.	A	1 sec.	A	1 sec.	A

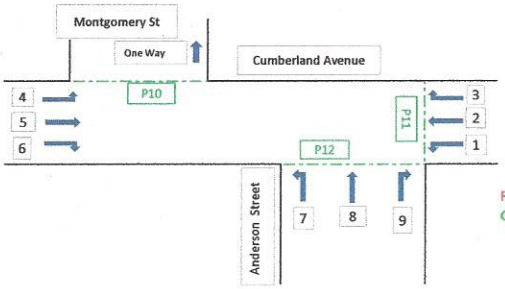
As presented in the chart above, the proposed project has no measurable impact on traffic operations at any of the three study intersections. Each intersection was found to operate at acceptable levels of service under both pre-development and post-development conditions.

SUMMARY

1. The proposed 53-unit apartment complex can be expected to generate a total of 27 vehicle trips during the AM peak hour and a slight increase of 33 trips in the afternoon peak hour. Twenty-two (22) trips during the morning peak hour and 12 trips in the evening peak hour will exit the site and the remaining trips (5 AM trips and 21 PM trips) during both peak time periods will enter the site.
2. MaineDOT's Traffic Safety Bureau's latest three-year safety report for the identified portions of Washington Avenue, Fox Street, and Anderson Street shows that all roadway segments and intersections, with the exception of the Washington Avenue/Fox Street/Walnut Street intersection, experience fewer traffic crashes than the threshold criteria for identification of a high crash location. The noted traffic intersection, based upon the most recent three-year data, meets both of MaineDOT's criteria for identification of a high crash location. A total of 9 vehicle crashes were reported at the intersection during the study time period and the Critical Rate Factor, which compares operations at the intersection with a statewide average for similar locations, exceeds 1.00 at 1.98. Detailed vehicle collision diagrams were prepared for each of the reported 9 vehicle crashes to determine if a correctible pattern of vehicle crash is occurring at the intersection. The detailed analysis identified two crash patterns; four "angle" collisions involving vehicles entering Washington Avenue from Fox Street being struck by motorists traveling eastbound on Washington Avenue. The second pattern involved three crashes that resulted from vehicles approaching Washington Avenue on Walnut Street skidding, during inclement weather, into thru vehicles traveling west on Washington Avenue.
3. It would appear that all modes of transportation would benefit from full traffic signalization of the Washington Avenue/Fox Street/Walnut Street intersection; an abbreviated preliminary assessment of existing travel conditions was conducted and it was determined that prevailing traffic conditions at the noted intersection do not appear to meet the minimum travel conditions required for traffic signalization (Copy of abbreviated traffic signal warrant study is attached as an appendix to the report). The City may want to monitor traffic conditions on an annual basis to determine if prevailing conditions change meeting one or more of the warrants for traffic signalization. This report does identify three improvement strategies that, with implementation, should improve overall safety at the intersection, they include the following:
    - Utilization of an anti-icing agent on the full length of Walnut Street would potentially reduce vehicle skidding problems on Walnut Street.
    - Alternatively, or in conjunction with utilization of the anti-icing agent, the City may want to consider closure of Walnut Street at North Street during periods of severe winter road conditions using a remotely operated flashing "*Street Closed*" beacon placed at the top of the Walnut Street "hill".
    - Replace and/or update existing pedestrian crossing equipment (equipment presently inoperative) at both existing Washington Avenue crosswalks to improve safety of pedestrians crossing "busy" Washington Avenue.
4. The operational analysis conducted for the three study intersections clearly shows that traffic generated by the proposed apartment complex has virtually no impact on traffic operations at any of the three study intersections. Each study intersection was found to operate at acceptable levels of service during both the pre-development and post-development conditions.

5. Pedestrian crosswalk markings and stop bars should be installed at the Anderson Street/Fox Street intersection on all four approaches of the intersection.

INTERSECTION PLAN
WITH NUMBERED MOVEMENTS:



Red = Bicycle Movement
Green = Pedestrian Movement

Portland
Intersection: Cumberland Ave./Anderson St./Montgomery St.
Date: 8/13/14
Day of Week: Wednesday
Weather:
Remarks:

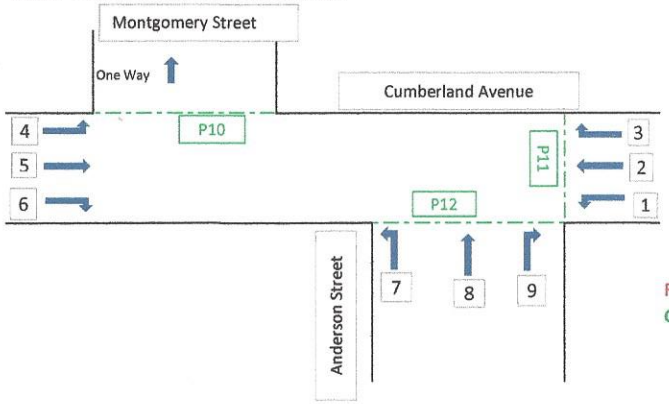
Count Summary Movement

Start	End	1	2	3	4	5	6	7	8	9	10	11	12	Total	P10	P11	P12	C2	C4	C5	C6	C7	C9
7:00	7:15	1	16	0	0	29	0	1	0	3	0	0	0	50	0	0	3	0	1	1	0	0	1
Truck Count		0	1	1	0	1	0	0	0	1	0	0	0	4									
7:15	7:30	0	18	0	0	16	1	2	0	6	0	0	0	43	4	1	4	0	0	0	1	0	0
Truck Count		0	0	0	0	0	1	0	0	0	0	0	0	1									
7:30	7:45	1	13	1	0	25	3	2	0	3	0	0	0	48	4	5	3	0	0	0	0	0	0
Truck Count		0	0	1	0	0	0	0	0	0	0	0	0	1									
7:45	8:00	3	18	1	1	39	0	1	1	3	0	0	0	67	3	3	4	0	0	2	0	0	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0									
8:00	8:15	4	28	0	1	54	3	1	0	10	0	0	0	101	7	3	5	0	0	0	0	0	0
Truck Count		0	2	0	0	2	0	0	0	0	0	0	0	4									
8:15	8:30	3	23	0	3	55	1	0	0	11	0	0	0	96	8	5	4	1	0	2	0	0	0
Truck Count		0	0	0	0	3	0	1	0	1	0	0	0	5									
8:30	8:45	1	16	0	1	59	1	0	0	10	0	0	0	88	2	0	9	1	1	2	0	1	0
Truck Count		1	3	0	0	1	0	0	0	1	0	0	0	6									
8:45	9:00	2	32	2	0	38	1	3	0	15	0	0	0	93	5	6	3	0	0	0	0	0	0
Truck Count		0	3	0	0	1	0	0	0	0	0	0	0	4									

PEAK HOUR COUNT **TIME:** **8:00** **TO:** **9:00**

11	107	2	5	213	6	5	0	48	0	0	0	397

INTERSECTION PLAN
WITH NUMBERED MOVEMENTS:



Red = Bicycle Movement
Green = Pedestrian Movement

Portland
Intersection: Cumberland Ave/Anderson St/Montgomery St
Date: 8/13/14
Day of Week: Wednesday
Weather:
Remarks:

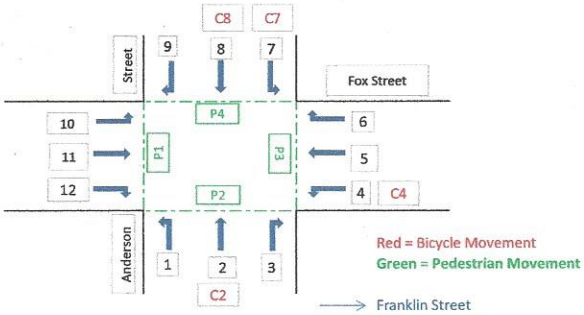
Count Summary Movement

Start	End	1	2	3	4	5	6	7	8	9	10	11	12	Total	P10	P11	P12	C1	C2	C4	C5	C6
3:00	3:15	5	52	0	2	43	1	1	0	11	0	0	0	115	12	7	11	1	1	0	2	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0								
3:15	3:30	2	46	0	1	38	2	4	0	9	0	0	0	102	10	13	7	0	0	1	0	0
Truck Count		0	1	0	0	0	0	0	0	0	0	0	0	1								
3:30	3:45	4	42	4	1	32	1	1	1	5	0	0	0	91	6	6	7	1	1	0	0	0
Truck Count		1	0	0	1	2	0	0	0	0	0	0	0	4								
3:45	4:00	5	68	2	2	43	3	3	0	13	0	0	0	139	12	5	12	0	0	0	1	0
Truck Count		0	0	0	0	1	0	0	0	0	0	0	0	1								
4:00	4:15	7	40	2	0	28	4	3	0	4	0	0	0	88	3	3	11	0	0	0	0	1
Truck Count		0	0	0	0	1	0	0	0	0	0	0	0	1								
4:15	4:30	5	64	0	1	32	3	3	0	11	0	0	0	119	6	8	7	0	1	0	0	0
Truck Count		0	1	0	0	1	0	0	0	0	0	0	0	2								
4:30	4:45	8	60	2	0	61	2	3	1	11	0	0	0	148	20	3	7	0	1	0	2	0
Truck Count		0	1	0	0	0	0	0	0	0	0	0	0	1								
4:45	5:00	3	67	3	0	60	2	5	1	10	0	0	0	151	10	19	14	0	1	0	1	2
Truck Count		0	2	0	0	2	0	0	0	0	0	0	0	4								
5:00	5:15	2	76	1	3	48	1	1	1	14	0	0	0	147	5	6	2	0	1	0	0	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0								
5:15	5:30	7	117	4	2	80	4	6	0	13	0	0	0	233	4	2	6	0	1	0	0	0
Truck Count		0	0	0	0	1	0	0	0	0	0	0	0	1								
5:30	5:45	5	89	1	0	46	3	1	0	7	0	0	0	152	3	2	1	0	0	0	0	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0								
5:45	6:00	2	78	2	1	47	4	3	0	12	0	0	0	149	2	0	2	0	0	0	0	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0								

PEAK HOUR COUNT **TIME:** 4:30 **TO:** 5:30

20	323	10	5	252	9	15	3	48	0	0	0	685	

INTERSECTION PLAN
WITH NUMBERED MOVEMENTS:



Portland
Intersection: Fox Street/Anderson Street
Date: 8/12/14
Day of Week: Tuesday
Weather:
Remarks:

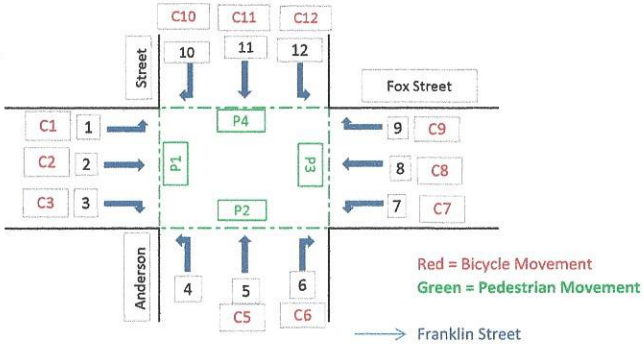
Count Summary Movement

Start	End	1	2	3	4	5	6	7	8	9	10	11	12	Total	P1	P2	P3	P4	C2	C4	C7	C8
7:00	7:15	1	3	8	2	15	3	3	1	0	0	19	6	61	1	1	3	1	0	0	1	0
Truck Count		0	0	1	0	0	0	0	1	0	0	0	0	2								
7:15	7:30	1	1	3	1	12	3	9	3	1	0	25	1	60	1	0	0	2	0	1	0	0
Truck Count		0	0	1	0	0	0	0	0	0	0	0	0	1								
7:30	7:45	6	8	15	1	16	1	7	4	1	0	33	3	95	0	0	0	0	0	0	0	0
Truck Count		0	1	2	0	0	0	0	0	0	0	1	0	4								
7:45	8:00	1	11	17	3	20	7	12	1	0	3	40	1	116	0	0	0	0	0	0	1	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0								
8:00	8:15	4	9	21	3	18	4	14	2	1	0	39	1	116	4	1	5	3	0	0	1	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0								
8:15	8:30	2	10	17	6	16	11	14	2	0	0	40	3	121	4	0	0	5	0	0	0	0
Truck Count		0	1	2	0	0	0	0	0	0	0	0	0	3								
8:30	8:45	3	12	35	3	20	8	20	0	1	1	29	2	134	4	3	0	0	1	0	0	0
Truck Count		0	0	2	0	1	0	0	0	0	1	1	0	5								
8:45	9:00	7	21	22	1	21	8	13	6	2	1	32	0	134	0	0	2	1	0	0	1	1
Truck Count		0	0	0	0	1	0	0	0	0	0	0	0	1								

PEAK HOUR COUNT **TIME:** 8:00 **TO:** 9:00

16	53	99	13	77	31	61	10	4	3	141	6	514

INTERSECTION PLAN
WITH NUMBERED MOVEMENTS:



Portland
Intersection: Fox Street/Anderson Street
Date: 8/12/14
Day of Week: Tuesday
Weather:
Remarks:

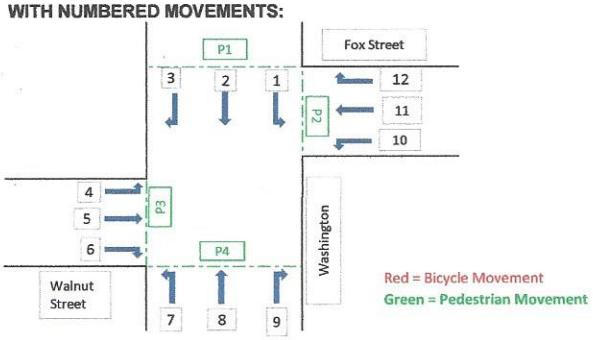
Count Summary Movement

Start	End	1	2	3	4	5	6	7	8	9	10	11	12	Total	P7	P8	P9	P4	C1	C2	C3	C5	C6	C7	C8	C9	C10	C11	C12
3:00	3:15	1	27	2	3	6	14	4	34	12	2	9	12	126	2	0	0	1	2	3	0	1	1	0	2	0	0	0	1
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0															
3:15	3:30	0	27	2	11	10	21	8	28	13	1	5	9	135	2	1	2	2	0	0	0	1	1	0	0	0	0	2	4
Truck Count		0	0	0	0	0	1	0	0	0	0	0	0	1															
3:30	3:45	0	28	5	6	9	16	10	31	15	2	7	17	146	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0
Truck Count		0	1	0	0	0	1	0	1	0	0	0	0	3															
3:45	4:00	1	36	3	6	8	13	5	29	18	3	4	10	136	3	2	2	0	0	2	0	0	0	1	1	0	0	0	0
Truck Count		0	1	0	0	0	0	0	0	0	0	0	0	1															
4:00	4:15	3	26	0	6	11	16	9	34	15	1	4	10	135	1	1	0	3	0	0	0	0	1	2	0	0	0	0	0
Truck Count		0	0	0	1	0	1	0	0	0	0	0	0	2															
4:15	4:30	1	26	4	5	14	9	10	41	16	2	5	12	145	0	0	2	2	0	0	0	0	0	1	0	0	0	0	0
Truck Count		0	0	0	0	0	1	0	0	0	0	0	0	1															
4:30	4:45	2	49	2	6	2	10	9	30	23	3	3	14	153	2	0	1	2	0	0	0	0	5	3	2	0	0	1	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0															
4:45	5:00	3	40	5	4	9	21	8	45	20	3	9	11	178	1	0	3	5	0	0	1	0	2	0	1	0	0	3	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0															
5:00	5:15	2	34	2	5	6	17	7	38	18	4	2	17	152	2	1	0	3	0	2	1	0	1	0	0	0	1	1	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0															
5:15	5:30	3	35	1	9	14	22	9	49	18	0	5	17	182	1	1	6	4	0	1	2	0	1	5	0	0	0	0	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0															
5:30	5:45	1	27	3	5	7	17	8	40	15	5	2	12	142	3	5	1	2	0	1	0	1	1	0	2	1	0	1	0
Truck Count		0	0	0	0	0	1	0	0	0	0	0	0	1															
5:45	6:00	1	30	1	3	9	13	4	46	12	0	0	17	136	3	1	0	6	1	1	0	1	2	1	0	0	0	0	0
Truck Count		0	0	0	0	0	1	0	0	0	0	0	0	1															

PEAK HOUR COUNT **TIME:** **4:30** **TO:** **5:30**

10	158	10	24	31	70	33	162	79	10	19	59	665

INTERSECTION PLAN
WITH NUMBERED MOVEMENTS:



Portland
Intersection: Washington Ave./Fox St./Walnut St.
Date: 8/14/14
Day of Week: Thursday
Weather:
Remarks: Construction

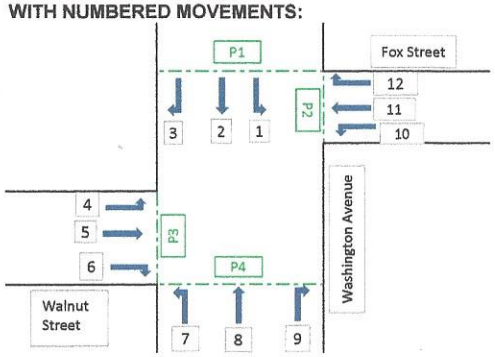
Count Summary Movement

Start	End	1	2	3	4	5	6	7	8	9	10	11	12	Total	P1	P2	P3	P4	C2	C8	C11	C12
7:00	7:15	7	24	1	2	6	3	6	74	1	5	7	5	141	1	1	2	0	0	0	0	0
Truck Count		0	1	0	0	0	0	1	6	0	0	0	0	8								
7:15	7:30	3	26	1	1	10	5	6	78	3	10	10	5	158	0	0	1	0	0	0	0	0
Truck Count		1	2	0	0	0	0	0	4	0	0	0	0	7								
7:30	7:45	9	36	2	4	14	4	2	85	12	1	5	9	183	0	1	0	1	0	0	0	0
Truck Count		0	5	0	1	0	0	0	3	0	0	0	0	9								
7:45	8:00	10	47	2	2	11	6	3	142	8	7	2	11	251	0	4	3	2	0	0	0	0
Truck Count		1	1	0	0	0	0	0	4	0	0	0	0	6								
8:00	8:15	10	39	2	3	11	9	2	159	19	10	4	9	277	4	1	1	1	1	0	0	1
Truck Count		0	3	0	0	0	0	0	1	0	0	0	0	4								
8:15	8:30	19	43	2	5	16	10	4	126	8	8	1	11	253	1	2	3	1	0	0	0	0
Truck Count		0	2	0	1	0	0	1	7	0	0	0	2	13								
8:30	8:45	15	40	2	1	13	2	2	114	9	8	2	15	223	1	0	1	0	0	1	0	0
Truck Count		0	2	0	0	0	0	0	1	1	1	0	0	5								
8:45	9:00	16	60	6	2	21	6	2	117	7	9	2	15	263	0	1	0	0	0	1	1	0
Truck Count		0	2	1	0	0	0	0	5	2	0	0	0	10								

PEAK HOUR COUNT **TIME:** **8:00** **TO:** **9:00**

60	191	13	12	61	27	11	530	46	36	9	52	1,048

INTERSECTION PLAN
WITH NUMBERED MOVEMENTS:



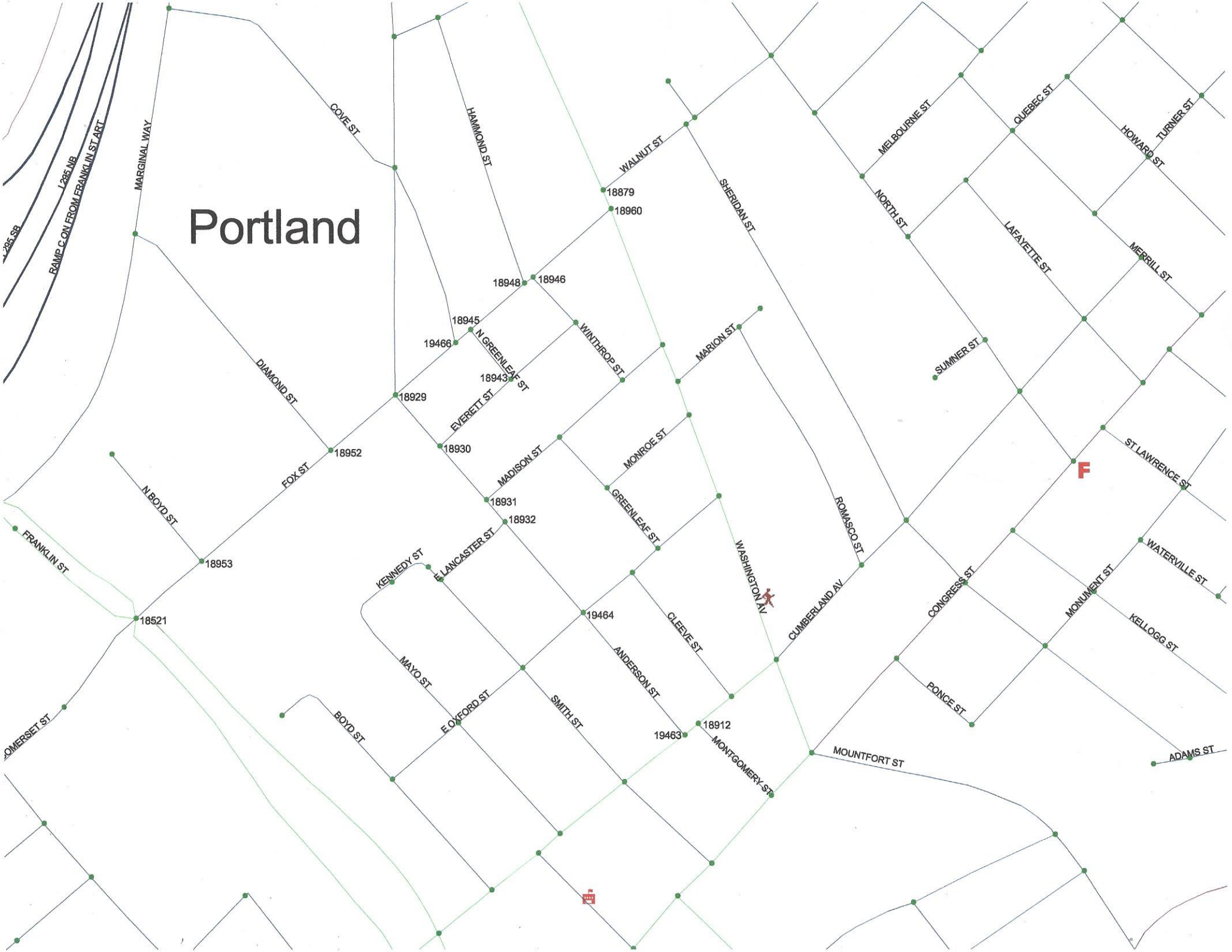
Portland
Intersection: Washington Ave./Fox St./Walnut St.
Date: 8/14/14
Day of Week: Thursday
Weather:
Remarks:

Count Summary Movement

Start	End	1	2	3	4	5	6	7	8	9	10	11	12	Total	P1	P2	P3	P4	C1	C2	C4	C6	C8	C9	C11	C12
3:00	3:15	20	83	4	0	8	3	10	63	19	5	11	10	236	4	1	3	0	0	2	1	0	1	0	1	0
Truck Count		0	0	0	0	0	0	0	2	0	1	0	0	3												
3:15	3:30	14	57	1	4	9	5	4	58	6	11	15	13	197	0	3	2	1	0	0	0	0	1	0	0	0
Truck Count		0	1	0	0	0	0	0	0	0	0	0	0	1												
3:30	3:45	21	110	6	0	13	11	2	66	13	9	22	15	288	3	4	1	0	0	1	1	0	1	0	0	0
Truck Count		0	0	0	1	0	0	0	1	0	0	0	0	2												
3:45	4:00	19	68	3	3	10	0	3	67	8	9	6	8	204	1	4	2	1	0	0	0	0	2	0	0	0
Truck Count		0	0	0	0	1	0	0	0	0	0	0	0	1												
4:00	4:15	36	108	6	0	6	3	5	90	8	15	18	17	312	0	2	0	1	0	1	0	0	0	0	0	0
Truck Count		0	3	0	0	0	0	0	0	0	0	0	0	3												
4:15	4:30	16	104	8	2	15	3	7	76	12	9	17	9	278	1	4	0	0	0	1	0	0	1	0	0	0
Truck Count		0	0	0	0	1	0	0	2	0	0	1	0	4												
4:30	4:45	23	136	7	2	14	11	3	73	19	11	9	16	324	0	3	1	0	0	4	0	0	2	0	0	1
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0												
4:45	5:00	16	139	4	2	14	9	7	81	6	5	17	23	323	2	3	1	0	0	3	0	1	4	0	0	0
Truck Count		0	1	0	0	0	0	0	0	0	0	0	0	1												
5:00	5:15	22	148	8	1	7	3	7	83	6	12	19	8	324	2	3	1	0	1	1	0	0	1	0	0	0
Truck Count		0	1	0	0	0	0	0	0	0	0	0	0	1												
5:15	5:30	15	154	7	2	11	1	9	76	12	15	14	11	327	4	9	1	0	0	4	0	0	1	1	1	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0												
5:30	5:45	30	130	8	5	13	4	5	93	8	9	21	15	341	1	4	0	1	0	2	0	0	1	0	0	0
Truck Count		0	0	0	0	0	0	0	0	0	0	0	0	0												
5:45	6:00	9	84	3	0	9	3	8	75	9	6	14	7	227	3	2	4	1	1	2	0	0	1	0	0	0
Truck Count		0	1	0	0	0	0	0	0	0	0	0	0	1												

PEAK HOUR COUNT **TIME:** 4:30 **TO:** 5:30

76	579	26	7	46	24	26	313	43	43	59	58	1,300


Portland
I-295 SB
I-295 NB
RAMP C ON FROM FRANKLIN ST ART
MARGINAL WAY
COVE ST
HAMMOND ST
WALNUT ST
18879
18960
18948
18946
18945
19466
N GREENLEAF ST
WINTHROP ST
18943
EVERETT ST
18929
DIAMOND ST
18952
FOX ST
18930
MADISON ST
MONROE ST
MARION ST
SHERIDAN ST
18931
18932
GREENLEAF ST
N BOYD ST
FRANKLIN ST
18953
KENNEDY ST
E LANCASTER ST
WASHINGTON AV
ROMASCO ST
CUMBERLAND AV
18521
19464
CLEEVE ST
ANDERSON ST
MAYO ST
E OXFORD ST
SMITH ST
BOYD ST
19463
18912
MONTGOMERY ST
MOUNTFORT ST
PONCE ST
CONGRESS ST
MONUMENT ST
KELLOGG ST
WATERVILLE ST
ADAMS ST
ST LAWRENCE ST
SUMNER ST
NORTH ST
LAFAYETTE ST
MERRILL ST
HOWARD ST
TURNER ST
QUEBEC ST
MELBOURNE ST
F

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

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

#1

REPORT PARAMETERS

Year 2011, Start Month 1 through Year 2013 End Month: 12

Route: **0560293**	Start Node: **18521**	Start Offset: **0**	☐ **Exclude First Node**
	End Node: **18960**	End Offset: **0**	☐ **Exclude Last Node**
Route: **0026X**	Start Node: **18960**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18879**	End Offset: **0**	☐ **Exclude Last Node**

Crash Summary I

Nodes

Node	Route - MP	Node Description	U/R	Total Crashes	Injury Crashes K	A	B	C	PD	Percent Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF
18521	0560293 - 0	Int of FOX ST FRANKLIN ST	9	20	0	0	2	8	10	50.0	11.697	0.57	0.99	0.00
												Statewide Crash Rate:	0.65	
18953	0560293 - 0.06	0509373 POR,N.BOYD,FOX ST.	2	3	0	0	0	0	3	0.0	2.209	0.45	0.44	1.03
												Statewide Crash Rate:	0.14	
18952	0560293 - 0.16	0509372 POR,FOX,DIAMOND ST.	2	1	0	0	0	0	1	0.0	2.178	0.15	0.44	0.00
												Statewide Crash Rate:	0.14	
18929	0560293 - 0.21	0509349 POR,ANDERSON,FOX ST.	2	2	0	0	0	0	2	0.0	1.996	0.33	0.45	0.00
												Statewide Crash Rate:	0.14	
19466	0560293 - 0.25	0509888 POR,FOX STREET,COVE STREET	2	0	0	0	0	0	0	0.0	1.531	0.00	0.48	0.00
												Statewide Crash Rate:	0.14	
18945	0560293 - 0.26	0509365 POR,FOX,N.GREENLEAF ST.	2	2	0	0	0	1	0	100.0	1.381	0.48	0.49	0.00
												Statewide Crash Rate:	0.14	
A18948	0560293 - 0.30	0509368 POR,FOX,HAMMOND ST.	2	0	0	0	0	0	0	0.0	0.000	0.00	0.00	0.00
												Statewide Crash Rate:	0.14	
P18946	0560293 - 0.31	0509366 POR,FOX,WINTHROP ST.	2	2	0	0	0	0	2	0.0	1.248	0.53	0.50	1.06
												Statewide Crash Rate:	0.14	
A18960	0560293 - 0.36	Int of FOX ST WASHINGTON AV	2	0	0	0	0	0	0	0.0	0.000	0.00	0.00	0.00
												Statewide Crash Rate:	0.14	
P18879	0026X - 0.28	Int of WALNUT ST, WASHINGTON AV	2	9	0	0	0	2	7	22.2	4.034	0.74	0.38	1.98
												Statewide Crash Rate:	0.14	
Study Years: 3.00		**NODE TOTALS:**		39	0	0	2	11	25	33.3	26.274	0.49	0.54	0.92

Crash Summary I

Sections

Start Node	End Node	Element	Offset Begin - End	Route - MP	Section Length	U/R	Total Crashes	Injury Crashes K	A	B	C	PD	Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF
18521	18953	194034	0 - 0.06	0560293 - 0	0.06	2	0	0	0	0	0	0	0.0	0.00138	0.00	971.45	0.00
Int of FOX ST FRANKLIN ST				RD INV 05 60293											Statewide Crash Rate: 346.84		
18952	18953	194637	0 - 0.10	0560293 - 0.06	0.10	2	0	0	0	0	0	0	0.0	0.00201	0.00	881.52	0.00
0509372 POR,FOX,DIAMOND ST.				RD INV 05 60293											Statewide Crash Rate: 346.84		
18929	18952	194603	0 - 0.05	0560293 - 0.16	0.05	2	0	0	0	0	0	0	0.0	0.00097	0.00	1064.25	0.00
0509349 POR,ANDERSON,FOX ST.				RD INV 05 60293											Statewide Crash Rate: 346.84		
18929	19466	194604	0 - 0.04	0560293 - 0.21	0.04	2	0	0	0	0	0	0	0.0	0.00061	0.00	1195.29	0.00
0509349 POR,ANDERSON,FOX ST.				RD INV 05 60293											Statewide Crash Rate: 346.84		
18945	19466	194628	0 - 0.01	0560293 - 0.25	0.01	2	0	0	0	0	0	0	0.0	0.00015	0.00	1497.37	0.00
0509365 POR,FOX,N.GREENLEAF ST.				RD INV 05 60293											Statewide Crash Rate: 346.84		
18945	18948	194627	0 - 0.04	0560293 - 0.26	0.04	2	1	0	0	0	0	1	0.0	0.00049	681.12	1258.33	0.00
0509365 POR,FOX,N.GREENLEAF ST.				RD INV 05 60293											Statewide Crash Rate: 346.84		
18946	18948	194629	0 - 0.01	0560293 - 0.30	0.01	2	0	0	0	0	0	0	0.0	0.00012	0.00	1483.19	0.00
0509366 POR,FOX,WINTHROP ST.				RD INV 05 60293											Statewide Crash Rate: 346.84		
18946	18960	194630	0 - 0.05	0560293 - 0.31	0.05	2	1	0	0	0	0	1	0.0	0.00058	575.63	1210.04	0.00
0509366 POR,FOX,WINTHROP ST.				RD INV 05 60293											Statewide Crash Rate: 346.84		
18879	18960	3123723	0 - 0.01	0026X - 0.27	0.01	2	0	0	0	0	0	0	0.0	0.00036	0.00	793.55	0.00
Int of WALNUT ST, WASHINGTON AV				ST RTE 26											Statewide Crash Rate: 186.16		
Study Years: 3.00				**Section Totals:**	0.37		2	0	0	0	0	2	0.0	0.00666	100.05	648.35	0.15
				Grand Totals:	0.37		41	0	0	2	11	27	31.7	0.00666	2050.99	796.08	2.58

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

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

#3

REPORT PARAMETERS

Year 2011, Start Month 1 through Year 2013 End Month: 12

Route: **0560847**	Start Node: **18929**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **19463**	End Offset: **0**	☐ **Exclude Last Node**
Route: **0561238**	Start Node: **19463**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18912**	End Offset: **0**	☑ **Exclude Last Node**

Crash Summary I

Nodes

Node	Route - MP	Node Description	U/R	Total Crashes	Injury Crashes K	A	B	C	PD	Percent Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF
18930	0560847 - 0.53	0509350 POR,ANDERSON,EVERETT ST.	2	0	0	0	0	0	0	0.0	0.159	0.00 Statewide Crash Rate:	0.49 0.14	0.00
18931	0560847 - 0.56	0509351 POR,ANDERSON,MADISON ST.	2	1	0	0	0	1	0	100.0	0.153	2.18 Statewide Crash Rate:	0.47 0.14	4.63
18932	0560847 - 0.59	0509352 POR,E.LANCASTER,ANDERSON ST.	2	0	0	0	0	0	0	0.0	0.133	0.00 Statewide Crash Rate:	0.41 0.14	0.00
19464	0560847 - 0.65	0509886 POR,ANDERSON ST,E.OXFORD STR.	2	1	0	0	0	0	1	0.0	0.164	2.03 Statewide Crash Rate:	0.50 0.14	4.09
19463	0560847 - 0.74	Int of ANDERSON ST CUMBERLAND AV	2	2	0	0	0	0	2	0.0	2.068	0.32 Statewide Crash Rate:	0.45 0.14	0.00
Study Years:	3.00	**NODE TOTALS:**		4	0	0	0	1	3	25.0	2.677	0.50	0.42	1.19

Crash Summary I

Sections

Start Node	End Node	Element	Offset Begin - End	Route - MP	Section Length	U/R	Total Crashes	Injury Crashes K	A	B	C	PD	Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF
18929	18930	194602	0 - 0.04	0560847 - 0.49	0.04	2	1	0	0	0	0	1	0.0	0.00006	5272.76	1194.07	4.42
0509349 POR,ANDERSON,FOX ST.				RD INV 05 60847											Statewide Crash Rate: 346.84		
18930	18931	194605	0 - 0.03	0560847 - 0.53	0.03	2	0	0	0	0	0	0	0.0	0.00004	0.00	682.58	0.00
0509350 POR,ANDERSON,EVERETT ST.				RD INV 05 60847											Statewide Crash Rate: 346.84		
18931	18932	194607	0 - 0.03	0560847 - 0.56	0.03	2	0	0	0	0	0	0	0.0	0.00004	0.00	441.48	0.00
0509351 POR,ANDERSON,MADISON ST.				RD INV 05 60847											Statewide Crash Rate: 346.84		
18932	19464	194609	0 - 0.06	0560847 - 0.59	0.06	2	4	0	0	1	0	3	25.0	0.00007	19896.34	1243.30	16.00
0509352 POR,E.LANCASTER,ANDERSON ST.				RD INV 05 60847											Statewide Crash Rate: 346.84		
19463	19464	195146	0 - 0.09	0560847 - 0.65	0.09	2	4	0	0	0	0	2	0.0	0.00008	15854.90	1385.36	11.44
Int of ANDERSON ST CUMBERLAND AV				RD INV 05 60847											Statewide Crash Rate: 346.84		
18912	19463	194577	0 - 0.01	0561238 - 0.98	0.01	2	0	0	0	0	0	0	0.0	0.00020	0.00	785.75	0.00
Int of CUMBERLAND AV, MONTGOMERY ST				RD INV 05 61238											Statewide Crash Rate: 186.16		
Study Years: 3.00				**Section Totals:**	0.26		9	0	0	1	0	6	11.1	0.00049	6102.75	1070.96	5.70
				Grand Totals:	0.26		13	0	0	1	1	9	15.4	0.00049	8815.08	1357.90	6.49

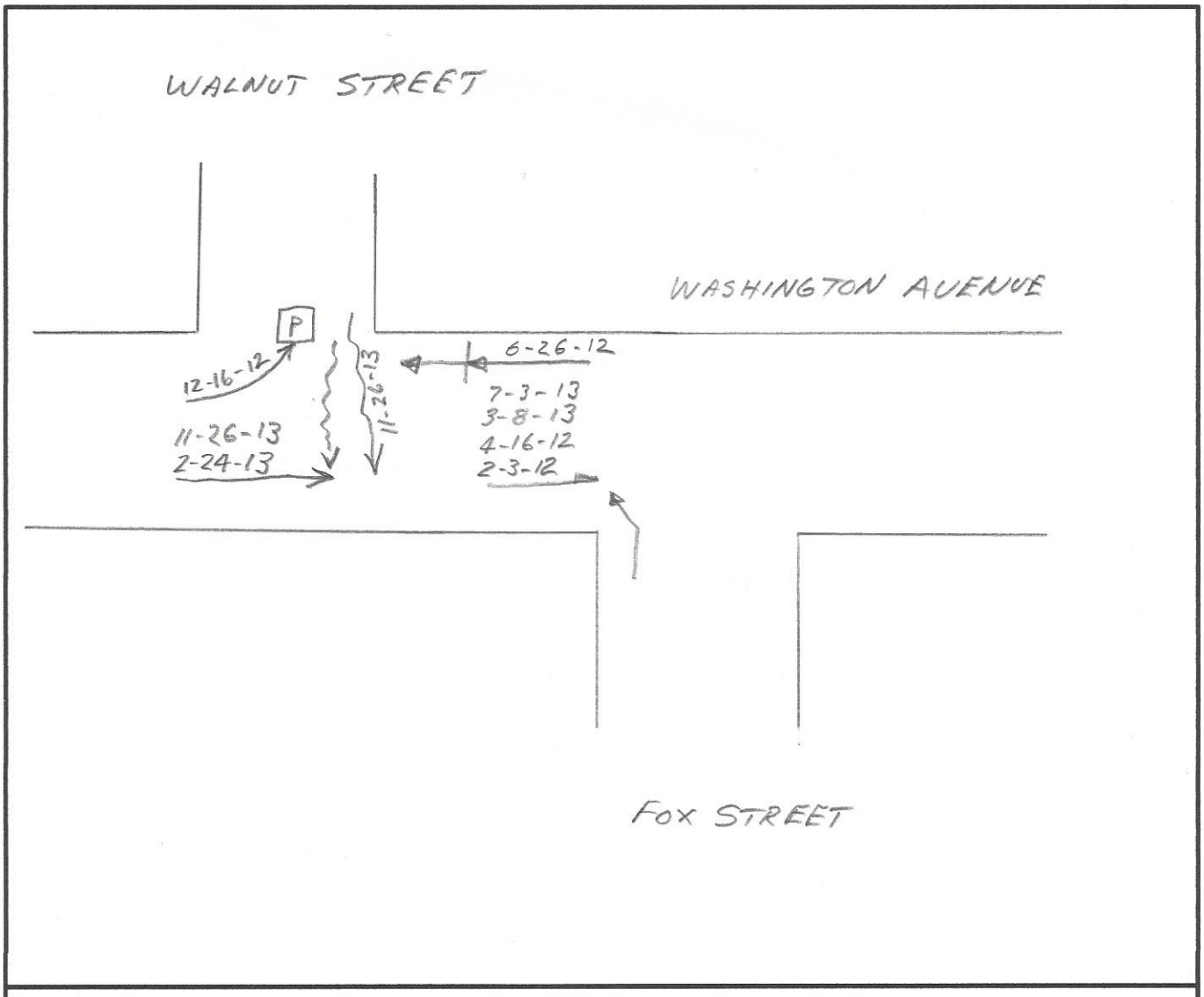
COLLISION DIAGRAM

SHEET 1 OF 2

LOCATION WASHINGTON AVE. / WALNUT ST. / FOX ST.

TOWN PORTLAND NODE NO(S) P18879

YEARS REVIEWED 2011-2014 DATE PREPARED 8-23-2014



CRITICAL RATE FACTOR _____ EQUIV. PROP. DAMAGE ACC/YEAR _____ ACC/MEV _____

LIGHT
1. DAWN (MORNING) 2. DAYLIGHT 3. DUSK (EVENING)
4. DARK (ST. LIGHTS ON) 5. DARK (NO ST. LIGHTS) 6. DARK (ST. LIGHTS OFF)
7. OTHER

ROAD SURFACE
1. DRY 2. WET 3. SNOW/SLUSH–SANDED
4. ICE/PACKED SNOW–SANDED 5. MUDDY 6. DEBRIS
7. OILY 8. SNOW/SLUSH–NOT SANDED 9. ICE–PKD. SNOW–NOT SANDED
10. OTHER

APPARENT CONTRIBUTING FACTORS – HUMAN
1. NO IMPROPER ACTION 2. FAIL TO YLD. RIGHT OF WAY 3. ILLEGAL UNSAFE SPEED
4. FOLLOW TOO CLOSE 5. DISREGARD TRAFFIC CONTROL DEVICE
6. DRIVING LEFT OF CENTER–NO PASSING 7. IMPROPER PASS–OVERTAKING
8. IMP. UNSAFE LANE CHANGE 9. IMP. PARKING START/STOP 10. IMPROPER TURN
11. UNSAFE BACKING 12. NO SIGNAL OR IMP. SIGNAL 13. IMPEDING TRAFFIC
14. DRIVER INATTENTION–DISTRACTION 15. DRIVER INEXPERIENCE
16. PEDEST. VIOLATION ERROR 17. PHYSICAL IMPAIRMENT 18. VISION OBSCURED–WINDSHIELD GLASS
19. VISION OBSCURED–SUN/HEADLIGHTS
20. OTHER VISION OBSCUREMENT 30. OTHER HUMAN VIOLATION FACTOR
31. HIT AND RUN 51. UNKNOWN

– VEHICULAR
41. DEFECTIVE BRAKES 42. DEFECTIVE TIRE/FAILURE 43. DEFECTIVE LIGHTS
44. DEFECTIVE SUSPENSION OR FACTOR 45. DEFECTIVE STEERING 50. OTHER VEHICLE DEFECT
51. UNKNOWN

SYMBOLS

ANGLE	→	PEDESTRIAN	→ P	FATAL ACCIDENT	●
BACKING	⇤	REAR END	→|		
FIXED OBJECT	→□	SIDE SWIPE	⇉	VEHICLE (MOVING)	→
HEAD ON	→←	TURNING MOVE	↱	BICYCLE	- - B
OVERTURN	→○	CHANGE LANE	⇗	ANIMAL	- - A
PARKED VEHICLE	▨	OUT OF CONTROL	⇝	SLED	- - S

WEATHER
C = CLEAR F = FOG R = RAIN
SL = SLEET S = SNOW CL = CLOUDY
XW = CROSS WINDS

INJURIES
K = FATAL B = NON–INCAPACITATING
A = INCAPACITATING C = POSSIBLE INJURY

S:/SHEETS/COLLISION DIAGRAM.DWG

COLLISION DIAGRAM

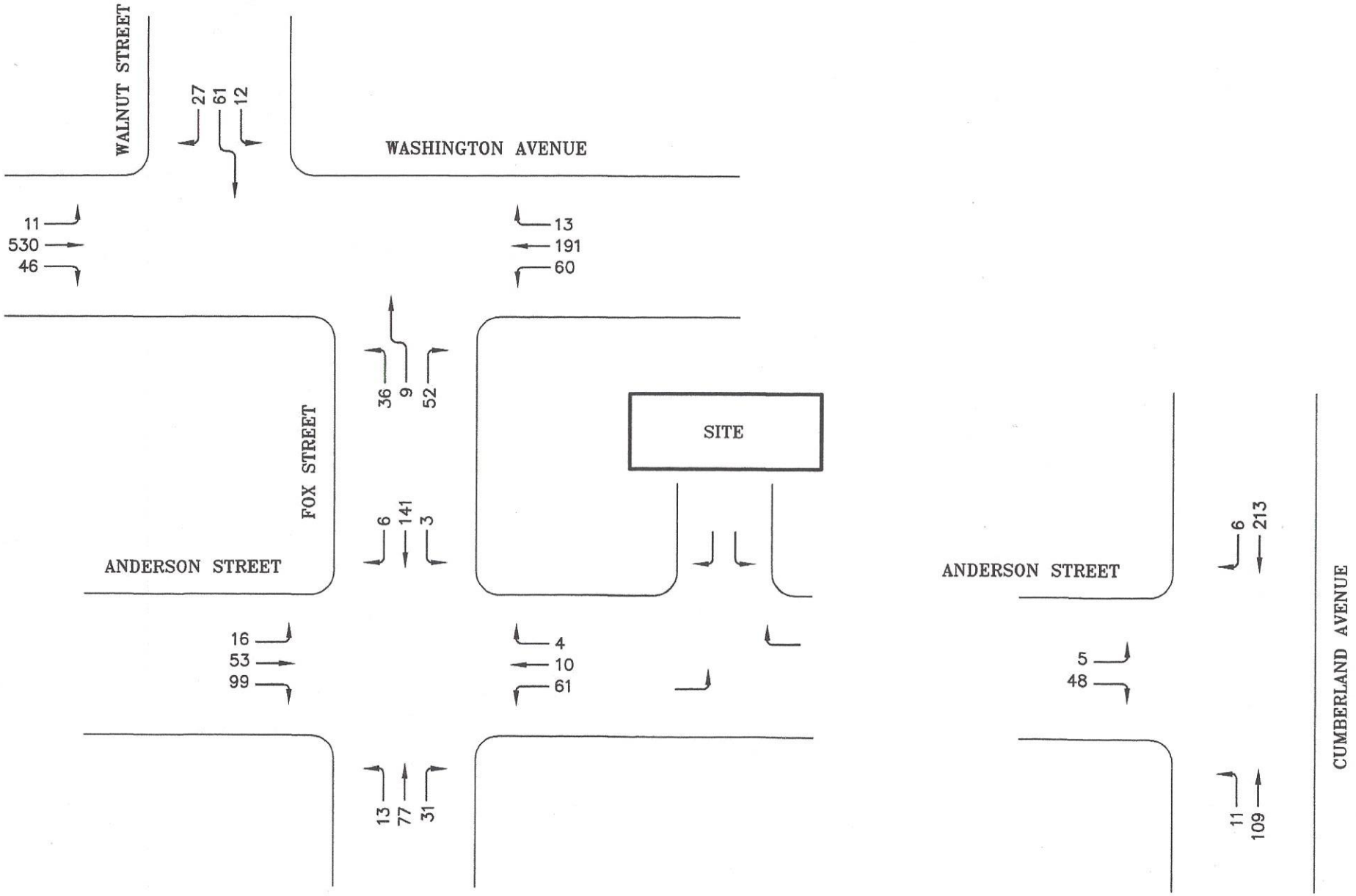
SHEET 2 OF 2

LOCATION WASHINGTON AVE. / WALNUT ST. / FOX ST.

TOWN PORTLAND NODE NO(S) P19879

YEARS REVIEWED 2011 - 2014 DATE PREPARED 8-23-2014

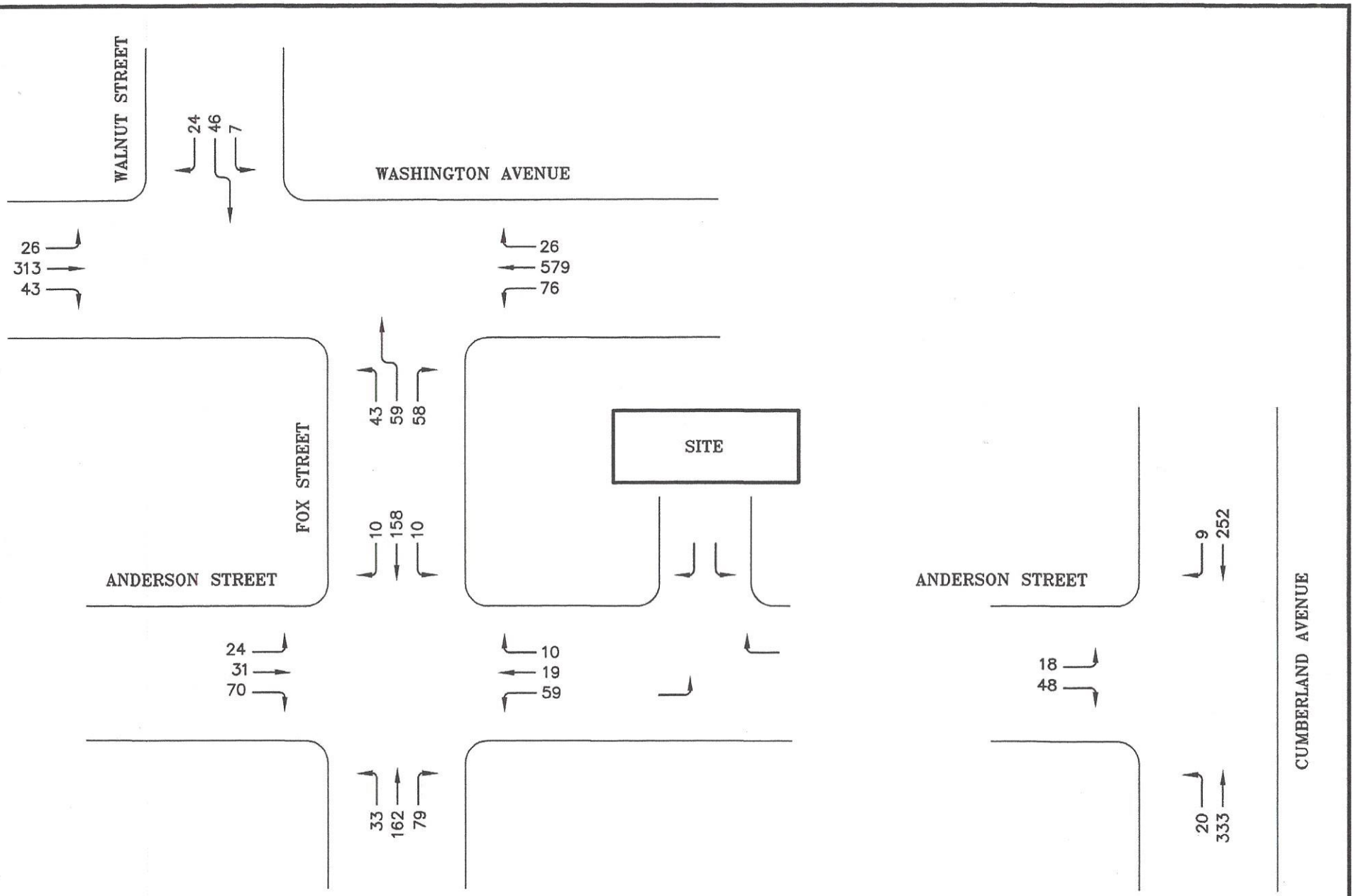
REPORT NO.	DATE	TIME	INJURIES K	A	B	C	LIGHT	ROAD SURFACE	ACF	OTHER
12-315	2/3/12	6:06					1	1	2	
12-000883	4/16/12	11:11					2	1	2	
12-001534	6/26/12	13:38				1	2	1	4	Ped in xwalk
12-003182	12/16/12	20:04			1		4	1		
13-684	2/24/13	13:59					2	8	Roadway	Cond.'tions
13-843	3/8/13	17:01					2	1	2	
13-001902	7/3/13	15:30					2	1	2	
13-003402	11/26/13	7:31					2	Ice/frost	Roadway	Cond.'tions
13-003403	11/26/13	7:30					2	Ice/frost	Roadway	Cond.'tions



2014 DESIGN HOUR TRAFFIC
AM PEAK HOUR
FIGURE 1

E:\LAND PROJECTS\34000\344399 TRAFFIC SOLUTIONS\89 ANDERSON ST\PLANSET\89 ANDERSON STREET.DWG

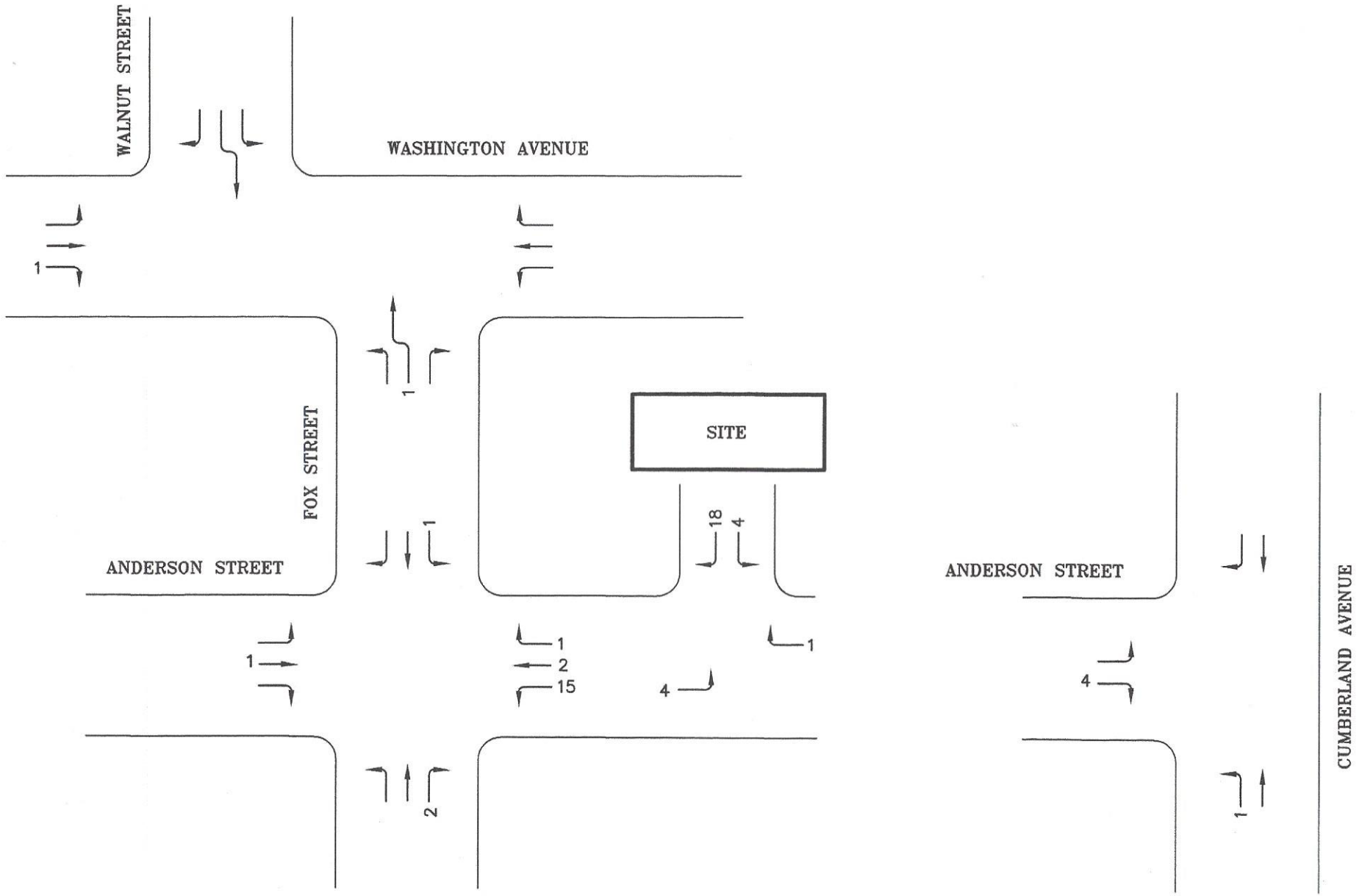
Project Name and Location: 89 ANDERSON STREET APARTMENTS, PORTLAND, MAINE	TRAFFIC SOLUTIONS, 235 BANCROFT STREET, PORTLAND, MAINE 04102-1730
DATE: AUGUST 18, 2014	FIGURE: 1



2014 DESIGN HOUR TRAFFIC
PM PEAK HOUR
FIGURE 2

E:\LAND PROJECTS\34000\344399 TRAFFIC SOLUTIONS\89 ANDERSON ST\PLANSET\89 ANDERSON STREET.DWG

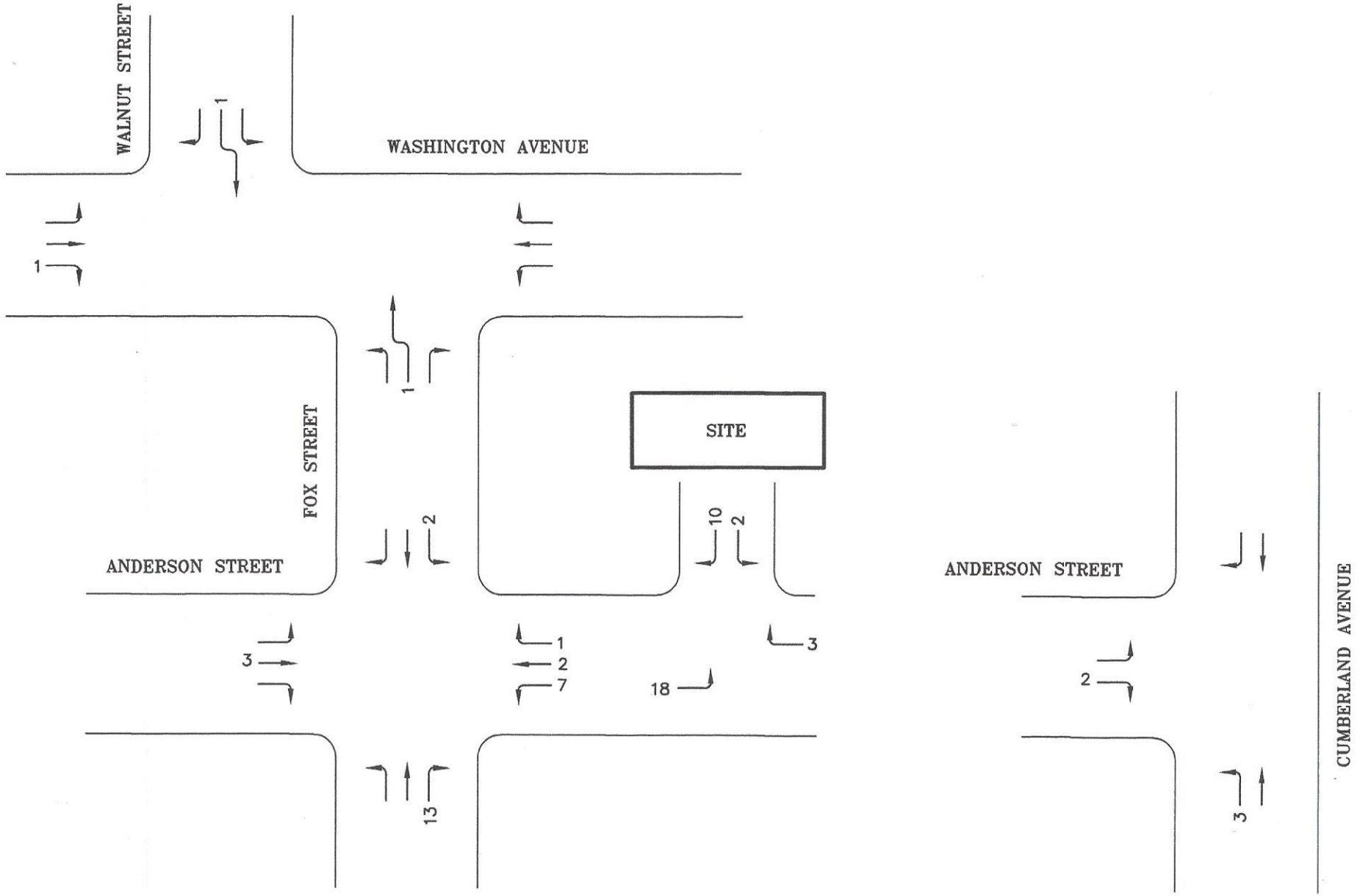
Project Name and Location: 89 ANDERSON STREET APARTMENTS, PORTLAND, MAINE	TRAFFIC SOLUTIONS, 235 BANCROFT STREET, PORTLAND, MAINE 04102-1730
DATE: AUGUST 18, 2014	FIGURE: 2



SITE TRAFFIC ASSIGNMENTS
AM PEAK HOUR
FIGURE 3

E:\LAND PROJECTS\34000\344399 TRAFFIC SOLUTIONS\89 ANDERSON ST\PLANSET\89 ANDERSON STREET.DWG

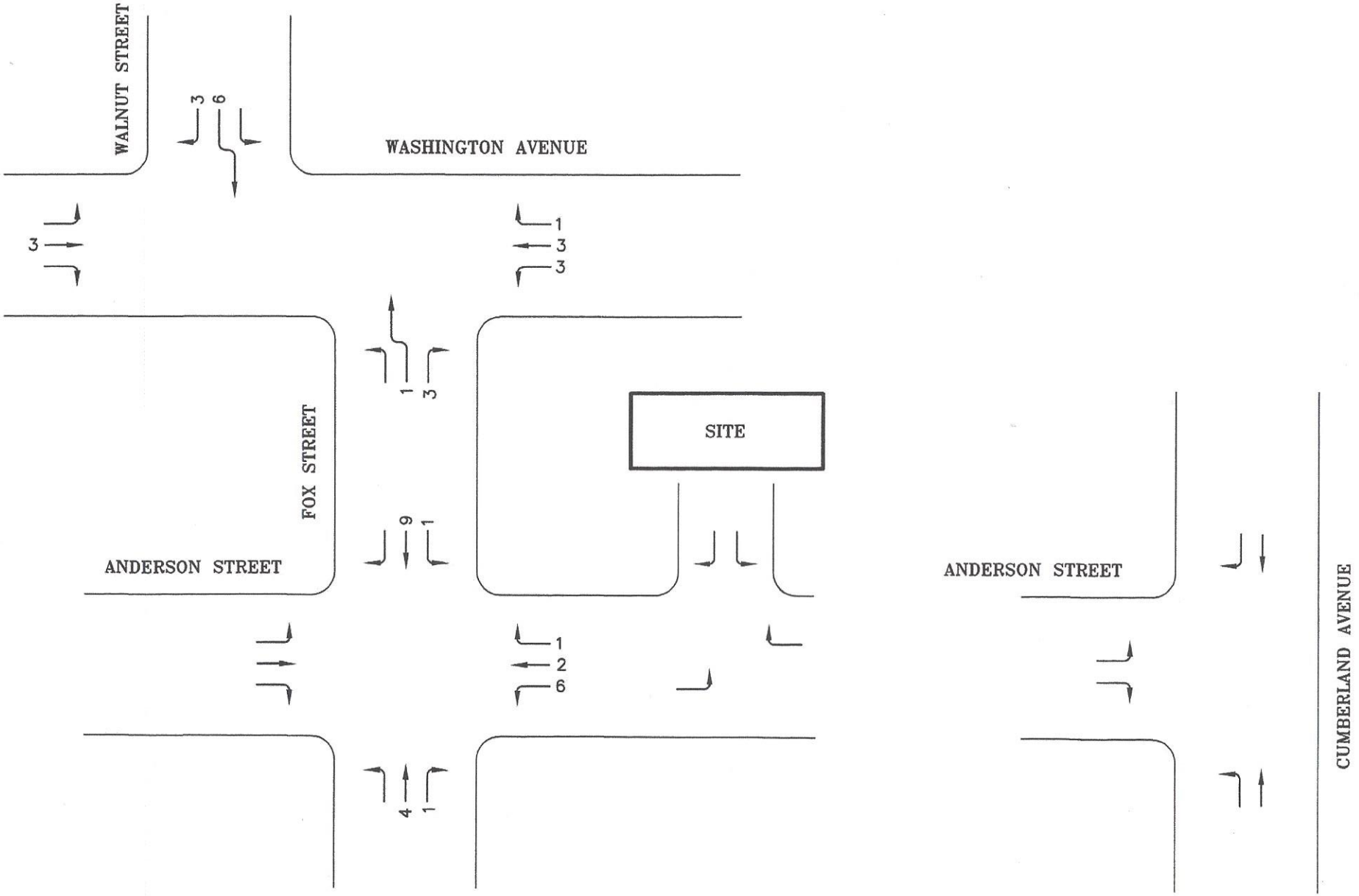
Project Name and Location: 89 ANDERSON STREET APARTMENTS, PORTLAND, MAINE	TRAFFIC SOLUTIONS
DATE: AUGUST 18, 2014 FIGURE: 3	235 BANCROFT STREET, PORTLAND, MAINE 04102-1730



SITE TRAFFIC ASSIGNMENTS
PM PEAK HOUR
FIGURE 4

E:\LAND PROJECTS\34000\344399 TRAFFIC SOLUTIONS\89 ANDERSON ST\PLANSET\89 ANDERSON STREET.DWG

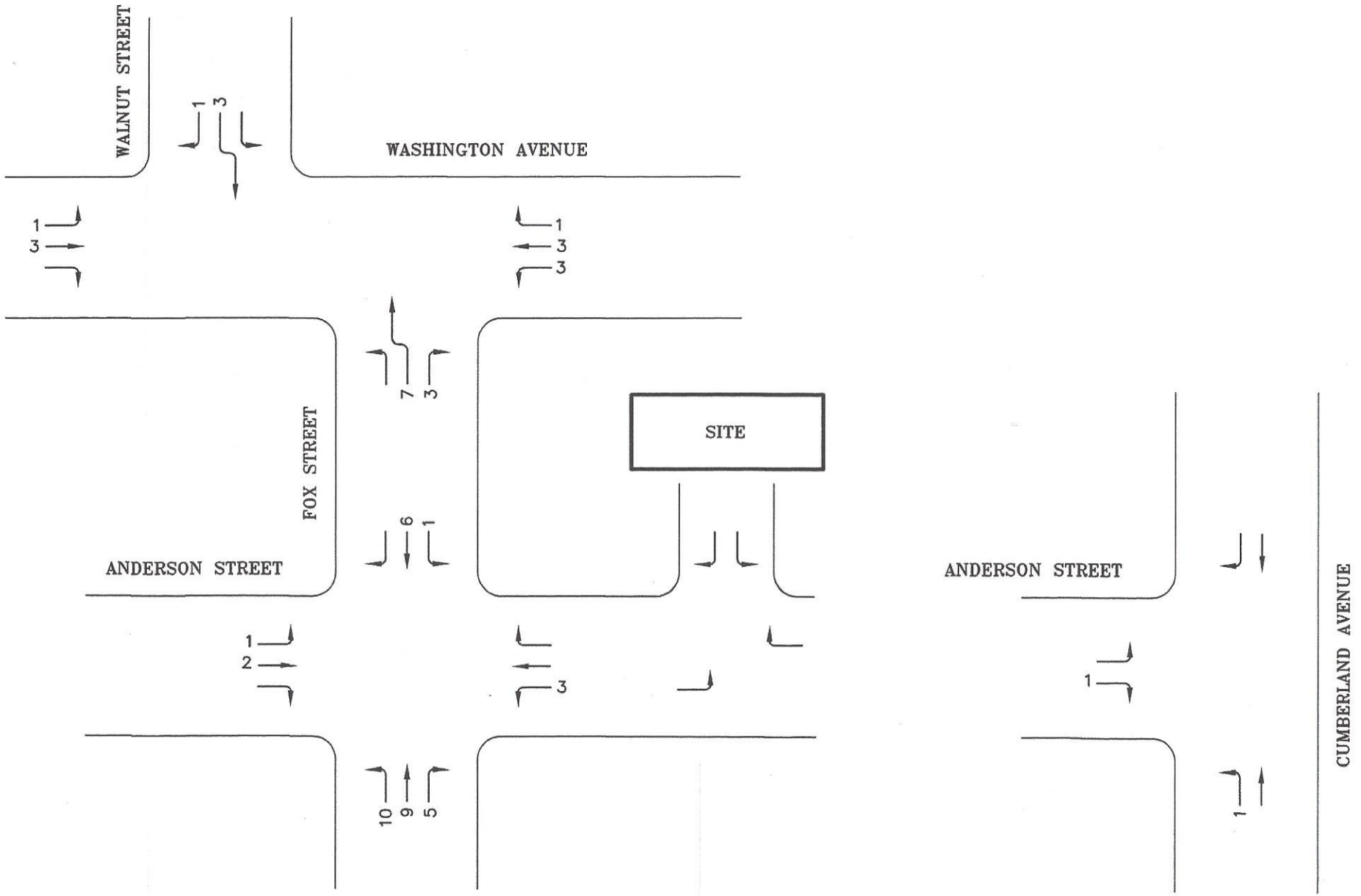
Project Name and Location: 89 ANDERSON STREET APARTMENTS, PORTLAND, MAINE	TRAFFIC SOLUTIONS
DATE: AUGUST 18, 2014 FIGURE: 4	235 BANCROFT STREET, PORTLAND, MAINE 04102-1730



OTHER DEVELOPMENT TRAFFIC
AM PEAK HOUR
FIGURE 5

E:\LAND PROJECTS\34000\344399 TRAFFIC SOLUTIONS\89 ANDERSON ST\PLANSET\89 ANDERSON STREET.DWG

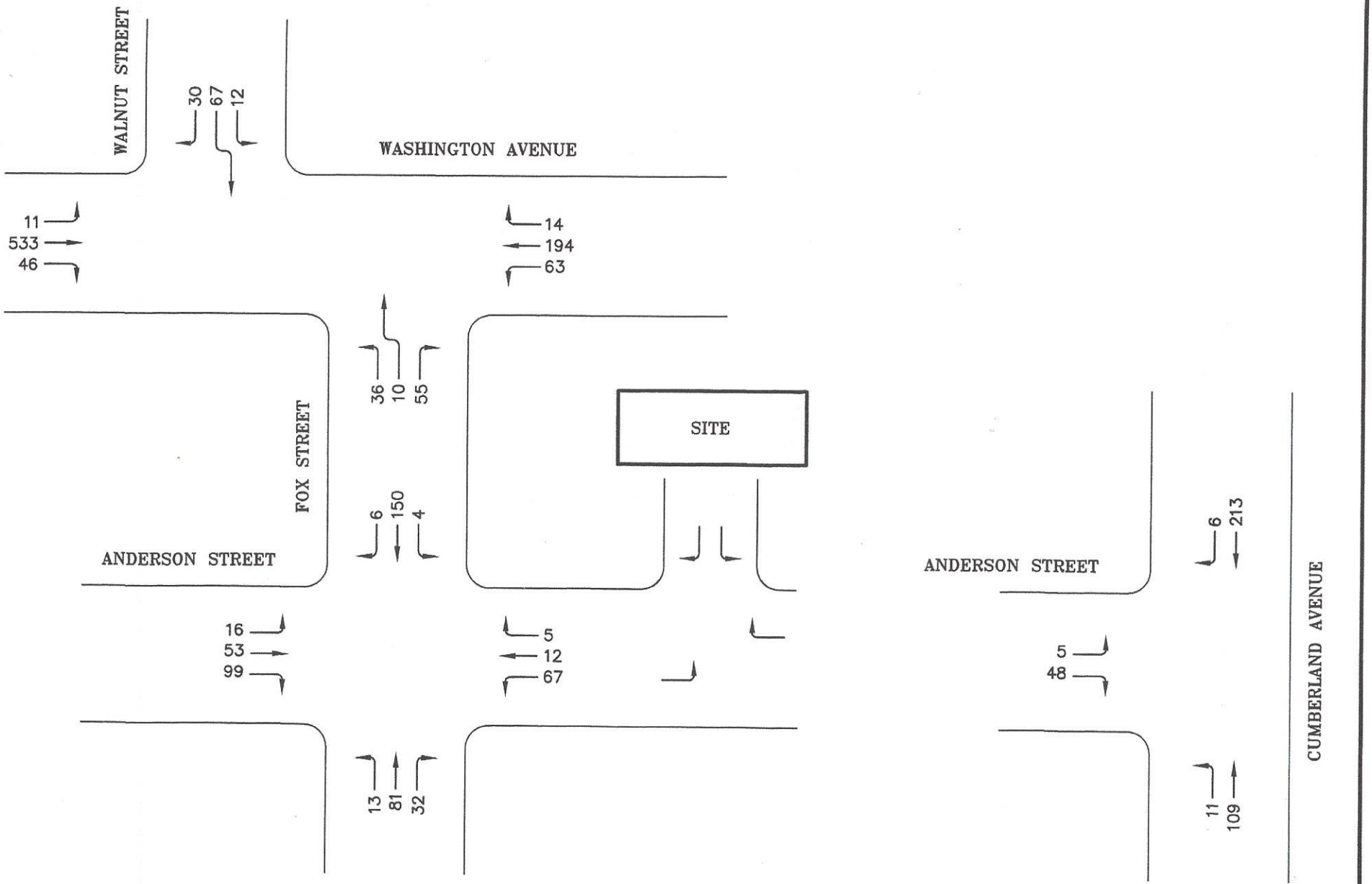
Project Name and Location: 89 ANDERSON STREET APARTMENTS, PORTLAND, MAINE	TRAFFIC SOLUTIONS
DATE: AUGUST 18, 2014 FIGURE: 5	235 BANCROFT STREET, PORTLAND, MAINE 04102-1730



OTHER DEVELOPMENT TRAFFIC
PM PEAK HOUR
FIGURE 6

E:\LAND PROJECTS\34000\344399 TRAFFIC SOLUTIONS\89 ANDERSON ST\PLANSET\89 ANDERSON STREET.DWG

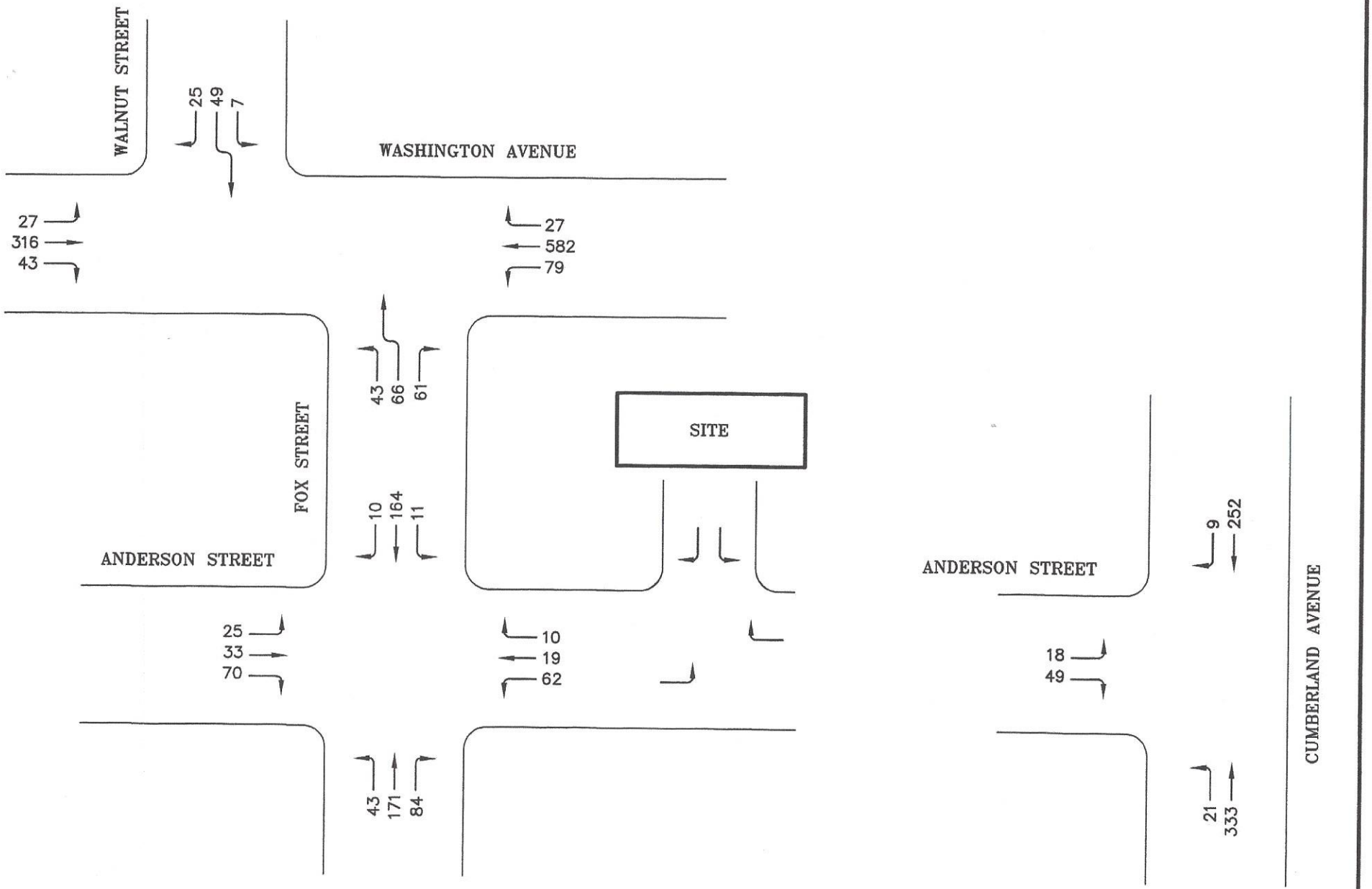
89 ANDERSON STREET APARTMENTS PORTLAND, MAINE	TRAFFIC SOLUTIONS 235 BANCROFT STREET, PORTLAND, MAINE 04102-1730
DATE: AUGUST 18, 2014	FIGURE: 6



2014 PRE-DEVELOPMENT TRAFFIC
AM PEAK HOUR
FIGURE 7

E:\LAND PROJECTS\34000\344399 TRAFFIC SOLUTIONS\89 ANDERSON ST\PLANSET\89 ANDERSON STREET.DWG

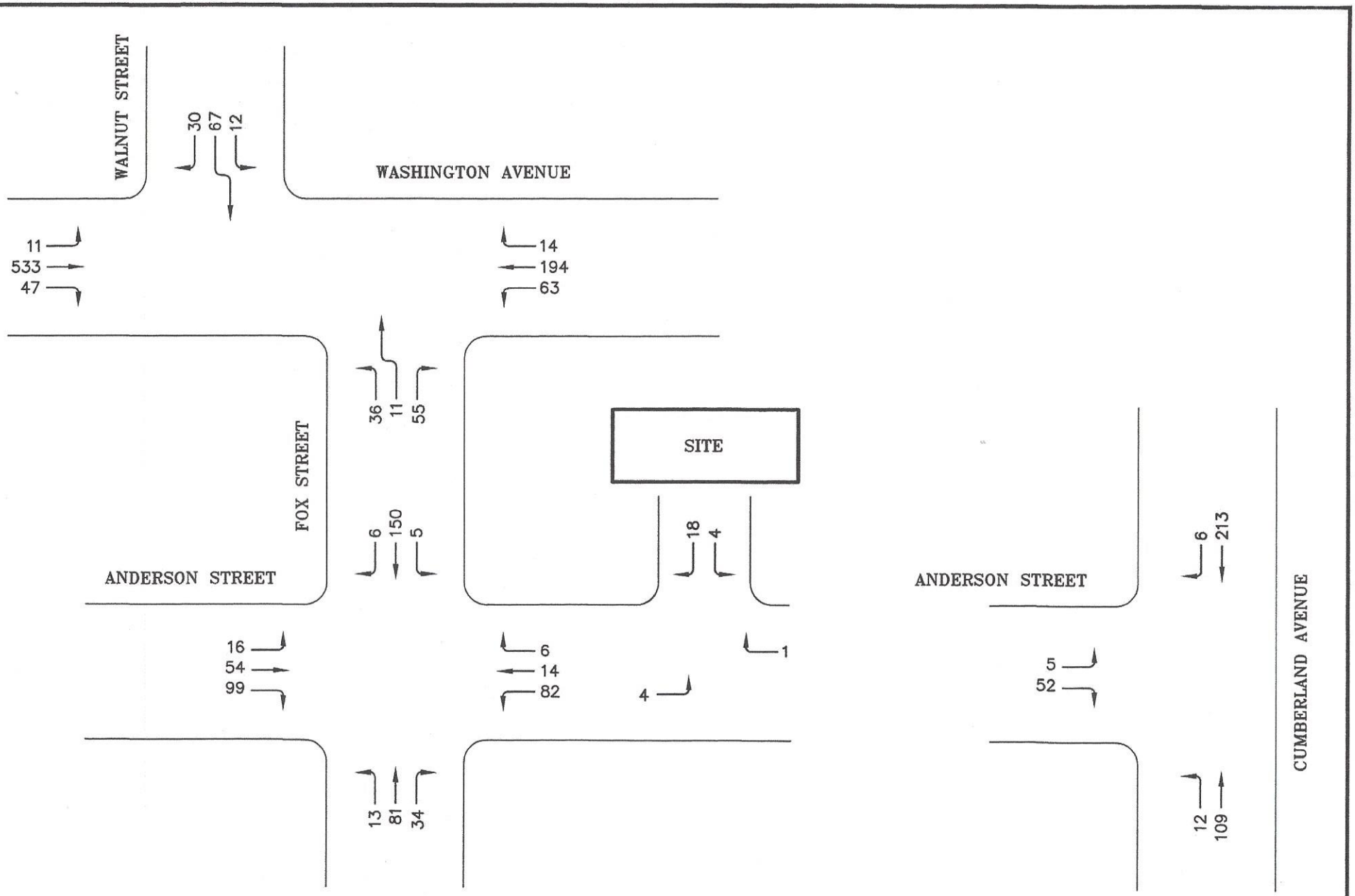
Project Name and Location: 89 ANDERSON STREET APARTMENTS, PORTLAND, MAINE	TRAFFIC SOLUTIONS
DATE: AUGUST 18, 2014	FIGURE: 7
	235 BANCROFT STREET, PORTLAND, MAINE 04102-1730



2014 PRE-DEVELOPMENT TRAFFIC
PM PEAK HOUR
FIGURE 8

E:\LAND PROJECTS\34000\344399 TRAFFIC SOLUTIONS\89 ANDERSON ST\PLANSET\89 ANDERSON STREET.DWG

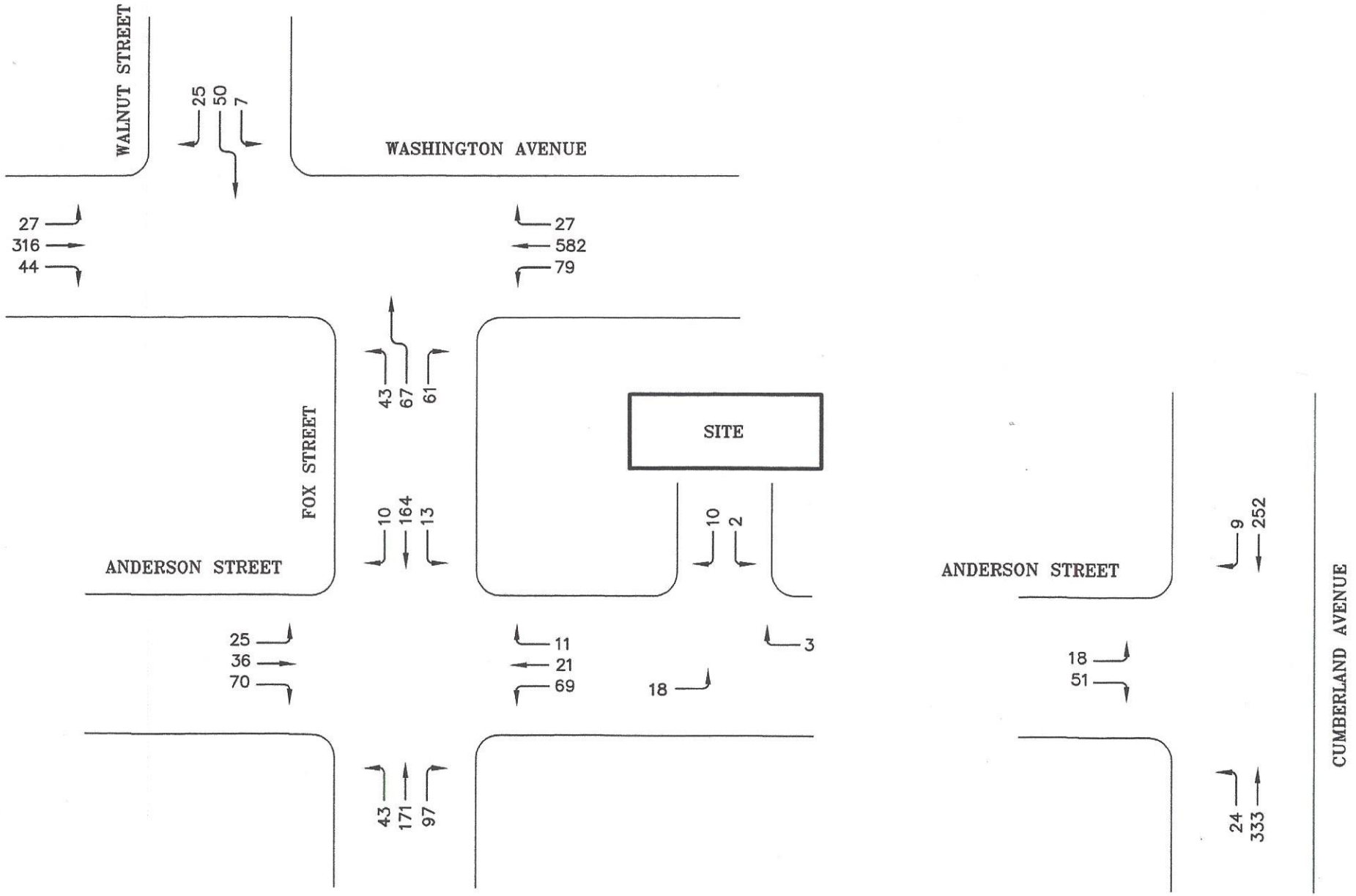
Project Name and Location: 89 ANDERSON STREET APARTMENTS, PORTLAND, MAINE	TRAFFIC SOLUTIONS
DATE: AUGUST 18, 2014	FIGURE: 8
	235 BANCROFT STREET, PORTLAND, MAINE 04102-1730



2014 POST-DEVELOPMENT TRAFFIC
AM PEAK HOUR
FIGURE 9

E:\LAND PROJECTS\34000\344399 TRAFFIC SOLUTIONS\89 ANDERSON ST\PLANSET\89 ANDERSON STREET.DWG

Project Name and Location: 89 ANDERSON STREET APARTMENTS, PORTLAND, MAINE	TRAFFIC SOLUTIONS
DATE: AUGUST 18, 2014	FIGURE: 9
	235 BANCROFT STREET, PORTLAND, MAINE 04102-1730



2014 POST-DEVELOPMENT TRAFFIC
PM PEAK HOUR
FIGURE 10

E:\LAND PROJECTS\34000\344399 TRAFFIC SOLUTIONS\89 ANDERSON ST\PLANSET\89 ANDERSON STREET.DWG

89 ANDERSON STREET APARTMENTS PORTLAND, MAINE	TRAFFIC SOLUTIONS 235 BANCROFT STREET, PORTLAND, MAINE 04102-1730
DATE: AUGUST 18, 2014	FIGURE: 10

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:25	4:25	4:25	4:25	4:25	4:25
End Time	5:30	5:30	5:30	5:30	5:30	5:30
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2238	2298	2292	2198	2271	2261
Vehs Exited	2235	2292	2270	2189	2267	2251
Starting Vehs	25	20	18	18	23	18
Ending Vehs	28	26	40	27	27	27
Travel Distance (mi)	593	612	608	573	609	599
Travel Time (hr)	26.2	26.7	27.5	24.9	27.0	26.5
Total Delay (hr)	5.1	4.8	5.8	4.4	5.3	5.1
Total Stops	1099	1188	1241	1098	1182	1162
Fuel Used (gal)	21.7	22.4	22.6	20.9	22.3	22.0

Interval #0 Information Seeding

Start Time	4:25
End Time	4:30
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	4:30
End Time	5:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2238	2298	2292	2198	2271	2261
Vehs Exited	2235	2292	2270	2189	2267	2251
Starting Vehs	25	20	18	18	23	18
Ending Vehs	28	26	40	27	27	27
Travel Distance (mi)	593	612	608	573	609	599
Travel Time (hr)	26.2	26.7	27.5	24.9	27.0	26.5
Total Delay (hr)	5.1	4.8	5.8	4.4	5.3	5.1
Total Stops	1099	1188	1241	1098	1182	1162
Fuel Used (gal)	21.7	22.4	22.6	20.9	22.3	22.0

2: Washington Ave & Walnut Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.3	0.1
Total Del/Veh (s)	1.9	0.6	17.3	2.1

4: Fox Street & Washington Ave Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.5	0.0	0.3
Total Del/Veh (s)	0.5	3.6	26.0	6.2

5: Fox Street & Anderson Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.1	0.3	0.0	0.2
Total Del/Veh (s)	5.0	5.7	6.8	6.8	6.3

6: Cumberland Ave & Anderson Street Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.2	0.2
Total Del/Veh (s)	3.1	0.5	0.3	1.0

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	7.7

Intersection: 2: Washington Ave & Walnut Street

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	122	38	113
Average Queue (ft)	23	8	43
95th Queue (ft)	75	30	85
Link Distance (ft)	422	12	156
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Fox Street & Washington Ave

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	33	146	179
Average Queue (ft)	4	41	81
95th Queue (ft)	22	112	152
Link Distance (ft)	12	1288	760
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Fox Street & Anderson Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	62	58	118	75
Average Queue (ft)	37	35	60	42
95th Queue (ft)	58	53	92	67
Link Distance (ft)	764	1258	282	760
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cumberland Ave & Anderson Street

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	56	45
Average Queue (ft)	31	6
95th Queue (ft)	52	29
Link Distance (ft)	1258	289
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 2

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:25	4:25	4:25	4:25	4:25	4:25
End Time	5:30	5:30	5:30	5:30	5:30	5:30
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2201	2294	2276	2197	2254	2246
Vehs Exited	2200	2291	2257	2193	2246	2238
Starting Vehs	28	21	18	26	18	21
Ending Vehs	29	24	37	30	26	27
Travel Distance (mi)	581	608	599	569	600	592
Travel Time (hr)	25.3	26.7	27.4	25.0	26.3	26.1
Total Delay (hr)	4.6	5.0	6.1	4.6	4.8	5.0
Total Stops	1096	1118	1161	1055	1133	1113
Fuel Used (gal)	21.2	22.2	22.2	20.7	21.8	21.6

Interval #0 Information Seeding

Start Time	4:25
End Time	4:30
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	4:30
End Time	5:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2201	2294	2276	2197	2254	2246
Vehs Exited	2200	2291	2257	2193	2246	2238
Starting Vehs	28	21	18	26	18	21
Ending Vehs	29	24	37	30	26	27
Travel Distance (mi)	581	608	599	569	600	592
Travel Time (hr)	25.3	26.7	27.4	25.0	26.3	26.1
Total Delay (hr)	4.6	5.0	6.1	4.6	4.8	5.0
Total Stops	1096	1118	1161	1055	1133	1113
Fuel Used (gal)	21.2	22.2	22.2	20.7	21.8	21.6

2: Washington Ave & Walnut Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.2	0.1
Total Del/Veh (s)	1.7	0.6	16.0	2.0

4: Fox Street & Washington Ave Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.5	0.0	0.3
Total Del/Veh (s)	0.5	3.8	27.0	6.5

5: Fox Street & Anderson Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.1	0.3	0.0	0.2
Total Del/Veh (s)	4.6	5.6	6.8	6.7	6.2

6: Cumberland Ave & Anderson Street Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.2	0.2
Total Del/Veh (s)	3.3	0.5	0.3	0.9

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	7.6

Intersection: 2: Washington Ave & Walnut Street

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	95	47	113
Average Queue (ft)	19	7	42
95th Queue (ft)	63	31	84
Link Distance (ft)	422	12	156
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Fox Street & Washington Ave

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	31	199	208
Average Queue (ft)	5	45	83
95th Queue (ft)	23	135	161
Link Distance (ft)	12	1288	737
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Fox Street & Anderson Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	62	55	107	72
Average Queue (ft)	22	33	57	35
95th Queue (ft)	45	50	89	57
Link Distance (ft)	662	1258	281	737
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cumberland Ave & Anderson Street

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	52	44
Average Queue (ft)	30	5
95th Queue (ft)	48	25
Link Distance (ft)	1258	289
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:55	6:55	6:55	6:55	6:55	6:55
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1738	1660	1705	1739	1659	1701
Vehs Exited	1737	1662	1708	1735	1648	1697
Starting Vehs	16	16	20	23	14	14
Ending Vehs	17	14	17	27	25	17
Travel Distance (mi)	483	459	475	474	456	469
Travel Time (hr)	20.8	19.2	20.5	20.2	19.4	20.0
Total Delay (hr)	3.3	2.8	3.4	3.1	3.0	3.1
Total Stops	982	883	963	926	870	926
Fuel Used (gal)	17.7	16.6	17.4	17.3	16.4	17.1

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1738	1660	1705	1739	1659	1701
Vehs Exited	1737	1662	1708	1735	1648	1697
Starting Vehs	16	16	20	23	14	14
Ending Vehs	17	14	17	27	25	17
Travel Distance (mi)	483	459	475	474	456	469
Travel Time (hr)	20.8	19.2	20.5	20.2	19.4	20.0
Total Delay (hr)	3.3	2.8	3.4	3.1	3.0	3.1
Total Stops	982	883	963	926	870	926
Fuel Used (gal)	17.7	16.6	17.4	17.3	16.4	17.1

2: Washington Ave & Walnut Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.4	0.0	0.1	0.3
Total Del/Veh (s)	1.3	0.4	15.3	2.7

4: Fox Street & Washington Ave Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	0.5	3.5	13.1	2.6

5: Fox Street & Anderson Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.2	0.2	0.0	0.1
Total Del/Veh (s)	5.2	5.9	5.7	6.5	5.8

6: Cumberland Ave & Anderson Street Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.2	0.1
Total Del/Veh (s)	3.7	0.4	0.2	1.0

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	6.3

Intersection: 2: Washington Ave & Walnut Street

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	62	24	112
Average Queue (ft)	4	1	50
95th Queue (ft)	27	12	95
Link Distance (ft)	422	12	156
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Fox Street & Washington Ave

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	31	112	92
Average Queue (ft)	8	37	41
95th Queue (ft)	30	89	71
Link Distance (ft)	12	1288	735
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	2		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Fox Street & Anderson Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	68	69	71	72
Average Queue (ft)	27	36	37	36
95th Queue (ft)	55	58	59	58
Link Distance (ft)	600	1258	281	735
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cumberland Ave & Anderson Street

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	63	34
Average Queue (ft)	28	3
95th Queue (ft)	50	19
Link Distance (ft)	1258	289
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 2

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:55	6:55	6:55	6:55	6:55	6:55
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1614	1713	1638	1725	1629	1663
Vehs Exited	1602	1717	1640	1711	1632	1659
Starting Vehs	11	17	21	14	17	14
Ending Vehs	23	13	19	28	14	18
Travel Distance (mi)	451	478	461	482	455	465
Travel Time (hr)	18.7	19.8	19.3	20.2	19.2	19.4
Total Delay (hr)	2.6	2.8	2.8	2.9	2.9	2.8
Total Stops	805	859	877	844	849	849
Fuel Used (gal)	16.0	17.2	16.5	17.1	16.3	16.6

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1614	1713	1638	1725	1629	1663
Vehs Exited	1602	1717	1640	1711	1632	1659
Starting Vehs	11	17	21	14	17	14
Ending Vehs	23	13	19	28	14	18
Travel Distance (mi)	451	478	461	482	455	465
Travel Time (hr)	18.7	19.8	19.3	20.2	19.2	19.4
Total Delay (hr)	2.6	2.8	2.8	2.9	2.9	2.8
Total Stops	805	859	877	844	849	849
Fuel Used (gal)	16.0	17.2	16.5	17.1	16.3	16.6

2: Washington Ave & Walnut Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.5	0.0	0.2	0.3
Total Del/Veh (s)	1.2	0.4	13.2	2.4

4: Fox Street & Washington Ave Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	0.5	3.3	11.3	2.2

5: Fox Street & Anderson Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.1	0.2	0.0	0.1
Total Del/Veh (s)	4.7	5.5	5.5	6.0	5.4

6: Cumberland Ave & Anderson Street Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.2	0.1
Total Del/Veh (s)	3.5	0.3	0.2	0.9

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	5.7

Intersection: 2: Washington Ave & Walnut Street

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	43	24	117
Average Queue (ft)	4	1	46
95th Queue (ft)	23	10	85
Link Distance (ft)	422	12	156
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Fox Street & Washington Ave

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	38	130	98
Average Queue (ft)	8	33	38
95th Queue (ft)	30	87	69
Link Distance (ft)	12	1288	740
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	2		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Fox Street & Anderson Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	61	57	74	56
Average Queue (ft)	25	31	36	31
95th Queue (ft)	49	51	60	46
Link Distance (ft)	647	1258	281	740
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cumberland Ave & Anderson Street

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	52	31
Average Queue (ft)	25	2
95th Queue (ft)	47	16
Link Distance (ft)	1258	289
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 2

Traffic Solutions
William J. Bray, P.E.
235 Bancroft Street
Portland, ME 04102
(207) 774-3603
(207) 400-6890 mobile
trafficsolutions@maine.rr.com

August, 2014

Traffic Signal Warrant Assessment

Washington Avenue/Fox Street/Walnut Street Intersection Portland, Maine

INTRODUCTION

An abbreviated traffic signal warrant analysis was conducted for the Washington Avenue/Fox Street/Walnut Street intersection based upon traffic data gathered in the month of August 2014 between the hours of 7:00 to 9:00 AM and, again, between the hours of 3:00 to 6:00 PM. The traffic data was adjusted by a factor of 13%, which represents the approximate variation between "peak" traffic collected during the week of August 14 and "*average*" travel conditions during the month of November (Adjustment factor based upon MaineDOT's Weekly Group Mean Factors; refer to attached copy of MaineDOT factors). The abbreviated or preliminary traffic signal warrant analysis is based upon a total of 5-hours of traffic data; a formal traffic signal warrant study is generally prepared based upon 12-hours of traffic data and traffic information.

TRAFFIC SIGNAL WARRANT ASSESSMENT

The abbreviated traffic signal warrant analysis follows the guidelines presented in the 2009 edition of the Manual on Uniform Traffic Control Devices (MUTCD) in Chapter 4C. The MUTCD provides nine separate traffic signal warrants, whereby, prevailing conditions at an intersection can be evaluated to determine if sequenced traffic signals are warranted. Each of the nine warrants is listed as follows:

Warrant 1 – Eight Hour Vehicular Volume
Warrant 2 – Four Hour Vehicular Volume
Warrant 3 – Peak Hour
Warrant 4 – Pedestrian Volume
Warrant 5 – School Crossing
Warrant 6 – Coordinated Signal System
Warrant 7 – Crash Experience
Warrant 8 – Roadway Network
Warrant 9 – Intersection near a Grade Crossing

The federal publication clearly states that, "***the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal".*** Guidance is specifically provided in the MUTCD on the conduct of the required engineering study and the judgment required in completing the signal warrant assessment. The direction provided, specific to prevailing conditions found at the study intersection, is summarized as follows:

A traffic signal should not be installed unless an engineering study indicates that the signal will improve the overall safety and/or operation of the intersection.

A signal should not be installed if it will seriously disrupt traffic flow.

Estimated 2014 "Average" Hourly Traffic Data

The presentation of the traffic volume data presented in Table 1 has been adjusted, as necessary, to project the hourly "major" and "minor" street volumes used in the conduct of the traffic signal warrant study.

Table 1
Abbreviated Traffic Signal Warrant Study
***"Average"* Conditions-Traffic Values[1]**
Washington Avenue/Fox Street/Walnut Street Intersection

Time of Day	Major Street Volume[2] (Both Approaches) Washington Avenue	Minor Street Volume[3] Fox Street	Minor Street Volume[3] Walnut Street
7:00 - 8:00 AM	562	73	67
8:00 - 9:00 AM	740	87	84
3:00 - 4:00 PM	634	59	117
4:00 - 5:00 PM	867	71	145
5:00 - 6:00 PM	880	41	131

Notes:

[1] "Average traffic values were computed applying a 13% reduction of August 2014 Traffic Data (refer to copy of August traffic count cards for subject intersection), which is based upon the Maine Department of Transportation's Weekly Group Mean Factors.
[2] Washington Avenue has been defined as the "major" street.
[3] Minor Street approaches are both Fox Street and Walnut Street. All right-turn movements were included in hourly Minor Street volumes.

Traffic Safety Data: The Washington Avenue/Walnut Street/Fox Street intersection meets MaineDOT's criteria for a high crash location. A total of 9 crashes and a Critical Rate Factor (CRF) of 1.98 were reported for the intersection. A more in-depth review (preparation of detailed vehicle collision diagrams) was prepared for the intersection to determine if a clear pattern of accident is occurring (Copies of the Collision Diagrams are attached as an appendix to the report). The detailed review of the vehicle crash reports for the intersection would suggest two clear patterns of concern: 1) four of the nine accidents involved vehicles on the Fox Street approach turning left onto Washington Avenue being struck by thru vehicles traveling eastbound on Washington Avenue; 2) the second pattern, with a total of three collisions, involved vehicles approaching Washington Avenue from Walnut Street sliding through the intersection striking a thru vehicle on Washington Avenue.

Traffic Signal Warrant Analyses: The evaluation was conducted for Warrants 1, 2, 3, and 7 and was based upon the 5-hours of traffic data presented in Table 1 only.

Each of the three traffic signal warrants used in the analyses are briefly described below followed by a determination of whether forecast conditions meet or fail required conditions.

Warrant 1: Eight Hour Vehicular Volume

Condition A - Warrant requires 500 vehicles per hour on major roadway (combination of both directions) and a total of 150 vehicles per hour on the highest minor street approach.

Condition B - Warrant requires 750 vehicles per hour on major roadway (combination of both directions) and a total of 75 vehicles per hour on the highest minor street approach.

Condition A+B - Warrant requires 80% of values stated for both Conditions A & B.

Warrant Likely Not Satisfied

Warrant 2: Four Hour Vehicular Volume

If travel conditions for any four hours of an average day representing the volume per hour on the major street and the corresponding vehicles per hour on the higher volume minor street approach all fall above the applicable curve in Figure 4C-1 then warrant is met. **Warrant Likely Not Satisfied**

Warrant 3: Peak Hour

If travel conditions for one hour of an average day representing the volume per hour on the major street and the corresponding vehicles per hour on the higher volume minor street approach fall above the applicable curve in Figure 4C-3 then warrant is met. **Warrant Likely Not Satisfied**

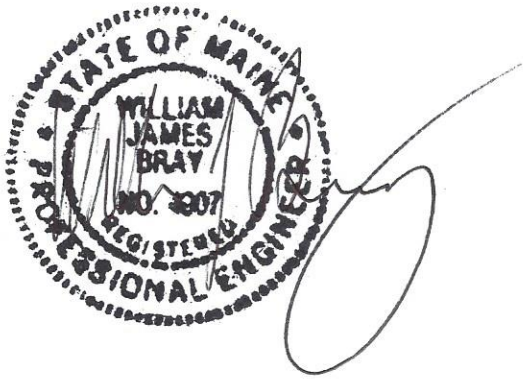
Warrant 7: Crash Experience

Analysis based upon conclusions of safety evaluation conducted in Safety History Section above. Each of the following criteria must be met to consider the need for a traffic control signal:

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

B. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period; and

C. For each of any 8 hours of an average day the vehicles per hour given in the 80% column for Condition A in Table 4C-1 or the vph in both of the columns of Condition B in Table 4C-1 exists on both the major and minor street approaches. **Warrant Likely Not Satisfied**



2012
Weekly Group Mean Factors
Average: 2009, 2010, 2011

Month	Start Date	Dates	Month Week #	Urban Group I	Arterial Group II	Recreationa Group III	Group I + II	Group II + III	Group I + III	Year Week #
Jan	01	2,3,4,5,6	1	1.02	1.11	1.35	1.07	1.23	1.19	1
	08	9,10,11,12	2	1.09	1.21	1.50	1.15	1.36	1.30	2
	15	16,17,18,1	3	1.10	1.23	1.53	1.17	1.38	1.32	3
	22	23,24,25,2	4	1.05	1.18	1.46	1.12	1.32	1.26	4
	29	30,31,1,2,3	5	1.12	1.26	1.57	1.19	1.42	1.35	5
Feb	05	6,7,8,9,10	1	1.02	1.14	1.41	1.08	1.28	1.22	6
	12	13,14,15,1	2	1.02	1.12	1.36	1.07	1.24	1.19	7
	19	20,21,22,2	3	1.06	1.15	1.38	1.11	1.27	1.22	8
	26	27,28,29,1	4	1.06	1.17	1.38	1.12	1.28	1.22	9
Mar	04	5,6,7,8,9	1	1.06	1.16	1.39	1.11	1.28	1.23	10
	11	12,13,14,1	2	1.00	1.10	1.33	1.05	1.22	1.17	11
	18	19,20,21,2	3	1.02	1.13	1.35	1.08	1.24	1.19	12
	25	26,27,28,2	4	1.01	1.12	1.32	1.07	1.22	1.17	13
Apr	01	2,3,4,5,6	1	0.98	1.09	1.26	1.04	1.18	1.12	14
	08	9,10,11,12	2	0.97	1.08	1.22	1.03	1.15	1.10	15
	15	16,17,18,1	3	0.97	1.04	1.12	1.01	1.08	1.05	16
	22	23,24,25,2	4	0.97	1.05	1.17	1.01	1.11	1.07	17
	29	30,1,2,3,4	5	0.93	1.02	1.10	0.98	1.06	1.02	18
May	06	7,8,9,10,11	1	0.92	1.00	1.08	0.96	1.04	1.00	19
	13	14,15,16,1	2	0.92	0.98	1.04	0.95	1.01	0.98	20
	20	21,22,23,2	3	0.89	0.93	0.92	0.91	0.93	0.91	21
	27	28,29,30,3	4	0.90	0.94	0.96	0.92	0.95	0.93	22
Jun	03	4,5,6,7,8	1	0.89	0.93	0.91	0.91	0.92	0.90	23
	10	11,12,13,1	2	0.90	0.92	0.90	0.91	0.91	0.90	24
	17	18,19,20,2	3	0.90	0.89	0.81	0.90	0.85	0.86	25
	24	25,26,27,2	4	0.89	0.86	0.77	0.88	0.82	0.83	26
Jul	01	2,3,4,5,6	1	0.87	0.81	0.70	0.84	0.76	0.79	27
	08	9,10,11,12	2	0.88	0.83	0.71	0.86	0.77	0.80	28
	15	16,17,18,1	3	0.88	0.82	0.69	0.85	0.76	0.79	29
	22	23,24,25,2	4	0.88	0.81	0.67	0.85	0.74	0.78	30
	29	30,31,1,2,3	5	0.87	0.79	0.64	0.83	0.72	0.76	31
Aug	05	6,7,8,9,10	1	0.87	0.78	0.65	0.83	0.72	0.76	32
	12	13,14,15,1	2	0.87	0.79	0.66	0.83	0.73	0.77	33
	19	20,21,22,2	3	0.88	0.81	0.70	0.85	0.76	0.79	34
	26	27,28,29,3	4	0.88	0.85	0.78	0.87	0.82	0.83	35
Sep	02	3,4,5,6,7	1	0.89	0.88	0.86	0.89	0.87	0.88	36
	09	10,11,12,1	2	0.90	0.90	0.89	0.90	0.90	0.90	37
	16	17,18,19,2	3	0.91	0.91	0.92	0.91	0.92	0.92	38
	23	24,25,26,2	4	0.92	0.91	0.96	0.92	0.94	0.94	39
	30	1,2,3,4,5	5	0.91	0.89	0.98	0.90	0.94	0.95	40
Oct	07	8,9,10,11,1	1	0.92	0.90	0.98	0.91	0.94	0.95	41
	14	15,16,17,1	2	0.93	0.95	1.05	0.94	1.00	0.99	42
	21	22,23,24,2	3	0.95	1.00	1.12	0.98	1.06	1.04	43
	28	29,30,31,1	4	0.95	1.02	1.18	0.99	1.10	1.07	44
Nov	04	5,6,7,8,9	1	0.96	1.04	1.21	1.00	1.13	1.09	45
	11	12,13,14,1	2	0.97	1.04	1.23	1.01	1.14	1.10	46
	18	19,20,21,2	3	1.00	1.04	1.25	1.02	1.15	1.13	47
	25	26,27,28,2	4	0.97	1.03	1.24	1.00	1.14	1.11	48
Dec	02	3,4,5,6,7	1	1.00	1.13	1.32	1.07	1.23	1.16	49
	09	10,11,12,1	2	1.01	1.12	1.34	1.07	1.23	1.18	50
	16	17,18,19,2	3	0.98	1.08	1.30	1.03	1.19	1.14	51
	23	24,25,26,2	4	1.08	1.14	1.34	1.11	1.24	1.21	52

USE 0.13 Factor To Create "Average" Conditions