NEW YORK GATEWAY
CONNECTIONS IMPROVEMENT PROJECT
TO THE US PEACE BRIDGE PLAZA

Draft Design Report/Environmental Impact Statement

Draft Section 4(f) Evaluation (49 USC 303)

APPENDIX B – TRAFFIC ANALYSIS

PIN 5760.80
City of Buffalo
Erie County, New York

November 15, 2013

U.S. Department of Transportation
Federal Highway Administration

New York State
Department of Transportation

TABLE OF CONTENTS

1. INTRODUCTION 1
2. TRAFFIC STUDY APPROACH 4
3. DATA COLLECTION 7
   3.1 Automatic Traffic Recorder Counts 7
   3.2 Manual Turning Movement Counts 9
   3.3 Pedestrian Counts 9
   3.4 Travel Time and Delay Surveys 9
   3.5 Roadway Inventories 11
   3.6 Accident Data 11
4. 2013 EXISTING CONDITIONS 12
   4.1 Roadway Network 12
   4.2 Traffic Volumes 14
   4.3 Travel Speeds 21
   4.4 Traffic Analysis Methodology 21
   4.5 Traffic Analysis Results 23
   4.6 Accident Analysis 34
5. 2015 AND 2045 NO BUILD CONDITIONS 38
   5.1 Planned Improvements 38
   5.2 Traffic Volumes 38
   5.3 Traffic Analysis Results 51
6. 2015 AND 2045 BUILD CONDITIONS 67
   6.1 Proposed Improvements 67
   6.2 Traffic Volumes 72
   6.3 Traffic Analysis Results 81
      6.3.1 Preliminary Evaluation 82
      6.3.2 Signalized Intersection Option 85
      6.3.3 Roundabout Option 93
7. CONCLUSION 105

Attachments

1 – Automatic Traffic Recorder Volume Data
2 – Automatic Traffic Recorder Vehicle Classification Data
3 – Automatic Traffic Recorder Speed Data
4 – Manual Turning Movement Count and Pedestrian Crossing Data
5 – Travel Time and Delay Survey Summaries
6 – Roadway Inventories and Pedestrian Generator Checklist
7 – Official Existing Condition Traffic Signal Timings
8 – Truck Route Information
9 – Bicycle Route Information
10 – Bus Route Information
11 – Accident Information
12 – No Build Planned Improvements Information
13 – GBNRTC Regional Travel Demand Model Data
14 – Build Alternative Signalized Intersection Option Porter Avenue at Ramps P and PN Traffic Signal Timings
15 – Build Alternative Mitigation Measures

LIST OF FIGURES

Figure 1.1 – Project Location Map 2
Figure 1.2 – Project Study Area Map 3
Figure 2.1 – Traffic and Accident Study Area Map 5
Figure 3.1 – Traffic Count Data Collection Map 8
Figure 3.2 – Travel Time and Delay Survey Data Collection Map 10
Figure 4.1 – 2013 Existing Condition Weekday AM Peak-Hour Traffic Volumes 15
Figure 4.2 – 2013 Existing Condition Weekday PM Peak-Hour Traffic Volumes 18
Figure 4.3 – Traffic Analysis Locations 24
Figure 4.4 – High Accident Locations 36
Figure 5.1 – 2015 No Build Condition Weekday AM Peak-Hour Traffic Volumes 39
Figure 5.2 – 2015 No Build Condition Weekday PM Peak-Hour Traffic Volumes 42
Figure 5.3 – 2045 No Build Condition Weekday AM Peak-Hour Traffic Volumes 45
Figure 5.4 – 2045 No Build Condition Weekday PM Peak-Hour Traffic Volumes 48
Figure 6.1 – Proposed Build Alternative 68
Figure 6.2 – Proposed Shoreline Trail and Massachusetts Pumping Station Modifications 69
Figure 6.3 – Signalized Intersection Option Design 70
Figure 6.4 – Roundabout Option Design 71
Figure 6.5 – 2015 Build Condition Signalized Intersection Option Weekday AM Peak-Hour Traffic Volumes 73
Figure 6.6 – 2015 Build Condition Signalized Intersection Option Weekday PM Peak-Hour Traffic Volumes 74
Figure 6.7 – 2045 Build Condition Signalized Intersection Option Weekday AM Peak-Hour Traffic Volumes 75
Figure 6.8 – 2045 Build Condition Signalized Intersection Option Weekday PM Peak-Hour Traffic Volumes 76
Figure 6.9 – 2015 Build Condition Roundabout Option Weekday AM Peak-Hour Traffic Volumes 77
Figure 6.10 – 2015 Build Condition Roundabout Option Weekday PM Peak-Hour Traffic Volumes 78
Figure 6.11 – 2045 Build Condition Roundabout Option Weekday AM Peak-Hour Traffic Volumes 79
Figure 6.12 – 2045 Build Condition Roundabout Option Weekday PM Peak-Hour Traffic Volumes 80

LIST OF TABLES

Table 4.1 – LOS Criteria for Basic Freeway Segments 22
Table 4.2 – LOS Criteria for Freeway Weaving, Merge, and Diverge Segments 22
Table 4.3 – LOS Criteria for Signalized Intersections 23
Table 4.4 – LOS Criteria for Unsignalized Intersections 23
Table 4.5 – 2013 Existing Condition Weekday AM and PM Peak-Hour Basic Freeway Segment Analysis Results 26
Table 4.6 – 2013 Existing Condition Weekday AM and PM Peak-Hour Weaving, Merge, and Diverge Segment Analysis Results 27
Table 4.7 – 2013 Existing Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results 29
Table 4.8 – 2013 Existing Condition Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results 32
Table 4.9 – Comparison of Calculated Segment Accidents Rates to Expected Rates 34
Table 4.10 – I-190 Accident Type Summary 35
Table 4.11 – Local Street Intersections with Highest Numbers of Accidents 37
Table 4.12 – Local Street Accident Type Summary 37
Table 5.1 – Project Study Area Annual Growth Rates 38
Table 5.2 – 2015 No Build Condition Weekday AM and PM Peak-Hour Basic Freeway Segment Analysis Results 52
Table 5.3 – 2015 No Build Condition Weekday AM and PM Peak-Hour Weaving, Merge, and Diverge Segment Analysis Results 53
Table 5.4 – 2015 No Build Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results 54
Table 5.5 – 2015 No Build Condition Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results 57
Table 5.6 – 2045 No Build Condition Weekday AM and PM Peak-Hour Basic Freeway Segment Analysis Results 59
Table 5.7 – 2045 No Build Condition Weekday AM and PM Peak-Hour Weaving, Merge, and Diverge Segment Analysis Results 60
Table 5.8 – 2045 No Build Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results 62
Table 5.9 – 2045 No Build Condition Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results 65
Table 6.1 – Comparison of No Build and Preliminary Build Evaluation Weekday PM Peak-Hour Signalized Intersection Analysis Results 83
Table 6.2 – 2015 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Basic Freeway Segment Analysis Results 86
Table 6.3 – 2015 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Weaving, Merge, and Diverge Segment Analysis Results 87
Table 6.4 – 2015 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results 88
Table 6.5 – 2015 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results 91
Table 6.6 – 2045 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Basic Freeway Segment Analysis Results 94

LIST OF TABLES CONT'D

Table 6.7 – 2045 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Weaving, Merge, and Diverge Segment Analysis Results 95
Table 6.8 – 2045 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results 96
Table 6.9 – 2045 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results 99
Table 6.10 – 2015 Build Condition Roundabout Option Porter Avenue Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results 101
Table 6.11 – 2015 Build Condition Roundabout Option Porter Avenue Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results 102
Table 6.12 – 2045 Build Condition Roundabout Option Porter Avenue Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results 103
Table 6.13 – 2045 Build Condition Roundabout Option Porter Avenue Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results 104

1. INTRODUCTION

The New York State Department of Transportation (NYSDOT) is conducting the New York Gateway Connections Improvement Project to the U.S. Peace Bridge Plaza to reduce interstate traffic on the local streets in the West Side neighborhood of the City of Buffalo, New York (see **Figure 1.1**). The Niagara Thruway (I-190) is a north-south limited-access facility that extends from I-90 east of Buffalo, through downtown Buffalo, and north to the Lewiston-Queenston Bridge to Canada. At Interchange 9, I-190 provides access to the Peace Bridge over the Niagara River, and carries high traffic volumes, including significant truck volumes. Customs inspections for the eastbound Peace Bridge are made at the U.S. Peace Bridge Plaza (Plaza) in Buffalo. Most traffic to and from the Plaza originates from or is destined to I-190 in the West Side area.

Interchange 9 provides access between I-190 and the Peace Bridge Plaza/Porter Avenue. However, there is not a direct connection between the U.S.-bound Plaza and northbound I-190. Consequently, all Plaza traffic destined to northbound I-190 (including a significant portion of commercial vehicles/trucks) must utilize the local street network (see **Figure 1.2**). Most vehicles travel along Baird Drive, through Front Park (a local park with a soccer field, playground, tennis courts, and bike/pedestrian trails), and then along Porter Avenue in the vicinity of residences, schools, and the waterfront's LaSalle Park and Shoreline Trail to access the Interchange 9 northbound on-ramp (Ramp P). To reduce interstate traffic on the local streets in the residential neighborhoods, as well as improve vehicular, bicycle, and pedestrian traffic operations and safety and residents' quality of life in the area, there is a need to provide direct access between the Plaza and northbound I-190. The proposed action would construct a ramp directly from the Plaza to northbound I-190 and would remove Baird Drive and convert it to green space within Front Park. It should be noted that neighborhood traffic to the Canada-bound Peace Bridge must currently access the bridge via Baird Drive; therefore, the removal of Baird Drive would require alternate access to the westbound Plaza for local-street traffic as well as from the eastbound Plaza for both local and interstate traffic.

The following traffic study report documents traffic analysis methodologies; existing vehicular, bicycle, and pedestrian traffic operations and safety issues in the area; and anticipated short- and long-term future condition operations in the area with and without project-related improvements. Evaluated designs include the construction of a new ramp from the Peace Bridge Plaza to northbound I-190, as well as different options for Porter Avenue access to the Plaza.

Figure 1.1 – Project Location Map

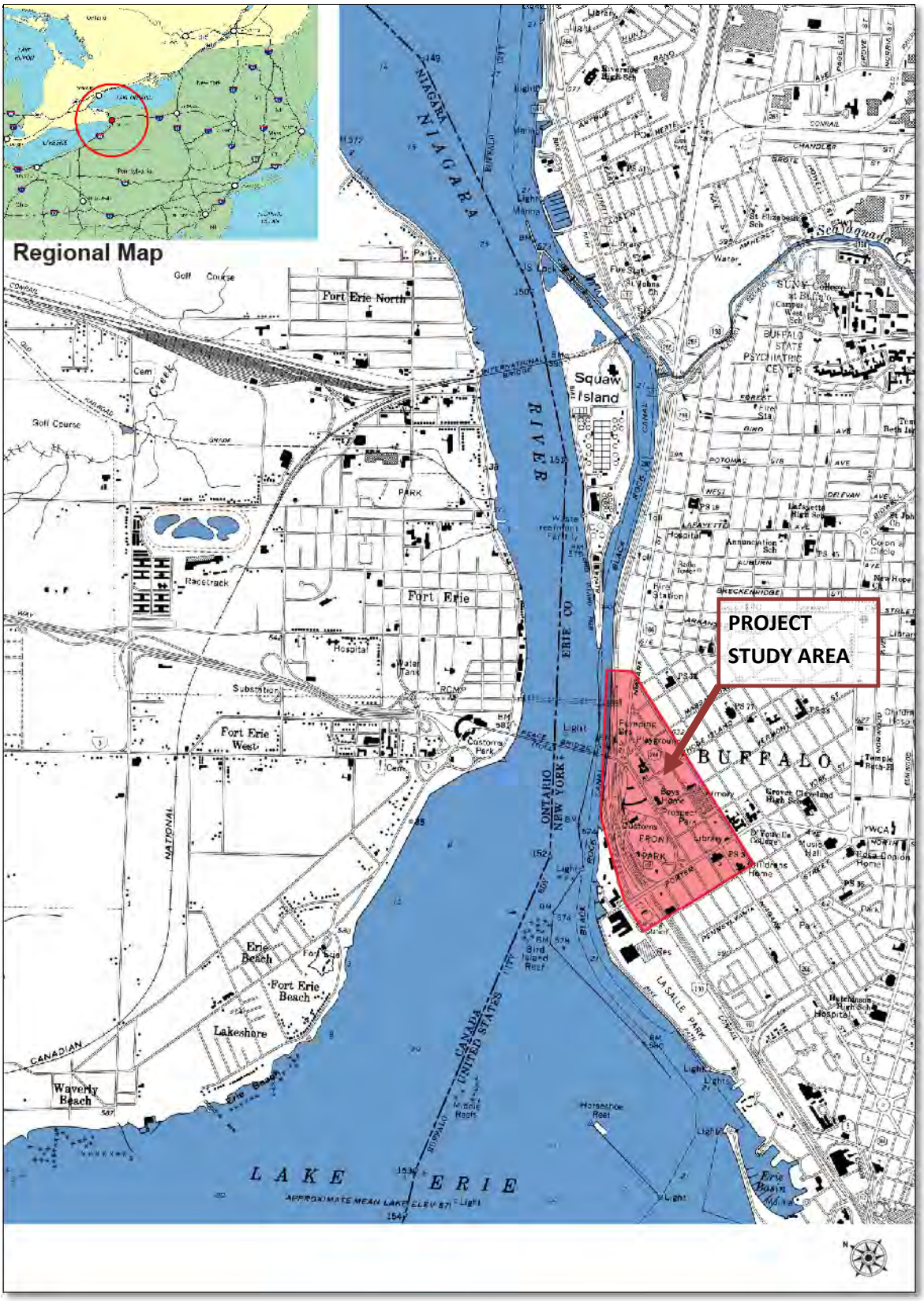


Figure 1.2 – Project Study Area Map

2. TRAFFIC STUDY APPROACH

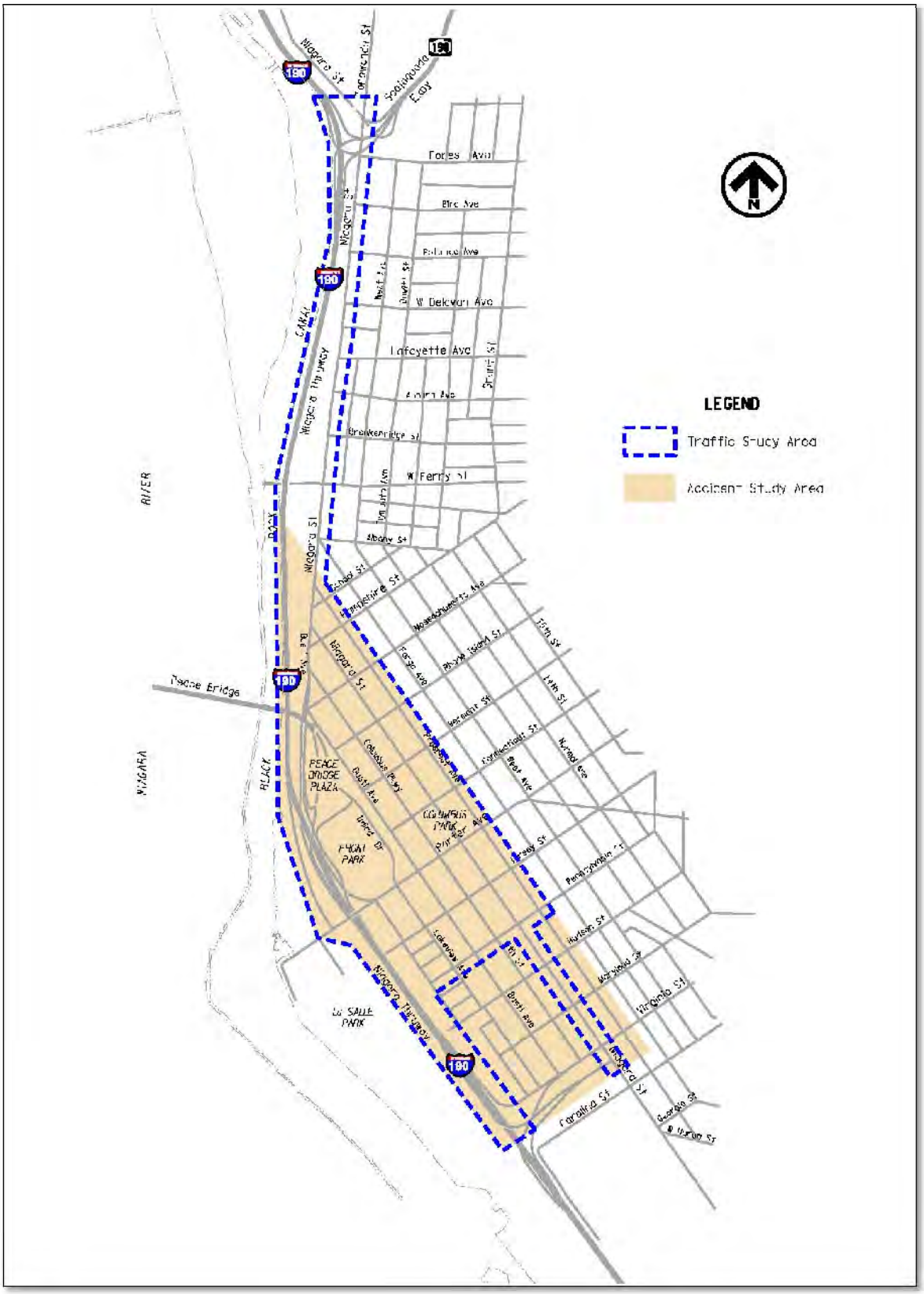
To evaluate alternatives and various design options for the New York Gateway Connections Improvement Project to the U.S. Peace Bridge Plaza (hereafter referred to as the NY Gateway Connections project), it was first necessary to define the project's traffic study area. The study area includes highway segments and intersections where potential traffic volume diversions and/or operational or geometric changes could occur as a result of the various design options. As shown in **Figure 2.1**, the traffic study area generally comprises I-190 and the local streets between the Lake Erie/ Niagara River waterfront to the north and west, Prospect Avenue to the east, and Pennsylvania Street to the south.

To determine the traffic data needs for this project, available studies and traffic data were examined. These included the January 14, 2013 *Peace Bridge Access Assessment of Direct Connections to I-190 and the Local Street Network from the Existing Peace Bridge Plaza*; the May 2011 *Preliminary Final Design Report/Preliminary Final Environmental Impact Statement*; historical traffic counts from the New York State Thruway Authority (NYSTA) and the Buffalo and Fort Erie Public Bridge Authority (i.e., Peace Bridge Authority, PBA); available automatic traffic recorder (ATR) data and other project information from the NYSDOT website; available ATR, manual turning movement count (TMC), vehicle classification, speed, and pedestrian data from the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC) website; and available vehicular, bicycle, pedestrian, and traffic signal timing inputs in the Synchro traffic signal coordination traffic models provided by GBNRTC. Based on review of this information, and in coordination with NYSDOT and GBNRTC, it was decided that available 2011 through 2012 traffic data could be utilized and updated/supplemented, as necessary, at critical locations for this project. A traffic data plan was developed and approved by NYSDOT and GBNRTC, and supplemental traffic data was collected in April and May 2013.

The analysis peak periods were also selected in coordination with NYSDOT; these were determined to be the typical weekday AM and PM periods when commuter volumes would be highest. It should be noted that analyses were not conducted for the overflow condition (i.e., when backup occurs at the Plaza and traffic is sometimes re-routed from I-190 to the local streets). This is because the overflow condition occurs occasionally; may occur during any time of day and for numerous, sometimes unpredictable, reasons; is handled differently based on magnitude/duration; and the analysis of the congested, standstill conditions would not provide valuable results. Both the overflow condition storage and oversized vehicle accessibility needs were, however, considered in the design of this project, as discussed in Sections 3.3.5.1 and 3.3.5.2 of NY Gateway Connection project's Draft Environmental Impact Statement (DEIS).

From the available and supplemental traffic count data, and with additional traffic volume data from NYSTA for the I-190 mainline for the supplemental traffic count days, existing condition weekday AM and PM peak-hour traffic volume networks were developed. Traffic models with the peak-hour volumes were developed using VISSIM traffic simulation software to determine existing traffic operations and deficiencies for the critical time periods. Accident reports were reviewed and summarized to evaluate safety issues along I-190 and the local streets. The calibrated existing conditions analyses served as the basis for future condition analyses.

Figure 2.1 – Traffic and Accident Study Area Map



No Build condition analyses were also conducted using VISSIM. The No Build alternative is the future condition without the proposed project and is the baseline to which the Build Alternative with various options is compared. Traffic growth forecasts were made based on data from GBNRTC's regional travel demand model, and specific planned developments and geometric and operational improvements for the area that are independent of the NY Gateway Connections project were incorporated into the analysis. The No Build results for the Estimated Time of Completion (ETC = 2015) for this project and for the design year (ETC + 30 = 2045) for this project represent future traffic operations in the study area without any NY Gateway Connections project improvements.

A Scoping Meeting was held on June 11, 2013 to gather feedback from the public regarding existing traffic concerns and potentials for improvement. Based on the public's comments and existing and future No Build condition traffic analyses, one Build alternative with two options was developed. The alternative includes the construction of a ramp between the Plaza and northbound I-190 (Ramp D), the construction of a ramp from Porter Avenue to the westbound Plaza via Ramp N (Ramp PN), the modifications of various ramps in the Ramp D area, the relocation of the Shoreline Trail, the relocation of the Front Park driveway, the modification of the access road to the Massachusetts Pumping Station, the removal of Baird Drive and its traffic signal at Ramp A, and the conversion of Baird Drive to green space within Front Park. Options for the Build Alternative include different geometries and traffic control (i.e., for a signalized intersection and a roundabout) at the new Ramps P and PN intersection with Porter Avenue in the vicinity of Fourth Street. The impacts of various Build scenarios were determined using VISSIM traffic models.

The remainder of this document describes the details of the traffic analysis effort.

3. DATA COLLECTION

A review of available traffic information from NYSDOT, GBNRTC, NYSTA, PBA, and of previously-conducted traffic studies of the area was performed. Recent traffic volumes from NYSTA and PBA confirmed that peak traffic volumes in the area occur in the summer, and it was found that a substantial amount of traffic data for the summer was available in the GBNRTC's Transportation Data Management System. Based on discussions with NYSDOT and GBNRTC, it was decided that available data for 2011 through 2012 would be used for this study and supplemented/updated at critical locations, as necessary.

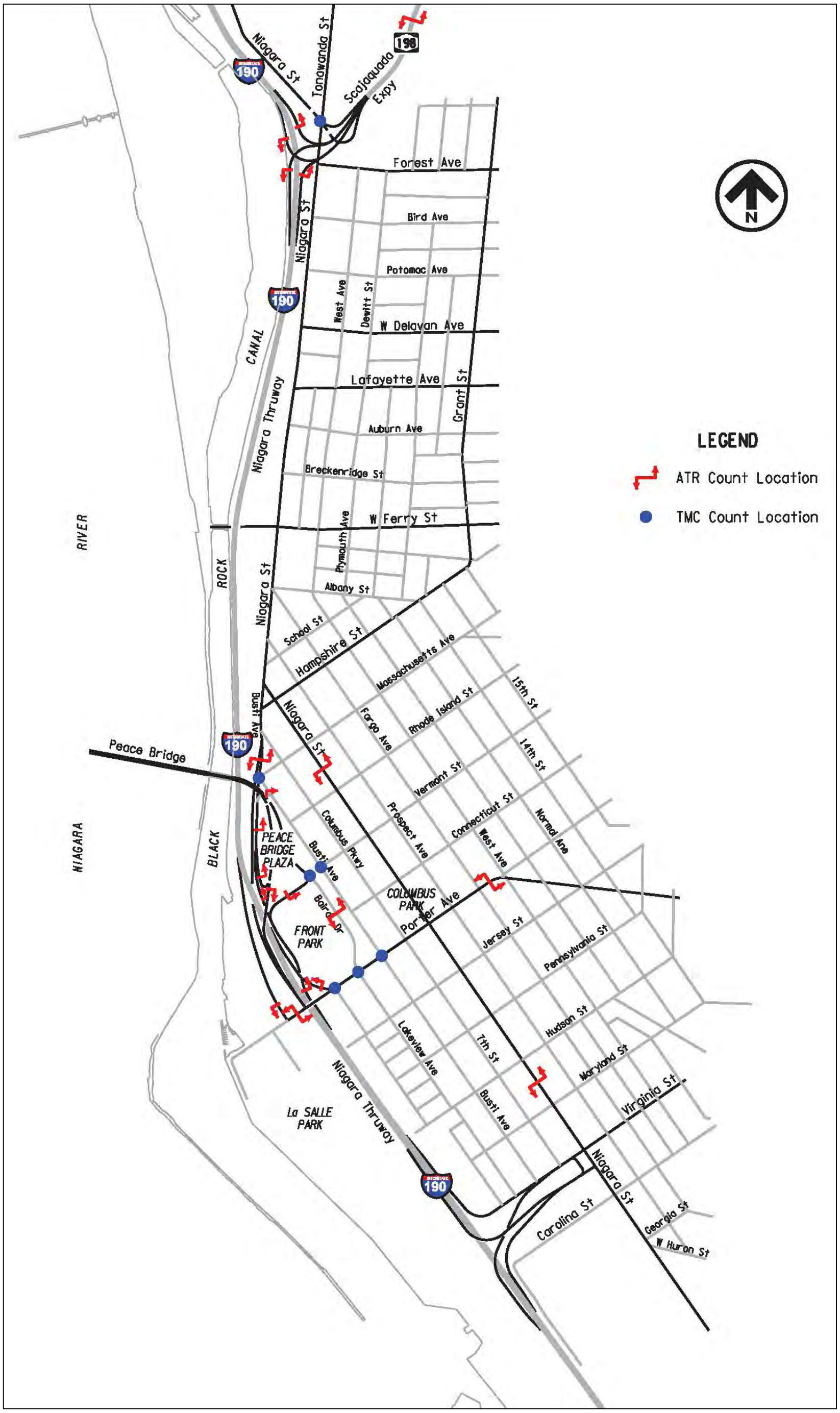
A traffic data collection plan was developed in coordination with NYSDOT and GBNRTC to collect the additional data needed. The traffic data collection effort included ATR counts, TMCs, vehicle classifications, pedestrian crosswalk volumes, travel time surveys, intersection inventories, and field observations of vehicle queues and pedestrian, bicycle, transit, and parking operations – as discussed in more detail below. The data were collected in spring 2013 to expedite the project, with the understanding that traffic volumes would be seasonally adjusted to reflect peak summer conditions.

3.1 Automatic Traffic Recorder Counts

Twenty-four-hour ATR counts, installed to record traffic volume, vehicle classification, and speed data, were collected by NYSDOT during typical traffic flow conditions in the study area (i.e., during a non-holiday period while school was in session). The ATR data were typically recorded for the continuous 12-day period (including two weekends) between April 27 and May 9, 2013. The ATRs were used to verify manual turning movement counts and to account for temporal and daily variations in volumes over the count period, as well as to determine the daily and peak-hour traffic volumes, vehicle classifications, and speeds on the area's ramps and local streets. The locations of the ATR counts are listed below and shown in **Figure 3.1**. It should be noted that ATRs were not installed on the I-190 mainline, since the Thruway mainline data for the count days was available from continuous count station information provided by NYSTA.

1. Niagara Street northbound/southbound between Maryland and Hudson Streets
2. Porter Avenue eastbound/westbound between the southbound I-190 Exit 9 ramp and Fourth Street
3. Porter Avenue eastbound/westbound between Fargo and West Avenues
4. Southbound I-190 Interchange 9 off-ramp to Porter Avenue (Ramp SD)
5. Northbound I-190 Interchange 9 off-ramp to Peace Bridge/Fort Erie Canal (Ramp N)
6. Northbound I-190 Interchange 9 on-ramp from Porter Avenue (Ramp P)
7. Southbound I-190 Interchange 9 on-ramp from Peace Bridge Plaza eastbound (Ramp B)
8. Sheridan Terrace on-ramp from Peace Bridge Plaza eastbound (Ramp C)
9. Baird Drive northbound/southbound between Ramp A and Porter Avenue
10. Busti Avenue eastbound/westbound between Massachusetts Avenue and Columbus Parkway
11. Niagara Street northbound/southbound between Rhode Island Street and Massachusetts Avenue
12. Northbound I-190 Exit 11 off-ramp to Scajaquada Expressway
13. Southbound I-190 Exit 11 off-ramp to Scajaquada Expressway
14. Northbound I-190 Exit 11 on-ramp from Scajaquada Expressway
15. Southbound I-190 Exit 11 on-ramp from Scajaquada Expressway
16. Scajaquada Expressway eastbound/westbound between I-190 and Grant Street

Figure 3.1 – Traffic Count Data Collection Map



17. Ramp A eastbound between Ramp N and Baird Drive
18. Ramp N northbound between Ramps A and C
19. Sheridan Terrace northbound between Ramp C and Busti Avenue
20. Sheridan Terrace eastbound hook ramp to Busti Avenue

Summaries of the spring ATR volume, vehicle classification, and speed data are provided in **Attachments 1, 2, and 3**, respectively.

3.2 Manual Turning Movement Counts

TMCs were collected by NYSDOT concurrent with the ATR counts. The TMCs were conducted during the weekday AM (7 to 9), weekday MD (12 to 2 p.m.), and weekday PM (4 to 6) peak periods on either Tuesday, April 30 or Wednesday, May 1, 2013 and were collected by vehicle classification (i.e., grouped as either passenger cars or trucks). The TMCs were utilized to update available traffic volume and heavy vehicle information and were seasonally adjusted to develop weekday AM and PM peak-summer season existing condition traffic volume networks of the study area. The locations of the TMCs are listed below and shown in **Figure 3.1**.

1. Porter Avenue at Fourth Street/the northbound I-190 on-ramp from Porter Avenue (Ramp P)
2. Porter Avenue at Baird Drive/Lakeview Avenue
3. Porter Avenue at Busti Avenue
4. Baird Drive at the westbound Peace Bridge Plaza entrance (Ramp A)
5. Busti Avenue at Massachusetts Avenue/Sheridan Terrace
6. Busti Avenue at Vermont Street
7. Niagara Street at Tonawanda Street/Scajaquada Expressway ramps

Summaries of the spring TMCs are provided in **Attachment 4**.

3.3 Pedestrian Counts

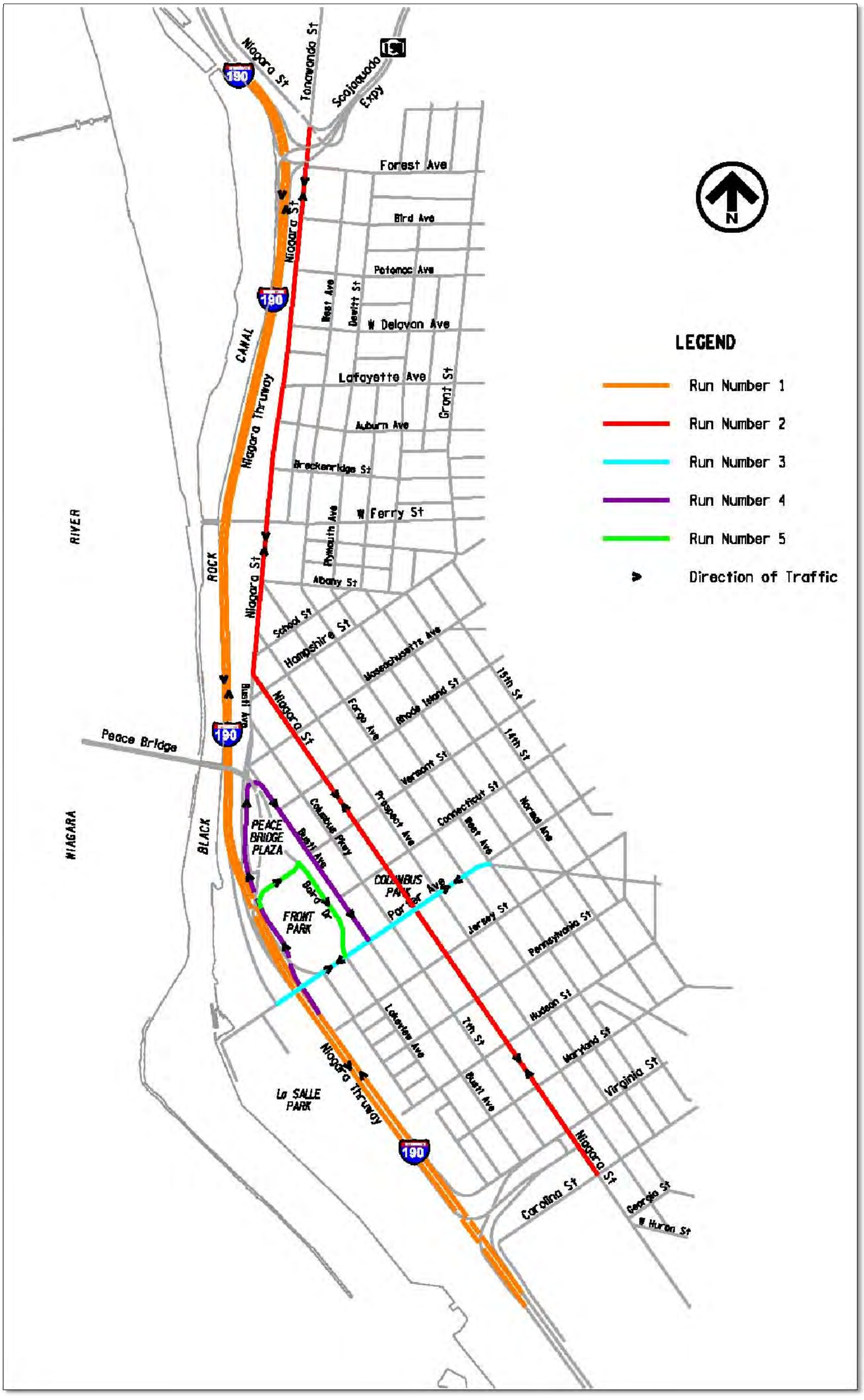
Pedestrian crosswalk volumes were collected concurrent with TMCs at the same locations as the TMCs. The counts were utilized to establish existing pedestrian conditions. Summaries of the spring pedestrian counts are provided with the TMCs in **Attachment 4**.

3.4 Travel Time and Delay Surveys

Travel time and delay surveys were conducted concurrent with the traffic counts to determine average speeds and operating speeds along critical segments of the project study area. The information was utilized to help validate existing condition traffic models. The routes for the travel time surveys are listed below and shown in **Figure 3.2**.

1. I-190 northbound and southbound between Interchanges 8 and 11
2. Niagara Street northbound and southbound between Carolina Street and Tonawanda Street/the eastbound Scajaquada Expressway on-ramp and westbound Scajaquada Expressway off-ramp
3. Porter Avenue between the southbound I-190 Exit 9 ramp and West Avenue

Figure 3.2 – Travel Time and Delay Survey Data Collection Map



4. The northbound I-190 Exit 9 off-ramp (Ramp N) to Sheridan Terrace northbound to Busti Avenue, north of Porter Avenue
5. The westbound Peace Bridge Plaza approach (Ramp A) to Baird Drive southbound, north of Porter Avenue

Summaries of the spring travel time and delay surveys are provided in **Attachment 5**.

3.5 Roadway Inventories

Roadway inventories were conducted throughout the study area to determine existing conditions, including lane widths, permitted traffic movements, bus stop locations, parking locations, parking regulations, and other physical/operational characteristics. Available traffic signal timings in Synchro models provided by GBNRTC were field verified, and those at additional locations were collected. Observations were made of parking, transit, and queuing conditions to help calibrate existing condition traffic models. It should be noted that the only difference found between the aerials used for geometry verification and field observations was that high-visibility crosswalks had been installed on Porter Avenue at Prospect Avenue and the two intersections immediately to the east. It should also be noted that discrepancies were found between the Synchro timings provided by GBNRTC and the field, which necessitated the use of official traffic signal timings from the City of Buffalo. The roadway inventories and official traffic signal timings are provided in **Attachments 6 and 7**, respectively.

3.6 Accident Data

Accident data (i.e., summaries, police reports, Priority Investigation Locations (PILs), statewide average accident rates) for the latest available three-year period were obtained from NYSDOT and PBA for the accident study area shown in **Figure 2.1**. The data were summarized, collision diagrams developed, accident rates calculated and compared to statewide average accident rates for similar facilities, and safety deficiencies identified.

4. 2013 EXISTING CONDITIONS

To assess the impacts of proposed improvements on traffic conditions in the future design year, it was necessary to determine the existing traffic conditions from which future traffic conditions would be projected. The existing conditions represent traffic operations during the peak summer months (i.e., when traffic volumes in the NY Gateway Connections study area are typically highest).

4.1 Roadway Network

Following are descriptions of the major roadways in the NY Gateway Connections study area. See **Figure 1.2** for a map of the roadways.

Niagara Thruway (I-190). I-190 is a north-south interstate, and qualifying highway for larger dimension vehicles, that extends from the New York State Thruway (I-90) in Cheektowaga, New York, through downtown Buffalo, north to Niagara Falls and the Lewiston-Queenston Bridge into Canada. There are three I-190 interchanges in the project study area. Interchange 8 at the southern end provides northbound and southbound access to and from Niagara Street; Interchange 11 at the northern end provides northbound and southbound access to and from NY 198 (Scajaquada Expressway). Interchange 9 in the vicinity of the Plaza provides limited access to and from the Plaza and Fort Erie Canal. Ramp N connects northbound I-190 to the Plaza via Ramp A and a signalized intersection at Baird Drive; Ramp B connects the eastbound Peace Bridge to southbound I-190; Ramp P provides access to northbound I-190 from Porter Avenue; and Ramp SD provides access from southbound I-190 to Porter Avenue. There is no direct connection between southbound I-190 and the Plaza, so all southbound vehicles must exit to Porter Avenue and turn left onto Baird Drive and travel through Front Park to access the facility. There also is no direct connection between the Plaza and northbound I-190, so most exiting Plaza vehicles destined to the northbound Thruway currently travel southbound on Baird Drive through Front Park and turn right onto Porter Avenue to utilize Ramp P. Another (more circuitous) option to access northbound I-190 from the Plaza is via Ramp C. Ramp C merges with Ramp N to become Sheridan Terrace north of the Plaza, and drivers can turn right onto Busti Avenue and then right onto Porter Avenue to access Ramp P.

I-190 typically provides three travel lanes in each direction south of Interchange 9 and two travel lanes in each direction north of Interchange 9 – with auxiliary, acceleration, and/or deceleration lanes at the interchanges to facilitate traffic entering and exiting the facility. The highest traffic volumes along I-190 occur in the evening when peak bi-directional traffic volume is approximately 9,000 vehicles per hour (vph) south of Interchange 9 and 7,800 vph north of Interchange 9. In the evenings, the peak travel direction in the study area is northbound away from downtown Buffalo, which has a peak traffic volume of approximately 4,600 vph south of Interchange 8. The peak traffic volume southbound occurs in the morning during the commute into downtown Buffalo when the peak traffic volume is approximately 4,100 vph between Interchanges 8 and 9. Throughout the day, trucks comprise 5 to 10 percent of the vehicles along the Thruway. Traffic volume from northbound I-190 along Ramp A to the Plaza is lower (i.e., less than 600 vph) but typically includes 30 to 35 percent trucks.

Porter Avenue. Porter Avenue is an east-west city street and truck route that extends from the Lake Erie/Niagara River waterfront to the west and has bus and bicycle routes along part of its length. It is a principal arterial between I-190 and Niagara Street and a minor arterial east of Niagara Street. West of

Niagara Street, Porter Avenue provides two travel lanes in each direction with additional turning lanes where necessary. East of Niagara Street, the roadway provides one lane and a bicycle lane plus on-street parking in each direction. Porter Avenue is lined with local parks, schools, churches, and public institutions/community facilities, and has a designated off-street bicycle path on the north side between Front and Prospect Parks. It also provides access to the Plaza via a signalized intersection at Baird Drive/ Lakeview Avenue and to northbound I-190 via unsignalized ramps in the vicinity of Fourth Street. Weekday AM and PM bi-directional traffic volumes along Porter Avenue peak at between 1,250 and 1,350 vph and are highest in the segment between Baird Drive and Ramp P. The peak eastbound volumes occur in the morning and are approximately 850 vph. Peak westbound volumes occur in the evening and are approximately 750 vph.

Baird Drive/Lakeview Avenue. Baird Drive is the north-south roadway through Front Park that provides access between Porter Avenue and the Plaza; it continues through the residential neighborhood to the south as Lakeview Avenue. Baird Drive/Lakeview Avenue provides one lane in each direction, with additional lanes at the signalized intersection with Ramp A at the Plaza north of Porter Avenue and on-street parking on both sides of the roadway south of Porter Avenue. Weekday peak-hour bi-directional traffic volumes along Baird Drive range from approximately 300 to 400 vph. The highest traffic volume in each direction is approximately 270 vph. Trucks to and from the Plaza comprise 5 to 12 percent of the vehicles, the highest of this range occurring during the off-peak/overnight hours.

Busti Avenue. Busti Avenue extends from Niagara Street, past Sheridan Terrace, alongside Front Park, through a residential neighborhood, and to Virginia Street. South of Sheridan Terrace, where there is an eastbound hook ramp from Ramp N, Busti Avenue is a one-way southbound collector roadway. Between Sheridan Terrace and Porter Avenue, the roadway is striped as two lanes in each direction; south of Porter Avenue, the roadway is not striped, but is wide enough to function, as two lanes in each direction when necessary. On-street parking typically is allowed on at least one side of the street. Busti Avenue often is utilized during overflow conditions (i.e., when there is queuing/congestion along the Peace Bridge) to re-route and store queued vehicles. There also is a gate on Busti Avenue across from Vermont Street that can be opened to provide Plaza access to trucks and emergency vehicles. During typical non-overflow traffic conditions, traffic volumes along Busti Avenue are low, peaking at approximately 200 vph during the weekday AM peak period. As discussed previously, traffic analyses were not conducted for overflow conditions, but overflow storage and oversized vehicle needs were considered in the design of this project (see DEIS Sections 3.3.5.1 and 3.3.5.2).

Niagara Street. Niagara Street is a north-south principal arterial and bus and truck route that extends from River Road north of the Scajaquada Expressway to Niagara Square in downtown Buffalo. North of Porter Avenue, the roadway typically provides one lane in each direction with a continuous two-way center left-turn lane. South of Porter Avenue, the roadway typically provides two lanes plus on-street parking in each direction with additional turning lanes at major intersections, as necessary. Abutting land use includes commercial development. In the southern section of the project study area, Niagara Street also provides access to and from I-190 at Interchange 8 via Virginia Street and the off-ramps north of Carolina Street. Traffic volumes on Niagara Street are relatively high. North of Porter Avenue, in the residential and D'Youville College/Columbus Park areas, peak bi-directional traffic volumes range from 550 to 800 vph. Between Porter Avenue and Pennsylvania Street, in the more densely commercial area, peak bi-directional volumes are 800 to 1,050 vph. Between Pennsylvania Street and the I-190 Interchange 8 ramps, the bi-directional volumes are 1,050 to

1,400 vph. Traffic volumes typically are highest on Niagara Street south of the Interchange 8 ramps (i.e., headed toward downtown Buffalo) where the bi-directional volumes range from 1,150 to 2,050 vph during the peak periods. As for I-190, the peak traffic volumes along Niagara Street are consistently southbound toward downtown in the mornings and northbound away from downtown in the evenings. Volumes are fairly balanced during the midday peak period.

There are numerous Niagara Frontier Transportation Authority-Metro (NFTA-Metro) bus routes that operate in the traffic study area. These include the 5, 12, 22, 29, 40, 60, 61, 64, and 79. The primary routes are along Niagara Street and Porter Avenue.

Truck route, bicycle route, and bus route information are provided in **Attachments 8, 9, and 10**, respectively.

4.2 Traffic Volumes

2013 existing condition traffic volume networks were developed for the project study area based on a combination of traffic data collected for this project and of available traffic data provided by GBNRTC and NYSTA. Since traffic data was collected for the project in April and May 2013, it was seasonally adjusted to reflect peak summer conditions in the area. The seasonal adjustment factors for I-190 and the Peace Bridge ramps, including Baird Drive, were calculated based on 2011 through 2012 hourly traffic volume data provided by NYSTA and PBA. It was determined that the weekday AM and PM peak hours are 7:30 to 8:30 a.m. and 4:45 to 5:45 p.m. From a comparison of April and May historical data to summer June through September historical data, it was found that traffic volumes on northbound and southbound I-190 during the AM peak hour and on northbound I-190 during the PM peak hour are typically the same in the spring as the summer. However, traffic volumes on southbound I-190 during the PM peak hour are approximately 5 percent higher in the summer. Southbound Thruway counts for these time periods were adjusted accordingly. A similar comparison of PBA data indicated that traffic volumes at the Plaza are consistently higher during the summer. Eastbound (U.S.-bound) Plaza volumes were calculated to be 30 and 16 percent higher during the AM and PM periods than in the spring, respectively, and Ramp B, Ramp C, and Baird Drive southbound traffic counts were adjusted accordingly. Westbound (Canada-bound) Plaza volumes were found to be 9 and 24 percent higher during the AM and PM periods, respectively, and these adjustments were applied to Ramp N, Ramp A, and Baird Drive northbound traffic counts. The seasonal adjustments were propagated throughout the traffic study network to create balanced 2013 existing condition peak summer traffic volume networks. The existing condition weekday AM and PM peak-hour volumes are shown in **Figures 4.1 and 4.2**, respectively.

Figure 4.1 – 2013 Existing Condition Weekday AM Peak-Hour Traffic Volumes

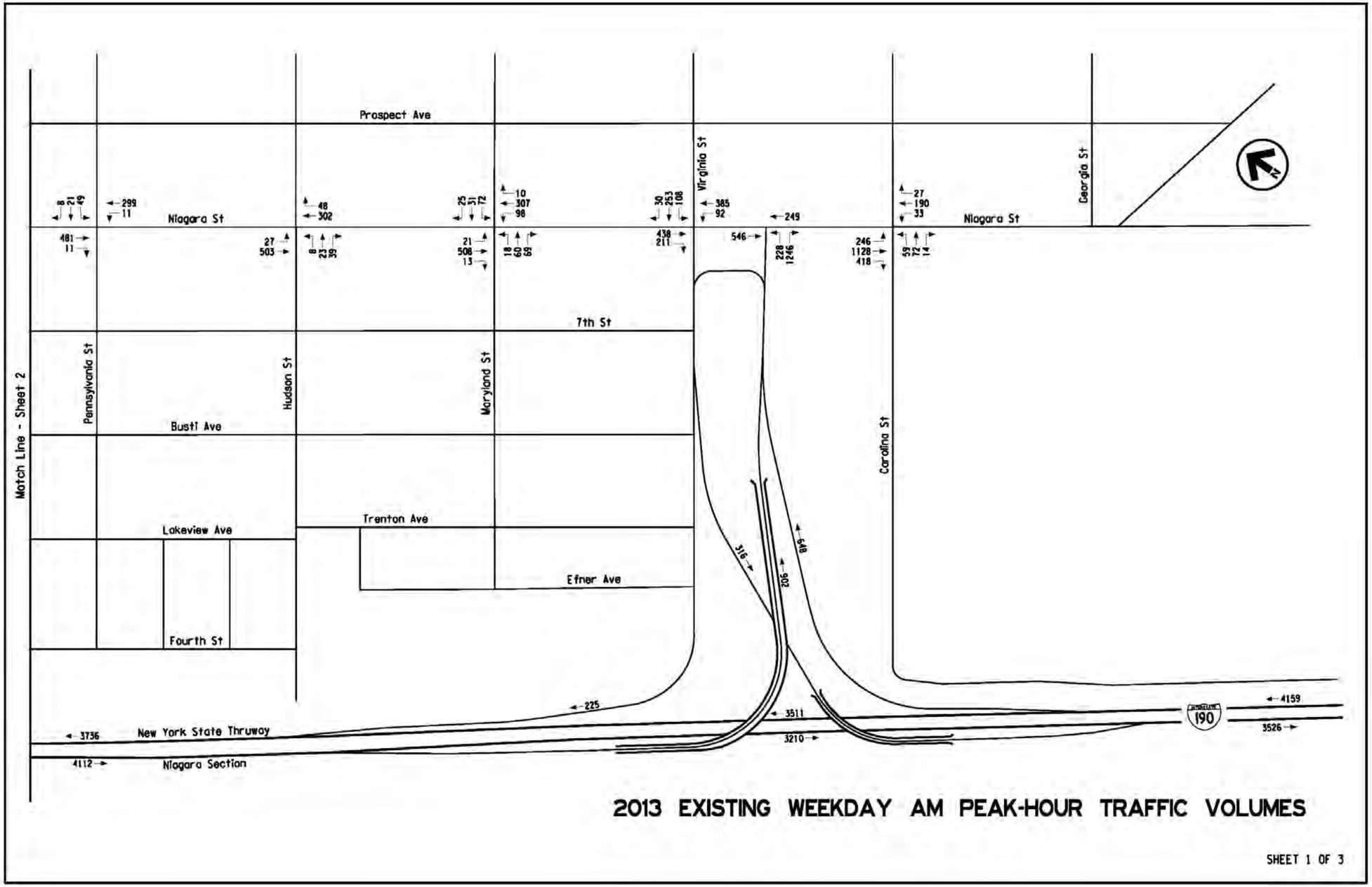


Figure 4.1 – 2013 Existing Condition Weekday AM Peak-Hour Traffic Volumes Cont'd

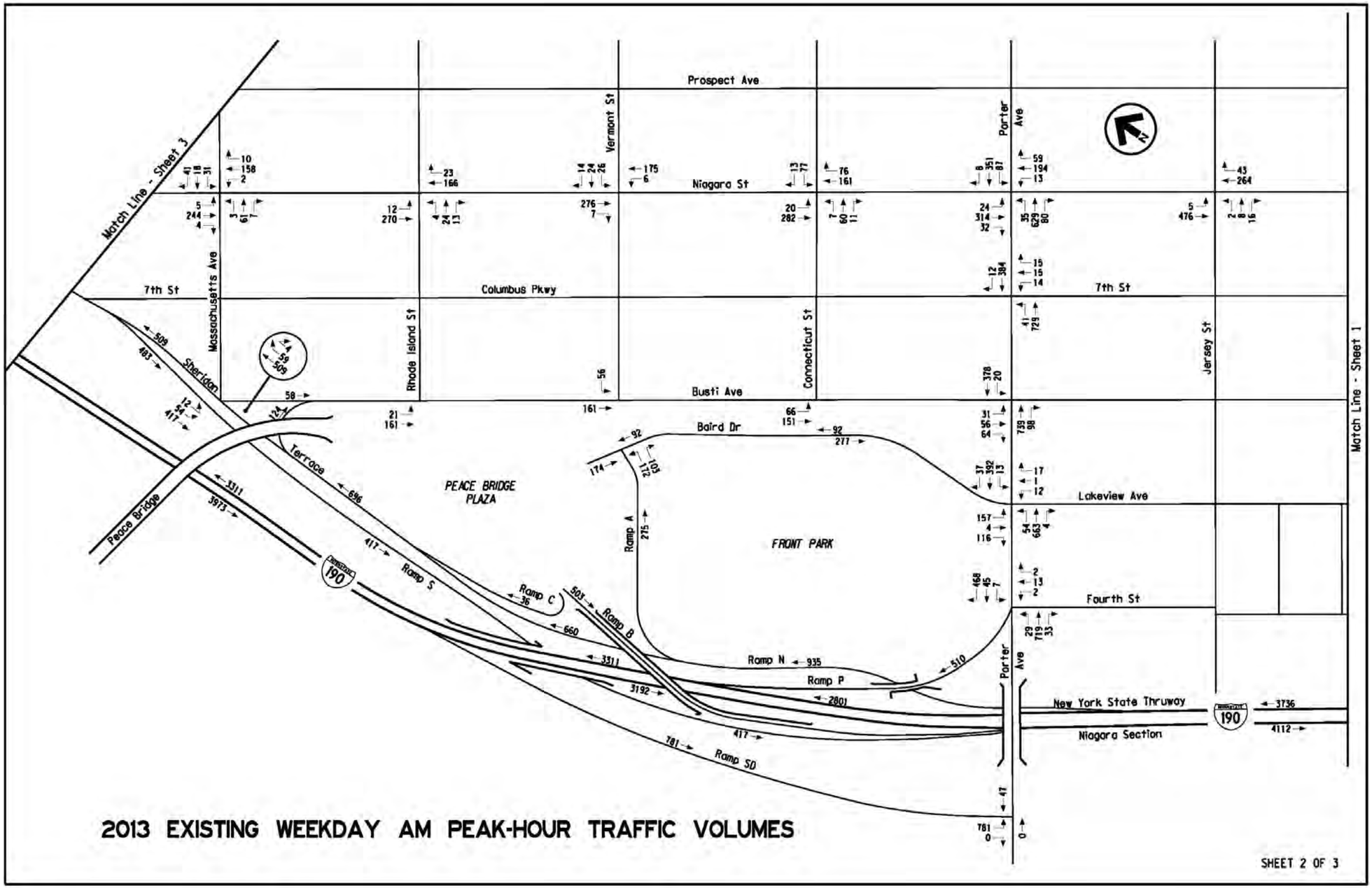


Figure 4.1 – 2013 Existing Condition Weekday AM Peak-Hour Traffic Volumes Cont'd

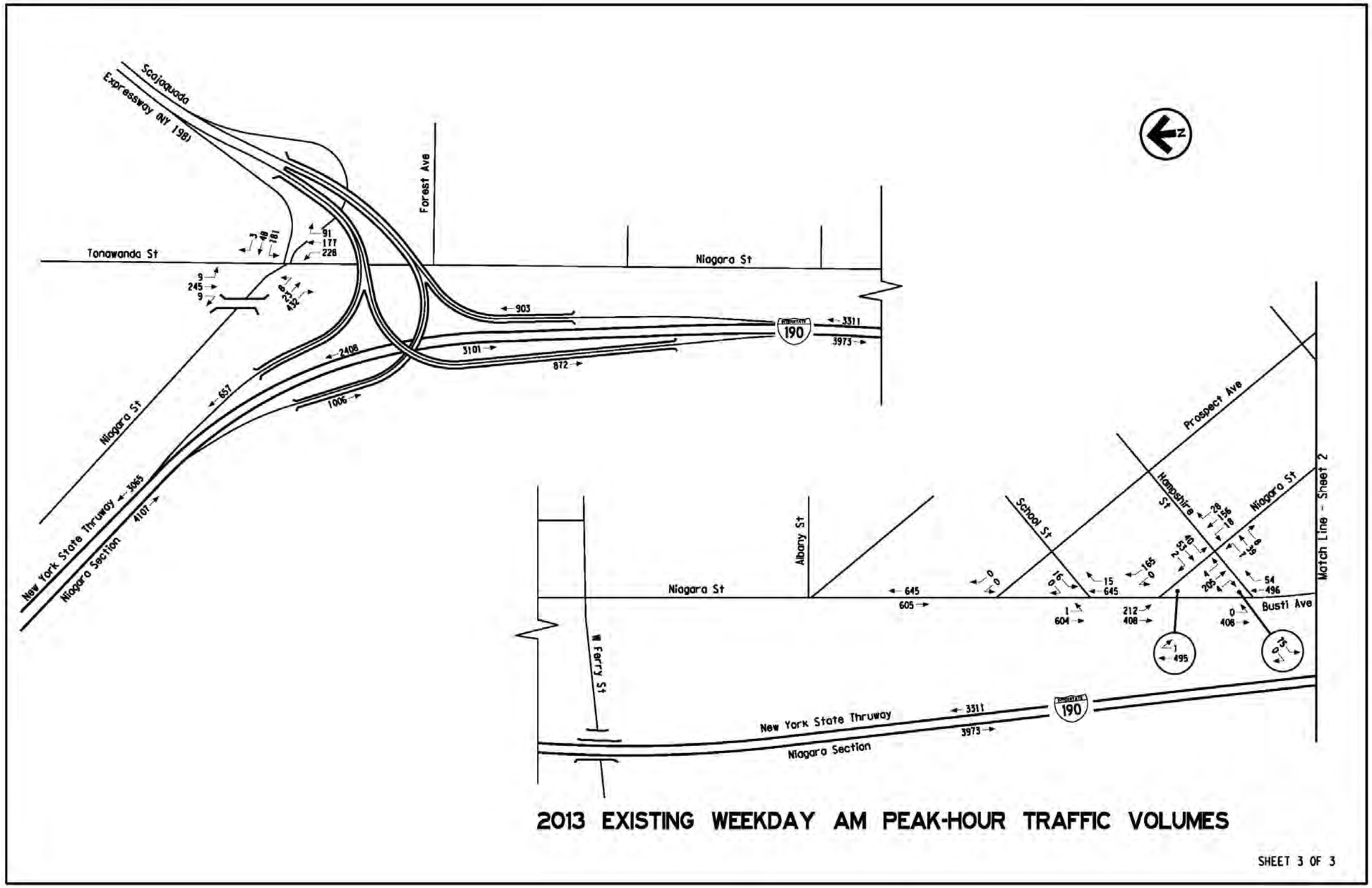


Figure 4.2 – 2013 Existing Condition Weekday PM Peak-Hour Traffic Volumes

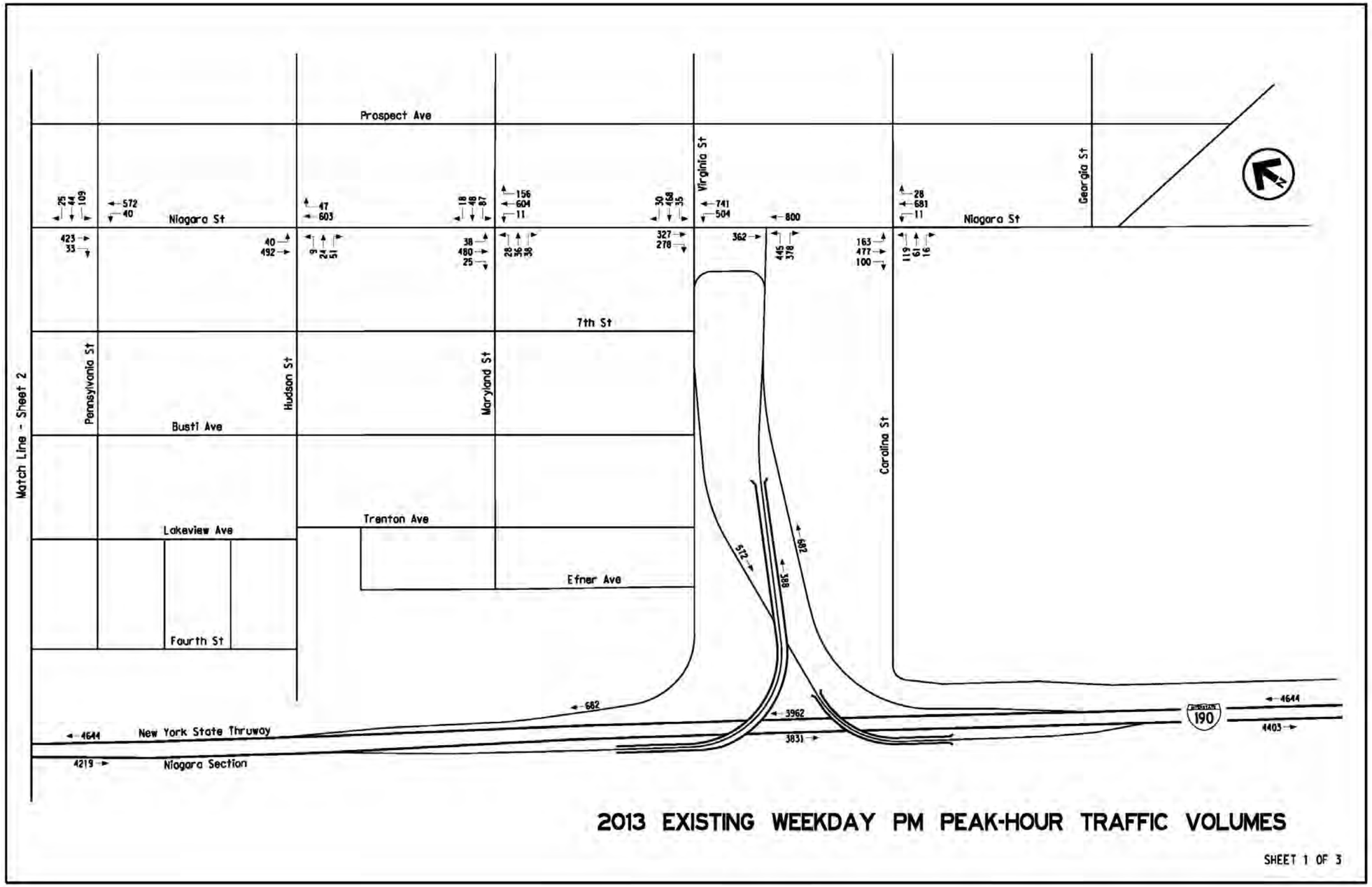


Figure 4.2 – 2013 Existing Condition Weekday PM Peak-Hour Traffic Volumes Cont'd

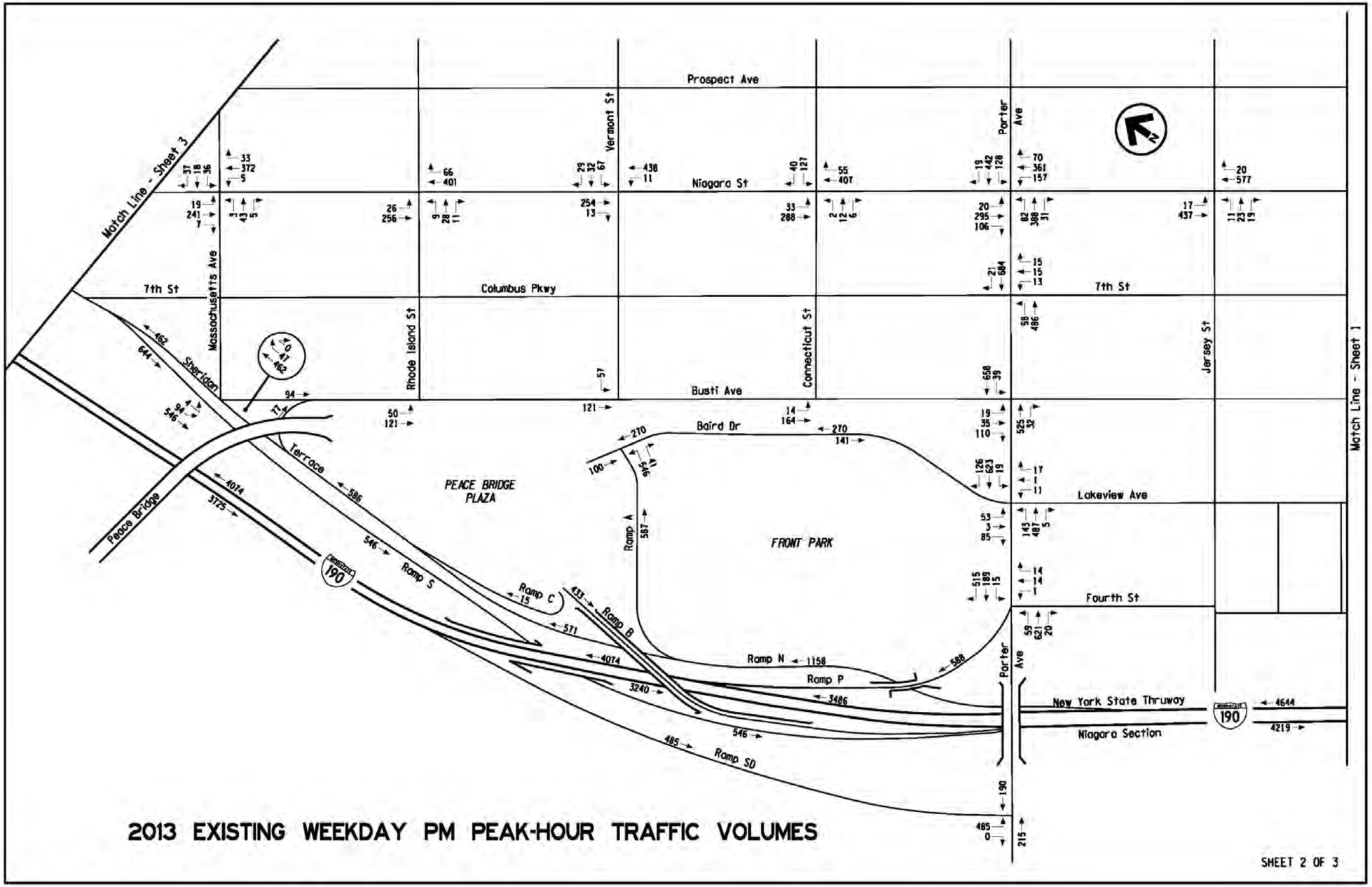
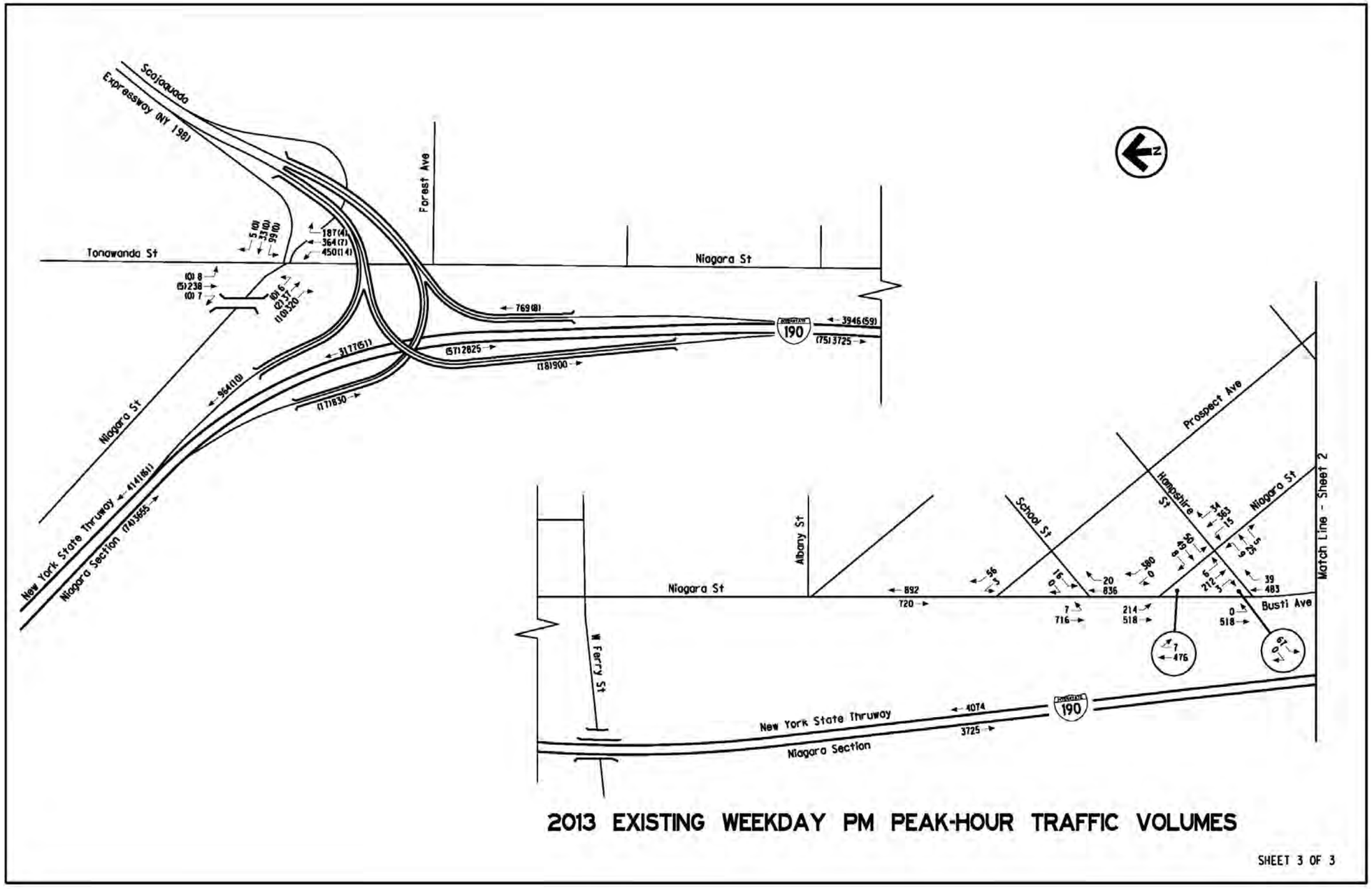


Figure 4.2 – 2013 Existing Condition Weekday PM Peak-Hour Traffic Volumes Cont'd



4.3 Travel Speeds

Travel time and delay surveys and ATR speed measurements were performed to determine existing average travel speeds and 85th-percentile speeds on the major roadways in the project area. The information was used to validate existing condition traffic models and to assess potential project and construction diversions. The travel time surveys indicate that average speeds on I-190 between Interchanges 8 and 11 are higher than the 55-mph speed limit during the peak periods, although there are often slowdowns along the segment. During the weekday AM peak period, the average travel speed southbound toward downtown is 57 miles per hour (mph), but speeds may decrease to approximately 39 mph at the Interchange 11 on-ramp to the north and/or around Ramp B near the Plaza. During the weekday PM peak period, the average travel speed leaving downtown is 60 mph. However, there were slowdowns to approximately 47 mph between the Interchange 8 on-ramp and Interchange 9, where the Thruway cross-section decreases from three to two travel lanes. The weekday MD peak period was found to represent free-flow conditions along the Thruway. During this time period, the average speed (approximating the 85th-percentile spped) was 63 mph, with slowdowns near the ramps to no less than 50 mph. Average and 85th-percentile speeds obtained from 24-hour ATRs along the local streets were found to be approximately 25 and 35 mph, respectively. Peak-hour travel time surveys confirm this range, which is near the posted 30-mph speed limit – although travel speeds during the peak periods were found to be slightly (approximately 5 mph) slower than those over the course of the day. It should be noted that the average and 85th-percentile speeds on Ramp A and Sheridan Terrace in the vicinity of the Plaza were higher than along other ramps and local streets, approximately 45 and 55 mph, respectively.

4.4 Traffic Analysis Methodology

To assess traffic operations in the project study area, freeway, ramp, signalized intersection, and unsignalized intersection analyses were conducted using VISSIM, a microscopic time step- and behavior-based traffic simulation model. Model inputs included passenger car, truck, bus, bicycle, and pedestrian volumes, as well as roadway geometry and traffic controls, including stop signs, yield signs, or signal timings. Traffic models were calibrated based on observed traffic volumes and validated based on travel time data. Model outputs included simulated volumes, speeds, and delays from which densities and freeway and intersection levels of service could be calculated. Details of freeway and intersection analyses are discussed below.

<u>Basic Freeway Segment, Weaving, and Merge and Diverge Analysis</u>

Freeway analyses were conducted along I-190 between Interchanges 8 and 11 to assess traffic operations for basic freeway segments (i.e., uninterrupted sections of the roadway), weaving areas (i.e., where upstream on-ramps and downstream off-ramps are sufficiently close to each other to result in lane-changing issues), and merge/diverge segments (i.e., freeway segments near on-ramps and off-ramps). The typical measures of effectiveness (MOEs) for basic freeway segment, weaving, and merge/diverge analyses are speed, density, and level-of-service (LOS). Average speed, dependent on traffic volumes and mainline and ramp free-flow speeds, is an indicator of the degree of congestion on the freeway segment, weaving segment, or ramp influence area. Density, typically provided in passenger cars per mile per lane (pc/mi/ln), describes how closely spaced vehicles are within the

mainline, weaving, or ramp area. As density decreases, congestion increases and average speed decreases. Level-of-service, ranging from excellent LOS A to failing LOS F, is an indicator of how traffic operations are perceived in a particular location. The LOS designations for basic freeway segment and weaving and merge/diverge analyses, as published in the Transportation Research Board (TRB) 2010 *Highway Capacity Manual* (HCM), are provided in **Tables 4.1 and 4.2**.

Table 4.1 – LOS Criteria for Basic Freeway Segments

LOS	Density (pc/mi/ln)[1]
A	≤ 11
B	> 11-18
C	> 18-26
D	> 26-35
E	> 35-45
F	Demand exceeds capacity, > 45

Note: [1]pc/mi/ln ≡ passenger cars per mile per lane

Table 4.2 – LOS Criteria for Freeway Weaving, Merge, and Diverge Segments

LOS	Density (pc/mi/ln)[1]
A	≤ 10
B	> 10-20
C	> 20-28
D	> 28-35
E	> 35
F	Demand exceeds capacity

Note: [1]pc/mi/ln ≡ passenger cars per mile per lane

Signalized and Unsignalized Intersection Analysis

Signalized and unsignalized intersection analyses were conducted for all local streets between I-190 and Prospect Avenue from Busti Avenue/Niagara Street to Pennsylvania Street. This area was found to have varying traffic results based on project alternatives and was identified for air and noise analyses. The typical MOEs for both signalized and unsignalized (i.e., two-way stop-controlled, all-way stop-controlled, and roundabout) intersection analysis are delay and LOS. Delay, typically provided in seconds per vehicle (s/veh), is an indicator of how much additional travel time, compared to free-flow conditions, is experienced at a particular location and is used to determine LOS. The delay/LOS thresholds for signalized and unsignalized intersection analyses from the HCM are provided in **Tables 4.3 and 4.4**, respectively.

Table 4.3 – LOS Criteria for Signalized Intersections

LOS	Delay (s/veh)[1]
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

Note: [1]s/veh ≡ seconds per vehicle

Table 4.4 – LOS Criteria for Unsignalized Intersections

LOS	Delay (s/veh)[1]
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	>50

Note: [1]s/veh ≡ seconds per vehicle

4.5 Traffic Analysis Results

Basic freeway segment analyses were conducted for the following locations, shown in **Figure 4.3**.

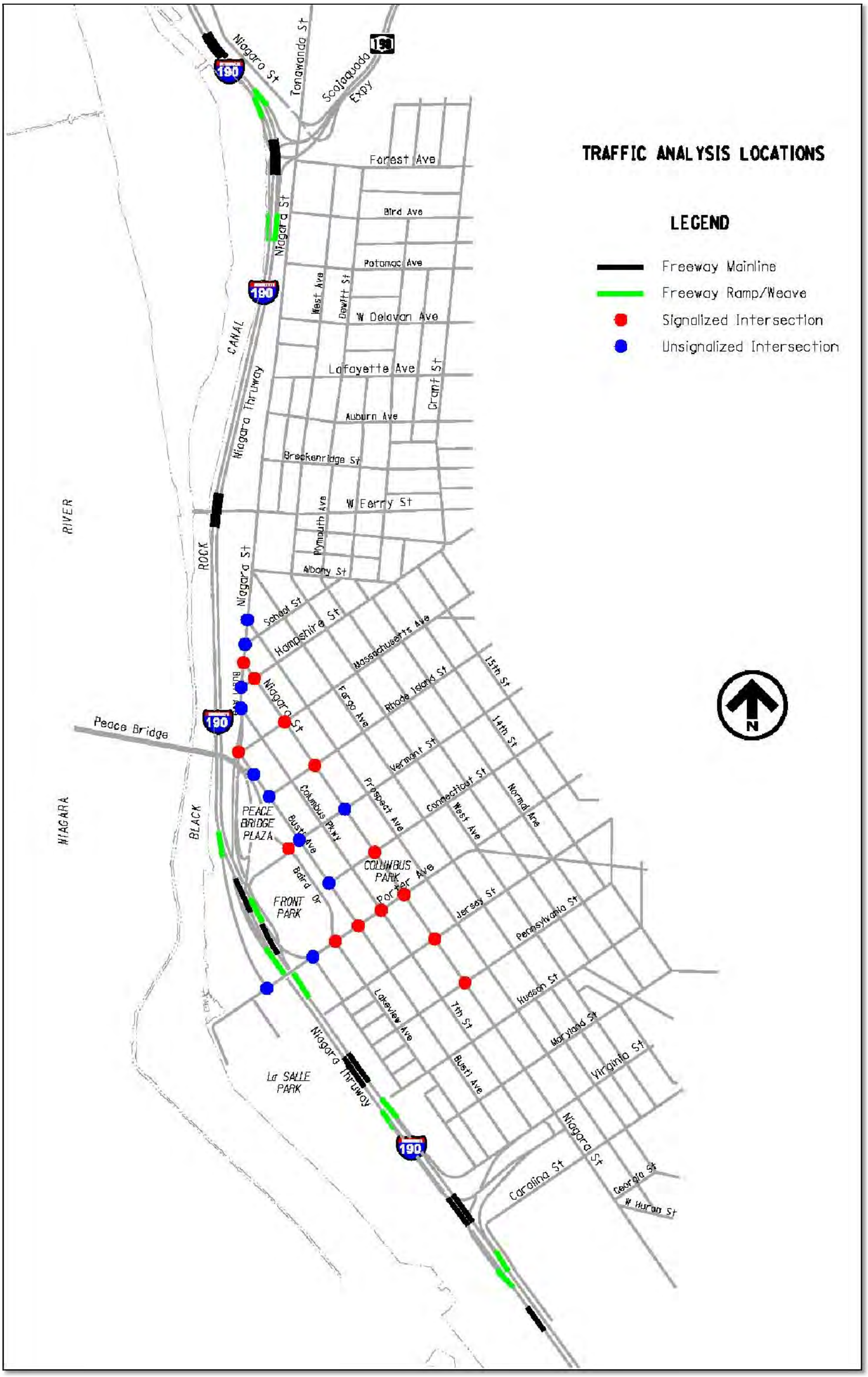
Northbound I-190

1. Mainline between Niagara Street on- and off-ramps
2. Mainline between Niagara Street on-ramp and Peace Bridge/Fort Erie Canal/Sheridan Terrace off-ramp
3. Mainline between Peace Bridge/Fort Erie Canal/Sheridan Terrace off-ramp and Porter Avenue on-ramp
4. Mainline between Porter Avenue on-ramp and Scajaquada Expressway off-ramp
5. Mainline between Scajaquada Expressway off- and on-ramps
6. Mainline between Scajaquada Expressway on-ramp and Amherst Street off-ramp

Southbound I-190

7. Mainline between Hamilton Street on-ramp and Scajaquada Expressway off-ramp
8. Mainline between Scajaquada Expressway off-and on-ramps
9. Mainline between Scajaquada Expressway on-ramp and Porter Avenue off-ramp
10. Mainline between Porter Avenue off-ramp and Peace Bridge/Ramp S on-ramp
11. Mainline between Peace Bridge/Ramp S on-ramp and Niagara Street off-ramp
12. Mainline between Niagara Street off- and on-ramps
13. Mainline between Niagara Street on-ramp and Church Street on-ramp

Figure 4.3 – Traffic Analysis Locations



The results of the basic freeway segment existing conditions analyses are provided in **Table 4.5**. During the weekday AM and PM peak hours in the non-peak travel directions (i.e., northbound in the mornings and southbound in the evenings), the mainline I-190 operates well, at LOS D or better. However, in the peak travel directions (i.e., toward downtown in the mornings and away from downtown in the evenings), there is some congestion. During the weekday AM peak hour, in the two-lane section and particularly in the Scajaquada Expressway area, southbound I-190 operates at LOS D or E. During the weekday PM peak hour, most of northbound I-190 is congested, operating at LOS E north of the Niagara Street on-ramp. Speeds are also lower than the 55-mph speed limit, typically less than 50 mph and as slow as 35 mph in the area between the Niagara Street on-ramp and the Peace Bridge off-ramp, as vehicles approach the transition in the roadway from three to two lanes.

Weaving and merge or diverge segment analyses were conducted for the following locations, also shown in **Figure 4.3**.

Northbound I-190

1. Weave between Church Street on-ramp and Niagara Street off-ramp
2. Merge at Niagara Street on-ramp
3. Diverge at Peace Bridge/Fort Erie Canal/Sheridan Terrace off-ramp
4. Merge at Porter Avenue on-ramp
5. Diverge at Scajaquada Expressway off-ramp
6. Merge at Scajaquada Expressway on-ramp

Southbound I-190

7. Diverge at Scajaquada Expressway off-ramp
8. Merge at Scajaquada Expressway on-ramp
9. Diverge at Porter Avenue off-ramp
10. Merge at Peace Bridge/Ramp S on-ramp
11. Diverge at Niagara Street off-ramp
12. Merge at Niagara Street on-ramp

The results of the ramp weaving, merge, and diverge existing conditions analyses are provided in **Table 4.6**. During the weekday AM peak hour at most of the ramp merges, traffic operates at LOS D or better. However, there is some congestion in the two-lane segment of southbound I-190 north of the Scajaquada Expressway off-ramp, where I-190 operates at LOS E. Speeds slow substantially (i.e., to less than 45 mph) at this location and in the three-lane segment of the Thruway upstream of the off-ramp to Niagara Street. During the weekday PM peak hour, southbound I-190 operates at LOS E near the Peace Bridge/Ramp S, at the complex merge of the two-lane mainline with a two-lane on-ramp. Northbound I-190 (the peak travel direction) is congested at all ramp merges, and traffic generally operates at LOS F, with speeds slowing to 30 to 40 mph.

Table 4.5 – 2013 Existing Condition Weekday AM and PM Peak-Hour Basic Freeway Segment Analysis Results

Mainline Analysis Location	Weekday					
	AM Peak Hour			PM Peak Hour		
	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)	LOS
I-190 NB						
1 - Mainline between Niagara Street on- and off-ramps	57	21	C	43	33	D
2 - Mainline between Niagara Street on-ramp and Peace Bridge off-ramp	57	23	C	35	42	E
3 - Mainline between Peace Bridge off-ramp and Porter Avenue on-ramp	56	25	D	42	43	E
4 - Mainline between Porter Avenue on-ramp and Scajaquada Expressway off-ramp	57	30	D	56	38	E
5 - Mainline between Scajaquada Expressway off- and on-ramps	57	22	C	46	37	E
6 - Mainline between Scajaquada Expressway on-ramp and Amherst Street off-ramp	54	29	D	49	44	E
I-190 SB						
7 - Mainline between Hamilton Street on-ramp and Scajaquada Expressway off-ramp	54	39	E	57	33	D
8 - Mainline between Scajaquada Expressway off- and on-ramps	56	28	D	57	25	C
9 - Mainline between Scajaquada Expressway on-ramp and Porter Avenue off-ramp	57	36	E	57	33	D
10 - Mainline between Porter Avenue off-ramp and Peace Bridge on-ramp	57	29	D	57	29	D
11 - Mainline between Peace Bridge on-ramp and Niagara Street off-ramp	54	27	D	56	27	D
12 - Mainline between Niagara Street off- and on-ramps	57	20	C	57	24	C
13 - Mainline between Niagara Street on-ramp and Church Street on-ramp	57	22	C	57	27	C

Notes: NB ≡ Northbound, SB ≡ Southbound

Table 4.6 – 2013 Existing Condition Weekday AM and PM Peak-Hour Weaving, Merge, and Diverge Segment Analysis Results

Ramp Analysis Location	Weekday					
	AM Peak Hour			PM Peak Hour		
	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)	LOS
I-190 NB						
1 - Weave between Church Street on-ramp and Niagara Street off-ramp	45	27	C	42	33	D
2 - Merge at Niagara Street on-ramp	56	21	C	33	51	F
3 - Diverge at Peace Bridge off-ramp	56	18	B	51	25	C
4 - Merge at Porter Avenue on-ramp	50	29	D	31	57	F
5 - Diverge at Scajaquada Expressway off-ramp	47	29	D	51	34	D
6 - Merge at Scajaquada Expressway on-ramp	52	24	C	40	41	F
I-190 SB						
7 - Diverge at Scajaquada Expressway off-ramp	46	37	E	53	29	D
8 - Merge at Scajaquada Expressway on-ramp	55	28	D	52	27	C
9 - Diverge at Porter Avenue off-ramp	56	30	D	55	34	D
10 - Merge at Peace Bridge on-ramp	57	30	D	43	40	E
11 - Diverge at Niagara Street off-ramp	43	27	C	53	28	D
12 - Merge at Niagara Street on-ramp	51	22	C	46	33	D

Notes: NB ≡ Northbound, SB ≡ Southbound

Signalized intersection analyses were conducted for all signalized locations between I-190 and Niagara Street from Pennsylvania Street to Busti Avenue/Niagara Street, as listed below and shown in **Figure 4.3**.

1. Porter Avenue at Niagara Street
2. Porter Avenue at Columbus Parkway/Seventh Street
3. Porter Avenue at Busti Avenue
4. Porter Avenue at Baird Drive/Lakeview Avenue
5. Busti Avenue at Sheridan Terrace/Massachusetts Avenue
6. Baird Drive at Plaza (Ramp A/Westbound Peace Bridge)
7. Niagara Street at Pennsylvania Street
8. Niagara Street at Jersey Street
9. Niagara Street at Connecticut Street
10. Niagara Street at Rhode Island Street
11. Niagara Street at Massachusetts Avenue
12. Niagara Street at Hampshire Street
13. Niagara Street at Busti Avenue

The results of the signalized intersection existing conditions analyses are provided in **Table 4.7**. Traffic operates well at most locations during both the weekday AM and PM peak hours (typically LOS C or better). The only location that experiences relatively high delays is Porter Avenue at Niagara Street, the intersection of the two highest-volume local streets in the study area. Left-turn movements at the intersection typically operate at LOS D with delays of 40 to 55 s/veh. During the weekday PM peak hour, the northbound left turn from Niagara Street to Porter Avenue (headed toward I-190) operates at LOS E with a delay of nearly 75 s/veh.

Unsignalized intersection analyses were conducted for the major unsignalized locations in the project study, as listed below and shown in **Figure 4.3**.

1. Porter Avenue at Fourth Street
2. Porter Avenue at the southbound I-190 Off-Ramp (Ramp SD)
3. Busti Avenue at Connecticut Street
4. Busti Avenue at Vermont Street
5. Busti Avenue at Rhode Island Street
6. Busti Avenue at Sheridan Terrace Hook Ramp
7. Busti Avenue at Seventh Street
8. Busti Avenue at Hampshire Street
9. Niagara Street at Vermont Street
10. Niagara Street at School Street
11. Niagara Street at Prospect Avenue

The results of the unsignalized intersection existing conditions analyses are provided in **Table 4.8**. Most unsignalized locations operate well (typically at LOS A) during both the weekday AM and PM peak hours.

Table 4.7 – 2013 Existing Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Niagara St					
NB	L	47.0	D	73.4	E
NB	T	29.7	C	40.1	D
NB	R	27.5	C	30.0	C
SB	L	52.6	D	48.3	D
SB	T	30.9	C	32.2	C
SB	R	33.7	C	37.4	D
EB	L	43.7	D	43.9	D
EB	T	41.1	D	29.1	C
EB	R	37.4	D	20.8	C
WB	L	46.4	D	49.3	D
WB	T	28.2	C	28.9	C
WB	R	20.8	C	21.6	C
	Overall	**35.3**	**D**	**36.9**	**D**
2 - Porter Ave @ Columbus Pkwy / Seventh St					
NB	L	18.1	B	17.9	B
NB	T	20.1	C	19.1	B
NB	R	16.9	B	14.7	B
EB	L	10.1	B	12.4	B
EB	T	12.8	B	9.6	A
WB	T	8.4	A	9.1	A
WB	R	7.0	A	8.4	A
	Overall	**11.5**	**B**	**9.7**	**A**
3 - Porter Ave @ Busti Ave					
SB	L	21.3	C	17.2	B
SB	T	19.5	B	17.1	B
SB	R	20.1	C	21.2	C
EB	T	4.8	A	4.1	A
EB	R	5.4	A	4.0	A
WB	L	14.1	B	8.0	A
WB	T	4.4	A	5.7	A
	Overall	**6.7**	**A**	**6.8**	**A**
4 - Porter Ave @ Baird Dr / Lakeview Ave					
NB	L	21.6	C	21.7	C
NB	T	20.2	C	25.0	C
NB	R	7.2	A	6.5	A
SB	L	26.0	C	23.6	C
SB	T	24.4	C	24.3	C
SB	R	5.6	A	1.9	A
EB	L	7.5	A	11.3	B
EB	T	7.4	A	6.8	A
EB	R	5.2	A	4.1	A
WB	L	23.6	C	19.2	B
WB	T	16.2	B	18.3	B
WB	R	12.4	B	16.4	B
	Overall	**12.0**	**B**	**13.3**	**B**

Notes: NB ≡ Northbound, SB ≡Southbound, EB ≡ Eastbound, WB ≡ Westbound, L ≡ Left Turn, T ≡ Through, R ≡ Right Turn

Table 4.7 – 2013 Existing Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
5 - Busti Ave @ Sheridan Ter / Massachusetts Ave					
NB	T	7.8	A	8.3	A
NB	R	5.3	A	4.7	A
NB	R	8.6	A	0.0	A
SB	L	16.8	C	15.6	B
SB	L	18.3	C	17.5	B
SB	T	0.4	A	0.2	A
	Overall	**5.3**	**A**	**5.0**	**A**
6 - Baird Dr @ Plaza (Ramp A / Westbound Peace Bridge)					
NB	T	16.2	B	18.1	B
SB	T	16.6	B	16.7	B
EB	L	7.9	A	11.9	B
EB	R	3.9	A	6.4	A
	Overall	**11.7**	**B**	**13.9**	**B**
7 - Niagara St @ Pennsylvania St					
NB	L	16.0	B	17.3	B
NB	T	12.9	B	14.2	B
SB	T	11.4	B	11.0	B
SB	R	10.6	B	11.8	B
WB	L	12.7	B	13.6	B
WB	T	15.9	B	15.5	B
WB	R	3.9	A	4.4	A
	Overall	**12.1**	**B**	**12.9**	**B**
8 - Niagara St @ Jersey St					
NB	T	1.1	A	1.2	A
NB	R	2.0	A	1.7	A
SB	L	11.4	B	13.2	B
SB	T	10.0	A	10.0	A
EB	L	21.3	C	13.9	B
EB	T	17.3	B	17.8	B
EB	R	15.8	B	16.2	B
	Overall	**6.9**	**A**	**5.8**	**A**
9 - Niagara St @ Connecticut St					
NB	T	17.1	B	18.4	B
NB	R	13.5	B	17.4	B
SB	L	31.2	C	42.5	D
SB	T	14.7	B	11.2	B
EB	L	4.0	A	0.3	A
EB	T	13.0	B	11.7	B
EB	R	4.6	A	4.0	A
WB	L	13.1	B	14.0	B
WB	R	3.2	A	4.9	A
	Overall	**14.8**	**B**	**15.6**	**B**

Table 4.7 – 2013 Existing Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
10 - Niagara St @ Rhode Island St					
NB	T	24.7	C	27.7	C
NB	R	17.8	B	23.9	C
SB	L	22.5	C	22.7	C
SB	T	18.3	B	10.6	B
EB	L	10.0	A	13.1	B
EB	T	13.9	B	16.4	B
EB	R	3.9	A	3.5	A
	Overall	**19.9**	**B**	**20.8**	**C**
11 - Niagara St @ Massachusetts Ave					
NB	L	5.1	A	13.4	B
NB	T	5.1	A	9.6	A
NB	R	3.2	A	5.6	A
SB	L	9.5	A	9.0	A
SB	T	9.5	A	6.6	A
SB	R	4.8	A	3.2	A
EB	L	22.8	C	21.3	C
EB	T	21.5	C	20.2	C
EB	R	24.0	C	21.1	C
WB	L	21.8	C	20.9	C
WB	T	20.6	C	21.1	C
WB	R	20.7	C	20.3	C
	Overall	**11.4**	**B**	**10.4**	**B**
12 - Niagara St @ Hampshire St					
NB	L	7.2	A	3.6	A
NB	T	2.6	A	4.6	A
NB	R	2.3	A	3.0	A
SB	L	1.4	A	2.8	A
SB	T	0.3	A	0.2	A
SB	R	0.3	A	0.3	A
EB	L	9.0	A	10.9	B
EB	T	8.8	A	9.4	A
EB	R	6.1	A	5.2	A
WB	L	9.2	A	10.2	B
WB	T	8.9	A	10.1	B
WB	R	7.2	A	6.3	A
	Overall	**3.5**	**A**	**4.2**	**A**
13 - Niagara St @ Busti Ave					
NB	T	19.5	B	7.8	A
NB	R	18.8	B	5.3	A
SB	L	23.1	C	14.9	B
SB	T	20.3	C	1.1	A
WB	R	37.6	D	18.4	B
	Overall	**22.7**	**C**	**9.1**	**A**

Table 4.8 – 2013 Existing Condition Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Fourth St					
NB	L	9.3	A	8.1	A
NB	L	7.4	A	7.0	A
NB	R	5.4	A	6.1	A
EB	L	0.3	A	0.5	A
EB	T	0.3	A	0.4	A
EB	R	0.5	A	0.8	A
WB	L	3.8	A	3.0	A
WB	T	2.9	A	2.8	A
WB	R	5.2	A	5.7	A
	Overall	**2.2**	**A**	**2.7**	**A**
2 - Porter Ave @ the I-190 SB Off-Ramp (Ramp SD)					
SB	L	2.2	A	3.0	A
EB	T	0.0	A	0.0	A
WB	T	0.0	A	0.1	A
	Overall	**2.0**	**A**	**1.6**	**A**
3 - Busti Ave @ Connecticut St					
SB	L	0.5	A	0.4	A
SB	T	0.2	A	0.2	A
	Overall	**0.3**	**A**	**0.2**	**A**
4 - Busti Ave @ Vermont St					
SB	T	7.9	A	7.7	A
WB	L	6.7	A	6.0	A
	Overall	**7.6**	**A**	**7.2**	**A**
5 - Busti Ave @ Rhode Island St					
SB	L	0.4	A	0.4	A
SB	T	0.1	A	0.1	A
	Overall	**0.1**	**A**	**0.2**	**A**
6 - Busti Ave @ Sheridan Terrace Hook Ramp					
SB	T	0.2	A	0.2	A
EB	R	1.9	A	2.5	A
	Overall	**1.3**	**A**	**1.2**	**A**

Notes: NB ≡ Northbound, SB ≡Southbound, EB ≡ Eastbound, WB ≡ Westbound, L ≡ Left Turn, T ≡ Through, R ≡ Right Turn

Table 4.8 – 2013 Existing Condition Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
7 - Busti Ave @ Seventh St					
NB	T	0.4	A	0.3	A
SB	T	0.4	A	0.2	A
WB	L	0.0	A	8.2	A
WB	R	6.8	A	6.4	A
	Overall	**0.6**	**A**	**0.9**	**A**
8 - Busti Ave @ Hampshire St					
NB	T	1.3	A	0.7	A
NB	R	1.0	A	0.7	A
SB	T	0.4	A	0.1	A
WB	L	8.3	A	7.6	A
	Overall	**1.4**	**A**	**0.9**	**A**
9 - Niagara St @ Vermont St					
NB	L	4.9	A	4.5	A
NB	T	1.5	A	1.8	A
SB	T	1.7	A	1.4	A
SB	R	2.4	A	4.6	A
WB	L	8.2	A	11.0	B
WB	T	9.2	A	11.7	B
WB	R	7.0	A	8.2	A
	Overall	**2.5**	**A**	**3.1**	**A**
10 - Niagara St @ School St					
NB	T	0.6	A	0.4	A
NB	R	1.7	A	1.0	A
SB	L	1.7	A	4.1	A
SB	T	1.6	A	0.6	A
WB	L	11.4	B	11.0	B
	Overall	**1.3**	**A**	**0.6**	**A**
11 - Niagara St @ Prospect Ave					
NB	T	0.4	A	0.2	A
SB	T	1.1	A	0.7	A
WB	L	0.0	A	11.2	B
WB	R	0.0	A	5.3	A
	Overall	**0.7**	**A**	**0.6**	**A**

4.6 Accident Analysis

Accident data for I-190 and the local street system in the area between Interchange 8 and Niagara Street at Prospect Avenue were provided by NYSDOT. The data included police accident reports (MV-104s) from the New York State Department of Motor Vehicles for the three-year period from June 1, 2009 through May 31, 2012, as well as high accident location (HAL) and statewide average accident rate information from the New York State Safety Information Management System (SIMS) for Region 5. Based on the data, there were 524 accidents in the study area over the three-year period – 192 (118 northbound, 74 southbound) on I-190 and 331 on the local streets. One accident could not be located. The calculated accident rates for the major roadway segments in the area, as well as comparisons to the statewide averages for similar NYSDOT roadway facilities, are provided in **Table 4.9**.

Table 4.9 – Comparison of Calculated Segment Accident Rates to Statewide Average Rates

Roadway Segment	Lanes	AADT[1]	Accident Rate (per MVM)[2]		
			Calculated	Statewide Average	High?
Northbound I-190 south of Interchange 9	3	50,000	1.26	1.29	No
Northbound I-190 north of Interchange 9	2	40,000	1.07	1.19	No
Southbound I-190 south of Interchange 9	3	45,000	0.83	1.29	No
Southbound I-190 north of Interchange 9	2	40,000	0.74	1.19	No
Porter Avenue	4	10,000	16.44	4.86	Yes
Niagara Street south of Porter Avenue	4	12,000	12.55	4.86	Yes
Niagara Street north of Porter Avenue	3	7,000	9.02	3.55	Yes

Note: [1]AADT ≡ annual average daily traffic
[2]MVM ≡ million vehicle miles. Accident rate is the number of accidents that occurred per MVM.

I-190

The 118 accidents on northbound I-190 were somewhat evenly distributed along the Thruway between milepost (MP) 5.6 and MP 7.6. However, there were higher concentrations (12 accidents) at MP 6.0 around the Niagara Street on-ramp and 32 accidents at MP 6.5 and MP 6.6 in the vicinity of the Peace Bridge/Fort Erie Canal off-ramp. Most accidents occurred during the weekday PM peak period and were rear-end or overtake accidents associated with congestion. As shown in Table 4.9, the calculated accident rate of 1.26 for the three-lane segment of the Thruway south of Interchange 9 and 1.07 for the two-lane segment north of Interchange 9 are both lower than the statewide averages of 1.29 and 1.19, respectively.

The 74 accidents on southbound I-190 were evenly distributed along the Thruway. Many accidents were rear-end or overtake accidents; however, most accidents (23) were fixed-object accidents that occurred during inclement, particularly cold-weather, conditions. The accidents on southbound I-190 most often occurred during the weekday AM and PM peak hours. In addition, the calculated accidents rates of 0.83 and 0.74 for the three- and two-lane segments of the Thruway are both less than the statewide averages of 1.29 and 1.19, respectively.

See **Table 4.10** for details regarding the accident types along I-190 in the study area.

Table 4.10 – I-190 Accident Type Summary

Accident Type	Number of Accidents	Percentage of Accidents
Rear-end	76	40%
Overtake	46	24%
Fixed-object	45	23%
Other	22	11%
Backing	2	1%
Sideswipe	1	1%
Total	**192**	**100%**

It should be noted that SIMS identified three High Accident Locations (HALs) in the project study area. Though not on the I-190 mainline, they are on ramps to and from the mainline (see **Figure 4.4**). Ramp S at its north end between Busti Avenue/Massachusetts Avenue and the I-190 overpass (reference marker (RM) 951J 5301 1000 to 1002) is a Safety Deficiency Location (SDL), due to horizontal and vertical curvature and non-standard shoulders. Ramp S at its other end, at the merge with the Plaza's Ramp B and then immediate merge with southbound I-190 (RM 951J 5301 1004 to 1006), is a Priority Investigation Location (PIL) – likely due to the proximity and unconventional design of the merges. The I-190 off-ramps at Interchange 8 between their merge and Niagara Street (RM 951L 5301 1003 to 1004) is also an SDL, which experiences very high volumes and operational deficiencies/capacity constraints at the downstream signalized intersections.

Local Streets

Of the 331 accidents on the local streets in the three-year study period, 90 occurred on Porter Avenue, 150 occurred on Niagara Street, and the remaining 91 were scattered north and south of Porter Avenue on the more residential streets. As shown in **Table 4.9**, the calculated accident rates of 16.44, 12.55, and 9.02 on Porter Avenue, on Niagara Street in the four-lane segment south of Porter Avenue, and on Niagara Street in the three-lane segment north of Porter Avenue, respectively, are all higher than the statewide averages. The ten locations with the highest numbers of accidents are listed in **Table 4.11**. The types of accidents along the local streets are summarized in **Table 4.12**. As indicated, the majority of accidents are right-angle, rear-end, overtake, and left-turn – accidents associated with vehicles turning into and out of, or trying to maneuver around other vehicles turning into and out of, intersections and driveways.

It should be noted that there were two fatalities in the accident study area during the three-year analysis period and, in both cases, pedestrians were killed. One occurred on September 1, 2010 in front of Tops supermarket on Niagara Street; details regarding the accident's causes were not provided. Another fatality occurred on December 1, 2011 at Prospect Street and Rhode Island Street when a bus hit a child.

Detailed accident information, including a key map, summaries, and collision diagrams for I-190 and the local streets, are provided in **Attachment 11**.

Figure 4.4 – High Accident Locations

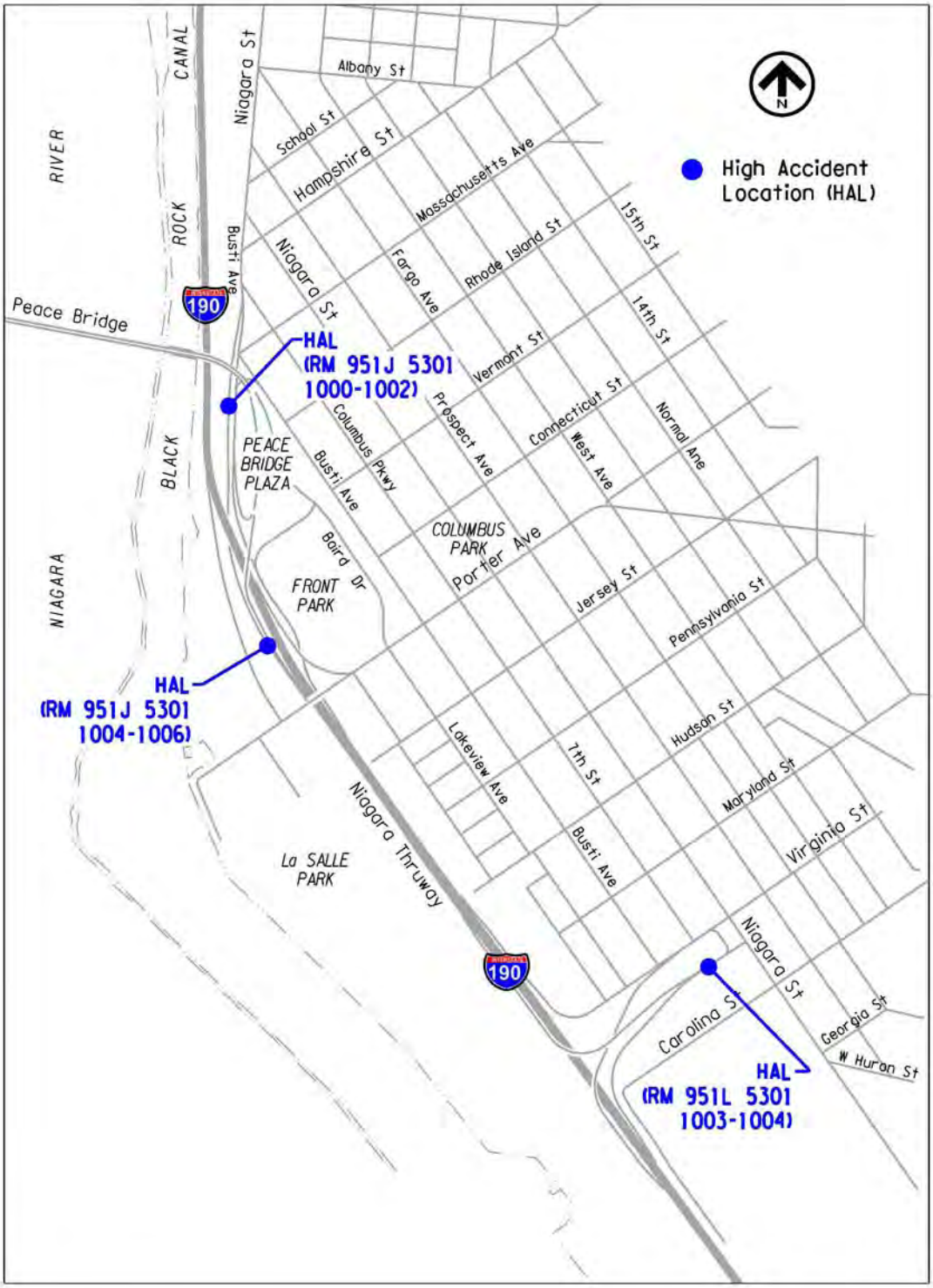


Table 4.11 – Local Street Intersections with the Highest Numbers of Accidents

Intersection	Number of Accidents
Niagara Street at Virginia Street	30
Porter Avenue at Niagara Street	28
Niagara Street at Maryland Street	25
Porter Avenue at Prospect Avenue	20
Niagara Street at Hampshire Street	19
Niagara Street at Pennsylvania Street	15
Porter Avenue at Seventh Street/Columbus Parkway	14
Porter Avenue at Busti Avenue	13
Porter Avenue at Baird Drive/Lakeview Avenue	10
Niagara Street at Jersey Street	10

Table 4.12 – Local Street Accident Type Summary

Accident Type	Number of Accidents	Percentage of Accidents
Right-angle	90	27%
Rear-end	85	25%
Overtake	51	15%
Left-turn	30	9%
Fixed-object	17	5%
Right-turn	12	4%
Backing	12	4%
Other	12	4%
Parking	11	3%
Pedestrian	6	2%
Head-on	2	1%
Sideswipe	2	1%
Run-off-the-road	1	0%
Total	**331**	**100%**

5. 2015 AND 2045 NO BUILD CONDITIONS

No Build condition traffic operations in the NY Gateway Connections project study area were modeled using the same methodologies as for existing conditions. The No Build conditions are the future conditions without project-related improvements to which the future conditions with the proposed action are compared. The No Build conditions were evaluated for 2015, the Estimated Time of Completion (ETC) of the project, and 2045 (ETC+30), the project's design year.

5.1 Planned Improvements

Currently, there is only one planned improvement to the project study area between now and 2045, the City of Buffalo's Niagara Street Gateway project. Construction of this project is expected to begin in spring 2014. The project will include the rehabilitation of Niagara Street from Porter Avenue, in the NY Gateway Connections project study area, to S. Elmwood Avenue, in downtown Buffalo south of the project study area. As part of this project, Niagara Street will be converted from four travel lanes to two travel lanes with a center median or turn lane, plus either shared or exclusive bicycle lanes. Streetscape and signage improvements, and traffic signal improvements, including bus priority, will also be implemented. See **Attachment 12** for conceptual drawings of the Niagara Street Gateway project and for planned traffic signal timings for the area as provided by GBNRTC.

5.2 Traffic Volumes

2015 and 2045 No Build condition traffic volume networks were developed for the project study area based on information provided from GBNRTC's travel demand model. The model data included weekday AM and PM peak-hour traffic volumes on the major roadway links for 2013 existing and 2015, 2025, and 2035 forecast conditions.

Traffic volumes for corresponding time periods were compared to determine peak period growth rates by roadway link for the various forecast years. An examination of the link growth rates by street direction revealed that the rates were fairly consistent along the lengths of major roadways. For this reason, the growth rates were consolidated along major roadways (i.e., I-190, Porter Avenue, Baird Drive, Busti Avenue, and Niagara Street). The growth rates on these roadways and along the I-190 ramps were applied to the existing condition traffic volume networks to develop the No Build traffic volumes. Adjustments were then made along various roadways to develop the final balanced No Build condition traffic volume networks. The 2015 and 2045 No Build condition weekday AM and PM peak-hour volumes are provided in **Figures 5.1 through 5.4**. The linear annual growth rates for the project study area as a whole for the weekday AM and PM peak time periods are provided in **Table 5.1** to provide a general indication of the forecast growth in the area had a uniform rate been applied.

Table 5.1 – Project Study Area Annual Growth Rates

Peak Hour	Linear Growth Rate (from 2013 to)	
	2015	2045
Weekday AM	0.8%	0.5%
Weekday PM	0.8%	0.6%

The traffic volume data from GBNRTC's regional travel demand model is provided in **Attachment 13**.

Figure 5.1 – 2015 No Build Condition Weekday AM Peak-Hour Traffic Volumes

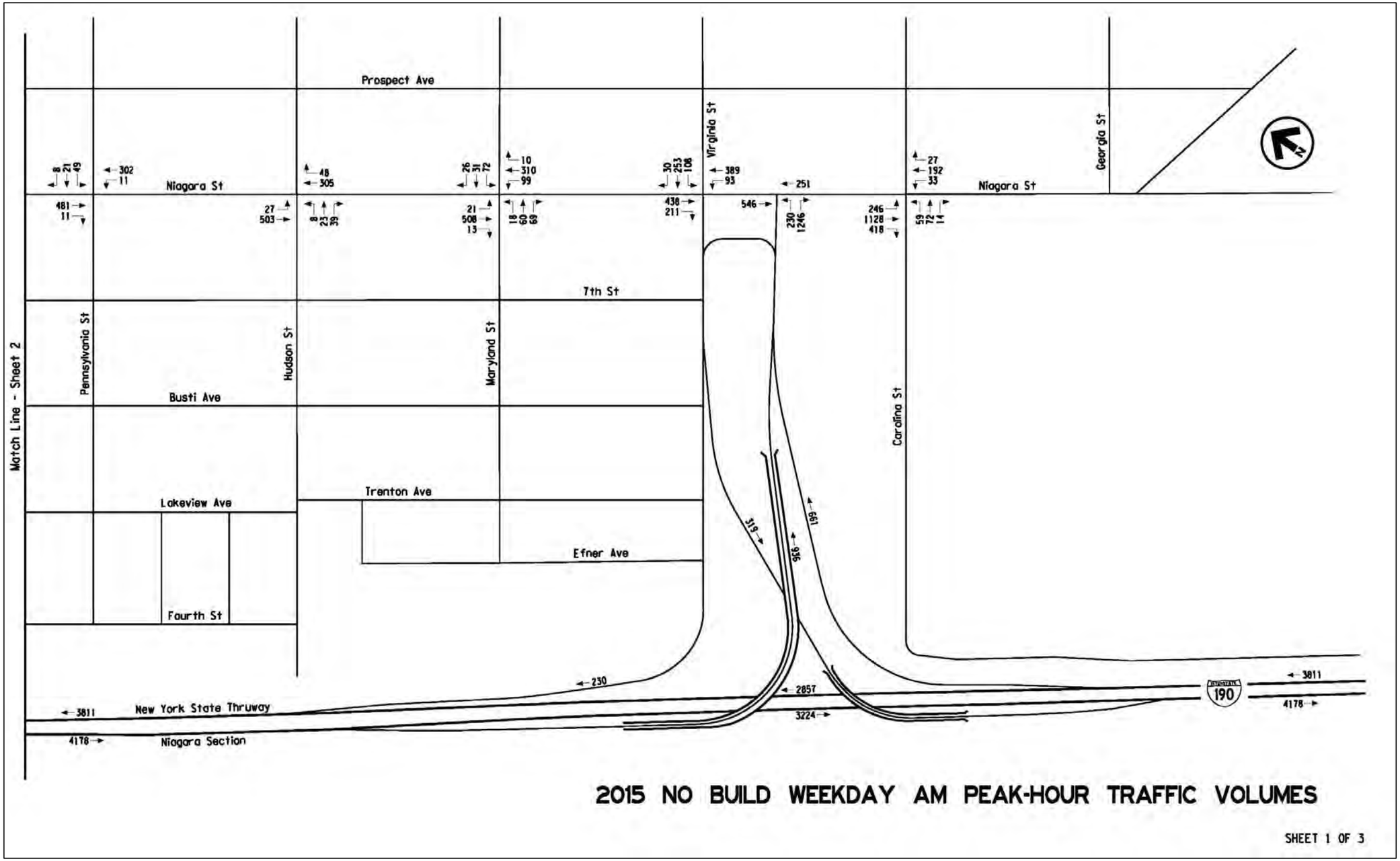


Figure 5.1 – 2015 No Build Condition Weekday AM Peak-Hour Traffic Volumes Cont'd

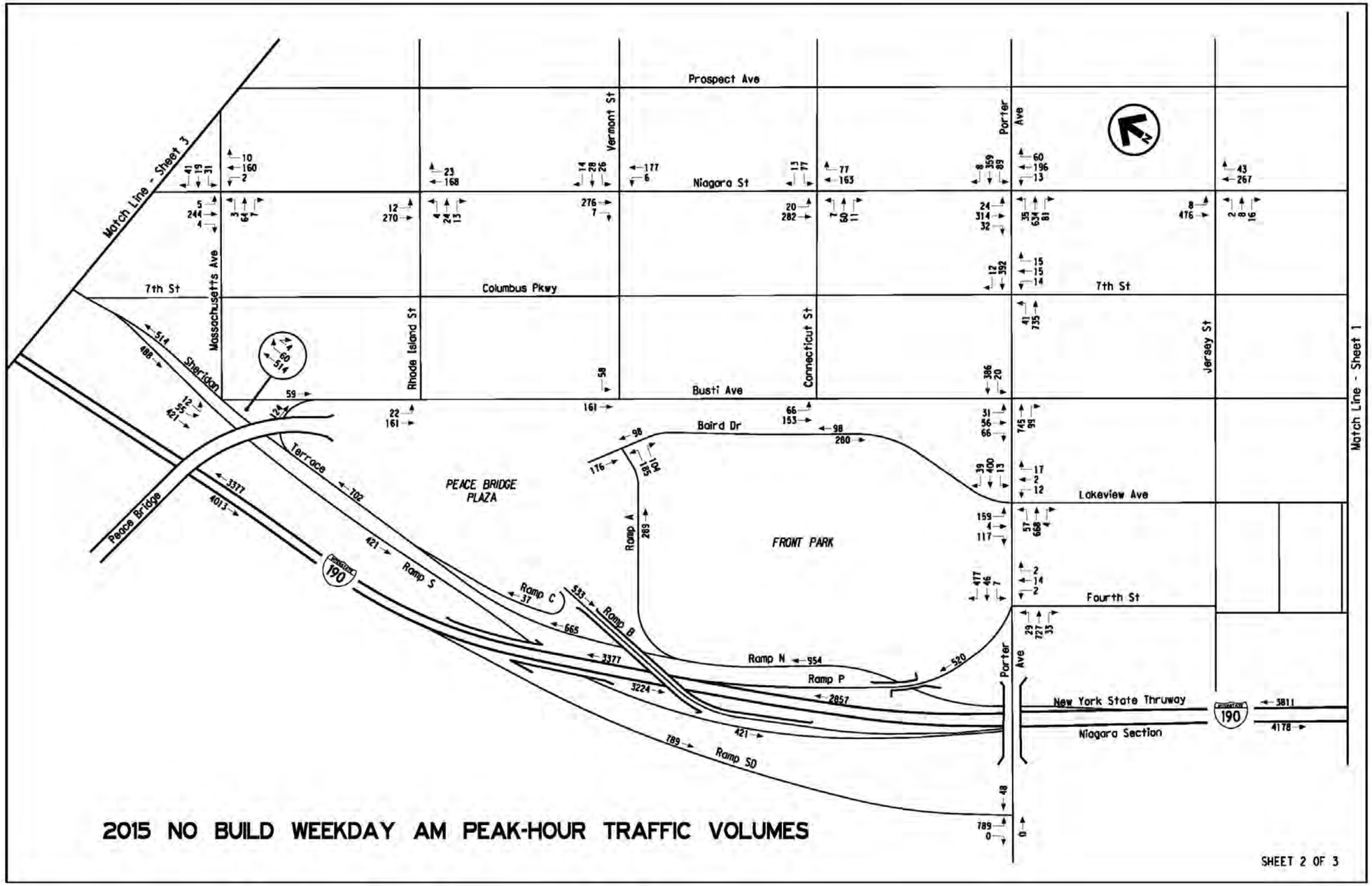


Figure 5.1 – 2015 No Build Condition Weekday AM Peak-Hour Traffic Volumes Cont'd

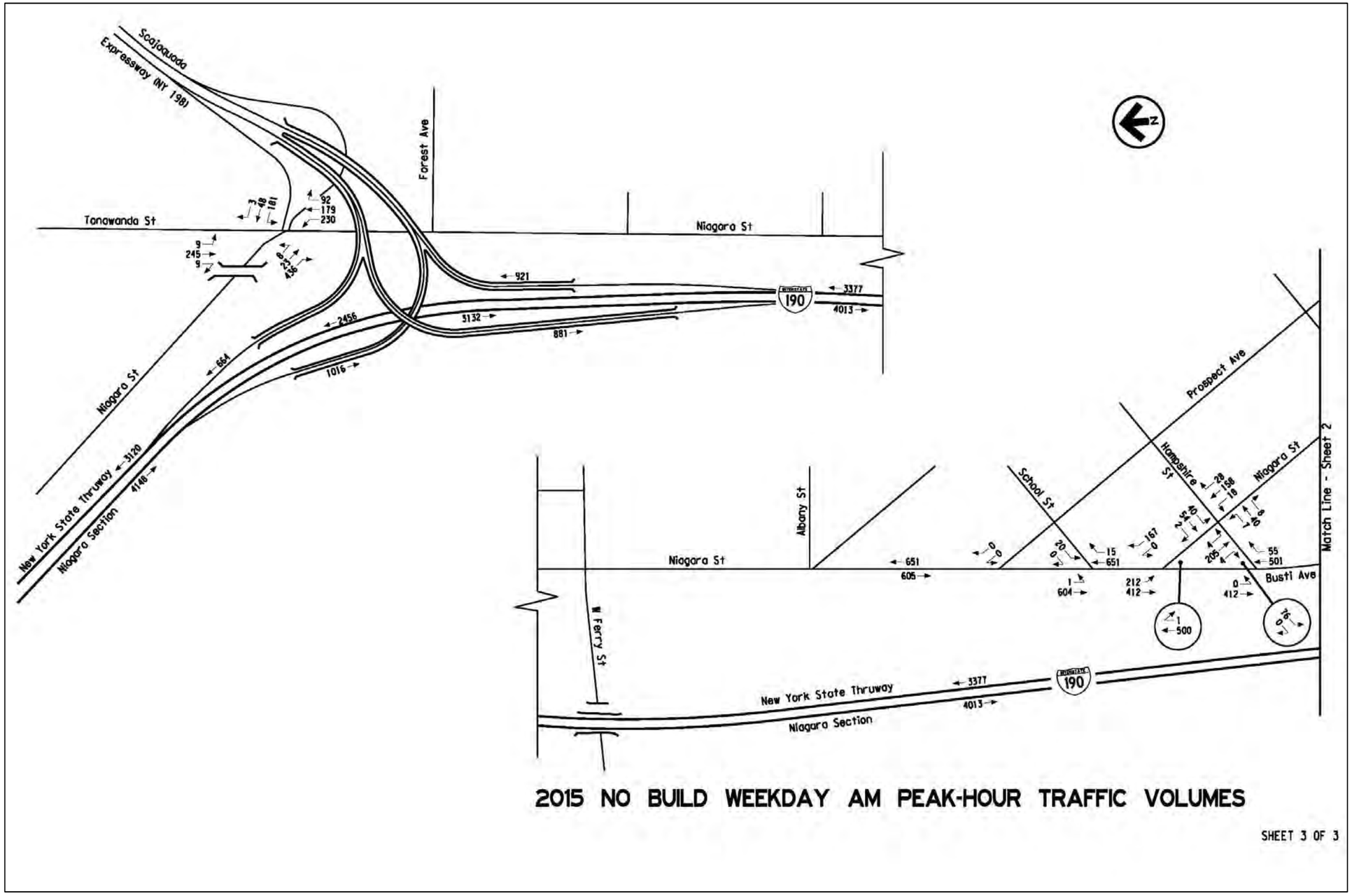


Figure 5.2 – 2015 No Build Condition Weekday PM Peak-Hour Traffic Volumes

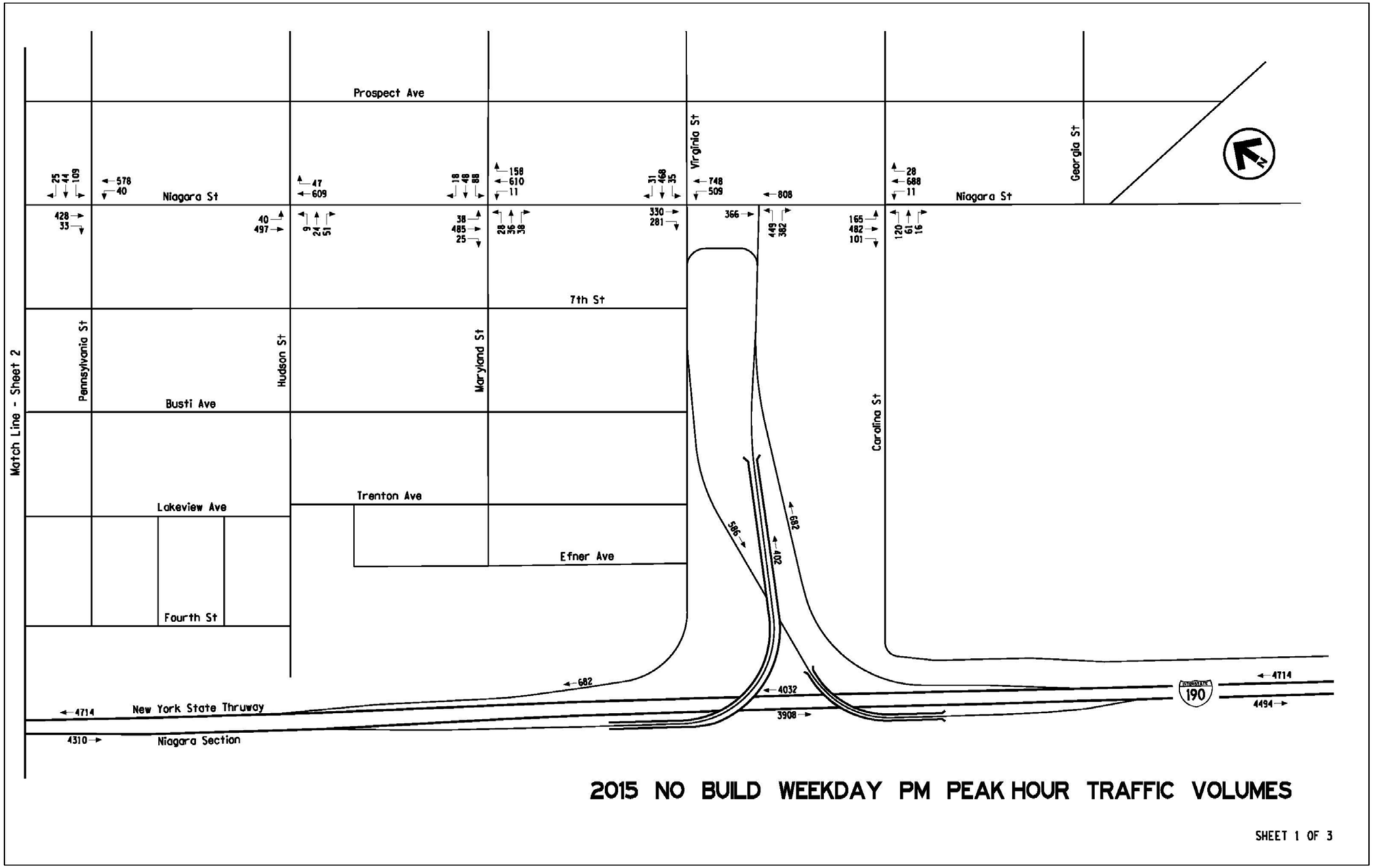


Figure 5.2 – 2015 No Build Condition Weekday PM Peak-Hour Traffic Volumes Cont'd

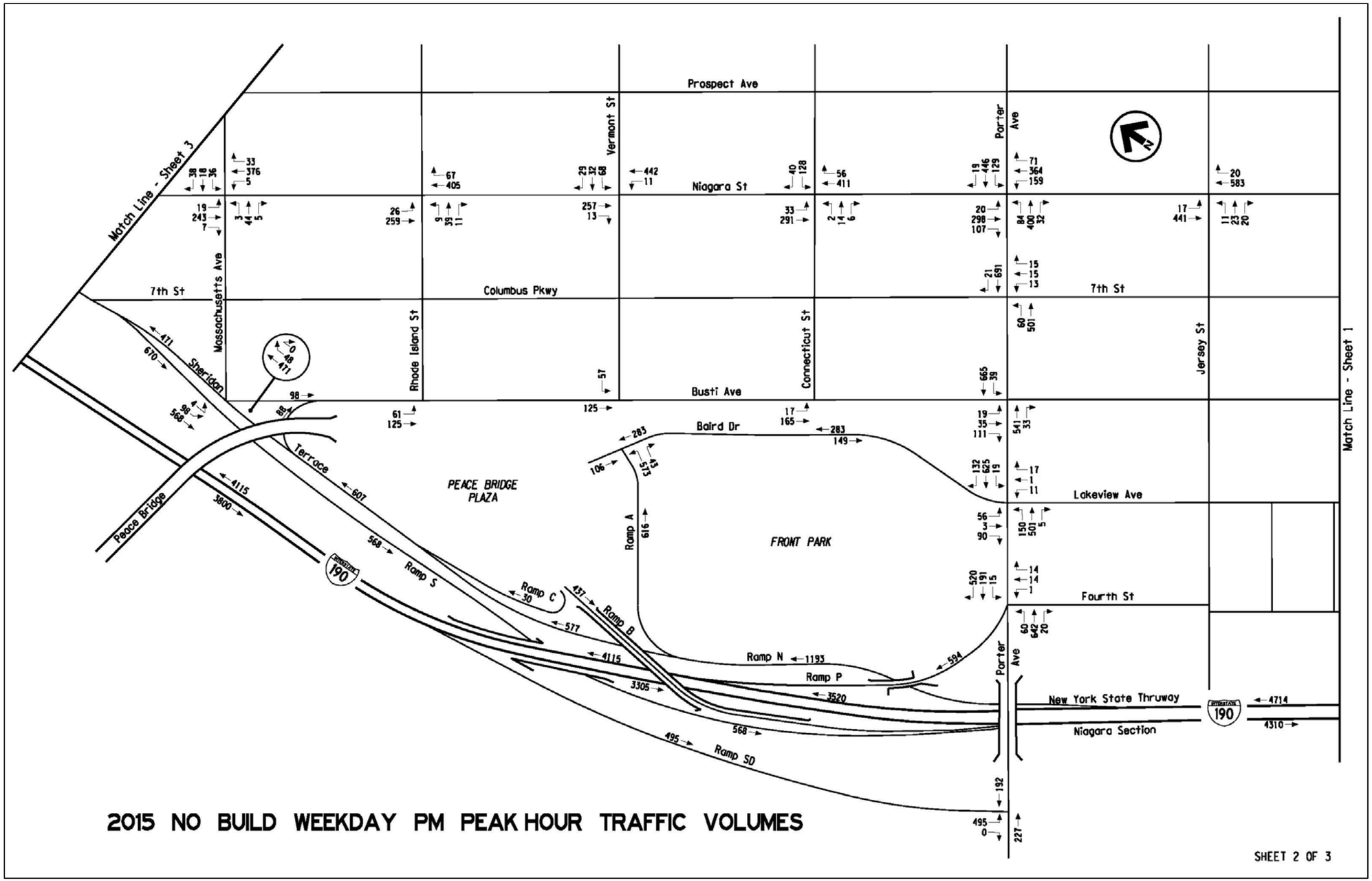
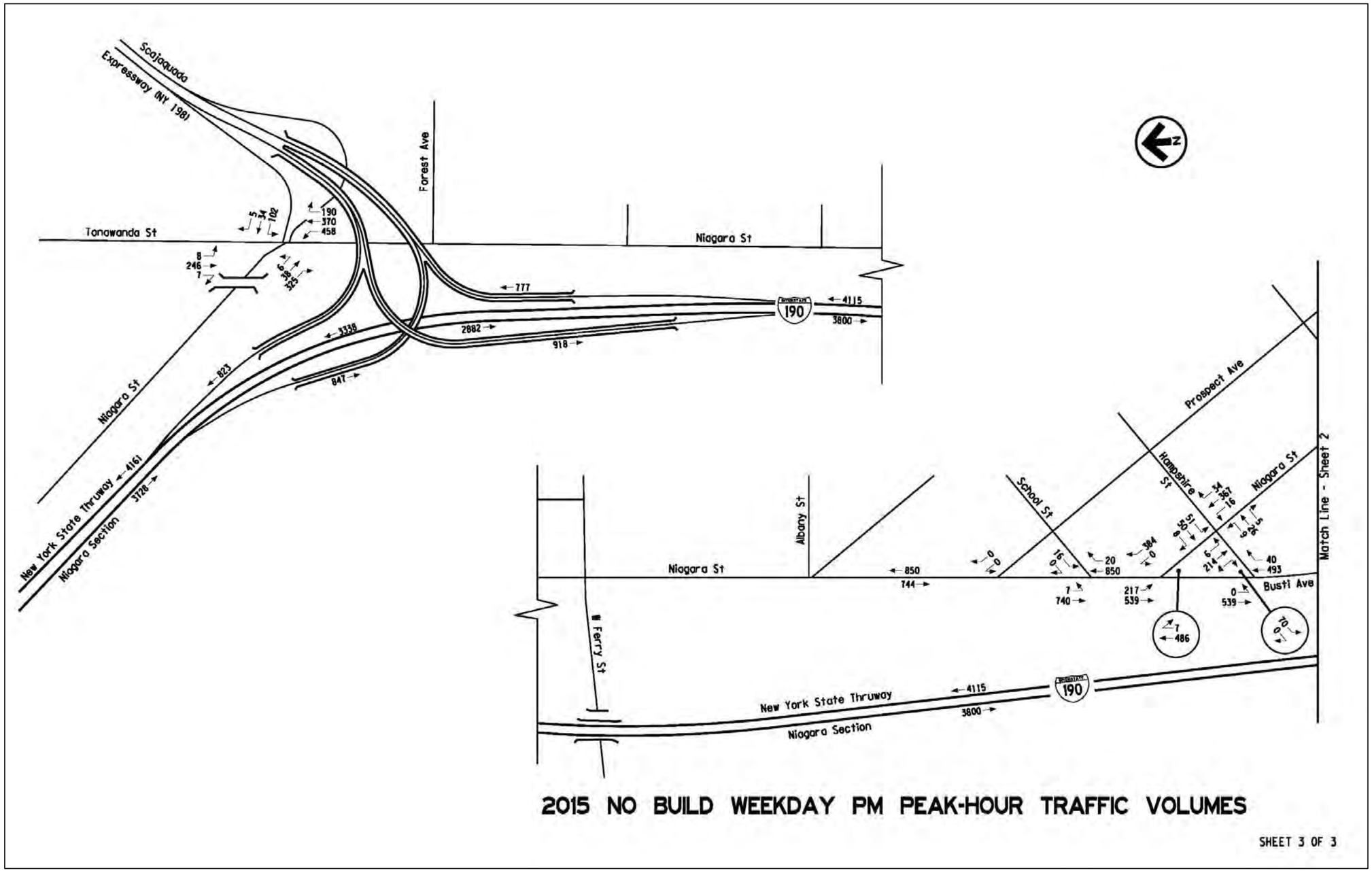


Figure 5.2 – 2015 No Build Condition Weekday PM Peak-Hour Traffic Volumes Cont'd



2015 NO BUILD WEEKDAY PM PEAK-HOUR TRAFFIC VOLUMES

SHEET 3 OF 3

Figure 5.3 – 2045 No Build Condition Weekday AM Peak-Hour Traffic Volumes

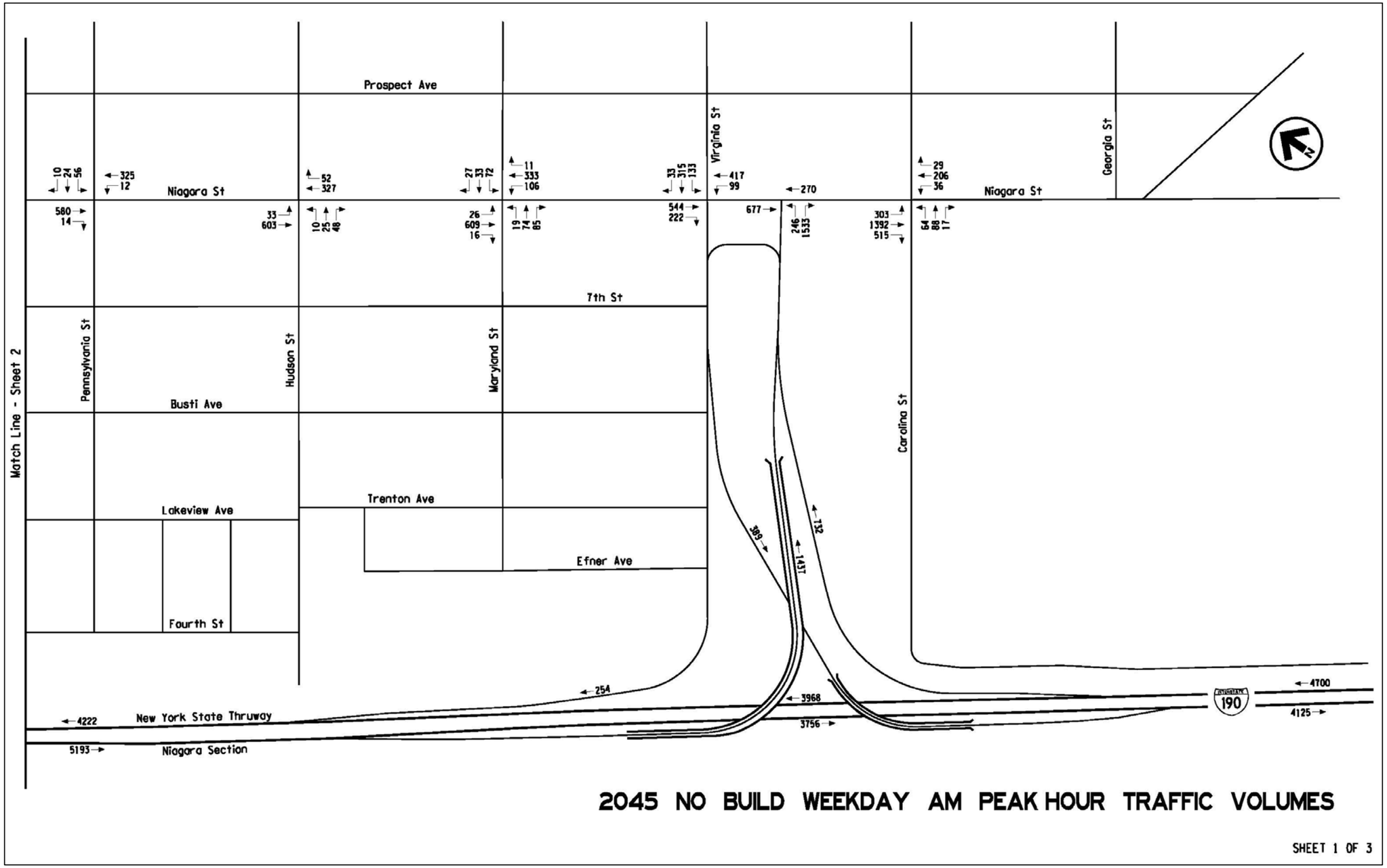


Figure 5.3 – 2045 No Build Condition Weekday AM Peak-Hour Traffic Volumes Cont'd

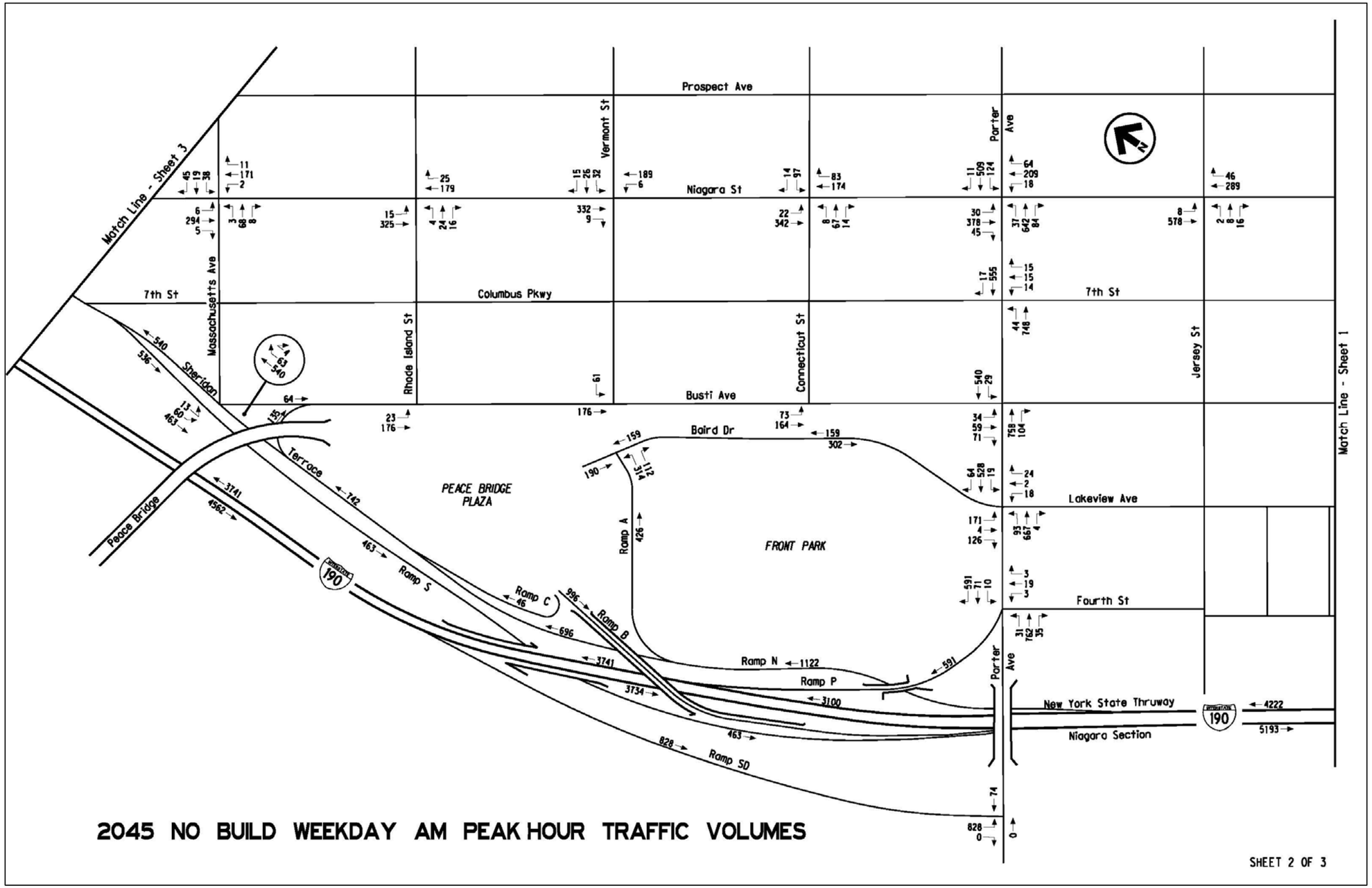


Figure 5.3 – 2045 No Build Condition Weekday AM Peak-Hour Traffic Volumes Cont'd

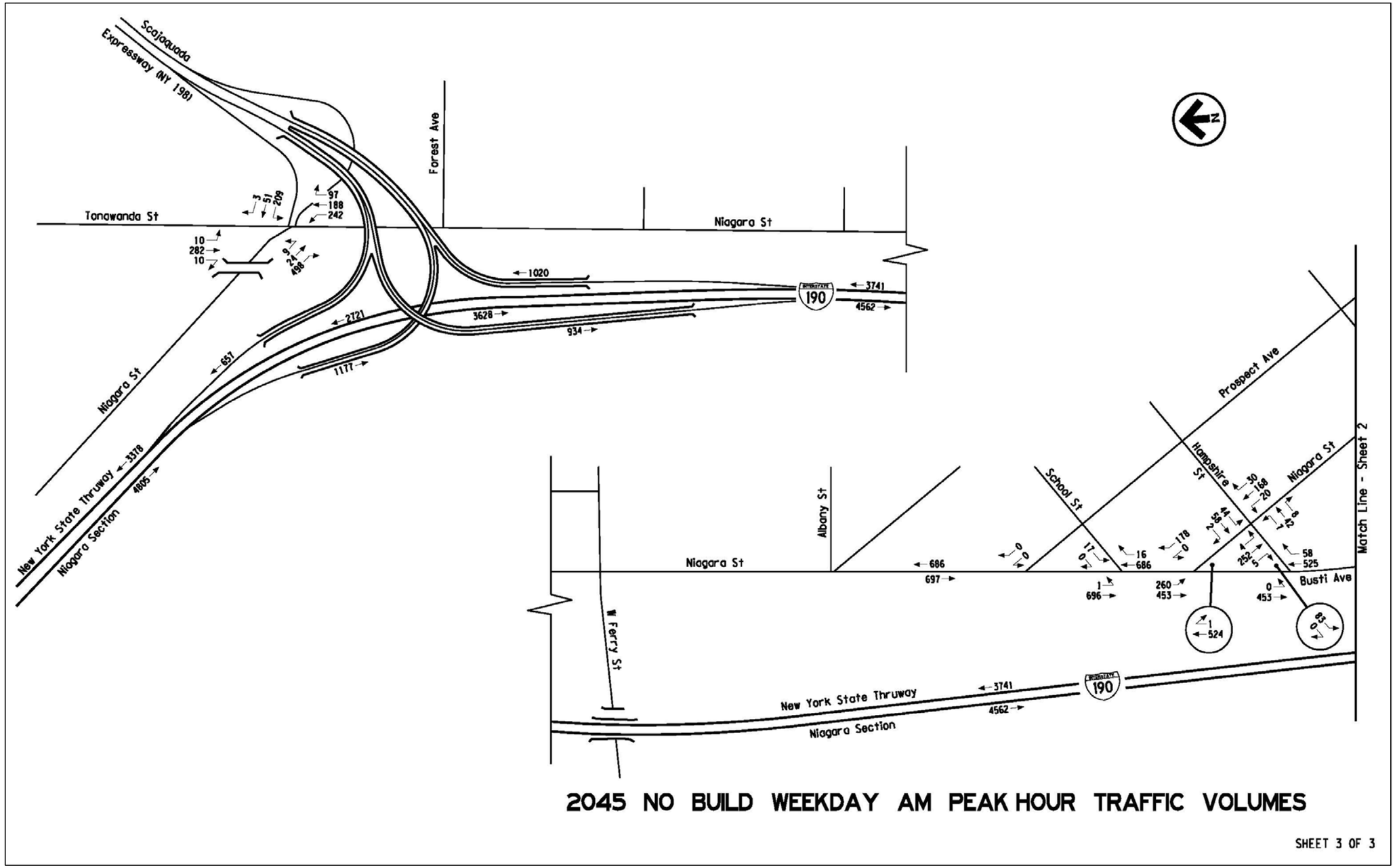


Figure 5.4 – 2045 No Build Condition Weekday PM Peak-Hour Traffic Volumes

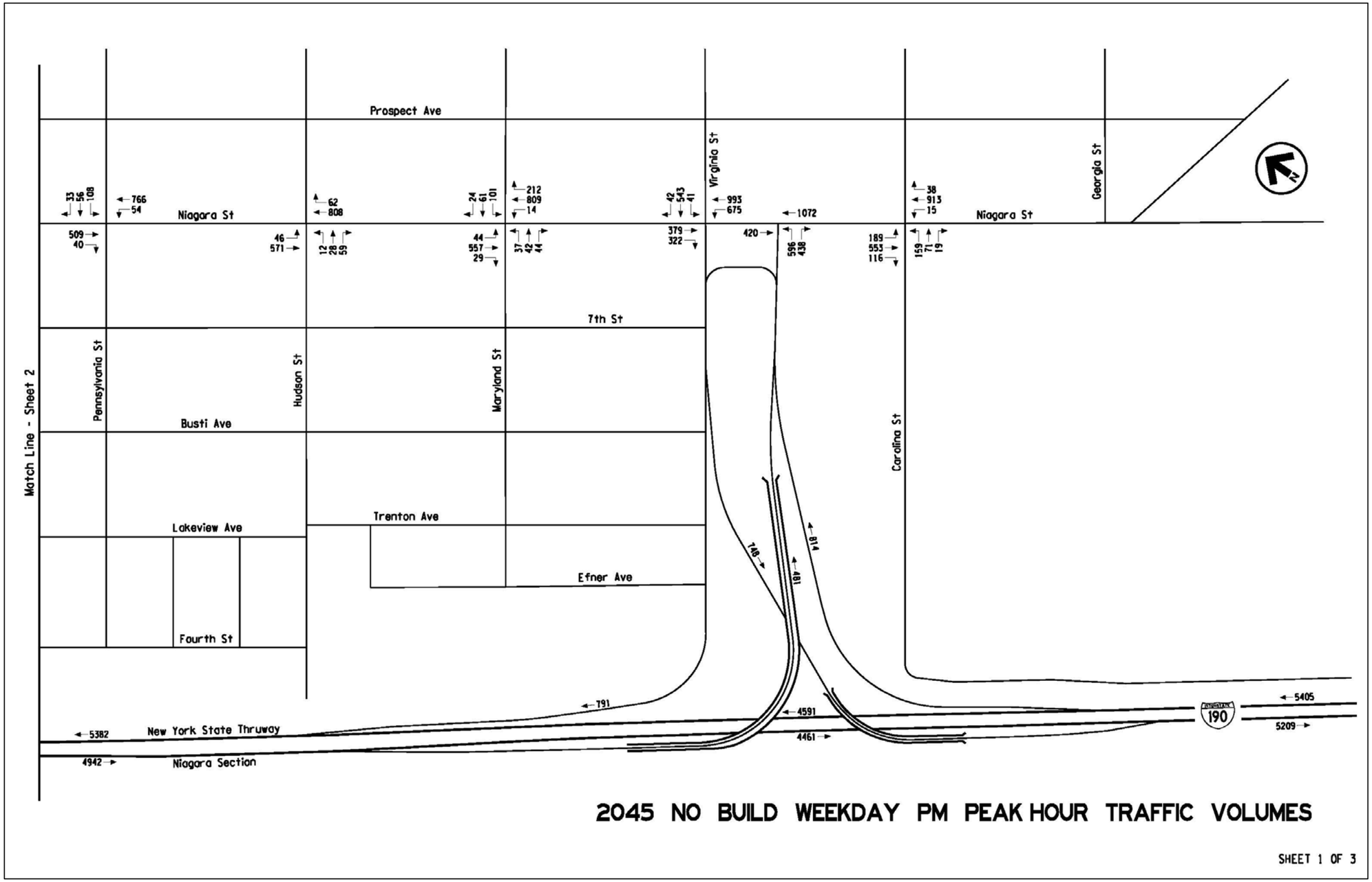


Figure 5.4 – 2045 No Build Condition Weekday PM Peak-Hour Traffic Volumes Cont'd

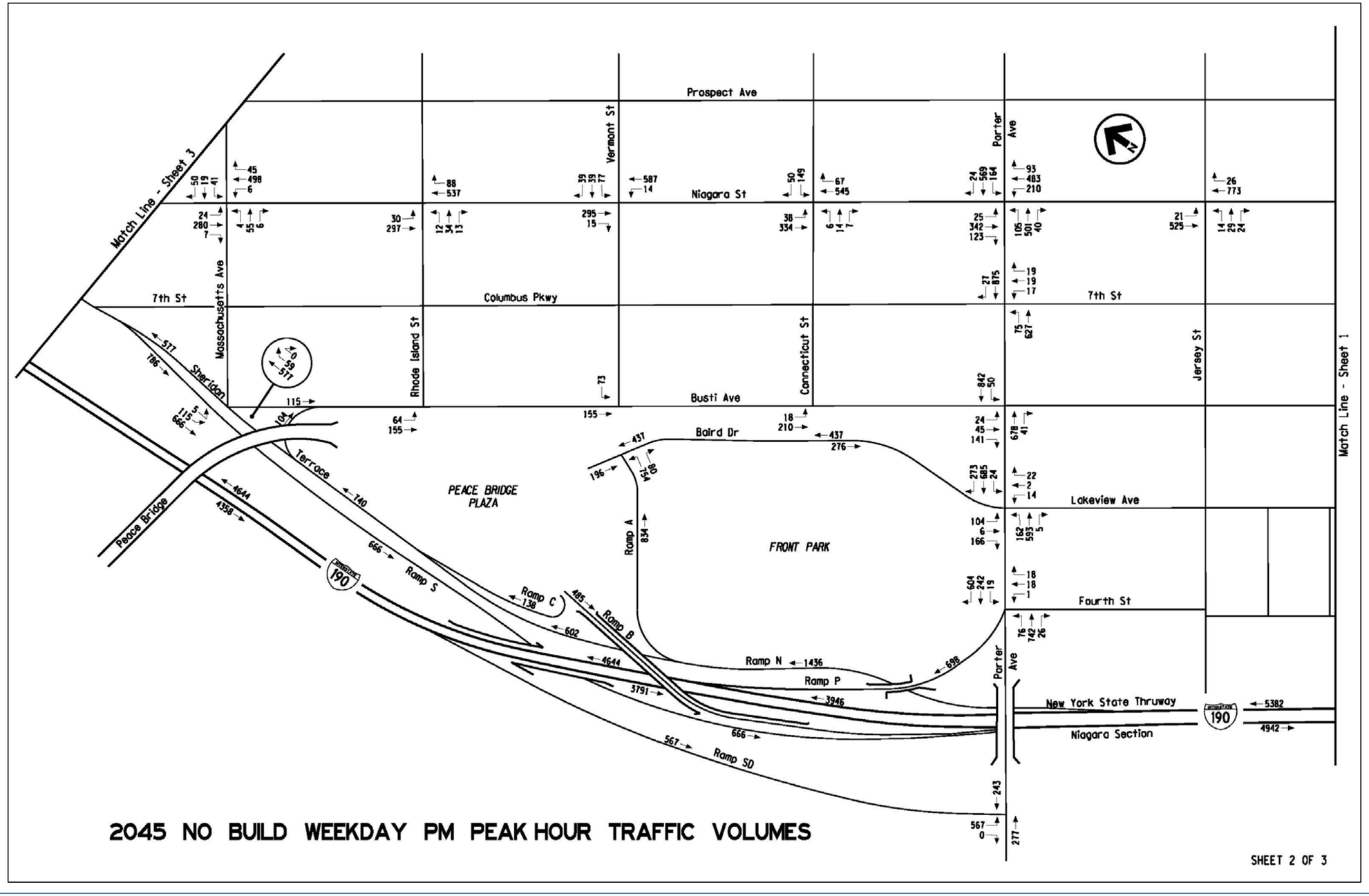
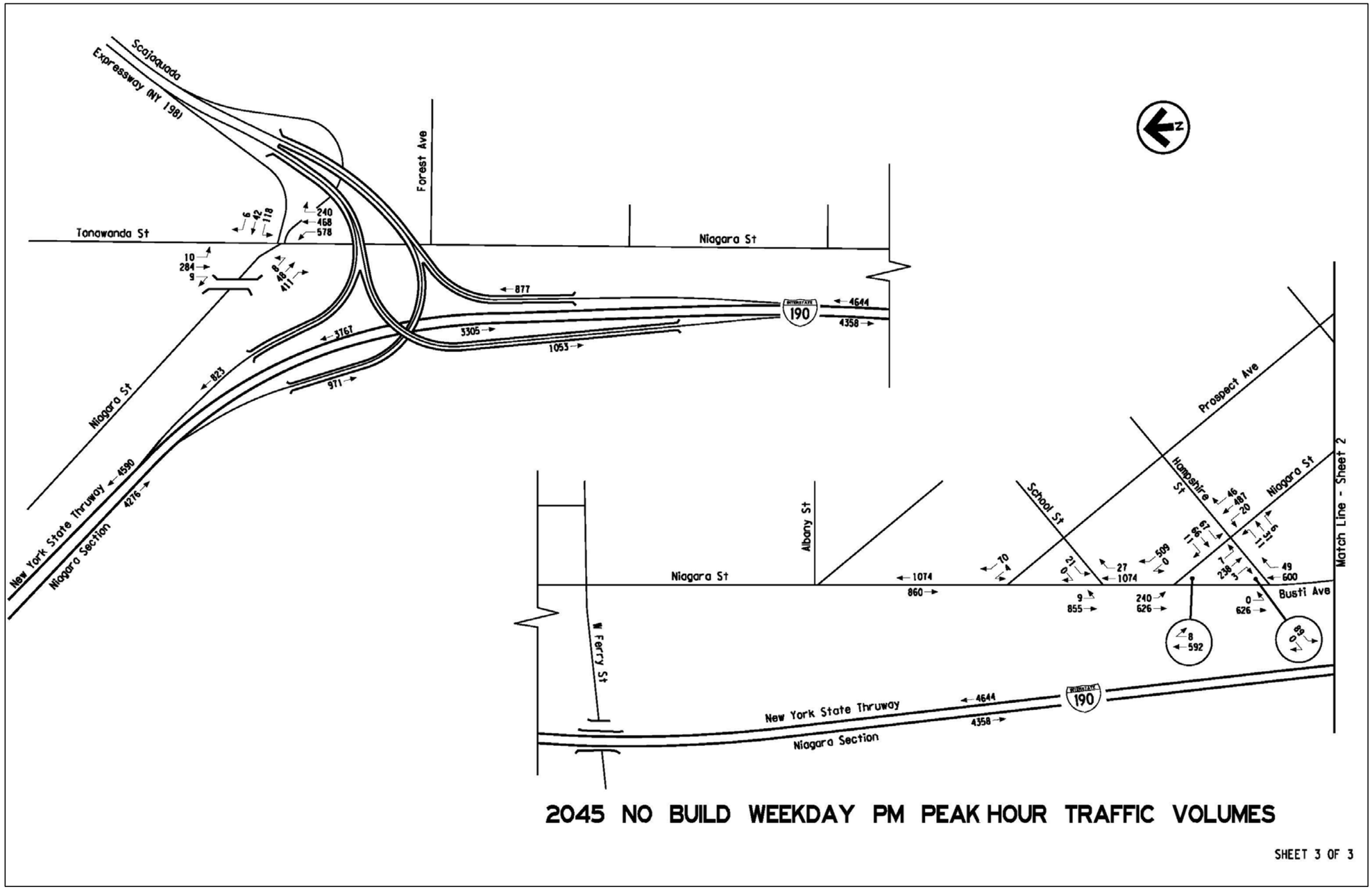


Figure 5.4 – 2045 No Build Condition Weekday PM Peak-Hour Traffic Volumes Cont'd



5.3 Traffic Analysis Results

2015 and 2045 No Build conditions traffic analyses were conducted for the same freeway and ramp segments and signalized and unsignalized intersections that were analyzed for existing conditions. Traffic signal timings for the No Build conditions were provided by GBNRTC in a Synchro file of the area.

2015

The results of the 2015 No Build condition basic freeway and ramp segment analyses are provided in **Tables 5.2 and 5.3**, respectively. In 2015, I-190 mainline traffic operations essentially would be the same for No Build conditions as for existing conditions. Peak-direction traffic segments (southbound in the morning, northbound in the evening) would operate at the same levels of service as existing conditions and non-peak direction segments would continue to operate at LOS D or better. However, traffic operations in the ramp areas would worsen slightly between existing and 2015 No Build conditions. During the weekday AM peak hour on southbound I-190, the diverge at the Scajaquada Expressway off-ramp would become more congested, and the diverge to Niagara Street would deteriorate from LOS C to LOS D. During the weekday PM peak hour, the density on the northbound I-190 weave between Church and Niagara Streets would increase and operations would deteriorate from LOS D to LOS E.

The results of the 2015 No Build condition signalized and unsignalized intersection analyses are provided in **Tables 5.4 and 5.5**, respectively. Most intersections would continue to operate well. The only location that would continue to experience high delays is Porter Avenue at Niagara Street. During the weekday PM peak hour, with the proposed Niagara Street Gateway project roadway configuration and signal timings, left turns at the intersection typically would deteriorate from LOS D to LOS F and would incur 15 to 75 s/veh additional delay. For the northbound and eastbound left turns, the delays would exceed the 100-second cycle length. This would result in backups (especially in the northbound direction) and would cause some congestion at the adjacent intersections at Jersey and Pennsylvania Streets.

2045

The results of the 2045 No Build condition freeway and ramp segment analyses are provided in **Tables 5.6 and 5.7**, respectively. Traffic operations on I-190 would become congested by 2045 with the projected traffic volumes.

As shown in **Table 5.6**, the southbound I-190 mainline typically would deteriorate to LOS E or LOS F between Interchanges 8 and 11 during the weekday peak hours, and speeds would typically decrease by at least 10 mph and to approximately 30 mph in the vicinity of Scajaquada Expressway and Niagara Street during the weekday AM peak hour. Northbound I-190 would become very congested at the south end of the study area during the weekday PM peak hour (operating at LOS F and with speeds of less than 25 mph), causing a bottleneck. This would effectively meter traffic into the study area, resulting in better downstream mainline levels-of-service than for existing conditions.

Table 5.2 – 2015 No Build Condition Weekday AM and PM Peak-Hour Basic Freeway Segment Analysis Results

Mainline Analysis Location	AM Peak Hour			PM Peak Hour		
	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)	LOS
I-190 NB						
1 - Mainline between Niagara Street on- and off-ramps	57	22	C	42	34	D
2 - Mainline between Niagara Street on-ramp and Peace Bridge off-ramp	56	24	C	34	44	E
3 - Mainline between Peace Bridge off-ramp and Porter Avenue on-ramp	56	26	D	46	38	E
4 - Mainline between Porter Avenue on-ramp and Scajaquada Expressway off-ramp	56	31	D	56	37	E
5 - Mainline between Scajaquada Expressway off- and on-ramps	57	23	C	46	37	E
6 - Mainline between Scajaquada Expressway on-ramp and Amherst Street off-ramp	54	30	D	49	43	E
I-190 SB						
7 - Mainline between Hamilton Street on-ramp and Scajaquada Expressway off-ramp	52	41	E	57	33	D
8 - Mainline between Scajaquada Expressway off- and on-ramps	56	28	D	57	26	D
9 - Mainline between Scajaquada Expressway on-ramp and Porter Avenue off-ramp	56	36	E	57	34	D
10 - Mainline between Porter Avenue off-ramp and Peace Bridge on-ramp	57	29	D	57	30	D
11 - Mainline between Peace Bridge on-ramp and Niagara Street off-ramp	53	27	D	56	27	D
12 - Mainline between Niagara Street off- and on-ramps	57	20	C	57	24	C
13 - Mainline between Niagara Street on-ramp and Church Street on-ramp	57	22	C	56	28	D

Table 5.3 – 2015 No Build Condition Weekday AM and PM Peak-Hour Weaving, Merge, and Diverge Segment Analysis Results

Ramp Analysis Location	Weekday					
	AM Peak Hour			PM Peak Hour		
	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)	LOS
I-190 NB						
1 - Weave between Church Street on-ramp and Niagara Street off-ramp	49	26	C	41	40	E
2 - Merge at Niagara Street on-ramp	56	22	C	34	50	F
3 - Diverge at Peace Bridge off-ramp	55	19	B	49	26	C
4 - Merge at Porter Avenue on-ramp	50	30	D	36	49	F
5 - Diverge at Scajaquada Expressway off-ramp	53	26	C	53	33	D
6 - Merge at Scajaquada Expressway on-ramp	51	25	C	40	40	F
I-190 SB						
7 - Diverge at Scajaquada Expressway off-ramp	46	37	E	51	30	D
8 - Merge at Scajaquada Expressway on-ramp	55	28	D	50	29	D
9 - Diverge at Porter Avenue off-ramp	56	30	D	55	35	D
10 - Merge at Peace Bridge on-ramp	57	30	D	54	32	D
11 - Diverge at Niagara Street off-ramp	42	28	D	53	28	D
12 - Merge at Niagara Street on-ramp	50	22	C	47	34	D

Table 5.4 – 2015 No Build Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Niagara St					
NB	L	14.6	B	146.0	F
NB	T	11.6	B	50.6	D
NB	R	10.0	A	54.1	D
SB	L	15.4	B	65.2	E
SB	T	14.8	B	26.8	C
SB	R	17.7	B	27.9	C
EB	L	27.5	C	103.1	F
EB	T	27.4	C	45.5	D
EB	R	22.5	C	33.3	C
WB	L	28.3	C	94.8	F
WB	T	14.8	B	41.2	D
WB	R	10.4	B	33.7	C
	Overall	**19.5**	**B**	**53.9**	**D**
2 - Porter Ave @ Columbus Pkwy / Seventh St					
NB	L	15.5	B	10.2	B
NB	T	15.2	B	12.3	B
NB	R	12.5	B	10.5	B
EB	L	16.2	B	12.4	B
EB	T	17.7	B	9.9	A
WB	T	6.4	A	5.8	A
WB	R	7.8	A	4.4	A
	Overall	**13.8**	**B**	**7.8**	**A**
3 - Porter Ave @ Busti Ave					
SB	L	34.0	C	22.4	C
SB	T	29.8	C	23.1	C
SB	R	29.1	C	24.9	C
EB	T	2.7	A	4.1	A
EB	R	2.5	A	4.8	A
WB	L	6.8	A	11.7	B
WB	T	3.0	A	8.4	A
	Overall	**6.1**	**A**	**8.7**	**A**
4 - Porter Ave @ Baird Dr / Lakeview Ave					
NB	L	12.8	B	11.2	B
NB	T	4.2	A	17.1	B
NB	R	4.7	A	4.7	A
SB	L	21.5	C	13.1	B
SB	T	17.7	B	12.2	B
SB	R	5.1	A	2.2	A
EB	L	11.7	B	12.5	B
EB	T	10.1	B	7.9	A
EB	R	6.6	A	5.4	A
WB	L	23.1	C	24.5	C
WB	T	5.5	A	16.9	B
WB	R	3.5	A	14.6	B
	Overall	**9.7**	**A**	**12.4**	**B**

Table 5.4 – 2015 No Build Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
5 - Busti Ave @ Sheridan Ter / Massachusetts Ave					
NB	T	7.7	A	8.7	A
NB	R	5.3	A	5.3	A
NB	R	6.8	A	0.0	A
SB	L	18.1	C	19.0	B
SB	L	18.1	C	16.6	B
SB	T	0.2	A	0.2	A
	Overall	**5.2**	**A**	**5.1**	**A**
6 - Baird Dr @ Plaza (Ramp A / Westbound Peace Bridge)					
NB	T	8.6	A	18.0	B
SB	T	16.6	B	17.0	B
EB	L	8.8	A	12.5	B
EB	R	4.4	A	6.6	A
	Overall	**10.3**	**B**	**14.2**	**B**
7 - Niagara St @ Pennsylvania St					
NB	L	13.9	B	16.1	B
NB	T	8.7	A	13.5	B
SB	T	7.9	A	3.6	A
SB	R	7.7	A	3.7	A
WB	L	16.8	B	39.5	D
WB	T	21.2	C	40.4	D
WB	R	5.1	A	14.9	B
	Overall	**9.0**	**A**	**12.9**	**B**
8- Niagara St @ Jersey St					
NB	T	8.1	A	37.1	D
NB	R	8.9	A	31.9	C
SB	L	13.6	B	14.4	B
SB	T	8.6	A	10.1	B
EB	L	21.5	C	22.5	C
EB	T	18.1	B	16.9	B
EB	R	17.7	B	13.6	B
	Overall	**8.7**	**A**	**24.7**	**C**
9 - Niagara St @ Connecticut St					
NB	T	8.1	A	10.7	B
NB	R	9.3	A	4.7	A
SB	L	12.5	B	24.7	C
SB	T	11.6	B	7.9	A
EB	L	3.6	A	0.8	A
EB	T	14.2	B	12.2	B
EB	R	6.2	A	4.0	A
WB	L	17.5	B	16.6	B
WB	R	12.4	B	11.0	B
	Overall	**11.4**	**B**	**10.7**	**B**

Table 5.4 – 2015 No Build Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
10 - Niagara St @ Rhode Island St					
NB	T	7.9	A	12.0	B
NB	R	5.7	A	9.9	A
SB	L	15.0	B	18.4	B
SB	T	8.6	A	8.5	A
EB	L	13.2	B	12.9	B
EB	T	17.1	B	14.9	B
EB	R	3.5	A	6.0	A
	Overall	**8.7**	**A**	**11.0**	**B**
11 - Niagara St @ Massachusetts Ave					
NB	L	4.7	A	6.2	A
NB	T	3.7	A	5.3	A
NB	R	2.9	A	3.9	A
SB	L	6.3	A	6.4	A
SB	T	4.2	A	2.8	A
SB	R	3.0	A	2.7	A
EB	L	17.1	B	15.5	B
EB	T	15.7	B	11.6	B
EB	R	18.1	B	13.3	B
WB	L	16.9	B	12.6	B
WB	T	15.8	B	13.8	B
WB	R	16.2	B	11.0	B
	Overall	**7.4**	**A**	**5.6**	**A**
12 - Niagara St @ Hampshire St					
NB	L	6.6	A	2.8	A
NB	T	1.6	A	4.2	A
NB	R	1.5	A	3.0	A
SB	L	0.9	A	1.4	A
SB	T	0.2	A	0.2	A
SB	R	0.2	A	0.3	A
EB	L	8.1	A	8.6	A
EB	T	9.1	A	10.6	B
EB	R	5.8	A	5.8	A
WB	L	9.1	A	9.9	A
WB	T	9.0	A	10.2	B
WB	R	5.4	A	5.6	A
	Overall	**3.1**	**A**	**3.9**	**A**
13 - Niagara St @ Busti Ave					
NB	T	13.1	B	10.3	B
NB	R	6.8	A	7.2	A
SB	L	5.7	A	10.5	B
SB	T	1.2	A	1.0	A
WB	R	6.4	A	9.6	A
	Overall	**7.0**	**A**	**7.0**	**A**

Table 5.5 – 2015 No Build Condition Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Fourth St					
NB	L	8.8	A	8.5	A
NB	L	7.1	A	7.1	A
NB	R	5.6	A	6.2	A
EB	L	0.4	A	0.4	A
EB	T	0.3	A	0.4	A
EB	R	0.5	A	0.8	A
WB	L	3.8	A	2.5	A
WB	T	2.6	A	2.3	A
WB	R	5.3	A	5.1	A
	Overall	**2.3**	**A**	**2.5**	**A**
2 - Porter Ave @ the I-190 SB Off-Ramp (Ramp SD)					
SB	L	2.3	A	3.1	A
EB	T	0.0	A	0.0	A
WB	T	0.0	A	0.1	A
	Overall	**2.1**	**A**	**1.7**	**A**
3 - Busti Ave @ Connecticut St					
SB	L	0.5	A	0.4	A
SB	T	0.2	A	0.2	A
	Overall	**0.3**	**A**	**0.2**	**A**
4 - Busti Ave @ Vermont St					
SB	T	7.9	A	7.7	A
WB	L	6.8	A	6.1	A
	Overall	**7.6**	**A**	**7.2**	**A**
5 - Busti Ave @ Rhode Island St					
SB	L	0.4	A	0.5	A
SB	T	0.1	A	0.1	A
	Overall	**0.1**	**A**	**0.2**	**A**
6 - Busti Ave @ Sheridan Terrace Hook Ramp					
SB	T	0.2	A	0.2	A
EB	R	1.8	A	2.7	A
	Overall	**1.3**	**A**	**1.4**	**A**

Table 5.5 – 2015 No Build Condition Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
7 - Busti Ave @ Seventh St					
NB	T	0.4	A	0.3	A
SB	T	0.3	A	0.2	A
WB	L	0.0	A	8.1	A
WB	R	6.4	A	6.3	A
	Overall	**0.6**	**A**	**0.9**	**A**
8 - Busti Ave @ Hampshire St					
NB	T	1.1	A	0.9	A
NB	R	1.1	A	0.8	A
SB	T	0.2	A	0.1	A
WB	L	8.2	A	7.9	A
	Overall	**1.2**	**A**	**0.9**	**A**
9 - Niagara St @ Vermont St					
NB	L	2.6	A	2.5	A
NB	T	0.9	A	1.6	A
SB	T	1.3	A	1.4	A
SB	R	1.2	A	3.4	A
WB	L	7.7	A	10.6	B
WB	T	9.3	A	12.5	B
WB	R	6.9	A	8.7	A
	Overall	**2.0**	**A**	**2.9**	**A**
10 - Niagara St @ School St					
NB	T	0.5	A	0.4	A
NB	R	1.0	A	1.1	A
SB	L	2.0	A	4.5	A
SB	T	0.6	A	0.7	A
WB	L	9.5	A	11.9	B
	Overall	**0.7**	**A**	**0.7**	**A**
11 - Niagara St @ Prospect Ave					
NB	T	0.2	A	0.2	A
SB	T	0.9	A	0.6	A
WB	L	0.0	A	10.5	B
WB	R	0.0	A	5.4	A
	Overall	**0.6**	**A**	**0.6**	**A**

Table 5.6 – 2045 No Build Condition Weekday AM and PM Peak-Hour Basic Freeway Segment Analysis Results

Mainline Analysis Location	Weekday					
	AM Peak Hour			PM Peak Hour		
	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)	LOS
I-190 NB						
1 - Mainline between Niagara Street on- and off-ramps	57	24	C	23	61	F
2 - Mainline between Niagara Street on-ramp and Peace Bridge off-ramp	56	26	D	34	40	E
3 - Mainline between Peace Bridge off-ramp and Porter Avenue on-ramp	55	28	D	46	32	D
4 - Mainline between Porter Avenue on-ramp and Scajaquada Expressway off-ramp	56	34	D	56	36	E
5 - Mainline between Scajaquada Expressway off- and on-ramps	57	25	C	48	31	D
6 - Mainline between Scajaquada Expressway on-ramp and Amherst Street off-ramp	53	32	D	51	38	E
I-190 SB						
7 - Mainline between Hamilton Street on-ramp and Scajaquada Expressway off-ramp	29	79	F	42	51	F
8 - Mainline between Scajaquada Expressway off- and on-ramps	54	31	D	34	47	F
9 - Mainline between Scajaquada Expressway on-ramp and Porter Avenue off-ramp	54	40	E	56	38	E
10 - Mainline between Porter Avenue off-ramp and Peace Bridge on-ramp	48	38	E	53	35	D
11 - Mainline between Peace Bridge on-ramp and Niagara Street off-ramp	31	55	F	49	34	D
12 - Mainline between Niagara Street off- and on-ramps	57	22	C	56	27	D
13 - Mainline between Niagara Street on-ramp and Church Street on-ramp	57	24	C	56	30	D

Table 5.7 – 2045 No Build Condition Weekday AM and PM Peak-Hour Weaving, Merge, and Diverge Segment Analysis Results

Ramp Analysis Location	Weekday					
	AM Peak Hour			PM Peak Hour		
	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)	LOS
I-190 NB						
1 - Weave between Church Street on-ramp and Niagara Street off-ramp	47	30	D	10	135	F
2 - Merge at Niagara Street on-ramp	56	24	C	20	81	F
3 - Diverge at Peace Bridge off-ramp	54	21	C	53	21	C
4 - Merge at Porter Avenue on-ramp	47	34	D	34	40	F
5 - Diverge at Scajaquada Expressway off-ramp	52	29	D	54	29	D
6 - Merge at Scajaquada Expressway on-ramp	50	27	C	44	34	D
I-190 SB						
7 - Diverge at Scajaquada Expressway off-ramp	42	44	F	38	45	F
8 - Merge at Scajaquada Expressway on-ramp	51	33	D	26	61	F
9 - Diverge at Porter Avenue off-ramp	52	35	D	53	40	F
10 - Merge at Peace Bridge on-ramp	57	36	F	48	40	F
11 - Diverge at Niagara Street off-ramp	40	35	D	44	38	F
12 - Merge at Niagara Street on-ramp	50	25	C	47	37	F

The ramp analysis results provided in **Table 5.7** also reflect congested conditions. During the weekday AM peak hour, the southbound I-190 diverge at Scajaquada Expressway and merge at Peace Bridge Plaza/Ramp S would deteriorate to LOS F. During the weekday PM peak hour, all southbound I-190 ramp segments would deteriorate to LOS F, as would the northbound I-190 weave between Church and Niagara Streets. This would be due, in part, to queuing from the intersection of the I-190 off-ramps at Niagara Street extending onto the Thruway. During the weekday PM peak hour, the northbound I-190 merges at Niagara Street and at Porter Avenue would also fail with speeds in the 20 to 35 mph range.

The results of the 2045 No Build condition signalized and unsignalized intersection analyses are provided in **Tables 5.8 and 5.9**, respectively. Most intersections in the project study area would continue to operate well for the 2045 No Build condition. However, weekday PM peak-hour traffic operations at the Porter Avenue/Niagara Street intersection would continue to deteriorate, with overall intersection operations worsening to LOS E. All left turns would experience excessive delays from 70 to 185 s/veh, and other movements on the northbound Niagara Street and westbound Porter Avenue approaches would begin to operate poorly. The congestion at this intersection would cause backups along Niagara Street that would affect adjacent intersections. As shown in **Table 5.8**, the northbound Niagara Street through movements at Jersey Street and at Pennsylvania Street would operate at LOS F with delays of approximately 100 s/veh; the westbound right turn from Pennsylvania Street to Niagara Street would also fail and incur delays of over 165 s/veh.

Although mentioned previously in the freeway discussion, it should be noted that substantial congestion would occur along Niagara Street in the vicinity of the I-190 Interchange 8 ramps (i.e., between Carolina and Virginia Streets). With projected 2045 No Build traffic volumes, and planned geometric and traffic signal modifications to the area, it is expected that backups would occur along northbound Niagara Street and the I-190 off-ramps approach to the area. It is projected that queues along the I-190 off-ramps would extend onto I-190 and affect mainline operations. However, this is beyond the influence area of, and is not related to, the NY Gateway Connections project.

Table 5.8 – 2045 No Build Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Niagara St					
NB	L	16.1	B	183.2	F
NB	T	12.3	B	73.9	E
NB	R	10.8	B	81.1	F
SB	L	17.7	B	69.9	E
SB	T	17.9	B	28.3	C
SB	R	21.4	C	28.3	C
EB	L	31.0	C	177.7	F
EB	T	25.8	C	51.6	D
EB	R	21.6	C	40.7	D
WB	L	29.2	C	139.4	F
WB	T	16.5	B	64.9	E
WB	R	15.2	B	48.9	D
	Overall	**19.9**	**B**	**73.2**	**E**
2 - Porter Ave @ Columbus Pkwy / Seventh St					
NB	L	14.2	B	12.2	B
NB	T	15.4	B	10.3	B
NB	R	13.5	B	16.8	B
EB	L	15.8	B	14.0	B
EB	T	16.9	B	13.2	B
WB	T	6.8	A	8.1	A
WB	R	7.4	A	6.5	A
	Overall	**12.5**	**B**	**10.5**	**B**
3 - Porter Ave @ Busti Ave					
SB	L	28.9	C	25.0	C
SB	T	29.8	C	22.5	C
SB	R	30.5	C	26.1	C
EB	T	3.0	A	4.6	A
EB	R	2.9	A	5.1	A
WB	L	8.1	A	14.8	B
WB	T	3.3	A	10.1	B
	Overall	**6.1**	**A**	**9.8**	**A**
4 - Porter Ave @ Baird Dr / Lakeview Ave					
NB	L	11.4	B	13.2	B
NB	T	5.7	A	11.4	B
NB	R	4.6	A	5.5	A
SB	L	21.7	C	15.3	B
SB	T	15.8	B	16.1	B
SB	R	5.5	A	3.8	A
EB	L	13.6	B	13.0	B
EB	T	10.1	B	8.2	A
EB	R	8.2	A	6.6	A
WB	L	21.7	C	28.2	C
WB	T	5.8	A	18.9	B
WB	R	4.2	A	16.9	B
	Overall	**9.6**	**A**	**13.5**	**B**

Table 5.8 – 2045 No Build Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
5 - Busti Ave @ Sheridan Ter / Massachusetts Ave					
NB	T	8.2	A	8.6	A
NB	R	5.5	A	5.7	A
NB	R	8.3	A	0.0	A
SB	L	17.8	C	19.8	B
SB	L	17.6	C	17.3	B
SB	T	0.3	A	0.2	A
	Overall	**5.5**	**A**	**5.0**	**A**
6 - Baird Dr @ Plaza (Ramp A / Westbound Peace Bridge)					
NB	T	10.5	B	19.3	B
SB	T	16.8	B	16.8	B
EB	L	8.5	A	15.7	B
EB	R	4.2	A	9.9	A
	Overall	**10.3**	**B**	**16.8**	**B**
7 - Niagara St @ Pennsylvania St					
NB	L	15.0	B	70.7	E
NB	T	9.4	A	90.9	F
SB	T	8.8	A	3.9	A
SB	R	9.1	A	4.2	A
WB	L	17.3	B	58.5	E
WB	T	22.3	C	72.2	E
WB	R	5.1	A	166.6	F
	Overall	**9.8**	**A**	**54.8**	**D**
8- Niagara St @ Jersey St					
NB	T	8.2	A	103.7	F
NB	R	8.5	A	105.2	F
SB	L	14.7	B	16.1	B
SB	T	9.7	A	10.7	B
EB	L	23.5	C	36.0	D
EB	T	19.7	B	15.7	B
EB	R	19.1	B	14.2	B
	Overall	**9.5**	**A**	**58.9**	**E**
9 - Niagara St @ Connecticut St					
NB	T	8.3	A	11.8	B
NB	R	9.3	A	5.5	A
SB	L	15.4	B	31.2	C
SB	T	12.1	B	9.4	A
EB	L	4.1	A	0.9	A
EB	T	16.5	B	13.3	B
EB	R	8.5	A	4.8	A
WB	L	19.0	B	17.3	B
WB	R	12.3	B	11.2	B
	Overall	**12.3**	**B**	**12.0**	**B**

Table 5.8 – 2045 No Build Condition Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
10 - Niagara St @ Rhode Island St					
NB	T	8.1	A	11.9	B
NB	R	5.5	A	9.9	A
SB	L	14.3	B	20.8	C
SB	T	9.6	A	8.7	A
EB	L	18.4	B	12.5	B
EB	T	17.1	B	16.2	B
EB	R	4.0	A	5.8	A
	Overall	**9.3**	**A**	**11.1**	**B**
11 - Niagara St @ Massachusetts Ave					
NB	L	6.6	A	5.9	A
NB	T	3.6	A	5.9	A
NB	R	5.1	A	4.2	A
SB	L	6.6	A	10.1	B
SB	T	4.4	A	3.3	A
SB	R	2.9	A	3.3	A
EB	L	14.6	B	12.6	B
EB	T	15.7	B	12.7	B
EB	R	15.9	B	12.5	B
WB	L	17.9	B	13.3	B
WB	T	15.5	B	12.0	B
WB	R	16.8	B	12.6	B
	Overall	**7.5**	**A**	**6.3**	**A**
12 - Niagara St @ Hampshire St					
NB	L	7.0	A	4.0	A
NB	T	1.8	A	5.9	A
NB	R	1.5	A	4.4	A
SB	L	1.0	A	2.3	A
SB	T	0.2	A	0.2	A
SB	R	0.3	A	0.2	A
EB	L	8.3	A	9.2	A
EB	T	9.6	A	11.5	B
EB	R	6.9	A	6.6	A
WB	L	9.3	A	11.6	B
WB	T	9.7	A	12.3	B
WB	R	5.5	A	7.2	A
	Overall	**3.3**	**A**	**5.3**	**A**
13 - Niagara St @ Busti Ave					
NB	T	13.2	B	10.0	A
NB	R	12.1	B	4.9	A
SB	L	6.2	A	10.5	B
SB	T	1.6	A	1.1	A
WB	R	6.6	A	11.1	B
	Overall	**7.4**	**A**	**7.3**	**A**

Table 5.9 – 2045 No Build Condition Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Fourth St					
NB	L	8.8	A	8.4	A
NB	L	7.4	A	7.1	A
NB	R	5.5	A	6.3	A
EB	L	0.3	A	0.5	A
EB	T	0.3	A	0.5	A
EB	R	0.5	A	0.9	A
WB	L	3.1	A	4.8	A
WB	T	2.5	A	2.8	A
WB	R	5.1	A	5.7	A
	Overall	**2.5**	**A**	**2.8**	**A**
2 - Porter Ave @ the I-190 SB Off-Ramp (Ramp SD)					
SB	L	3.6	A	3.8	A
EB	T	0.0	A	0.0	A
WB	T	0.0	A	0.1	A
	Overall	**3.3**	**A**	**2.1**	**A**
3 - Busti Ave @ Connecticut St					
SB	L	0.6	A	0.5	A
SB	T	0.2	A	0.2	A
	Overall	**0.3**	**A**	**0.2**	**A**
4 - Busti Ave @ Vermont St					
SB	T	8.0	A	7.7	A
WB	L	6.8	A	6.2	A
	Overall	**7.7**	**A**	**7.2**	**A**
5 - Busti Ave @ Rhode Island St					
SB	L	0.4	A	0.5	A
SB	T	0.1	A	0.1	A
	Overall	**0.1**	**A**	**0.2**	**A**
6 - Busti Ave @ Sheridan Terrace Hook Ramp					
SB	T	0.2	A	0.2	A
EB	R	2.2	A	2.6	A
	Overall	**1.6**	**A**	**1.3**	**A**

Table 5.9 – 2045 No Build Condition Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
7 - Busti Ave @ Seventh St					
NB	T	0.4	A	0.3	A
SB	T	0.3	A	0.2	A
WB	L	0.0	A	8.8	A
WB	R	6.8	A	6.8	A
	Overall	**0.6**	**A**	**1.0**	**A**
8 - Busti Ave @ Hampshire St					
NB	T	1.1	A	0.8	A
NB	R	1.0	A	0.6	A
SB	T	0.3	A	0.2	A
WB	L	8.5	A	7.9	A
	Overall	**1.3**	**A**	**1.0**	**A**
9 - Niagara St @ Vermont St					
NB	L	3.0	A	2.7	A
NB	T	0.8	A	1.7	A
SB	T	1.6	A	1.5	A
SB	R	1.7	A	4.1	A
WB	L	8.1	A	12.2	B
WB	T	9.5	A	13.3	B
WB	R	6.8	A	9.5	A
	Overall	**2.2**	**A**	**3.2**	**A**
10 - Niagara St @ School St					
NB	T	0.5	A	0.4	A
NB	R	1.0	A	1.2	A
SB	L	1.5	A	3.3	A
SB	T	0.7	A	0.8	A
WB	L	9.8	A	13.5	B
	Overall	**0.7**	**A**	**0.8**	**A**
11 - Niagara St @ Prospect Ave					
NB	T	0.2	A	0.3	A
SB	T	1.2	A	0.8	A
WB	L	0.0	A	12.5	B
WB	R	0.0	A	5.3	A
	Overall	**0.7**	**A**	**0.7**	**A**

6. 2015 AND 2045 BUILD CONDITIONS

2015 and 2045 traffic operations were modeled for one NY Gateway Connections Build alternative with two design options for the new connections at Porter Avenue (signalized intersection and roundabout), using the same methodologies as for existing and No Build conditions.

6.1 Proposed Improvements

Proposed improvements for the project were developed to achieve the project's purpose and objectives. The proposed improvements include one basic Build Alternative with two options for local-street traffic control. Details are provided below.

Build Alternative

The Build Alternative would include the construction of a new ramp (Ramp D) that would provide direct access from the Plaza to northbound I-190 and a new ramp (Ramp PN) from Porter Avenue to the existing northbound I-190 off-ramp (Ramp N) that would maintain local-street access to the Plaza (via Ramp A). The combination of these new ramps would satisfy the project's purpose and objectives, allowing the removal of Baird Drive and the conversion of its existing roadbed into an additional 4.5 acres of green space in Front Park. The traffic signal at Baird Drive and the Plaza would be removed. The existing driveway for Front Park would be relocated east to Lakeview Avenue, and Fourth Street would be made one-way southbound to remove conflicts with the two design options along Porter Avenue in the vicinity of Ramps P and PN. A shared-use path would also be provided on the south side of Porter Avenue to allow the safe travel of bicyclists and pedestrians between the waterfront and the east (and away from Ramps P and PN) in the area (see **Figure 6.1**). To accommodate Ramp D, the Shoreline Trail bicycle/pedestrian facility along the waterfront would need to be realigned, which would allow a two-way access road to the Massachusetts Pumping Station to be constructed (see **Figure 6.2**). Minor modifications to four existing ramps (Ramps B, C, N, and P) in the vicinity of the Plaza, as well as new signing approaching and within the Plaza to clearly direct vehicles to the appropriate ramps and routes, would also be required.

For the Build Alternative, the following two design options were evaluated for Porter Avenue in the new Ramp PN and existing Ramp P area.

Signalized Intersection Option - The signalized intersection option is shown in **Figure 6.3**. This would allow all movements, except the westbound right turn to Ramp PN, to be protected (i.e., controlled by the protected phase of a traffic signal).

Roundabout Option - The roundabout option is shown in **Figure 6.4**. This would provide for uninterrupted flow of traffic in the Ramps P and PN area.

Figure 6.1 – Proposed Build Alternative

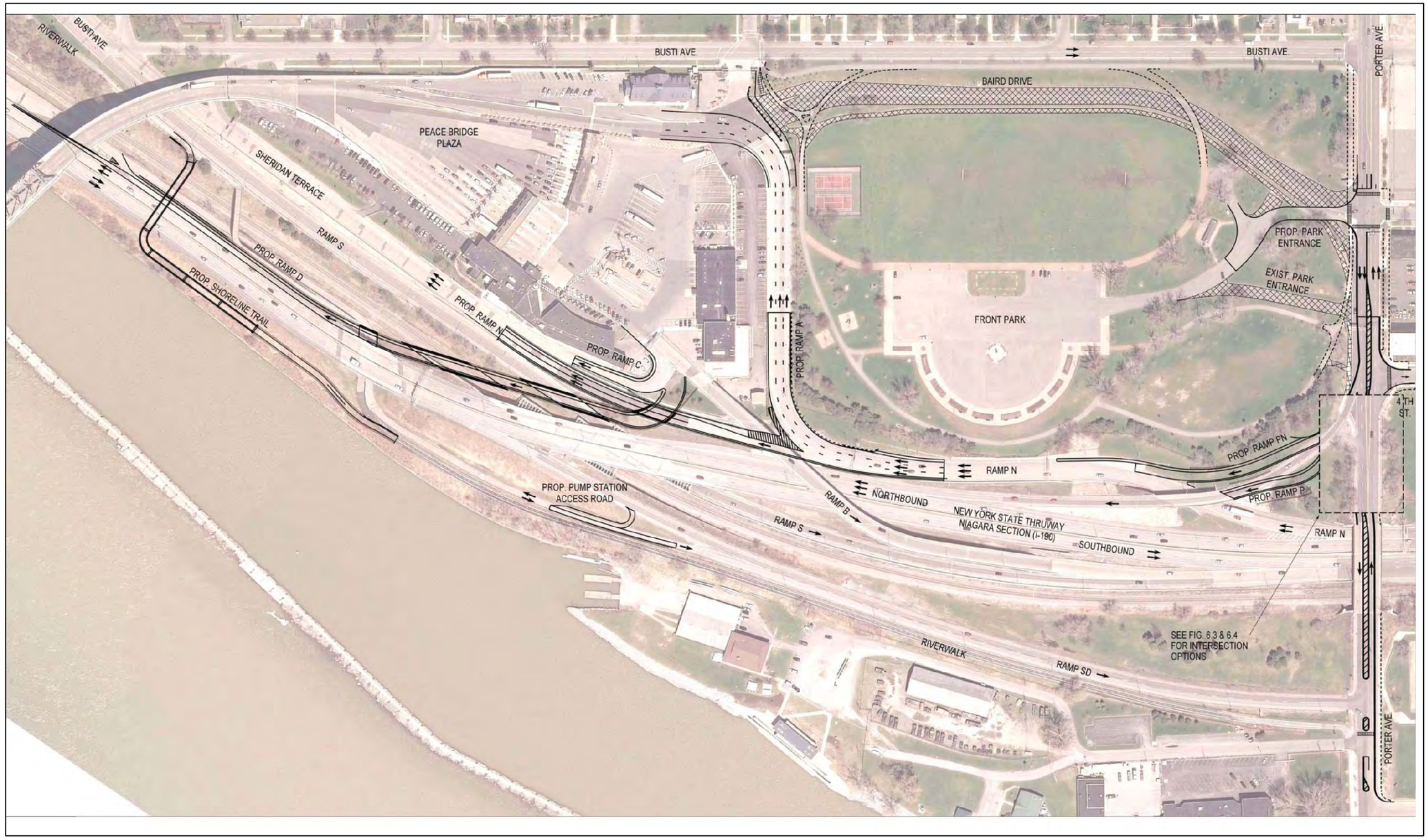


Figure 6.2 – Proposed Shoreline Trail and Massachusetts Pumping Station Modifications

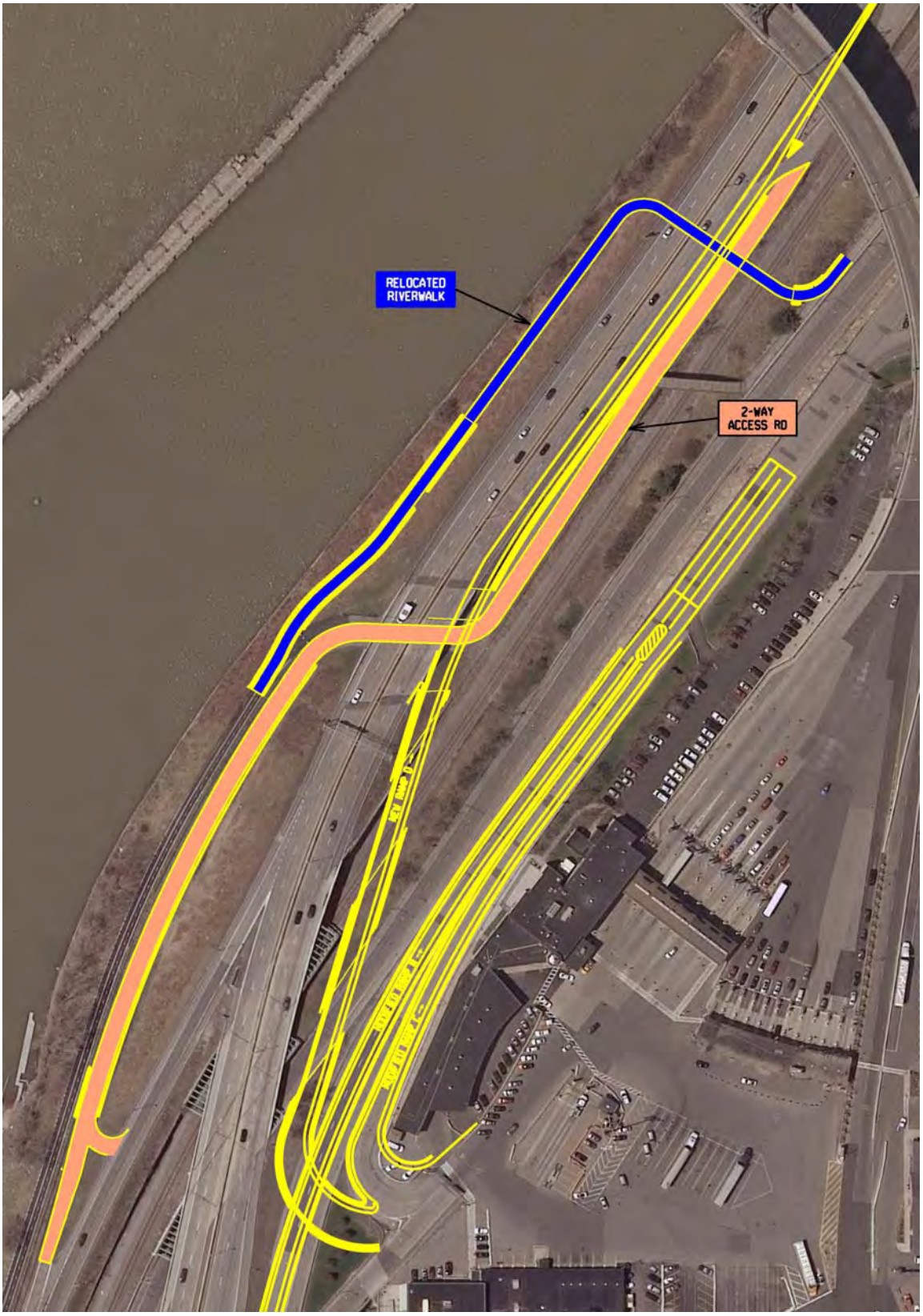


Figure 6.3 – Signalized Intersection Option Design

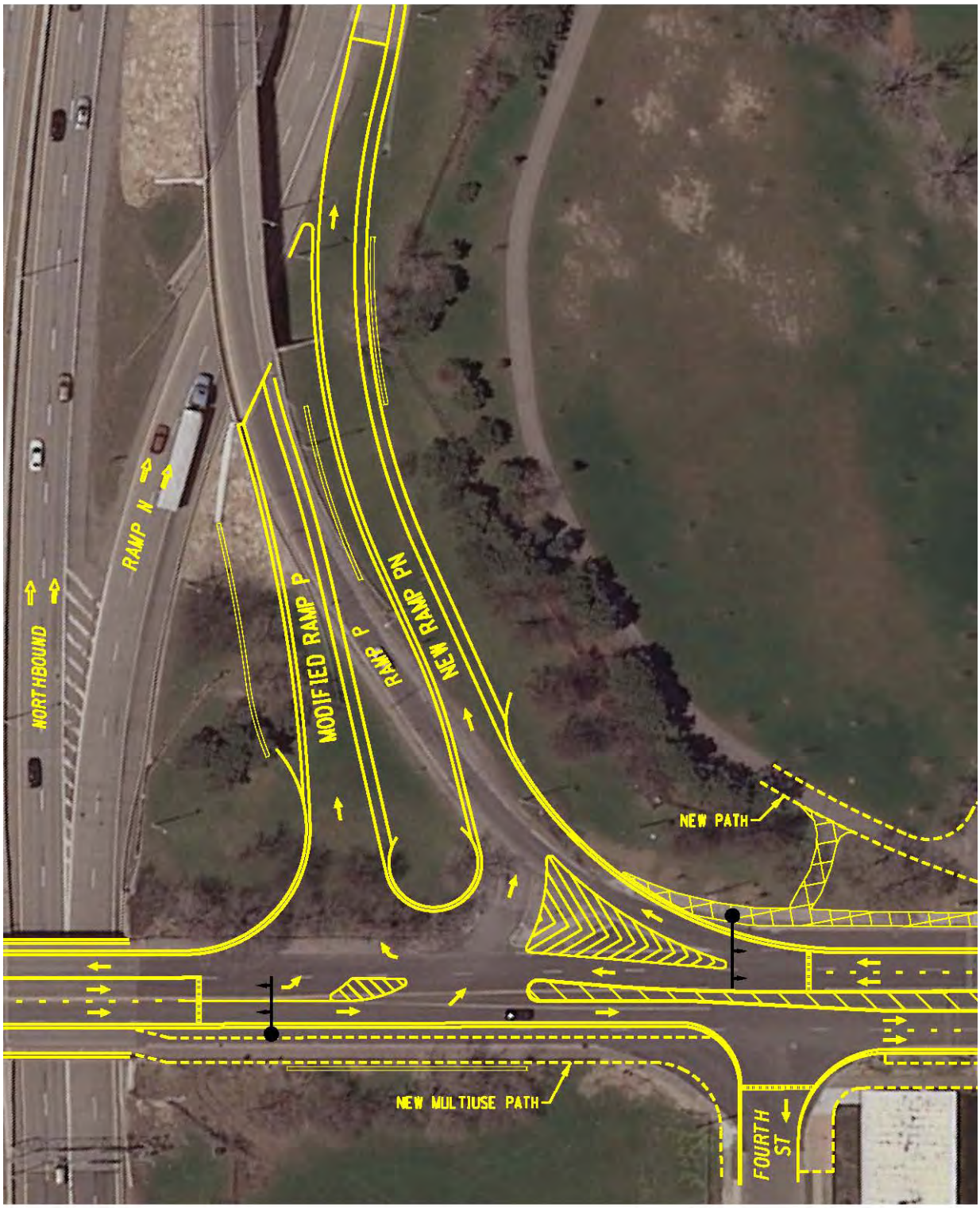
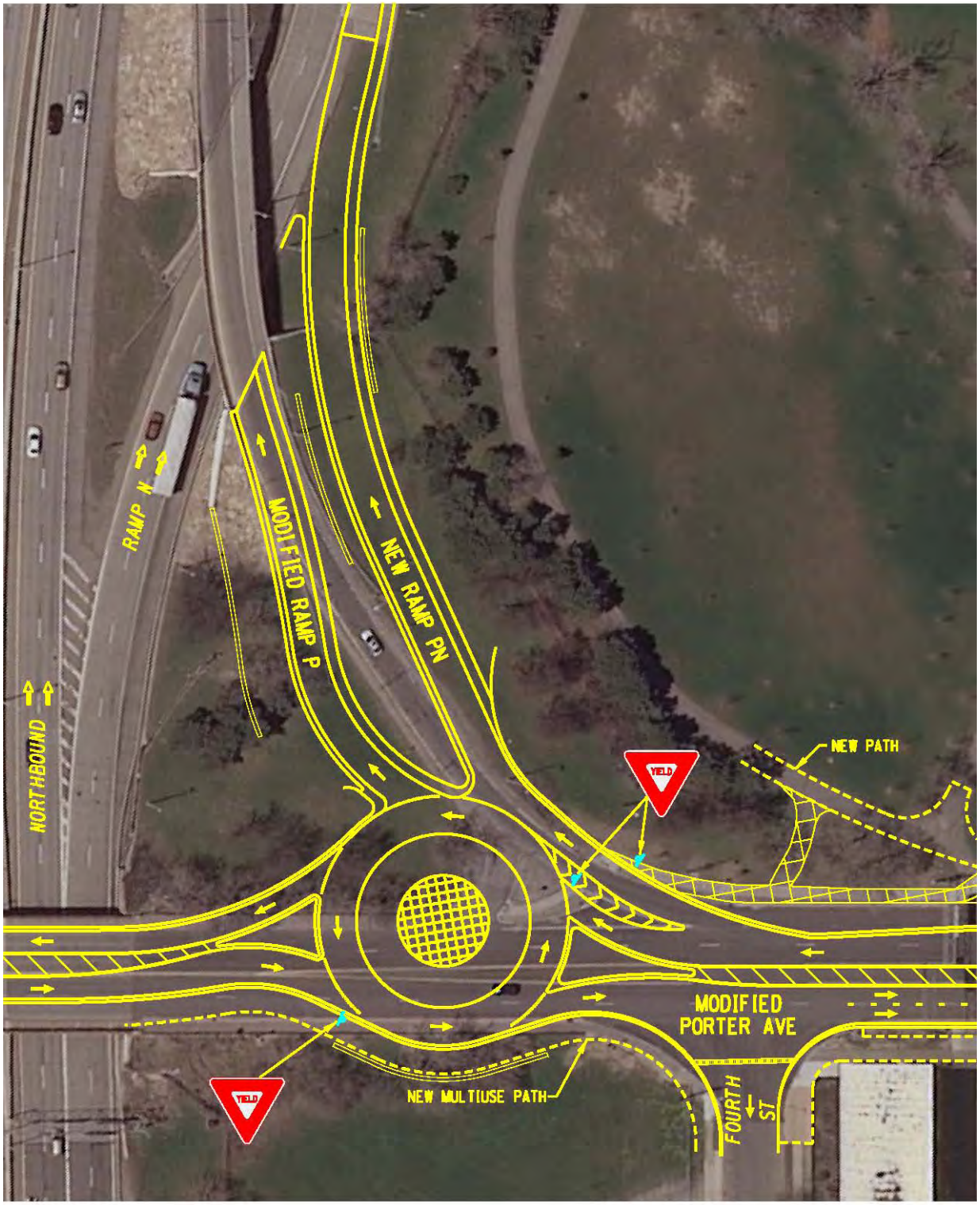


Figure 6.4 – Roundabout Option Design



6.2 Traffic Volumes

Implementation of the improved connections associated with the Build Alternative would alter existing traffic flow patterns in the study area. Therefore, traffic volume networks were adjusted to reflect the Build Alternative and its two design options. The resulting Build condition 2015 and 2045 weekday AM and PM peak-hour traffic volumes for the Signalized Intersection Option are provided in **Figures 6.5 through 6.8**; those for the Roundabout Option are provided in **Figures 6.9 through 6.12**.

Traffic to the Plaza (Canada-bound)

From Northbound I-190. The direct connection from northbound I-190 to the Plaza would remain, although Ramp A would be widened to three lanes and Ramp N would be reduced to one lane in the area of the split for Ramp A. No re-routing of traffic from No Build to Build conditions would be required.

From Southbound I-190. Currently, traffic from southbound I-190 exits to Porter Avenue (at Ramp SD) and turns left onto Porter Avenue and then left onto Baird Drive through Front Park to access the Plaza. With the Build Alternative, southbound I-190 traffic would utilize Ramp PN to access the Plaza, rather than the removed Baird Drive. Left turns onto Baird Drive for the No Build condition would become left turns onto Ramp PN for the Build condition. This would reduce interstate traffic on eastbound Porter Avenue between Ramp PN and Baird Drive by as many as 162 total vehicles during the weekday PM peak hour and by as many as 19 trucks during the weekday AM peak hour.

From the Local Streets. Currently, vehicles from the local street network access the Plaza from multiple directions via Baird Drive. With the Build Alternative, local-street vehicles would use Ramp PN instead. Local-street traffic to the Plaza would be re-routed from the Porter Avenue/Baird Drive intersection for the No Build conditions to the new Porter Avenue intersection at Ramps P and PN for Build conditions.

Traffic from the Plaza (U.S.-bound)

To Southbound I-190. The direct connection from the Plaza to southbound I-190 (Ramp B) would remain, although Ramp B would be modified slightly to accommodate the proposed Ramp D. No re-routing of traffic would occur.

To Northbound I-190. Currently, traffic from the Plaza travels along Baird Drive through Front Park and turns right onto Porter Avenue and then right onto Ramp P to access northbound I-190. With the Build Alternative, a new ramp (Ramp D) from the Plaza to northbound I-190 would be constructed. This direct connection effectively would remove all U.S.-bound Plaza interstate traffic from the local streets. Traffic currently exiting Baird Drive and traveling westbound along Porter Avenue to Ramp P would be re-routed to Ramp D for the Build condition. This would reduce traffic on westbound Porter Avenue by as many as 96 total vehicles and 11 trucks during the weekday AM peak hour.

To the Local Streets. Currently, most traffic to the local streets (65 to 85 percent) accesses the area roadways via Baird Drive through Front Park, with the balance using Ramp C to Sheridan Terrace. With the Build Alternative, Baird Drive would be removed, and all local-street traffic would enter the area via Ramp C. Local-street traffic exiting the Plaza at Porter Avenue and Baird Drive for the No Build condition would be re-routed to Ramp C for the Build condition.

Figure 6.5 – 2015 Build Condition Signalized Intersection Option Weekday AM Peak-Hour Traffic Volumes

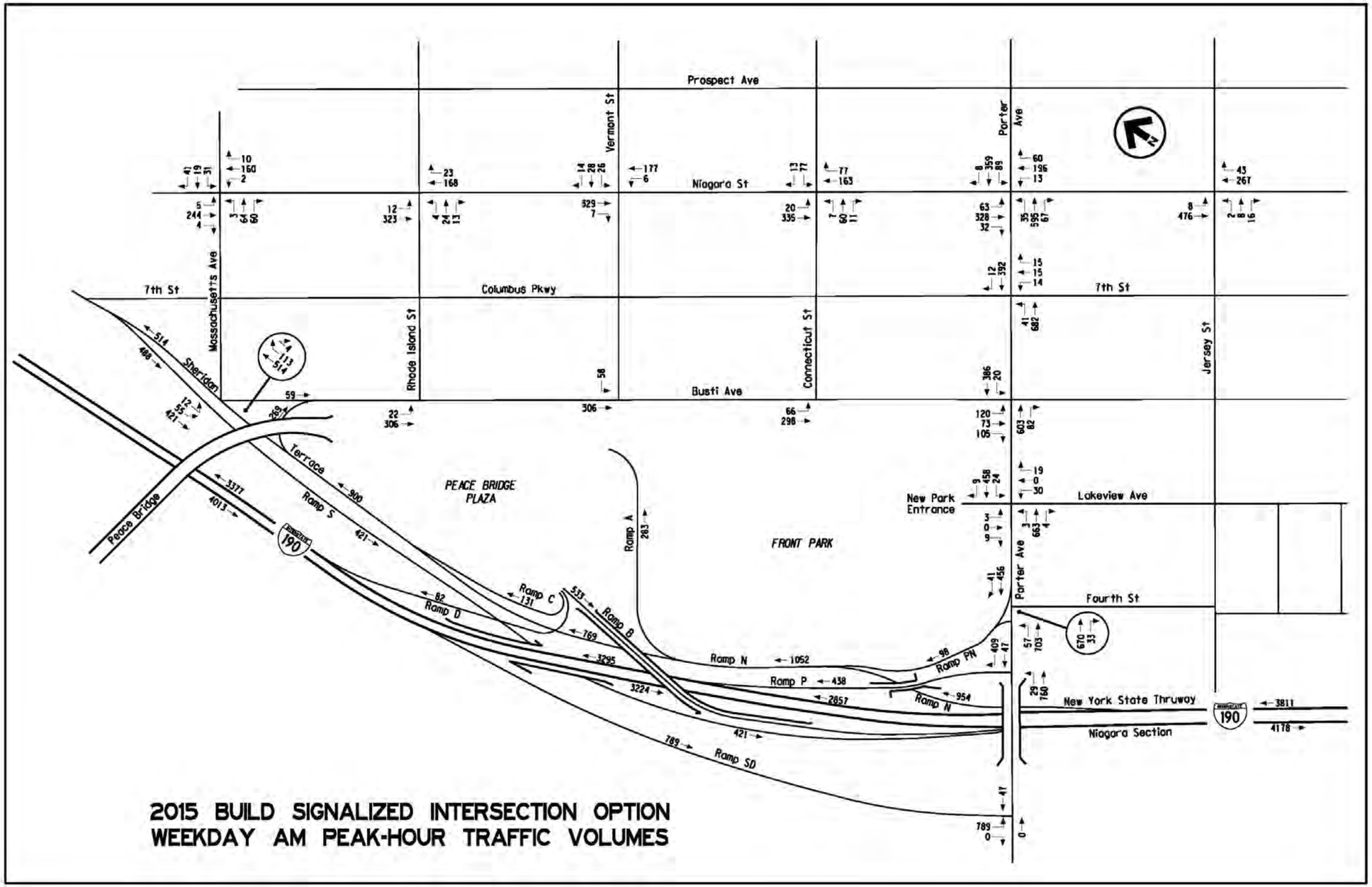


Figure 6.6 – 2015 Build Condition Signalized Intersection Option Weekday PM Peak-Hour Traffic Volumes

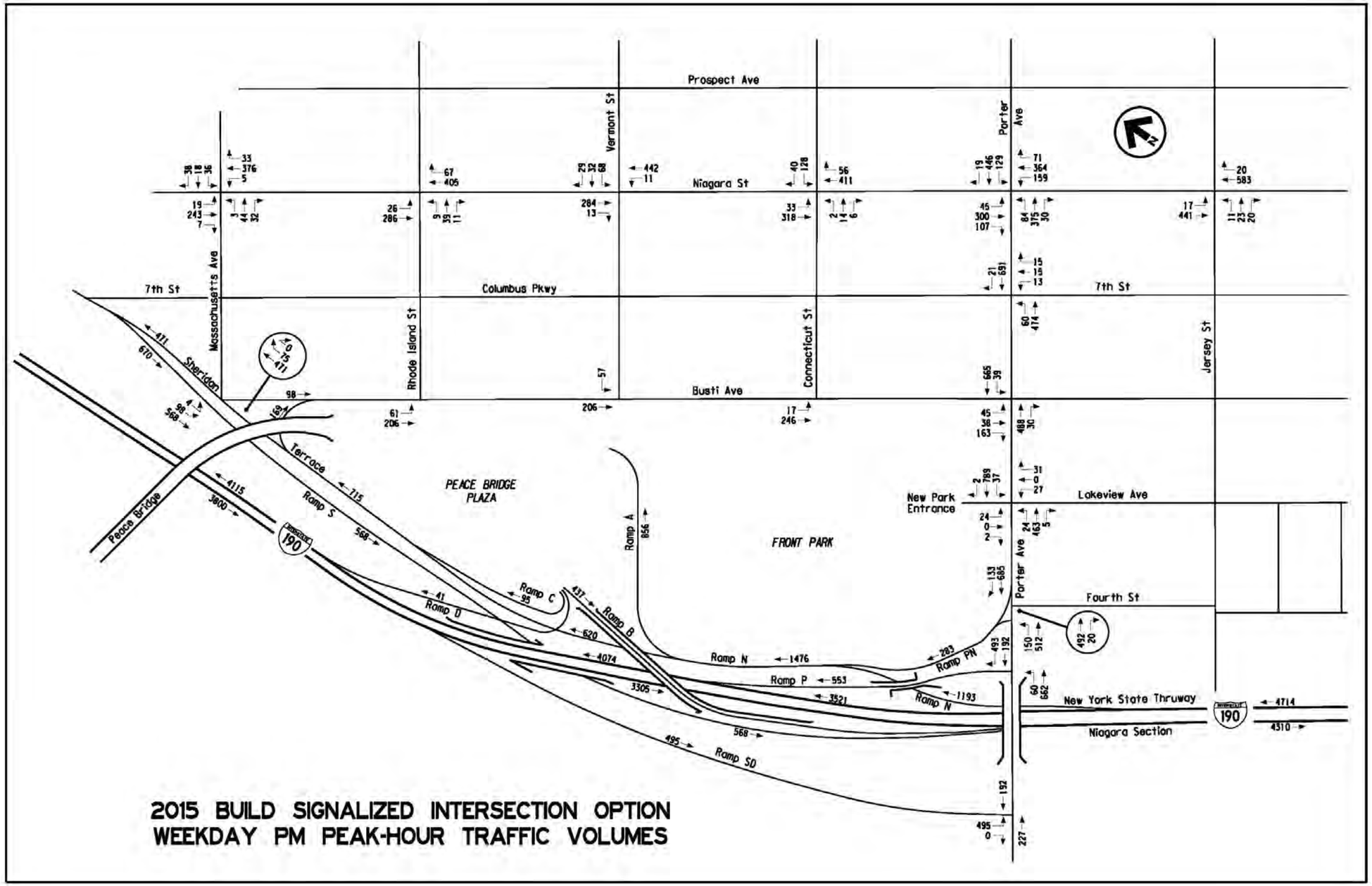


Figure 6.7 – 2045 Build Condition Signalized Intersection Option Weekday AM Peak-Hour Traffic Volumes

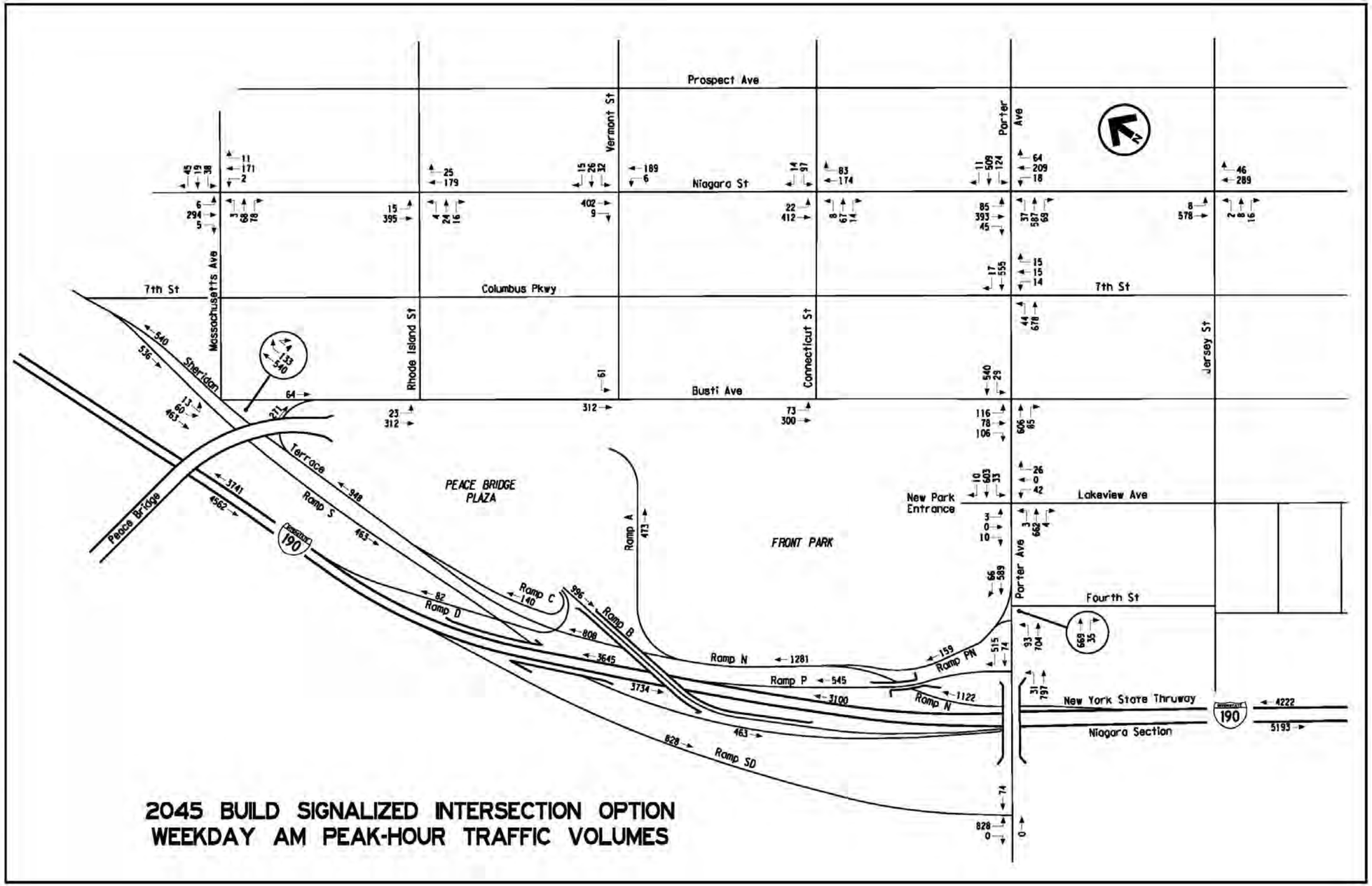


Figure 6.8 – 2045 Build Condition Signalized Intersection Option Weekday PM Peak-Hour Traffic Volumes

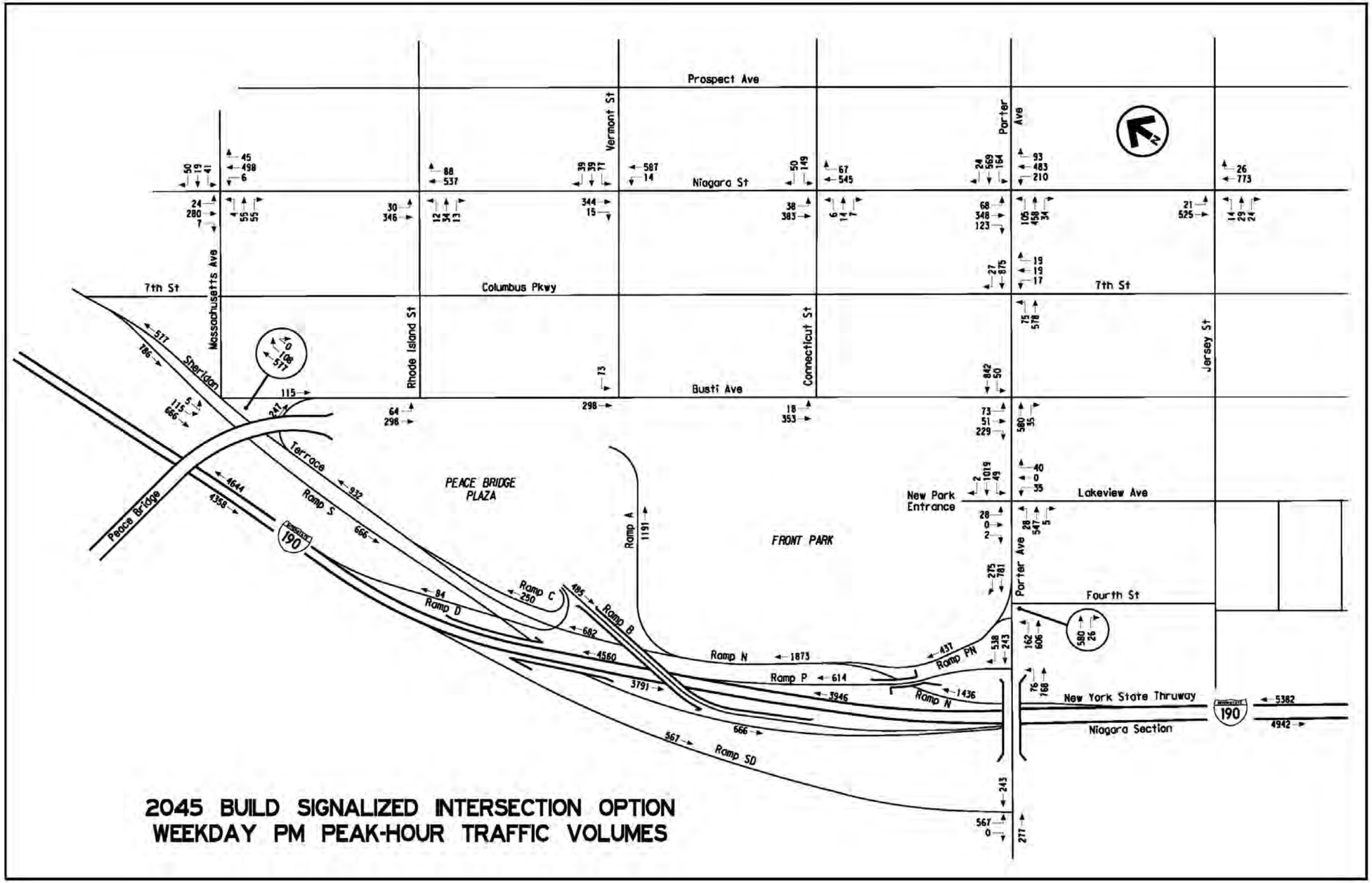


Figure 6.9 – 2015 Build Condition Roundabout Option Weekday AM Peak-Hour Traffic Volumes

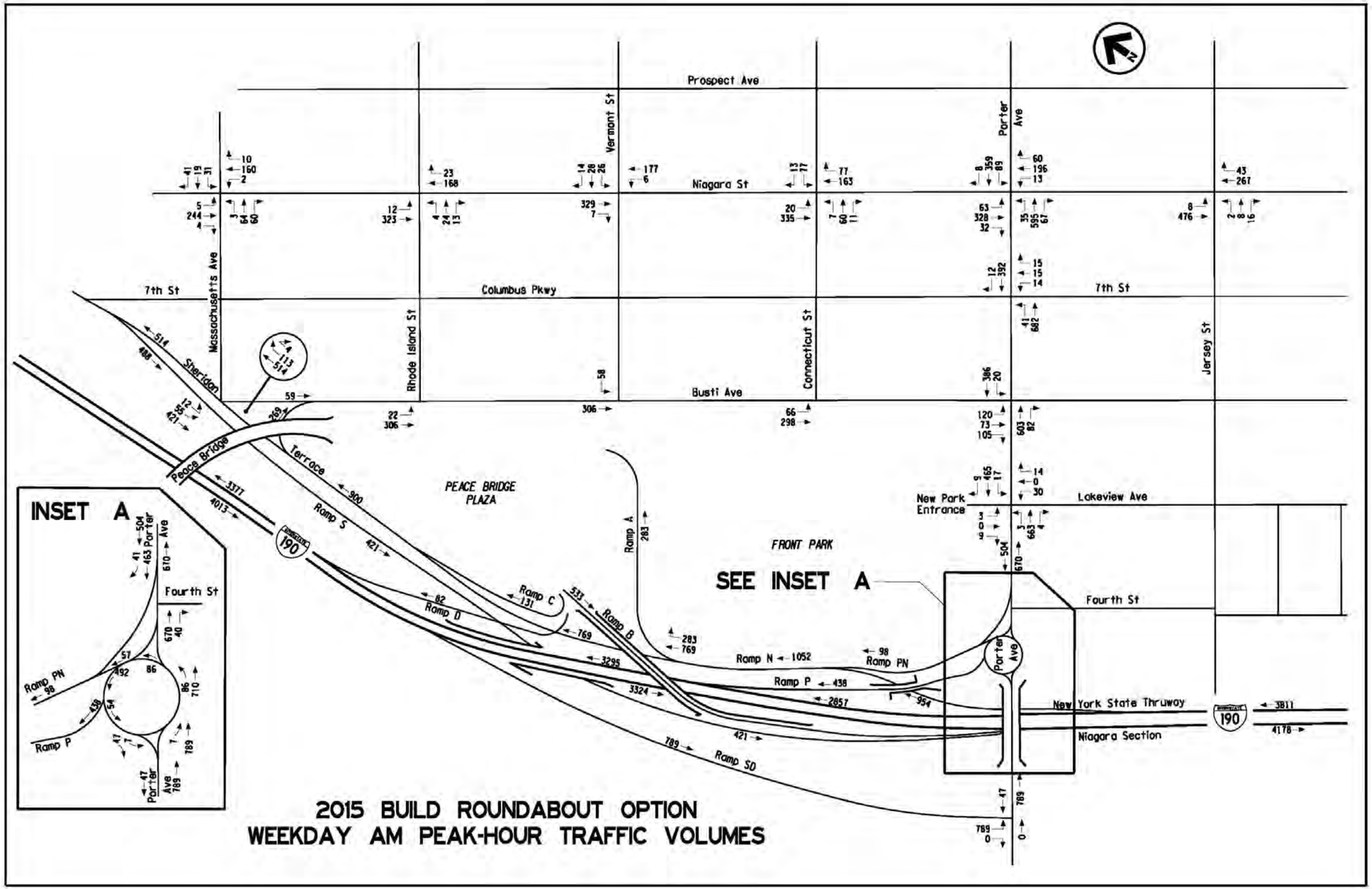


Figure 6.10 – 2015 Build Condition Roundabout Option Weekday PM Peak-Hour Traffic Volumes

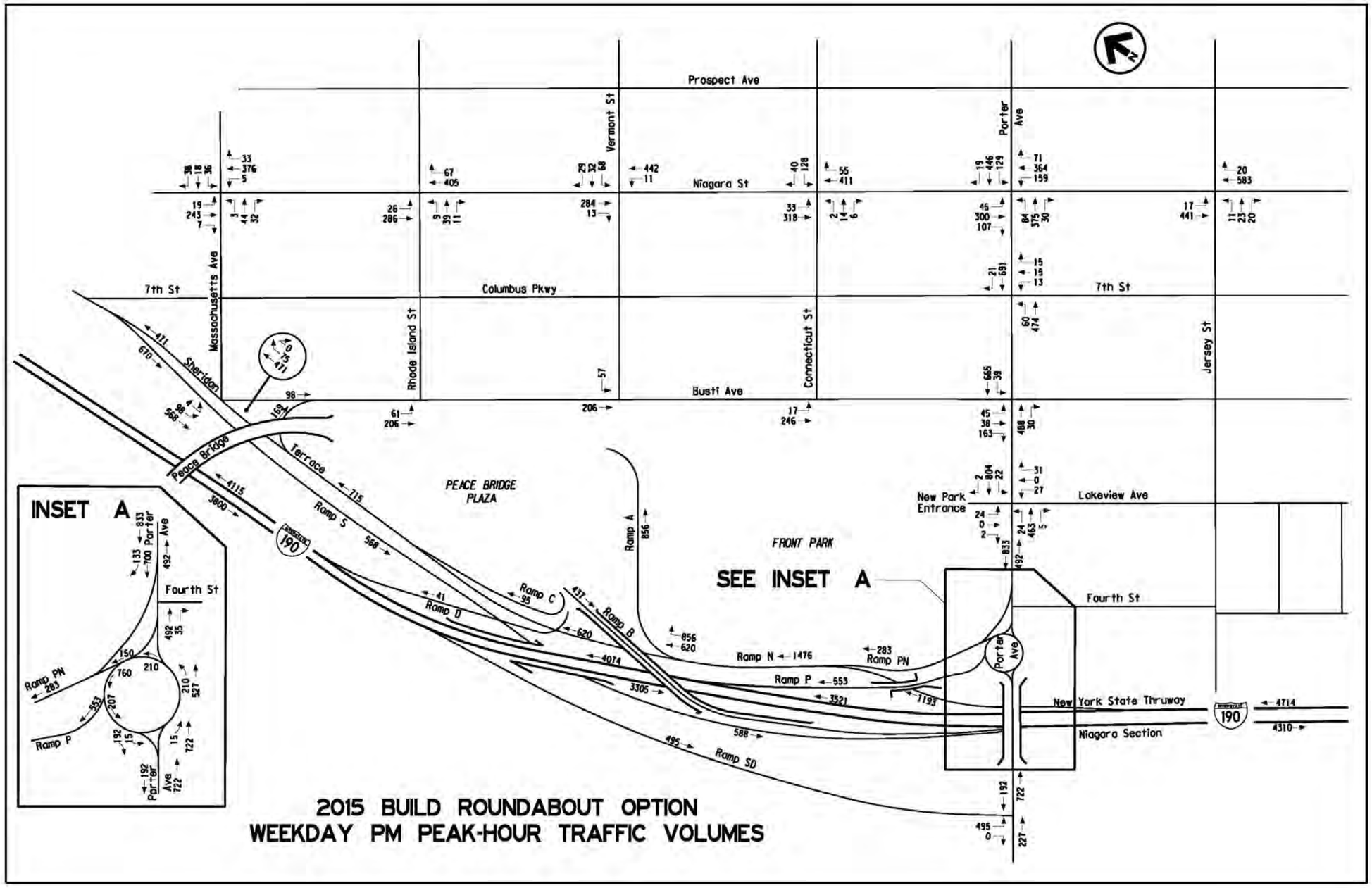


Figure 6.11 – 2045 Build Condition Roundabout Option Weekday AM Peak-Hour Traffic Volumes

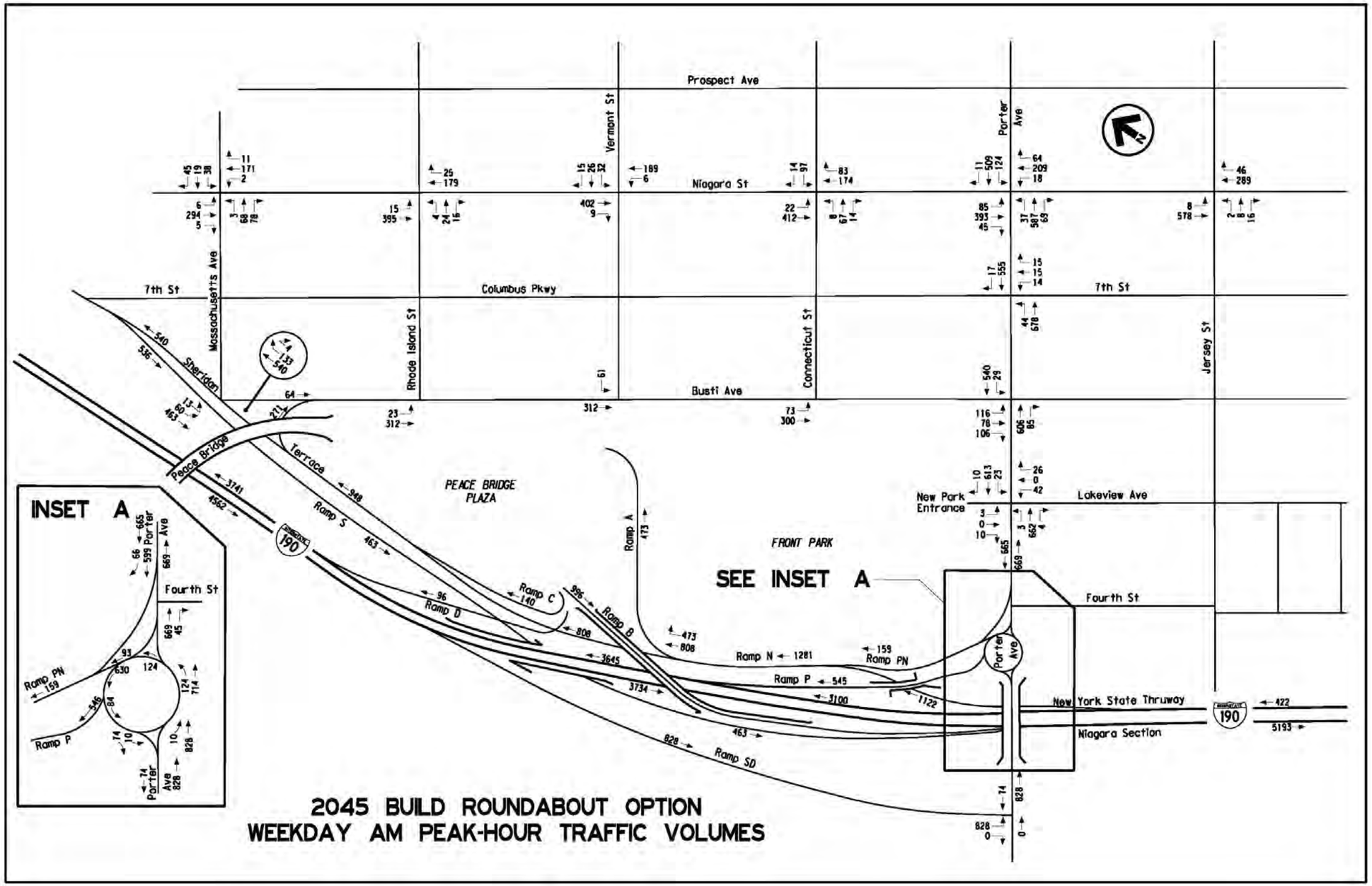
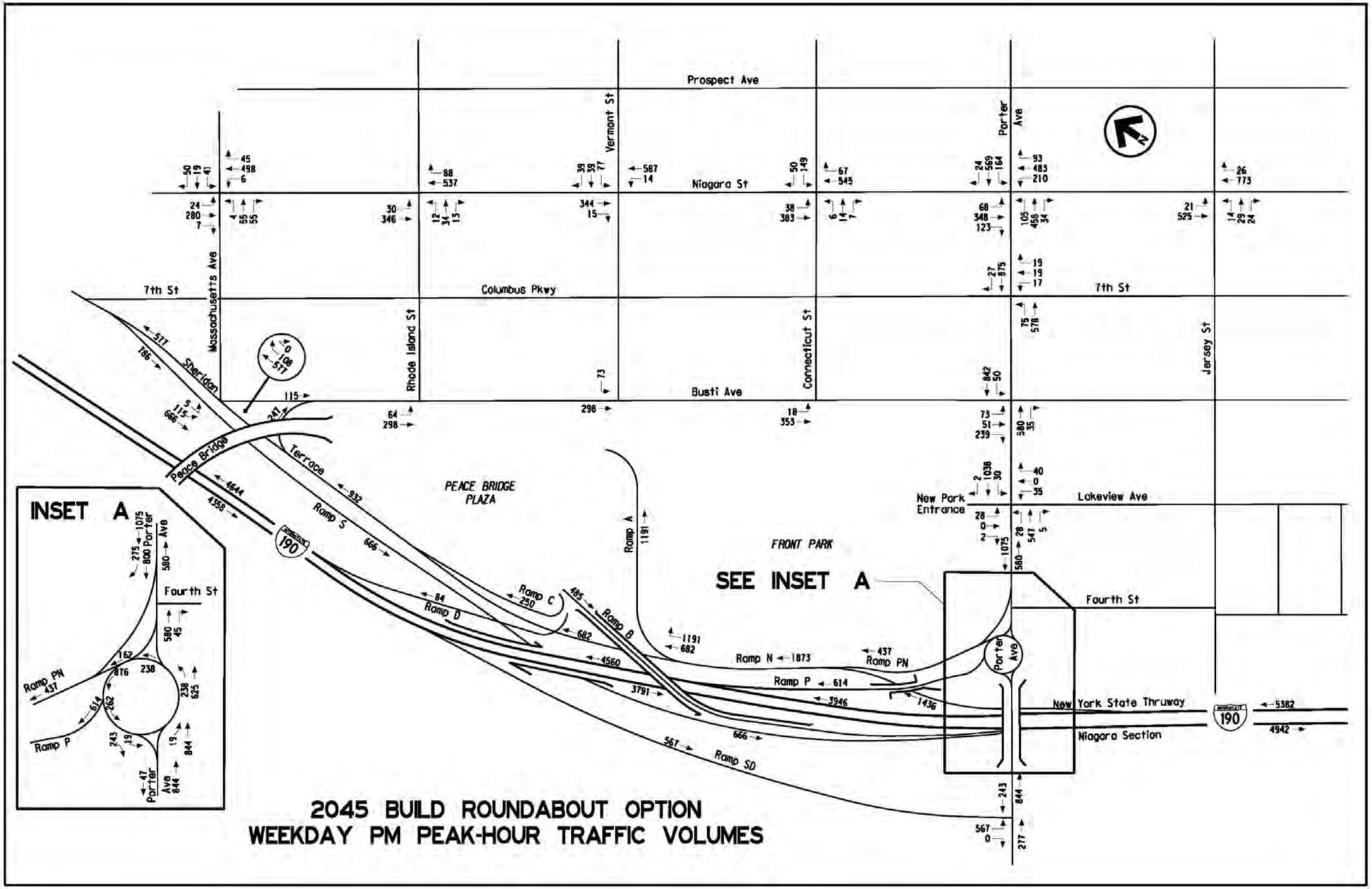


Figure 6.12 – 2045 Build Condition Roundabout Option Weekday PM Peak-Hour Traffic Volumes



It should be noted that the destinations of local-street passenger cars and trucks were assumed to be the same for the Build condition as for the No Build condition (i.e., to reflect No Build condition travel patterns). Local-street traffic would be routed from Ramp C to either Busti Avenue or Niagara Street depending on destination.

Traffic to Front Park

Currently, the driveway to Front Park is unsignalized and located on the north side of Porter Avenue between Baird Drive/Lakeview Avenue and Fourth Street. With the Build Alternative, the driveway would be realigned to intersect Porter Avenue opposite Lakeview Avenue at the existing traffic signal. Traffic to and from Front Park would be re-routed from the current driveway location to the Porter Avenue intersection at Lakeview Avenue for the Build condition.

Traffic at Porter Avenue and the Ramp P/PN Intersection

For the Build Alternative, there are two potential designs for Porter Avenue at Ramps P and PN – the Signalized Intersection Option and the Roundabout Option. For both of these options, it is proposed to convert Fourth Street on the south side of Porter Avenue, approximately 100 feet north of the existing Ramp P, to one-way southbound operation and prohibit left turns onto Fourth Street from Porter Avenue. This would eliminate vehicular conflicts in close proximity to the intersection or roundabout. Northbound Fourth Street traffic would be re-routed from the existing unsignalized intersection to the adjacent signalized Lakeview Avenue intersection for the Build condition. The re-routing of westbound left-turn traffic varies by option. For the Signalized Intersection Option, westbound left turns to Fourth Street would become westbound left turns at Lakeview Avenue for the Build condition. For the Roundabout Option, westbound left turns could effectively still be made by circulating through the roundabout. Westbound left turns would become westbound through traffic at Fourth Street, travel through the roundabout, and then turn right onto Fourth Street for the Build condition.

In addition, a shared-use bicycle/pedestrian path would be constructed on the south side of Porter Avenue for the Build Alternative. With either of the Porter Avenue Build options, bicycles could be separated from vehicular traffic and pedestrians would be accommodated on the more active, recreational, and residential side of the street and then allowed to cross safely over to the main, relocated entrance to Front Park at the signalized intersection with Lakeview Avenue. A striped shoulder would also be provided on the south side of Porter Avenue between Ramp SD and either the signal or the roundabout. This would maintain eastbound through access to the city during overflow conditions (see DEIS section 3.3.5.1).

6.3 Traffic Analysis Results

2015 and 2045 freeway, ramp, signalized intersection, and unsignalized intersection traffic analyses were conducted for both the Build Alternative Signalized Intersection Option and the Roundabout Option. The Signalized Intersection Option was evaluated first, as this is the one that would require the most coordination of traffic signal timings in the project study area. Proposed traffic signal timings for the Signalized Intersection Option served as the basis of those for the Roundabout Option. Details of the Build Alternative traffic analyses are provided below.

6.3.1 Preliminary Evaluation

Preliminary traffic analyses were conducted for the Build Alternative, assuming the Signalized Intersection Option. Weekday AM and PM peak-period cycle lengths at the new intersection were assumed to be the same as those at the adjacent Porter Avenue/Lakeview Avenue intersection, and No Build condition traffic signal timings at all other signalized locations were used. The preliminary analyses indicated that there would be no impacts to the I-190 mainline, the I-190 ramps, or to most intersections in the project study area for the Build Alternative. However, signalized intersections along Porter Avenue would be impacted for the 2015 and 2045 weekday PM peak-hour conditions – especially at the Porter Avenue intersections with Niagara Street and Busti Avenue where local-street traffic would be re-routed as part of the Build Alternative.

A comparison of the 2015 and 2045 No Build and preliminary Build condition Signalized Intersection Option weekday PM peak-hour analysis results for Porter Avenue, with critical movements highlighted, is provided in **Table 6.1**. As indicated, the Porter Avenue intersections with Niagara Street and Busti Avenue would experience higher delays for the preliminary Build condition than for the No Build condition in both 2015 and 2045. At Porter Avenue and Niagara Street, between 25 and 50 vehicles would be re-routed from eastbound Porter Avenue to southbound Niagara Street – most as left turns. This would alter traffic patterns at the already-congested intersection, causing little impact to, or even improved level of service, for the overall intersection, but resulting in generally poorer levels of service on one or more approaches and especially to the southbound left turn. Analysis results suggested that traffic signal timing changes could be made at the intersection to improve operations; however, traffic simulation showed substantial queuing and a potential need for geometric improvements. At Porter Avenue and Busti Avenue, between 80 and 140 vehicles would be re-routed from eastbound Porter Avenue to southbound Busti Avenue – and over half as right turns. The poor operations for the southbound right turn movement, in combination with poor operations for westbound Porter Avenue at the adjacent Lakeview Avenue intersection, suggested that traffic signal timing and/or coordination improvements could be made to mitigate Build Alternative traffic impacts. A second round of traffic analysis was conducted to determine the detailed improvements needed to mitigate the impacts of the Build Alternative. These improvements (i.e., required changes between No Build and Build conditions) include the following.

Traffic signal design at Porter Avenue and Ramps P and PN (Signalized Intersection Option Only). It is recommended that the traffic signal at this intersection be split-phased to allow all left turns and the westbound right turn to be protected. The signal could have a 60-second cycle during the weekday AM peak period and a 50-second cycle during the weekday PM peak period, in keeping with planned cycle lengths for adjacent intersections in the area. Eastbound left-turn and through/ westbound through and right-turn phase splits of 30/30 and 25/25 seconds would operate well during the AM and PM peak periods, respectively, for both 2015 and 2045 conditions.

Modification of traffic signal phasing and timings at Porter Avenue and Niagara Street. Leading and protected-only phases are recommended for all left turns, with modified splits to allow more time for left turns during the 2015 and 2045 weekday PM peak periods.

Modification of traffic signal timings at Porter Avenue and Busti Avenue. Modified 2015 PM peak-period splits are recommended to provide more green time to the southbound Busti Avenue approach.

Table 6.1 – Comparison of No Build and Preliminary Build Evaluation Weekday PM Peak-Hour Signalized Intersection Analysis Results

Intersection		2015 Weekday PM Peak Hour				2045 Weekday PM Peak Hour			
		No Build Condition		Preliminary Build Evaluation		No Build Condition		Preliminary Build Evaluation	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Niagara St									
NB	L	146.0	F	139.7	F	183.2	F	172.5	F
NB	T	50.6	D	48.7	D	73.9	E	66.3	E
NB	R	54.1	D	51.0	D	81.1	F	72.7	E
SB	L	65.2	E	81.1	F	69.9	E	130.7	F
SB	T	26.8	C	25.6	C	28.3	C	30.0	C
SB	R	27.9	C	26.3	C	28.3	C	32.7	C
EB	L	103.1	F	168.6	F	177.7	F	59.0	E
EB	T	45.5	D	46.1	D	51.6	D	37.8	D
EB	R	33.3	C	42.6	D	40.7	D	27.2	C
WB	L	94.8	F	87.4	F	139.4	F	124.1	F
WB	T	41.2	D	38.5	D	64.9	E	59.5	E
WB	R	33.7	C	31.8	C	48.9	D	50.2	D
	Overall	**53.9**	**D**	**55.8**	**E**	**73.2**	**E**	**66.7**	**E**
2 - Porter Ave @ Columbus Pkwy / Seventh St									
NB	L	10.2	B	10.0	A	12.2	B	12.0	B
NB	T	12.3	B	11.3	B	10.3	B	9.8	A
NB	R	10.5	B	13.5	B	16.8	B	11.1	B
EB	L	12.4	B	13.4	B	14.0	B	15.2	B
EB	T	9.9	A	12.5	B	13.2	B	8.9	A
WB	T	5.8	A	7.1	A	8.1	A	9.2	A
WB	R	4.4	A	6.1	A	6.5	A	7.4	A
	Overall	**7.8**	**A**	**9.8**	**A**	**10.5**	**B**	**9.4**	**A**
3 - Porter Ave @ Busti Ave									
SB	L	22.4	C	32.1	C	25.0	C	35.1	D
SB	T	23.1	C	44.1	D	22.5	C	48.2	D
SB	R	24.9	C	188.3	F	26.1	C	205.6	F
EB	T	4.1	A	8.0	A	4.6	A	8.7	A
EB	R	4.8	A	10.0	A	5.1	A	10.9	B
WB	L	11.7	B	24.0	C	14.8	B	26.2	C
WB	T	8.4	A	39.0	D	10.1	B	42.6	D
	Overall	**8.7**	**A**	**41.5**	**D**	**9.8**	**A**	**45.3**	**D**

Table 6.1 – Comparison of No Build and Preliminary Build Evaluation Weekday PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		2015 Weekday PM Peak Hour				2045 Weekday PM Peak Hour			
		No Build Condition		Preliminary Build Evaluation		No Build Condition		Preliminary Build Evaluation	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
4 - Porter Ave @ Front Park Driveway / Lakeview Ave									
NB	**L**	11.2	B	47.1	D	13.2	B	13.6	B
NB	**T**	17.1	B	0.0	A	11.4	B	0.0	A
NB	**R**	4.7	A	51.7	D	5.5	A	13.2	B
SB	**L**	13.1	B	10.8	B	15.3	B	2.2	A
SB	**T**	12.2	B	0.0	A	16.1	B	0.0	A
SB	**R**	2.2	A	0.0	A	3.8	A	0.0	A
EB	**L**	12.5	B	8.4	A	13.0	B	7.1	A
EB	**T**	7.9	A	8.9	A	8.2	A	3.1	A
EB	**R**	5.4	A	5.0	A	6.6	A	7.1	A
WB	**L**	24.5	C	10.0	A	28.2	C	12.4	B
WB	**T**	16.9	B	66.8	E	18.9	B	13.0	B
WB	**R**	14.6	B	0.0	A	16.9	B	0.0	A
	Overall	**12.4**	**B**	**11.4**	**B**	**13.5**	**B**	**11.9**	**B**
4a - Porter Ave @ I-190 NB/Peace Bridge On-Ramps (Ramps P and PN)									
NB	**L**	8.5	A	-	-	8.4	A	-	-
NB	**T**	7.1	A	-	-	7.1	A	-	-
NB	**R**	6.2	A	-	-	6.3	A	-	-
EB	**L**	0.4	A	12.5	B	0.5	A	12.4	B
EB	**L**	-	-	34.2	C	-	-	13.0	B
EB	**T**	0.4	A	26.5	C	0.5	A	15.3	B
EB	**R**	0.8	A	27.4	C	0.9	A	15.4	B
WB	**T**	2.5	A	27.2	C	4.8	A	26.8	C
WB	**R**	2.3	A	14.0	B	2.8	A	0.9	A
WB	**R**	5.1	A	9.8	A	5.7	A	27.9	C
	Overall	**2.5**	**A**	**18.3**	**B**	**2.8**	**A**	**19.6**	**B**

Modification of traffic signal timings at Porter Avenue and Lakeview Avenue. Modified 2015 AM and PM and 2045 AM splits are recommended to provide more green time to the eastbound and westbound Porter Avenue approaches.

Optimization of Traffic Signal Offsets. Re-optimized traffic signal offsets are recommended along Porter Avenue. Adjustments to the offsets were included in the analyses at Busti Avenue, Lakeview Avenue, and Niagara Street during one or more time period or analysis year.

Long-Term modification of geometry at Porter Avenue and Niagara Street. In the long-term, regardless of whether the NY Gateway Connections project is constructed, backups on the intersection approaches would occur, preventing vehicles from reaching the turning bays.

When traffic volumes reach projected 2045 levels, it is recommended to lengthen the northbound Niagara Street left-turn bay to approximately 175 feet and the westbound Porter Avenue left-turn bay to at least 100 feet. It is also recommended that a southbound Niagara Street right-turn bay be provided, in keeping with the planned design on the opposite side of the street. All of these improvements could be achieved with striping, although it may be desirable to widen the southbound approach slightly to allow wider lanes for trucks and buses along the roadway. One or two on-street parking spaces along westbound Porter Avenue might also need to be eliminated.

Proposed traffic signal timings for the Porter Avenue intersection at Ramps P and PN for the Signalized Intersection Option are provided in **Attachment 14**. Detailed geometric and traffic signal mitigation measures for the Build Alternative are provided in **Attachment 15**. The results of the Build condition Signalized Intersection Option and Roundabout Option analyses, incorporating these designs/improvements, are discussed below.

6.3.2 Signalized Intersection Option

The traffic analysis for the Build condition Signalized Intersection Option incorporated the basic Build Alternative design, the Signalized Intersection Option design, and the mitigation measures identified in the preliminary evaluation.

2015

The results of the 2015 Build condition Signalized Intersection Option freeway and ramp segment analyses are provided in **Tables 6.2 and 6.3**, respectively. As shown and discussed previously, there would basically be no change in I-190 mainline or ramp operations with the Build Alternative. Even in the northbound direction where Ramp D would be added, there would only be a minor decrease in average speed (i.e., of approximately 5 mph) on the mainline around the northbound Porter Avenue and Peace Bridge Plaza on-ramps; levels of service would remain the same as for the No Build condition.

The results of the 2015 Build condition Signalized Intersection Option signalized and unsignalized intersection analyses are provided in **Tables 6.4 and 6.5**, respectively. As indicated, most intersections would operate well (generally at LOS B or better) during the weekday AM and PM peak hours with the Build Alternative. Operations at Porter Avenue and Niagara Street would improve from the No Build condition. During the weekday PM peak hour, the left turns on all approaches would operate at LOS E, rather than LOS F, with delays as low as half of those projected for the No Build condition and all less than the 100-second cycle length.

Table 6.2 – 2015 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Basic Freeway Segment Analysis Results

Mainline Analysis Location	Weekday					
	AM Peak Hour			PM Peak Hour		
	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)	LOS
I-190 NB						
1 - Mainline between Niagara Street on- and off-ramps	57	22	C	42	34	D
2 - Mainline between Niagara Street on-ramp and Peace Bridge off-ramp	57	24	C	35	43	E
3 - Mainline between Peace Bridge off-ramp and Porter Avenue on-ramp	56	26	D	46	39	E
4a - Mainline between Porter Avenue on-ramp and Peace Bridge Plaza/Ramp D on-ramp	56	30	D	51	39	E
4b - Mainline between new Ramp D on-ramp and Scajaquada Expressway off-ramp	56	31	D	51	40	E
5 - Mainline between Scajaquada Expressway off- and on-ramps	57	22	C	46	36	E
6 - Mainline between Scajaquada Expressway on-ramp and Amherst Street off-ramp	54	30	D	49	42	E
I-190 SB						
7 - Mainline between Hamilton Street on-ramp and Scajaquada Expressway off-ramp	52	41	E	57	33	D
8 - Mainline between Scajaquada Expressway off- and on-ramps	56	28	D	57	26	D
9 - Mainline between Scajaquada Expressway on-ramp and Porter Avenue off-ramp	56	36	E	56	34	D
10 - Mainline between Porter Avenue off-ramp and Peace Bridge on-ramp	57	29	D	57	30	D
11 - Mainline between Peace Bridge on-ramp and Niagara Street off-ramp	52	29	D	56	27	D
12 - Mainline between Niagara Street off- and on-ramps	57	20	C	57	24	C
13 - Mainline between Niagara Street on-ramp and Church Street on-ramp	57	22	C	57	28	D

Table 6.3 – 2015 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Weaving, Merge, and Diverge Segment Analysis Results

Ramp Analysis Location	Weekday					
	AM Peak Hour			PM Peak Hour		
	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)	LOS
I-190 NB						
1 - Weave between Church Street on-ramp and Niagara Street off-ramp	49	26	C	43	39	F
2 - Merge at Niagara Street on-ramp	56	22	C	34	48	F
3 - Diverge at Peace Bridge off-ramp	56	19	B	53	24	C
4- Merge at Porter Avenue on-ramp	53	24	C	36	48	F
4a - Merge at Peace Bridge Plaza/Ramp D on-ramp	57	28	D	52	35	D
5 - Diverge at Scajaquada Expressway off-ramp	53	25	C	53	32	D
6 - Merge at Scajaquada Expressway on-ramp	50	25	C	40	39	F
I-190 SB						
7 - Diverge at Scajaquada Expressway off-ramp	46	37	F	50	31	D
8 - Merge at Scajaquada Expressway on-ramp	55	28	D	51	28	D
9 - Diverge at Porter Avenue off-ramp	56	30	D	55	35	D
10 - Merge at Peace Bridge on-ramp	57	31	D	54	32	D
11 - Diverge at Niagara Street off-ramp	40	30	D	53	28	D
12 - Merge at Niagara Street on-ramp	50	23	C	47	33	D

Table 6.4 – 2015 Build Condition Signalized Intersection Option
Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Niagara St					
NB	L	5.8	A	60.1	E
NB	T	4.7	A	22.5	C
NB	R	5.8	A	22.7	C
SB	L	14.0	B	59.1	E
SB	T	12.9	B	31.9	C
SB	R	13.1	B	30.6	C
EB	L	19.8	B	56.8	E
EB	T	25.7	C	26.8	C
EB	R	20.0	B	23.4	C
WB	L	17.7	B	59.7	E
WB	T	16.3	B	33.8	C
WB	R	13.6	B	32.9	C
	Overall	**16.8**	**B**	**34.5**	**C**
2 - Porter Ave @ Columbus Pkwy / Seventh St					
NB	L	17.5	B	9.1	A
NB	T	14.6	B	12.4	B
NB	R	13.6	B	10.2	B
EB	L	0.0	A	22.0	C
EB	T	15.3	B	11.8	B
WB	T	6.2	A	16.4	B
WB	R	6.0	A	13.8	B
	Overall	**12.0**	**B**	**14.8**	**B**
3 - Porter Ave @ Busti Ave					
SB	L	24.3	C	17.0	B
SB	T	24.5	C	20.1	C
SB	R	24.6	C	22.0	C
EB	T	2.1	A	2.1	A
EB	R	2.5	A	2.4	A
WB	L	9.4	A	11.5	B
WB	T	4.7	A	9.2	A
	Overall	**7.5**	**A**	**9.0**	**A**
4 - Porter Ave @ Front Park Driveway / Lakeview Ave					
NB	L	17.0	B	23.0	C
NB	T	0.0	A	0.0	A
NB	R	19.1	B	19.9	B
SB	L	19.1	B	21.1	C
SB	T	0.0	A	0.0	A
SB	R	0.0	A	2.6	A
EB	L	38.4	D	0.0	A
EB	T	11.4	B	2.0	A
EB	R	5.9	A	0.7	A
WB	L	14.7	B	10.0	A
WB	T	9.7	A	7.5	A
WB	R	4.5	A	6.6	A
	Overall	**11.1**	**B**	**6.6**	**A**

Table 6.4 – 2015 Build Condition Signalized Intersection Option
Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
4a - Porter Ave @ I-190 NB/Peace Bridge On-Ramps (Ramps P & PN)					
EB	L	9.3	A	12.5	B
EB	L	20.0	B	16.3	B
EB	T	20.1	C	18.4	B
EB	R	21.4	C	17.9	B
WB	T	14.1	B	13.1	B
WB	R	2.4	A	0.3	A
WB	R	19.4	B	13.4	B
	Overall	**18.9**	**B**	**14.0**	**B**
5 - Busti Ave @ Sheridan Ter / Massachusetts Ave					
NB	T	7.3	A	10.4	B
NB	R	3.9	A	7.1	A
NB	R	6.6	A	0.0	A
SB	L	16.8	C	21.7	C
SB	L	13.1	B	17.0	B
SB	T	0.2	A	0.2	A
	Overall	**4.4**	**A**	**6.0**	**A**
6 - Niagara St @ Pennsylvania St					
NB	L	15.5	B	7.5	A
NB	T	7.0	A	6.3	A
SB	T	8.6	A	13.7	B
SB	R	8.3	A	14.3	B
WB	L	17.7	B	38.4	D
WB	T	19.7	B	40.4	D
WB	R	5.5	A	8.9	A
	Overall	**8.8**	**A**	**12.9**	**B**
7 - Niagara St @ Jersey St					
NB	T	7.4	A	8.9	A
NB	R	7.4	A	9.5	A
SB	L	14.9	B	12.8	B
SB	T	6.6	A	9.5	A
EB	L	13.1	B	15.0	B
EB	T	21.0	C	15.4	B
EB	R	19.2	B	12.0	B
	Overall	**7.4**	**A**	**9.5**	**A**
8 - Niagara St @ Connecticut St					
NB	T	3.4	A	7.5	A
NB	R	8.1	A	2.9	A
SB	L	11.4	B	23.9	C
SB	T	10.8	B	9.7	A
EB	L	0.5	A	1.8	A
EB	T	13.8	B	7.8	A
EB	R	5.0	A	3.2	A
WB	L	17.1	B	16.2	B
WB	R	12.4	B	10.6	B
	Overall	**9.7**	**A**	**9.6**	**A**

Table 6.4 – 2015 Build Condition Signalized Intersection Option
Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
9 - Niagara St @ Rhode Island St					
NB	T	6.4	A	9.2	A
NB	R	4.3	A	7.4	A
SB	L	11.7	B	19.2	B
SB	T	8.7	A	9.1	A
EB	L	18.3	B	10.3	B
EB	T	15.5	B	12.9	B
EB	R	3.9	A	5.8	A
	Overall	**8.0**	**A**	**9.6**	**A**
10 - Niagara St @ Massachusetts Ave					
NB	L	11.1	B	6.4	A
NB	T	3.7	A	4.0	A
NB	R	3.4	A	3.2	A
SB	L	3.8	A	19.8	B
SB	T	4.3	A	16.8	B
SB	R	2.7	A	6.6	A
EB	L	18.1	B	13.8	B
EB	T	15.6	B	11.6	B
EB	R	16.0	B	12.1	B
WB	L	18.4	B	13.0	B
WB	T	14.4	B	14.1	B
WB	R	16.1	B	10.9	B
	Overall	**8.0**	**A**	**9.8**	**A**
11 - Niagara St @ Hampshire St					
NB	L	6.9	A	3.3	A
NB	T	1.7	A	4.4	A
NB	R	1.5	A	2.7	A
SB	L	1.7	A	2.9	A
SB	T	0.2	A	0.2	A
SB	R	0.3	A	0.2	A
EB	L	7.5	A	10.4	B
EB	T	8.5	A	10.3	B
EB	R	5.7	A	6.3	A
WB	L	8.5	A	10.5	B
WB	T	8.5	A	10.0	A
WB	R	4.9	A	5.8	A
	Overall	**3.0**	**A**	**4.1**	**A**
12 - Niagara St @ Busti Ave					
NB	T	13.0	B	10.1	B
NB	R	3.8	A	6.9	A
SB	L	4.3	A	16.7	B
SB	T	1.3	A	0.9	A
WB	R	6.3	A	21.3	C
	Overall	**6.5**	**A**	**10.4**	**B**

Table 6.5 – 2015 Build Condition Signalized Intersection Option
Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
2 - Porter Ave @ I-190 SB Off-Ramp					
SB	L	4.8	A	5.3	A
EB	T	1.6	A	0.3	A
WB	T	0.0	A	0.3	A
	Overall	**4.5**	**A**	**2.9**	**A**
3 - Busti Ave @ Connecticut St					
SB	L	0.5	A	0.5	A
SB	T	0.2	A	0.2	A
	Overall	**0.3**	**A**	**0.2**	**A**
4 - Busti Ave @ Vermont St					
SB	T	8.5	A	8.1	A
WB	L	6.9	A	6.2	A
	Overall	**8.2**	**A**	**7.7**	**A**
5 - Busti Ave @ Rhode Island St					
SB	L	0.4	A	0.5	A
SB	T	0.1	A	0.1	A
	Overall	**0.1**	**A**	**0.2**	**A**
6 - Busti Ave @ NB Sheridan Terrace (Hook Ramp)					
SB	T	0.2	A	0.2	A
EB	R	3.1	A	4.2	A
	Overall	**2.5**	**A**	**2.7**	**A**
7 - Busti Ave @ Seventh St					
NB	T	0.3	A	0.5	A
SB	T	0.3	A	0.2	A
WB	L	0.0	A	8.2	A
WB	R	6.1	A	6.8	A
	Overall	**0.5**	**A**	**1.0**	**A**
8 - Busti Ave @ Hampshire St					
NB	T	1.2	A	1.1	A
NB	R	1.1	A	0.8	A
SB	T	0.2	A	0.2	A
WB	L	8.1	A	8.0	A
	Overall	**1.3**	**A**	**1.0**	**A**

Table 6.5 – 2015 Build Condition Signalized Intersection Option
Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
9 - Niagara St @ Vermont St					
NB	L	2.5	A	2.4	A
NB	T	1.0	A	1.4	A
SB	T	1.4	A	1.2	A
SB	R	1.7	A	3.7	A
WB	L	7.7	A	10.4	B
WB	T	9.6	A	11.3	B
WB	R	7.2	A	7.8	A
	Overall	**2.1**	**A**	**2.6**	**A**
10 - Niagara St @ School St					
NB	T	0.6	A	0.4	A
NB	R	1.0	A	1.2	A
SB	L	0.3	A	4.9	A
SB	T	0.6	A	0.6	A
WB	L	8.5	A	11.1	B
	Overall	**0.7**	**A**	**0.7**	**A**
11 - Niagara St @ Prospect Ave					
NB	T	0.2	A	0.3	A
SB	T	1.0	A	0.7	A
WB	L	0.0	A	9.8	A
WB	R	0.0	A	5.4	A
	Overall	**0.6**	**A**	**0.6**	**A**

2045

The results of the 2045 Build condition Signalized Intersection Option freeway and ramp segment analyses are provided in **Tables 6.6 and 6.7**, respectively. As for 2015 conditions, the I-190 mainline and ramps would basically operate the same for the Build Alternative as for the No Build condition and all levels of service would remain the same.

The results of the 2045 Build condition Signalized Intersection Option signalized and unsignalized intersection analyses are provided in Tables **6.8 and 6.9**, respectively. All intersections would continue to operate well for the Build Alternative and at the same or better levels of service than for the No Build condition.

6.3.3 Roundabout Option

The traffic analysis for the Build condition Roundabout Option incorporated the basic Build Alternative design, the Roundabout Option design, and the mitigating measures identified in the preliminary evaluation. The analysis indicated that there would be little difference in traffic operations between the Roundabout and Signalized Intersection Options. The only notable differences would be along Porter Avenue and primarily in the Ramps P and PN area. For this reason, only the Roundabout Option traffic analysis results at the Porter Avenue intersections are provided below. Traffic operations for the I-190 freeway and ramp segments and at all other intersections would be the same as presented for the Signalized Intersection Option (see **Tables 6.2 through 6.9**).

2015

The results of the 2015 Build condition Roundabout Option signalized and unsignalized intersection analyses for Porter Avenue are provided in **Tables 6.10 and 6.11**, respectively. Traffic would operate well along Porter Avenue for 2015 conditions. Levels of service at the intersections from Busti Avenue north typically would be the same as for the Signalized Intersection Option. At Porter Avenue and Ramps P and PN, traffic operations would be improved with the roundabout option, since traffic flow at the intersection would be uninterrupted. The roundabout would alter traffic operations minimally at the immediately adjacent intersections.

2045

The results of the 2045 Build condition Roundabout Option signalized and unsignalized intersection analyses for Porter Avenue are provided in **Tables 6.12 and 6.13**, respectively. As indicated, all intersections along Porter Avenue would continue to operate well in 2045 – typically at LOS B or better. With the Build Alternative and recommended improvements, Porter Avenue at Niagara Street would operate better than for the No Build condition.

Table 6.6 – 2045 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Basic Freeway Segment Analysis Results

Mainline Analysis Location	Weekday					
	AM Peak Hour			PM Peak Hour		
	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)	LOS
I-190 NB						
1 - Mainline between Niagara Street on- and off-ramps	57	24	C	21	59	F
2 - Mainline between Niagara Street on-ramp and Peace Bridge off-ramp	56	26	D	33	40	E
3 - Mainline between Peace Bridge off-ramp and Porter Avenue on-ramp	56	28	D	48	33	D
4a - Mainline between Porter Avenue on-ramp and Peace Bridge Plaza/Ramp D on-ramp	56	33	D	51	36	E
4b - Mainline between new Ramp D on-ramp and Scajaquada Expressway off-ramp	56	35	D	54	36	E
5 - Mainline between Scajaquada Expressway off- and on-ramps	57	24	C	50	30	D
6 - Mainline between Scajaquada Expressway on-ramp and Amherst Street off-ramp	53	32	D	51	37	E
I-190 SB						
7 - Mainline between Hamilton Street on-ramp and Scajaquada Expressway off-ramp	29	80	F	41	52	F
8 - Mainline between Scajaquada Expressway off- and on-ramps	56	30	D	34	47	F
9 - Mainline between Scajaquada Expressway on-ramp and Porter Avenue off-ramp	56	39	E	56	38	E
10 - Mainline between Porter Avenue off-ramp and Peace Bridge on-ramp	50	36	E	54	35	D
11 - Mainline between Peace Bridge on-ramp and Niagara Street off-ramp	32	54	F	50	34	D
12 - Mainline between Niagara Street off- and on-ramps	57	22	C	56	27	D
13 - Mainline between Niagara Street on-ramp and Church Street on-ramp	57	25	C	56	30	D

Table 6.7 – 2045 Build Condition Signalized Intersection Option Weekday AM and PM Peak-Hour Weaving, Merge, and Diverge Segment Analysis Results

Ramp Analysis Location	Weekday					
	AM Peak Hour			PM Peak Hour		
	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)	LOS
I-190 NB						
1 - Weave between Church Street on-ramp and Niagara Street off-ramp	47	30	D	10	140	F
2 - Merge at Niagara Street on-ramp	56	24	C	17	84	F
3 - Diverge at Peace Bridge off-ramp	54	22	C	53	22	C
4- Merge at Porter Avenue on-ramp	52	27	C	39	40	F
4a - Merge at Peace Bridge Plaza/Ramp D on-ramp	56	31	D	56	32	D
5 - Diverge at Scajaquada Expressway off-ramp	52	28	D	51	30	D
6 - Merge at Scajaquada Expressway on-ramp	50	26	C	42	34	D
I-190 SB						
7 - Diverge at Scajaquada Expressway off-ramp	43	43	F	36	48	F
8 - Merge at Scajaquada Expressway on-ramp	52	32	D	27	59	F
9 - Diverge at Porter Avenue off-ramp	51	35	D	54	39	F
10 - Merge at Peace Bridge on-ramp	57	36	F	50	39	F
11 - Diverge at Niagara Street off-ramp	42	33	D	43	39	F
12 - Merge at Niagara Street on-ramp	50	25	C	46	38	F

Table 6.8 – 2045 Build Condition Signalized Intersection Option
Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Niagara St					
NB	L	6.5	A	71.3	E
NB	T	4.4	A	51.6	D
NB	R	5.4	A	46.0	D
SB	L	6.3	A	55.5	E
SB	T	10.5	B	38.9	D
SB	R	11.2	B	45.1	D
EB	L	16.3	B	40.1	D
EB	T	22.3	C	33.0	C
EB	R	17.1	B	26.6	C
WB	L	17.0	B	58.0	E
WB	T	15.8	B	32.7	C
WB	R	15.6	B	29.0	C
	Overall	**14.1**	**B**	**43.6**	**D**
2 - Porter Ave @ Columbus Pkwy / Seventh St					
NB	L	15.5	B	10.8	B
NB	T	13.3	B	10.2	B
NB	R	12.6	B	11.3	B
EB	L	12.2	B	16.0	B
EB	T	13.2	B	9.9	A
WB	T	6.5	A	8.3	A
WB	R	5.8	A	7.3	A
	Overall	**10.2**	**B**	**9.2**	**A**
3 - Porter Ave @ Busti Ave					
SB	L	25.0	C	16.1	B
SB	T	21.8	C	16.9	B
SB	R	24.9	C	20.5	C
EB	T	1.2	A	1.4	A
EB	R	1.8	A	1.6	A
WB	L	11.0	B	9.8	A
WB	T	5.0	A	8.6	A
	Overall	**7.2**	**A**	**8.5**	**A**
4 - Porter Ave @ Front Park Driveway / Lakeview Ave					
NB	L	16.3	B	11.4	B
NB	T	0.0	A	0.0	A
NB	R	11.2	B	13.1	B
SB	L	16.3	B	14.1	B
SB	T	0.0	A	0.0	A
SB	R	0.0	A	4.9	A
EB	L	38.4	D	0.0	A
EB	T	11.0	B	3.1	A
EB	R	8.2	A	2.3	A
WB	L	14.3	B	12.3	B
WB	T	10.3	B	9.6	A
WB	R	6.5	A	8.0	A
	Overall	**11.0**	**B**	**7.9**	**A**

Table 6.8 – 2045 Build Condition Signalized Intersection Option
Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
4a - Porter Ave @ I-190 NB/Peace Bridge On-Ramps (Ramps P & PN)					
EB	L	9.5	A	14.8	B
EB	L	17.9	B	18.0	B
EB	T	19.7	B	20.0	B
EB	R	20.3	C	19.6	B
WB	T	20.0	B	21.2	C
WB	R	0.8	A	0.6	A
WB	R	25.2	C	22.4	C
	Overall	**20.7**	**C**	**17.9**	**B**
5 - Busti Ave @ Sheridan Ter / Massachusetts Ave					
NB	T	8.3	A	12.0	B
NB	R	6.0	A	9.7	A
NB	R	12.6	B	0.0	A
SB	L	11.9	B	17.1	B
SB	L	11.8	B	17.1	B
SB	T	0.3	A	0.2	A
	Overall	**5.1**	**A**	**7.0**	**A**
6 - Niagara St @ Pennsylvania St					
NB	L	17.7	B	6.2	A
NB	T	7.3	A	7.4	A
SB	T	9.9	A	9.4	A
SB	R	6.7	A	9.7	A
WB	L	17.2	B	39.7	D
WB	T	22.6	C	44.9	D
WB	R	4.2	A	13.4	B
	Overall	**9.6**	**A**	**11.6**	**B**
7 - Niagara St @ Jersey St					
NB	T	8.0	A	18.7	B
NB	R	7.5	A	19.8	B
SB	L	22.3	C	12.6	B
SB	T	8.6	A	7.2	A
EB	L	22.6	C	15.8	B
EB	T	19.8	B	14.0	B
EB	R	15.0	B	12.5	B
	Overall	**8.7**	**A**	**14.1**	**B**
8 - Niagara St @ Connecticut St					
NB	T	4.2	A	9.3	A
NB	R	7.9	A	5.5	A
SB	L	13.4	B	29.8	C
SB	T	11.0	B	10.3	B
EB	L	3.2	A	0.7	A
EB	T	17.2	B	11.8	B
EB	R	7.5	A	4.5	A
WB	L	18.6	B	17.1	B
WB	R	13.1	B	11.4	B
	Overall	**10.8**	**B**	**10.9**	**B**

Table 6.8 – 2045 Build Condition Signalized Intersection Option
Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
9 - Niagara St @ Rhode Island St					
NB	T	6.7	A	8.5	A
NB	R	4.3	A	7.4	A
SB	L	13.3	B	20.5	C
SB	T	10.1	B	7.0	A
EB	L	16.5	B	12.5	B
EB	T	17.2	B	16.3	B
EB	R	4.5	A	5.4	A
	Overall	**9.2**	**A**	**8.6**	**A**
10 - Niagara St @ Massachusetts Ave					
NB	L	7.3	A	6.3	A
NB	T	3.9	A	4.0	A
NB	R	3.9	A	3.5	A
SB	L	3.8	A	9.0	A
SB	T	4.2	A	3.3	A
SB	R	2.7	A	2.7	A
EB	L	13.5	B	10.4	B
EB	T	18.0	B	13.5	B
EB	R	17.8	B	12.3	B
WB	L	21.3	C	14.2	B
WB	T	17.0	B	14.3	B
WB	R	19.5	B	13.7	B
	Overall	**9.1**	**A**	**5.9**	**A**
11 - Niagara St @ Hampshire St					
NB	L	7.2	A	4.1	A
NB	T	1.9	A	5.5	A
NB	R	1.4	A	3.7	A
SB	L	1.4	A	3.7	A
SB	T	0.3	A	0.2	A
SB	R	0.3	A	0.2	A
EB	L	6.8	A	9.6	A
EB	T	8.2	A	12.8	B
EB	R	6.6	A	7.7	A
WB	L	9.3	A	11.9	B
WB	T	9.4	A	12.2	B
WB	R	6.4	A	7.8	A
	Overall	**3.2**	**A**	**5.2**	**A**
12 - Niagara St @ Busti Ave					
NB	T	12.0	B	11.1	B
NB	R	2.2	A	8.5	A
SB	L	4.3	A	10.5	B
SB	T	1.5	A	1.1	A
WB	R	6.7	A	10.6	B
	Overall	**6.5**	**A**	**7.7**	**A**

Table 6.9 – 2045 Build Condition Signalized Intersection Option
Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
2 - Porter Ave @ I-190 SB Off-Ramp					
SB	L	4.4	A	8.2	A
EB	T	1.2	A	0.5	A
WB	T	0.1	A	0.3	A
	Overall	**4.0**	**A**	**4.3**	**A**
3 - Busti Ave @ Connecticut St					
SB	L	0.8	A	0.4	A
SB	T	0.2	A	0.2	A
	Overall	**0.3**	**A**	**0.2**	**A**
4 - Busti Ave @ Vermont St					
SB	T	8.7	A	8.6	A
WB	L	7.0	A	6.3	A
	Overall	**8.5**	**A**	**8.2**	**A**
5 - Busti Ave @ Rhode Island St					
SB	L	0.5	A	0.6	A
SB	T	0.1	A	0.2	A
	Overall	**0.2**	**A**	**0.2**	**A**
6 - Busti Ave @ NB Sheridan Terrace (Hook Ramp)					
SB	T	0.2	A	0.2	A
EB	R	4.8	A	6.4	A
	Overall	**4.0**	**A**	**4.5**	**A**
7 - Busti Ave @ Seventh St					
NB	T	0.4	A	0.6	A
SB	T	0.3	A	0.2	A
WB	L	0.0	A	9.2	A
WB	R	6.5	A	7.1	A
	Overall	**0.6**	**A**	**1.2**	**A**
8 - Busti Ave @ Hampshire St					
NB	T	1.5	A	1.2	A
NB	R	1.0	A	1.0	A
SB	T	0.3	A	0.2	A
WB	L	8.9	A	9.2	A
	Overall	**1.6**	**A**	**1.3**	**A**

Table 6.9 – 2045 Build Condition Signalized Intersection Option
Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results Cont'd

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
9 - Niagara St @ Vermont St					
NB	L	3.2	A	3.1	A
NB	T	0.8	A	2.0	A
SB	T	1.7	A	1.2	A
SB	R	1.8	A	3.5	A
WB	L	8.0	A	12.7	B
WB	T	9.9	A	14.1	B
WB	R	7.1	A	9.1	A
	Overall	**2.2**	**A**	**3.2**	**A**
10 - Niagara St @ School St					
NB	T	0.6	A	0.5	A
NB	R	1.1	A	1.4	A
SB	L	0.8	A	5.5	A
SB	T	0.7	A	0.8	A
WB	L	9.3	A	15.8	C
	Overall	**0.8**	**A**	**0.8**	**A**
11 - Niagara St @ Prospect Ave					
NB	T	0.3	A	0.4	A
SB	T	1.2	A	0.8	A
WB	L	0.0	A	13.2	B
WB	R	0.0	A	5.4	A
	Overall	**0.8**	**A**	**0.7**	**A**

Table 6.10 – 2015 Build Condition Roundabout Option Porter Avenue Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Niagara St					
NB	L	7.0	A	59.1	E
NB	T	5.2	A	22.0	C
NB	R	6.7	A	23.9	C
SB	L	14.4	B	58.1	E
SB	T	13.3	B	31.1	C
SB	R	14.7	B	29.5	C
EB	L	24.6	C	56.8	E
EB	T	39.4	D	28.6	C
EB	R	29.2	C	22.2	C
WB	L	19.7	B	59.6	E
WB	T	16.3	B	34.3	C
WB	R	13.2	B	28.8	C
	Overall	**21.8**	**C**	**34.5**	**C**
2 - Porter Ave @ Columbus Pkwy / Seventh St					
NB	L	20.7	C	10.5	B
NB	T	24.4	C	11.5	B
NB	R	28.3	C	10.5	B
EB	L	0.0	A	24.5	C
EB	T	16.4	B	14.8	B
WB	T	6.0	A	16.6	B
WB	R	5.1	A	12.4	B
	Overall	**13.0**	**B**	**16.1**	**B**
3 - Porter Ave @ Busti Ave					
SB	L	26.7	C	17.2	B
SB	T	22.9	C	19.5	B
SB	R	24.4	C	22.6	C
EB	T	1.7	A	4.7	A
EB	R	1.6	A	5.6	A
WB	L	9.0	A	12.9	B
WB	T	4.3	A	9.3	A
	Overall	**7.2**	**A**	**10.0**	**A**
4 - Porter Ave @ Front Park Driveway / Lakeview Ave					
NB	L	17.7	B	23.4	C
NB	T	0.0	A	0.0	A
NB	R	20.4	C	19.9	B
SB	L	18.9	B	21.1	C
SB	T	0.0	A	0.0	A
SB	R	0.0	A	2.6	A
EB	L	26.8	C	30.3	C
EB	T	6.1	A	3.0	A
EB	R	3.2	A	1.1	A
WB	L	13.3	B	12.5	B
WB	T	6.0	A	9.5	A
WB	R	2.5	A	10.0	A
	Overall	**6.7**	**A**	**8.4**	**A**

Table 6.11 – 2015 Build Condition Roundabout Option Porter Avenue Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1a - Porter Ave @ I-190 NB/Peace Bridge On-Ramps (Ramps P & PN)					
EB	L	0.6	A	0.6	A
EB	L	0.5	A	0.7	A
EB	T	0.7	A	0.8	A
EB	R	0.9	A	0.9	A
WB	L	4.1	A	7.0	A
WB	T	2.5	A	6.3	A
WB	R	3.9	A	6.4	A
WB	R	0.7	A	0.9	A
	Overall	**1.8**	**A**	**3.3**	**A**
2 - Porter Ave @ I-190 SB Off-Ramp					
SB	L	2.6	A	4.6	A
EB	T	0.0	A	0.2	A
WB	T	0.2	A	0.1	A
	Overall	**2.5**	**A**	**2.5**	**A**

Table 6.12 – 2045 Build Condition Roundabout Option Porter Avenue Weekday AM and PM Peak-Hour Signalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 - Porter Ave @ Niagara St					
NB	L	43.6	D	70.7	E
NB	T	5.6	A	53.1	D
NB	R	7.0	A	50.0	D
SB	L	32.0	C	55.3	E
SB	T	17.6	B	36.9	D
SB	R	13.4	B	45.4	D
EB	L	31.7	C	41.5	D
EB	T	30.8	C	33.4	C
EB	R	22.7	C	27.8	C
WB	L	70.4	E	55.6	E
WB	T	17.3	B	32.8	C
WB	R	16.2	B	30.1	C
	Overall	**23.0**	**C**	**43.8**	**D**
2 - Porter Ave @ Columbus Pkwy / Seventh St					
NB	L	15.5	B	10.4	B
NB	T	15.1	B	10.2	B
NB	R	13.0	B	11.8	B
EB	L	12.6	B	17.1	B
EB	T	11.0	B	11.5	B
WB	T	4.8	A	8.4	A
WB	R	5.2	A	7.9	A
	Overall	**8.4**	**A**	**9.9**	**A**
3 - Porter Ave @ Busti Ave					
SB	L	24.0	C	18.1	B
SB	T	21.7	C	18.0	B
SB	R	22.3	C	21.0	C
EB	T	1.4	A	3.8	A
EB	R	2.2	A	3.8	A
WB	L	10.8	B	9.7	A
WB	T	5.0	A	8.2	A
	Overall	**7.1**	**A**	**9.2**	**A**
4 - Porter Ave @ Front Park Driveway / Lakeview Ave					
NB	L	16.2	B	11.6	B
NB	T	0.0	A	0.0	A
NB	R	10.9	B	13.1	B
SB	L	16.3	B	14.2	B
SB	T	0.0	A	0.0	A
SB	R	0.0	A	5.0	A
EB	L	26.4	C	0.0	A
EB	T	6.4	A	7.3	A
EB	R	2.7	A	4.8	A
WB	L	18.9	B	12.4	B
WB	T	10.8	B	7.7	A
WB	R	6.1	A	6.2	A
	Overall	**9.1**	**A**	**8.0**	**A**

Table 6.13 – 2045 Build Condition Roundabout Option Porter Avenue Weekday AM and PM Peak-Hour Unsignalized Intersection Analysis Results

Intersection		Weekday			
		AM Peak Hour		PM Peak Hour	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1a - Porter Ave @ I-190 NB/Peace Bridge On-Ramps (Ramps P & PN)					
EB	L	0.8	A	0.6	A
EB	L	0.5	A	1.0	A
EB	T	0.7	A	1.2	A
EB	R	0.7	A	1.1	A
WB	L	7.0	A	10.8	B
WB	T	4.7	A	10.1	B
WB	R	6.1	A	7.3	A
WB	R	0.5	A	7.3	A
	Overall	**2.9**	**A**	**5.3**	**A**
2 - Porter Ave @ I-190 SB Off-Ramp					
SB	L	2.2	A	8.0	A
EB	T	0.0	A	0.2	A
WB	T	0.2	A	0.3	A
	Overall	**2.0**	**A**	**4.1**	**A**

7. CONCLUSION

The NY Gateway Connections project would provide direct access between the U.S.-bound Peace Bridge Plaza and northbound I-190 and would remove Baird Drive through Front Park, returning the property to green space within the park. The construction of the new Ramp D to northbound I-190 would eliminate the need for any U.S.-bound interstate traffic to use the local street system, and hundreds of vehicles per day, including some large trucks, would be removed from Baird Drive and westbound Porter Avenue. The construction of Ramp PN at Porter Avenue would maintain access to the Canada-bound Peace Bridge. Ramp PN would be closer to the Thruway than Baird Drive and, because of this, hundreds of vehicles per day, including trucks, destined to the Plaza from southbound I-190 would be removed from eastbound Porter Avenue. The removal of Baird Drive would also eliminate the existing intersection with Ramp A at the Canada-bound Peace Bridge Plaza. This would allow the existing traffic signal to be removed and traffic to operate free-flow in the Plaza area.

The NY Gateway Connections project could be achieved using either of the Build Alternative design options. Both the Signalized Intersection Option and the Roundabout Option for the Porter Avenue intersection at Ramps P and PN would work well in the short- and long-term with proposed traffic signal timing and geometric changes. In the short-term, signal timing, phasing, and offset changes are recommended to optimize traffic operations in the area with the localized changes in travel patterns resulting from this project. In the long-term, traffic simulation analyses indicate that geometric changes at Porter Avenue and Niagara Street may be necessary. It should be noted, however, that these geometric modifications (i.e., addition and/or lengthening of turning bays at the intersection) are needed more to accommodate forecast growth and the Niagara Street Gateway project than the NY Gateway Connections project. Because of this, it is not recommended that long-term geometric changes be made as part of this project. Instead, it is recommended that traffic volumes be monitored and geometric changes made as forecast volumes come to fruition. It is also suggested that traffic signal coordination models of the area be developed to ensure that recommended signal timings are optimized and provide adequate progression in the project area.