

# APPENDIX G

## Travel Demand Forecasting



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## G. Travel Demand Forecasting

The Niagara Frontier Metro Systems, Inc. (Metro), a wholly-owned subsidiary of the Niagara Frontier Transportation Authority (NFTA), is proposing to expand the existing 6.4-mile Metro Rail light-rail transit (LRT) from its current terminus at University Station on the University at Buffalo (UB) South Campus, along Kenmore Avenue, Niagara Falls Boulevard, Maple Road, and Sweet Home Road, through the UB North Campus to John James Audubon Parkway and Interstate 990 (I-990). Ten stations are proposed with two stations containing a park & ride facility—and a light maintenance/storage facility is proposed at the end of the line.

This report describes the methodology developed for estimating potential ridership for the Metro Rail Expansion (Proposed Action), key service characteristics, and resulting ridership forecasts. The potential demand for the Proposed Action comprises two key markets:

- Commute, shopping, personal business and other travel currently served by NFTA Metro bus and Metro Rail (“existing NFTA markets”).
- University at Buffalo campus-to-campus and intra-North Campus circulation trips currently using the Stampede shuttle bus system (“Stampede market”).

Forecasts are developed using Version 2.50 of the Federal Transit Administration (FTA) Simplified Trips-on-Project Software (STOPS). For this project, two different STOPS methods are employed:

- For the existing NFTA market, STOPS was applied in its synthetic mode. This STOPS approach synthesizes total trip-making based on schedule data contained in NFTA’s general transit feed specification (GTFS) files and travel demand information obtained from the 2006-2010 Census Transportation Planning Package (CTPP). Initial estimates of ridership by route and stop location are compared to counts from 2017-2018 and the model is adjusted to match current ridership patterns. Forecasts are prepared by:
  - Analyzing expected growth in population and employment projected by the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC) for each Traffic Analysis Zone (TAZ) and estimating the impact of this growth on total (all mode) travel demand; and
  - Evaluating changes to the transit network between existing, No Action, and Proposed Action scenarios and determining the impacts of these mobility changes on transit mode share.
- The Stampede market is estimated using the STOPS incremental method. This approach begins with a transit trip table derived from recent user surveys. STOPS then computes the change in demand that is anticipated to result from changes in population and employment projected by GBNRTC and from changes to the transit network between existing, No Action, and Proposed Action scenarios using procedures like those applied in the synthetic version of STOPS.

In most cases, the incremental form of STOPS is preferred by FTA for developing estimates of project-level ridership. Its use requires availability of a current survey that is carefully expanded to

represent total transit trip-making and on the project serving a mature, already-developed transit market. These conditions are largely met with the Stampede service, hence the use of the incremental method for the Stampede market.

By contrast, the NFTA market is not sufficiently mature and stable in parts of the Proposed Action corridor to support application of the incremental method. In particular:

- The Boulevard Mall will be redeveloped into a new mixed-use area with considerably higher population and employment densities than are present today. The new area could be substantially different in character than what exists in the area at present.
- The area along Audubon Parkway currently has very little NFTA service<sup>1</sup> and generates very few trips today. This could change with more direct and more frequent transit service to the area.

Both factors, together, mean that the incremental method is not suitable for either the two proposed stations that are located north of the North Campus of the University at Buffalo or for the station at Boulevard Mall.

Since the requirements for using the incremental method are not present for the existing NFTA market, these trips were forecasted using the Synthetic Method.

The remainder of this document is organized as follows:

- Section G.1 presents the methodology used for applying STOPS to the Metro Rail Expansion Project.
- Section G.2 presents key assumptions regarding the Proposed Action that is the basis of the ridership projections.
- Section G.3 presents the resulting forecasts of ridership for the project.

## **G.1 METHODOLOGY**

### **G.1.1 Geographic Scope of the Analysis**

The geographic scope of the analysis is based on the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC) region and includes all of Erie and Niagara Counties in New York.

Zones are based on the GBNRTC Traffic Analysis Zone (TAZ) system with state, county, and tract coding to describe the relationship between GBNRTC TAZs and the American Community Survey (ACS) Census Transportation Planning Products (CTPP) TAZs.

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<sup>1</sup> The service that does exist in the area operates on North Forest Road, a nearby local street

The zones representing the two main UB campuses are further subdivided to represent the catchment areas of the existing Stampede and University Shuttle services. These special zones (and their model names) are:

- South Campus
  - Area near Goodyear Residence Hall (\$450gy2)
  - Area near Main Circle (\$450mn)
  - Remainder of the campus
  
- North Campus
  - Area near Flint Circle (\$671fl)
  - Area near Lee Circle (\$671le)
  - Area near Lockwood Library (\$671li)
  - Area near Center for the Arts (\$671ca)
  - Area near the Alumni Arena (\$671ar)
  - Area Near Natural Sciences Complex (\$671ns)
  - Area near Governor’s Residence Halls (\$671go)
  - Area near Center for Tomorrow (\$671ce)
  - Area near Greiner Residence Hall (\$673gr)
  - Area near the Ellicott Complex (\$673el)
  - Remainder of the campus

One very large zone near the proposed Audubon Station was also split into 3 sections and walk links adjacent to this station and Boulevard Mall to account for internal circulation roads and driveways that can be used by the public to access the Proposed Action stations.

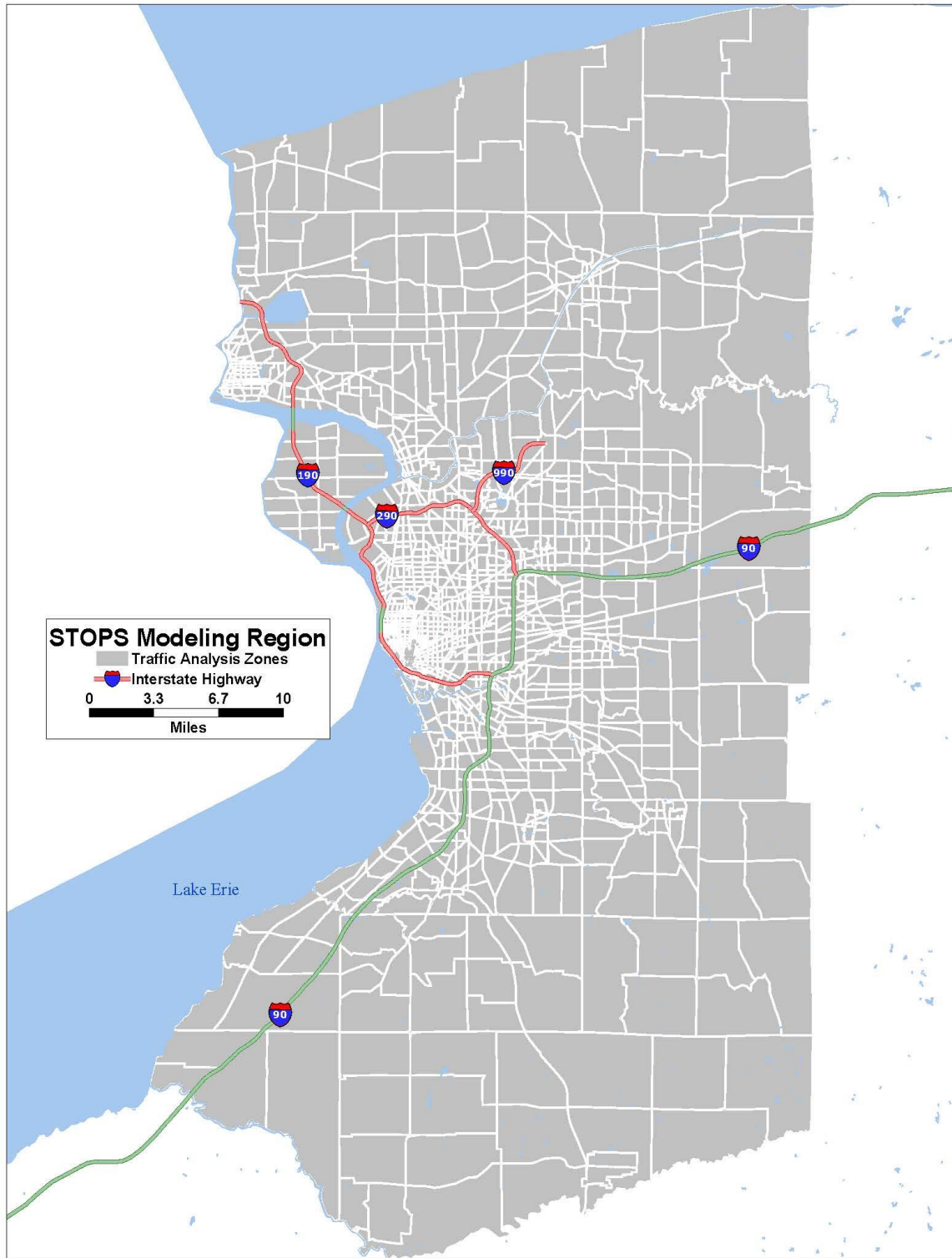
Figure G-1 presents an overview of the regional zone system and Figure G-2 shows a view of the zones in the Proposed Action corridor. Figures G-3 and G-4 present the detailed zones in the vicinity of the UB South and North campuses, respectively. Note that the special market zones are configured to be a relatively small part of the overall zone area. This practice is recommended by FTA for special zones as it preserves the CTPP-based demand estimates in addition to the special-market elements of transit demand.

As part of the STOPS implementation, a highly detailed system of 97 districts were defined to provide a high degree of resolution for reporting on existing and future transit travel demand patterns. This district system is depicted in Figure G-5 for the existing LRT corridor and Figure G-6 for the UB North Campus area. Separate districts are maintained for each special TAZ at the UB South and North Campuses.

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<sup>2</sup> “\$450gy” is the zone “name” used in STOPS data files and related mapping it is comprised of a dollar sign (“\$”) denoting a special zone, a 1 to 4 digit number indicating the GBNRTC zone number, and a 2-character abbreviation describing the location. Non-special zones are denoted with a “~” and the GBNRTC zone number. These zones represent multiple land uses and do not have a 2-character abbreviation.

**Figure G-1. Overview of Regional Zone System**

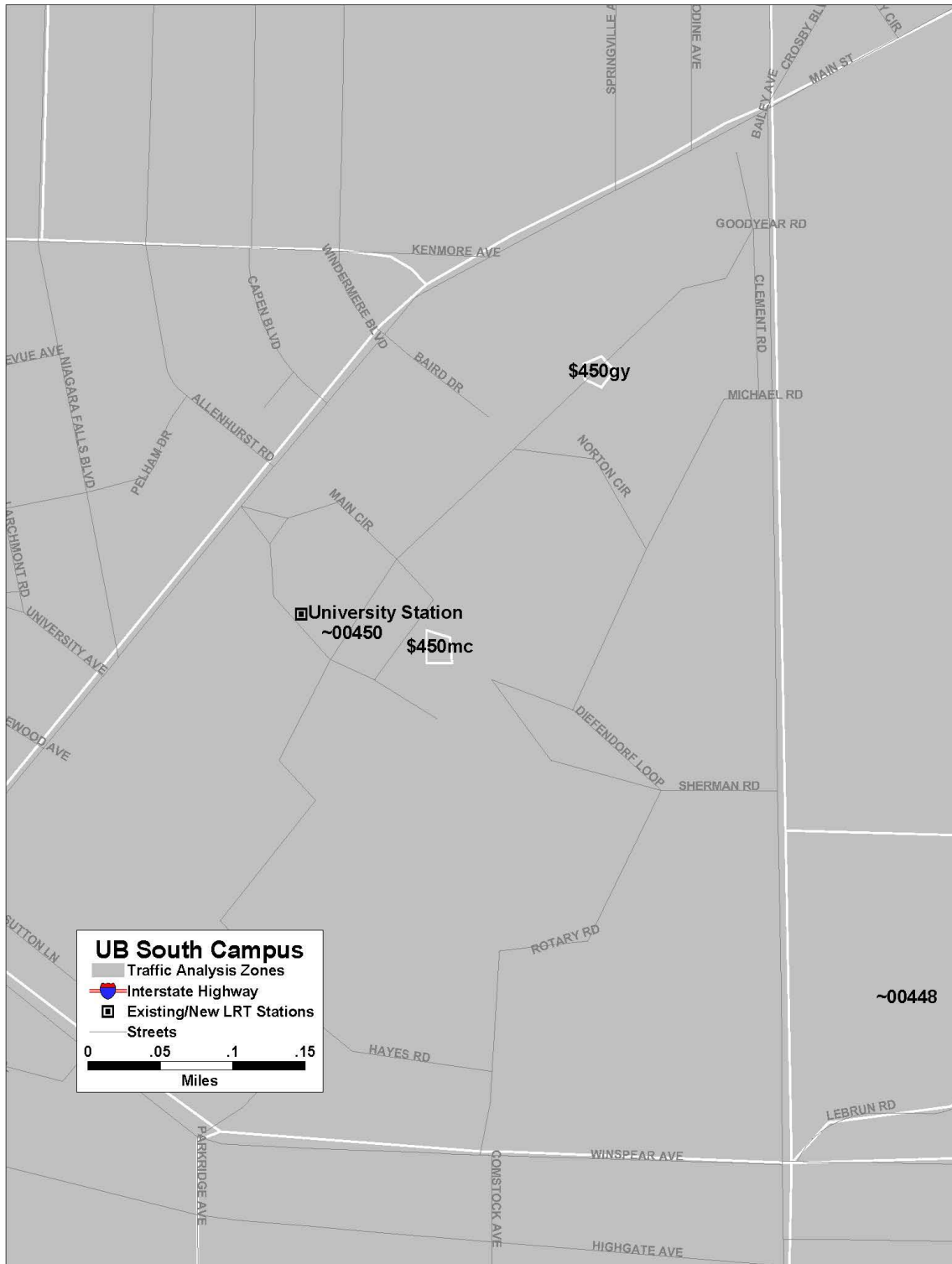




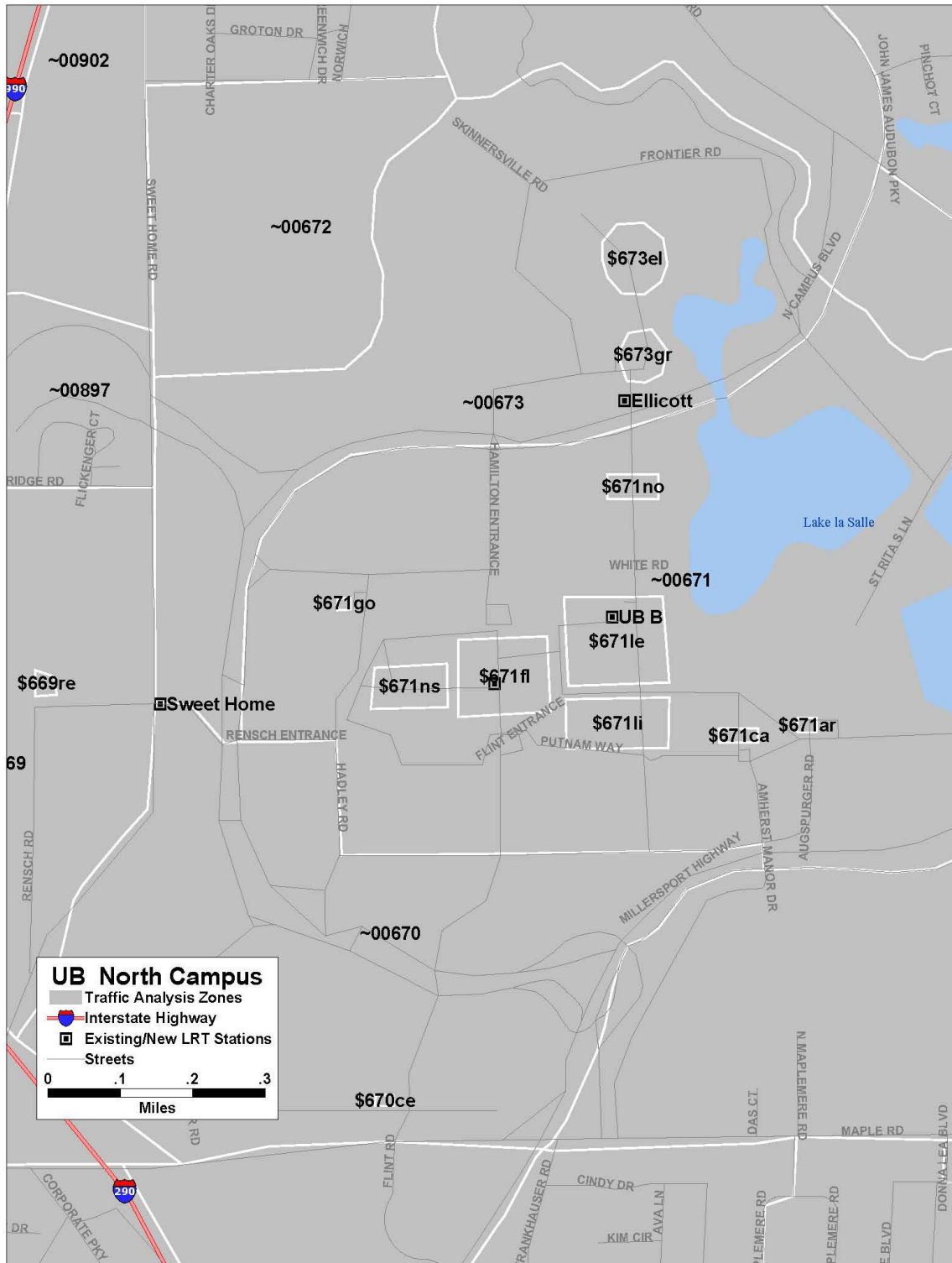
**Figure G-2. Zone System in the Existing and Proposed Action Corridor**



**Figure G-3. Zone System in University at Buffalo South Campus**



**Figure G-4. Zone System in University at Buffalo North Campus**



**Figure G-5. District System in the Existing Metro Rail Corridor**

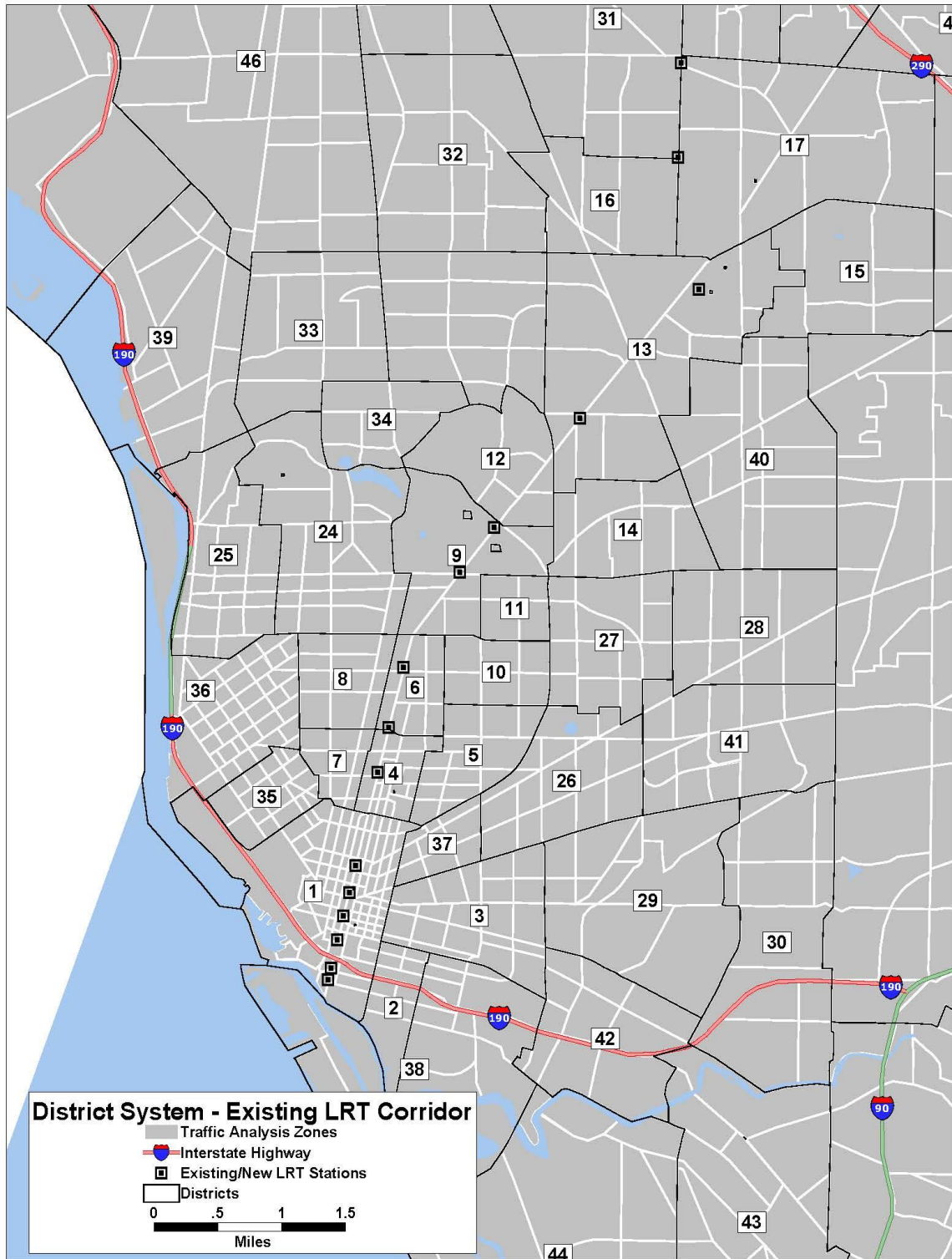
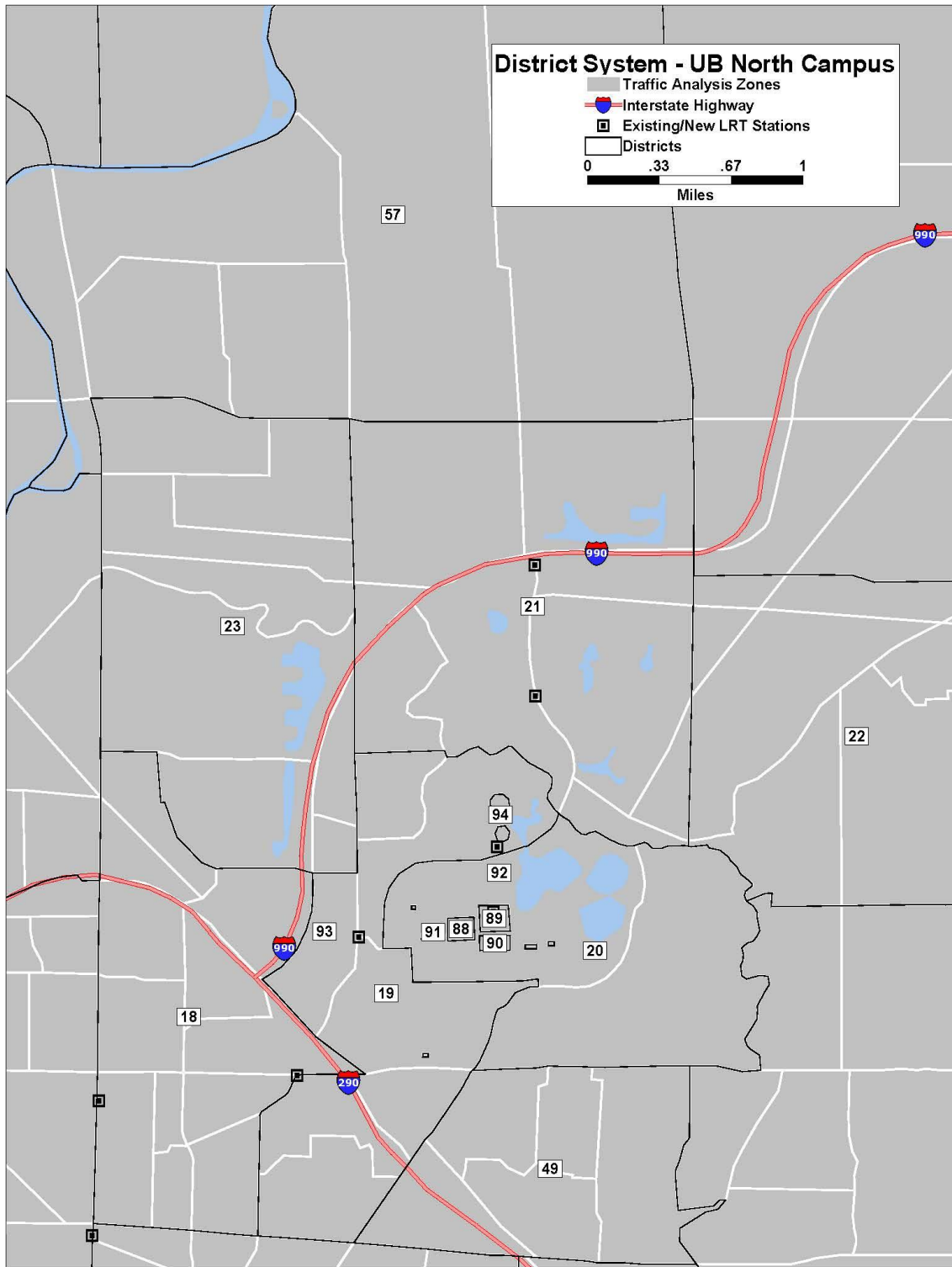


Figure G-6. District System in the UB North Campus Area



### G.1.2 Population and Employment Forecasts

Population and employment projections were provided by GBNRTC for 2015, 2030 and 2040. Intermediate years were interpolated. Table G-1 presents a summary of current and forecast year population and employment by district and organized into four broad categories: the existing Metro Rail corridor, the Proposed Acton corridor c, other GBNRTC zones, and special market zones. As this table shows, population in the existing Metro Rail corridor is projected to grow by 12 percent while employment is expected to grow by 31 percent between 2017 and 2040. The Proposed Action corridor is expected to grow at a more moderate rate—2 percent for population and 12 percent for employment between 2017 and 2040. Regional growth in population is expected to equal 2 percent for population and 15 percent for employment between 2017 and 2040.

A key driver for future-year ridership for the Proposed Action would be future enrollment and employment at the University at Buffalo and the degree to which academic programs would be located so that they require more or less commuting by students and faculty between different campuses. The University at Buffalo does not have official projections of future enrollment. UB staff have indicated that the GBNRTC forecasts of approximately 10 percent employment growth between 2017 and 2040 for Districts 13 and 20 (South and North Campuses, respectively) are generally consistent with their sense that the campuses will grow only modestly over the next 23 years.

**Table G-1. Summary of Population and Employment by District**

District	Population			Employment		
	2017	2040	Change	2017	2040	Change
1-CBD	6,940	8,901	28%	32,075	40,391	26%
4-LRT1	1,322	2,216	68%	10,822	19,453	80%
6-LRT2	2,795	3,236	16%	2,569	2,890	12%
7-wLR1	3,780	3,296	-13%	4,218	5,247	24%
8-wLR2	6,466	6,514	1%	5,175	5,558	7%
9-BFL20	5,349	5,982	12%	3,542	3,839	8%
12-BF20N	3,311	3,301	0%	3,818	3,822	0%
Subtotal, Existing LRT Corridor	29,963	33,446	12%	62,219	81,200	31%
13-LRT4	17,854	18,861	6%	11,613	12,854	11%
17-NofUB	13,740	13,533	-2%	7,036	8,378	19%
18-BlvdM	3,933	3,926	0%	11,192	12,525	12%
19-EofUB	6,751	7,265	8%	6,726	5,594	-17%
20-UBamh	536	534	0%	6,929	7,695	11%
21-AMH42	7,051	7,069	0%	8,988	11,321	26%
31-GrnAc	14,548	14,646	1%	5,401	6,216	15%
Subtotal, LRT Extension Corridor	64,413	65,834	2%	57,885	64,583	12%
Subtotal, Other	1,037,104	1,051,356	1%	536,898	611,024	14%
Special Zones	235	261	11%	646	706	9%
<b>TOTALS</b>	<b>1,131,715</b>	<b>1,150,897</b>	<b>2%</b>	<b>657,648</b>	<b>757,513</b>	<b>15%</b>

Source: GBNRTC Population and Employment Projections Summarized to STOPS Districts

### G.1.3 Highway Characteristics

Highway travel time skims for 2015 and 2040 were provided by GBNRTC and checked against on-line mapping estimates. During this review, it was determined that a fixed addition of 3 minutes to all travel times would be useful for improving the estimate of highway impedances, particularly for shorter trips. This fixed quantity was added to the highway skims as the input data files were being prepared. The resulting times required a multiplicative adjustment of 0.93 to match on-line times. This adjustment was accomplished using the STOPS auto time adjustment parameter. A summary of existing and future highway times (following all adjustments) are presented in Table G-2.

Highway skims contain one set of manual edits to represent detailed travel times between split zones on the UB North Campus. Distances were particularly important since they are used to represent the walk-all-the-way option. These distances were measured using on-line mapping programs to the centroid of each split zone.

**Table G-2. Comparison of Modeled Highway Travel Times to On-Line Estimates of Highway Times to CBD**

Origin TAZ	Nearby Intersection	Original GBNRTC Skim	On-Line Estimate	Adjusted Skim Value
177	Porter Ave/ Plymouth Ave	8.57	11.5	7.9
204	Jefferson Ave/Northampton St	8.78	8.8	8.1
511	Broadway/Herman St	8.37	8.1	7.8
291	S Park Ave/Louisiana St	7.18	6.1	6.7
363	Amherst St/ SR 384	13.6	12.8	12.6
439	Kensington Ave/Eggert Rd	13.78	14.1	12.8
762	William St/SR 240	14.46	15.5	13.4
561	S Park Ave/US 62	12.60	14.8	11.7
<b>667</b>	<b>I 290/I990 (Near North Campus of UB)</b>	<b>26.35</b>	<b>22.6</b>	<b>24.4</b>
1243	Clarence Center Rd/ SR 78	37.53	38.8	34.8
1454	William St/Bowen Rd	35.69	29.6	33.1
1040	US 20/SR 240	26.23	26.6	24.3
1371	Kinne Rd/Waterman Rd	51.73	42.0	48.0
1569	SR 5/Bamum Rd	49.27	48.8	45.7
1595	Omphallus Rd/ SR 391	42.49	30.9	39.4

Source: GBNRTC and STOPS Adjustments

### G.1.4 Transit Supply

Transit supply is represented by the following elements:

- Current NFTA bus and rail services as contained in the October 2017 NFTA schedules in General Transit Feed Specification (GTFS) format for the base year calibration and October 2018 NFTA schedules for the No Action condition and as the beginning-point for the development of the Proposed Action.
- Fall 2018 UB Stampede, Red Line, Yellow Line and North Campus Shuttle as published on the UB web site and manually converted to GTFS format. Services coded in the GTFS files include the Stampede, North-South Express, Lee-Ellicott Express, and the North Campus Shuttle. Other

services connect residential areas to the North Campus and neither the supply nor demand are represented inside STOPS. The Stampede and North-South Express routes are terminated for the Proposed Action leaving only the Lee-Ellicott Express and North Campus Shuttle as UB shuttle services after the LRT line is extended.

- A walk network based on a geographic database of individual streets in the modeling area with extra detail on the UB North Campus to represent internal walking opportunities.
- A station file with one station record for each bus or rail stop ID in the GTFS datasets. Key codes included for each station include:
  - GTFS stop\_id(s).
  - Year 2017-2018 average weekday boardings at the station/bus stop level
  - Station group definitions that correspond to the district for NFTA bus stops. LRT stations and UB stops have individual station groups to facilitate reporting.
  - STOPS type set to 1 for bus stops and surface LRT stations. Underground LRT stations are coded as 3, 5, or 7 depending on their depth. Station platforms less than 25 feet below the surface (no current stations) are treated as level “-1” and are assigned a type of 3. Station platforms between 26 and 50 feet (LaSalle, Amherst, Utica, Summer-Best, and Allen/Medical Campus) are treated as level “-2” and are assigned a type of “5”. Stations deeper than 50 feet (University, Humboldt, and Delavan-Canisius) are treated as level “-3” and are assigned a type of “7”.
  - Recode NFTA Metro Rail services with route\_type equal 1 so that Metro Rail services are always represented as full fixed guideway.
  - Code all PNR lots in region. However, exclude the PNR lot at University Station from the Stampede market run to prevent unlikely campus-to-campus trips parking at the University Station PNR lot.
- The fare structure is coded as follows:
  - NFTA services (except free services as described below) are coded as one-half of the day pass fare (i.e., \$2.50) and any additional transfers are free. Although a one trip ride costs just \$2.00, this simpler structure is within \$0.50 of the lowest fare available to the general public and avoids problems with over-estimating the cost of transfers under a variety of situations related to the specific pass types that are purchased.
  - UB Stampede services are assumed to be free to travelers within the UB North Campus and between the North and South Campuses of UB.
  - Free LRT services (downtown Buffalo Fare-Free LRT zone and future LRT services that will replace the existing Stampede bus are duplicated as separate LRT lines in a different GTFS file. These services are assigned with a suffix of “F” or “f” and are assumed in the fare structure file to be free.
  - The value of time is assumed to be \$9 per hour. This value was chosen to replicate the distribution of ridership between services that charge a fare and those that are free. This value is lower than the STOPS default of \$12/hour but appears appropriate given the high proportion of transit-dependent riders.



### **G.1.5 Transit Demand**

As noted above, the STOPS application was split into two elements: 1) a synthetic STOPS application to represent general transit (i.e., NFTA) ridership and 2) an incremental application to represent UB Stampede usage. This approach was selected since the transit market in the corridor is not sufficiently robust in all locations to support the incremental method. In particular, the proposed Boulevard Mall is slated for major redevelopment and project areas north of the UB North Campus have little or no transit service. By contrast, the UB market is robust and is a highly specialized market that is better represented using the incremental form of STOPS and an estimate of existing Stampede transit trips.

#### **G.1.5.1 NFTA Market**

The synthetic model estimates of travel demand from the Census Transportation Planning Products (CTPP) and data on transit ridership in the form of route and bus stop/rail station counts. Optionally, it can also use estimates of linked transit trips by purpose and auto ownership to develop a better understanding of the reasons for making transit trips and the socioeconomic characteristics of transit riders.

For the Proposed Action, transit linked trips by purpose and auto ownership were estimated from the 2013 NFTA on-board survey. Although a more recent survey was conducted, it is not weighted to represent total transit ridership. The older (2013) survey was weighted to represent 2013 and modest weighting adjustments could be used match 2017 ridership. Tables G-3 and G-4 present a route-level summary of the survey reweighting process.

Table G-5 presents a summary of the 2017 NFTA trip table developed from the 2013 survey.

**Table G-3. NFTA Weekday Route Ridership for 2013 and FY2018 and Adjustment to the On-Board Survey (Part 1 of 2)**

Route	Original 2013 Sum of Weights	2017-2018 Average Weekday Ridership	Adjustment to Survey to Represent 2018
1-William	1,642	1,466	0.89
2-Clinton	1,597	1,455	0.91
3-Grant	5,858	4,956	0.85
4-Broadway	2,818	2,564	0.91
5-Niagara/Kenmore	6,855	5,616	0.82
6-Sycamore	2,768	2,435	0.88
7-Baynes/Richmond	350	224	0.64
8-Main	1,318	1,442	1.09
11-Colvin	992	920	0.93
12-Utica	5,604	5,183	0.92
13-Kensington	3,396	2,828	0.83
14-Abbott	1,815	1,658	0.91
15-Seneca	2,090	2,170	1.04
16-South Park	1,954	1,853	0.95
18-Jefferson	758	514	0.68
19-Bailey	4,503	4,296	0.95
20-Elmwood	5,109	4,269	0.84
22-Porter/Best	1,171	1,321	1.13
23-Filmore/Hertel	4,915	4,579	0.93
24-Genesee	3,106	2,739	0.88
25—Delaware	3,177	2,680	0.84
26-Delevan	3,257	2,633	0.81
27-Erie County Home	88	88	1.00
29-Wohlers	170	138	0.81
32-Amherst	3,170	2,915	0.92
34-Niagara Falls Blvd	1,647	1,159	0.70
35-Sheridan	774	597	0.77
36-Hamburg	736	633	0.86
40-Grand Island	1,271	1,332	1.05
42-Lackawanna	138	153	1.11
44-Lockport	747	633	0.85
45-Metro Rail	21,564	15,186	0.70
46-Lancaster	265	356	1.34
47-Youngs Rd	512	375	0.73
48-Williamsville	940	822	0.87
49-Millard Suburban	154	227	1.47
50-Main/Niagara	495	494	1.00

Source: Analysis of 2013 Survey and NFTA

**Table G-4. NFTA Weekday Route Ridership for 2013 and FY2018 and Adjustment to the On-Board Survey (Part 2 of 2)**

Route	Original 2013 Sum of Weights	2017-2018 Average Weekday Ridership	Adjustment to Survey to Represent 2018
52-Hyde Park	306	274	0.90
54-Military	121	82	0.68
55-Pine Ave	1,175	986	0.84
57-Tonawandas	105	105	1.00
60-Niagara Falls Express	85	57	0.67
61-North Tonawanda Express	52	43	0.83
64-Lockport Express	67	39	0.58
66-Williamsville Express	97	75	0.77
67-Cleveland Hill Express	71	65	0.92
68-George Urban Express	26	21	0.81
69-Alden Express	63	48	0.76
70-East Aurora Express	62	38	0.61
72-Orchard Park Express	48	36	0.75
74-Hamburg Express	123	100	0.81
75-West Seneca Express	65	66	1.02
76-Lotus Bay Express	146	144	0.99
79-Tonawanda Express	28	30	1.07
81-Eastside Express	51	37	0.73
201-Lockport	34	34	1.00
204-Airport/Downtown Express	130	117	0.90
206-Buffalo State Circulator	42	40	0.95
211-ECC Circulator	216	216	1.00
<b>TOTALS</b>	<b>100,837</b>	<b>85,562</b>	<b>0.85</b>

Source: Analysis of 2013 Survey and NFTA

**Table G-5. Estimated Weekday NFTA Linked Transit Trips by Purpose and Auto Ownership, FY 2018**

Purpose	0-Car Households	1-Car Households	2+ -Car Households	Total
Home-Based Work	14,168	5,926	2,930	23,024
Home-Based Other	17,862	5,801	2,462	26,125
Non-Home Based	8,186	2,564	1,574	12,324
<b>TOTALS</b>	<b>40,216</b>	<b>14,291</b>	<b>6,966</b>	<b>61,473</b>

Source: 2013 NFTA Survey and FY2018 Route-Level Counts

### **G.1.5.2 Stampede Market**

Stampede ridership patterns were developed from a survey conducted in October 2014 and reweighted to match Stampede boarding and alighting counts from September-October 2018 and then further allocated to assign station-level trips to representative origin and destination zones within the UB North and South Campuses. The process is based on an iterative proportional fitting (IPF) technique and is done in stages to limit the incidence of very large adjustment factors that would distort the resulting trip table.

Specific steps are as follows:

1. Convert the unweighted 2014 UB Stampede survey into a stop-to-stop trip table. This table has a total of 4,339 survey records suitable for use in developing trip tables (approximately one third of all Stampede riders).
2. Estimate 2018 station-level boardings as equal to the counted boardings and alightings divided by two. Remove trips from the calibrated NFTA model that elect to use the Stampede shuttle bus. These are typically trips that access the South Campus by NFTA transit services and then transfer to the Stampede. Stop count data and the resulting estimate of average September-October 2018 ridership is presented in Table G-6.
3. Merge the estimate of Ellicott and Greiner stations into a single number (the survey had no records boarding or alighting at Greiner). These stops are close to one another and serve similar markets. The Ellicott/Greiner split will be estimated from survey origins and destinations in a later step.
4. Use an IPF technique to adjust the survey trip table to match counts but limit the goal for growth to 2.03-the growth needed to match demand at Main Circle and Goodyear (the two South Campus Stations). This goal is enough to closely match all stations except Ellicott/Greiner and Flint/Lee Loop which require a much higher adjustment factor to match the survey to counts. This deficiency of surveyed Ellicott/Greiner-Lee/Flint Loop trips in the survey database is most likely a result of the very short trip times (6 minutes) which are frequently under-represented in transit surveys due to the lack of enough time to distribute, complete, and collect surveys. So that this under-sample did not distort the remaining trip table, factoring of these markets was limited to the adjustment applied on longer distance trips. Then Ellicott/Greiner-to-Lee/Flint trips were manually added back in the next step to match control totals.
5. Add trips to represent under-sampled journeys and match counted ridership
  - a. Ellicott-Lee Circle – 350 trips

- b. Lee Circle-Ellicott – 200 trips
  - c. Flint (area) - Ellicott – 100 trips
  - d. Maynard-Flint Circle – 50 trips
  - e. Ellicott-Flint – 100 trips
6. Allocate services with limited UB North Campus station stops (i.e., those where the stop may not be indicative of the final destination) to origins and destinations according to distributions obtained from the survey:
- a. Redistribute 5.1% of Ellicott trip ends from Lee-Ellicott express to Greiner Hall
  - b. Redistribute 39.8% of Lee Circle trip ends from Lee-Ellicott express to Flint Loop area (20.3%), Library (9.5%), Center for the Arts (1.3%), Arena (2.4%), and Natural Sciences Complex (6.3%)
  - c. Redistribute 21.5% of Flint Circle trips ends from Stampede service to Lee Loop area (8.9%), Library (5.7%), Arena (1.2%), Center for the Arts (0.3%) and the Natural Sciences Complex (5.3%)

The resulting table of 2018 station-to-station UB Stampede trips are shown in Table G-7.

UB Stampede trips are distributed to home-based other and non-home based trip purposes and to auto ownership groups according to the university-related purposes found in the 2013 NFTA on-board survey. These percentages are as follows:

- Home-Based Other
  - 0-car households: 39%
  - 1-car households: 26%
  - 2+ car households: 14%
- Non-Home Based
  - 0-car households: 11%
  - 1-car households: 5%
  - 2+ car households: 5%

Workers making trips to UB facilities will generally ride NFTA transit services as part of their journey and these home-based work trips are captured in the NFTA survey. Table G-8 summarizes the UB Stampede trips developed from the UB Stampede survey and ridership counts.

**Table G-6. September-October UB Stampede Weekday Ridership (Unlinked Trips)**

Station	Ons	Offs	Average Boardings (ons+offs)/2	Adjustment to avoid double-counting from NFTA Model	Final Estimated Boardings
CLEMENT	22	83	53		53
ELLCOTT TUNNEL	2,166	1,954	2,060	-4	2,056
FLINT LOOP	2,789	2,979	2,884	-99	2,785
GOODYEAR	1,333	1,189	1,261	-36	1,225
GOVERNORS	263	224	244	-43	201
GREINER HALL	43	335	189		189
HADLEY VILLAGE	1	50	26		26
LEE LOOP	2,341	1,840	2,091		2,091
MAIN CIRCLE	1,772	1,736	1,754	-323	1,431
MAYNARD	184	29	107	-223	10 <sup>3</sup>
SERVICE CENTER RD.	241	68	155	-88	67
TOPS INTERNATIONAL	1	-	1		1
WEGMAN S	54	87	71		71
<b>TOTALS</b>	<b>11,210</b>	<b>10,574</b>	<b>10,892</b>	<b>-816</b>	<b>10,203</b>

Source: UB Stampede Passenger Counts

<sup>3</sup> Full adjustment to account for trips in the NFTA portion of the model could not be applied since the trips to be removed exceed the number of trips in the Stampede database. Ten trips were retained in the database so that factoring procedures would continue to work properly. This action resulted in the final database having approximately 130 more trips than originally intended. This variance is well within the precision of counted ridership estimates.

**Table G-7. Estimated UB Weekday Linked Origin-Destination Trips, 2018**

Station	Ellicott Dorns	Greiner	Lee Loop	Gov Hall	Flint Loop	Ctr Tomw	Mayn Drive	Good year	Main Circ	Libr ary	Arena	Ctr Arts	NSC	Total
Ellicott Dorns	-	-	848	35	789	3	1	123	175	267	66	34	183	2,524
Greiner	-	-	100	2	18	0	0	7	9	-	-	-	-	137
Lee Loop	459	45	19	48	44	12	2	215	250	10	2	1	9	1,115
Governors Hall	40	2	14	-	60	3	1	37	32	6	1	0	5	200
Flint Loop	1,024	55	30	48	87	32	5	643	725	13	3	2	10	2,676
Center for Tomorrow	7	0	5	3	39	-	-	2	3	3	1	0	3	66
Maynard Drive	0	0	1	0	8	0	-	0	-	1	0	0	1	10
Goodyear Hall	79	4	101	12	695	1	0	-	23	56	12	4	50	1,036
Main Circle/Health Library	86	5	131	17	817	5	0	15	-	68	15	5	61	1,224
Library	171	-	7	14	20	4	1	81	93	-	-	-	-	391
Arena	41	-	2	3	5	1	0	19	22	-	-	-	-	92
CtrArts	18	-	1	2	3	0	0	8	9	-	-	-	-	40
NSC	130	-	6	10	14	3	1	65	74	-	-	-	-	303
<b>TOTALS</b>	<b>2,054</b>	<b>111</b>	<b>1,264</b>	<b>192</b>	<b>2,597</b>	<b>65</b>	<b>10</b>	<b>1,213</b>	<b>1,417</b>	<b>423</b>	<b>101</b>	<b>46</b>	<b>321</b>	<b>9,815</b>

Source: UB 2014 Stampede Survey Adjusted to Match 2018 Counts

**Table G-8. Estimated Weekday UB Stampede Linked Transit Trips by Purpose and Auto Ownership, FY 2018**

Purpose	0-Car Households	1-Car Households	2+ -Car Households	Total
Home-Based Work	-	-	-	-
Home-Based Other	3,856	2,525	1,350	7,731
Non-Home Based	1,221	485	478	2,085
<b>TOTALS</b>	<b>4,977</b>	<b>2,525</b>	<b>1,828</b>	<b>9,815</b>

Source: 2014 UB Stampede Survey and 2018 Stop-Level Counts

### G.1.6 STOPS Application

STOPS reads the transportation supply and demand information described above and automatically calibrates itself so that the base year/existing simulation (i.e., current year estimate of transit ridership related to existing transit schedules) matches both linked and unlinked transit trip estimates developed from survey and count databases. Initial runs of the model were made without using the count-based adjustment procedures to confirm that the model had no major problems with the representation of transit service or ridership. Final runs are made using the count-based adjustment procedures and result in base-year STOPS ridership estimates that closely match counted ridership for groups of bus or rail stops and for individual routes.

### G.1.7 Validation

The final base year run was examined to confirm that the model has an appropriate grasp of the key markets that are the basis for the forecasts. Where available, model results with and without count-

based adjustment are examined to confirm that the underlying model understands transit markets in the region and that the count-based adjustments serve as a minor tune-up rather than a broad (and possibly inaccurate) revision to the underlying travel data.

Validation results are presented in Table G-9. Key findings are as follows:

- The model properly represents the ratio of unlinked to linked NFTA trips before and after the application of counts. This means that the willingness to transfer is appropriately represented and that count adjustments are not dramatically changing the nature of transit travel from that which is derived from the CTPP.
- The modeled UB Stampede ridership properly represents travel between the North and South Campuses of UB which is the largest single market for the Metro Rail extension. Nearly all of these riders are candidates for diversion to the extended LRT system. Travel within the North Campus is also appropriately represented and many of these riders may also be diverted to LRT.
- Existing LRT ridership is properly represented. The model closely matches ridership at the University Station, other stations in different segments of the line, within the fare-free zone downtown, and for Park-Ride access as compared to other access modes. For the most part, these markets are well represented before and after count-based adjustment. One exception is within-downtown trips before station adjustment. This is not unexpected since the Census Transportation Planning Package Journey-to-Work tables don't include non-home based circulation trips that are a sizable proportion of these fare-free trips. The count-based adjustment largely corrects this short-coming and the final estimate of intra-downtown trips closely matches count data.
- STOPS generates a close match to observed bus trips on a route-by-route basis after count-based adjustment. The model over-estimates these trips before the count adjustment suggesting that the model naturally over-estimates transit ridership in the corridor. However, the count-based adjustment successfully calms this tendency before its use in forecasting ridership for the LRT extension.
- STOPS closely replicates regional distributions of trips by purpose and auto ownership.



**Table G-9. Validation Summary**

Test (source of observed data and relevance)	Observed Value	Initial Model (Before Count Adjustment)	Final Model (After Count Adjustment)
Ratio of linked to unlinked NFTA trips (2013 NFTA survey, demonstrates understanding of willingness to transfer)	1.39	1.38	1.36
North Campus-South Campus Stampede Ridership ( <b>Sum</b> of NFTA and UB Stampede Markets, based on September-October 2018 UB Stampede boardings+ alightings at Goodyear & Main Circle, largest potential market for LRT extension)	6,030		6,074
Other Stampede Ridership (September-October 2018 UB Stampede ridership, potential for some of these riders to shift to LRT extension)	4,862		5,336
LRT Boardings by line segment (FY 2018 NFTA counts, shows that STOPS reflects overall ridership and geographic distribution of trips)			
University Station	2,728	2,594	2,664
LaSalle-Amherst Stations	1,941	2,898	1,990
Humboldt-Allen Medical Campus Stations	4,563	4,900	4,712
Fountain Plaza-Special Events Stations (CBD)	5,954	4,639	5,983
Total LRT Ridership	15,186	15,031	15,349
LRT trips in downtown free-fare zone (FY2018 directional station boarding/alighting counts, reflects usage of LRT as circulator)	2,092	1,038	1,948
Park-and-Ride Linked Trips (2013 NFTA survey adjusted to FY2018 Counts, indicates strength of PNR market)			
Trips Using LRT	1,364		1,355
Bus-Only Trips	461		504
All Transit Trips	1,825		1,859
Corridor and non-corridor bus route ridership (FY2018 NFTA ridership counts, indicates market potential for transit in corridor)			
Route 34	1,159	1,762	1,159
Route 35	597	1,053	596
Route 44	633	1,671	630
Route 49	227	862	229
All Corridor Routes	2,616	5,348	2,613
Non-Corridor Routes	67,982	62,441	67,607
All Bus Routes	70,598	67,789	70,220
NFTA linked transit trips by purpose (2013 NFTA survey adjusted to FY2018 Counts, indicates relative size purpose-specific markets)			
Home-Based Work	23,024		22,145
Home-Based Other	26,125		28,320
Non-Home-Based	12,324		13,197
Total	61,473		63,663
NFTA linked transit trips by autos owned (2013 NFTA survey adjusted to FY2018 Counts, indicates number of transit dependent riders)			
0 car households	40,217		40,321
1 car households	14,291		16,180
2+ car households	6,966		7,162
TOTAL	61,474		63,663

Source: STOPS Model Results

## G.2 PROPOSED ACTION

The Proposed Action would operate as an extension of the existing NFTA Metro Rail line that currently terminates at University Station. All trips that currently begin or end at University Station would be extended northward along Kenmore Avenue, Niagara Falls Boulevard, Maple Road, Sweet Home Road, and through the North Campus of the University at Buffalo to a new terminal station at Audubon Parkway and I-990/Dodge Road. Park & ride facilities are assumed to be constructed at Boulevard Mall and I-990/Dodge Road.

The Proposed Action assumes that some UB shuttle bus services would be terminated and users of these services would, for the most part, shift over to the new LRT service. Terminated services include:

- UB Stampede (Blue Line, Main Circle to/from Flint Circle and Ellicott)
- UB Stampede North-South Express (Yellow Line, Main Circle to/from Flint Circle with stops at Maynard, Service Center Road, and Goodyear Residence Hall<sup>4</sup>)

Other UB shuttle services would remain in operation including the Lee-Ellicott Express (Red Line), and the North Campus Shuttle.

Figure G-7 presents a map of the proposed LRT extension. Table G-10 presents station-specific running times for the Proposed Action. Table G-11 presents peak and off-peak frequencies for trips from University Station to local stops and to UB Flint Circle (which is served today by both Stampede Local and Express services). Both tables provide a comparison to the existing UB Stampede service which is the principal transit service for this market at the present time. As these tables show, the LRT is slightly faster than the UB Stampede between Main Circle and Flint Circle but provides a substantial time advantage between Flint Circle and the Student Center due, in part, to its direct routing through the UB North Campus.

Existing bus services provide significantly more frequent services than the proposed LRT service for trips between the UB North and South Campuses.

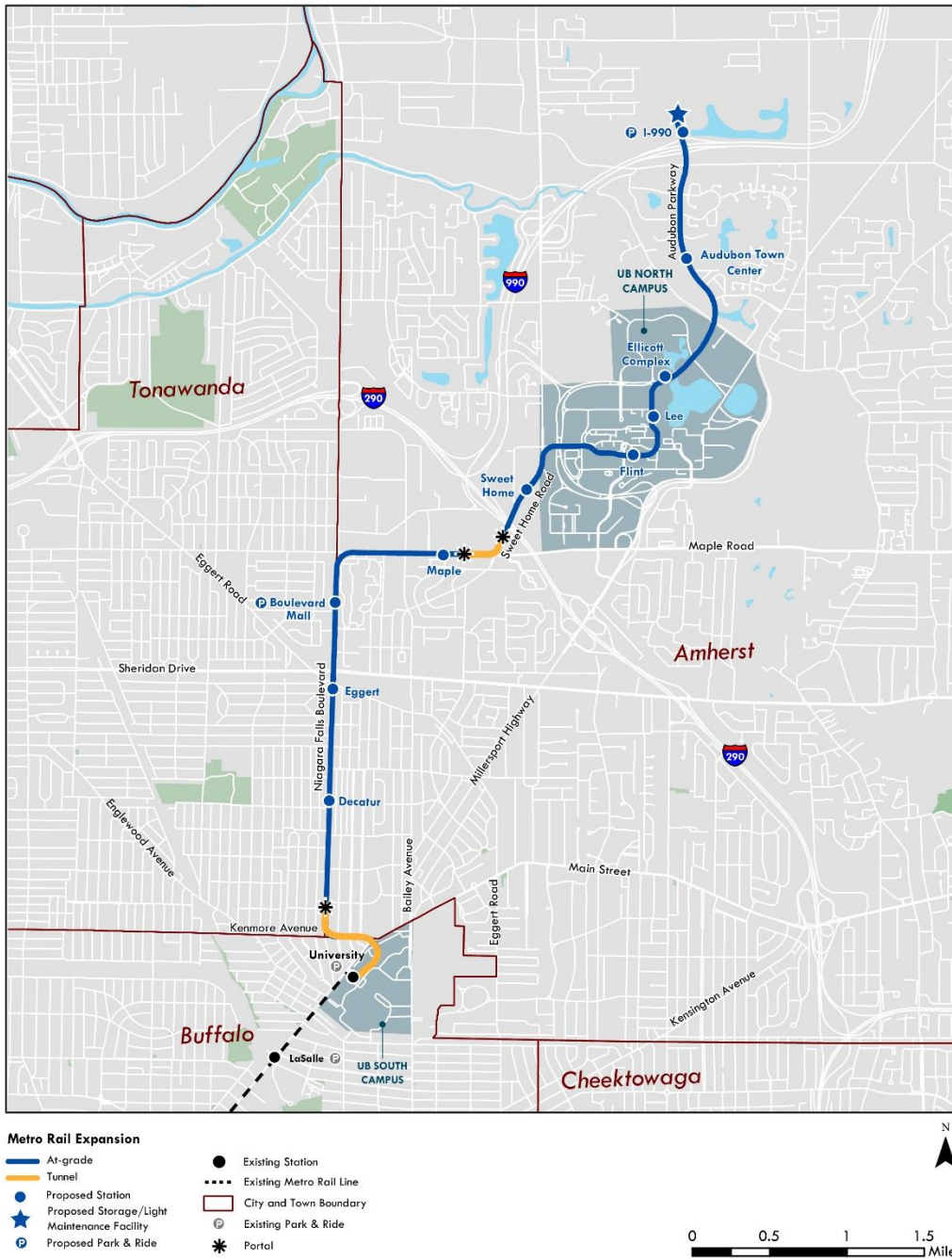
The Proposed Action was modeled with and without a station on Niagara Falls Boulevard at Eggert Road. The Eggert Station was added in response to Scoping comments requesting an additional stop on Niagara Falls Boulevard. With the Eggert Station, riders beginning or ending their journeys in the vicinity of Eggert Road would have easier access to the LRT system, but the end-to-end running time for the LRT would be slightly longer due to the time required to decelerate, dwell, and accelerate in order to make this additional station stop.

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<sup>4</sup>

Stop at Goodyear is made in the southbound direction only

**Figure G-7. Proposed Action**



**Table G-10. Cumulative Times to New Stations from University Station (minutes) Compared to Existing UB Stampede Service**

Station	Stampede <sup>5</sup>	Proposed Action Without Eggert	Proposed Action With Eggert
University Station	0.00	0.00	0.00
Decatur		3.28	3.28
Eggert			5.47
Boulevard Mall		6.26	7.22
Maple Ridge		8.57	9.53
Sweet Home		10.65	11.61
University at Buffalo A (Flint Loop)	15.00 <sup>6</sup>	13.11	14.07
University at Buffalo B (Student Center).	25.00	14.70	15.66
Ellicott Complex	33.00	16.07	17.03
Audubon		18.31	19.26
I-990/DODGE		19.74	20.70

Source: Stampede Fall 2018 Schedules and WSP

<sup>5</sup> Service provided by UB Stampede Blue Line service only unless otherwise noted

<sup>6</sup> Service provided by UB Stampede Blue and Yellow Lines.

**Table G-11. Service Frequencies (minutes) Compared to Existing UB Stampede Services**

Period	Stampede	LRT Extension Without Eggert	LRT Extension With Eggert
To All Blue Line Stops			
AM Peak (8:00-9:00 AM)	6:00	10:00	10:00
MIDDAY (1:00-2:00 PM)	6:00	12:00	12:00
MAIN CIRCLE TO FLINT CIRCLE (LOCAL + EXPRESS, COMBINED SERVICE)			
AM PEAK (8:00-9:00 AM)	2.70	10:00	10:00
MIDDAY (1:00-2:00 PM)	2.70	12:00	12:00

Source: Fall 2018 Stampede and NFTA Schedules

### G.3 RIDERSHIP FORECASTS

This section presents ridership forecasts for each the Proposed Action with and without the Eggert Station for two forecast years:

- If the project had been constructed in 2018. This “current year” forecast is used by the FTA to understand how the project serves existing markets that are observable today. FTA procedures weight current year forecasts more heavily than future year forecasts since demographic growth assumptions add uncertainty to forecasts of project ridership.
  - Forecasts for the project if it were built in 2040. This is a forward-looking projection of ridership and includes the impact that future development will have on project ridership.

#### G.3.1 Overview

Project forecasts begin with an assessment of the potential markets that would be served by the Proposed Action. Figure G-8 shows the geographic areas represented by the different market areas discussed in this section. Table G-12 presents the results of this assessment of the ridership forecasts.

The largest market to be served by the Proposed Action is currently served by the UB Stampede Bus. As noted in section G.2, the Proposed Action service between the UB North and South campuses is slightly faster than the current bus. However, the Proposed Action would operate on 10-minute peak and 12-minute off-peak headways, which is less frequent than the current bus service which consists of 2 different routes operating on a combined 3-minute headway. The current Stampede ridership for the UB North and South campus market is approximately 5,300 (excluding the demand that transfers from NFTA bus and LRT services). Essentially all of these riders would divert to the Proposed Action when this service is implemented, and the North/South Stampede services would be terminated. Enrollment at UB is assumed to be stable over time so this market is not expected to grow materially into the future. If UB restructures academic program locations or residence locations, this market could change in size and could grow smaller or larger depending on the nature of UB’s future plans.

The next largest market is for circulation travel within the UB North campus. Of the various sub-markets that are included, the Proposed Action would offer a superior service for over 2,300 students

who currently use the Stampede to travel from Ellicott to the Flint Circle and Natural Sciences Complex. With the Proposed Action, this market is expected to grow to between 2,800 and 3,300 trips. The Proposed Action would offer a much more direct trip than the bus leading to the growth in transit demand.

For the Ellicott-to-Lee Circle market, the Proposed Action attracts a smaller proportion of Stampede riders. Today, this service is offered by the Red Line, which is assumed to continue to operate even with the Proposed Action. This line connects the Ellicott tunnel (a covered platform attached to the Ellicott Dorms) and provides direct, 6-minute frequency service to Lee Circle. The location of the Ellicott bus stop is much closer to student residential housing than the proposed Ellicott Complex station and service would be much more frequent resulting in two-thirds of all students choosing the bus over the Metro Rail for this very short circulation trip.

The other UB North Campus circulation markets would not be served by the Proposed Action and, consequently, attract few of these riders.

The next largest market consists of walk-access transit trips that use NFTA today to travel to, from, and within the Proposed Action corridor. Based on survey data and ridership counts, this market currently consists of approximately 4,500 transit trips. In the future, the Proposed Action would attract 2,900 to 3,500 of these trips through a combination of growing the transit market in this area and diverting existing bus trips to the Metro Rail. This market consists of trips with one or both trip-ends in the Proposed Action corridor. The other trip ends are distributed broadly across the area, much like the survey market is today.

Finally, the Proposed Action would attract 800 to 900 corridor park & ride (PNR) trips and 300 to 400 out-of-corridor PNR trips. Of these, 430 to 470 cars would park at the proposed Boulevard Mall park & ride facility (860 to 940 trips) and about 90 cars would park at the proposed I-990 park & ride facility (180 trips). A small number of PNR trips would park at existing Metro Rail and bus parking lots and travel outbound on the project and then transfer to a bus to the final destination accounting for the balance of project PNR trips.

The result of these markets together is total Proposed Action ridership that ranges from 13,000 to 14,200 weekday linked transit trips d.

### **G.3.2 Detailed Forecast Statistics**

This section presents detailed estimates of unlinked and linked ridership for each forecast year. These data are as follows:

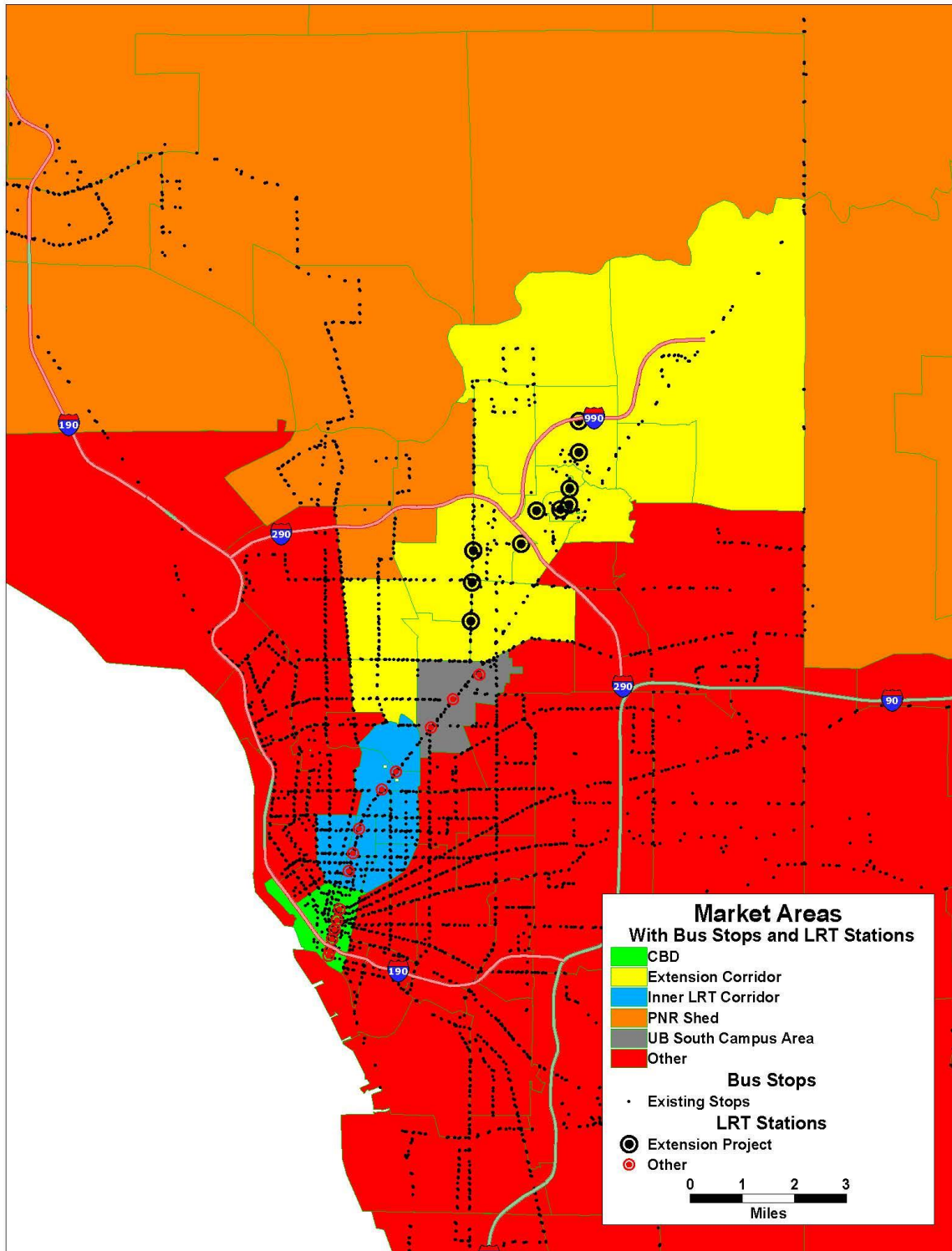
- Table G-13 presents weekday<sup>7</sup> unlinked trips by LRT boarding station. This table includes all boardings, independent of access mode. A similar number of station exits would also occur at each station.

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<sup>7</sup> All weekday estimates of linked and unlinked trips represents a typical weekday when UB is in session. Project ridership on weekdays when UB is not in session will be lower by up to 8,000 to 9,000 passengers per day.

- Table G-14 presents weekday unlinked PNR trips by boarding station. The number of parked vehicles is similar to this number but might be slightly less if the vehicle occupancy for PNR trips is significantly greater than 1.0.
- Table G-15 presents weekday linked transit trips by trip purpose and auto-ownership. Table G-16 shows the incremental weekday linked transit trips as compared to the No Action condition. Incremental linked transit trips are also sometimes called “new” riders. Forecasting results show that the project will add 2,200 to 2,600 new daily transit trips to the system each day.
- Table G-17 presents linked transit trips-on-project and is a key element of the FTA mobility measure. The Proposed Action would attract 13,000 to 14,200 daily project trips. Of these, approximately half are made by residents of 0-car households. Trips by zero-car households are more heavily weighted by FTA in evaluating project mobility benefits.
- Table G-18 presents weekday automobile travel impacts. Both person-miles and vehicle-miles saved per day are reported.

Figure G-8. Proposed Action Market Areas





**Table G-12. Weekday Linked Trips-on-Project by Market Compared to Existing Transit Market Size**

Market	Existing Condition (2018)	Proposed Action Without Eggert (2018)	Proposed Action With Eggert (2018)	No Action Condition (2040)	Proposed Action Without Eggert (2040)
<b>Diversion from UB Stampede (excludes transfers from NFTA which is included in next section)</b>					
North Campus to/from South Campus	5,291	5,109	5,022	5,127	5,038
Ellicott to/from Flint/Natural Sciences	2,251	2,804	2,852	3,206	3,262
Ellicott to/from Lee Circle	1,563	410	404	462	455
Other Intra-North Campus	1,314	57	56	75	72
Subtotal	10,419	8,380	8,334	8,870	8,827
<b>NFTA Walk-to-Transit Market</b>					
Within Extension Corridor	379	273	314	292	341
Extension Corridor-CBD	245	339	361	405	431
Extension Corridor-Inner LRT Corridor	405	279	293	343	363
Extension Corridor-UB South Campus	159	177	200	189	216
Extension Corridor to other parts of region	998	412	454	444	486
CBD-Extension Corridor	322	73	74	96	97
Inner LRT Corridor-Extension Corridor	248	334	343	380	391
UB South Campus-Extension Corridor	333	273	286	309	321
Other Parts of Region-Extension Corridor	1,410	712	782	777	850
Subtotal	4,499	2,873	3,107	3,236	3,497
<b>NFTA PNR Market</b>					
Within Extension Corridor	4	39	42	41	43
Project PNR Shed-Inner LRT Corridor	-	77	84	73	80
Extension Corridor-CBD	477	215	206	260	252
Project PNR Shed-CBD	35	218	205	229	212
Extension Corridor-Inner LRT Corridor	132	58	55	77	71
Project PNR Shed-Inner LRT Corridor	7	48	47	55	55
Extension Corridor-UB South Campus	-	26	24	28	25
Project PNR Shed to UB South Campus	-	55	59	60	67
UB South Campus-Extension Corridor	4	8	9	8	9
Other Parts of Region-Extension Corridor	-	77	84	73	80
Subtotal	659	820	814	904	892
<b>NFTA KNR Market</b>					
		379	381	444	445
<b>Project Trips not to/from corridor</b>					
Walk Access		160	194	176	213
PNR		373	367	350	345
<b>TOTAL</b>		<b>12,985</b>	<b>13,197</b>	<b>13,980</b>	<b>14,219</b>

Source: STOPS Model Runs

**Table G-13. Weekday Total (All Access Modes) Boardings by Metro Rail Station (2018 and 2040)**

Station	Existing Condition (2018)	Proposed Action Without Eggert (2018)	Proposed Action With Eggert (2018)	No Action Condition (2040)	Proposed Action Without Eggert (2040)	Proposed Action With Eggert (2040)
Special Events	117	120	120	140	144	144
Erie Canal Harbor	851	884	884	1,011	1,050	1,049
Seneca	504	519	522	655	676	678
Church Street	1,548	1,605	1,609	1,915	1,982	1,984
Lafayette	1,474	1,560	1,564	1,803	1,898	1,903
Fountain Plaza	1,490	1,550	1,555	1,872	1,940	1,946
Allen-Medical Campus	1,136	1,198	1,203	1,591	1,670	1,677
Summer-Best	777	815	817	971	1,014	1,018
Utica	1,500	1,586	1,592	1,745	1,838	1,844
Delavan-Canisius College	685	762	764	810	893	896
Humboldt	558	615	621	621	683	689
Amherst	1,121	1,285	1,301	1,258	1,435	1,453
LaSalle	897	987	998	1,005	1,116	1,123
University Station	2,699	4,550	4,537	3,062	4,814	4,804
Decatur	-	690	472	-	794	546
Eggert	-	-	501	-	-	553
Boulevard Mall	-	983	950	-	1,075	1,040
Maple Ridge	-	228	144	-	250	160
Sweet Home	-	72	72	-	70	68
University at Buffalo A (Flint Loop)	-	3,196	3,192	-	3,458	3,456
University at Buffalo B (Student Center).	-	893	882	-	928	914
Ellicott Complex	-	1,953	1,968	-	2,144	2,162
Audubon	-	124	124	-	143	142
I-990/Dodge	-	180	175	-	195	189
<b>Subtotal Project Stations</b>	<b>-</b>	<b>8,319</b>	<b>8,480</b>	<b>-</b>	<b>9,057</b>	<b>9,230</b>
<b>TOTAL</b>	<b>15,357</b>	<b>26,355</b>	<b>26,567</b>	<b>18,459</b>	<b>30,210</b>	<b>30,438</b>

Source: STOPS Model Runs

**Table G-14. Weekday Park-Ride Access Boardings by Metro Rail Station (2018 and 2040)**

Station	Existing Condition (2018)	Proposed Action Without Eggert (2018)	Proposed Action With Eggert (2018)	No Action Condition (2040)	Proposed Action Without Eggert (2040)	Proposed Action With Eggert (2040)
Special Events	-	-	-	-	-	-
Erie Canal Harbor	-	-	-	-	-	-
Seneca	-	-	-	-	-	-
Church Street	-	-	-	-	-	-
Lafayette	-	-	-	-	-	-
Fountain Plaza	-	-	-	-	-	-
Allen-Medical Campus	-	-	-	-	-	-
Summer-Best	-	-	-	-	-	-
Utica	-	-	-	-	-	-
Delavan-Canisius College	-	-	-	-	-	-
Humboldt	-	-	-	-	-	-
Amherst	-	-	-	-	-	-
LaSalle	218	195	197	208	190	188
University Station	458	258	273	475	247	262
Decatur	-	-	-	-	-	-
Eggert	-	-	-	-	-	-
Boulevard Mall	-	440	427	-	472	456
Maple Ridge	-	-	-	-	-	-
Sweet Home	-	-	-	-	-	-
University at Buffalo A (Flint Loop)	-	-	-	-	-	-
University at Buffalo B (Student Center).	-	-	-	-	-	-
Ellicott Complex	-	-	-	-	-	-
Audubon	-	-	-	-	-	-
I-990/Dodge	-	93	90	-	94	90
<b>Subtotal Project Stations</b>	-	<b>533</b>	<b>517</b>	-	<b>566</b>	<b>546</b>
<b>TOTAL</b>	<b>676</b>	<b>986</b>	<b>987</b>	<b>683</b>	<b>1,003</b>	<b>996</b>

Source: STOPS Model Runs

**Table G-15. Weekday Linked Transit Trips (2018 and 2040)**

Purpose/Auto Ownership	Existing Condition (2018)	Proposed Action Without Eggert (2018)	Proposed Action With Eggert (2018)	No Action Condition (2040)	Proposed Action Without Eggert (2040)	Proposed Action With Eggert (2040)
<b>Home-Based Work</b>						
0 car	13,239	13,455	13,478	15,408	15,649	15,674
1 car	6,175	6,416	6,434	7,197	7,460	7,475
2+ car	2,838	3,162	3,170	3,245	3,592	3,599
<b>Total</b>	<b>22,252</b>	<b>23,033</b>	<b>23,082</b>	<b>25,850</b>	<b>26,701</b>	<b>26,748</b>
<b>Home-Based Other</b>						
0 car	18,664	19,093	19,142	22,032	22,505	22,561
1 car	6,998	7,180	7,195	8,231	8,432	8,448
2+ car	2,938	3,198	3,208	3,401	3,684	3,694
<b>Total</b>	<b>28,600</b>	<b>29,471</b>	<b>29,545</b>	<b>33,664</b>	<b>34,621</b>	<b>34,703</b>
<b>Non-Home Based</b>						
0 car	8,552	8,731	8,746	10,342	10,533	10,551
1 car	3,174	3,263	3,269	3,852	3,949	3,956
2+ car	1,588	1,641	1,645	1,861	1,915	1,919
<b>Total</b>	<b>13,314</b>	<b>13,635</b>	<b>13,660</b>	<b>16,055</b>	<b>16,397</b>	<b>16,426</b>
<b>UB Shuttle</b>						
0 car	5,100	5,234	5,231	5,460	5,621	5,620
1 car	3,406	3,519	3,492	3,633	3,769	3,741
2+ car	1,914	2,008	1,990	2,045	2,155	2,136
<b>Total</b>	<b>10,420</b>	<b>10,761</b>	<b>10,713</b>	<b>11,138</b>	<b>11,545</b>	<b>11,497</b>
<b>All Purposes</b>						
0 car	45,555	46,513	46,597	53,242	54,308	54,406
1 car	19,753	20,378	20,390	22,913	23,610	23,620
2+ car	9,278	10,009	10,013	10,552	11,346	11,348
<b>Total</b>	<b>74,586</b>	<b>76,900</b>	<b>77,000</b>	<b>86,707</b>	<b>89,264</b>	<b>89,374</b>

Source: STOPS Model Runs

**Table G-16. Weekday Incremental Linked Transit Trips (2018 and 2040)**

Purpose/Auto Ownership	Existing Condition (2018)	Proposed Action Without Eggert (2018)	Proposed Action With Eggert (2018)	No Action Condition (2040)	Proposed Action Without Eggert (2040)	Proposed Action With Eggert (2040)
Home-Based Work						
0 car	-	216	239	-	241	266
1 car	-	241	259	-	263	278
2+ car	-	324	332	-	347	354
Total	-	781	830	-	851	898
Home-Based Other						
0 car	-	429	478	-	473	529
1 car	-	182	197	-	201	217
2+ car	-	260	270	-	283	293
Total	-	871	945	-	957	1,039
Non-Home Based						
0 car	-	179	194	-	191	209
1 car	-	89	95	-	97	104
2+ car	-	53	57	-	54	58
Total	-	321	346	-	342	371
UB Shuttle						
0 car	-	134	131	-	161	160
1 car	-	113	86	-	136	108
2+ car	-	94	76	-	110	91
Total	-	341	293	-	407	359
All Purposes						
0 car	-	958	1,042	-	1,066	1,164
1 car	-	625	637	-	697	707
2+ car	-	731	735	-	794	796
Total	-	2,314	2,414	-	2,557	2,667

Source: STOPS Model Runs

**Table G-17. Weekday Linked Project Transit Trips (2018 and 2040)**

Purpose/Auto Ownership	Existing Condition (2018)	Proposed Action Without Eggert (2018)	Proposed Action With Eggert (2018)	No Action Condition (2040)	Proposed Action Without Eggert (2040)	Proposed Action With Eggert (2040)
Home-Based Work						
0 car	-	902	964	-	1,016	1,085
1 car	-	601	633	-	668	698
2+ car	-	781	793	-	845	856
Total	-	2,284	2,390	-	2,529	2,639
Home-Based Other						
0 car	-	861	943	-	967	1,058
1 car	-	364	386	-	411	435
2+ car	-	498	511	-	546	559
Total	-	1,723	1,840	-	1,924	2,052
Non-Home Based						
0 car	-	351	375	-	391	418
1 car	-	144	152	-	162	171
2+ car	-	97	102	-	105	111
Total	-	592	629	-	658	700
UB Shuttle						
0 car	-	4,037	4,036	-	4,271	4,273
1 car	-	2,778	2,752	-	2,935	2,909
2+ car	-	1,568	1,551	-	1,663	1,645
Total	-	8,383	8,339	-	8,869	8,827
All Purposes						
0 car	-	6,151	6,318	-	6,645	6,834
1 car	-	3,887	3,923	-	4,176	4,213
2+ car	-	2,944	2,957	-	3,159	3,171
Total	-	12,982	13,198	-	13,980	14,218

Source: STOPS Model Runs

**Table G-18. Weekday Automobile Travel Impacts (2018 and 2040)**

Automobile Impact Statistic	Existing Condition (2018)	Proposed Action Without Eggert (2018)	Proposed Action With Eggert (2018)	No Action Condition (2040)	Proposed Action Without Eggert (2040)	Proposed Action With Eggert (2040)
Change in Automobile Person-Miles (vs. No Action)	-	(14,755)	(15,454)	-	(16,444)	(17,154)
Change in Automobile Vehicle-Miles (vs. No Action)	-	(13,414)	(14,049)	-	(14,949)	(15,595)

Source: STOPS Model Runs